



**Determinants of Credit Market Choices for Urban Low-Income Households, Sampaloc
Manila**

**In Partial Fulfillment of the Requirements for
Research Economics II**

LAU, Lance Victor

Prof. Rulina B. Vilorio

AEC4

2025

Abstract

This study investigates the determinants influencing credit market choices among low-income urban households in Barangay 571, Sampaloc, Manila. Despite efforts to expand financial inclusion in the Philippines, many low-income households remain dependent on informal credit providers due to persistent structural and socioeconomic barriers. Using a cross-sectional primary data gathered through surveys from August to October 2025, this research analyzes three critical dimensions of household credit behavior: credit participation, access to formal credit, and the likelihood of facing credit constraints. Utilizing the theories of financial dualism, credit rationing, and social capital, the study employs probit regression to estimate how income, employment status, financial literacy, and asset ownership shape household borrowing decisions. Results show that low-income households exhibit high participation in the credit market, driven largely by insufficient income and vulnerability to financial shocks. However, access to formal credit remains limited, with many respondents reporting difficulties. Findings further indicate that informal lenders continue to fulfill essential credit needs, functioning as substitutes or complements to formal institutions depending on borrower characteristics. The study concludes that district-level financial inclusion initiatives improve the responsiveness of formal financial institutions to the needs of low-income borrowers.

Acknowledgement

The completion of this thesis would not have been possible without the guidance, support, and encouragement of numerous individuals and institutions. I would like to express my deepest gratitude to my thesis adviser, Prof. James Catudan, for her invaluable insights, constructive feedback, and unwavering support throughout the development of this research. Her mentorship strengthened both the academic rigor and clarity of this study.

I extend my sincere appreciation to the residents of Barangay 571, Sampaloc, who generously shared their time and experiences as respondents. Their participation made this research feasible and meaningful. I am also grateful to the barangay officials who assisted in facilitating data collection within the community.

My heartfelt thanks go to my family, whose constant encouragement and understanding sustained me throughout this academic journey. Their support motivated me to persevere through the many challenges of writing and completing this work.

To my friends, classmates, and the Research Committee of SBES, thank you for your helpful comments, camaraderie, and moral support. Your presence made this process lighter and more enriching.

Finally, I give thanks to all individuals named and unnamed who contributed to the completion of this thesis. Your collective support has been instrumental in shaping the outcome of this research.

Table of Content

Chapter 1: Background of the Study	8
Introduction	8
Statement of the Problem	13
Significance of the Study.....	14
Scope and Delimitations of the Study	16
Chapter 2: Literature Review	18
Low-income Filipino Households.....	18
Determinants of Credit Choices.....	19
Research Gaps	25
Chapter 3: Theoretical Framework	26
<i>Financial Dualism</i>	<i>26</i>
<i>Credit Rationing Theory.....</i>	<i>26</i>
<i>Social Capital Theory</i>	<i>28</i>
Conceptual Framework	29
Operational Framework.....	30
Assumptions.....	31
Hypotheses	31
Chapter 4: Methodology.....	34
Research Design and Strategy.....	34
Research Participants/Respondents	35
Sampling Design	36
Measurement and Instrumentation.....	36
Research Procedures of Data Collection.....	37
Research Ethics Approaches	37

Data Analysis	38
Chapter 5:Results.....	42
<i>Empirical Results</i>	<i>42</i>
Probit Results & Diagnostics.....	48
<i>Probit Estimates</i>	<i>48</i>
<i>Accuracy Test</i>	<i>51</i>
<i>Likelihood Ratio Test.....</i>	<i>52</i>
<i>Multicollinearity</i>	<i>52</i>
<i>Linearity Test (Box–Tidwell Test)</i>	<i>53</i>
<i>Marginal Effects</i>	<i>54</i>
Chapter 6: Conclusions	56
Conclusion.....	56
Recommendation	59
References	63
Appendix A: Research Questionnaire.....	70
Appendix B: Google Colab Probit Estimates	73
Appendix C: Diagnostic Test	74

List of Figures

Figure 1: Household Decision making Process. Based on "Household Multistage Decision Process" by Chivakul, M., & Chen, K., 2008, What Drives Household Borrowing and Credit Constraints? Evidence from Bosnia and Herzegovina (IMF Working Paper No. 2008/202).	29
Figure 2: Household's Three-stage Credit Decision Process	30
Figure 3: Data Collection Procedure.....	37

List of Tables

Table 1: Informal Credit Sources by 2021FISTopline Report (BSP, 2022)	9
Table 2: Formal Credit Sources by 2021FISTopline Report (BSP, 2022).....	10
Table 3: Summary Statistics	40
Table 4: Gender & Marital Status	43
Table 5: Age & Number of Dependents	44
Table 6: Monthly Income & Employment Status	45
Table 7: Educational Attainment & Assets Owned	46
Table 8: Credit Decisions	47
Table 9: Probit Estimates	50
Table 10: Model Accuracy	51
Table 11: Likelihood Ratio Test	52
Table 12: Variance Inflation Factor.....	53
Table 13: Box-Tidwell Test	53
Table 14: Marginal Effect	54

Chapter 1: Background of the Study

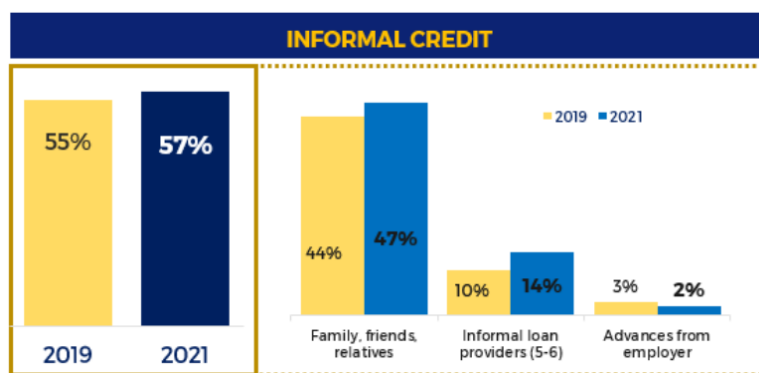
Introduction

Access to financial services remains uneven across the globe. According to the Global Findex (2021), the share of adults in developing nations borrowing from formal credit sources increased over the decade but remains low on average at 21 percent. Financial exclusion remains a global concern. It is particularly pronounced in places like the Philippines. Financial exclusion continues to undermine the potential benefits of economic development, despite empirical evidence showing that basic access to savings, payments, credit, and investment services can improve people's livelihoods (BSP, 2013; ADB, 2021; World Bank, 2018). As such, the promotion of financial inclusion programs is essential to improving the welfare of underserved and unserved markets (BSP, 2013).

A key innovation in financial inclusion has been the emergence of microfinance as a tool for expanding access to financial services. Microfinance has contributed to improving the well-being of low-income individuals and reducing poverty in both developing and developed economies. Studies also show that financial inclusion helps bridge inequality gaps (World Bank Group, 2022). Furthermore, microfinance addresses the shortcomings of earlier directed credit and guarantee programs (ADB, 2021; BSP, 2013). Despite the expansion of microfinance, a significant portion of low-income households continue to rely heavily on informal credit sources, highlighting ongoing gaps in financial service accessibility.

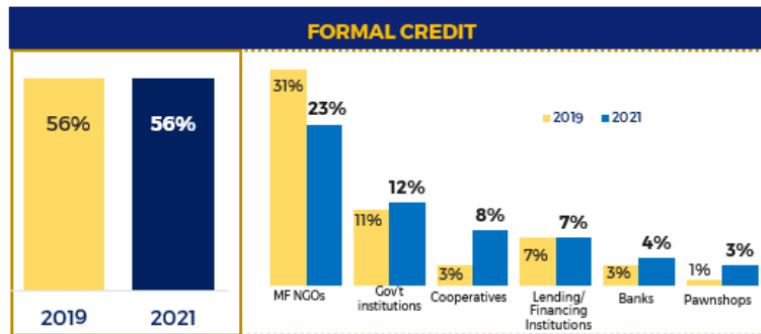
The persistence of informal credit in low-income countries stems from the inability of formal providers to meet the financial needs of the poor (Shem & Atieno, 2001). In the Philippines, informal credit remains a common funding source for households, particularly those with low incomes. This trend can be further visualized by the 2021 Financial Inclusion Survey by the Bangko Sentral ng Pilipinas (2022), where borrowing from family, friends, and informal lenders slightly increased to 47% and 14%, respectively (Figure 2). Despite the consistent overall usage of formal credit among Filipinos, shifts occurred within the formal lending landscape. The dominance of microfinance non-government organizations (MFNGOs) as a credit source lessened, even as they remained the top provider. Concurrently, borrowing from other formal institutions saw an upward trend (Figure 3). According to the BSP (2022), most Filipino households borrow to cover daily expenses, with interest rates, loan amounts, and maturity periods being key considerations. About half of the adult population perceives borrowing from formal institutions, including banks and online lenders, as difficult.

Table 1: Informal Credit Sources by 2021FISTopline Report (BSP, 2022)



Note: Respondents can report more than one response

Table 2: Formal Credit Sources by 2021FISTopline Report (BSP, 2022)



Note: Respondents can report more than one response

To contextualize this landscape, the study distinguishes between formal and informal credit providers. Formal providers include banks, quasi-banks, pawnshops, and other financial intermediaries authorized and regulated under the Bangko Sentral ng Pilipinas (BSP) or the Securities and Exchange Commission (SEC). These providers operate without relying on personal relationships to enforce repayment (Karaivanov & Kessler, 2018). According to Abdelzaher (2019), formal credit aims to improve the conditions of the poor by offering broader savings and lending services. In contrast, informal credit refers to loans from family, friends, neighbors, or moneylenders that rely on social ties. These arrangements are not subject to formal legal enforcement (Abdelzaher, 2019).

Literature exploring the determinants of credit decisions has been well-studied (Asiamah, Steel & Ackah, 2021; Tang & Guo, 2017; Doan et al., 2010; Chivakul & Chen, 2008). These studies reveal various factors affecting access to credit, for example, in Bosnia, credit participation follows a U-shaped pattern by age, peaking around 45 (Chivakul, 2008), while a study in rural China, Tang & Guo (2017), explained that the government can play a significant role in constraining households by making the formal credit more flexible. Other studies find that higher income and younger age correlate with greater credit participation (Doan et al.,

2010). According to Asiamah, Steel & Ackah (2021), the drivers of credit participation and credit constraints can vary significantly between urban and rural contexts. Although global financial technology and mobile banking are expanding, structural barriers, like low financial literacy, insufficient documentation, and gender disparities, continue to limit inclusion (Demirgüç-Kunt et al., 2018).

Doan et al. (2010) further reported that nearly half of poor households face difficulties obtaining adequate formal credit. Income and assets are significant factors influencing credit access (Doan et al., 2010; Chivakul, 2008), leading low-income borrowers to often rely on informal sources, even if they prefer formal options. Employment also plays a role in financial access (Allen et al., 2016). In developing countries, key barriers include limited documentation, irregular income, and poor access to banks (Llanto et al., 2018). Madestam (2005) highlighted that underdeveloped credit markets often result in households using both informal and formal funding simultaneously. These constraints underscore the credit rationing by formal lenders due to asymmetric information, where borrowers possess more knowledge about their repayment ability than lenders.

Informal credit serves as a viable alternative for many Filipinos unable to access formal options. Santos (2019) noted that Filipino borrowers are often satisfied with informal lenders, who help them cover daily needs. The infamous “5-6” lenders are popular because they require no collateral or documentation, making access easier (Dula & Grego, 2015). Despite financial market innovations and regulations, informal credit continues to thrive. Mansour, Samak, and Gad (2024) found a positive relationship between the demand for formal loans and informal borrowing, suggesting informal credit complements rather than substitutes for formal lending. One of the disadvantages of formal credit is inflexibility; borrowers often find that informal

credit providers are more flexible when it comes to payment deadlines, and are easier to access compared to formal credit providers that require borrowers to offer collateral. Despite government efforts of microfinance programs offering better terms, Zapata (2006) & Karaivanov & Kessler (2018) highlighted that borrowers prefer informal credit providers for their lower nominal rates and fewer requirements.

Manila, being the capital of the Philippines, has a population that spans a wide varying characteristic. McFarlane, Saguin, and Cunanan (2024) cited that Manila is characterized as the world's densest and unequal city, with over half of the households living in low-income areas. The district of Sampaloc, classified as a low-income neighborhood (Hickman et al., 2017), presents a diverse urban population that could provide relevant insight into the variations in household credit decisions in the credit market conditions. Moreover, low-income individuals often find themselves unable to access formal credit markets due to their limited social network and financial capabilities (Yuan & Xu, 2015). Reflecting the broader trend in the Philippines, they are often financially vulnerable and more susceptible to informal lenders such as the widely known "5-6" and the "paluwagan" for their immediate credit needs. This diversity in income, employment, financial literacy, and assets within Manila could enable researchers to assess the influence of these characteristics on credit decisions.

This paper complements existing literature by deconstructing credit decisions into three stages: participation, access, and constraint. Where credit participation is whether the household borrowed or did not borrow from any credit source; Credit access shall be the household's ability to obtain a loan from formal credit sources; Credit constraints is where a household needs or desires a formal loan but is unable to obtain it due to rejection. Then the study analyzes the socio-economic profile of households and understands how it influences their credit participation

in the credit market, Barangay 571, Sampaloc, specifically chosen for being a low-income neighborhood with high rates of informal workers. Subsequently, this study will also measure the probability of them successfully obtaining formal credit sources. Afterwards, it will measure the credit constraints faced by low-income households when accessing formal credit providers.

Utilizing a logistic regression, this study will assess the probability of a borrower participating in the credit market and difficulties in borrowing from formal sources based on their socio-economic profile. Data collection will be gathered through primary surveys, employing a probit model as the statistical tool. This research will explore how these factors influence an individual to participate in the credit market, their access to formal credits, and their likelihood of being rejected by formal credits affects their financial decisions, and see whether these factors will help alleviate or reinforce financial exclusion.

Statement of the Problem

Prior studies have shown that access to financial services plays a crucial role in improving the livelihoods of individuals and also enhances economic development. Despite efforts to strengthen formal credit providers, however, the persistence of informal credit among the low-income and marginalized communities raises critical questions regarding its role. The district of Sampaloc may provide insight into the dynamics of the credit market on the demand side.

This study seeks to address the following research questions:

1. What is the socio-demographic profile of the households in the credit market of the city of Manila?
 - 1.1. Gender
 - 1.2. Marital Status

- 1.3. Age
- 1.4. Number of Dependents
2. What are the factors? How do these factors influence a household's likelihood of credit market participation, their access to formal credit sources, and their likelihood of being credit-constrained when trying to access formal credit providers?
 - 2.1. Income per Month (Individual)
 - 2.2. Employment status (Full Time Only / Part Time Only / Unemployed)
 - 2.3. Financial Literacy (Tertiary Level or Not)
 - 2.4. Assets (Collateral)
3. What are the policy recommendations based on the researcher's findings?

Significance of the Study

The significance of this study is to address the challenges of financial inclusion by determining the socio-economic profile and factors that influence the credit decision (credit participation, credit access & credit constraints) by borrowers in the Sampaloc district, a low-income urban neighborhood, which presents a compelling case for examining the interplay of formal and informal credit providers in the credit market. Through examining the roles of credit providers from the demand side, this study provides an estimate of households' reliance on informal credit.

Public Sector

The findings of this study can also help inform the public sector, such as policy makers, in formulating an effective policy that improves the financial ecosystem that ensures equitable access to credit while protecting them from amoral lending services, and the stability and inclusivity of the financial system, particularly for low-income households. By identifying the

key factors driving restricted access to formal credit, policymakers can develop district-specific interventions that enhance financial access and ensure finance programs reach the most vulnerable groups.

Formal Credit Providers

Formal Credit providers can benefit from this study by providing valuable insights into the borrowing behavior of low-income households and understanding why specific demographics of the population remain excluded from their services. The result from this study can help these institutions assess the structural barriers preventing low-income households from accessing formal credit and help them to design financial products to be better tailored to meet the consumers' needs. By designing their lending models and risk assessments to accommodate the underserved and unserved populations, formal credit providers can play a more significant role in advancing financial inclusion.

Community Development Planners

This study aims to help inform community development planners in their program design. Understanding the factors that influence low-income credit access that helps planners design inclusive economic policies and microfinance programs that target structural barriers. Moreover, the role of community-level infrastructure, education, and support systems could be used to enhance financial behavior in areas where credit exclusion is highest.

Low Income Borrowers

This study sheds light on how these factors motivate households to participate in credit markets and the difficulties in borrowing that shape their credit decisions. Where insights from this study can lead to the establishment of borrower education programs that improve financial decisions. Estimating how borrowers are approved or denied formal credit builds confidence and

encourages greater use of formal financial services. Additionally, if the findings indicate that formal financial sources are rarely utilized, it points to structural issues that can be addressed through targeted financial products designed to meet low-income borrowers' actual credit needs.

NGOs

Informed NGOs can more effectively design lending and support programs that are responsive to the actual needs and limitations of their communities. Understanding the constraints faced by borrowers can also help NGOs improve credit risk assessment tools for low-income households.

Academic Researchers

This paper will add to the existing literature on credit market behavior, particularly within an urban developing country context. Being focused on a specific urban district like Sampaloc can offer valuable comparative insights to studies conducted in rural areas or other urban settings.

Scope and Delimitations of the Study

This study focuses on assessing credit market decisions of residents of Manila, specifically households from Sampaloc and their corresponding credit behaviour, namely their loans borrowed in order to cover their day-to-day expenses, emergencies, and financial goals. The research focuses on the household head's borrowing behavior changes as each household has varying socio-economic characteristics, such as their income, employment, financial literacy, and asset ownership.

The scope of this study is limited in scope of the credit market to the demand side of the credit market and geographically confined to selected barangay within Manila. Consequently, the findings may not be fully represented in other urban or rural contexts. Additionally, this

study also employs primary cross-sectional data collected in August to October 2025, which restricts its ability to capture long-term trends and behavioral changes of the borrowers.

The paper focuses on credit market participation, assessing the formal sources and difficulties in borrowing from formal sources, without considering the macro-economic factors, supply-side of the credit market, or the impact of ease of access to formal credit on household welfare. Despite these limitations, this study aims to provide a meaningful contribution to understanding financial behavior in underserved communities and offers valuable insights for both academic inquiry and policy intervention.

Chapter 2: Literature Review

The purpose of this chapter is to present previous literature on credit decisions faced by households in order to establish the foundation for this study. It explores the role of the borrower's socio-economic characteristics in influencing borrowing behaviors. Additionally, it investigates the structural barriers that limit low-income households from utilizing the formal credit market. Lastly, it reviews the gaps in the previous literature and will focus on the interaction between the demand for credit and formal credit providers for the low-income community of Sampaloc District in Manila.

Low-income Filipino Households

The Philippine Institute for Development Studies (PIDS) categorizes low-income families, both the poor and low-income but not poor, as having an income of less than 24,060 pesos per month. This was the large proportion of the population as of 2021, standing at 59.3 percent. There is, however, a decreasing trend in the proportion of low-income families in the population. In the National Capital Region (NCR), 36.7 percent of the families are below the low-income line, with a Philippine average household size of 4.2 members, but lower-income households have a mean household size of 5.0 members. Such households tend to be multi-generational in structure. Furthermore, the report by Albert, Briones, and Rivera (2024) highlights a notable prevalence of single-parent households within this segment.

According to the Bangko Sentral ng Pilipinas (BSP, 2022), only 44 percent of individuals in the low-income class own a formal financial account, reflecting a significant gap in financial inclusion. This group also ranks lowest in terms of financial health, frequently relying on credit to meet daily expenses and cope with emergencies. In terms of labor participation, women from

low-income households exhibit lower employment rates than those in higher-income households. Additionally, low-income individuals generally work fewer hours and are often engaged in short-term or casual employment. As a result, about one-fourth of low-income Filipinos are underemployed. The same report notes that these households spend the highest proportion of their income on food, underscoring their economic vulnerability.

Combined, the PIDS and BSP findings present an overall picture of the structural handicaps experienced by low-income Filipino families. They are characterized by lower and more volatile income, greater household size, restricted access to financial institutions, and insecure work. Understanding how these socioeconomic attributes affect participation in credit is crucial in finding out the groups most likely to avail themselves of formal credit and the most at risk for exclusion.

Determinants of Credit Choices

In the context of this study, credit participation refers to both the demand for credit and the borrower's eligibility to access it through either formal or informal financial institutions. It entails the capacity to delay payments over time, granting access to resources for the purchase of goods and services (Braswell & Chernow, n.d.). In low-income contexts, participation in the credit market can be both a coping mechanism and a pathway for economic advancement. The following sections explore four key socioeconomic determinants of credit participation, such as income, financial literacy, employment status, and asset ownership based on recent empirical findings and their relevance to low-income populations.

The question regarding being able to access formal credit sources and the likelihood of facing credit rationing by formal credit sources, especially among low-income households, are

often structural and systemic. Formal credit is generally associated with welfare improvements, as shown by Luan and Bauer (2016) and Quach (2016), but access is often constrained by institutional requirements. Dula and Grego (2015) and Demirgüç-Kunt et al. (2018) report that documentation, collateral, and income proof create high entry barriers for the poor, forcing many to rely on informal sources. This shows that despite high credit demand in vulnerable communities, formal market exclusion remains prevalent. The literature broadly affirms that socioeconomic characteristics, including income, employment, financial literacy, and assets, are critical in shaping credit constraints. Moreover, this study will also take into account the constraints faced in loan requests from informal credit providers.

The BSP (2022) reports that low-income households, due to insufficient income and limited savings, are key drivers of credit demand in the Philippines. This supports the finding that credit participation is inversely related to income; higher-income individuals are generally less reliant on borrowing. As noted by Pinitjitsamut and Suwanprasert (2022), households often resort to borrowing when their income is insufficient to meet high or unforeseen expenses. Similarly, Tang and Guo (2017) observed that more productive farmers exhibit higher demand for credit, suggesting that credit use is often a function of both financial need and investment capacity. For low-income households, the struggle to meet basic expenses, such as food, healthcare, and housing, places a strain on their finances. This financial pressure increases their dependence on credit, even for small or short-term needs. With formal credit often inaccessible due to structural barriers, many are forced to turn to informal lenders, who may offer more flexible terms but at significantly higher costs. This dynamic exposes low-income borrowers to higher risks of debt cycles and financial instability, underscoring the urgent need for inclusive and accessible credit solutions.

The literature on household income and difficulties in borrowing indicates that an inverse relationship exists between household income and credit constraints. Studies by Bathan and Gordoncillo (2017) and Lin et al. (2019) confirm that income significantly reduce the likelihood of facing borrowing difficulties. Higher income enhances repayment capacity, making borrowers more attractive to lenders (Tang & Guo, 2017). Richer households are also more likely to be served by formal lenders, while the poor, deemed high-risk due to unstable or low income, often face rejection. Layaoen and Takahashi (2022) add that wealthier borrowers gravitate toward microfinance and formal banking, reinforcing the inequality of access. Hence, low-income households experience a critical disadvantage, namely, strong demand for credit paired with institutional exclusion, intensifying their financial vulnerability.

Employment status influences credit participation and credit access, particularly among low-income individuals. As a proxy for income stability, employment significantly influences a borrower's confidence and capacity to meet formal credit requirements. Mansour, Samak & Gad (2024) highlight that individuals with more stable income tend to engage in the formal credit market at a higher rate. In contrast, individuals with irregular or unstable income sources often avoid participating in the credit market due to fears of default. These findings highlight how employment security influences not just access to credit, but also the degree to which households depend on it to maintain financial stability. Additionally, Layaoen and Takahashi (2022) found that self-employed individuals, often viewed as enterprising, receive favorable consideration from formal lenders. However, Pinitjitsamut and Suwanprasert (2022) caution that income volatility in specific jobs results in credit rationing, particularly in Thailand. These studies suggest that lenders closely assess employment type and its associated income stability when approving loans. For low-income borrowers, especially those informally employed or seasonally

engaged, this translates to higher rejection rates and more reliance on informal lending networks. Therefore, while employment improves credit access, its quality and perceived reliability are equally critical in formal credit evaluations.

Education is often used as a proxy for financial literacy, with the understanding that more educated borrowers are less likely to participate in the credit market while easing their access to formal credit. Davies et al. (2019) stated that lower financial literacy is strongly connected to poor borrowing behaviours and overindebtedness, with concerns that young people are particularly at risk. Similarly, Ambong & Pasco (2022) observed that rural farmers with a greater number of years of completed education were correlated with reducing the likelihood of borrowing. This aligns with Mansour, Samak & Gad's (2024) finding of a negative relation between increasing education level and credit participation during the progression from illiterate to literate education level. Mansour, Samak & Gad (2024) further explained that the more educated borrowers are expected to be more capable of comprehending loan conditions and assessing the resulting debt burden, which could increase their risk aversion towards using formal loans. In line with this, Ambong & Pasco (2022) suggested that better-educated borrowers are more financially stable, thus reducing their need for loans. However, evidence to the contrary exists. Mwonge & Alexis (2021) found that greater educational attainment positively influences credit participation among farmers in Tanzania, particularly from formal sources, implying that with greater knowledge, potential borrowers can more likely comprehend available information with regard to credit services and are more able to fill out loan applications. Several studies have found that higher education levels have a negative effect on credit rationing, meaning that better-educated borrowers face fewer credit constraints. Specifically, Lin et al. (2019) found that household heads who have at least a high school

education are less likely have a 10.26 percent decrease in their probability of facing formal credit constraints, and Tang & Guo (2017) along with Akpan et al., (2013) estimate that for every additional year of education raises the probability of securing a formal credit increases by approximately 2.5% and 3.1% respectively. Supporting this, Asiamah, Steel & Ackah (2021) note that household heads from urban and rural populations with tertiary education were less likely to experience credit constraints from formal credit providers, and highly educated household heads tend to have stable incomes.

Overall, prior literature demonstrates that higher levels of education are associated with greater financial literacy, leading to a reduction in the need to participate in the credit market. This is primarily due to an enhanced understanding of loan conditions, increased risk aversion towards debt, and ultimately, greater financial stability that lessens the perceived need for external credit. Moreover, higher education levels correlate with greater access to financial knowledge, a stronger intention to invest, and, consequently, reduced credit constraints.

Asset ownership presents a nuanced influence on credit participation and credit access. While conventional economic theory suggests that owning assets facilitates access to credit by serving as collateral, empirical findings present mixed results. Tang and Guo (2017) found a positive relationship between land ownership and formal credit participation in rural areas. However, Mwonge & Naho (2021) and Mansour, Samak & Gad (2024) contradict this, with Mansour, Samak & Gad (2024) explaining that asset-rich individuals, particularly those owning houses or agricultural land, are less likely to apply for formal credit, suggesting a substitution effect. In their case, the need for credit diminishes as financial stability improves. Conversely, households could be motivated to borrow to improve their standard of living. Dharmadasa & Gunatilake, (2023) found that they borrowed money in order to either renovate their house or

invest on income-generating activities. This highlights the dual role of assets, either as a facilitator or a substitute for credit which varies across income levels. Pang, Kuang, and Gong (2014) and Layaoen and Takahashi (2022) found that wealthier households with substantial asset holdings face fewer constraints in the formal credit market. However, Bathan and Gordoncillo (2017) highlight that households without tangible assets, especially in rural areas, experience intense credit rationing. Interestingly, Tang and Guo (2017) reveal that an increase in land size paradoxically increases credit constraints in some rural settings, possibly due to complexities in land titling or lender biases.

Therefore, among low-income populations, the lack of asset ownership may both increase demand for credit and simultaneously indicate that not all assets are equally effective in reducing credit barriers. Among the poor, the absence of recognized or liquid collateral often excludes them from formal finance, underscoring the structural rigidity in the current credit systems.

Though understanding the factors affecting credit participation in the credit market is essential, it is crucial to explore barriers that impede low-income individuals from successfully accessing formal credit. Analyzing these factors could help in promoting financial inclusion that gives access to resources that can improve livelihoods. These findings highlight how income level, employment type, and asset shape credit choices. Analyzing these socio-economic factors could be essential in addressing financial inclusion gaps and designing policies. Specifically, such analysis can inform targeted interventions that address challenges faced by low-income urban households and promote greater access to financial resources and services.

Research Gaps

The existing literature explored the relationship between socio-economic profile and their respective credit decision; there remain critical gaps that this paper seeks to address. Prior studies, both primarily focused on rural areas, specifically with farmers and agricultural workers, assessed the credit market participation and difficulties in borrowing. This leaves urban communities, such as those in Sampaloc, Manila, underrepresented, despite their unique financial circumstances, employment structures, and access to credit.

Additionally, most prior literature tends to analyze the credit participation, credit access, and credit constraints separately, rarely assessing the dynamics between the three in a single framework. Credit participation represents a household's willingness to take on credit (loan), credit access is whether the household obtained a formal loan, and credit constraints are the barriers they encounter within the formal credit system in the form of rejection. Thus, a comprehensive assessment of both dynamics, in particular, urban low-income settings, is necessary for informing financially inclusive policies.

Furthermore, while prior literature acknowledges income as a critical factor in credit access, less attention is given to the roles of employment instability and financial vulnerability among urban poor communities. Finally, most of the available evidence is taken from different institutional and cultural contexts, such as rural Vietnam, Egypt, Africa, and Ghana, which may not fully capture the dynamics of the Philippine financial environment and urban landscape. There is a clear need for locally grounded research that can inform the design of financial inclusion initiatives tailored to urban low-income households in the Philippines.

Chapter 3: Theoretical Framework

In this chapter, relevant theories will be presented for the study. The researcher finds the Credit Rationing Theory & Discrimination Theory in Credit Markets to be appropriate for this study. Furthermore, this study will also present the Conceptual Framework, Operational Framework, Assumptions, Hypotheses & Definition of Terms.

Financial Dualism

The financial accessibility is significantly influenced by the interplay between formal and informal credit, especially in low-income countries where formal credit providers failed to provide a broader population. Shem & Atieno (2001) defined financial dualism as the informal credit is a response to the formal credit's characteristics of inefficiency and defined as too bureaucratic, too regulated and too rigid to provide financial services for the low-income countries making it unsuitable and fueling the existence of informal credit. From the concept of financial dualism, this study posits that borrowers' socio-economic profile influences the probability of credit participation from either formal or informal credit providers. Moreover, the study contends that formal credit constraints are varied across borrowers by their socio-economic factors. Lastly, the researcher hypothesizes that lowering the constraints faced by borrowers in the formal credit lenders can mitigate their reliance on informal lenders.

Credit Rationing Theory

According to Christie (2014), the credit market at equilibrium is characterized by credit rationing. This phenomenon is not when a potential borrower refuses to accept credit because the

price is too high but when credit is denied at a price selected by the lender itself. Thus, this leaves unsatisfied demand for credit at the given price, where credit demand exceeds supply at that price, even under high interest rates the lender refuses to provide the loan. Even after analyzing each borrower's financial information, the formal credit institutions may not be able to distinguish perfectly between borrowers with different credit risks (Greenbaum, Thakor & Boot, 2019). The primary cause of this asymmetric information, Christie (2014) highlights that credit market participants having different information are motivated differently to use that information, such that the asymmetric information may favor the borrower with better information about their investment opportunities and risk involved, their own character, and the amount of efforts they're willing to give compared to the information available to lenders. This advantage of information leads to moral hazard for borrowers and selection problems for lenders, thus, may result in credit rationing (Stiglitz & Weiss, 1981).

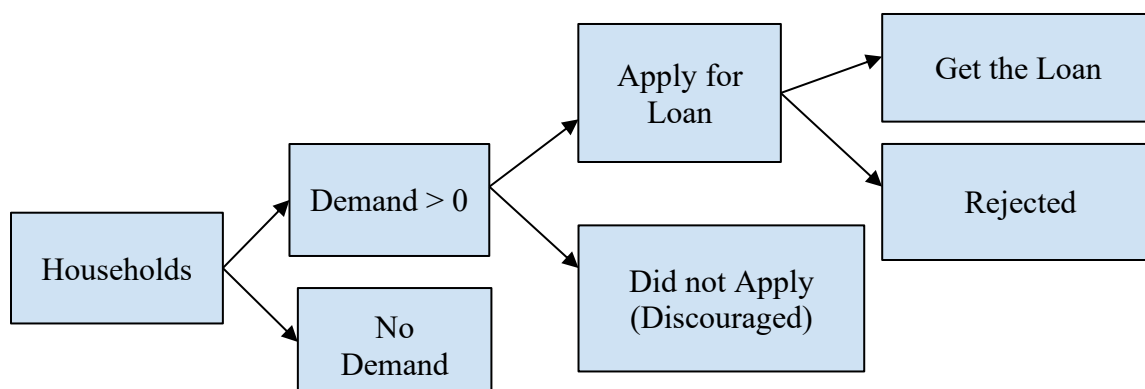
Credit Rationing Theory is used in this study to determine as the researcher finds it appropriate it provides a comprehensive understanding of the inherent challenges faced by borrowers in formal credit providers, which are often characterized by information asymmetry and the risk of adverse selection especially from those living in low-income neighborhoods. Analyzing the dynamics that can contribute to the existing literature on financial inclusion while also providing insights into the factors that drive households to seek loans. Since the study is limited to the demand-side of the credit market, it primarily focuses on quantitative and qualitative characteristics of borrowers and how lenders perceive their ability and willingness to repay loans.

Social Capital Theory

Trust and social networks play a significant role in the credit market, particularly in both informal and formal lending contexts. Vasquez et al. (2024) social capital helps increase the chances of access to credit and reduces the default rates and transaction costs by expanding information channels while increasing the capacity to afford obligations. While Karaivanov & Kessler (2018) noted that informal loans can be enforced by the threat of severing social ties, and such loans from the lender to be someone they are close to, informal loans tend to have a lower interest rate and collateral than formal loans from the credit market, even the possibility of zero interest and collateral. In the context of this study, social capital has an influential factor by facilitating trust and lowering perceived risks of failure of repayment while giving lower interest rates for borrowers. For the informal credit markets, social capital strengthens financial interactions by fostering cooperative behavior and improving access to credit with credit suppliers by depending on trust.

Conceptual Framework

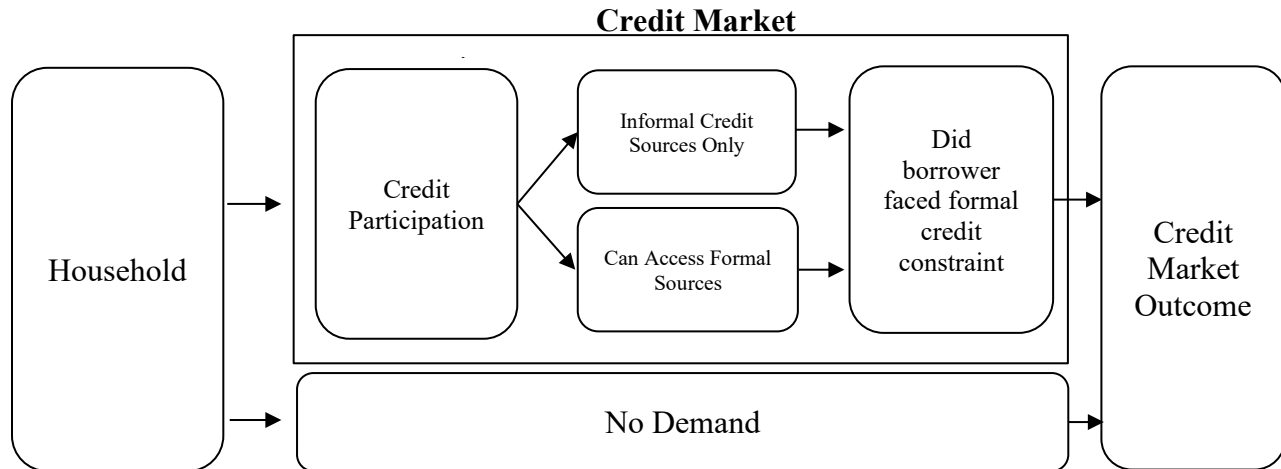
Figure 1: Household Decision making Process. Based on "Household Multistage Decision Process" by Chivakul, M., & Chen, K., 2008, What Drives Household Borrowing and Credit Constraints? Evidence from Bosnia and Herzegovina (IMF Working Paper No. 2008/202).



The “Households Multistage Decision Process (Figure 4)” by Chivakul (2008). It illustrates the step by step decision process a household undergoes. Where participating in the credit market relies on both the need for funds and the availability of credit. First, a household might not even need to borrow money. But if they do, they'll consider actually applying for a loan, there they might worry about getting turned down or not being able to handle the payments down the line. If the borrower is not discouraged and applied for a loan, then the lender has the choice of accepting the loan request. Those who got approved will have their credit demand satiated. This whole process demonstrates that there are plenty of reasons why a household might have no debt at all. What they expect to happen in the future, especially how much money they think they'll have, really shapes these decisions.

Operational Framework

Figure 2: Household's Three-stage Credit Decision Process



This study's framework, adapted from Chivakul and Chen (2008), illustrates the decision-making process of households within the credit market. As shown in Figure 5, the analysis begins with the household, whose socio-economic characteristics, such as monthly income, financial literacy, employment status, and asset ownership influence its decision to participate in the credit market.

The first stage examines credit participation, whether the households decide to demand credit. Those with no demand exit the credit market, while those who choose to borrow proceed to the next stage. The second stage, borrowing households determine their source of credit, which may come from formal credit sources or informal credit sources. Given that this study focuses on low-income households, it focuses on the decision between formal and informal credit channels. The third stage evaluates credit constraints within the formal credit market. Borrowers who experience rejection or are unable to secure loans from formal institutions are

classified as credit-constrained, while those who have not experienced loan request rejection are considered credit-unconstrained. Notably, even after experiencing credit rationing, some households may still access formal credit sources through persistence or alternative arrangements.

This framework links household characteristics and borrowing decisions to the credit market outcome, providing a structured approach for analyzing how socio-economic factors shape credit access and constraints among low-income urban households.

Assumptions

1. Credit markets in general are characterized by the presence of asymmetric information, where borrowers have better knowledge about their financial situation and their capability for repayment compared to lenders, which then leads to adverse selection and credit rationing.
2. There is a significant influence of the borrowers' socio-economic characteristics when it comes to their demand for loans in the credit market.
3. When borrowers are subjected to credit rationing by a formal lender, they would either find other formal sources or turn to an informal lender to provide them credit loans.

Hypotheses

H_{01} : Monthly income does not have significant influence on the likelihood of participating in the credit market, access to formal credit sources, and the likelihood of being credit constraints.

H_{02} : Individuals with stable employment do not increase nor decrease the likelihood to borrow from the credit market, their access to formal credit source, nor does it significantly influence their probability of being credit constraints.

H_{03} : The level of financial literacy of the borrower does not have a significant influence on the likelihood of participating in the credit market, their access to formal credit sources, the being credit constraint.

H_{04} : Borrowers' asset (car & home ownership) does not have significant influence on the likelihood of participating in the credit market, their access to formal credit sources, nor chances of being credit constraint.

Definition of Terms

1. Financial Inclusion: financial products and services are affordable that help people to build wealth, invest in business and help people manage risks.
2. Credit Access: the ability of individuals or households to obtain loans from formal banks, quasi-banks & microfinance or other form of formal sources.
3. Credit Participation: the total amount of loans or credit that borrowers (households and businesses) are willing and able to take out at various prices (interest rates), time (maturity).
4. Credit Rationing: a phenomenon where lenders are unwilling to lend funds to borrowers at the market interest rate, even when they are willing to pay higher interest rates, often due to perceived risk and information asymmetry.
5. Collateral: The tangible and intangible resources such as land, vehicle jewelry and bonds etc.

6. Informal Credit Providers: defined as financial entities outside the supervision and regulation of the BSP, that form contracts or agreements made without recourse to the legal system for the exchange of funds at present or in the future.
7. Formal Credit Providers: defined as regulated financial entities, like banks and credit unions, that provide financial products such as credit and other financial services, are authorized and regulated by the BSP

Chapter 4: Methodology

This chapter will cover the data requirement, research method and statistical treatment necessary to analyze the credit market for Sampaloc Households with respect to credit participation and credit constraints. This chapter also consists of the Research Design and Strategy, Research Participants, Sampling Design, Research Procedures of Data Collection, Research Ethics Approaches & Data Analysis in order to obtain the crucial information.

Research Design and Strategy

This section consists of the approach used in this research to answer the research questions. This study employed descriptive, survey & cross-sectional research design aimed to understand the determinant of credit decision among households.

Descriptive

This study is descriptive for it summarizes the socio-economic, demographic of the Sampaloc low-income households. The data collected will summarize the different credit decisions by households particularly their credit participation and credit constraints. Through this, the researcher seeks to determine what motivates a household to demand for a loan and their subsequent difficulties in obtaining said loan. The results can help formulate future policy proposals to enhance financial inclusion in the country.

Survey

The strategy implemented by the researcher is an interviewer administered survey, which is the primary tool for data collection. The information will first be whether or not they borrowed money within the last 12 months (*binary* values), what are their credit sources from the last 12

months, and whether their loan request was rejected by a formal credit provider (*binary* values) in order to evaluate their credit participation and credit constraints.

Cross-sectional

The researcher also used cross-sectional analysis in this study. Wang & Cheng (2020), cross-sectional analysis are observational studies that assess data from a population at a single point in time. Moreover, cross-sectional studies do not follow individuals over time, and are usually inexpensive and easy to conduct Wang & Cheng, 2020). Simkus (2023) added that the sample examined depicts what already exists in the population without manipulating any variables or interfering with the environment. The researcher chose this type of research design to measure their credit participation and credit constraints without influencing households' credit market decisions.

Research Participants/Respondents

In this study, the target population is the urban households from the Sampaloc District, Manila. Specifically, the household heads, who are current residents of Barangay 571, and who are also earning PHP 24,060 or less as their monthly income. The researcher chose this district of Manila to identify the credit market decision among low-income urban households, in particular, the credit participation in the credit market, credit access, and credit constraints faced in formal credit providers among low-income households according to their socio-economic characteristics. As prior literature stated, lower-income households are more likely to demand credit while at the same time more likely to face borrowing difficulties in the formal credit sector.

Sampling Design

This study will utilize the simple sampling method for gathering data. First, the study utilizes the simple sampling method within the targeted district to gather respondents, which involves randomization in sample selection, where it also gives every member of the population an equal chance of being selected. In the context of this study, the respondents will be households randomly selected in each district. To find the sufficient number needed from the population to form its sample, the researcher used the Slovin Formula along with the Finite Population Correction. This formula determines the minimum number from the large population needed for the study to ensure a sample size that is representative of the households in the district. From the computation, the research will need at least 209 samples from the total population in order to have meaningful and reliable data for the research.

Measurement and Instrumentation

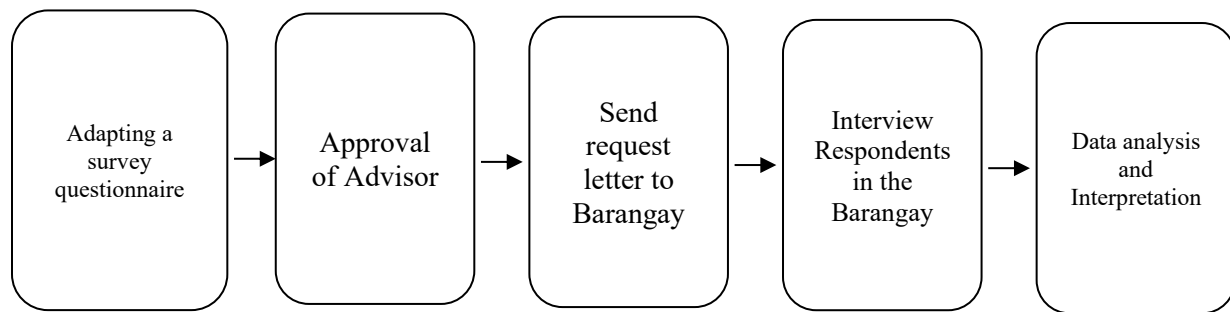
The main tool used for this study for data collection will be via survey questionnaires. After approval and subsequent testing, it can only be used for data collection to ensure its reliability. The content of the survey questionnaires will be designed for the research purpose, which is to identify the credit participation and credit constraints of the low-income households in the credit market.

The survey questionnaire collects qualitative and quantitative data from the research respondents, with a focus on the statement of the problem that aims to find how the factors influence households' credit market decisions. These characteristics consist of the households' income per month, employment status, and assets owned. The measure of credit participation will be done by whether they demanded for a loan in the last 12 months, ask who was their credit

providers, then whether they experience credit rationing by formal sources, with the researcher adapted the questionnaire from the BSP 2021 consumer financial survey. Correspondingly, the findings of this paper can be used to formulate policy on improving the financial inclusion program.

Research Procedures of Data Collection

Figure 3: Data Collection Procedure



The survey questionnaire, formed with the guidance of the thesis advisors, guarantees its reliability. The primary data collection of this study will be conducted on-site in Barangay 571, Sampaloc. After collecting the survey data, the researcher will aggregate the survey results and tabulate the data set. Finally, the gathered data were processed with the R statistical software, and subsequently, a thorough analysis and interpretation of the findings.

Research Ethics Approaches

This study will mainly use the data collection from the Sampaloc residences, which requires the participant to volunteer and disclose personal information; considering this, the researcher will ensure the ethical use of the data, such as confidentiality, transparency, and informed consent of every participant. The Data Privacy Act of 2012 aimed to protect

individuals' personal information in government and private sectors, and this law will be strictly upheld while conducting this research.

With regards to the Data Privacy Act, the researcher will send consent letters to the respondents and a clear explanation, informing the respondent about the relevance of the study, what types of information will be needed from them, along with how the data collected will be handled with safety as a top priority. The letter handed to them will seek their approval for participating in this study's data collection process, while guaranteeing that the participant's privacy and anonymity will be maintained throughout the process. In the scenario where the participant does not want to take part in the study, they can exercise their right to refuse. Similarly, those willing to take part will be encouraged to answer the questions truthfully in order to form reliable results. The data collected here will solely be used for academic purposes, and not for any other purposes. The data will be disposed of properly after the research has been conducted and the collected information no longer serves its purpose.

Data Analysis

To analyze the determinants of credit behavior among low-income households, this study employs the binary probit model. The Probit model is utilized when the outcome variables are binary; thus is used to examine credit participation (Model 1), credit access (Model 2), and credit constraints (Model 3). The outcome variable for credit participation equals 1 if the household successfully obtained credit and 0 otherwise. The outcome variable for credit access takes the value of 1 if the borrower has sourced their loan from formal credit providers, 0 if the borrower only sourced their loan from informal credit providers. For credit constraints, the dependent variable equals 1 if the household is considered credit-constrained (i.e., loan request is rejected

from formal sources) and 0 if the household is credit-unconstrained (i.e., loan request is accepted or the household does not need credit from formal lenders). Accordingly, the model is written below:

Model 1

$$Cd_i = \beta_0 + \beta_1 (Inc)_i + \beta_2 (Fe)_i + \beta_3 (Ter)_i + \beta_4 (Hs)_i + \beta_5 (Cr)_i + \varepsilon_i$$

Model 2

$$Cc_i = \beta_0 + \beta_1 (Inc)_i + \beta_2 (Fe)_i + \beta_3 (Ter)_i + \beta_4 (Hs)_i + \beta_5 (Cr)_i + \varepsilon_i$$

Model 3

$$Cco_i = \beta_0 + \beta_1 (Inc)_i + \beta_2 (Fe)_i + \beta_3 (Ter)_i + \beta_4 (Hs)_i + \beta_5 (Cr)_i + \varepsilon_i$$

Prior literature suggests that households' socio-economic are significant independent variable to predict households' credit decisions. Therefore, this study includes households' income per month, employment status, financial literacy, & assets ownership.

Where:

Dependent Variables	
Cd	1 = Successfully borrowed money within the last 12 months, 0=Did not borrow money within the last 12 months
Co	1=Have access to Formal Sources 0=Have no access to Formal Sources
Cco	1=Rejected from Formal Credit Source (Credit Constrained), 0=Did not face rejection by formal credit sources (Credit Unconstrained)
Independent Variables	

Inc	Monthly Income (in Thousands)
Fe	0=unemployed 1=Part time only 2=Full-time only 3=Full time and Part-time
Ter (Educational Attainment)	0=Less than Tertiary Level 1=Tertiary or Higher
Hs	0=Not a Home Owner 1=Home Owner
Cr	0=Not a Vehicle owner 1=Vehicle Owner

Statistical analysis was carried out using R Studio and Microsoft Excel. Marginal effects were computed to assess the magnitude and direction of influence of each explanatory variable on the predicted probability of credit participation and credit constraints. These effects provide practical insights into how changes in household characteristics shift the likelihood of engaging in or being constrained in the credit market.

Table 3: Summary Statistics

<i>Statement of the Problem</i>	<i>Statistical Treatment</i>
What is the socio-demographic profile of the households in the credit market of the Sampaloc District?	Descriptive Statistics
What factors influence a household's likelihood of credit market participation?	Binary Probit Model

What factors influence a household's access to formal credit sources?

Binary Probit Model

What factors influence a household's likelihood of being credit-constrained when trying to access formal credit providers?

Binary Probit Model

Chapter 5:Results

This chapter comprises the descriptive statistics, data analysis, and interpretation of the statistical results. The results gathered can help the researchers tackle the statement of the problem and form comprehensive conclusions.

Empirical Results

Table 2 below shows the distribution of gender among the household heads. The data set of 216 respondents shows that 121 (56%) of the household heads, who constitute the majority of the sample collected, are male, while the female household heads only 95 (44%) of the sample collected. This suggests that men are more likely to be the primary decision-makers or representatives of the household in this dataset.

In terms of marital status (Table 2), the data reveal that a majority of respondents, 102 (49%), are married, while 83 (38%) are single, 13 (6%) are separated, and 18 (8%) are widowed. This distribution indicates that most of the household heads live in stable family structures, which may influence the dynamics of household decision-making and financial responsibilities. The proportion of single and widowed respondents also highlights the diversity of household compositions within the sample.

Table 4: Gender & Marital Status

Feature of the Household	Number	Percentage
Gender		
Male	121	56%
Female	95	44%
Total	216	
Marital Status		
Single	83	38%
Married	102	47%
Separated	13	6%
Widowed	18	8%
Total	216	

Table 3 below shows the age of the survey participants. The distribution shows that the largest group of household heads falls within the 36–45 age range, with 66 (31%) respondents, followed by those aged 46–55 at 48 (22%). Younger respondents aged 26–35 comprise 45 (21%), while those aged 18–25 account for 33 (15%). Meanwhile, respondents aged 56 and above accounted for 24 (11%) of the sample. This indicates that the majority of decision-makers are in their middle adulthood, a life stage typically characterized by financial stability, active employment, and significant family responsibilities.

The household number of dependents, 76 (35%) of respondents reported having 1–2 dependents, making it the most common household size. This is followed by 3–5 dependents at

70 (32%), while 53 (25%) of survey respondents have no dependents, and finally 17 (8%) have six or more. These data suggest that a significant portion of households support multiple family members, which could influence their financial needs, spending priorities, and reliance on formal or informal credit sources.

Table 5: Age & Number of Dependents

Socio-Economic Profile	Number	Percentage
Age		
18-25	33	15%
26-35	45	21%
36-45	66	31%
46-55	48	22%
56 & Above	24	11%
Total	216	
Number of Dependents		
0	53	25%
1-2	76	35%
3-5	70	32%
6 and above	17	8%
Total	216	

The table below shows the socio-economic characteristics of respondents from the chosen Sampaloc District, Manila. The two largest income groups of the survey respondents each account for 55 (25%) earning between PHP 10,001 to PHP 15,000, and PHP 15,001 to PHP 20,000, followed by 47 (22%) earning between PHP 5,001 to PHP 10,000. Moreover, 39 (18%) of the respondents fall within the PHP 20,001 to PHP 24,060 bracket, while the smallest group of 20 (9%) earns less than PHP 5,001 per month. When it comes to employment status, most respondents at 160 (74%) have a full-time job, while 56 (26%) respondents are part-time workers or are unemployed. This suggests that a considerable portion of the respondents maintain stable employment.

Table 6: Monthly Income & Employment Status

Socio-economic Profile	Count	Percentage
Monthly Income		
Less than PHP 5,001	20	9%
PHP 5,001 - 10,000	47	22%
PHP 10,001 - 15,000	55	25%
PHP 15,001 - 20,000	55	25%
PHP 20,001 - 24,060	39	18%
Total	216	
Employment Status		
Full-time	160	74%
Part-time & Unemployed	56	26%
Total	216	

For educational attainment (Table 5), 111 (51%) of the respondents have less than a tertiary level of education, while 105 (49%) have attained tertiary education or higher. This reflects a relatively balanced distribution between respondents with higher education and those with only basic or secondary education. With regards to asset ownership, 89 (41%) reported not owning a vehicle or a house, while 47 (22%) respondents own a vehicle, 49 (23%) respondents own at least a house, and 31 (14%) respondents possess both a house and a vehicle. This suggests that a significant portion of respondents have limited asset accumulation, consistent with their low-income classification.

Table 7: Educational Attainment & Assets Owned

Socio-economic Profile	Count	Percentage
Educational Attainment		
Tertiary or Higher	105	49%
Less than Tertiary level	111	51%
Total	216	
Asset Owned		
None	89	41%
Vehicle	47	22%
House	49	23%
Both (House & Vehicle)	31	14%
Total	216	

Table 6 shows the credit participation, credit access, and credit constraints. For credit decisions, the majority of the respondents, which accounts for 137 (63%), are identified as borrowers, which means that they have borrowed or currently have outstanding loans within the past 12 months. 79 (37%) respondents are non-borrowers, showing that they have not participated in any form of borrowing during the same period. This distribution reveals that most low-income households in the sample actively engage in borrowing activities, reflecting their reliance on credit to meet financial needs. When it comes to credit access, among the 137 identified borrowers, 107 (78%) respondents reported having borrowed from formal credit sources such as banks, cooperatives, and microfinance institutions etc., while 30 (22%) respondents claimed to lack access to formal credit sources. This suggests that while a majority can access formal credit sources, a notable portion still depends solely on informal credit sources. Lastly, for credit constraints, among those who attempted to obtain credit from formal sources, which comprises 133 respondents, 36 (27%) respondents reported having faced rejection by formal financial institutions, while 97 (73%) respondents were not rejected. The presence of rejections indicates that, despite some level of access, formal financial institutions continue to impose credit constraints that may limit the borrowing capacity of low-income households, but it should be noted that households that faced credit rationing by a formal source can still rely on other formal sources to fulfill their credit demand.

Table 8: Credit Decisions

Household Categories	Count	Percentage
Credit Participation		
Borrower	137	63%
Non-Borrower	79	37%

Total	216	
Credit Access		
w/ access to Formal Sources	107	78%
w/o access to Formal Sources	30	22%
Total	137	
Credit Constraints		
Rejected by Formal Sources	36	27%
Not rejected by Formal Sources	97	73%
Total	133	

Probit Results & Diagnostics

In analyzing the regression, the study utilized R in Google Colab, a cloud-based statistical software. This was utilized in all statistical analyses of the dependent variables on the independent variables, as well as the subsequent diagnostic procedures to test the validity of the estimates. The results of the probit estimates and diagnostics are shown hereafter.

Probit Estimates

The estimate of the binary probit models for credit decision is done as follows. The five independent variables (Inc, Fe, Ter, Cr & Hs) are regressed against each of the three dependent variables (credit participation, credit access, and credit constraints). The estimates reveal at least

one or two of the chosen determinants that are significant for the Credit Participation (Model 1), credit access (Model 2), and credit constraints (Model 3).

The level of monthly income does influence the likelihood of a household borrowing money, in contrast to the findings by Pinitjitsamut & Suwanprasert (2022) and Tang & Guo (2017). The results show that monthly income has a significant and positive influence when it comes to credit participation. This is perhaps due to the target population focusing on the lower-income households, but a report by Transunion (2023) highlights the negative stigma of borrowing; this might be a significant factor dissuading low-income earners from borrowing money. Monthly income also has a significant explanatory power for both Model 2 and Model 3, with a p-value at 5% and 1% significance, respectively. This indicates that as households increase their monthly income, the probability of being able to access formal credit sources also increases, while the probability of being rejected by formal credit sources decreases. This result coincides with the findings by prior literature, with the increase of income, it helps reduce the difficulties in borrowing (Bathan & Gordoncillo, 2017; Lin et al., 2019; Tang & Guo, 2017). Which implies their greater ability to repay loans, thus assuring credit providers their return on investment (Tang & Guo, 2017).

Interestingly, the type of employment of the household head does not affect their choices when it comes to borrowing money, access to formal credit sources, and constraints when borrowing from formal sources. As seen from the result of the probit estimates (Table 7), the coefficient's p-value is shown to be statistically insignificant. This could mean that other variables play a significant role in credit participation, and formal credit sources perceive fully employed individuals as having lower significance when providing credit.

For financial literacy, if the household heads' education level is associated with increasing the likelihood of accessing loans from formal credit providers, with the p-value at 5% significance (0.0174). This result supports the findings by Lin et al. (2019), Tang & Guo (2017), and Asiamah, Steel & Ackah (2021), where better-educated borrowers have fewer difficulties in borrowing. This may be partly explained by Asiamah, Steel & Ackah (2021), claiming that highly educated households tend to have more stable income, making them more attractive to formal lenders. Moreover, Akpan et al. (2013) explain that a greater level of education will expose them to the environment of innovations and better management techniques, thus they are more productive. However, financial literacy has no explanatory power when it comes to credit participation and credit constraints, with their respective coefficient not statistically significant.

Assets (collateral), particularly car ownership is found to be significant variables when predicting credit participation, with a p-value (0.0534) at 10%. This result is similar to that of Tang and Guo (2017), of a positive relation between asset and credit participation. However, house ownership is an insignificant variable when predicting credit participation, while house and car ownership are found to be insignificant variables when predicting credit access and credit constraints. This result contrasts prior literature (Mansour, Samak, & Gad, 2024; Pang, Kuang, & Gong, 2014; Bathan & Gordoncillo, 2017; Tang & Guo, 2017), which suggests assets play a significant role in credit decisions, but their findings show inconsistent correlation when it comes to asset ownership and credit decisions.

Table 9: Probit Estimates

Explanatory Variables	Model 1	Model 2	Model 3
Intercept	-0.19480 (0.4229)	-0.38465 (0.2766)	0.56520 (0.12194)

Inc (in Thousands)	0.03544 (0.0328)**	0.05626 (0.0181)**	-0.06052 (0.00951)***
Fe (1=Fully employed)	-0.28352 (0.2140)	-0.06917 (0.8224)	0.03072 (0.91845)
Ter (1=Tertiary or Higher)	0.06433 (0.7300)	0.66204 (0.0174)**	-0.31248 (0.22695)
Hs (1=yes)	0.24505 (0.1942)	0.26649 (0.3242)	-0.07689 (0.76115)
Cr (1=yes)	0.37280 (0.0534)*	0.05772 (0.8311)	-0.27317 (0.28112)

Notes: Significant at 10% (*), 5% (**), and 1% (***)

Accuracy Test

The predictive performance of the three models was tested using the confusion matrices and overall classification accuracy. Table 12 summarizes the number of correctly and incorrectly classified observations between the two outcomes (0 or 1) for each of the three models. As observed, model 1 has an accuracy of 64.35%, model 2 has an overall accuracy of 78.83%, while model 3 produces an accuracy of 77.44%.

Table 10: Model Accuracy

Model	Predicted	Actual 0	Actual 1	Accuracy
Model 1	0	12	10	64.35%
	1	67	127	
Model 2	0	5	4	78.83%
	1	25	103	

Model 3	0	95	28	77.44%
	1	2	8	

Likelihood Ratio Test

To evaluate the validity of the model, the Likelihood Ratio Test is utilized. The Likelihood Ratio Test role is to compare the goodness of fit between two models, which are the null model (simpler model) and the model proposed by this study. The Likelihood Ratio Test helps the researcher decide whether the model provides a statistically significant improvement over the simpler model.

Table 11: Likelihood Ratio Test

	Chi-squared	Pr(>Chisq)
Model 1	12.2297	0.03177232**
Model 2	19.50266	0.001548736***
Model 3	14.31151	0.0137472**

Notes: Significant at 10% (*), 5% (**), and 1% (***)

As observed in Table 8, all three models have a significant chi-squared value. This indicates that the proposed models are an improvement compared to the null model.

Multicollinearity

In the Binary Probit Regression, all the independent variables are assumed not to exhibit multicollinearity. Multicollinearity refers to when the independent variables in a regression model are correlated. The Variance Inflation Factor (VIF) is utilized to observe multicollinearity

in the regression model. The VIF measures the variance of a regression coefficient as a result of collinearity. Presented below (Table 9) are the VIF values on all three models for each independent variable.

Table 12: Variance Inflation Factor

	Inc	Fe	Ter	Hs	Cr
Model 1	1.307399	1.267345	1.098711	1.002999	1.046688
Model 2	1.222672	1.212702	1.114795	1.000940	1.051500
Model 3	1.181799	1.201179	1.132003	1.003274	1.021052

As observed, all the VIF values for each independent variable are close to 1, indicating little to no multicollinearity violation among them in the model. Hence, the multicollenearity assumption for this logistic regression is met.

Linearity Test (Box–Tidwell Test)

In logistic regression, the independent variables that are continuous and are assumed to be linear are related to the dependent variables. The Box-Tidwell test is used for the study, the Box-Tidwell test is a statistical tool to determine if the probit function is a linear combination of the dependent variables. If the Lambda score is statistically significant, then the assumption of linearity is declined.

Table 13: Box-Tidwell Test

	MLE of lambda Score	T-Stat	P-value
Model 1	-0.22659	-0.3743	0.7086

Model 2	0.97851	-0.0253	0.9798
Model 3	0.5635	0.9013	0.3691

Notes: Significant at 10% (*), 5% (**), and 1% (***)

As seen in the table above (Table 10), the p-value Model 1 (0.7086), Model 2 (0.9798) & Model 3 (0.3691) are statistically insignificant. Thus at the confidence level of 95%, the null hypothesis is not rejected, indicating that there is no evidence to assume in the probit function that there is no linearity between the independent and dependent variables. Thus the assumption of linearity in the model is met.

Marginal Effects

Since the probit model's coefficient is not interpreted as is, for its coefficients are the effect of a unit change in X_i on the index, not on the outcome directly. The coefficients we can obtain the direction (positive or negative) and its level of significance. Thus, the average marginal effect (AME) is utilized to estimate the marginal effects on the outcome for a unit change in X_i while all other variables are held constant.

Table 14: Marginal Effect

	Inc	Fe	Ter	Hs	Cr
Model 1	0.013**	-0.102	0.023	0.088	0.134*
Model 2	0.014**	-0.018	0.17**	0.068	0.015
Model 3	-0.018***	0.01	-0.093	0.023	-0.082

Notes: Significant at 10% (*), 5% (**), and 1% (***)

The study will be limited to interpreting the marginal effects of the significant independent variables. As observed in Table 11, a unit increase in Inc (Income in Thousands) is

associated with 1.3% increase in credit participation, 1.4% increase in being able access formal credit sources, and 1.8% decrease in being rejected by formal credit sources. Owning a vehicle is associated with 13.4% higher probability of credit participation as compared to those without a vehicle. Having a tertiary education or higher is associated with a 17% higher probability of being able to access formal credit sources.

Chapter 6: Conclusions

This chapter comprises the study's conclusion, coming from the in-depth examination of the literature, data collection, and the analysis. In line with the conclusion, the study's recommendation is for improving and advancing financial inclusion for the urban poor in specific areas.

Conclusion

According to the Banko Sentral ng Pilipinas (2022), over half of the Filipino adults perceived borrowing from formal credit sources as difficult, citing that among formal credit sources, banks were the hardest to apply for a loan (65%), followed by credit card companies (56%), online lenders (48%), then cooperatives/NSSLAs (47%) and financing/lending companies (44%). The perceived least difficult to borrow from are from MF NGOs (39%) and pawnshops (35%). This is dire, especially when it comes to low-income households, who are synonymous with lacking required documents & valid IDs, low and unstable income, lack of collateral, and finding application processes to be lengthy and complex. Hence, many low-income households are deterred from approaching formal financial institutions and instead resort to informal credit sources, such as borrowing from family, friends, or local moneylenders, which offer more lenient terms, minimal documentation, and faster access to funds. This reliance on informal credit reflects both the exclusionary nature of formal financial systems and the persistent barriers to financial inclusion among the poor. Consequently, the lack of access to formal credit not only limits their ability to invest in productive activities but can also perpetuate their financial vulnerability and dependence on costly or unsustainable borrowing channels.

The study was conducted in Barangay 571, Manila, with 216 urban household participants, to identify and determine how many variables influence a household's credit participation, credit access, and credit constraints. In the next section, the researcher will present the findings in the descriptive statistics.

- Majority of the household heads are male (56%).
- The majority of respondents were married (47%), followed by single individuals (38%), with smaller proportions who were widowed (8%) or separated (6%).
- Differences in educational attainment were apparent, with only 49% of the participants having tertiary or higher education.
- Most respondents owned neither a house nor a vehicle (41%), while (23%) owned a house only, (22%) owned a vehicle only, and (14%) owned both a house and a vehicle.

Furthermore, the binary probit regression analysis was conducted in this study, which serves as the statistical tool that delved into the relationship between the households' various socio-economic factors and their corresponding credit decisions. Employing this method, the study provides an in-depth analysis of a binary outcome variable using probit regression, allowing for an understanding of the factors shaping household credit decisions.

The binary probit regression analysis the relationship of credit decision (credit participation, credit access & credit constraints) with the individual independent variable: Inc represents the household's monthly income (in thousands), Fe indicates whether the household head is fully employed, Ter indicates whether the household head has attained tertiary or higher education, while Hs and Cr specify whether the household owns a house or a car, respectively. The estimates concluded that Inc & Cr are significant predictors for credit participation, Inc & Ter for credit access, and Inc for credit constraints. Therefore, this suggests that for the low-

income households, monthly income emerges as a critical determinant for all three models, vehicle ownership is a significant factor for credit participation, while having college level of education or higher is a determinant for credit access. Furthermore, the Inc variable for Model 1 has a coefficient sign (+), contradicting prior literature findings (-).

The models all underwent the diagnostics, namely the confusion matrix, likelihood ratio test, the multicollinearity test, and the linearity test to determine their reliability. The confusion matrix results highlight the accuracy of each of the estimates: Model 1 (64.35%), Model 2 (78.83%), and Model 3 (77.44%). The likelihood ratio test highlighted that the models are significant, thus this is an improvement as compared to the simple model (null model). The multicollinearity test results suggest no significant correlation between all the independent variables. Lastly, the linearity test shows that the relationship in all three models' continuous independent variables and the logit transformation of the outcome is linear.

Conversely, the study finds that Fe (full employment), Ter (College Education or higher), and Cr (vehicle ownership) & Hs (house ownership) did show statistically significant evidence of influencing credit decision in some or all three models among the low-income households population within Barangay 571, Sampaloc. This means that within the scope of the study and its chosen variables, there is no evidence to support that the aforementioned variables have an impact on household credit decisions.

It should be noted that the absence of statistical significance of some of the variables does not mean the lack of importance of these variables. External factors that are not covered in the study might give these variables more significance for credit decisions. Therefore, this paper suggests that the lack of evidence is due to its parameters, rather than a definitive statement

regarding the overall significance of the variables. This statement acknowledges the complexity of the decision-making of households when it comes to their credit decisions.

Recommendation

Drawing the result from Chapter 5 and the previously discussed conclusion, the study puts forward the following recommendation:

Public Sector

The study recommends that the government and relevant financial regulatory bodies, such as the Bangko Sentral ng Pilipinas (BSP) and Department of Finance (DOF), should strengthen financial inclusion policies through tackling the barriers that prevent low-income households from accessing formal credit. Firstly, having a district-level Financial Inclusion Program, where Policymakers should design community-based lending schemes targeting low-income urban districts like Sampaloc. These can include credit guarantee mechanisms of microcredit initiatives supported by local government units to reduce the risk faced by formal lenders. Simplify credit requirements for low-income borrowers, such as relaxing collateral requirements or adopting character-based lending. This would help alleviate credit rationing while ensuring that borrowers remain within the formal regulatory framework. Lastly, Financial Literacy Integration involves embedding financial literacy modules into community livelihood programs, focusing on credit management, budgeting, and responsible borrowing.

Formal Credit Providers

The researcher suggests that formal credit sources, such as banks, microfinance institutions, cooperatives, and digital lenders, etc., The World Bank suggested (2026) that credit providers can help in the push of financial inclusion through integrating other forms of data, namely, telecommunications data, mobile money transaction history, and social media data, to

substitute for traditional requirements, thereby enabling unsecured loans worth less than sometimes as low as \$0.50 which can increase in value in the future as borrowers establish their credit history. These can bridge the formal credit supply to the demand and drive away the need for informal credit while remaining within formal regulatory boundaries.

Community Development Planners

The study suggests the incorporation of credit access into urban planning, such as including financial access indicators, such as the number of accessible physical lending institutions, when assessing community development performance. Train local barangay officials to act as community-based financial facilitators who can guide residents toward legitimate lending sources and discourage engagement with informal predatory lenders. Lastly, improving the digital infrastructure can help address this by including digital infrastructure such as internet hotspots, connectivity in public markets, and barangay halls, as part of community infrastructure planning. For example, push for connectivity, especially in underserved or remote communities, so that digital financial services such as mobile banking and digital payments can reach low-income households.

Low Income Borrowers

The low-income borrowers must also play an active role in improving their financial participation. Households should participate in available financial literacy programs that teach credit comparison, what is available and reliable credit sources (e.g., online lenders), how to prioritize repayment, and financial recordkeeping. They should also maintain basic documentation such as income proof, barangay clearance, or co-borrower records, in order to improve creditworthiness when engaging with formal lenders. Finally, borrowers should

establish credit histories with formal lenders to transition away from high-interest informal loans over time.

NGOs

NGOs working in community finance, livelihood support, and social enterprise should leverage the study's findings to design more inclusive credit interventions. NGOs could act as a bridge between borrowers and formal lenders by facilitating financial literacy programs, where they help borrowers complete application forms, understand loan terms, and comply with documentation requirements. Moreover, NGOs can help form an alternative credit assessment approach that overcomes documentation constraints. Additionally, NGOs can collect data on the ground with regard to borrower needs, repayment behavior, and informal loan dynamics; such data can help inform product design and policy.

Academic Researchers

The researcher suggests deepening the empirical understanding of the motivation for credit demand and behavioral dynamics among low-income households. This can be done through expanding the credit demand section to not only measure whether households borrowed or not, but also when they needed to borrow but were unable to, and for what purpose. This provides insight into whether the potential credit demand was met and how persistent a borrower would be in seeking credit if the purpose of borrowing were consumption smoothing, productive investment, etc. Secondly, future research could include post-rejection behaviors. Specifically, the likelihood of reapplying to formal lenders, turning to informal ones, or outright not borrowing anymore. This could be modeled using multinomial logit regression that captures decision-switching between credit sources. Moreover, variables such as loan purpose, size, and frequency can help differentiate necessity-driven borrowing from opportunity-driven borrowing.

Lastly, expanding future data collection to include other Manila districts or nearby cities to better assess credit behavior and financial exclusion patterns could create more reliable estimates.

References

- Abdelzaher, M. A. (2019). A comparative study between informal and formal finance: A literature review. *American Finance Review*, 8(4), 231–242.
<https://doi.org/10.5430/afr.v8n4p231>
- Akpan, S. (2013). Determinants of credit access and demand among poultry farmers in Akwa Ibom State, Nigeria. *American Journal of Experimental Agriculture*, 3(2), 293–307.
<https://doi.org/10.9734/AJEA/2013/2810>
- Allen, F., Demirgüç-Kunt, A., Klapper, L., & Pería, M. S. M. (2016). The foundations of financial inclusion: Understanding ownership and use of formal accounts. *Journal of Financial Intermediation*. <https://doi.org/10.1016/j.jfi.2015.12.003>
- Ambong, R. M., & Pasco, M. (2022). Determinants of rural credit access decision-making among small-scale rice farmers in Calintaan, Occidental Mindoro, Philippines. *Journal of Agribusiness and Rural Development*. <https://doi.org/10.17306/J.JARD.2022.01475>
- Asiamah, T. A., Steel, W. F., & Ackah, C. (2021). Determinants of credit demand and credit constraints among households in Ghana. *Heliyon*, 7(10), e08162.
<https://doi.org/10.1016/j.heliyon.2021.e08162>
- Bangko Sentral ng Pilipinas. (2013). Financial inclusion in the Philippines: Microcredit and financial infrastructure.
- Bangko Sentral ng Pilipinas. (2022). Financial Inclusion Survey Topline Report. BSP Financial Inclusion.
- Bangko Sentral ng Pilipinas. (2021). Manual of regulations for banks (MORB).
<https://www.bsp.gov.ph>.

- Bathan, B. M., & Gordoncillo, P. U. (2017). Determinants of credit constraint among corn farmers in Isabela Province, Philippines. *Journal of Economics, Management & Agricultural Development*. DOI: 10.22004/ag.econ.309412
- Bocher, T. F., Alemu, B. A., & Kelbore, Z. G. (2017). Does access to credit improve household welfare? Evidence from Ethiopia using endogenous regime switching regression. 1 *African Journal of Economic and Management Studies*, 8(1), 51–65. 2 <https://doi.org/10.1108/AJEMS-03-2017-145>
- Braswell, M. G., & Chernow, E. (n.d.). Consumer credit law & practice in the U.S. United States Federal Trade Commission.
- Campbell, J. Y., & Deaton, A. (1989). Why is consumption so smooth? *The Review of Economic Studies*, 56(3), 357-373.
- Christie, A. N. (2014). Asymmetric information and bank lending: The role of formal and informal institutions (a survey of laboratory research). *Experiments in Financial Economics*, 16, 5-30. <https://doi.org/10.1108/S0193-2306>.
- Chivakul, M., & Chen, K. (2008). What drives household borrowing and credit constraints? Evidence from Bosnia and Herzegovina (IMF Working Papers No. 08). International Monetary Fund. <https://doi.org/10.5089/9781451870602.001>
- Davies, S., Finney, A., Collard, S., & Trend, L. (2019). Borrowing behaviour – a systematic review. Standard Life Foundation.
- Demirgüç-Kunt, A., Klapper, L., Singer, D., & Ansar, S. (2022). The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19. World Bank. <https://doi.org/10.1596/978-1-4648-1897-4>

- Dharmadasa, C., & Gunatilake, M. M. (2023). Determinants of household credit behavior of low-income households in Sri Lanka. *Asian Economic and Financial Review*, 13(10), 715–726. <https://doi.org/10.55493/5002.v13i10.4851>
- Doan, T., Gibson, J., & Holmes, M. (2010). What determines credit participation and credit constraints of the poor in peri-urban areas, Vietnam? (MPRA Paper No. 27509). University Library of Munich, Germany.
- Dula, R. M., & Grego, M. P. (2015). Informal loan trap: Bombay 5-6 and its effect on micro-entrepreneurs in Tacloban City, Philippines. *International Money Transfer and Financial Inclusion*.
- Greenbaum, S. I., Thakor, A. V., & Boot, A. W. A. (2019). Further issues in bank lending. In *Contemporary Financial Intermediation*, 169–179. Elsevier Inc.
- Hickman, R., Cao, M., Mella Lira, B., Fillone, A., & Biona, J. B. M. (2017). Understanding capabilities, functionings and travel in high and low income neighbourhoods in Manila. *Social Inclusion*, 5(4), 2183–2803. <https://doi.org/10.17645/si.v5i4.1083>
- Higgins, J. (n.d.). Understanding Cronbach's alpha. *Statistics By Jim*. <https://statisticsbyjim.com/basics/cronbachs-alpha/>
- Karaivanov, A., & Kessler, A. (2018). (Dis)advantages of informal loans – Theory and evidence. *European Economic Review*, 102, pp 100–128. <https://doi.org/10.1016/j.euroecorev.2017.12.005>
- Kondo, M. (2003). The “Bombay 5-6”: Last resource informal financiers for Philippine micro-enterprises. *Kyoto Review of Southeast Asia*. <https://kyotoreview.org/issue-4/the-bombay-5-6-last-resource-informal-financiers-for-philippine-micro-enterprises/>

- Krueger, D., & Perri, F. (2005). Understanding consumption smoothing: Evidence from The U.S. Consumer Expenditure Data. *Journal of the European Economic Association*, 3(2/3), 340-349. <https://www.jstor.org/stable/40004977>
- Layaoen, C. W. G., & Takahashi, K. (2022). Can microfinance lending crowd out informal lenders? Evidence from the Philippines. *Journal of International Development*, 34(2), 379–414. <https://doi.org/10.1002/jid.3596>
- Lin, L., Wang, W., Gan, C., Cohen, D. A., & Nguyen, Q. T. T. (2019). Rural credit constraint and informal rural credit accessibility in China. *Sustainability*, 11(7), 1935. <https://doi.org/10.3390/su11071935>
- Llanto, G. M., Rosellon, M. A. D., & Ortiz, M. K. P. (2018). E-finance in the Philippines: Status and prospects for digital financial inclusion (PIDS Discussion Paper Series No. 2018-22). Philippine Institute for Development Studies. <https://hdl.handle.net/10419/211042>
- Luan, D. X., Bauer, S., & Kühl, R. (2016). Income impacts of credit on accessed households in rural Vietnam: Do various credit sources perform differently? *Agris on-line Papers in Economics and Informatics*, 8(1), 57-67. <https://doi.org/10.7160/aol.2016.080106>
- Madestam, A. (2005). Informal finance: A theory of moneylenders. *Journal of Development and Economic*, 107, 157–174. <https://doi.org/10.2139/ssrn.1319725>
- Manalad, C. A., Buenaseda, A. Y., & Gomez, M. L. H. (2024). An assessment of the informal money lending practices to the micro-entrepreneurs. *International Journal of Finance and Management Research*, <https://doi.org/10.36948/ijfmr.2024.v06i06.32700>

- Mansour, S., Samak, N., & Gad, N. (2024). Credit choices in rural Egypt: A comparative study of formal and informal borrowing. *Journal of Risk and Financial Management*, 17(487). <https://doi.org/10.3390/jrfm17110487>
- Mwonge, L. A., & Naho, A. (2021). Determinants of credit demand by smallholder farmers in Morogoro, Tanzania. *African Journal of Agricultural Research*, 17(8), 1068–1080. <https://doi.org/10.5897/AJAR2020.15382>
- Pang, X., Kuang, Y. & Gong, X. (2015). The Analysis of Credit Using and Rationing Under Farmer's Risk Attitudes. <https://ageconsearch.umn.edu/record/208985/?ln=en>
- Philippine Statistics Authority. (2021). 2020 Census of Population and Housing results (City of Manila). National Capital Region. <https://rssoncr.psa.gov.ph/content/2020-census-population-and-housing-results-city-manila>
- Philippine Statistics Authority | National Capital Region. (2021). 2020 Census of Population and Housing Results (City of Manila). <https://rssoncr.psa.gov.ph/content/2020-census-population-and-housing-results-city-manila#:~:text=Among%20the%2014%20administrative%20area,and%20Santa%20Ana%20with%20203%2C598>.
- Pinitjitsamut, P., & Suwanprasert, W. (2022). Informal loans in Thailand: Stylized facts and empirical analysis. Rutgers University & Middle Tennessee State University.
- Rashdan, A., & Eissa, N. (2020). The determinants of financial inclusion in Egypt. *International Journal of Financial Research*, 11(1), 123–136. <https://doi.org/10.5430/ijfr.v11n1p123>

- Santos, K. E. S. (2019). Perception of vendors on informal lending institutions. *International Journal of Advanced Engineering, Management and Science*, 5(12), 659-661.
<https://doi.org/10.22161/ijaems.512.8>
- Shem, A. O., & Atieno, R. (2001). Financial dualism and financial sector development in low income countries. *Savings and Development*, 25(4), 413–438.
<https://www.jstor.org/stable/25830774>
- Stiglitz, K. E. & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American Economic Review*, 71(3), pp. 393-410.
- Tang, S., & Guo, S. (2017). Formal and informal credit markets and rural credit demand in China. *Proceedings of the 2017 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM)*, 471-480.
<https://doi.org/10.1109/IEEM.2017.8290138>
- TransUnion Philippines. (2023, October 18). TransUnion study finds major gaps in unbanked Filipinos' credit knowledge. TransUnion Newsroom.
<https://newsroom.transunion.ph/transunion-study-finds-major-gaps-in-unbanked-filipinos-credit-knowledge>
- Wang, X., & Cheng, Z. (2020). Cross-sectional studies: Strengths, weaknesses, and recommendations. *Chest*, 158(1, Suppl.), S65-S71.
<https://doi.org/10.1016/j.chest.2020.03.012>
- World Bank. (n.d.). Financial Inclusion.
<https://www.worldbank.org/en/topic/financialinclusion/overview>
- World Bank Group. (2026). Digital credit. Digital Finance Inclusion.
<https://digitalfinance.worldbank.org/topics/digital-credit>

- Wu, K., & Wan, S. (2023). Job stability and household financial vulnerability: Evidence from field surveys in China. *Finance Research Letters*, 58(C), 104554.
<https://doi.org/10.1016/j.frl.2023.104554>
- Yuan, Y., & Xu, L. (2015). Are poor able to access the informal credit market? Evidence from rural households in China. *China Economic Review*, 33, 232–246.
<https://doi.org/10.1016/j.chieco.2015.01.003>
- Zapata, N. (2006). Credit decision and rationing rules: A study of informal lenders in the Philippines. *Philippine Management Review*, 13, 117-126. Available at SSRN:
<https://ssrn.com/abstract=3075655>

Appendix A: Research Questionnaire

Household Head Profile Profile ng Padre de Pamilya	
Gender Kasarian	☐ Male / Lalaki ☐ Female / Babae ☐ Prefer not to say / Mas pinipiling huwag sagutin
Marital Status Katayuang Sibil	☐ Single / Walang asawa ☐ Married / May asawa ☐ Widowed / Balo ☐ Separated / Hiwalay
Age Edad	_____ years old / taong gulang
Number of Dependents Bilang ng Umaasa sa Inyo	_____
Monthly Income (PHP) Buwanang Kita (PHP)	Pesos: _____
Employment Status Katayuan sa Trabaho	☐ Full-time / Regular na empleyado ☐ Part-time / Panandaliang empleyado ☐ Full-time with part-time job / May dagdag na trabaho ☐ Unemployed / Walang trabaho
Highest Educational Attainment Pinakamataas na Natapos na Antas ng Edukasyon	☐ No formal education / Walang pormal na edukasyon ☐ Elementary / Elementarya ☐ High School / Sekundarya ☐ Vocational/Technical / Bokasyonal/Teknikal ☐ College / Kolehiyo ☐ Postgraduate / Graduate o mas mataas
Do you own any of the following assets? Mayroon ba kayong alinman sa mga sumusunod na ari-arian?	☐ Vehicle, / Sasakyan ☐ , / Sasakyan Specify / Tukuyin: _____

SURVEY QUESTIONS

Do you have any outstanding loans from the following? What else? Is there anything else?

Mayroon po ba kayong kasalukuyang loan o utang sa mga sumusunod? Ano pa po? Mayroon pa po ba?

Do you have any loans in the past year that you have already paid from the following? What else? Is there anything else?

Mayroon po ba kayong loan o utang sa nakaraang taon na inyo nang nabayaran sa mga sumusunod? Ano pa po? Mayroon po pa ba?

Please check if yes / Pakilagyan ng tsek kung meron.

	Outstanding	Previous
Bank, where a bank is an institution wherein you can deposit money and earn interest, and borrow money (loan) with interest Bank, kung saan ang bangko ay isang institusyon kung saan maaaring mag-deposito ng pera nang may interes at manghiram ng pera (loan) nang may interes		
Non-Stock Savings and Loan Association or non-stock, where NSSLA is an institution engaged in the business of accumulating the savings of its members and using such accumulations for loans to members to service the needs of households by providing long term financing for home building and development and for personal finance Non-Stock Savings and Loans Association, kung saan ang NSSLA o non-stock ay rehistradong samahan kung saan pinagsasama-sama ang mga savings ng mga miyembro at siya namang ginagamit din upang ipautang sa mga miyembro		
Cooperative, where a Cooperative is a group or association voluntarily formed by people to meet their socio-economic needs. Members pay their dues like membership fees and regular contributions which in turn are used by the group to grant loans and provide other financial services to its members Kooperatiba, kung saan ang Kooperatiba ay isang rehistradong samahang may mga miyembrong boluntaryong nagbibigay ng regular na kontribusyon na ginagamit upang isulong ang mga programang makakatulong sa kanilang kabuhayan. Isang halimbawa nito ay ang pagpapautang para sa pangangailangang pinansyal		
Microfinance NGO, where an MF NGO is a task-oriented voluntary group driven by common interest, to promote microfinance, which is the provision of financial products and services that cater to the low-income household to help them improve their lives (e.g., Card NGO, ASA, KMBI, TSPI) Microfinance NGO, kung saan ang MF NGO ay isang samahang isinusulong ang microfinance o ang pagpapautang sa mga mahihirap o maliliit na negosyante na may kakayanan magbayad upang matulungan maiangat ang kanilang kabuhayan (hal. Card NGO, ASA, KMBI, TSPI)		
Traditional lending institution/Financing company - Corporations primarily organized for the purpose of extending credit facilities to consumer and to industrial, commercial, or agricultural enterprises (e.g., RFC) Institusyong nagpapautang ng may interest, ngunit hindi katulad ng isang bangko, ang mga ito ay hindi tumatanggap ng deposito (hal. RFC)		
Lending institution/financing company in appliance centre/department store/other stores (e.g., Home Credit, FlexiFinance) Loan mula sa appliance centre/department store/iba pang uri ng tindahan (hal. Home Credit, FlexiFinance, Cashalo)		
Online lending platform, including crowdfunding and P2P lending (e.g., Tala, GCredit) Mula sa nagpapahiram online, kasama ang crowdfunding and P2P lending (hal. Tala, GCredit)		
Pawnshop - A duly organized and licensed pawnshop has, in general, the power to engage in the business of lending money on the security of personal property. Sanglaan - Lisensyadong institusyon na nagpapautang gamit ang mga mahahalagang ari-arian gaya ng alahas o relo bilang seguridad		
Credit card payables, including 'buy now, pay later' installments, and cash advances using credit card		

Mga bayarin sa credit card, kasama ang 'buy now, pay later' na hulugang pagbabayad at cash advance gamit ang credit card		
Government institutions (e.g., GSIS, SSS, Pag-IBIG, P3 Program)		
Family, friends, relatives Kapamilya, kaibigan		
Informal loan providers like 5-6 or Paluwagan Impormal na mga nagpapa-utang gaya ng 5-6 o Paluwagan		
Get an advance from the employer or the boss Advance mula sa employer o boss		
In-house financing – loans provided by private companies like automotive and real estate firms to facilitate the purchase of properties like cars and land In-house financing – utang na ipinagkaloob ng isang pribadong kumpanya tulad ng automotive o real estate firm para mapadali ang pagbili ng bagay tulad ng kotse o lupa		
Others, please specify:		
None, I don't have any loans Walang kahit na anong loan		

DENIED LOAN (ASK ALL)

Have you ever been denied a loan from a formal financial institution in the past year?

Mayroon po bang pagkakataon sa nakaraang taon na na-deny o hindi na-aprubahan ang aplikasyon inyo ng loan sa isang pormal na institusyong pinansyal?

	Bank	Cooperative/NSSLA	Micro-finance NGO	Pawnshop	Financing/lending company	Credit card	Online lender
Yes Oo							
No Hindi							

Appendix B: Google Colab Probit Estimates

Estimates for Credit Participation

```

▶ probit_cd <- glm(cd ~ inc + fe + ter + hs + cr,
                  data = data,
                  family = binomial(link = "probit"))
summary(probit_cd)

```

...

Call:
 glm(formula = cd ~ inc + fe + ter + hs + cr, family = binomial(link = "probit"),
 data = data)

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-0.19480	0.24305	-0.801	0.4229
inc	0.03544	0.01660	2.135	0.0328 *
fe	-0.28352	0.22818	-1.243	0.2140
ter	0.06433	0.18639	0.345	0.7300
hs	0.24505	0.18876	1.298	0.1942
cr	0.37280	0.19303	1.931	0.0534 .

 Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 283.67 on 215 degrees of freedom
 Residual deviance: 271.44 on 210 degrees of freedom
 AIC: 283.44

Number of Fisher Scoring iterations: 4

Estimates for Credit Access

```

▶ probit_cc <- glm(cc ~ inc + fe + ter + hs + cr,
                  data = data,
                  family = binomial(link = "probit"))
summary(probit_cc)

```

...

Call:
 glm(formula = cc ~ inc + fe + ter + hs + cr, family = binomial(link = "probit"),
 data = data)

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-0.38465	0.35352	-1.088	0.2766
inc	0.05626	0.02381	2.363	0.0181 *
fe	-0.06917	0.30809	-0.225	0.8224
ter	0.66204	0.27846	2.377	0.0174 *
hs	0.26649	0.27031	0.986	0.3242
cr	0.05772	0.27059	0.213	0.8311

 Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 144.02 on 136 degrees of freedom
 Residual deviance: 124.51 on 131 degrees of freedom
 (79 observations deleted due to missingness)
 AIC: 136.51

Number of Fisher Scoring iterations: 5

Estimates for Credit Constraints

```
probit_cco <- glm(cco ~ inc + fe + ter + hs + cr,
                 data = data,
                 family = binomial(link = "probit"))
summary(probit_cco)
```

Call:
glm(formula = cco ~ inc + fe + ter + hs + cr, family = binomial(link = "probit"),
data = data)

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	0.56520	0.36542	1.547	0.12194
inc	-0.06052	0.02334	-2.593	0.00951 **
fe	0.03072	0.29999	0.102	0.91845
ter	-0.31248	0.25863	-1.208	0.22695
hs	-0.07689	0.25296	-0.304	0.76115
cr	-0.27317	0.25345	-1.078	0.28112

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 155.33 on 132 degrees of freedom
Residual deviance: 141.01 on 127 degrees of freedom
(83 observations deleted due to missingness)
AIC: 153.01

Number of Fisher Scoring iterations: 5

Appendix C: Diagnostic Test

Likelihood Ratio Test

Credit Participation

```
▶ probit_cd <- glm(cd ~ inc + fe + ter + hs + cr,
                 data = data,
                 family = binomial(link = "probit"))

probit_cd_null <- glm(cd ~ 1,
                    data = data,
                    family = binomial(link = "probit"))
lrtest(probit_cd, probit_cd_null)
```

```
...
      A anova: 2 x 5
      #Df   LogLik    Df  Chisq Pr(>Chisq)
      <dbl>   <dbl> <dbl>  <dbl>   <dbl>
1      6 -135.7215   NA    NA      NA
2      1 -141.8364   -5 12.2297 0.03177232
```

Credit Access

```

▶ probit_cc <- glm(cc ~ inc + fe + ter + hs + cr,
  data = data,
  family = binomial(link = "probit"))

probit_cc_null <- glm(cc ~ 1,
  data = data,
  family = binomial(link = "probit"))
lrtest(probit_cc, probit_cc_null)

```

```

***
              A anova: 2 x 5
      #Df    LogLik      Df    Chisq  Pr(>Chisq)
      <dbl>    <dbl>  <dbl>    <dbl>    <dbl>
1      6 -62.25745    NA      NA      NA
2      1 -72.00878     -5  19.50266  0.001548736

```

Credit Constraints

```

probit_cco <- glm(cco ~ inc + fe + ter + hs + cr,
  data = data,
  family = binomial(link = "probit"))

probit_cco_null <- glm(cco ~ 1,
  data = data,
  family = binomial(link = "probit"))
lrtest(probit_cco, probit_cco_null)

```

```

              A anova: 2 x 5
      #Df    LogLik      Df    Chisq  Pr(>Chisq)
      <dbl>    <dbl>  <dbl>    <dbl>    <dbl>
1      6 -70.50703    NA      NA      NA
2      1 -77.66279     -5  14.31151  0.0137472

```

Multicollinearity Test

```

vif(probit_cd)
vif(probit_cc)
vif(probit_cco)

```

inc:	1.30739963469967	fe:	1.26734561374383	ter:	1.09871193178809	hs:	1.0029998646957	cr:	1.04668820442107
inc:	1.22267271296174	fe:	1.21270253184405	ter:	1.11479506340496	hs:	1.00094017582422	cr:	1.05150019835161
inc:	1.18179985818505	fe:	1.20117997390374	ter:	1.1320037201726	hs:	1.00327499889255	cr:	1.02105207303667

Linearity Test

```

▶ probit_cd <- glm(cd ~ inc + fe + ter + hs + cr,
  data = data,
  family = binomial(link = "probit"))

data$inc_pos <- data$inc + 1 # Add 1 to avoid log(0)
boxTidwell(cd ~ inc_pos, ~ 1, data = data)

*** MLE of lambda Score Statistic (t) Pr(>|t|)
      -0.22659      -0.3743      0.7086

iterations = 10

```

```

probit_cc <- glm(cc ~ inc + fe + ter + hs + cr,
  data = data,
  family = binomial(link = "probit"))
data$inc_pos <- data$inc + 1
boxTidwell(cc ~ inc_pos, ~ 1, data = data)

Warning message in boxTidwell.default(y, X1, X2, max.iter = max.iter, tol = tol, :
"maximum iterations exceeded"
MLE of lambda Score Statistic (t) Pr(>|t|)
      0.97851      -0.0253      0.9798

iterations = 26

```

```

probit_cco <- glm(cco ~ inc + fe + ter + hs + cr,
  data = data,
  family = binomial(link = "probit"))
data$inc_pos <- data$inc + 1 # Add 1 to avoid log(0)
boxTidwell(cco ~ inc_pos, ~ 1, data = data)

MLE of lambda Score Statistic (t) Pr(>|t|)
      0.5635      0.9013      0.3691

iterations = 15

```

Credit Participation Prediction Performance

```

▶ data$pred_cd <- predict(probit_cd, type = "response")
data$pred_cd_class <- ifelse(data$pred_cd > 0.5, 1, 0)
confusionMatrix(
  factor(data$pred_cd_class),
  factor(data$cd),
  positive = "1"
)

```

```

*** Confusion Matrix and Statistics

          Reference
Prediction  0    1
          0  12  10
          1  67 127

      Accuracy : 0.6435
      95% CI   : (0.5757, 0.7073)
  No Information Rate : 0.6343
    P-Value [Acc > NIR] : 0.4185

      Kappa   : 0.0931

  McNemar's Test P-Value : 1.75e-10

      Sensitivity : 0.9270
      Specificity : 0.1519
    Pos Pred Value : 0.6546
    Neg Pred Value : 0.5455
      Prevalence   : 0.6343
    Detection Rate : 0.5880
  Detection Prevalence : 0.8981
    Balanced Accuracy : 0.5395

      'Positive' Class : 1

```

Credit Access Prediction Performance

```
data_cc <- na.omit(data[, c("cc", "inc", "fe", "ter", "hs", "cr")])
data_cc$pred_cc <- predict(probit_cc, type = "response")
data_cc$pred_cc_class <- ifelse(data_cc$pred_cc > 0.5, 1, 0)
confusionMatrix(factor(data_cc$pred_cc_class),
                 factor(data_cc$cc), positive = "1")
```

*** Confusion Matrix and Statistics

	Reference	
Prediction	0	1
0	5	4
1	25	103

Accuracy : 0.7883
 95% CI : (0.7103, 0.8534)
 No Information Rate : 0.781
 P-Value [Acc > NIR] : 0.4665472

Kappa : 0.1728

Mcnemar's Test P-Value : 0.0002041

Sensitivity : 0.9626
 Specificity : 0.1667
 Pos Pred Value : 0.8047
 Neg Pred Value : 0.5556
 Prevalence : 0.7810
 Detection Rate : 0.7518
 Detection Prevalence : 0.9343
 Balanced Accuracy : 0.5646

'Positive' Class : 1

Credit Constraints Prediction Performance

```
data$pred_cco <- predict(probit_cco, type = "response")
data$pred_cco_class <- ifelse(data$pred_cco > 0.5, 1, 0)
confusionMatrix(
  factor(data$pred_cco_class),
  factor(data$cco),
  positive = "1"
)
```

*** Confusion Matrix and Statistics

	Reference	
Prediction	0	1
0	95	28
1	2	8

Accuracy : 0.7744
 95% CI : (0.6939, 0.8423)
 No Information Rate : 0.7293
 P-Value [Acc > NIR] : 0.1409

Kappa : 0.2608

Mcnemar's Test P-Value : 5.01e-06

Sensitivity : 0.2222
 Specificity : 0.97938
 Pos Pred Value : 0.80000
 Neg Pred Value : 0.77236
 Prevalence : 0.27068
 Detection Rate : 0.06015
 Detection Prevalence : 0.07519
 Balanced Accuracy : 0.60080

'Positive' Class : 1

Credit Participation Model Marginal Effects

```
margins_cd <- margins(probit_cd)
summary(margins_cd)
```

A summary.margins: 5 × 7

	factor	AME	SE	z	p	lower	upper
	<chr>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
1	cr	0.13366490	0.067485674	1.9806411	0.04763153	0.001395411	0.26593439
2	fe	-0.10165359	0.080979830	-1.2552951	0.20937164	-0.260371138	0.05706396
3	hs	0.08786196	0.066927391	1.3127953	0.18925194	-0.043313312	0.21903724
4	inc	0.01270670	0.005766378	2.2035852	0.02755353	0.001404812	0.02400860
5	ter	0.02306512	0.066780459	0.3453873	0.72980323	-0.107822173	0.15395242

Credit Access Model Marginal Effects

```
margins_cc <- margins(probit_cc)
summary(margins_cc)
```

A summary.margins: 5 × 7

	factor	AME	SE	z	p	lower	upper
	<chr>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
1	cr	0.01475692	0.069157913	0.2133800	0.83103054	-0.120790101	0.15030394
2	fe	-0.01768501	0.078754871	-0.2245577	0.82232339	-0.172041722	0.13667170
3	hs	0.06813295	0.068592323	0.9933029	0.32056238	-0.066305531	0.20257143
4	inc	0.01438379	0.005770873	2.4924802	0.01268544	0.003073083	0.02569449
5	ter	0.16926486	0.067916023	2.4922669	0.01269306	0.036151900	0.30237782

Credit Constraints Model Marginal Effects

```
margins_cco <- margins(probit_cco)
summary(margins_cco)
```

A summary.margins: 5 × 7

	factor	AME	SE	z	p	lower	upper
	<chr>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
1	cr	-0.081661889	0.07494290	-1.0896547	0.275865257	-0.22854728	0.06522350
2	fe	0.009182056	0.08968021	0.1023866	0.918449781	-0.16658793	0.18495204
3	hs	-0.022985690	0.07556884	-0.3041689	0.760999243	-0.17109790	0.12512652
4	inc	-0.018093007	0.00649875	-2.7840748	0.005368065	-0.03083032	-0.00535569
5	ter	-0.093413633	0.07621634	-1.2256379	0.220334978	-0.24279491	0.05596765