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微型貸款改善菲律賓貧困之研究

Microloans as a Tool for Poverty Alleviation
in the Philippines

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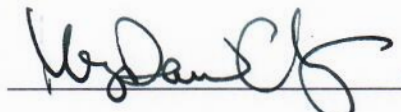
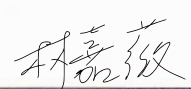
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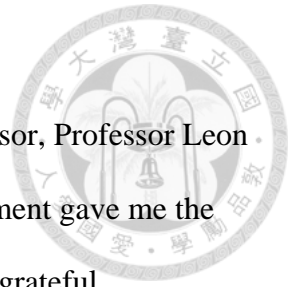
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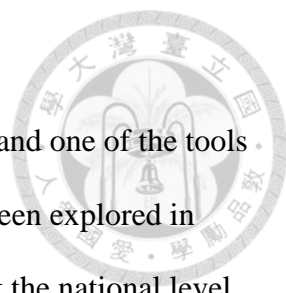
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Abstract



Poverty affects nearly 19.99 million people in the Philippines alone, and one of the tools created to mitigate this issue is microloans. Although this topic has been explored in other countries, the impact of microloans has not been investigated at the national level in the Philippines. These existing studies have also found that while microloans can be said to yield positive outcomes, such as reducing business costs and increasing income, they often have shortcomings. These include being unable to reach their target borrowers, being difficult to repay, and even causing their borrowers to fall deeper into debt. As such, this paper aims to determine the effect of microfinance loans on the country's poverty levels through quantitative methods, specifically through regression analysis using secondary data collected by government institutions for each of the 17 regions in the Philippines. The findings conclude that microcredit has little to no impact on poverty. In line with these, it is recommended that microfinance institutions improve their screening processes for borrowers as this can help to ensure that they have the ability to repay the loans and that they will use the funds for their intended purpose.

Keywords: microloans, microfinance institutions, poverty alleviation, Philippines

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List of Abbreviations



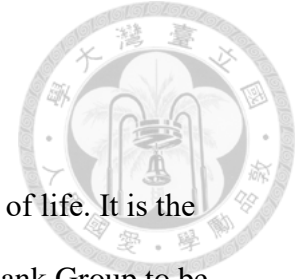
The following is a list of abbreviations used in this paper:

ADB	Asian Development Bank
ARMM	Autonomous Region in Muslim Mindanao
BSP	Central Bank of the Philippines (<i>Bangko Sentral ng Pilipinas</i>)
CAR	Cordillera Administrative Region
CPI	Consumer Price Index
FIES	Family Income and Expenditure Survey
FLEMMS	Functional Literacy, Education, and Mass Media Survey
GDP	Gross Domestic Product
HDI	Human Development Index
HPI	Human Poverty Index
LOS	Loans Outstanding
MF-NGO	Microfinance Non-Governmental Organization
MFI	Microfinance Institution
MNRC	Microfinance NGO Regulatory Council
MPI	Multidimensional Poverty Index
MPM	Multidimensional Poverty Measure
MSME	Micro, Small, and Medium Enterprises
NCC	National Credit Council
NCR	National Capital Region
NGO	Non-Governmental Organization
OPHI	Oxford Poverty and Human Development Initiative
PSA	Philippine Statistics Authority
SEC	Securities and Exchange Commission

SME	Small and Medium Enterprises
UNDP	United Nations Development Programme
VIF	Variance Inflation Factor



1. Introduction



1.1. Background

Poverty is a prevalent social issue that impacts man's quality of life. It is the inability to afford one's basic needs and is estimated by the World Bank Group to be living on less than \$2.15 per person per day (*Poverty*, 2022). As one of the UN Sustainable Development Goals, many efforts are being put toward poverty alleviation, which refers to the goal of improving the quality of life of people who are experiencing poverty. However, according to the United Nations, over four years of progress in this field has been reversed due to the COVID-19 pandemic, and this is further exacerbated by inflation and the war in Ukraine (*The Sustainable Development Goals Report 2022*, 2022). The Philippines is no exception. In 2021, 18.1% of Filipinos were determined to be living below the poverty line. This is the equivalent of approximately 19.99 million people (Mapa, 2022).

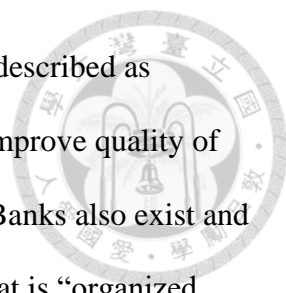
One of the tools touted to help in this cause is microloans. While traditional loans can aid in acquiring capital for starting businesses and boosting income streams, these services are inaccessible to many. This lack of access is referred to as being underbanked and could be due to a lack of documents, lack of funds to use as a minimum balance for a bank account, lack of assets that could be used as collateral for the loan, and more. On the other hand, microloans are small loans issued by microfinance institutions (MFIs) and are typically given to borrowers who need capital to start or grow their small businesses. These do not typically require collateral like traditional loans. Given the small principal and that the money loaned is put towards income generation, repaying these loans is more manageable for borrowers.

The modern concept of microloans was developed by Muhammad Yunus in Bangladesh in 1976 when he realized that agricultural training alone would not be able

to lift people out of poverty if they had no assets (*Muhammad Yunus / Biography & Facts*, 2005). He then founded Grameen Bank in 1983. Since then, Grameen Bank has provided over 7.5 million people with microloans, 97% of which have been women, and has consistently maintained a repayment rate above 98%. He was awarded the Nobel Peace Prize for his work on microcredit in 2006 (*Muhammad Yunus*, 2022).

The Philippines began to implement concepts taken from the Grameen Bank in the late 1980s and was one of the first few countries to do so. Before this, the government was providing subsidized credit to the poor through direct credit programs with little success. However, the large amounts of paperwork that this required drove up costs, cutting into the money that could be used for government projects (Adams & Lim, 2000). High rates of default for both loan repayment and subsidy also contributed to the failure of these programs (Adams & Lim, 2000). In the 1990s, the National Credit Council (NCC) created the National Strategy for Microfinance. Involvement from the private sector also increased around this time. In the 2000s, microfinance was recognized as a legitimate banking activity by the *Bangko Sentral ng Pilipinas* (Central Bank of the Philippines, BSP), and multiple new microfinance products and services emerged. These included housing microloans, micro-agriculture loans, micro-deposit, and microinsurance (*Financial Inclusion in the Philippines*, 2013).

According to the BSP, MFIs in the Philippines can be classified into four types: a) Microfinance NGOs (MF-NGOs), b) Cooperatives, and banks with microfinance operations, most of which can be divided into c) Rural Banks and d) Thrift Banks (*Financial Inclusion in the Philippines*, 2013). Philippine Republic Act No. 10693 states in their definition of terms that an MF-NGO is a non-stock and non-profit organization to carry out a microenterprise development strategy and microfinance programs for low-income clients (*Implementing Rules and Regulations of the Microfinance NGOs Act*,

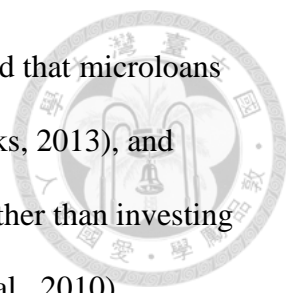


2016). They must also be registered with the SEC. Cooperatives are described as “democratic organizations that are controlled by their members” to improve quality of life (*Republic Act No. 9520*, 2008). To aid in this goal, Cooperative Banks also exist and are described in 13th Congress Senate Bill Number 1119 as a bank that is “organized, owned and controlled by cooperative organizations” that provides financial services solely to cooperatives and their members (*13th Congress Senate Bill No. 1119*, 2004). Meanwhile, Rural Banks are banks that provide credit services mainly for farmers and fishermen, but also for cooperatives and merchants (*Republic Act No. 10574*, 2012). Thrift Banks, on the other hand, provide financial services for small and medium enterprises (SMEs) (*Republic Act No. 7906*, 1995). This is usually done within a chosen industry, such as agriculture or housing. They provide services such as savings accounts, loans secured by bonds, real estate mortgages, chattel mortgages, bonds and other securities, and personal or household loans.

1.2. Research Problem

The motivation for this research originates from the prevalence of poverty in the Philippines wherein 18.1% of the population is experiencing poverty (Mapa, 2022), approximately nine million people are underbanked, and 58 million are unbanked (Pradipta & Abdullah, 2023). As previously mentioned, one of the solutions made towards mending poverty is microloans which are implemented to increase access to financial services for those in poverty. However, whether microloans can fulfill their purpose is still up for debate.

A review of existing literature has shown contradictory conclusions in terms of effective poverty alleviation and has revealed a lack of research within the context of the Philippines. With regards to the effect of microfinance implementation, microloans have been found to reduce income inequality in some countries as it increases financial



access (Miled et al., 2022). On the other hand, studies have also found that microloans can exacerbate financial problems, such as over-indebtedness (Schicks, 2013), and eventually worsen poverty when the loans are used for consuming rather than investing which leaves people unable to pay the high interest rates (Stewart et al., 2010).

These discrepancies regarding the effects of microfinance implementation may be due to the differing contexts, policies, and other country-specific factors (Miled et al., 2022). Therefore, in order to understand the influence of microfinance in the Philippines, it is crucial that research be done in the context of the country while considering poverty-influencing factors (Agbola et al., 2017). However, in the context of the Philippines, there is a dearth of literature regarding microfinance as a means of poverty alleviation at the national level. Specifically, existing research either focuses on other countries (Afrin et al., 2010; Samer et al., 2015) or merely focuses on a region of the Philippines, such as Northeastern Mindanao (Agbola et al., 2017).

To bridge the existing gaps in the literature, the study aims to determine the impact that microloans have on poverty alleviation in the Philippines at the national level. This provides avenues for understanding the impact of microloans, so that further steps and investigations can be made to improve its contributions to poverty alleviation. As such, the following research question will be used to guide this paper: *Do microloans help to reduce poverty levels in the Philippines?*

1.3. Research Methodology

The main research method for this paper is quantitative analysis. This makes use of secondary data collected by government institutions in the Philippines, including the BSP and the Philippine Statistics Authority (PSA). The data includes financial data submitted to the BSP by MFIs, regional poverty and subsistence incidence statistics, income statistics, population and housing statistics, inflation data, and literacy data.

Regression analysis was then used to determine the relationship between the variables.

1.4. Structure of the Thesis

This thesis is comprised of six main sections. This section (i.e., Section 1) introduces the study by providing its background, significance, methodology, and research problem.

Section 2 delves into the literature review. Here, readers may gain a further understanding of microloans wherein the current benefits and challenges they bring about are discussed. Moreover, different approaches to measuring their impact are provided to support the methodology of this paper. Finally, the section ends by describing other factors that influence poverty as these were also taken into consideration when analyzing microloans.

Section 3 describes the methodology of this research. Specifically, it transparently delves into the method of data collection, data organization, and data analysis. It includes the data sources, as well as the independent, dependent, and control variables. It also includes tables, formulae, and explanations of the analysis used.

Section 4 is the results section which provides summaries of the regression models created for both dependent variables, Poverty Incidence and Subsistence Incidence. Significant variables and their relationships to the dependent variables are noted in this section.

In Section 5: Discussion, key findings and research implications are thoroughly discussed. This is followed by a description of the scope and limitations and areas for future research.

Finally, Section 6 provides the conclusion which summarizes the findings of the study.

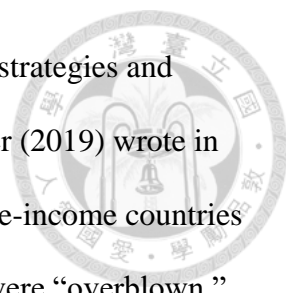
2. Literature Review



2.1. Microloans for Poverty Alleviation

The literature relevant to this study has found that while microloans are effective at poverty alleviation in some respects, they are lacking in others. Miled et al. (2022) stated that these programs do work since countries with larger loan portfolios tend to have lower income inequality. They attribute this to the ability of the loans to open borrowers up to income-generating and income-maintaining opportunities. Another study done on microfinance in India found that survey respondents from both the perspective of microfinance institutions (MFIs) and the perspective of borrowers agreed that microloans were able to have a positive impact since they allowed small businesses to reduce their costs through economies of scale and consequently increase the household incomes of borrowers (Bhusare & Chanda, 2017). However, Bhusare and Chanda (2017) also found that the majority of the borrowers who responded to their survey were middle-aged men living in semi-urban areas. They inferred from this that MFIs in India were still unable to serve rural areas and, as such, had not addressed the root of the issue. A study on microfinance in Northeastern Mindanao, Philippines concluded that “there is a positive and mildly significant impact of microfinance in poverty reduction. Our findings indicate that microfinance does play a critical role in reducing poverty and improving living standards in the Philippines” (Agbola et al., 2017).

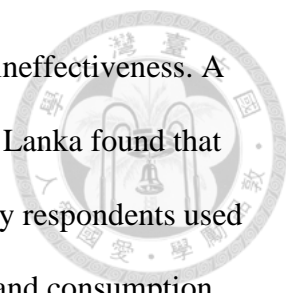
Yet another study done on female entrepreneurs from rural areas in Bangladesh found that the support provided by MFIs acted as a motivator for women to participate in financial projects, which helped to improve their financial management skills (Afrin et al., 2010). Despite this positive finding, Afrin et al. (2010) state that this does not address the main issue of these small businesses, which is the illiteracy of these



entrepreneurs. This prevents them from creating functional financial strategies and maintaining their financial records adequately. Duvendack and Mader (2019) wrote in their paper about the impact of financial inclusion on low- and middle-income countries that claims made about the impact of microfinance and microcredit were “overblown.” Another study done in sub-Saharan Africa concluded that some people were made poorer by microfinance, specifically microcredit services (Stewart et al., 2010). The study stated that this was a result of borrowers spending beyond their means rather than investing in their futures. In addition to this, their businesses were not profitable enough to allow them to afford the higher interest rates that accompanied microcredit, and their investments were insufficient to provide them with adequate returns. Stewart et al. (2010) also concluded that the use of the term “microcredit” was misleading as it created expectations for development aid that microfinance was unable to meet. Because of this, they recommended that microfinance programs be put through more rigorous evaluation before they are implemented. They also suggested that people avoid promoting microfinance as a means to attain Millenium Development Goals and avoid contributing to the rhetoric that microfinance is successful in aiding those in poverty.

2.2. Other Possible Causes of Ineffectiveness

Another possible cause for the ineffectiveness of microcredit as a poverty alleviation tool is the issue of over-indebtedness. According to Schicks (2013), this occurs when a borrower is “continuously struggling to meet repayment deadlines and structurally has to make unduly high sacrifices related to his/her loan obligations.” MFIs can contribute to the issue of over-indebtedness by prioritizing the growth of their business over the welfare of their borrowers, providing their borrowers with financial products that are not suited to their circumstances, and inadequately assessing borrowers’ ability to repay before issuing loans (Schicks, 2013).



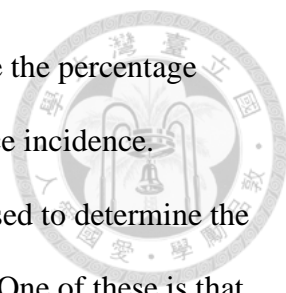
Income and consumption smoothing may also be a cause for ineffectiveness. A study by Wickramasinghe and Fernando (2017) on microloans in Sri Lanka found that while these were intended for entrepreneurial endeavors, all 53 survey respondents used the funds for purposes that could be described as smoothing income and consumption. These purposes included repayment of older loans, home improvement, offsetting of expenses in the event of delays in income, unforeseen medical expenses, and children's tuition fees. According to Wickramasinghe and Fernando (2017), the use of funds for purposes other than generating income makes repayment of the loans more difficult for borrowers. This, combined with the frequent use of microloans to repay older loans, could lead to a cycle of indebtedness.

2.3. Measuring the Effectiveness of Microloans

To measure the effectiveness of microloans, methods for measuring microloans implementation and their outcomes, such as the effect on poverty, must be established. Microloans implementation can be measured through total loans outstanding and the number of active borrowers. These can also be used within ratios, such as the variables used in Miled et al. (2022): the ratio of total loans outstanding to the gross domestic product (GDP) and the ratio of the number of active borrowers to the total population.

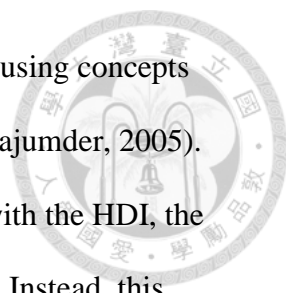
Measuring outcomes is more complex. The study by Agbola et al. (2017) made use of three approaches for measuring poverty. The first is the self-rated poverty approach. This depends completely on how survey respondents perceive their circumstances. Self-rated poverty data provided by Social Weather Stations and the PSA were also found to be vastly different, and it was inferred that this should be interpreted with caution.

The second is the poverty line approach. This involves the use of thresholds, such as poverty and food thresholds. The percentage of the population whose income is



below the poverty threshold is referred to as poverty incidence, while the percentage whose income is below the food threshold is referred to as subsistence incidence. According to the Asian Development Bank, however, the methods used to determine the poverty and food thresholds have received criticism (Aldaba, 2009). One of these is that the poverty line has not been properly adjusted for inflation. The sample used to determine poverty also excludes families that do not have an official residence. Since this includes informal settlers, which is a significant portion of the poor population, poverty in the Philippines may be underestimated. A paper by David and Maligalig (2001) states that consumption data may be a more accurate measure of welfare than income data since it also takes into account other sources of money, such as loans. It also better reflects consumption smoothing and is easier and more cost-effective to collect. The food threshold could be inaccurate since it is based on the food consumption of all families in the Philippines rather than just the poor population. It also fails to consider that the poor population must pay more since they cannot afford to buy food in large quantities (Schelzig, 2005).

The third is the Multidimensional Poverty Index (MPI) approach. This index was formulated by the United Nations Development Programme (UNDP) and the Oxford Poverty and Human Development Initiative (OPHI) in 2010 in place of the Human Poverty Index (HPI) (*History of the MPI*). It is a measurement tool that considers three dimensions of poverty: health, education, and standard of living. This is done through household surveys that help to form a deprivation profile for each household or individual. The ten questions in this survey are each concerned with one of the three equally-weighted dimensions, and individuals or households are considered multidimensionally poor if they have a deprivation score of at least a third (Alkire et al., 2022).



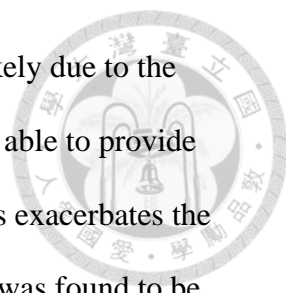
The predecessor of the MPI, the HPI, was developed in 1997 using concepts taken from the Human Development Index (HDI) (Chakravarty & Majumder, 2005). Instead of determining whether benchmarks have been achieved as with the HDI, the HPI looks at the inverse side and measures the degree of deprivation. Instead, this emphasizes whether poverty is present, rather than the average of the entire group. According to (Chakravarty & Majumder, 2005), the HPI is lacking in some dimensions, such as tuberculosis incidence, anemia, and malnutrition; however, these still were not taken into consideration when the MPI was created.

Aside from this, the World Bank also created the Multidimensional Poverty Measure (MPM). It takes inspiration from the MPI but also includes the monetary aspect of poverty, which is gauged as living on less than \$2.15 per person per day (*Multidimensional Poverty Measure, 2022*).

The studies included in this literature review most frequently make use of surveys (Afrin et al., 2010; Bhusare & Chanda, 2017), while others use monetary or economic indicators. The study by Miled et al. (2022) made use of the Gini coefficient—a measure of income inequality—and real GDP per capita to measure outcomes.

2.4. Other Factors Influencing Poverty

Aside from microloans, other factors must also be considered when exploring poverty alleviation. According to Aldaba (2009), the following are some of these factors. Slow economic growth and weak, low-quality job generation reduce the opportunities for those in poverty to escape deprivation. High inflation further diminishes the impacts of economic growth. Poorly managed population growth is also an issue. There is accumulating evidence that family size affects poverty mobility negatively (Cudia, 2015). This means that a larger household size makes it more difficult to overcome



poverty and makes the family more susceptible to poverty. This is likely due to the resulting smaller income distribution, which is unfavorable for being able to provide members of the family with basic needs and adequate education. This exacerbates the effects of a large household size since higher educational attainment was found to be positively linked to the probability of being non-poor (Reyes, 2002). The same study found that for families whose heads have the same educational attainment, larger families were likely to be poorer.

2.5. Hypothesis Development

The hypothesis of this study takes its direction from the literature previously explored. Many studies cited positive effects related to microloans; however, most of these came with a catch.

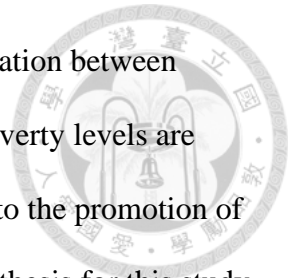
In India, borrowers were able to reduce their business costs and increase their incomes, but this was only observed in semi-urban areas. This suggested that microloans were unable to help those in rural areas, who have a greater need for aid (Bhusare & Chanda, 2017).

In Bangladesh, support from MFIs was found to motivate women entrepreneurs to participate in financial projects, but they were unable to get to the root of the issue and improve the literacy of these business owners (Afrin et al., 2010).

In sub-Saharan Africa, some evidence was found suggesting that microcredit helped to empower women, but the study came to the conclusion that microcredit made some people poorer as it allowed them to spend beyond their means and was difficult to repay still (Stewart et al., 2010).

While microloans have been found to be correlated with positive outcomes, an in-depth look will reveal that these could be considered insignificant in comparison to the original issue or that they are overshadowed by the negative effects of these

microloans. With this in mind, the study aims to determine the correlation between microloans and poverty levels in the Philippines, particularly how poverty levels are affected as a result of the implementation of microloans. This is due to the promotion of microloans as a tool for poverty alleviation. The corresponding hypothesis for this study, in line with the related literature, is as follows: *Microloans do not have a significant impact on poverty levels in the Philippines.*



3. Method



3.1. Data Collection Method

Variables. The independent variables explored were gross loans outstanding from Thrift Banks and gross loans outstanding from Rural and Cooperative Banks. Gross loans outstanding from Thrift Banks is the total amount of money currently being loaned out by Thrift Banks, and gross loans outstanding from Rural and Cooperative Banks is the total amount of money currently being loaned out by both Rural Banks and Cooperative Banks. Both variables are in billions of Philippine Pesos. These were chosen to be the independent variables since the aim of the study is to determine whether microloans help to reduce poverty levels in the Philippines.

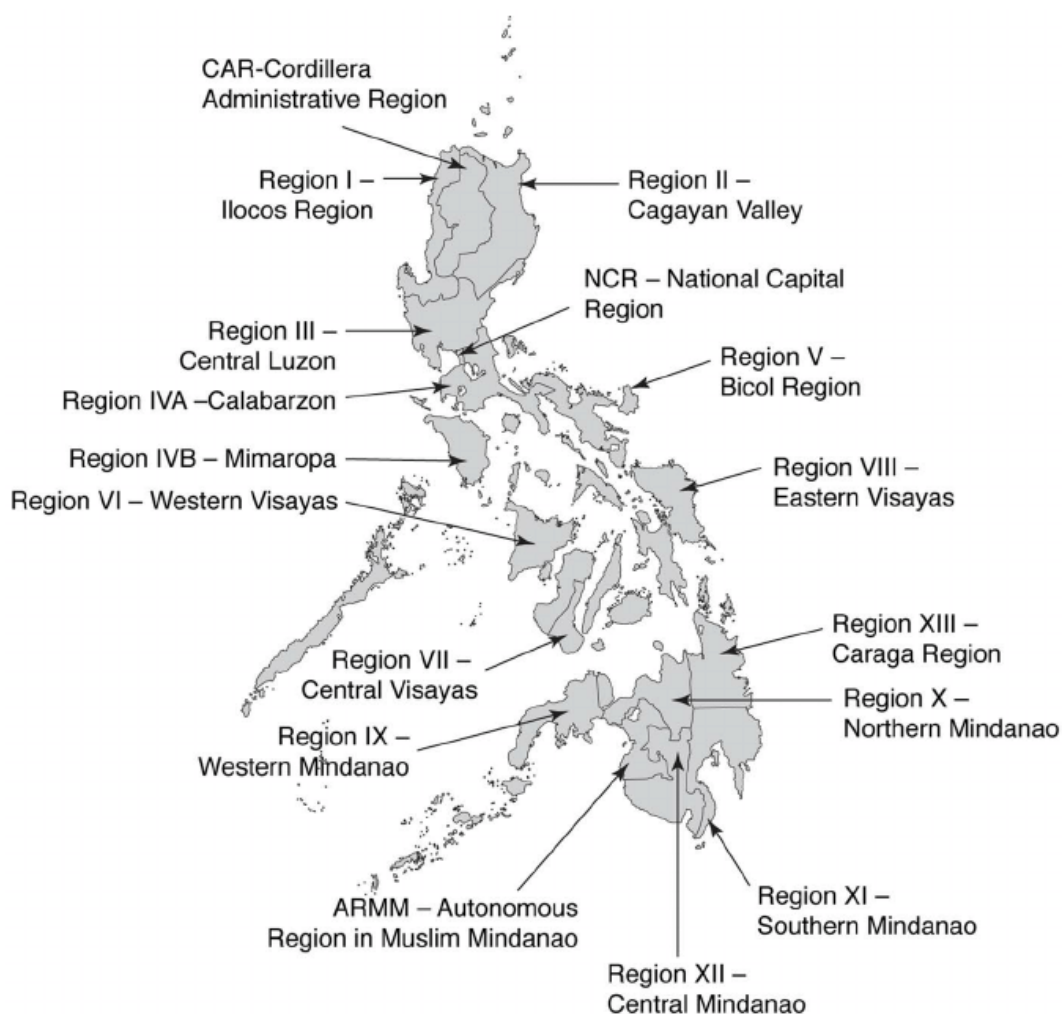
The dependent variables included were poverty incidence among the population and subsistence incidence among the population. Poverty Incidence refers to the percentage of the population whose per capita income is below the poverty threshold, which is the amount required to meet both basic food and non-food needs. On the other hand, Subsistence Incidence refers to the percentage of the population whose per capita income is below the food threshold, or the amount required to meet basic food needs. For both variables, the statistic included in the study will be “among the population” rather than “among families.” This means the information is based on the number of individuals within the population, not the number of families.

Control variables were also considered. These included the regions wherein the loans were issued, the year when the amounts of gross loans outstanding were recorded, the functional literacy rate, the unemployment rate, the average household size, the consumer price index (CPI), and the average income. These were collected per region of the Philippines, which include the National Capital Region (NCR), the Cordillera Administrative Region (CAR), I – Ilocos Region, II – Cagayan Valley, III – Central

Luzon, IVA – CALABARZON, IVB – MIMAROPA, V – Bicol Region, VI – Western Visayas, VII – Central Visayas, VIII – Eastern Visayas, IX – Zamboanga Peninsula, X – Northern Mindanao, XI – Davao Region, XII – SOCCSKSARGEN, XIII – Caraga, and the Autonomous Region of Muslim Mindanao. A map illustrating these regions can be found in Figure 1.

Figure 1

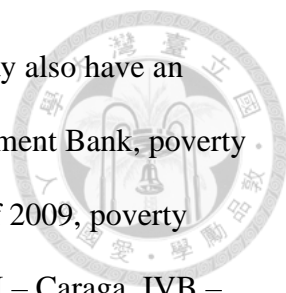
Map of the 17 Regions of the Philippines



Note. Image from Bravo, L., Roque, V. G., Brett, J., Dizon, R., & L'Azou, M. (2014).

Epidemiology of Dengue Disease in the Philippines (2000–2011): A Systematic Literature Review. *PLoS Neglected Tropical Diseases*, 8(11).

<https://doi.org/10.1371/journal.pntd.0003027>



The control variables were added to the model since these may also have an impact on poverty. According to a publication by the Asian Development Bank, poverty levels in the Philippines vary greatly by region (Aldaba, 2009). As of 2009, poverty incidence was found to be consistently high for regions ARMM, XIII – Caraga, IVB – MIMAROPA, V – Bicol, and IX – Zamboanga Peninsula.

Data Sources. The study made use of secondary data that is publicly available online. These were collected from individual Microfinance NGOs and Philippine government institutions, namely the *Bangko Sentral ng Pilipinas* (Central Bank of the Philippines, BSP), the Microfinance NGO Regulatory Council (MNRC) under the Securities and Exchange Commission (SEC), and the Philippine Statistics Authority (PSA).

Information on loans outstanding by region was taken from the BSP website for three of the MFIs identified: Thrift Banks, Rural Banks, and Cooperative Banks. Data from Cooperative Banks was used in place of that of Cooperatives due to the availability of the information.

Much of the data collected was taken from reports published by the PSA. The poverty and subsistence incidence data were taken from the Poverty Statistics Reports. These are recorded every three years. Literacy rate data was taken from the Functional Literacy, Education, and Mass Media Survey (FLEMMS) Report, which is published approximately every 5 to 6 years. The unemployment rate was taken from the Labor Force Survey, which was taken every January, April, July, and October for the years 2006-2018 and monthly in 2021. For consistency, the data used in this study comes from the unemployment rate in October of each year. Average household size data was taken from the Census of Population and Housing report published approximately every 3 to 5 years. The average income per region was collected from the Family Income and

Expenditure Survey (FIES) report, which is released annually, and Consumer Price Index (CPI) information was taken from the CPI and Inflation Rates statistics published on the PSA website annually. The data collected can be found in Appendix A.

Population and Sampling. The BSP provides loans outstanding data that covers all Thrift Banks and Rural and Cooperative Banks in the Philippines. As of December 2021, the last year included in this study, this equates to 52 Thrift Banks and 406 Rural and Cooperative Banks (*Statistics - Banking Financial Statements, 2023*).

The Philippine Statistics Authority (PSA) based its Poverty Incidence and Subsistence Incidence data on data collected for the Family Income and Expenditure Survey (FIES) (*Refinements in the Official Poverty Estimation Methodology, 2011*). In 2018, this amounted to 170,917 households interviewed nationwide (*2018 Family Income and Expenditure Survey, 2018*). According to the PSA, this was considered sufficient to reach reliable estimates for income and expenditure at the different levels included in the report. These are the national, regional, provincial, and highly urbanized cities levels.

3.2. Data Organization

After the data was collected, the information was arranged in a table based on region and year. The data was then cleaned through the deletion of rows with missing data. This included data collected from the Autonomous Region of Muslim Mindanao (ARMM) from 2015 onwards since the BSP stopped collecting data on loans outstanding from this region for Thrift Banks and Rural and Cooperative Banks. The data on loans outstanding for Thrift Banks in the I – Ilocos Region in 2006 was also missing. Lastly, the functional literacy rate of VIII – Eastern Visayas was not recorded for the year 2013 due to Typhoon Haiyan, also known as Typhoon Yolanda (Lisa Grace S. Bersales, 2013).

Since the consumer price index (CPI) information used in this study was collected over a long period (15 years from 2006 to 2021), the base year used was updated twice. This was adjusted to make the base year consistent for the data (2006=100) using the following formula:

$$\frac{CPI(i, a)}{CPI(i, b)} = \frac{CPI(j, a)}{CPI(j, b)}, \text{ where } CPI(\text{year}, \text{base year})$$

An example of the implementation of this adjustment can be observed in Table 1, which shows this being done for the National Capital Region (NCR). The same was done for all regions included in the study, and the derived CPI was used in the regression analysis. This adjustment allowed for comparison of CPI over the years covered.



Table 1

Adjusted CPI of National Capital Region (NCR)

Year	2000=100	2006=100	2012=100	Derived 2006=100
2006	140.7	100.0		100.0
2009	156.9			111.5
2012		124.4	100.0	124.4
2015		131.8		131.8
2018			115.0	143.1
2021			124.8	155.3

Note. Adapted from *CPI and Inflation Rate*. Philippine Statistics Authority.

<https://psa.gov.ph/price-indices/cpi-ir>.

Variables in the Philippine Peso were also adjusted for inflation based on the CPI. These variables included Average Income, Thrift Banks loans outstanding, and Rural and Cooperative Banks loans outstanding. The following formula was used:

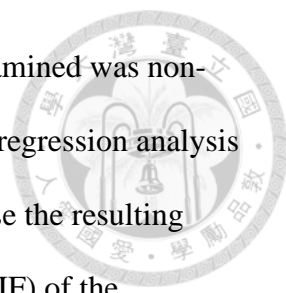
$$Adjusted\ Amount = \frac{Amount \times 100}{CPI}$$

3.3. Data Analysis

Analysis of the data was performed with the use of statistical software R to perform regression analysis. The packages used were the statistics package included in the standard installation and the “car” package, which was used to create scatterplots and to compute the Variance Inflation Factors (VIF) when testing the regression assumptions.

The chosen confidence level is 95%. Two models were created, one with Poverty Incidence among the Population as the dependent variable and another with Subsistence Incidence as the dependent variable. Before this, tests were conducted to ensure that the assumptions for regression were met.

Regression Assumptions. According to Hickey et al. (2019), the assumptions are the linearity of the functional form, homoscedasticity of the errors, independence of the errors, normality of the errors, non-multicollinearity of the independent variables,



and absence of influential points or outliers. The first assumption examined was non-multicollinearity. The independent and control variables explored in regression analysis must not have a strong correlation with each other since this can cause the resulting estimates to be unreliable. For this, the Variance Inflation Factors (VIF) of the independent variables were determined (see Figures 2 and 3 below). The control variable Average Income was excluded from the models as its VIF exceeded the chosen VIF threshold of 5 (O'Brien, 2007).

Figure 2

Multicollinearity Test for all independent variables

	Literacy	Unemployment	Household.Size	
	2.831757	1.112843	2.972229	
CPI	Avg. Income. Adj	Thrift. LOS. Adj	Rural. Coop. LOS. Adj	
2.065222	5.921798	2.883478	1.956153	

Figure 3

Multicollinearity Test after excluding Average Income control variable

	Literacy	Unemployment	Household. Size	
	2.435640	1.112044	2.640412	
CPI	Thrift. LOS. Adj	Rural. Coop. LOS. Adj		
1.827918	1.243065	1.607889		

The next assumption examined was the linearity of the functional form. This refers to the possibility of illustrating the relationship of the independent and dependent variables with the use of a regression model. If the relationship between them is not linear, such as if it is quadratic, then changes will have to be made to the model. To check if this assumption was met, Residuals vs. Predictor plots were used for each of the numerical independent variables. All the graphs showed approximately horizontal lines except for the independent variable Thrift Banks Loans Outstanding, which appeared to have a possible quadratic relationship with both dependent variables. As



such, this variable was squared so that the resulting formula would better represent the relationship between the variables. The resulting Residuals vs. Predictor plots are also approximately horizontal. See Figures 4 and 5 below.

Figure 4

Thrift LOS vs. Residuals for Poverty Incidence before (left) and after (right) squaring Thrift LOS

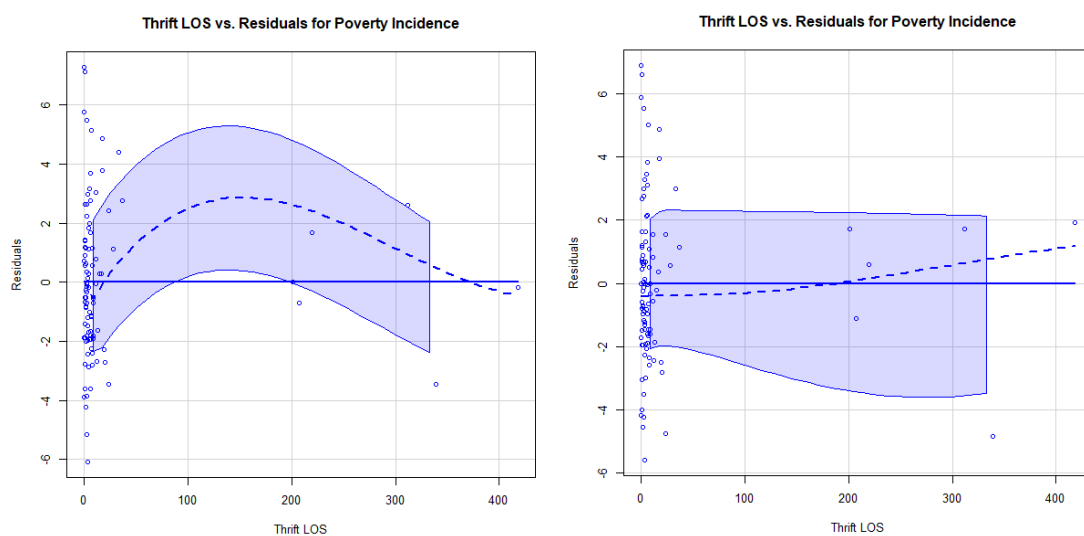
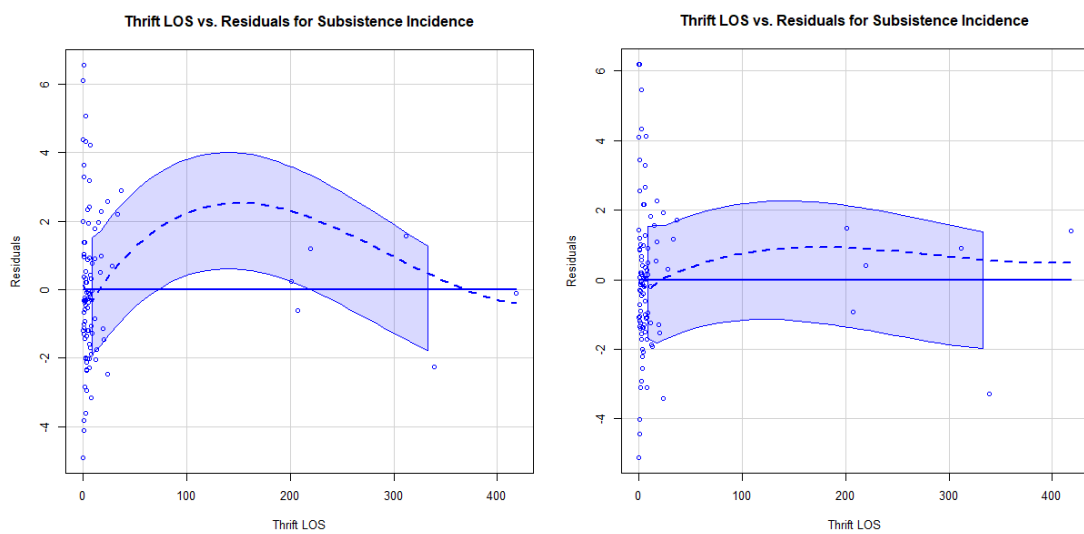
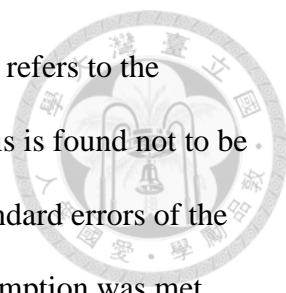


Figure 5

Thrift LOS vs. Residuals for Subsistence Incidence before (left) and after (right) squaring Thrift LOS





The third assumption examined was homoscedasticity, which refers to the similarity in the variance of the errors or residuals in the model. If this is found not to be similar across all the values, referred to as heteroscedasticity, the standard errors of the estimates produced by the model will be incorrect. Whether this assumption was met was determined with the use of Residuals vs. Fitted Values plots for both dependent variables Poverty Incidence among the Population (see Figure A17) and Subsistence Incidence among the Population (see Figure A18). The assumption was met for both models.

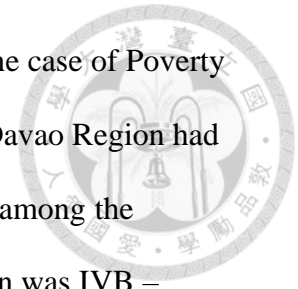
The fourth assumption examined was the independence of the errors. The errors must be independent as this can otherwise lead to biased standard errors and p-values, which would make for an inaccurate regression model. Scatterplots of the Residuals vs. Year independent variable were used, and the resulting smooth lines were approximately horizontal (see Figures A19 and A20). Thus, the assumption was met.

The fifth assumption examined was the normality of the errors. The errors must be normal as this can otherwise result in an inaccurate model. Quantile-quantile plots of the residuals were used for this (see Figures A21 and A22). For both models, the points plotted in the quantile-quantile plots were approximately aligned, suggesting that the assumption was met.

The final assumption examined was the absence of influential points or outliers. Residuals vs. Leverage plots were used (see Figures A23 and A24). None of the points exceeded Cook's distance for both models. Box plots were also used, and no data points were determined to be considered outliers through the Interquartile Range Method (see Figure A25). As such, it was assumed that the assumption was met in both models.

Reference Factor. The reference factor level for the categorical factor Region was set to the level whose mean was closest to the mean of the entire sample. This was

done to improve the interpretability of the model (Miles, 2021). In the case of Poverty Incidence among the Population, which had a mean of 26.49, XI – Davao Region had the closest mean at 25.35. On the other hand, Subsistence Incidence among the Population had a mean of 10.81, and the region with the closest mean was IVB – MIMAROPA with a mean of 10.93.



4. Results



4.1. Poverty Incidence

The summary of the regression model produced with Poverty Incidence among the Population as the dependent variable can be seen in Figure 6 below.

Figure 6

Regression Model for Poverty Incidence among the Population

```

Residuals:
    Min       1Q   Median       3Q      Max
-5.5827 -1.6295 -0.0799  1.3655  6.8935

Coefficients:
                Estimate Std. Error t value Pr(>|t|)
(Intercept)      2.446e+01  3.637e+01   0.672 0.503653
RegionARMM        7.510e+00  9.567e+00   0.785 0.435243
RegionCAR        -4.673e+00  2.799e+00  -1.670 0.099629 .
RegionI Ilocos Region -6.910e+00  3.270e+00  -2.113 0.038332 *
RegionII Cagayan Valley -3.525e+00  2.337e+00  -1.508 0.136237
RegionIII Central Luzon -1.613e+01  3.555e+00  -4.536 2.44e-05 ***
RegionIVA CALABARZON  -1.763e+01  4.052e+00  -4.350 4.75e-05 ***
RegionIVB MIMAROPA      3.401e+00  2.226e+00   1.527 0.131372
RegionIX Zamboanga Peninsula 1.151e+01  3.086e+00   3.728 0.000398 ***
RegionNCR        -6.199e+01  1.763e+01  -3.516 0.000791 ***
RegionV Bicol Region   8.904e+00  3.648e+00   2.441 0.017310 *
RegionVI Western Visayas -2.587e+00  2.243e+00  -1.154 0.252728
RegionVII Central Visayas 4.065e-01  2.387e+00   0.170 0.865251
RegionVIII Eastern Visayas 9.110e+00  3.084e+00   2.954 0.004325 **
RegionX Northern Mindanao 9.085e+00  2.900e+00   3.133 0.002569 **
RegionXII SOCCSKSARGEN  9.430e+00  2.476e+00   3.809 0.000306 ***
RegionXIII Caraga     1.583e+01  3.254e+00   4.865 7.27e-06 ***
Year.CatB         2.478e+00  2.774e+00   0.893 0.374940
Year.CatC         2.407e+00  4.311e+00   0.558 0.578467
Year.CatD         6.108e-01  6.323e+00   0.097 0.923327
Year.CatE        -4.953e+00  8.280e+00  -0.598 0.551725
Year.CatF        -1.139e+00  9.661e+00  -0.118 0.906541
Literacy          -2.493e-01  1.899e-01  -1.313 0.193530
Unemployment     -1.816e-01  3.503e-01  -0.518 0.605899
Household.Size    7.392e+00  6.346e+00   1.165 0.248246
CPI              -7.202e-02  1.202e-01  -0.599 0.550896
Thrift.LOS.Adj    2.652e-01  1.125e-01   2.356 0.021393 *
Thrift.LOS.Adj.2 -3.528e-04  1.709e-04  -2.064 0.042924 *
Rural.Coop.LOS.Adj 1.140e-01  2.505e-01   0.455 0.650377
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 3.027 on 67 degrees of freedom
Multiple R-squared:  0.9618,    Adjusted R-squared:  0.9458
F-statistic: 60.21 on 28 and 67 DF,  p-value: < 2.2e-16

```

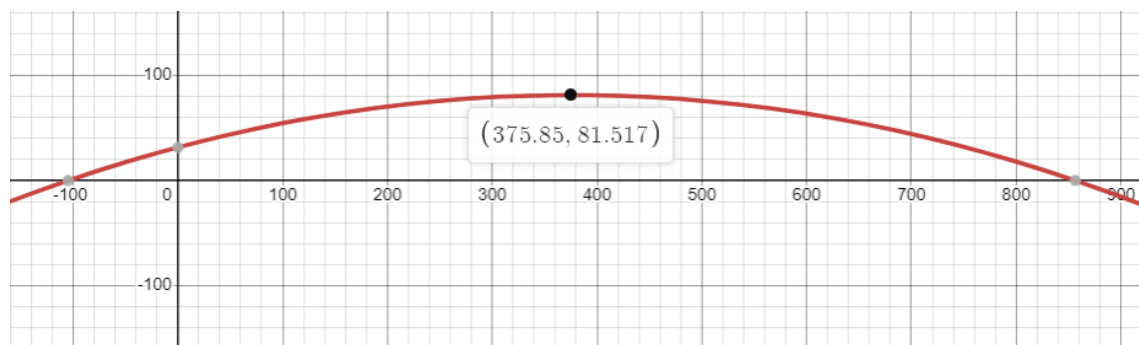
Based on the estimated coefficients produced by the regression analysis, some of the independent variables were found to have a significant effect on Poverty Incidence. The following estimates are made assuming that all other variables are held constant. The independent variable Thrift Bank Loans Outstanding was found to have a quadratic relationship with the dependent variable. This can be described using the following

formula: $y = -0.0003528x^2 + 0.2652x$. Using the average values of the other independent variables, the following formula is derived: $y = -0.0003528x^2 + 0.2652x + 31.6789$. This would result in the graph found in Figure 7. In this case, increasing Thrift Banks loans outstanding results in an increase in Poverty Incidence until Php375.85 billion, after which Poverty Incidence begins to decrease.

Several of the indicator variables about certain regions were also found to be significant. Poverty Incidence was higher than average in regions IX – Zamboanga Peninsula, V – Bicol Region, VIII – Eastern Visayas, X – Northern Mindanao, XII – SOCCSKSARGEN, and XIII – Caraga. On the other hand, it was lower than average in regions I – Ilocos Region, III – Central Luzon, IVA – CALABARZON, and NCR. This could be attributed to differences in infrastructure, geographical location, and government policies.

Figure 7

Thrift Banks Loans Outstanding vs. Poverty Incidence as estimated by the regression model and using average values



Note. The x-axis represents the amount of Thrift Banks Loans Outstanding in billions of Philippine Pesos. The y-axis represents the percentage of Poverty Incidence.

Source. This graph was created with the Desmos online graphing calculator.

4.2. Subsistence Incidence

The summary of the regression model produced with Subsistence Incidence among the Population as the dependent variable can be seen in Figure 8 below.

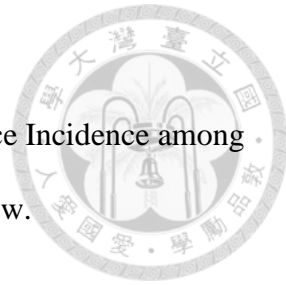


Figure 8

Regression Model for Subsistence Incidence among the Population

```

Residuals:
    Min       1Q   Median       3Q      Max
-5.1083 -1.3019 -0.0121  1.0244  6.1864

Coefficients:
                Estimate Std. Error t value Pr(>|t|)
(Intercept)      2.003e+01  3.045e+01   0.658 0.512859
RegionARMM      -9.729e+00  7.344e+00  -1.325 0.189776
RegionCAR       -1.958e+00  1.858e+00  -1.054 0.295852
RegionI Ilocos Region -6.039e+00  2.677e+00  -2.256 0.027309 *
RegionII Cagayan Valley -3.279e+00  1.882e+00  -1.742 0.086085 .
RegionIII Central Luzon -1.177e+01  3.605e+00  -3.264 0.001729 **
RegionIVA CALABARZON  -1.219e+01  4.110e+00  -2.967 0.004164 **
RegionIX Zamboanga Peninsula  6.144e+00  2.070e+00   2.968 0.004157 **
RegionNCR       -4.345e+01  1.544e+01  -2.813 0.006428 **
RegionV Bicol Region  -1.033e+00  2.623e+00  -0.394 0.694851
RegionVI Western Visayas -4.781e+00  1.818e+00  -2.630 0.010593 *
RegionVII Central Visayas -1.634e+00  2.147e+00  -0.761 0.449131
RegionVIII Eastern Visayas  1.628e+00  2.085e+00   0.781 0.437662
RegionX Northern Mindanao  6.155e+00  2.154e+00   2.857 0.005686 **
RegionXI Davao Region  -7.580e-01  1.845e+00  -0.411 0.682568
RegionXII SOCCSKSARGEN  4.956e+00  1.755e+00   2.825 0.006231 **
RegionXIII Caraga     9.075e+00  2.262e+00   4.012 0.000154 ***
Year.CatB         3.170e+00  2.299e+00   1.379 0.172470
Year.CatC         5.431e+00  3.573e+00   1.520 0.133200
Year.CatD         6.400e+00  5.240e+00   1.221 0.226211
Year.CatE         5.193e+00  6.863e+00   0.757 0.451855
Year.CatF         9.209e+00  8.007e+00   1.150 0.254191
Literacy          -3.552e-01  1.573e-01  -2.258 0.027237 *
Unemployment      7.354e-02  2.903e-01   0.253 0.800777
Household.Size    8.469e+00  5.260e+00   1.610 0.112058
CPI               -1.576e-01  9.958e-02  -1.583 0.118104
Thrift.LOS.Adj    2.016e-01  9.328e-02   2.161 0.034235 *
Thrift.LOS.Adj.2  -2.577e-04  1.417e-04  -1.819 0.073394 .
Rural.Coop.LOS.Adj  2.928e-01  2.076e-01   1.411 0.162948
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

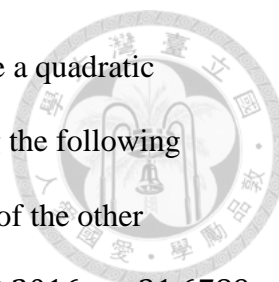
Residual standard error: 2.509 on 67 degrees of freedom
Multiple R-squared:  0.9176,    Adjusted R-squared:  0.8832
F-statistic: 26.66 on 28 and 67 DF,  p-value: < 2.2e-16

```

Based on the estimated coefficients produced by the regression analysis, some of the independent variables were found to have a significant effect on Poverty Incidence.

The following estimates are made assuming that all other variables are held constant.

Literacy Rate was found to have an inverse correlation with Poverty Incidence, with an approximate reduction of 0.3552% for every percent increase in Literacy.

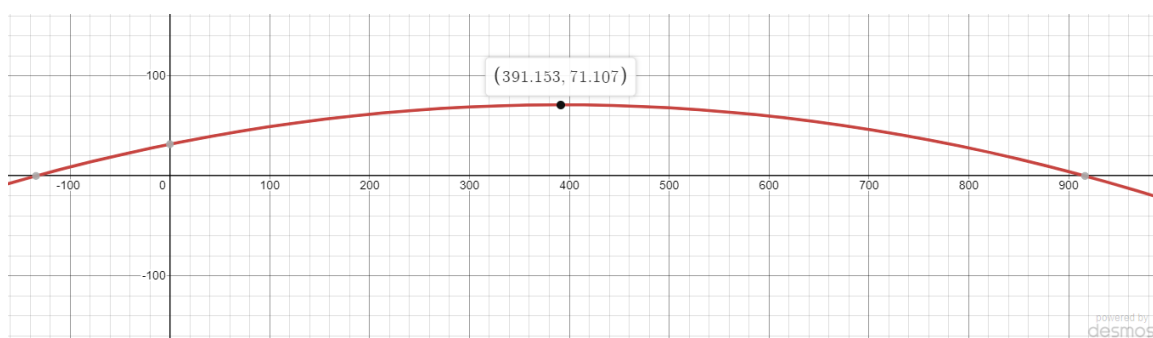


The independent variable Thrift Bank LOS was found to have a quadratic relationship with the dependent variable. This can be described using the following formula: $y = -0.0002577x^2 + 0.2016x$. Using the average values of the other variables, the following formula is derived: $y = -0.0002577x^2 + 0.2016x + 31.6789$. This would result in the graph found in Figure 9. In this case, increasing Thrift Banks loans outstanding results in an increase in Subsistence Incidence until Php391.153 billion, after which Subsistence Incidence begins to decrease.

Several of the indicator variables for certain regions were also found to be significant. Subsistence Incidence was higher than average in regions IX – Zamboanga Peninsula, VI – Western Visayas, X – Northern Mindanao, XII – SOCCSKSARGEN, and XIII – Caraga. On the other hand, it was lower than average in regions I – Ilocos Region, III – Central Luzon, IVA – CALABARZON, and NCR. This could be attributed to differences in infrastructure, geographical location, and government policies.

Figure 9

Thrift Banks Loans Outstanding vs. Subsistence Incidence as estimated by the regression model and using average values



Note. The x-axis represents the amount of Thrift Banks Loans Outstanding in billions of Philippine Pesos. The y-axis represents the percentage of Subsistence Incidence.

Source. This graph was created with the Desmos online graphing calculator.

5. Discussion



5.1. Key Findings

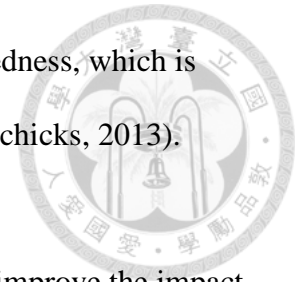
The study made use of two independent variables to represent microcredit, Thrift Banks LOS and Rural and Cooperative Banks LOS. Thrift Banks LOS was found to have a significant relationship with both Poverty Incidence and Subsistence Incidence. On the other hand, Rural and Cooperative Banks LOS was found to have no significant relationship with either Poverty Incidence or Subsistence Incidence.

However, the significant relationship between Thrift Banks LOS and both dependent variables, Poverty Incidence and Subsistence Incidence, is quadratic rather than linear. The first model indicated that, with all other variables held constant at their average values, Poverty Incidence would increase until Thrift Banks LOS had surpassed Php375.85 billion, after which it would decrease. The results are similar for the second model. It indicated that, with all other variables held constant at their average values, Subsistence Incidence would increase until Thrift Banks LOS had surpassed Php391.153 billion, after which it would decrease. Considering that the number of data points with Thrift Banks LOS above these two thresholds of Php375.85 billion and Php391.153 billion is very limited, the result is not well supported.

As such, this study concludes for research question “*Do microloans have an impact on poverty levels in the Philippines?*” that microloans have no significant impact. This supports the hypothesis: *Microloans do not have a significant impact on poverty levels in the Philippines.*

The findings are in line with that of Duvendack and Mader (2019), which state that claims about the impact of microcredit are overblown. This could be due to consumption smoothing (Wickramasinghe & Fernando, 2017). If the money loaned is not used for income-generating purposes, this could put borrowers in further debt rather

than help them to overcome poverty. This could lead to over-indebtedness, which is when borrowers have to make large sacrifices to repay their loans (Schicks, 2013).



5.2. Research Implications

Some recommendations can be made regarding practice. To improve the impact of microcredit, microfinance institutions (MFIs) must prioritize the welfare of their borrowers over their own profitability. Prioritizing profitability could encourage the recommendation of unsuitable financial products or services to customers, which could cause trouble for them financially. Those working in MFIs also must properly assess the ability of potential borrowers to repay loans before issuing them. This could prevent the cycle of debt that some borrowers enter.

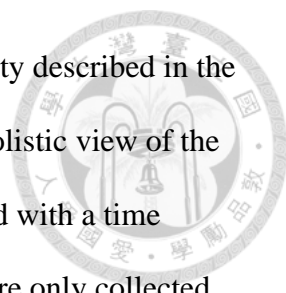
5.3. Scope and Limitations

This study aims to determine the relationship of loan issuance by MFIs to quantitative, monetary measures of poverty in the Philippines at the national level. As such, other aspects of poverty such as health, education, and housing were not considered.

Poverty Incidence and Subsistence Incidence may inaccurately represent poverty levels in the Philippines. According to the Asian Development Bank, the methods used to determine poverty lines in the Philippines have received criticism (Aldaba, 2009).

Due to time constraints, secondary data is used for its availability and breadth. It is the most time-efficient method for obtaining information that covers all 17 regions in the Philippines and as many MFIs as possible.

Due to limited availability of information, not all microfinance institutions in the country were considered and other variables were not used in the study. This includes the category of MF-NGOs. In addition, data such as the number of active borrowers per region is unavailable. This would have aided in the measurement of microcredit



implementation. More detailed information on other aspects of poverty described in the Multidimensional Poverty Index would have also provided a more holistic view of the dependent variables. For the same reason, the analysis was performed with a time increment of three years instead of annually since poverty statistics are only collected by the PSA every three years (2006, 2009, 2012, 2015, 2018, 2021). The data for Thrift Banks LOS and Rural and Cooperative Banks LOS was also only found for these six years, limiting the amount of data that could be used in the model and causing overfitting. For other control variables, such as functional literacy rate and average household size, information was only collected by the PSA every 5 to 6 years. Because of this, the data used in the analysis was based on the closest year. Another limitation is the separation of data for Rural and Cooperative Banks. While data for total loans outstanding for Rural Banks and loans total outstanding for Cooperative Banks was available, this was consolidated when the data was segregated by region.

5.4. Areas for Future Research

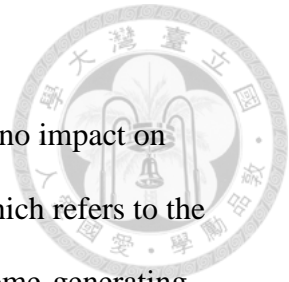
Related studies conducted in the future can consider including more years' worth of data to reduce the issue of overfitting in the model. They can also include MF-NGOs, a sector of the microfinance industry in the Philippines that was not included in this study due to the lack of availability of information.

More control variables could also be explored. In doing so, it may be possible to discover the cause of the differences in poverty and subsistence incidence among regions.

6. Conclusion

The findings of this study show that microloans have little to no impact on poverty alleviation. This could be due to consumption smoothing, which refers to the misallocation of the borrowed funds for expenses rather than for income-generating purposes. This makes repayment of the loans more difficult and could lead to over-indebtedness. Furthermore, providing borrowers with access to additional funds could encourage spending beyond their means. This combined with higher interest rates and the uncertain profitability of their businesses could exacerbate the problem.

However, the impact of microloans on poverty alleviation may be improved by developing better screening processes to be performed on potential borrowers before issuing microloans. This would ensure that borrowers are allocating the funds properly and that they are able to repay their loans, preventing over-indebtedness.



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