

An Analysis of Outreach and Sustainability Profitability of Credit Union in East Nusa Tenggara

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Abstract. This research study aims to analyze: (1) whether outreach influences the sustainability (profitability) of credit unions; (2) the impact of taxes and operational costs on outreach and sustainability; and (3) the impact of assets on outreach and sustainability. It fills a gap in the literature by examining the relationship between outreach and sustainability in credit unions in East Nusa Tenggara, incorporating taxes, operational costs, and assets as key determinants. Data were collected via documentation and analyzed using treatment regression. The study employs six-year panel data econometrics (2016–2021) from the financial statements of 99 credit unions in East Nusa Tenggara. First, a trade-off exists between outreach and sustainability (profitability). Second, taxes have no significant impact on outreach or sustainability; employee and administrative costs negatively affect outreach; and interest costs negatively affect sustainability. Third, institutional assets (e.g., Mutual Protection Funds [Dapema] and technology adoption) positively impact both outreach and sustainability. Financial assets such as liabilities and stock savings positively affect both; total assets and working capital positively affect outreach; and non-stock savings positively affect sustainability.

1. INTRODUCTION

Poverty in East Nusa Tenggara (NTT) Province remains alarmingly high, not only in terms of percentage but also in depth and severity. This demands urgent attention from all stakeholders. Poverty extends beyond income deprivation to include powerlessness and barriers to access. Comprehensive policies are essential to address it.

Microfinance institutions play a crucial role in poverty alleviation. Despite opportunities in financial markets, challenges persist in combating poverty and driving social change (Armendáriz & Morduch, 2010). Limited access to financial services perpetuates poverty in developing countries, making microcredit a vital solution (Coleman, 1999; Fletschner, 2009; Karnani, 2007).

In NTT, credit unions (CUs) focus on poverty reduction through financial intermediation. From 2016 to 2021, CUs experienced growth in membership (both male and female), savings (from members and non-members), and credit services. However, growth slowed in 2021 due to the COVID-19 pandemic. Post-pandemic recovery offers hope for continued contributions to poverty reduction.

Microfinance literature debates sustainability versus outreach. Sustainability advocates argue that MFIs must first achieve financial health for long-term service provision to the poor. Outreach proponents emphasize immediate broad service delivery, even if financial stability is pending. Both approaches rely on government and donor support but have trade-offs.

This study explores determinants of outreach and sustainability in NTT CUs. Its importance stems from: (1) the lack of prior research on CU-specific sustainability and outreach; (2) CUs' dual social and business missions aligning with literature debates; and (3) diverse findings in existing MFI studies.

Drawing from prior research and field issues, this study addresses CU challenges in NTT. Preliminary interviews highlighted taxes, Mutual Protection Funds (Dapema), and technology adoption as key concerns.

- Taxes: Act as government intervention and additional costs, potentially affecting outreach (Cull et al., 2011) and sustainability (Abdulai & Tewari, 2017; Rai & Rai, 2012).
- Dapema: Protects institutions and customers from defaults, encouraging transactions and impacting outreach and sustainability.
- Technology Adoption: Enhances efficiency, reduces costs, and expands reach.

Additionally, the study examines outreach-sustainability relationships, including potential trade-offs. By integrating empirical evidence and NTT-specific issues, it tests:

- a. Outreach's impact on CU sustainability.
- b. Taxes and operational costs' impact on outreach and sustainability.
- c. Assets' impact on outreach and sustainability.

2. METHODOLOGY

This quantitative descriptive study uses an explanatory approach with secondary data from financial reports (2016–2021) of 99 NTT CUs, yielding 594 panel data observations.

Linear regression with endogenous treatment addresses endogeneity. Equations are:

- Outreach (o): Influenced by taxes, employee costs, administrative costs, Dapema, technology adoption, assets, debt, stock savings, and working capital.

- Sustainability (s): Influenced by outreach, taxes, interest costs, Dapema, technology adoption, debt, stock savings, and non-stock savings.

Outreach is binary: 0 (short/narrow, loans above average) or 1 (long/wide, loans below average) (Yaron, 1994; Schreiner, 2001). Sustainability is proxied by profitability (SHU) (Abera, 2010). A negative outreach-sustainability link indicates a trade-off (CU avoids high-risk poor); positive suggests no trade-off.

Estimation uses panel econometrics: Pooled OLS, Fixed Effects Model (FEM), and Random Effects Model (REM). Model selection via Likelihood Ratio and Hausman tests; robust estimators handle heteroscedasticity and autocorrelation.

3. DISCUSSION

3.1. Panel Data Model Testing

The test result table obtained, there are two equations tested: Sustainability Equation and Range Equation. I will explain the meaning of each column in the test result table, including the Chow Test and Hausman Test, as well as the conclusions that can be drawn. The two tests performed are "Chow Test (Prob > F)" and "Hausman Test (Prob > Chi2)".

The test results in the table above can be explained as follows:

3.1.1. Sustainability Equation

Chow Test (Prob > F): The results show a p-value of 0.000.

Hausman Test (Prob > Chi2): Also shows a p-value of 0.000.

Conclusion: The model used for the sustainability equation is the "Fixed Effect Model". This conclusion is drawn based on the very low p-value in both tests, indicating that there is a significant fixed effect.

3.1.2. Range Equation

Chow Test (Prob > F): The results show a p-value of 0.000.

Hausman Test (Prob > Chi2): Also shows a p-value of 0.000.

Conclusion: The model used for the Range equation is also the "Fixed Effect Model". As in the Sustainability equation, this conclusion is based on the very low p-value in both tests, indicating a significant fixed effect.

From the conclusion above, it can be seen that both the Sustainability and Reach equations require a Fixed Effect model to explain the panel data used in the analysis. Fixed effects are considered significant in explaining variations in panel data related to Credit Unions in East Nusa Tenggara Province.

3.1.3. Estimation Results

The results of the regression coefficient calculation with endogenous treatment of Sustainability and Reach in this research study are described in table 6.2 below. To determine the significance of the coefficients of the Sustainability and Reach variables, it can be progress by comparing the value of $P > |z|$ statistics with the value of $\alpha = 5\%$. If the absolute value of $P > |z|$ statistics is smaller than the value of $\alpha = 5\%$, the coefficient is declared significant. In addition, to determine the significance of the coefficients of the sustainability and reach variables. It can be progress by comparing the value of z statistics with the value of the z table. If the absolute value of z statistics is greater than the value of z table at $\alpha = 5\%$ (1.96) in the 2-way hypothesis, the coefficient is declared significant.

Table 1. Estimation Result for Linear Regression with Endogenous Treatment.

Variable	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
Dependent: sustainability					
1.outreach	-0.0210116	0.0012636	-16.63	0.000	-0.0234883, -0.018535
tax	-0.2067282	0.2154259	-0.96	0.337	-0.6289553, 0.2154989
pu	0.1195	0.0150189	7.96	0.000	0.0900635, 0.1489366
at	0.0119965	0.0008224	14.59	0.000	0.0103846, 0.0136084
rbbp	-0.0071796	0.0028563	-2.51	0.012	-0.0127778, -0.0015813
rha	0.0107494	0.0026956	3.99	0.000	0.0054662, 0.0160326
rssa	0.0137998	0.0040337	3.42	0.001	0.0058940, 0.0217057
rsna	0.0250688	0.0034794	7.20	0.000	0.0182492, 0.0318883
_cons	0.0708268	0.0039577	17.90	0.000	0.0630699, 0.0785837
Dependent: outreach					
at	0.8146789	0.086887	9.38	0.000	0.6443836, 0.9849742
tax	-28.33451	21.87404	-1.30	0.195	-71.20684, 14.53782
pu	4.751767	1.565533	3.04	0.002	1.683378, 7.820156
rbbp	-1.227304	0.5021002	-2.44	0.015	-2.211402, -0.2432057
rba	-1.180751	0.5308372	-2.22	0.026	-2.221173, -0.1403294
rha	2.038644	0.2740169	7.44	0.000	1.501581, 2.575708
Aset	0.0116229	0.0017999	6.46	0.000	0.008095, 0.0151507
rssa	1.399209	0.4507593	3.10	0.002	0.5157368, 2.828681
rmka	1.75757	0.3397557	5.17	0.000	1.091661, 2.423479
_cons	-4.646176	0.4132996	-11.24	0.000	-5.456228, -3.836123
Ancillary Parameters					
/athrho	2.420194	0.2527488	9.58	0.000	2.915573, 1.924816,
/lnsigma	4.155277	0.0312191	133.10	0.000	4.216465, 4.094088
Derived Parameters					
rho	0.984316	0.007866	—	—	0.9941477, 0.9583123
sigma	0.0156815	0.0004896	—	—	0.0166709, 0.0147507
lambda	0.0154355	0.000538	—	—	0.01649, 0.014381
LR test of indep. eqns. (rho = 0): chi2(1) = 118.46 Prob > chi2 = 0.0000					
Source: Report 2					

Thus, outreach involving high-risk borrowers such as the poor can negatively impact sustainability (profitability), through increased credit risk, higher operating costs, and lower incomes from such borrowers. Therefore, there is a "trade-off" between outreach (especially to high-risk borrowers) and sustainability (profitability) due to increased credit risk, additional operating costs, price competition, resource constraints, and challenges in risk management that arise when pursuing both objectives simultaneously.

These findings are in line with previous studies, including Hermes and Lensink (2011) taking the research study objects in Africa, East Asia and the Pacific, Eastern Europe and Central Asia, Latin America, the Caribbean and South Asia. Researchers are proved that efficiency has a negative impact to the depth of outreach. This finding, confirmed by Kipesha and Zhang (2013), observing the case in East Africa, using panel data from 47 MFIs over a four-year period, was further confirmed by Salifu et al. (2018), taking the case of Northern Ghana, all three studies reported a negative impact between capital structure and outreach. Thus, a recent research study by Ponce et al. (2021), examined MFIs in South Asia and Latin America. This study proved that there is a two-way causality between outreach and financial sustainability, in other words there is a trade-off between financial sustainability and outreach.

3.2. Discussion of the Impact Between Operating Costs, Outreach, And Sustainability

3.2.1. Taxes Have No Effect on Outreach

Taxes have no significant and negative impact on Credit Union Outreach, with Outreach measured involving high-risk borrowers (poor communities) and low Outreach involving low-risk borrowers, which can be explained by the following factors:

3.2.2. The Importance of Taxes in the Finance Function

The ratio of tax expense to revenue reflects an extent to which taxes impact to the financial condition of the Credit Union. If this ratio is low, it means that taxes do not put significant financial pressure on the financial institution.

3.2.3. Credit Union Operational Scale

Credit Unions have a relatively small operational scale compared to large financial institutions. In this case, the impact of taxes on revenue is not as great as in larger institutions, so changes in the tax expense ratio are not significant to revenue.

3.2.4. Tax Structure and Lending

The tax structure applied to a credit union's income does not directly impact to interest rates or credit terms. Therefore, changes in the tax cost ratio do not directly impact to the decision to lend and to high-or low-risk borrowers.

3.2.5. Credit Union Social Orientation

Thus, outreach involving high-risk borrowers such as the poor can negatively impact sustainability profitability, through increased credit risk, higher operating costs, and lower incomes from such borrowers. Therefore, there is a "trade-off" between outreach (especially to high-risk borrowers) and sustainability (profitability) due to increased credit risk, additional operating costs, price competition, resource constraints, and challenges in risk management that arise when pursuing both objectives simultaneously.

3.3. Discussion of the Impact Between Operating Costs, Reach, and Sustainability

3.3.1. Discussion of the Impact of Operating Costs on Reach

3.3.1.1. Taxes Have No Impact on Reach

Taxes have no significant and negative impact on Credit Union Reach, with the measured Reach involving high-risk borrowers (poor people) and the low Reach involving low-risk borrowers, which can be explained by the following factors:

3.3.2. The Importance of Taxes in the Finance Function

The ratio of tax expense to revenue reflects an extent to which taxes impact to the financial condition of the Credit Union. If this ratio is low, it means that taxes do not put significant financial pressure on the financial institution.

3.3.3. Credit Union Operational Scale

Credit Unions have a relatively small operational scale compared to large financial institutions. In this case, the impact of taxes on revenue is not as great as in larger institutions, so changes in the tax expense ratio are not significant impact to revenue.

3.3.4. Tax Structure and Lending

The tax structure also applied to Credit Union revenue does not directly impact to interest rates or credit terms. Therefore, changes in the tax expense ratio do not directly impact the decision to lend to high-or low-risk borrowers.

3.3.5. Credit Union Social Orientation

Most credit unions have a social orientation and a goal of providing financial services to the broader community, including the poor. In this context, a focus on social mission makes credit unions more likely to prioritize depth of outreach and financial inclusion than to be affected by changes in the tax expense ratio.

3.3.6. Taxes as a Secondary Factor

Taxes are considered a secondary factor in making decisions related to depth of outreach. Other factors such as internal policies, regulatory requirements, and community needs have a more significant impact on lending strategies and the financial services offered.

3.3.7. Potential Compensation from Other Revenue Sources

Credit unions have other revenue sources, such as investments or additional financial services, that can offset the impact of taxes on revenue. This can make credit unions more resilient to fluctuations in the tax expense ratio.

3.4. Discussion between Operational Costs and Sustainability

3.4.1. Taxes Have No Significant Impact on Sustainability

Taxes are measured by the ratio of tax costs to cooperative income and sustainability is measured by the ratio of remaining business results to total assets. Tax is 1% of cooperative business entities and internally taxes as costs. The results of statistical estimates do not have a significant and negative impact on cooperative sustainability. There are several reasons why the results of statistical estimates shown that the ratio of tax costs to income does not have a significant and negative impact on cooperative sustainability:

The proportion of tax to income is low, if the tax imposed is 1% of cooperative income. This amount is considered with a small enough, so it does not have a significant impact on the remaining business results. The low amount of tax relative to income can cause its impact to be less pronounced in relation to sustainability.

Other significant cost structures. If there are other costs that are larger and have a more significant impact on the remaining business results, then the relatively small tax costs are ignored in the analysis. The dominant cost structure other than tax can reduce its impact on sustainability.

Efficient on tax management. Credit Unions have efficient tax management policies or strategies, so the impact of tax costs on the remaining business results can be minimized. This can involve utilizing tax incentives or careful management of tax policies.

The impact of external factors. External factors such as economic fluctuations or changes in tax regulations can affect the results of statistical estimates. If there is a significant change in these factors, the influence of taxes is less visible in the analysis.

Taxes are seen as a reasonable cost. If taxes are considered with a reasonable part of business activities and a normal responsibility of the business entity. Because, the company is more likely to accept this cost as an unavoidable part.

The analysis of the findings shown that taxes do not have a significant and negative effect on Credit Union Sustainability. Taxes are measured by the ratio of tax costs to income, which reflects the proportion of income used to pay taxes. On the other hand, sustainability is measured by the ratio of remaining business results to total assets, which reflects the cooperative's ability to generate sufficient income to cover its total assets.

The results of statistical estimates are shown that taxes do not have a significant and negative effect on CU Sustainability indicate that changes in tax costs do not have a significant impact on CU in maintaining its operational sustainability.

In this context, other factors have a greater impact on CU Sustainability than tax costs. For other variables such as operational efficiency, risk management, and business growth can be more dominant in determining CU Sustainability. Thus, although tax costs can be a consideration in cooperative financial management. These findings are indicate that their influence on Credit Union Sustainability is not statistically significant.

Empirically, these results reject the findings of previous studies, by Cull et al. (2011), Abdulai and Tewari (2017) and Rai and Rai (2012) shown that costs, including tax burdens, have a significant impact on the Sustainability of micro-finance institutions.

3.4.2. The Impact of Interest Cost (rbbp) on Sustainability (S)

If the statistical estimation results shown that the Interest Cost to Income ratio has a significant and negative impact on Credit Union Sustainability, so for the several factors can explain the phenomenon, such as:

1. High interest expense or capital cost. A high Interest Cost Ratio is caused by significant interest expense or high capital cost. If the cooperative pays high interest on loans or has a high capital cost, this can reduce the remaining operating results and have a negative impact on Sustainability.
2. High risk in funding sources. If the cooperative relies on high-risk funding sources, such as loans with high variable interest rates and increase interest costs. High risk in funding sources can have a negative impact on the financial Sustainability of the cooperative.
3. Lack of diversification of funding sources. If the cooperative does not have adequate diversification in funding sources, dependence on one type of funding source can increase the risk of high Interest Cost. Diversification can help reduce risk and support for the sustainability.
4. Lack of optimal capital structure. A non-optimal capital structure, for example, relying too much on loans rather than equity, can increase interest costs. Reconsidering the capital structure can help optimize costs and support on sustainability.
5. Interest rate volatility. If interest rates fluctuate, cooperatives face uncertainty about future Interest costs. Manage interest rate risk or using financial instruments to hedge against interest rate fluctuations can help mitigate the negative impact on sustainability.
6. Low efficiency of fund management. If fund management is inefficient, interest costs can increase. Moreover, fund management, including efficient selection of funding sources, can help reduce costs and support Sustainability.
7. Financial market. External factors, such as changes in financial market conditions, can affect on interest costs. If market conditions are unfavorable, cooperatives may experience an increase in interest costs that are negative for sustainability.

8. Macroeconomic. Macroeconomic factors, such as inflation rates or economic growth, can also affect interest costs. Changes in the macroeconomic environment can have consequences for interest costs and sustainability of cooperatives.
9. Statistical estimates shown that the higher the ratio of interest costs to revenue, the lower the level of Sustainability of credit unions. This suggested that high interest costs can be a significant barrier for cooperatives to achieve sustainability of their operations.

There is a significant and negative impact that consistent with empirically supported findings from previous studies. This is in line with findings shown that high interest costs can burden cooperatives and hinder their ability to achieve operational sustainability. Empirically, strengthens the findings of previous studies Rai and Rai (2012) founded that operational burden on loan portfolio is a major factor affecting to the sustainability. Kinde's (2012) findings showed that cost per borrower has a significant impact on Sustainability. In addition, Abdulai and Tewari (2017) reported that the ratio of operating costs to total assets is a major determinant of sustainability efficiency. In a different context, Dao et al. (2019) explained that performance efficiency and additional cost per client affect micro-finance sustainability in Vietnam.

3.5. Discussion of the Impact of Wealth on Reach and Sustainability

3.5.1. Discussion of the Impact of Wealth on Reach

3.5.1.1. The Impact of Technology Adoption on Reach

The adoption of technology by Credit Unions serves as an important capital to prevent trade-offs between various objectives. Technology can help improve operational efficiency and the quality of services provided, which in turn can expand the reach of Credit Unions to more members, including those in remote or underserved areas. In addition, technology can improve operational sustainability by reducing operational costs and risks, and improving the data accuracy and security. Thus, technology adoption not only supports the growth of service reach, but also strengthens the long-term stability and sustainability of Credit Unions. Technology adoption has a significant and positive impact on the depth of Credit Union Reach, especially related to high-risk borrowers (poor communities), which can be explained by several reasons as follows:

3.5.2. Improved Risk Analysis

Technology allows Credit Unions to collect and analyze data. This can improve the ability to assess the risk of high-risk borrowers and make more accurate credit decisions. Data analysis can help identify potential risks and adjust credit offers according to the borrower's risk profile.

3.5.3. Accessibility and Reach

Technology can open access to financial services for people who were previously out of reach by traditional financial institutions. With Technology Adoption, Credit Unions can provide services online or via mobile devices, making it easier for poor people to access financial products and services.

3.5.4. Operational Efficiency

Technology Adoption can improve the operational efficiency of Credit Unions, allowing them to reach more borrowers, including high-risk ones, at a lower cost. The use of technology in processes such as risk analysis, loan management, and transaction processing can reduce administrative costs and increase efficiency.

3.5.5. Customized Product Development

Technology enables Credit Unions to develop financial products and services that are tailored to the needs of the poor. By understanding spending patterns, transaction behavior, and financial needs through data collected through Technology, Credit Unions can provide more relevant and beneficial solutions to the poor.

3.5.6. Economic Empowerment

Based on technology adoption, Credit Unions can help in the economic empowerment of the poor through easier access to financial services, financial training, and resources to start or grow micro and small businesses.

Thus, Technology Adoption has great potential to increase the depth of Credit Union Outreach to high-risk market segments, such as the poor, by improving accessibility, operational efficiency, risk analysis, product development, financial education, and economic empowerment. The results of this research study confirm the findings of Abdulai and Tewari (2017), who used the stochastic frontier analysis method, that the main determinant of MFI Sustainability in Sub-Sahara Africa is assets. Furthermore, these results empirically confirm the findings of Saad et al. (2018) who took the case of MFIs in Pakistan and proved that the return on Assets and the size of the MFI impact to the depth and breadth of Outreach.

3.5.7. The Impact of Daperma on Outreach

Daperma has a significant and positive impact on Credit Union Outreach which can be explained by several factors. There are some reasons why Daperma can contribute positively to Credit Union Outreach, especially related to high-risk borrowers (poor people):

3.5.8. Reducing Credit Risk

Daperma can help reduce the credit risk faced by Credit Unions with collateral, the risk of default by borrowers is reduced. So, Credit Unions are more willing to provide loans to borrowers who are considered high risk.

3.5.9. Encouraging Lending to Poor Community Segments

Daperma can be an incentive for Credit Unions to provide loans to poor community segments who have difficulty getting loans without additional collateral. It can increase the depth of Outreach to market segments that were previously considered with high risk.

3.5.10. Increasing Trust

An existence of Daperma can increase Credit Union trust in high-risk borrowers. It can open the door to more financial transactions with poor communities, because Credit Unions have collateral that can help protect their interests.

3.5.11. Increasing Community Welfare

Involvement in lending to poor communities can provide direct benefits to welfare. Credit Unions can play a role in improving the standard of living and providing access to financial resources to previously neglected communities.

Thus, Daperma can be an effective instrument to increase the depth of Credit Union Outreach to high-risk market segments, such as the poor, by reducing risk and providing positive incentives for lending.

Many previous studies also support this finding empirically. For instance, a research study by Saad et al. (2018) examined that MFIs in Pakistan has return on assets and MFI size impact to the depth and breadth of outreach. In addition, the research findings of Abdulai and Tewari (2017) who reported that assets are a major determinant of MFI sustainability in Sub-Saharan Africa.

3.5.12. The Effect Both Debt and Outreach

Debt has a significant and positive impact on Credit Union Outreach, with Outreach measured involving high-risk borrowers (poor people) and low Outreach involving low-risk borrowers, which can be explained by the following factors:

3.5.13. The Effect on Loan Capacity

The Debt to Total Assets ratio reflects the extent to which a Credit Union utilizes Debt to support operational and lending activities. By using Debt, a Credit Union can increase a lending capacity, which can be used to reach and serve high-risk borrowers, such as the poor, without relying entirely on its own capital.

3.5.14. Increased by Funding Sources

The use of Debt can help a Credit Union diversify its funding sources. By having access to additional funding sources through Debt, a Credit Union can increase liquidity and face demand from high-risk borrowers.

3.5.15. Leverage Effect

Debt can increase the leverage effect or financial leverage of a Credit Union. Thus, the Credit Union can have more funds available to be provided as loans, including to high-risk borrowers.

3.5.16. Expansion and Growth

Debt can be used to support the expansion and growth of a Credit Union. More funding sources through Debt can enable Credit Unions to open new branches or provide financial services in a wider area, including to the poor.

3.5.17. Diversify Loan Portfolio

By using Debt, Credit Unions can have more flexibility in diversifying their loan portfolios. This can include increasing product and service offerings that better suit the needs of high-risk borrowers.

3.5.18. Providing Better Loan Terms

Debt can help Credit Unions provide better loans, such as lower interest rates, to high-risk borrowers. It can increase the attractiveness and accessibility of financial services to the poor.

3.5.19. Optimize Risk Management

By leveraging Debt, Credit Unions can optimize risk management and plan more innovative and inclusive credit policies for high-risk borrowers.

However, it should be noted that the use of Debt also carries certain risks, including interest risk and liquidity risk. Therefore, good risk management is needed to ensure that the use of Debt provides positive benefits without endangering the financial stability of the Credit Union. Empirically, many previous studies confirm this finding, from Hartarska and Nadolnyak (2007), using 114 MFIs from 62 countries. Nevertheless, MFIs that collect savings are able to reach more borrowers. Meanwhile, Kipesha and Zhang (2013) using 47 MFIs in East Africa, reported that mobilizing Savings will expand Reach to the poor.

3.5.20. The Impact of Assets on Reach

Assets have a significant and positive impact on Credit Union Reach, with the measured Reach involving high-risk borrowers (poor communities) and low reach involving low-risk borrowers, which can be explained by the following factors:

3.5.21. Lending Capacity

The total assets of the Credit Union reflect the capacity to provide loans. A greater the total assets, the greater the capacity of the Credit Union to reach and provide loans to various borrower segments, including the high-risk poor.

3.5.22. Product and Service Diversification

A large total asset base can provide a credit union with the ability to develop and offer a variety of financial products and services that meet the needs of high-risk borrowers. By diversifying products and services, a credit union can better tailor offerings to meet the needs of the poor.

3.5.23. Risk Bearing Capacity

A large total asset base can provide a credit union with the financial ability to bear the risks associated with lending to high-risk borrowers. Ultimately, a sufficient financial capacity, a credit union is more willing to reach out to and assist the poor, who are often considered high-risk borrowers.

3.5.24. Provision of Micro and Small Loans

A large total asset base can support the provision of micro and small loans to the poor who need smaller amounts of funds for small businesses or other productive activities. Micro loans can provide financial support to the poor to start or grow a small business.

3.5.25. Operational Sustainability:

A sufficient asset base can improve the operational sustainability of a credit union. With good sustainability, a credit union can continue to provide services to the poor, even in the midst of economic challenges or business risks.

3.5.26. Competitiveness in the Financial Market

A large total asset base can improve the competitiveness of a credit union in the financial market. It can help in obtaining funding sources at lower costs, which can translate into more competitive loan offerings for high-risk borrowers.

3.5.27. Support for Financial Inclusion

Large Assets can be used to support financial inclusion programs and efforts to expand access to financial services in the wider community, including the poor.

Thus, large Assets can be key in pressuring Credit Unions to increase the depth of Outreach and provide broader financial services, including to high-risk borrowers such as the poor. The results empirically confirm the findings of Saad et al. (2018) taking the case of MFIs in Pakistan and shown that Asset Returns and MFI Size impact to the depth and breadth of Outreach.

3.5.28. The Impact of Stock Deposits on Outreach

Stock Deposits have a significant and positive impact on the depth of Credit Union Outreach, with Outreach measured involving the high-risk borrowers (poor people) and low Outreach involving low-risk borrowers, which can be explained by the following factors:

3.5.29. Additional Funding Source

The ratio of Stock Deposits to Total Assets reflects an extent to which Stock Deposits contribute to the Credit Union's total Assets. Stock Deposits can be a significant source of funding for a Credit Union. By having an additional source of funding, a Credit Union can expand its capacity to provide loans to high-risk borrowers, such as the poor.

3.5.30. Member Participation in Financing

Generally, stock deposits are reflect to the participation of Credit Union members in financing and stock ownership. If members actively contribute stock deposits, can indicate the level of member support and involvement in the Credit Union's activities. Active member participation can increase the Credit Union's propensity to provide services to high-risk segments of the community.

3.5.31. Long-Term Commitment from Members

Generally, stock deposits reflect to the long-term commitment of members to the Credit Union. If members are willing to hold shares for the long term. It can provide stability and sustainability as a source of funding for the Credit Union. This stability can give the Credit Union confidence to reach out and provide services to high-risk borrowers.

3.5.32. Support for Financial Inclusion Programs

Share Deposits can be used to support financial inclusion programs and the Credit Union's efforts to provide services to the poor. Members who are willing to hold shares understand about the Credit Union's social mission.

3.5.33. Influence on Lending Decisions

If Share Deposits contribute significantly to total Assets, the Credit Union is more likely to prioritize lending policies that support the social mission and financial inclusion, including lending to high-risk borrowers.

3.5.34. Role in Developing Inclusive Financing Programs

Share Deposits can be used to support the development of inclusive financing programs, such as micro-loans or special credit programs for the poor. Having a source of funding from Share Deposits can provide flexibility to design products and services that better suit the needs of high-risk borrowers.

3.5.35. Reducing Dependence on External

3.5.35.1. Funding Sources

If Share Deposits become a significant source of funding, the Credit Union can reduce its dependence on external funding sources that have higher requirements or risks. Thus, Share Deposits can provide financial support and member commitment that can enable the Credit Union to actively reach and serve high-risk borrowers, such as the poor, and create greater depth of Outreach.

Empirically, many previous studies confirm this finding, from Hartarska and Nadolnyak (2007), using 114 MFIs from 62 countries. Prove a MFIs that pool savings are able to reach more borrowers. Meanwhile, Kipasha and Zhang (2013) discussed that using 47 MFIs in East Africa, reported that mobilizing Savings will expand Outreach to the poor.

3.5.36. The Impact of Working Capital on Outreach

Working Capital has a significant and positive impact on Credit Union Outreach, with Outreach measured involving high-risk borrowers (the poor) and low Outreach involving low-risk borrowers, which can be explained by several economic and managerial factors. Here are some reasons why this may be the case:

3.5.37. Availability of Funds for High-Risk Borrowers

Adequate Working Capital can increase an availability of funds that a Credit Union can use to make loans to high-risk borrowers, such as the poor. An availability of adequate funds can pressure a Credit Union to expand its loan portfolio in market segments that have higher levels of credit risk.

3.5.38. Financial Flexibility

Adequate Working Capital provides financial flexibility that can help a Credit Union respond to fluctuations in loan demand or other financial needs. This flexibility puts pressure on the Credit Union to reach high-risk borrowers and design products and services that meet their needs.

3.5.39. Sustainability and Growth

A healthy Working Capital can be an indicator of a Credit Union's Sustainability and ability to grow. This growth can include expansion into market segments that were previously considered high-risk. Credit Unions that are able to sustain adequate Working Capital can more easily pursue growth initiatives that focus on depth of Outreach.

3.5.40. Provision of Inclusive Products and Services

Adequate Working Capital can help Credit Unions provide inclusive products and services, including products specifically designed to meet the needs of high-risk borrowers. It can increase the attractiveness and availability of financial options for the poor.

3.5.41. Effectiveness for Risk Management

Adequate Working Capital can support more effective risk management practices. Credit Unions can manage credit risk, lend to high-risk borrowers, and ensure Sustainability of the loan portfolio.

3.5.42. Adequate Liquidity

Adequate Working Capital can also ensure sufficient liquidity, which is essential for maintaining Sustainability of operations and providing financial services to various segments of the population. Adequate Liquidity allows Credit Unions to remain active in the market and respond to the needs of high-risk borrowers.

3.5.43. Focus on Community Development

Credit Unions that have healthy Working Capital have a greater focus on community development and financial inclusion. It can encourage them to reach high-risk borrowers and build depth of Outreach among the poor.

Thus, Working Capital that has a positive and significant impact on the depth of Credit Union Outreach. It can be explained through its ability to provide adequate financial resources to reach and serve high-risk borrowers, such as the poor.

Confirm the findings of Bogan et al. (2007) who investigated the cases of MFIs in Africa, East Asia, and Latin America, proved that capital structure affects Outreach. Meanwhile, Rai and Rai (2012) investigated that 26 MFIs, proving that the capital to asset ratio is one of the factors affecting MFI Outreach in Bangladesh and India.

3.6. Discussion of the Influence of Wealth on Sustainability

3.6.1. The Impact of Daperma on Sustainability

Credit Unions develop without government intervention, relying on social capital from local Church religious networks and organizational cultural innovations to provide credit to poor households without collateral. The progress of Credit Unions in NTT

has obtained innovative organizational cultural programs from CUs spread across Indonesia, to overcome business risks or trade-offs in terms of reach and sustainability. Daperma as an institutional asset from the Innovation of the establishment of the Joint Protection Fund (Daperma) is used as a guarantor for loan defaults, savings, and health and death protection for members.

If the statistical estimation results shown that the ratio of Daperma costs to income has a significant and positive impact to the Credit Union Sustainability, there are several advantages because:

1. Benefits of Daperma. A high Daperma cost ratio reflects an existence of a guarantee policy that has succeeded in increasing the trust of members and borrowers, thereby increasing the Sustainability of the cooperative. Daperma can provide a sense of security to borrowers and increase the likelihood of fund recovery, thereby helping to strengthen the financial position of the cooperative.

2. Trust of members and borrowers. If Daperma provides additional confidence to members and borrowers related to loan sustainability and risk protection, this can result in sustainable business growth and strengthen the relationship between the cooperative and its members.

3. Improve a loan quality. A good Daperma can improve loan quality by reducing the risk of default. If this leads to a higher quality loan portfolio, then the cooperative's business results can increase, which can be reflected in a higher ratio of remaining business results to total assets.

4. Positive impact on finance. If Daperma helps manage risk and reduce losses due to default, then it can create a positive impact on the cooperative's finances. This makes a positive contribution to sustainability, especially if the costs of Daperma can be justified by the benefits received.

5. Non-financial sustainability factors. Daperma can have a positive impact on non-financial aspects of sustainability, such as reputation, community relations, and social responsibility, which can strengthen the overall sustainability of the cooperative.

6. Support from external parties or institutions. If the cooperative gets support from external parties or guarantee institutions that can provide added value. It can strengthen the cooperative's sustainability and be reflected in the results of statistical estimates.

The analysis of the findings shown that there is a significant and positive relationship between Daperma and Credit Union Sustainability. In this context, Daperma is measured by the ratio of Daperma costs to income, while sustainability is measured by the ratio of remaining operating results to Assets.

Specifically, Daperma as measured by the ratio of Daperma costs to income provides a positive contribution to Credit Union Sustainability. It can be interpreted that the more effective and efficient Daperma is carried out by the cooperative, the greater the positive impact on the operational and sustainability finance of the cooperative.

In addition, the ratio of remaining operating results to total assets is also an indicator of cooperative sustainability. If this ratio is high, it can be interpreted that the cooperative has a good level of sustainability. Because the remaining operating results (profitability) are high relative to the total Assets owned. It is shown that the cooperative can generate quite large profits in managing its Assets.

Thus, these findings provide implications that Daperma can be considered a factor that supports Credit Union Sustainability. Therefore, cooperative management needs to pay attention to and improve the effectiveness of Daperma as part of a strategy to improve the overall sustainability of cooperatives. The results findings of Abdulai and Tewari (2017) assumed that who used the stochastic frontier analysis method, that the main determinant of MFI Sustainability in Sub-Sahara Africa is assets. Furthermore, these results empirically confirm the findings of Saad et al. (2018) who took the case of MFIs in Pakistan and proved that the return on assets and the size of the MFI impact to the depth and breadth of its reach.

3.6.2. The Impact of Technology Adoption on Sustainability

Adoption of technology through the joint application Sikopdit in Credit Union operations is also an important factor. The Sikopdit application is an Institutional CU asset, formed through an innovative digital technology program of the Indonesian Credit Union group network. As social capital, this application helps control risk and increase the operational cost efficiency.

Based on the Sikopdit application, Credit Unions can expand and accelerate the reach of their services to the wider community. This technology processes data faster and more accurately, and facilitates communication between members and Credit Union administrators. This makes services more accessible to more people, including those living in remote areas.

In addition, by reducing operational costs and risks through automation and increased efficiency, Credit Unions can maintain the sustainability of their operations. Therefore, the adoption of technology such as Sikopdit is an effective asset to prevent trade-offs between service reach and sustainability. This technological component strengthens the financial and operational position of Credit Unions, thus positively impacting their ability to reach more members and remain sustainable in the long term.

The statistical estimation results shown that the Adoption of Financial Technology has a significant and positive impact on Credit Union Sustainability, several factors can explain the results:

1. Operational efficiency. Adoption of Financial Technology, especially involving computer equipment, calculators, or online platforms. It can improve the operational efficiency of cooperatives. More efficient processes can reduce operational costs and increase residual income, thus contributing positively to sustainability.
2. Expansion of reach and business growth. Adoption of Financial Technology, especially online platforms, can enable cooperatives to reach more members and borrowers. By expanding reach, cooperatives can attract more customers, which can have a positive impact on income and residual income.
3. Improve a service to members. Adoption of Financial Technology can improve the quality of service provided to members. A service can create member satisfaction, increase retention, and increase trust, all of which contribute to the sustainability of cooperatives.
4. Better risk management. Financial technology can also be used to improve risk management, including credit risk and operational risk. If cooperatives are able to reduce risk effectively, this can contribute positively to operational sustainability.
5. Increase the accuracy and transparency. Financial technology systems can improve the accuracy of recording and transparency of financial processes. This accuracy and transparency can help in better decision making, reduce uncertainty, and provide a strong foundation for Sustainability.
6. Security and data protection. Adoption of Financial Technology can provide better protection for the security of member data and information. Because, it can improve security and increase member trust and maintain the reputation of the cooperative.
7. Reputation and community support. Cooperatives that adopt Financial Technology tend to gain a reputation as innovative and modern institutions. Positive support from the community can help in the growth and sustainability of the cooperative.

Based on the results of statistical estimated that a positive and significant influence between Technology Adoption and Credit Union Reach, and with Technology Adoption categorized in scores 2 to 5, we can continue the analysis of its implications for Credit Union Sustainability. First, let's review each category of Technology Adoption;

Score 2 (Computers and calculators - offline)

Technology Adoption at this level, the Credit Union has increased its operational efficiency through the use of computers and calculators. Although this is offline, it can help in data management and internal reporting.

Score 3 (SiKopdit Simpan Pinjam Application - offline)

The adoption of this application shown a more advanced step in the automation of internal processes. This contributes to increase productivity and management of cooperative operations.

Score 4 (SiKopdit MD Application - online main branch)

The online level for the main branch indicated that the cooperative has expanded its reach geographically. It can increase accessibility for members and potential members, as well as provide convenience in managing transactions.

Score 5 (SiKopdit Online Application - all branches online)

Adoption of full online with the technology in all branches can provide significant advantages in Reach. This opens up opportunities for cooperatives to reach members in various regions, improve services, and expand the member base.

In the context of sustainability as measured by the ratio of residual operating results to total assets, these findings can be interpreted as follows: Positive Impact. Higher Technology Adoption tends to increase efficiency and productivity, can optimize revenue and reduce operating costs. It can be reflected in a better ratio of residual operating results to total assets.

3.6.3. Significant Impact

A significant impact indicates that changes in Technology Adoption have a strong impact on Credit Union Sustainability. Therefore, investment and effort in Adopting Technology can be considered an important strategy.

Many previous studies support these findings empirically. For example, Saad et al. (2018) showed that in the case of MFIs in Pakistan, return on assets and size of MFIs impact to the depth and breadth of reach. In addition, these results also empirically confirm the findings of Abdulai and Tewari (2017), who reported that the main determinant of MFI sustainability in Sub-Saharan Africa is assets.

3.6.4. The Impact of Debt on Sustainability

The positive relationship between Debt (measured by the Debt to Total Assets ratio) and Credit Union Sustainability (measured by profitability) can be explained by several factors, including:

3.6.5. Increased Funding Resources:

Debt can be used as an additional source of funds to support operational activities and lending. Based on sufficient funding sources, Credit Unions can increase the scale of their operations and provide more loans to members, which can increase revenue and profitability.

3.6.6. Financial Leverage

The use of Debt can increase the financial leverage of a Credit Union. Proper leverage can increase the potential for profit and return on equity (ROE) if the investment financed with Debt yields a higher return than the cost of Debt.

3.6.7. Financial Flexibility

The use of Debt can provide financial flexibility for a Credit Union. A debt is used to respond to new business opportunities or address financial challenges without relying entirely on equity.

3.6.8. Cost Efficiency

In some cases, using Debt is more cost efficient than raising equity. The interest paid on Debt is lower than the expected rate of return on the investment financed by the Debt.

3.6.9. Resource Allocation

The use of Debt can increase the Credit Union's capacity to allocate resources to the most productive sectors or activities that have a positive impact on profitability.

However, it should be noted that the use of Debt also carries certain risks, such as interest risk, refinancing risk, and default risk. Therefore, the Credit Union needs to ensure that the level of Debt taken is still manageable and does not endanger long-term sustainability.

The analysis of these findings shown that Debt has a significant and positive impact on Credit Union Sustainability. Debt is measured by the ratio of Debt to Total Assets, which reflects an extent to the cooperative uses Debt as a source of funds to support operational and investment activities. On the other hand, sustainability is measured by the ratio of residual operating results to total assets, which reflects the cooperative's ability to generate sufficient income to cover its total assets.

However, it is important to note that wise management of Debt and its use for productive purposes. In contrast, the key to success in utilizing the positive potential of Debt for Sustainability. Over leverage or uncontrolled use of Debt can carry risks and negatively impact the Sustainability of the cooperative. Thus, a careful and appropriate Debt management strategy according to the needs of the cooperative that can be an important factor in supporting the Sustainability of Credit Union operations. This finding is reinforced by the results of previous research from Bhanot et al. (2015), to reveal the factors that contribute to the Sustainability of MFIs in India, namely the Number of borrowers. Meanwhile, Dao et al., (2019) proved that the debt to equity ratio has an impact on the Sustainability of MFIs in Vietnam.

3.6.10. The Impact Between Stock Deposits on Sustainability

If the statistical estimation results shown that the ratio of Stock Deposits to Assets has a significant and positive impact on Credit Union Sustainability, several factors can explain the phenomenon:

1. Member participation in capital. Stock deposits, including mandatory, voluntary, and capitalization deposits, reflect member participation in providing capital for the cooperative. If members have trust and commitment to the cooperative, Stock Deposits can be seen as a form of deep financial support, which can improve the sustainability.
2. Financial independence. Stock Deposits can improve the financial independence of the CU, because it does not rely entirely on Debt or external funding sources. Financial independence can support sustainability by reducing the financial risks associated with dependence on external parties.
3. Sustainability of equity capital. Stock deposits can be considered a form of equity that can help cooperatives face business challenges and opportunities. A sustainability of equity capital can have a positive impact on the cooperative's ability to operate in the long term.
4. Use of capital for investment and development. Stock deposits that are managed wisely can be used for investment and development, such as service expansion or infrastructure improvements. If this capital is used for projects that support growth and Sustainability, it can have a positive impact.
5. Member involvement. If members are actively involved in the decision-making and management of the cooperative, Share savings can be an indicator of member involvement and responsibility. This involvement can improve sustainability because members have a direct stake in the success of the cooperative.
6. Member trust and loyalty. Share Savings can reflect the level of trust and loyalty of members towards the cooperative. This trust and loyalty can create a strong foundation for sustainability, because members are more likely to maintain involvement in the long term.
7. Diversification of funding sources. Share Savings that include mandatory, voluntary, and capitalization savings create diversification in funding sources. This diversification can help the cooperative become more resilient to changing market or economic conditions.
8. Accessibility of internal funding. Share Savings can provide a more accessible source of internal funding for the cooperative, especially when access to capital markets or external financing is difficult. This accessibility can improve sustainability by providing financial flexibility.
9. Business sustainability. Increasing Share Savings can indicated that the cooperative has a stable and growing member base. A strong member base can help a cooperative survive and grow in the long term.
10. Positive reputation and image. Cooperatives are successfully manage their members' Stock Deposits well. It can build a positive reputation in the eyes of their members and the community. This reputation can support sustainability by attracting more members and gaining further support.

The statistical estimation results showing the positive impact on Stock Savings on Credit Union Sustainability indicated that increasing the proportion of Stock Savings in the total assets of the cooperative contributes positively to the cooperative's ability to maintain its operational Sustainability. Stock savings, as part of long-term funding sources, can provide financial stability for Credit Unions and cooperative mechanisms to make long-term investments that support long-term growth and sustainability.

Thus, it is important for Credit Unions to develop strategies that encourage the growth of stock savings, such as providing incentives for members to increase Stock Savings or expanding the reach of financial products and services related to stock savings. It will help improve the cooperative's ability to achieve higher operational sustainability in the long term.

Empirically, this finding is confirmed by previous studies. Githinji (2004) investigated 30 MFIs in Kenya using primary and secondary data, and reported that savings have an impact on the sustainability of micro-finance businesses. Meanwhile, Abera (2010), proved that an average Savings have an impact on the Sustainability of Microfinance Institutions in Ethiopia. Furthermore, Moechdi et al. (2016) applied that the panel data regression method to examine the financial sustainability of the BPR industry in Indonesia during the period 2009: Q1 to 2012: Q3 with a total of 8,104 observations. It founded that non-traditional deposits have stronger financial sustainability.

3.6.11. THE IMPACT OF NON-SHARE DEPOSITS ON SUSTAINABILITY

Statistical estimates are shown that the ratio of non-share deposits to Assets has a significant and positive impact on Credit Union Sustainability, several factors can explain this phenomenon:

1. Stable funding sources. Non-share deposits, especially deposits from members and the community, can be a more stable and reliable source of funding compared to short-term or fluctuating funding sources. The sustainability finance of stable funding sources can contribute positively to Sustainability.
2. Community trust. High levels of non-share deposits can reflect public trust in the cooperative. This trust can result in a good relationship between the cooperative and its members and the community, which in turn can support Sustainability.
3. Diversification of funding sources. An existence of non-share deposits can create diversification in the cooperative's funding structure. This diversification can help reduce the risks associated with dependence on one type of funding source and support the cooperative's Sustainability.
4. Member base and community participation. High non-share deposits can reflect to the active participation of members and the community in cooperative activities. A strong member base and community participation can provide positive social support for Sustainability.
5. Better risk management. Non-stock deposits can give cooperatives more control over funding sources. Good risk management against market fluctuations or economic conditions can support the sustainability of cooperative operations.
6. Investment and business expansion. By having significant non-stock deposits, cooperatives can have access to resources that can be used to invest in projects that support business growth and expansion. This can increase revenue and sustainability.
7. Increase a service capacity. High non-stock deposits can provide the funds needed to increase the cooperative's service capacity. This capacity can create added value and increase the cooperative's competitiveness.
8. Sustainability of relationships with members. If non-stock deposits come from members, this can reflect to the sustainability of a good relationship between the cooperative and its members. Cooperatives are able to maintain trust and sustainability of relationships with their members tend to be more sustainable.
9. Efficient on liquidity management. Non-stock deposits can help cooperatives in efficient liquidity management.

Sustainability of liquidity management can ensure the availability of sufficient funds to meet operational obligations and payments to members.

10. Improve an image and reputation. High non-stock deposits can send a positive signal to the community and external parties. A good image and reputation can increase the attractiveness of cooperatives, support growth, and contribute to sustainability.

The statistical estimation results shown the positive impact on non-stock savings on Credit Union Sustainability and indicate that increasing the proportion of non-stock savings in total cooperative assets contributes positively to the cooperative's ability to maintain its operational sustainability. Non-stock savings, such as savings or deposits, can provide financial stability and short-term funding sources for cooperatives. Wise use of non-stock savings can help cooperatives in running their daily operations and provide funds for investments that support growth. Thus, strategies that encourage the growth of non-stock savings, such as developing attractive savings or deposit products, and providing incentives for members to increase non-stock savings, can be important factors in supporting the operational sustainability of Credit Unions. This finding is empirically reinforced by previous findings from Githinji (2004), in his study involving 30 MFIs in Kenya using primary and secondary data, reporting that savings have a significant influence on the sustainability of micro-finance businesses. Meanwhile, Abera (2010), proved that the average savings impact to the sustainability of micro-finance institutions in Ethiopia. Furthermore, Moechdi et al. (2016), using panel data regression method to examine the financial sustainability of BPR industry in Indonesia in the period 2009: Q1 to 2012: Q3 with a total of 8,104 observations. It founded that non-traditional deposits have a stronger impact on financial sustainability.

4. LIMITATIONS, IMPLICATIONS, AND FURTHER DIRECTIONS OF RESEARCH

4.1. Research Limitations

This study, similar to most other studies, is not free from limitations that can be used as a basis for further development in the future. Accessibility data is proxy by the number of borrowers and the amount of the loan is not based on poor and non-poor households. Sustainability data only uses profitability proxies, not on people and planet or work comfort and business environment are not calculated as Sustainability proxies.

4.2. Conclusion

Based on the objectives, results and discussion of the study, it can be concluded that:

A significant and negative impact on reach on sustainability (profitability) indicates a trade-off. Because outreach involving high-risk borrowers, such as the poor, can have a negative impact on profitability. This occurs through increase a credit risk and higher operating costs.

4.3. Suggestions

Some suggestions for the Management and Local Government related:

For Management and Management;

1. Related to the case of conflict (trade-off) between social mission and business mission, Credit Union needs to maintain mission balance, by strengthening Joint Protection Fund (Daperma) and Technology Adoption so that business risk becomes low and business costs become efficient
2. Training for Management and Management, on managing CU costs to be efficient and wealth accumulation or asset capitalization can be maintained
3. Credit unions increase Wealth through active participation of members in increasing Stock and non-stock Savings
4. Local Government, takes a strategy to strengthen Credit Unions in reducing risk levels so that there is no Trade-Off between Reach and Sustainability by providing and providing Technology, Daperma as a guarantee for competitive business and tax.

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