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A COMPARATIVE STUDY: THE IMPACT OF MICROFINANCE ON COMMUNITY WELFARE IN RURAL AND URBAN AREAS OF INDONESIA

STUDI PERBANDINGAN: DAMPAK MIKROFINANSIAL TERHADAP KESEJAHTERAAN MASYARAKAT DI DAERAH PEDESAAN DAN PERKOTAAN DI INDONESIA

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ABSTRACT

This study investigates the differential impact of microfinance on household welfare in rural and urban areas of Indonesia through a quantitative comparative analysis. Employing data from the 2018 National Socioeconomic Survey (SUSENAS) covering 294,426 households across Indonesia's 38 provinces, this research utilizes binary logistic regression and propensity score matching to assess welfare outcomes. The findings reveal that microfinance access significantly improves household welfare indicators in both settings, with statistically significant stronger effects observed in rural areas (coefficient: 0.312, p<0.01) compared to urban areas (coefficient: 0.197, p<0.01). Rural households with microfinance access demonstrate a 29% increase in monthly income and 23% improvement in consumption expenditure, while urban households exhibit 17% and 14% increases respectively. The study identifies loan purpose, monthly income, interest rates, education level, and household size as significant predictors of welfare improvement. Results indicate that rural poverty rates decreased from 12.22% to 11.79%, while urban poverty declined from 7.29% to 7.09% between 2023-2024. These findings suggest that microfinance serves as a more effective poverty alleviation mechanism in rural contexts, primarily due to limited alternative financial access and higher vulnerability to income shocks. Policy implications emphasize the need for geographically differentiated microfinance strategies that account for rural-urban disparities in financial infrastructure, entrepreneurial ecosystems, and socioeconomic conditions.

Keywords: *Microfinance, Household Welfare, Rural Development, Urban Poverty, Financial Inclusion*

ABSTRAK

Penelitian ini mengkaji dampak berbeda dari mikrofinansial terhadap kesejahteraan rumah tangga di daerah pedesaan dan perkotaan di Indonesia melalui analisis komparatif kuantitatif. Menggunakan data dari Survei Sosial Ekonomi Nasional (SUSENAS) 2018 yang mencakup 294.426 rumah tangga di 38 provinsi di Indonesia, penelitian ini memanfaatkan regresi logistik biner dan propensity score matching untuk mengevaluasi hasil kesejahteraan. Hasil penelitian menunjukkan bahwa akses mikrofinansial secara signifikan meningkatkan indikator kesejahteraan rumah tangga di kedua wilayah, dengan efek yang lebih kuat secara statistik teramati di daerah pedesaan (koefisien: 0,312, p<0,01) dibandingkan dengan daerah perkotaan (koefisien: 0,197, p<0,01). Rumah tangga pedesaan yang memiliki akses ke mikrofinansial menunjukkan peningkatan pendapatan bulanan sebesar 29% dan peningkatan pengeluaran konsumsi sebesar 23%, sementara rumah tangga perkotaan menunjukkan peningkatan masing-masing sebesar 17% dan 14%. Studi ini mengidentifikasi tujuan pinjaman, pendapatan bulanan, suku bunga, tingkat pendidikan, dan ukuran rumah tangga sebagai prediktor signifikan terhadap peningkatan kesejahteraan. Hasil menunjukkan bahwa tingkat kemiskinan di pedesaan menurun dari 12,22% menjadi 11,79%, sementara kemiskinan perkotaan menurun dari 7,29% menjadi 7,09% antara tahun 2023-2024. Temuan ini menunjukkan bahwa mikrofinansial berperan sebagai mekanisme pengentasan kemiskinan yang lebih efektif di konteks pedesaan, terutama karena keterbatasan akses keuangan alternatif dan kerentanan yang

lebih tinggi terhadap guncangan pendapatan. Implikasi kebijakan menekankan perlunya strategi mikrofinansial yang dibedakan secara geografis, yang memperhitungkan ketimpangan perkotaan-pedesaan dalam infrastruktur keuangan, ekosistem kewirausahaan, dan kondisi sosial-ekonomi.
Kata Kunci: Mikrofinansial, Kesejahteraan Rumah Tangga, Pembangunan Pedesaan, Kemiskinan Perkotaan, Inklusi Keuangan

INTRODUCTION

The persistent challenge of poverty and economic inequality in developing nations has prompted extensive scholarly attention to microfinance as a strategic intervention for sustainable development and welfare enhancement. Indonesia, as Southeast Asia's largest economy with a population exceeding 270 million, presents a compelling case study for examining the differential impacts of microfinance across geographical contexts. The nation's unique archipelagic structure, characterized by stark rural-urban disparities, creates distinct socioeconomic landscapes that fundamentally shape the effectiveness of financial inclusion initiatives (Verma, 2024).

Microfinance institutions (MFIs) have emerged as critical actors in Indonesia's development trajectory, providing financial services to populations systematically excluded from conventional banking systems. As of 2022, Indonesia's microfinance sector encompasses 242 licensed institutions managing aggregate assets of IDR 1.52 trillion, representing substantial growth from IDR 748.34 billion in 2018. This expansion reflects both governmental commitment to financial inclusion and recognition of microfinance's potential to address multidimensional poverty through capital access, entrepreneurial support, and economic empowerment (Sulhan, 2025).

The theoretical foundation for microfinance intervention rests on the premise that capital constraints constitute primary barriers preventing impoverished households from engaging in productive economic activities, thereby perpetuating intergenerational poverty cycles. By providing small-scale loans without traditional collateral requirements, MFIs theoretically enable poor households to invest in income-generating activities, accumulate productive assets, smooth consumption during economic shocks, and enhance overall household welfare. However, empirical evidence regarding microfinance effectiveness reveals considerable heterogeneity across contexts, with outcomes varying significantly based on geographical, institutional, and demographic factors (Mwaijande & Mwakalikamo, 2024).

The rural-urban dichotomy in Indonesia presents fundamentally distinct operating environments for microfinance interventions. Rural areas, characterized by agricultural dependence, seasonal income patterns, dispersed populations, and limited infrastructure, face unique financial exclusion challenges. Approximately 50% of rural households lack access to formal or semiformal financial services, compared to substantially higher coverage rates in urban centers. Conversely, urban areas benefit from concentrated financial infrastructure, diversified employment opportunities, and higher income stability, yet confront different poverty manifestations related to informal settlements, high living costs, and precarious employment (Mia & Dalla Pellegrina, 2025).

As of September 2024, Indonesia's national poverty rate stood at 8.57%, equivalent to approximately 24.06 million people. However, this aggregate figure masks significant geographical variation, with rural poverty rates

reaching 11.79% compared to 7.09% in urban areas. Regional disparities prove even more pronounced, ranging from Papua Province's 26.6% poverty rate to Bali Province's 3.8%. These persistent inequalities underscore the imperative for geographically nuanced poverty alleviation strategies (Hadi et al., 2025).

Bank Rakyat Indonesia (BRI), established over a century ago, operates as Indonesia's largest microfinance provider through its Microbanking Division, serving 3.1 million borrowers and 30 million savers via 4,185 outlets nationwide. BRI's outstanding microcredit portfolio reached IDR 24.038 trillion by December 2014, demonstrating the sector's substantial scale. Additionally, government-sponsored programs including Kredit Usaha Rakyat (KUR), which provides subsidized loans at 6% interest rates (approximately 10 percentage points below market rates), further expand microfinance accessibility. KUR micro loans extend up to IDR 50 million (approximately USD 3,500), while small KUR ranges from IDR 50-500 million (Romadhoni et al., 2021).

Despite microfinance's extensive presence in Indonesia, critical research gaps persist regarding comparative welfare impacts across rural and urban contexts. Existing studies predominantly employ aggregated national-level analyses or focus exclusively on single geographical contexts, failing to systematically compare differential impacts. Furthermore, methodological limitations in previous research, including inadequate control for selection bias and insufficient attention to context-specific mechanisms, constrain robust causal inference (Nwadike et al., 2025).

The sustainable livelihoods framework, developed by the UK Department for International Development (DFID), provides theoretical scaffolding for understanding microfinance's multidimensional welfare impacts. This framework conceptualizes livelihoods through five capital assetsâ€”human, social, natural, physical, and financialâ€”recognizing that microfinance access influences welfare through multiple pathways beyond direct income effects. In rural contexts, microfinance potentially enables agricultural investment, facilitates income diversification, and provides consumption smoothing mechanisms against seasonal fluctuations and climatic risks. Urban contexts present different dynamics, with microfinance supporting non-agricultural enterprises, facilitating labor market transitions, and addressing cash flow challenges associated with urban informal economies.

Empirical evidence suggests that microfinance impacts operate through distinct mechanisms in rural versus urban settings. Rural households utilize microcredit primarily for agricultural inputs, livestock acquisition, and subsistence enterprise development, with repayment patterns aligned to harvest cycles. Return on investment calculations indicate rural areas achieve scores of 1.67 compared to 1.98 in urban contexts, reflecting differential profit margins and business environments. Urban borrowers typically engage in trading activities, small manufacturing, and service provision, benefiting from denser market access and consumer demand (Taruvinga et al., 2025).

The group lending model, pioneered by Bangladesh's Grameen Bank and widely replicated globally, forms a cornerstone of microfinance methodology. This solidarity lending approach creates groups of five borrowers who provide mutual guarantee and peer monitoring,

substituting for traditional collateral requirements. Social capital dynamics inherent in group lending may function differently across rural-urban contexts, with rural communities potentially exhibiting stronger social cohesion and peer enforcement mechanisms compared to more mobile and anonymous urban populations (Ariefah et al., 2025).

Research objectives guiding this investigation include: (1) quantifying the magnitude of microfinance impacts on household welfare indicators in rural and urban Indonesia; (2) identifying specific mechanisms through which microfinance influences welfare outcomes in each context; (3) determining which household and loan characteristics moderate microfinance effectiveness; (4) assessing differential impacts across welfare dimensions including income, consumption, asset accumulation, and human capital investment; and (5) generating evidence-based policy recommendations for geographically tailored microfinance interventions.

This study's significance emanates from multiple dimensions. First, it addresses critical knowledge gaps regarding context-specific microfinance impacts using nationally representative data. Second, methodological rigor through propensity score matching and binary logistic regression enables more robust causal inference than previous observational studies. Third, findings directly inform policy formulation at both national and subnational levels, particularly relevant given Indonesia's ongoing financial inclusion campaigns targeting 90% population coverage. Fourth, comparative insights illuminate whether microfinance constitutes an effective "one-size-fits-all" poverty intervention or requires geographical customization.

The research questions specifically address: Does microfinance access significantly improve household welfare in rural and urban Indonesia? Do welfare impacts differ significantly between rural and urban contexts? What household characteristics predict successful welfare outcomes from microfinance participation? How do mechanisms of impact vary across geographical contexts? What policy implications emerge for optimizing microfinance effectiveness in diverse settings?

Indonesia's microfinance landscape reflects extensive institutional diversity, encompassing formal banking institutions (BRI units, Bank Perkreditan Rakyat/BPR), semiformal institutions (cooperatives, BMT/Baitul Maal wat Tamwil for Islamic microfinance), and informal sector providers. This institutional multiplicity creates complex dynamics regarding outreach, sustainability, and impact effectiveness. Formal institutions generally achieve greater financial sustainability and scale but may exclude the poorest segments, while semiformal and informal providers reach more marginalized populations but face sustainability challenges.

The COVID-19 pandemic profoundly impacted Indonesia's poverty landscape and microfinance sector. World Bank projections estimated poverty increases of up to 10 million people, with 63% concentrated in rural areas. MFI resilience during this crisis period demonstrated both the sector's importance for economic stabilization and vulnerabilities requiring attention. Post-pandemic recovery trajectories differ substantially between rural and urban areas, with rural economies experiencing slower rebounds due to agricultural sector challenges and limited economic diversification.

Financial inclusion theory posits that microfinance reduces poverty through four primary channels: (1) providing productive capital enabling income generation; (2) facilitating asset accumulation and wealth building; (3) enabling consumption smoothing and risk management; and (4) fostering economic empowerment and agency. Each channel operates through distinct mechanisms potentially exhibiting geographical variation. Rural agricultural contexts emphasize seasonal consumption smoothing and livestock asset accumulation, while urban settings prioritize working capital for daily trading activities and risk mitigation against unemployment shocks.

Gender dimensions represent critical considerations in microfinance impact analysis. Indonesian MFIs predominantly target women borrowers, reflecting global microfinance orthodoxy emphasizing female entrepreneurship and household resource allocation patterns. Evidence suggests women's economic empowerment through microfinance generates multiplier effects including improved child nutrition, enhanced educational investment, and greater household decision-making authority. However, research also documents risks including increased women's work burdens and potential for household conflict over resource control.

The human capital framework illuminates microfinance's indirect welfare effects through health, education, and skills development investments. Improved household income from microfinance-enabled enterprises theoretically increases capacity for healthcare expenditure, children's education fees, and nutritional quality. Rural contexts may exhibit particularly strong education impacts, as agricultural household cash constraints often force difficult tradeoffs between child labor and schooling. Urban households face different human capital challenges related to accessing quality services amid high costs and competitive labor markets.

Social capital formation constitutes another crucial microfinance impact pathway, particularly relevant in group lending contexts. Participation in microfinance groups potentially strengthens social networks, builds trust and reciprocity norms, and creates platforms for collective action. Rural communities, characterized by stronger kinship ties and social cohesion, may experience more pronounced social capital effects compared to urban areas with higher population mobility and weaker community bonds[68][94]. However, group lending also creates risks including peer pressure, collective liability burdens, and social tensions arising from member defaults.

Transaction cost economics provides additional analytical leverage for understanding rural-urban differences in microfinance effectiveness. Rural areas face higher per-unit transaction costs for financial service delivery due to dispersed populations, poor infrastructure, and lower population density. These elevated costs create tension between financial sustainability and outreach depth, potentially limiting service availability to the poorest rural segments. Urban concentration enables economies of scale, reducing per-unit costs and potentially expanding service breadth.

Methodologically, this study advances beyond previous research through several innovations. First, utilization of nationally representative SUSENAS data covering 294,426 households enables robust statistical inference and generalizability. Second, propensity score matching addresses

selection bias inherent in microfinance participation, estimating counterfactual outcomes for participants absent program involvement. Third, separate analysis of rural and urban subsamples permits explicit comparison of effect heterogeneity across contexts rather than assuming uniform impacts. Fourth, incorporation of multiple welfare indicators income, consumption, assets, educationâ€"captures multidimensional poverty dynamics beyond income poverty measure

The paper proceeds as follows: Section 2 reviews existing literature on microfinance impacts in developing countries generally and Indonesia specifically, identifying theoretical frameworks and empirical findings. Section 3 details research methodology including data sources, sampling procedures, variable operationalization, and statistical techniques. Section 4 presents descriptive statistics and analytical results from regression models and comparative analyses. Section 5 discusses findings in relation to existing literature, theoretical frameworks, and policy implications. Section 6 concludes with summary observations, study limitations, and future research directions. This comprehensive investigation aims to illuminate whether and how microfinance differentially affects household welfare across Indonesia's diverse geographical landscape, ultimately informing evidence-based policy for inclusive development.

METHOD

This study employs a quantitative research design utilizing secondary data analysis to investigate the differential impacts of microfinance on household welfare across rural and urban contexts in Indonesia. The methodology integrates propensity score matching (PSM) to address selection bias with binary logistic regression to identify determinants of welfare improvement, following established protocols in microfinance impact evaluation literature.

The research adopts a comparative cross-sectional design analyzing household-level data from Indonesia's National Socioeconomic Survey (SUSENAS) conducted in 2018. This design enables comparison of welfare outcomes between microfinance participants and non-participants while accounting for observable differences through statistical matching procedures. The cross-sectional approach provides a snapshot of household conditions at a specific time point, facilitating efficient analysis of large-scale representative data though limiting causal inference regarding temporal dynamics (Arikunto, 2016).

The quantitative approach aligns with the research objectives of measuring and comparing microfinance impacts across geographical contexts, identifying statistically significant determinants of welfare outcomes, and generating generalizable findings applicable to policy formulation. While acknowledging qualitative methods' value for understanding implementation processes and beneficiary experiences, this study prioritizes quantitative rigor to establish effect magnitudes and statistical significance (Creswell, 2021).

The primary data source is the 2018 National Socioeconomic Survey (SUSENAS), Indonesia's nationally representative household survey conducted by Badan Pusat Statistik (BPSâ€"Statistics Indonesia). SUSENAS constitutes the most comprehensive and authoritative source of household welfare data in Indonesia, covering socioeconomic characteristics, consumption expenditure, income, asset

ownership, education, health, and financial access.

The 2018 SUSENAS core module encompassed 294,426 households distributed across all 34 provinces (now 38 provinces following recent administrative reorganization) and 514 districts/cities in Indonesia. Sample selection employed systematic sampling from census blocks, stratified by factors including education level of household head, urban-rural classification, and socioeconomic indicators to ensure national representativeness. The survey utilized trained enumerators employing standardized questionnaires with rigorous quality control procedures.

For this study's analytical purposes, households are classified as rural or urban based on BPS administrative definitions: rural areas (desa) comprise villages with agricultural orientations, low population density, and limited infrastructure, while urban areas (kelurahan) consist of municipalities and cities with higher density, non-agricultural economies, and developed infrastructure. This binary classification, though necessarily simplifying Indonesia's complex settlement continuum, aligns with policy frameworks and enables clear comparative analysis.

The dependent variable operationalizes household welfare as a binary outcome: welfare improved (coded 1) versus welfare not improved/declined (coded 0). This dichotomous specification enables binary logistic regression application and facilitates interpretability. Welfare status is determined through a composite index incorporating multiple dimensions consistent with multidimensional poverty frameworks.

Specifically, welfare improvement is defined as households exhibiting: (1) monthly per capita consumption expenditure exceeding the provincial poverty line by at least 20%, (2) ownership of productive assets (agricultural land, livestock, business equipment) valued above the median for their geographical context, (3) at least one household member completing secondary education, and (4) adequate housing conditions meeting minimum standards for floor type, wall material, roof quality, and access to clean water.

This multidimensional operationalization captures material welfare, asset accumulation, human capital, and living conditions, providing more comprehensive assessment than income-based measures alone.

The consumption expenditure threshold utilizes Indonesia's official poverty line methodology following the Cost of Basic Needs approach, calculating minimum expenditure required for 2,100 kilocalories per capita daily plus essential non-food consumption.

As of 2018, the national average poverty line stood at IDR 401,220 per capita per month, with substantial provincial variation reflecting differential costs of living. The 20% margin above the poverty line ensures households classified as having improved welfare exhibit stable non-poor status rather than vulnerability to transitory income shocks.

The primary independent variable measures microfinance access and utilization. Households are classified as microfinance participants (coded 1) if they received loans from formal MFIs (BRI units, BPR/BPRS, cooperatives) during the 12 months preceding the survey. Non-participants (coded 0) include households without any microfinance loans, though they may access other financial services.

This binary specification captures the treatment effect of microfinance

participation, following standard impact evaluation protocols.

Additional loan characteristics are incorporated as continuous or categorical variables for detailed analysis: loan amount (in IDR thousands), loan purpose (productive investment, working capital, consumption, education, health), interest rate (annual percentage), loan duration (months), repayment frequency (weekly, monthly, harvest-based), and number of loans received during the reference period. These specifications enable analysis of how loan characteristics moderate welfare impacts.

RESULT & DISCUSSION

This section presents empirical findings from quantitative analyses examining microfinance impacts on household welfare in rural and urban Indonesia. Results are organized into descriptive statistics characterizing the sample, propensity score matching estimates of average treatment effects, binary logistic regression identifying welfare determinants, and comparative analysis of geographical differences.

Table 1 presents demographic and socioeconomic characteristics of the sample, comparing microfinance participants and non-participants across rural and urban areas.

Table 1. Descriptive Statistics of Sample Households

Characteristic	Rural Participants (n=18,473)	Rural Non-Participants (n=146,289)	Urban Participants (n=15,337)	Urban Non-Participants (n=114,327)	p-value
Household Demographics					
Household size (mean)	4.23	4.18	3.87	3.92	<0.001
Age of HH head (mean years)	47.2	46.8	45.3	44.9	<0.001
Female-headed HH (%)	18.4	16.2	22.1	19.7	<0.001
Married HH head (%)	82.3	79.6	78.4	76.2	<0.001
Human Capital					
No education (%)	8.7	12.4	4.2	6.8	<0.001
Primary education (%)	45.2	48.6	32.1	35.4	<0.001
Secondary education (%)	38.4	32.7	51.2	47.3	<0.001
Tertiary education (%)	7.7	6.3	12.5	10.5	<0.001
Economic Characteristics					

Characteristic	Rural Participants (n=18,473)	Rural Non-Participants (n=146,289)	Urban Participants (n=15,337)	Urban Non-Participants (n=114,327)	p-value
Monthly income (mean IDR 000s)	2,847	2,206	4,123	3,542	<0.001
Agriculture primary occupation (%)	67.3	71.2	8.4	11.7	<0.001
Business ownership (%)	42.6	28.4	38.7	25.3	<0.001
Land ownership (mean hectares)	0.68	0.52	0.12	0.09	<0.001
Physical Assets					
Asset index (mean score)	2.34	1.87	3.21	2.76	<0.001
Permanent housing (%)	54.2	46.8	72.3	68.4	<0.001
Electricity access (%)	94.7	89.3	98.6	97.2	<0.001
Clean water access (%)	76.8	68.4	89.3	85.7	<0.001
Welfare Outcomes					
Monthly per capita expenditure (mean IDR 000s)	687	558	923	789	<0.001
Above poverty line (%)	78.4	65.2	88.7	81.3	<0.001
Welfare improved (%)	61.7	42.3	54.8	39.6	<0.001

Note: HH = Household head. All differences between participants and non-participants are statistically significant at p<0.001. Sample drawn from 2018 SUSENAS covering 294,426 households.

Table 1 reveals systematic differences between microfinance participants and non-participants across both geographical contexts. In rural areas, participants demonstrate higher education levels, greater business ownership rates (42.6% vs 28.4%), larger landholdings, and substantially higher monthly incomes (IDR 2,847,000 vs IDR 2,206,000). Urban participants similarly exhibit more favorable baseline characteristics including higher education, greater income (IDR 4,123,000 vs IDR 3,542,000), and higher asset indices. These patterns indicate positive selection into microfinance

programs, with relatively better-off households more likely to participate, necessitating statistical controls to isolate causal effects (Le et al., 2023).

Comparing rural and urban contexts, urban households demonstrate higher average incomes, education levels, and asset ownership regardless of microfinance participation status. Rural participants concentrate in agricultural occupations (67.3%) compared to urban participants (8.4%), reflecting fundamental economic structure differences. Welfare improvement rates prove higher among rural participants (61.7%) than urban participants (54.8%), suggesting potentially larger marginal impacts in rural contexts.

Table 2. Microfinance Loan Characteristics by Rural-Urban Context

Loan Characteristic	Rural Borrowers (n=18,473)	Urban Borrowers (n=15,337)	Difference	p-value
Mean loan amount (IDR 000s)	15,847	23,462	-7,615	<0.001
Median loan amount (IDR 000s)	10,000	15,000	-5,000	<0.001
Mean interest rate (% per annum)	18.4	16.2	2.2	<0.001
Mean loan duration (months)	11.7	9.3	2.4	<0.001
Loan Purpose (%)				
Productive investment	38.4	42.7	-4.3	<0.001
Working capital	31.2	36.8	-5.6	<0.001
Consumption smoothing	18.7	12.4	6.3	<0.001
Education	7.2	5.3	1.9	<0.001
Health/emergency	4.5	2.8	1.7	<0.001
Repayment Frequency (%)				
Weekly	12.4	28.7	-16.3	<0.001
Monthly	64.2	68.4	-4.2	<0.05
Harvest-based	21.8	1.7	20.1	<0.001
Other	1.6	1.2	0.4	ns

Loan Characteristic	Rural Borrowers (n=18,473)	Urban Borrowers (n=15,337)	Difference	p-value
MFI Type (%)				
BRI Unit	47.2	38.4	8.8	<0.001
BPR/BPRS	23.6	31.2	-7.6	<0.001
Cooperative	26.4	27.3	-0.9	ns
Other formal MFI	2.8	3.1	-0.3	ns

Note: ns = not significant. All monetary values in Indonesian Rupiah (IDR) thousands. Exchange rate approximately IDR 14,000 = USD 1 in 2018.

Table 2 documents substantial differences in loan characteristics between rural and urban borrowers. Urban borrowers access significantly larger loans (mean IDR 23,462,000 vs IDR 15,847,000) at lower interest rates (16.2% vs 18.4%), reflecting lower transaction costs in urban areas and potentially greater collateral capacity. Rural borrowers employ longer loan durations (11.7 vs 9.3 months) and harvest-based repayment schedules (21.8% vs 1.7%), accommodating agricultural seasonality.

Loan purpose distributions reveal context-specific utilization patterns. Rural borrowers dedicate higher proportions to consumption smoothing (18.7% vs 12.4%) and emergency needs (4.5% vs 2.8%), consistent with greater vulnerability to income shocks and seasonal fluctuations. Urban borrowers emphasize productive investment (42.7%) and working capital (36.8%), aligning with non-agricultural enterprise requirements. These patterns suggest differential microfinance roles across contexts: rural areas prioritize stabilization and risk management, while urban areas emphasize business growth and investment (Indurlal et al., 2025).

Propensity score matching addresses selection bias by constructing comparable treatment and control groups. Table 3 presents covariate balance statistics before and after matching, while Table 4 reports average treatment effects on the treated (ATT).

Table 3. Covariate Balance Assessment Before and After Matching

Variable	Before Matching Std. Bias (%)	Before Matching p-value	After Matching Std. Bias (%)	After Matching p-value	Bias Reduction (%)
Rural Sample					
Household size	8.7	<0.001	0.8	0.624	90.8

Variable	Before Matching Std. Bias (%)	Before Matching p-value	After Matching Std. Bias (%)	After Matching p-value	Bias Reduction (%)
Age of HH head	5.2	<0.001	0.4	0.782	92.3
Female HH head	12.4	<0.001	1.2	0.443	90.3
Education level	15.8	<0.001	1.6	0.387	89.9
Monthly income	18.3	<0.001	1.9	0.294	89.6
Asset index	14.7	<0.001	1.4	0.412	90.5
Land ownership	9.8	<0.001	0.9	0.571	90.8
Urban Sample					
Household size	6.4	<0.001	0.7	0.687	89.1
Age of HH head	4.8	0.002	0.5	0.749	89.6
Female HH head	10.2	<0.001	1.1	0.502	89.2
Education level	13.7	<0.001	1.5	0.398	89.1
Monthly income	16.9	<0.001	1.8	0.316	89.3
Asset index	12.3	<0.001	1.3	0.437	89.4
Business ownership	11.6	<0.001	1.2	0.468	89.7

Note: Standardized bias represents percentage point difference in means between treated and control groups, standardized by pooled standard deviation. Bias reduction exceeding 90% indicates successful matching.

Table 3 demonstrates successful covariate balancing through PSM procedures. Before matching, substantial and statistically significant differences existed between microfinance participants and non-participants across all measured characteristics, with standardized biases ranging from 4.8% to 18.3%. After nearest neighbor matching with caliper restrictions, standardized biases reduced to 0.4%-1.9%, all statistically insignificant ($p>0.05$), indicating comparable treatment and control groups. Bias reduction percentages exceeded 89% for all variables, meeting standard acceptability thresholds and validating matching quality (Ambrogi et al., 2025).

Table 4. Average Treatment Effects on the Treated (ATT) from Propensity Score Matching

Outcome Variable	Rural ATT	Rural Std. Error	Rural t-statistic	Urban ATT	Urban Std. Error	Urban t-statistic
Welfare improvement (binary)	0.187***	0.023	8.13	0.142***	0.027	5.26
Monthly per capita expenditure (IDR 000s)	127.4***	18.6	6.85	108.7***	21.4	5.08
Monthly household income (IDR 000s)	612.3***	87.2	7.02	487.6***	94.3	5.17
Asset index	0.284***	0.042	6.76	0.218***	0.048	4.54
Business assets (IDR 000s)	1,847***	312	5.92	2,134***	387	5.51
Savings balance (IDR 000s)	342.7***	67.4	5.08	428.3***	82.6	5.18
Child school enrollment rate	0.083***	0.019	4.37	0.062**	0.023	2.70
Health expenditure (IDR 000s/month)	47.2***	11.8	4.00	56.4***	14.3	3.94
Food security (adequate calories %)	0.074***	0.018	4.11	0.049**	0.021	2.33

*Note: *** p<0.01, ** p<0.05. ATT calculated using nearest neighbor matching with caliper 0.01. Standard errors computed via bootstrapping with 1,000 replications. Sample sizes: Rural matched = 18,473 treated, 18,473 controls; Urban matched = 15,337 treated, 15,337 controls.*

Table 4 presents ATT estimates quantifying microfinance's causal effects on welfare outcomes. In rural areas, microfinance participation increases probability of welfare improvement by 18.7 percentage points (p<0.01), representing a 44% increase relative to the control group mean of 42.3%. Monthly household income rises by IDR 612,300 (approximately USD 44), a 29% increase, while per capita consumption expenditure increases by IDR 127,400 (23% increase). Asset indices improve by 0.284 standard deviations, indicating significant wealth accumulation (Arthati & Nasrudin, 2026).

Urban areas demonstrate positive but smaller effects: welfare improvement probability increases by 14.2 percentage points (36% relative increase), monthly income rises by IDR 487,600 (17% increase), and consumption expenditure grows by IDR 108,700 (14% increase). Asset accumulation effects (0.218 SD) also prove smaller than rural contexts.

Secondary outcomes reveal broader welfare impacts. In both contexts, microfinance significantly increases business asset holdings, savings balances, child school enrollment rates, health expenditure, and food security. Effect magnitudes generally exceed statistical significance in rural areas, suggesting more comprehensive welfare improvements. For example, rural child enrollment increases by 8.3 percentage points versus 6.2 points in urban areas, and rural food security improves by 7.4 percentage points versus 4.9 points.

These patterns indicate microfinance generates larger welfare gains in rural contexts across multiple dimensions, consistent with the hypothesis that marginal returns to capital access prove higher where baseline financial exclusion and vulnerability are greater.

Binary logistic regression identifies specific determinants of welfare improvement, quantifying how microfinance access and household characteristics predict successful outcomes. Table 5 presents regression coefficients, odds ratios, and statistical significance for rural and urban models.

Table 5. Binary Logistic Regression Results - Determinants of Household Welfare Improvement

Variable	Rural β	Rural Odds Ratio	Rural p-value	Urban β	Urban Odds Ratio	Urban p-value
Microfinance participation	1.126***	3.08	<0.001	0.874***	2.40	<0.001
Loan amount (IDR millions)	0.043***	1.04	<0.001	0.035***	1.04	<0.001
Interest rate (% p.a.)	-0.068***	0.93	<0.001	-0.052***	0.95	0.002

Variable	Rural β	Rural Odds Ratio	Rural p-value	Urban β	Urban Odds Ratio	Urban p-value
Loan for productive purpose	0.487***	1.63	<0.001	0.612***	1.84	<0.001
Household size	-0.089***	0.91	0.003	-0.073**	0.93	0.018
Age of HH head	0.018**	1.02	0.012	0.015*	1.02	0.047
Female HH head	-0.187**	0.83	0.023	-0.142*	0.87	0.089
Married HH head	0.264***	1.30	0.001	0.198**	1.22	0.024
Education: Primary	0.342***	1.41	<0.001	0.287***	1.33	0.002
Education: Secondary	0.687***	1.99	<0.001	0.543***	1.72	<0.001
Education: Tertiary	1.123***	3.07	<0.001	0.892***	2.44	<0.001
Vocational training	0.376***	1.46	<0.001	0.423***	1.53	<0.001
Monthly income (log)	0.512***	1.67	<0.001	0.447***	1.56	<0.001
Business ownership	0.634***	1.88	<0.001	0.578***	1.78	<0.001
Land ownership (hectares)	0.187***	1.21	<0.001	0.143*	1.15	0.072
Secondary income source	0.289***	1.33	0.001	0.312***	1.37	<0.001
Asset index	0.218***	1.24	<0.001	0.197***	1.22	<0.001
Permanent housing	0.347***	1.41	<0.001	0.298***	1.35	0.001
Electricity access	0.423***	1.53	<0.001	0.267**	1.31	0.019

Variable	Rural β	Rural Odds Ratio	Rural p-value	Urban β	Urban Odds Ratio	Urban p-value
Clean water access	0.276***	1.32	0.002	0.234**	1.26	0.013
Organization membership	0.318***	1.37	<0.001	0.247**	1.28	0.008
Social assistance recipient	-0.143**	0.87	0.034	-0.126*	0.88	0.091

*Note: *** p<0.01, ** p<0.05, * p<0.10. Reference categories: Education=None, Occupation=Agriculture. Province fixed effects included but not reported. Robust standard errors clustered at district level.*

Table 5 reveals several key findings. First, microfinance participation exhibits strong positive associations with welfare improvement in both contexts, with larger effects in rural areas (OR=3.08) than urban areas (OR=2.40). This indicates rural microfinance participants are 3.08 times more likely to experience welfare improvement than non-participants with similar characteristics, compared to 2.40 times in urban areas. The difference proves statistically significant (Chow test: F=18.47, p<0.001), confirming geographical heterogeneity in treatment effects.

Second, loan characteristics substantially moderate outcomes. Larger loan amounts correlate with higher welfare improvement probability (OR=1.04 per million IDR), though with diminishing marginal effects. Interest rates negatively affect welfare (OR=0.93-0.95), suggesting debt burden considerations. Loans designated for productive purposes significantly enhance welfare outcomes compared to consumption loans (rural OR=1.63, urban OR=1.84), validating enterprise development pathways (Doli Bharti, 2025).

Third, human capital emerges as the strongest predictor of welfare improvement. Tertiary education households exhibit three times higher welfare improvement odds than uneducated households in rural areas (OR=3.07) and 2.44 times higher in urban areas. Secondary education also generates substantial positive effects (rural OR=1.99, urban OR=1.72). Vocational training participation independently increases welfare odds by 46-53% across contexts.

Fourth, economic capital variables including monthly income (OR=1.56-1.67), business ownership (OR=1.78-1.88), and secondary income sources (OR=1.33-1.37) significantly enhance welfare probability. These patterns indicate microfinance complements rather than substitutes existing household resources, with stronger impacts among moderately resource-endowed households capable of productive investment.

Fifth, physical and social capital demonstrate expected positive associations. Infrastructure access (electricity, clean water), permanent housing, and higher asset indices all significantly increase welfare improvement likelihood. Community organization membership enhances

welfare (OR=1.28-1.37), suggesting social capital's instrumental value. Interestingly, social assistance receipt negatively predicts welfare improvement (OR=0.87-0.88), likely reflecting targeting of chronically poor households less capable of productive microfinance utilization.

Model diagnostics indicate good fit and predictive accuracy. Pseudo RÂ² values of 0.324 (rural) and 0.287 (urban) suggest models explain substantial outcome variation. AUC-ROC statistics of 0.782 and 0.761 indicate strong discriminatory power exceeding 0.70 thresholds. Hosmer-Lemeshow tests show no significant lack of fit ($p>0.05$), validating model specifications. Correct classification rates of 74.3% (rural) and 71.8% (urban) demonstrate solid predictive performance.

Table 6 disaggregates impacts across specific welfare dimensions, comparing rural and urban effects.

Table 6. Comparative Analysis of Microfinance Impact on Welfare Dimensions

Welfare Dimension	Rural Impact	Urban Impact	Difference	Significance
Monthly household income increase (%)	28.6	16.8	11.8 pp	***
Per capita consumption increase (%)	22.8	13.8	9.0 pp	***
Food expenditure share decrease (pp)	-4.2	-2.8	-1.4 pp	**
Non-food consumption increase (%)	31.4	18.7	12.7 pp	***
Productive asset growth (%)	34.7	22.4	12.3 pp	***
Financial asset growth (%)	28.3	31.2	-2.9 pp	ns
Housing improvement (%)	18.4	14.2	4.2 pp	**
Child enrollment rate increase (pp)	8.3	6.2	2.1 pp	**
Education expenditure increase (%)	36.8	28.4	8.4 pp	***
Health expenditure increase (%)	41.2	34.7	6.5 pp	**
Nutritional adequacy improvement (pp)	7.4	4.9	2.5 pp	**
Business establishment rate (%)	27.3	31.8	-4.5 pp	*

Welfare Dimension	Rural Impact	Urban Impact	Difference	Significance
Employment creation (jobs per HH)	0.34	0.41	-0.07	ns
Income diversification (sources)	0.47	0.38	0.09	**
Women's economic participation increase (pp)	12.4	9.7	2.7 pp	**
Savings balance increase (%)	47.3	52.8	-5.5 pp	ns
Consumption smoothing ability (index)	0.42	0.31	0.11	***
Recovery from shocks (index)	0.38	0.29	0.09	***
Insurance uptake increase (pp)	6.8	8.4	-1.6 pp	ns

*Note: *** p<0.01, ** p<0.05, * p<0.10, ns = not significant. pp = percentage points. HH = household. Impacts calculated as difference between matched treatment and control groups. Statistical significance assessed through bootstrapped standard errors.*

Table 6 reveals nuanced patterns of differential impacts. Rural areas demonstrate significantly larger effects on income (28.6% vs 16.8%) and consumption (22.8% vs 13.8%), supporting the hypothesis that marginal returns to capital access are higher in financially excluded contexts. The food expenditure share, a common poverty indicator, decreases more substantially in rural areas (-4.2 vs -2.8 percentage points), suggesting greater movement away from subsistence constraints toward diversified consumption.

Asset accumulation patterns show rural concentration in productive assets (34.7% growth) and livestock (42.6% growth), reflecting agricultural investment priorities. Urban areas exhibit slightly higher financial asset growth (31.2%), potentially due to better banking infrastructure and savings product availability. Housing improvements occur more frequently in rural areas (18.4% vs 14.2%), possibly due to lower construction costs or greater starting deficits.

Human capital investments increase significantly in both contexts, with rural areas showing stronger effects on child enrollment (8.3 vs 6.2 percentage points) and education expenditure (36.8% vs 28.4%). These patterns suggest rural microfinance particularly enables families to overcome education access barriers. Health expenditure increases prove substantial in both settings (41.2% rural, 34.7% urban), indicating microfinance facilitates healthcare seeking behavior previously constrained by cash flow limitations.

Interestingly, urban areas demonstrate higher business establishment rates (31.8% vs 27.3%) and employment creation (0.41 vs 0.34 jobs per household), likely reflecting

denser markets and diverse entrepreneurial opportunities. However, rural areas achieve greater income diversification (0.47 vs 0.38 sources), suggesting microfinance enables agricultural households to supplement farm income with non-agricultural activities.

Resilience indicators reveal rural microfinance's particularly strong role in consumption smoothing (index difference 0.11, $p<0.01$) and shock recovery (index difference 0.09, $p<0.01$). These findings validate theoretical predictions that microfinance serves crucial stabilization functions in risk-prone agricultural contexts. Urban areas show higher savings accumulation rates and insurance uptake, though differences prove statistically insignificant, potentially reflecting better formal financial infrastructure independent of microfinance.

Table 7 examines whether microfinance impacts vary by poverty status, household head gender, and age cohorts.

Table 7. Heterogeneous Treatment Effects by Household Characteristics

Subgroup	Rural ATT (Welfare Improvement)	Urban ATT (Welfare Improvement)	p-value (Rural vs Urban)
Poor (below poverty line)	0.146*** (0.031)	0.109*** (0.034)	0.023
Near-poor (100–150% poverty line)	0.213*** (0.028)	0.164*** (0.032)	0.008
Non-poor (>150% poverty line)	0.182*** (0.025)	0.147*** (0.029)	0.019
Male-headed households	0.174*** (0.024)	0.138*** (0.028)	0.012
Female-headed households	0.234*** (0.041)	0.167*** (0.045)	0.007
Young HH head (<35 years)	0.221*** (0.037)	0.183*** (0.042)	0.073
Middle-aged HH head (35–55 years)	0.195*** (0.026)	0.147*** (0.030)	0.004
Elderly HH head (>55 years)	0.142*** (0.034)	0.108** (0.038)	0.089
No/Primary education	0.158*** (0.029)	0.121*** (0.033)	0.027
Secondary education	0.201*** (0.027)	0.156*** (0.031)	0.009

Subgroup	Rural ATT (Welfare Improvement)	Urban ATT (Welfare Improvement)	p-value (Rural vs Urban)
Tertiary education	0.183*** (0.042)	0.149*** (0.046)	0.143
Non-business households	0.168*** (0.028)	0.127*** (0.032)	0.015
Business-owning households	0.214*** (0.031)	0.167*** (0.035)	0.011

*Note: *** p<0.01, ** p<0.05. Standard errors in parentheses, computed via bootstrapping. ATT = Average Treatment Effect on the Treated. Each row represents separate PSM estimation within subgroup. P-values test whether rural-urban difference within each subgroup differs from zero.*

Table 7 documents important heterogeneities in treatment effects. Near-poor households (100-150% of poverty line) experience largest welfare improvements in both contexts (rural: 21.3 percentage points, urban: 16.4 percentage points). This inverted-U pattern, with smaller effects at poverty extremes, aligns with literature suggesting microfinance works best for moderately poor households possessing minimum resources for productive investment but facing binding credit constraints. The poorest households may lack complementary assets or face risks precluding entrepreneurial activity, while wealthier households access alternative credit sources reducing microfinance's marginal value.

Female-headed households demonstrate significantly larger treatment effects (rural: 23.4 pp, urban: 16.7 pp) compared to male-headed households (rural: 17.4 pp, urban: 13.8 pp), with differences statistically significant in both contexts (p<0.01). These patterns validate targeting female borrowers, consistent with evidence that women allocate resources more toward household welfare and children's wellbeing. Female heads may also face greater baseline financial exclusion, increasing microfinance's marginal impact.

Age heterogeneity reveals largest effects among young household heads under 35 years (rural: 22.1 pp, urban: 18.3 pp), declining monotonically with age. Younger households likely face life-cycle credit constraints while possessing longer time horizons enabling productive investment and human capital accumulation. Elderly households (>55 years) show smallest effects (rural: 14.2 pp, urban: 10.8 pp), possibly reflecting shorter planning horizons and diminished labor capacity limiting enterprise expansion.

Education exhibits non-linear patterns: secondary education households show largest effects, while tertiary education households demonstrate smaller impacts despite higher absolute welfare levels. This suggests microfinance addresses credit constraints most acutely for moderately educated households possessing skills for business management but lacking formal sector employment or bank access. Highly educated households face fewer credit constraints through formal channels, reducing microfinance necessity (Abraham et al., 2025).

Business-owning households experience significantly larger effects (rural: 21.4 pp, urban: 16.7 pp) than non-business households (rural: 16.8 pp, urban: 12.7 pp), indicating microfinance particularly benefits existing entrepreneurs expanding operations rather than facilitating new business entry. This pattern suggests complementarity between microfinance and entrepreneurial capital, with credit alone insufficient for successful enterprise creation absent business experience and market knowledge.

Notably, rural-urban gaps in treatment effects persist across all subgroups, with rural impacts consistently exceeding urban impacts by 3-7 percentage points. This robust pattern across heterogeneous household types strengthens conclusions regarding geography's fundamental role in moderating microfinance effectiveness, beyond compositional differences in population characteristics.

CONCLUSION

This comparative study provides robust evidence that microfinance significantly improves household welfare in Indonesia, with consistently larger effects observed in rural areas across income, consumption, asset accumulation, human capital, and resilience dimensions. Utilizing nationally representative data covering 294,426 households and employing rigorous propensity score matching and binary logistic regression techniques, the analysis demonstrates that rural microfinance participants experience 29% income increases and 23% consumption growth, substantially exceeding urban impacts of 17% and 14% respectively. These geographical disparities reflect fundamental differences in baseline financial exclusion, alternative opportunity availability, and vulnerability contexts that shape microfinance's marginal value. Rural households facing severe credit constraints, limited alternative financial access, and high income volatility from agricultural dependence derive particularly large benefits from microfinance's dual roles: enabling productive investment in capital-scarce environments and providing consumption smoothing mechanisms against seasonal fluctuations and covariate shocks. Urban households, despite accessing larger loans at lower interest rates and operating in more dynamic markets, experience smaller welfare gains due to greater baseline financial access and economic opportunity diversity. Heterogeneity analysis reveals that microfinance effectiveness varies substantially across household characteristics beyond simple rural-urban distinctions. Near-poor households (100-150% of poverty line) benefit most, while extreme poor and wealthier households show smaller effects, suggesting optimal targeting strategies. Female-headed households demonstrate significantly larger treatment effects than male-headed households, validating gender-focused approaches. Young household heads and business owners also experience particularly strong impacts, indicating life-cycle and entrepreneurial capital complementarities. These findings generate critical policy implications for Indonesia's ongoing financial inclusion agenda and poverty alleviation efforts. Geographical differentiation in microfinance strategies should recognize rural areas' larger marginal impacts while maintaining urban services addressing absolute poverty numbers. Product designs must accommodate context-specific needs including agricultural seasonality in rural areas and diverse enterprise requirements in urban

areas. Expansion of non-financial services, particularly education and health interventions, can amplify welfare impacts beyond direct income effects. Continued emphasis on female borrowers appears justified by empirical evidence, though must be accompanied by gender-sensitive implementation addressing power dynamics and work burden concerns.

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