THE IMPACT OF DISASTERS ON BANK LENDING TO MSMEs IN THE PHILIPPINES

POLICY BRIEF

CONTENTS

ACKNOWLEDGMENTS

This policy brief is a product of the Inclusive Green Finance Working Group (IGFWG) and its members.

CONTRIBUTORS:

The report was written by Yu Sun, PhD Economics (SOAS University of London) under the guidance of Prof Ulrich Volz and the supervision of the AFI Management Unit's Johanna Nyman (Head of Inclusive Green Finance), Laura Ramos (Senior Policy Manager, Inclusive Green Finance), Jeanette Moling (Policy Specialist, Inclusive Green Finance), Audrey Hove (Head, Policy Management), Luis Trevino (Senior Policy Manager, Financial Inclusion Data), Nik Kamarun (Senior Policy Manager, SME Finance), and Vidhya Raman (Policy Specialist, Policy Analysis and Guidance).

We would like to thank Alex Dryden for kindly sharing his disaster dataset (Dryden 2025).

This work was carried out with the assistance of a grant from the International Development Research Centre (IDRC), Ottawa, Canada. The views expressed herein do not necessarily represent those of the IDRC or its Board of Governors.

ABSTRACT

This paper examines the impact of disasters on bank lending to micro, small, and medium enterprises (MSMEs) in the Philippines. Combining industry-level bank lending data with country-level disaster data, econometric analysis shows that large disasters lead to a decline in total bank lending to MSMEs and an increase in non-performing loan ratios for thrift, rural, and cooperative banks. These findings indicate that disasters exacerbate the challenge MSMEs face in accessing finance, making it more difficult for them to secure the funds needed to build resilience to climate change and invest in clean technologies. This paper argues that green finance policies should be developed alongside financial inclusion policies, through an Inclusive Green Finance (IGF) framework that supports a just transition.

KEYWORDS: Physical risks, bank lending, MSMEs, just transition, financial inclusion, sustainable finance

This research was conducted in collaboration with the Alliance for Financial Inclusion (AFI) with financial support from the International Development Research Centre (IDRC). The author thanks Alex Dryden for kindly sharing his disaster dataset. The author would also like to express sincere thanks to the valuable comments received in the course of this research from Professor Ulrich Volz, Laura Ramos, Luis Trevino, Audrey Hove, and Nik Kamerun. AFI extends its sincere appreciation to the Bangko Sentral ng Pilipinas (BSP) for their valuable contribution to this study. The usual disclaimer applies.

1. INTRODUCTION

Climate change and environmental degradation pose large macro-financial risks to the economy. Climate change increases inequalities not only between countries but also within them.[1]

While emerging and developing economies (EMDEs) are more prone to climate disasters, these events tend to disproportionally affect vulnerable groups in society. Rural households and micro, small, and medium enterprises (MSMEs) are often located in low-coastal areas with high physical risk occurrence, yet they lack the resources to invest in climate resilience.[2] Poor households and MSMEs may also be denied access to credit, as banks are generally reluctant to support low-margin and high-risk clients who may be unable to repay their debts.[3] This problem can be further exacerbated by climate-related physical risk.[4] In contrast, wealthier households and larger firms are often less exposed to such risks or better positioned to invest in resilience by, for instance, by securing access to alternative forms of finance.[5]

Hence, disaster risks can exacerbate existing social inequalities. To effectively address the social challenges associated with climate change and environmental degradation, it is essential to identify and understand the adverse effects of disaster risks on social inequality. While the Paris Agreement emphasizes the importance of a just transition and resilient planet, transformative efforts to mitigate climate change should be integrated with actions that advance other Sustainable Development Goals (SDGs), including the reduction of poverty and inequality.[6] This policy brief explores, using econometric analysis, how climate change deepens credit inequalities in banking by limiting MSMEs access to finance for climate resilience and clean technologies, and how disaster events further influence lending behavior by banks towards MSMEs.

An econometric analysis was conducted using aggregate data on bank lending to MSMEs provided by the Bangko Sentral ng Pilipinas (BSP) from 2014 to 2024, combined with country-level disaster data compiled by Dryden.[7] The findings indicate that across different types of banks, total bank lending to MSMEs decreases while non-performing loan (NPL) rates increase once disasters occur. This suggests that disasters tend to increase the credit risks of banks, leading to further retrenchment from lending to vulnerable firms. In effect, disasters reduce bank lending to MSMEs and increase their NPL rates, creating additional barriers that restrict access to finance. These dynamics further exacerbate credit inequalities, with significant effects on economic growth.[8]

Based on these findings, MSMEs in the Philippines face increased financial exclusion under the growing reality of climate change. To secure a green and resilient transition that is both just and equitable, it is crucial to build climate policies aligned with social policies.[9] Green finance policies must be integrated with financial inclusion initiatives to ensure that MSMEs are not left behind in the face of climate change and the green transition. An Inclusive Green Finance (IGF) framework combines Green Finance with Financial Inclusion policies to improve access to finance for MSMEs while simultaneously contributing to climate change mitigation and adaptation.[10]

Section 2 describes the BSP data on bank lending to MSMEs and outlines the process of merging it with country-level disaster data. Section 3 sets out the hypothesis underlying the econometric analysis and explains the econometric model used. Section 4 presents and interprets the econometric results, while Section 5 concludes with policy recommendations.

[1] H Hallegatte, S. et al. 2014. Climate Change and Poverty — An Analytical Framework. The World Bank. Available at: https://doi.org/10.1596/1813-9450-7126 even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.","collection-title": "Policy Research Working Papers","language":"en","note":"DOI: 10.1596/1813-9450-7126", publisher":"The World Bank","source":"DOI.org (Crossref

[2] Islam, S.N. and Winkel, J. 2017. Climate Change and Social Inequality. United Nations Department of Economic & Social Affairs. Available at: https://www.un.org/esa/desa/papers/2017/wp152_2017.pdf

[3] Stiglitz, J.E. and Weiss, A. 1981. Credit Rationing in Markets with Imperfect Information. The American Economic Review. Available at: https://pages.ucsd.edu/~aronatas/project/academic/Stiglitz%20credit.pdf

[4] H Hallegatte, S. et al. 2014. Climate Change and Poverty — An Analytical Framework; Volz, U. and Knaack, P. 2023. Inclusive green finance: A new agenda for central banks and financial supervisors. The INSPIRE Sustainable Central Banking Toolbox. Available at: https://doi.org/10.1163/9789004322714_cclc_2023-0148-0700

[5] Volz and Knaack. 2023.

[6] United Nations. 2015. Paris Agreement. Available at: https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf; Malerba, D. 2022. Just transitions: a review of how to decarbonise energy systems while addressing poverty and inequality reduction. Available at: https://doi.org/10.23661/DP6.2022

[7] Dryden, A. 2025.

[8] Beck, T. and Demirguc-Kunt, A. 2006. Small and medium-size enterprises: Access to finance as a growth constraint. Journal of Banking & Finance. Available at: https://doi.org/10.1016/j.jbankfin.2006.05.009; Bae, K.-H., Bailey, W. and Kang, J. 2021. Why is stock market concentration bad for the economy? Journal of Financial Economics. Available at: https://doi.org/10.1016/j.jfineco.2021.01.002

[9] Volz, U. et al. 2020. Inclusive Green Finance: From Concept to Practice. Alliance for Financial Inclusion and SOAS University of London. Available at: https://eprints.soas.ac.uk/34540/1/AFI_IGF_SOAS_digital.pdf; Alliance for Financial Inclusion. 2021. Promoting Inclusive Green Finance Initiatives and Policies. Available at: https://www.afi-global.org/wp-content/uploads/2024/10/AFI_IGF_promoting_sp_AW_digital_isbn2.pdf

[10] Ibid.

2. DATA

The BSP provided monthly data on bank lending to MSMEs from 2014-2024, allowing the analysis of how total lending and NPL rates have evolved in the Philippines over the last decade.

Sectoral data is also available, providing insights into the industries in which most MSMEs operate. This section describes the monthly bank lending data in greater detail. Furthermore, the monthly bank lending data to MSMEs has been merged with monthly disaster data for the Philippines from 2014-2024. Section 2.2 provides an overview of the process used to carry out this data merge. Only by joining the two data sets can a robust econometric analysis be performed.

2.1 Data description

The BSP data on bank lending to MSMEs is categorized into three groups – Universal and Commercial Banks (UKBs), Thrift Banks (TBs), and Rural and Cooperative Banks (RCBs). UKBs offer traditional banking services, including investment banking, and are typically larger in scale. TBs are consumer-focused institutions more likely to specialize in savings accounts. They are generally smaller in scale and operate at the local level. RCBs support the financial needs of residents in rural areas. Cooperative banks, in particular, are member-owned institutions established to promote the mutual benefit of local communities. RCBs are also smaller in scale and serve primarily local markets.

The following analysis examines the evolution of total bank lending, NPL rates, and the sectoral distribution of total bank lending to MSMEs across bank categories and firm sizes. The sample covers the 2014-2024 period and focuses on the Philippines.

Total bank lending per category and firm size

In the Philippines, MSMEs are firms with an asset size (excluding land) of up to PHP100 million and an employment size of less than 200 employees. Based on the latest available data as of March 2025, UKBs continued to dominate the Philippine banking system, holding 93.7 percent (PHP25.9 trillion) of total assets, 92.6 percent (PHP14.5 trillion) of total loans, 93.6 percent (PHP18.9 trillion) of total deposits, and 91.7 percent (PHP3.2 trillion) of total capital. In contrast, smaller banks held modest shares of the industry's total assets: four percent (PHP1.1 trillion) for TBs and 1.8 percent (PHP499.6 billion) for RCBs.

Figure 1 shows that total bank lending to MSMEs increased steadily from 2014 to 2018, declined moderately in 2019, and peaked again at the end of that year before dropping continuously thereafter. The gradual decline in MSME lending from 2019 onwards can be attributed to the expiration of the mandatory credit requirement for banks to allocate at least 10 percent of their total loan portfolio for MSMEs, as provided under Republic Act No. 9501.[11]

At the height of the COVID-19 pandemic in 2020 and 2021, total bank lending to MSMEs reached its lowest point. Lending began to recover in 2022, although data for the second quarter of 2024 indicated a slight decline. While COVID-19 significantly disrupted financial markets and adversely affected MSME lending, this paper does not elaborate further on the pandemic's effects. Instead, it focuses on exploring the relationship between disasters and bank lending to MSMEs, particularly by analyzing shifts in total bank lending that may be related to disaster occurrences.

Most of the credit extended by UKBs was directed to medium-sized firms, as shown in **Figure 2**. Lending to micro enterprises increased significantly from January to December 2019, but declined sharply in 2020, due to the onset of the COVID-19 pandemic. In contrast, small firms experienced a more gradual decline in bank lending from December 2019 to June 2021.

Lending by TBs to MSMEs has been more volatile over the past decade. As shown in **Figure 3**, lending by TBs to medium-sized firms reached its first peak in October 2017 before declining in January 2018. It then rose again to a second peak in June 2018, followed by a sustained downward trend. The drop in MSME lending in 2018 can be attributed to the expiration of the mandatory credit requirement for banks to allocate at least 10 percent of their total loan portfolio to MSMEs, as provided under Republic Act No. 9501.[12]

In June 2014, lending from TBs began to decline for small firms, reaching a low point in September 2015. Although lending recovered temporarily, a gradual decrease persisted from September 2015 until June 2023.

[11] Philippine banks were mandated to allocate a portion of their loan portfolios, equivalent to 8.0 percent for micro and small enterprises and 2.0 percent for medium enterprises, pursuant to Republic Act No. 9501, which was in effect from 2008 to 2018.

[12] Ibid.

FIGURE 1. TOTAL BANK LENDING TO MSMEs (IN MILLION PHP)

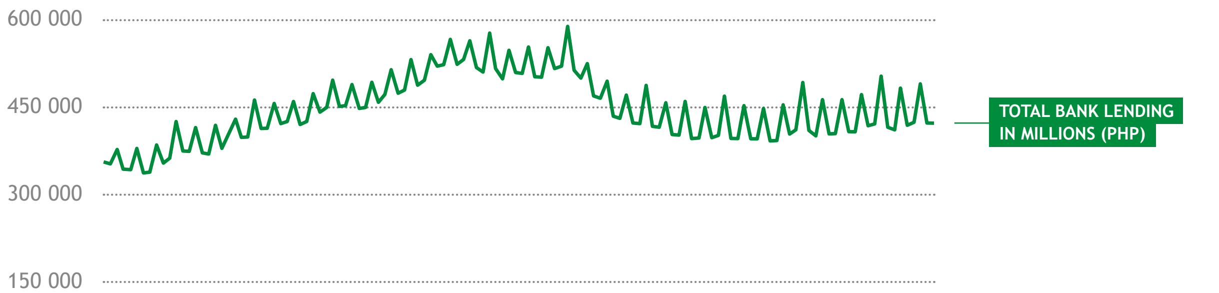


FIGURE 2. UNIVERSAL AND COMMERCIAL BANKS' LENDING TO MSMES (IN MILLION PHP)

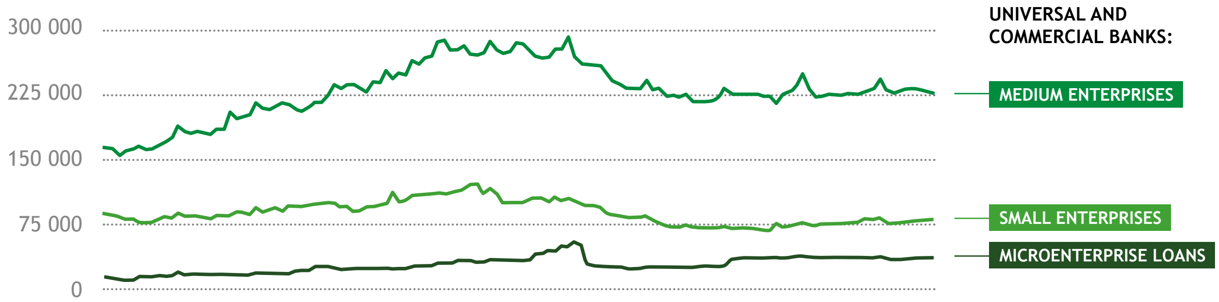


FIGURE 3. THRIFT BANKS' LENDING TO MSMES (IN MILLION PHP)

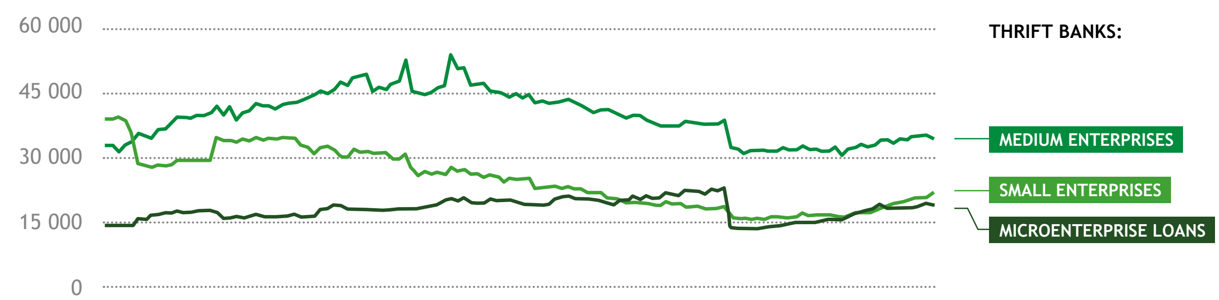
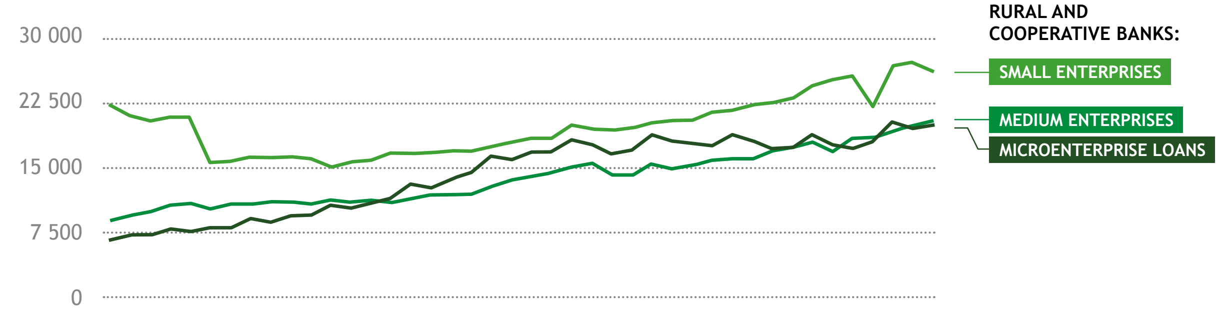


FIGURE 4. RURAL BANKS' LENDING TO MSMES (IN MILLION PHP)



Meanwhile, micro enterprises experienced a continuous increase in access to loans over the past few years, although there was an abrupt drop in loan disbursements starting in January 2022, a trend also observed among medium-sized firms during the same period.

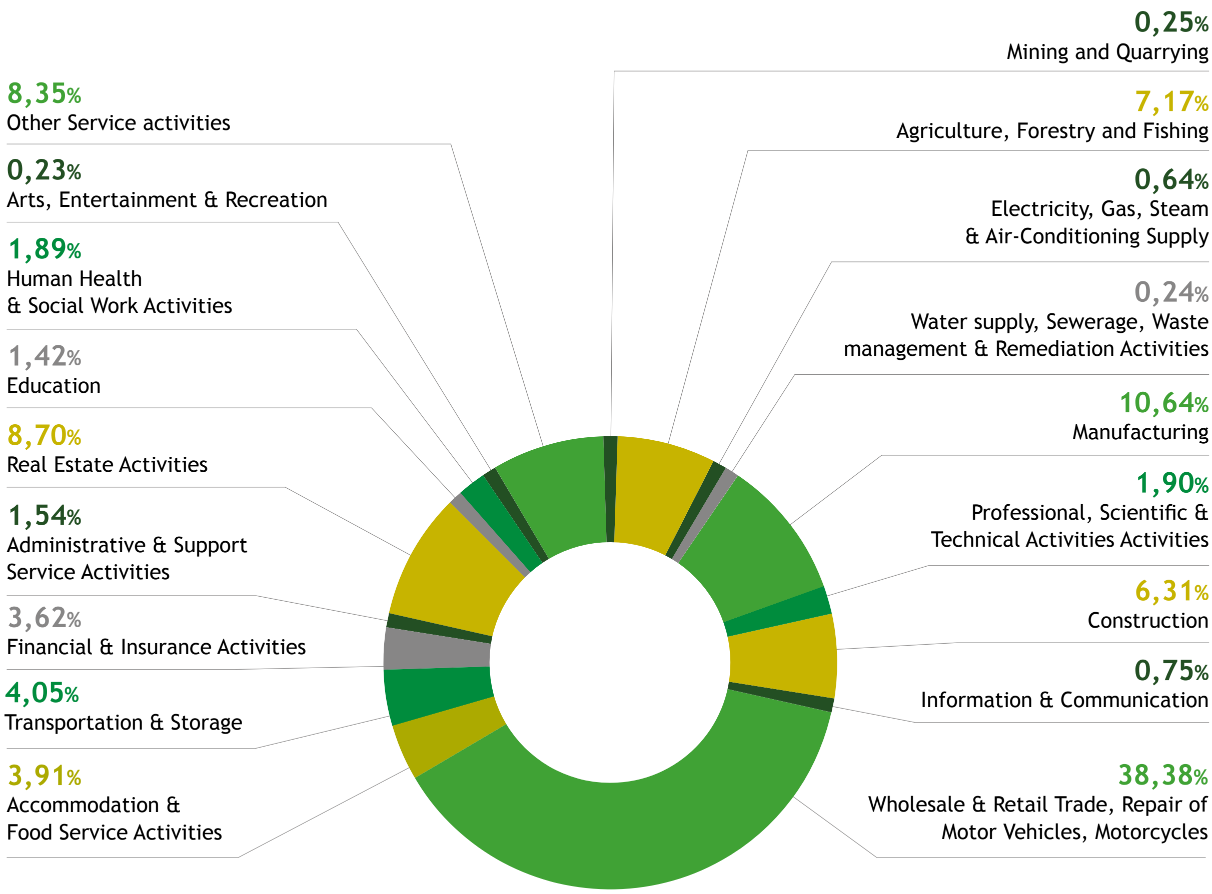
The RCB category supplies most of its credit to small and micro enterprises, in contrast to the TB and UKB categories, where medium-sized firms receive the largest aggregate share of capital (**Figures 2, 3, and 4**). RCBs are typically located in rural areas, primarily serving farmers and small business owners (**Figure 4**). Given their proximity to these communities, RCBs are better positioned than UKBs and TBs to provide financing to micro and small enterprises. As shown in **Figure 4**, small firms have consistently received the majority of RCB lending. However, from November 2014 to October 2015, lending to small firms experienced a sharp decline. From that point onward, bank lending to small firms continuously increased until another abrupt decrease occurred in September 2023.

Total bank lending per sector and firm size

As of end-December 2024, MSME loans accounted for approximately 3.6 percent of the Philippine banking system's total loan portfolio.[13] Data from August 2024, as shown in **Figure 6**, indicates that most MSME loans were extended to the following sectors: Wholesale and Retail Trade (41.59 percent), Manufacturing (9.19 percent), Construction (7.60 percent), Agriculture, Forestry, and Fishing (7.35 percent), and Real Estate (7.13 percent).

[13] Bangko Sentral ng Pilipinas. 2024. Report on the Philippine Financial System Available at: https://www.bsp.gov.ph/Lists/Report%20on%20the%20Philippine%20Financial%20System/Attachments/33/StatRep_2Sem2024.pdf

FIGURE 5. TOTAL BANK LENDING TO MSMEs (IN MILLION PHP)



Non-performing-loan rate per bank category and firm size

The NPL rate of micro firms decreased significantly from around six percent to one percent from 2014 to 2019 in both the UKB and TB categories, as shown in Figures 6 and 7 below. A lower NPL rate indicates that loans are performing more securely and stably. This trend suggests that micro firms have performed very well over the past decade, maintaining stable business operations and successfully repaying their debts to banks. Contrary to conventional theory, which assumes that smaller firms are less capable of meeting their debt obligations and therefore face credit rationing as high-risk, low-margin clients, **Figures 6 and 7** demonstrate that micro firms are effectively using their loans to invest in projects and enhance their profitability over time.[14]

The NPL rate of micro firms for UKBs decreased significantly from 3.52 percent at end-2014 to 0.33 percent in August 2024 (**Figure 6**). Meanwhile, the NPL rate for TBs remained relatively stable, moving only from 1.14 percent to 0.98 percent over the same period (Figure 6). A similar trend can be observed in the NPL rate of RCBs, which remained below one percent over the last 10 years, as shown in **Figure 7**.

[14] Berger, A.N., Klapper, L.F. and Udell, G.F. 2001. The ability of banks to lend to informationally opaque small businesses. Journal of Banking and Finance. Available at: https://doi.org/10.1016/S0378-4266(01)00189-3; Riding, A.L. 2001. Loan Guarantees: Costs of Default and Benefits to Small Firms. Available at: https://doi.org/10.1016/S0883-9026(00)00050-1; Volz, U. 2010. An Empirical Examination of Firms' Financing Conditions in Transition Countries. International Journal of Emerging and Transition Economies. Available at: https://www.idos-research.de/uploads/media/Volz_2008_an_empirical_examination_of_firm_s_financing_conditions_in_TCs.pdf; Mkhaiber, A. and Werner, R.A. 2021. The relationship between bank size and the propensity to lend to small firms: New empirical evidence from a large sample. Journal of International Money and Finance. Available at: https://doi.org/10.1016/j.jimonfin.2020.102281

FIGURE 6. NPL RATE OF MICRO FIRMS FROM TBS AND UKBS, IN PERCENT

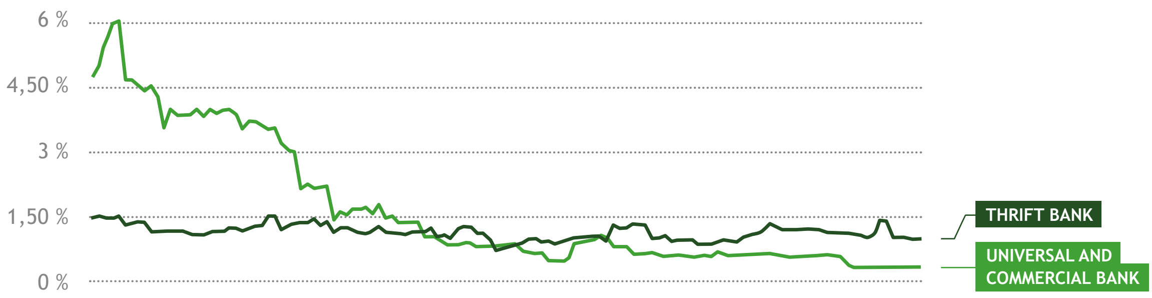


FIGURE 7. NPL RATE OF MICRO FIRMS FROM RCBS, IN PERCENT

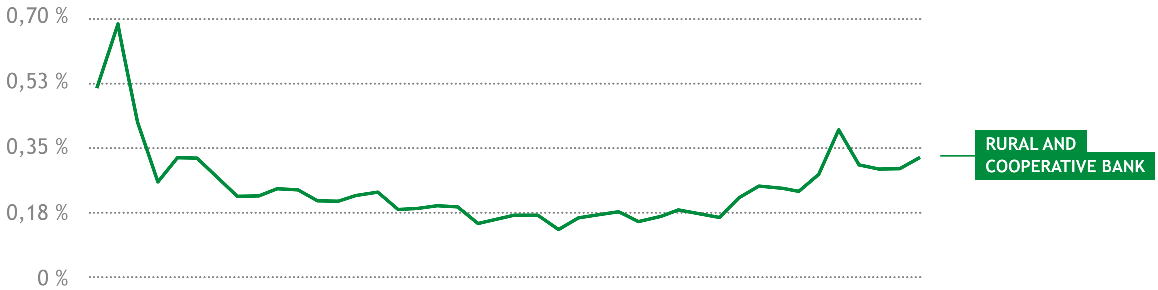


FIGURE 8. NPL RATE OF SMALL FIRMS FROM TBs AND UKBs (IN PERCENT)

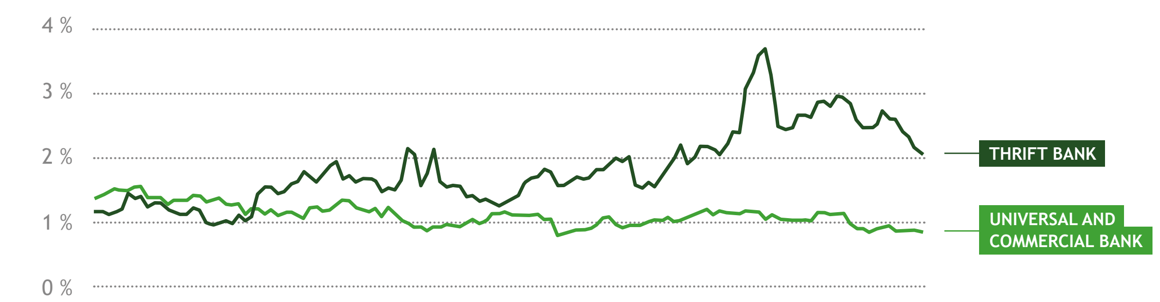


FIGURE 9. NPL RATE OF SMALL FIRMS FROM RCBs (IN PERCENT)

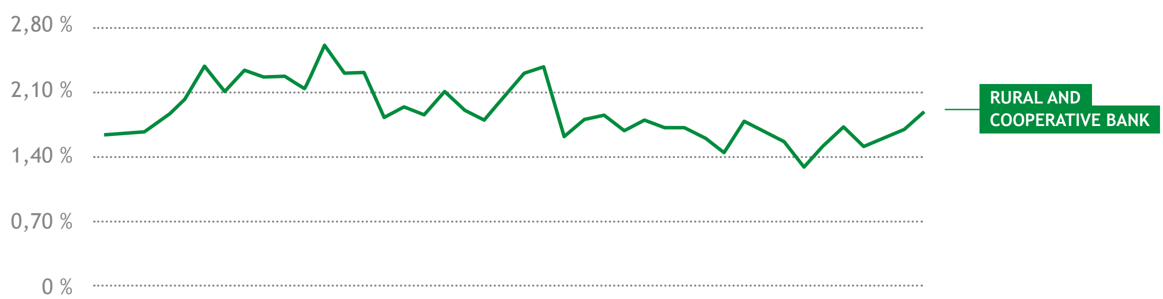


FIGURE 10. NPL RATE OF MEDIUM FIRMS FROM TBs AND UKBs (IN PERCENT)

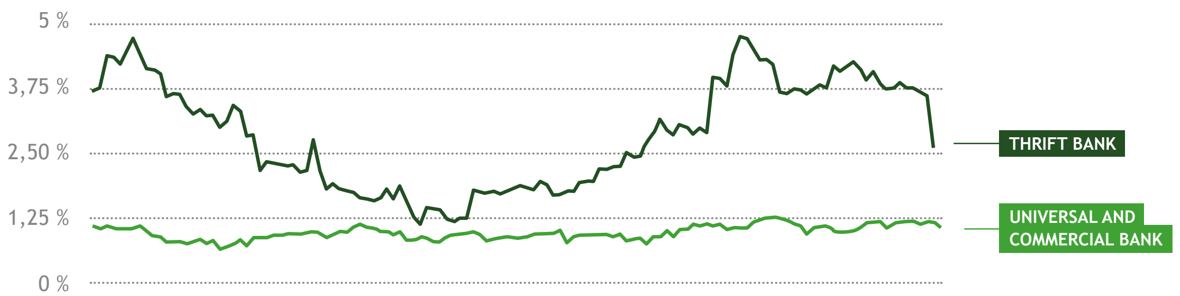
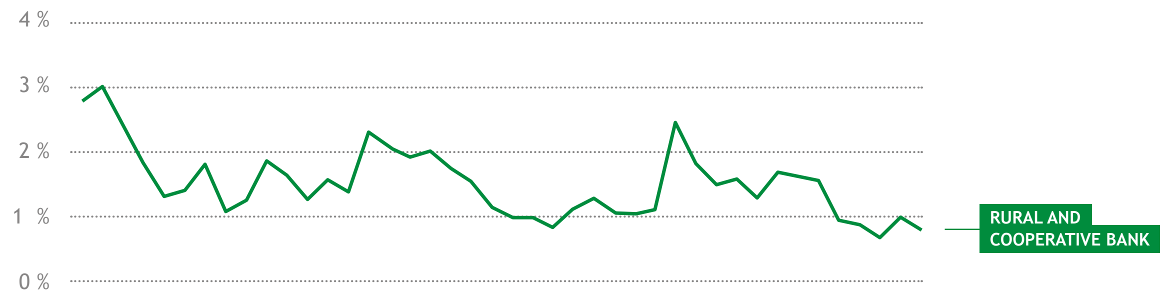


FIGURE 11. NPL RATE OF MEDIUM FIRMS FROM RCBs (IN PERCENT)



In contrast, the NPL rate of TBs for small firms showed an upward trend, rising from around 1.20 percent at end-2014 to 2.06 percent in August 2024 (**Figure 8**). A marked increase in the NPL ratio of TBs for small firms was observed between 2021 to 2022, most likely due to the scarring effects of the COVID-19 pandemic on the repayment capacity of borrowers. While the BSP implemented relief measures[15] to help banks manage credit risk, these policies could not fully offset the effect of reduced economic activity and the corresponding decline in incomes of borrowers (mostly MSMEs), particularly during periods of mobility restrictions across the country.

On the other hand, the NPL rate for UKBs declined slightly from 1.27 percent to 0.86 percent over the same period, while the rate for RCBs lending to small firms remained below two percent (**Figure 9**).

In terms of the NPL rate of medium firms, UKBs maintained a rate below 1.50 percent throughout the past decade (**Figure 10**). Following a sharp decline in the NPL rate of TBs from 3.60 percent at end-2014 to 1.61 percent in 2017, the rate increased notably at the height of the COVID-19 pandemic, reaching 2.72 percent in 2020 and 3.79 percent in 2021, before peaking at 4.70 percent in the first quarter of 2022. The NPL rate then began a downward trend starting in the second quarter of 2022.

Consistent with the NPL patterns of micro and small firms, the NPL rate of medium firms for RCBs remained below two percent from 2014 to August 2024. This U-shaped development in the NPL rates of TBs suggests that medium firms experienced adverse effects during this period. This development could be due to the broader economic conditions in the Philippines, which likely improved from 2015 to 2019, explaining the lower NPL rates for medium firms in the TB category and signaling that more firms were able to meet their obligations. The sharp rise in the NPL rates of TBs in 2021, however, could be linked to the impact of the COVID-19 pandemic. As shown in **Figure 11**, the NPL rate of medium firms from RCBs also declined over time as well.

[15] Bangko Sentral ng Pilipinas. 2023. Primer on BSP's COVID-19 response toolkit. Supervisory Policy and Research Department. Available at: https://www.bsp.gov.ph/Media_And_Research/Primers%20Faqs/Primer_on_Regulatory_Relief_Measures.pdf

2.2 Data merge

The BSP's monthly dataset on bank lending to MSMEs was cleaned and merged with country-level disaster data for the Philippines. As mentioned earlier, the bank lending data was provided by the BSP, while the disaster data was sourced from a dataset compiled by Dryden[16] using the Emergency Events Database (EM-DAT).

The disaster dataset includes events such as floods caused by landslides, lightening, or storms, and landslides triggered by storms or transport accidents, originating from monsoon rains, heavy rains, and low-pressure areas. A total of 30 disasters occurred from 2014 to 2024, eight of which meet at least one of the following criteria for classification as major disasters:[17]

1. The domestic government called for international assistance or declared a state of emergency following the event
2. Total damages exceeded one percent of GDP
3. The impacted population exceeded two percent of the total population

By aligning both datasets by the monthly date (TRDATE), a final dataset was created, which links financial variables, such as total bank lending per month, NPL rate per month, and sectoral lending breakdowns, with disaster variables indicating whether or not a disaster occurred that month, whether or not it was a major disaster, the total number of people affected, and the total damage incurred in million PHP.

Finally, the merged dataset enables analysis of whether total bank lending to MSMEs by UKBs, TBs, and RCBs is affected by disasters. It also provides insights into whether the NPL rates of MSMEs from these banks are affected when disasters occur, providing a foundation for econometric analysis on the impact of disasters on bank lending to MSMEs in the Philippines.

[16] Dryden, A. 2025.

[17] Ibid.

3. METHODOLOGY

This chapter outlines the hypothesis of the study and describes the econometric model employed.

3.1 Hypothesis building

This research project aims to quantify the impact of disasters on bank lending to MSMEs. By design, MSMEs face financial constraints when accessing credit, primarily due to information asymmetry in the credit market, which is exacerbated by the limited transparency of smaller firms' credit records.[18] Banks are generally reluctant to lend to low-margin, high-risk clients, as the potential credit default risk is too high to bear.[19]

This study examines whether access to finance for MSMEs is further constrained by disasters. Specifically, it investigates whether such events heighten credit risk for banks, as reflected in higher NPLs. Disasters increase the likelihood that firms will lose assets or experience business disruptions. Rebuilding or insuring against such events is very costly, often requiring funds that many MSMEs cannot afford.[20]

It is therefore important to determine whether banks become more or less willing to lend to MSMEs following disaster occurrences in the Philippines. If disasters reduce the willingness of banks to lend, this would represent an additional barrier for MSMEs seeking external finance, which is counterproductive, as these firms often need greater financial support in the aftermath of disasters.[21] Over time, this dynamic could create a vicious cycle of financial exclusion for MSMEs, particularly in the context of climate change and environmental degradation. Given this rationale, the first hypothesis to be tested is as follows:

H1 **TOTAL BANK LENDING TO MSMES WILL DECREASE FOLLOWING THE OCCURRENCE OF A DISASTER**

While total bank lending represents an adequate measure of access to finance, NPL rates also provide valuable insights. If NPL rates for MSME loans increase after disasters, this reflects the possibility that these firms are more vulnerable to disaster-related damages and more likely to default.[22] If this dynamic holds, it suggests that disasters increase the credit risk of MSMEs, further restricting their access to finance.

In response, the second hypothesis investigated in this paper is:

H2 **NPL RATES OF MSME LOANS WILL INCREASE AFTER THE OCCURRENCE OF A DISASTER**

If hypotheses H1 and H2 are confirmed, then climate change, by increasing the frequency and intensity of disasters, could trigger a vicious cycle of growing loss, damage, and financial distress for MSMEs. Furthermore, higher credit risk would make it more difficult for these firms to access affordable finance, limiting their ability to sufficiently invest in resilience or obtain insurance against disasters.[23] This negative feedback loop, in which disasters destabilize the economy and financial system, damage firm balance sheets, and reduce banks' credit supply to MSMEs, will be examined in this paper.

3.2 Econometric model

The econometric analysis consists of an OLS model with two dependent variables and three independent variables:

The dependent variables are either 'Total bank lending per month' or the 'NPL rate per month', each analyzed at the industry level for all MSMEs, with a lead of one, two, and three months following disaster occurrences. The original data on bank lending separates these variables by firm size, either micro, small, or medium. To analyze MSMEs as a whole, the values of 'Total bank lending per month' and 'NPL rate per month' were summed across micro, small, and medium firms per bank category. The independent variables were then regressed on 'Total bank lending per month' from UKBs, TBs, and RCBs separately, using one, two, and three month leads after disaster occurrences. The same

[18] Berger, A.N. and Udell, G.F. 1998. The economics of small business ﬁnance: The roles of private equity and debt markets in the ﬁnancial growth cycle. Journal of Banking & Finance. Available at: https://doi.org/10.1016/S0378-4266(98)00038-7; Berger, A.N. and Udell, G.F. 2002. Small Business Credit Availability and Relationship Lending: The Importance of Bank Organisational Structure. Available at: https://www.federalreserve.gov/pubs/feds/2001/200136/200136pap.pdf; Berger, A.N., Klapper, L.F. and Udell, G.F. 2001. The ability of banks to lend to informationally opaque small businesses. Journal of Banking and Finance. Available at: https://doi.org/10.1016/S0378-4266(01)00189-3

[19] Stiglitz, J.E. and Weiss, A. 1981. Credit Rationing in Markets with Imperfect Information. The American Economic Review. Available at: https://pages.ucsd.edu/~aronatas/project/academic/Stiglitz%20credit.pdf

[20] Islam, S.N. and Winkel, J. 2017. Climate Change and Social Inequality. United Nations Department of Economic & Social Affairs. Available at: https://www.un.org/esa/desa/papers/2017/wp152_2017.pdf; Volz and Knaack. 2023.

[21] Islam, S.N. and Winkel, J. 2017.

[22] Ibid.

[23] Islam, S.N. and Winkel, J. 2017; Volz and Knaack. 2023; Kling, G. et al. 2021. The impact of climate vulnerability on firms' cost of capital and access to finance. World Development. Available at: https://doi.org/10.1016/j.worlddev.2020.105131

procedure was applied to the 'NPL rate per month' for loans from UKBs, TBs, and RCBs, also with one, two, and three month leads.

The dependent variables are defined as follows:

$\gamma^{UCB,TB,RCB}_{t+1,t+2,t+3}$ = Total bank lending 1, 2, 3 months after disaster occurrence

$\gamma^{UCB,TB,RCB}_{t+1,t+2,t+3}$ = NPL rate 1, 2, 3 months after disaster occurrence

The independent variables consist of a numerical variable 'DDisaster', and two control variables: 'Total Affected' and 'Total Damage'. DDisaster is coded numerically to reflect the severity of disasters in a given month. A value of zero indicates that no disasters occurred in the Philippines in that specific month. A value of one denotes a fairly small disaster, defined as an event affecting less than two percent of the total population and causing damage amounting to less than one percent of total GDP. However, a value equal to two represents a major disaster, where more than two percent of the total population is affected and the damage inflicted exceeds two percent of total GDP.

The independent variables are defined as follows:

DDisaster = Numerical variable, where

0 = no disaster occurrence

1 = small disaster occurrence, when the population affected is < 2% and damage of GDP is < 1%

2 = major disaster occurrence, when the population affected is > 2% and damage of GDP is > 1%

Total Affected = Total number of people affected by the disaster

Total Damage = Amount of damage after the disaster occurrence in PHP, adjusted for inflation

Other independent variables are included as control variables. While 'Total Affected' reflects the total number of people impacted by a disaster, 'Total Damage' captures the total economic losses caused by the disaster in Philippine pesos. Potential multicollinearity among the three independent variables is resolved by running variance inflation factors, which were all below 3.8, indicating that multicollinearity is not a concern.

4. FINDINGS

Six regressions were conducted for each bank category. For each category, separate regressions were run with 'Total bank lending per month' and 'NPL rate per month' as the dependent variables.

It is assumed that bank lending behavior does not adjust immediately following a disaster but takes one, two, or three months to respond. Therefore, regressions with one, two, and three month leads were performed for each dependent variable, resulting in a total of six regressions per bank category.

4.1 Regression results for Thrift Banks

Table 1 presents the regression results of disasters on total bank lending for TBs. The independent variable 'Total Affected' is statistically significant across all three leads. Specifically, an increase of one unit in the total number of people affected is associated with a decrease in total bank lending of 0.002571 units after one month, at a statistically significant level of 10 percent (Table 1). For a lead of two months, total bank lending decreases by 0.002551 units per one unit increase in the affected population, also significant at the 10 percent level. For a lead of three months, the effect is stronger and statistically significant at the five percent level, with total bank lending decreasing by 0.002906 units for each additional one unit increase in the total number of people affected (Table 1).

These findings indicate that bank lending to MSMEs in the TB category is negatively impacted by disaster occurrences. A consistent negative correlation exists between 'Total Affected' and 'Total Bank Lending' across all three leads, supporting **H1** outlined in Chapter 3.1.

Table 2 displays the results for the dependent variable 'NPL rate per month' of TBs. Statistically significant results for 'Total Affected' are found with leads of two and three months. If the total number of people

TABLE 1. Regression of Disaster Occurrence on Total Bank Lending of TBs with Leads of 1, 2 and 3 Months

	TB_Total_lead_1	TB_Total_lead_2	TB_Total_lead_3
(Intercept)	75277.168188***	74322.831654***	73513.740436***
	(6205.096948)	(6155.134662)	(6179.567382)
DDisaster	7354.889383	8450.351820	9464.870563
	(6027.542259)	(5993.442214)	(6014.049153)
Total_Affected	-0.002571+	-0.002551+	-0.002906*
	(0.001359)	(0.001331)	(0.001336)
Total_Damage_adj	0.004442	0.002604	0.003240
	(0.006404)	(0.006303)	(0.006326)
Num.Obs.	81	80	79
R2	0.048	0.048	0.062
R2 Adj.	0.011	0.011	0.025
AIC	1752.2	1727.1	1706.2
BIC	1764.2	1739.0	1718.0
Log.Lik.	-871.090	-858.570	-848.082
RMSE	11330.59	11083.15	11117.55
+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001			

affected by a disaster increases by one unit, the NPL rate increases by 0.000000001 percent with a lead of two months at the 10 percent significance level (Table 2). Similarly, with a three month lead, the NPL rate increases by 0.000000001 percent if the total number of people affected increases by one unit, also significant at the 10 percent level (Table 2).

These results indicate a positive correlation between NPL rates and disaster occurrences, suggesting that disasters increase the number of NPLs among MSMEs in the TB category hold. As a result, disasters raise the credit default risk of MSME loans for TBs. These results align with **H2** outlined in Chapter 3.1.

4.2 Regression results for Universal and Commercial Banks

The same econometric analysis conducted for TBs has also been applied to UKBs. However, as Tables 3 and 4 below show, no statistical significant relationship was found between 'Total bank lending per month', 'NPL rate per month', and disaster occurrence.

The reason may be explained by the fact that UKBs tend to lend most of their resources to medium-sized firms, as shown in Figure 2 in Chapter 2.1. If the largest share of loans is extended to medium firms, it can be assumed that the dependent variables 'Total bank lending per month' and 'NPL rate per month' in the UKB category primarily reflect the performance of medium firms, which are often more stable operationally and financially. They are typically located in more central areas where commerce is flourishing and profits are growing.[24] The material and financial robustness of medium-sized enterprises likely enhances their resilience to disasters. Consequently, these firms are less financially impacted, as they retain the capacity to service their debt even under stress. This, in turn, sustains the confidence of banks in their creditworthiness and supports continued lending.

[24] Department of Trade and Industry Philippines. 2023. 2023 Philippine MSME Statistics. Available at: https://www.dti.gov.ph/resources/msme-statistics/

TABLE 2. Regression of Disaster Occurrence on the NPL Rate of TBs with Leads of 1, 2 and 3 Months

	TB_NPL_lead_1	TB_NPL_lead_2	TB_NPL_lead_3
(Intercept)	0.024111480***	0.024141349***	0.024786070***
	(0.003028709)	(0.003069224)	(0.003093177)
DDisaster	-0.002937113	-0.003259732	-0.003883471
	(0.002942044)	(0.002988597)	(0.003010327)
Total_Affected	0.000000001	0.000000001+	0.000000001+
	(0.000000001)	(0.000000001)	(0.000000001)
Total_Damage_adj	-0.000000001	-0.000000001	-0.000000000
	(0.000000003)	(0.000000003)	(0.000000003)
Num.Obs.	81	80	79
R2	0.036	0.051	0.055
R2 Adj.	-0.001	0.013	0.017
AIC	-602.1	-594.7	-586.0
BIC	-590.2	-582.8	-574.2
Log.Lik.	306.062	302.340	298.015
RMSE	0.01	0.01	0.01

*+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$*

TABLE 3. Regression of Disaster Occurrence on Total Bank Lending by UKBs with Leads of 1, 2 and 3 Months

	UKB_Total_lead_1	UKB_Total_lead_2	UKB_Total_lead_3
(Intercept)	362379.956722***	353000.854690***	354489.536526***
	(24260.248641)	(24592.966675)	(24253.176757)
DDisaster	-9925.533652	615.405669	550.937457
	(23566.057890)	(23946.921186)	(23603.561238)
Total_Affected	0.002507	0.000663	0.000254
	(0.005314)	(0.005316)	(0.005242)
Total_Damage_adj	-0.029818	-0.028366	-0.029025
	(0.025038)	(0.025184)	(0.024828)
Num.Obs.	81	80	79
R2	0.020	0.018	0.021
R2 Adj.	-0.018	-0.021	-0.018
AIC	1973.1	1948.8	1922.2
BIC	1985.0	1960.7	1934.0
Log.Lik.	-981.531	-969.383	-956.099
RMSE	44299.56	44282.96	43633.45
*+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001*			

TABLE 4. Regression of Disaster Occurrence on the NPL Rate of UKBs with Leads of 1, 2 and 3 Months

	UKB_NPL_lead_1	UKB_NPL_lead_2	UKB_NPL_lead_3
(Intercept)	0.009969905***	0.010245009***	0.010131055***
	(0.000702580)	(0.000715050)	(0.000646595)
DDisaster	0.000535132	0.000192718	0.000312329
	(0.000682476)	(0.000696266)	(0.000629277)
Total_Affected	**-0.000000000**	**-0.000000000**	**-0.000000000**
	(0.000000000)	(0.000000000)	(0.000000000)
Total_Damage_adj	0.000000000	0.000000000	0.000000000
	(0.000000001)	(0.000000001)	(0.000000001)
Num.Obs.	81	80	79
R2	0.011	0.001	0.004
R2 Adj.	-0.028	-0.038	-0.035
AIC	-838.8	-827.8	-833.3
BIC	-826.9	-815.9	-821.5
Log.Lik.	424.414	418.886	421.668
RMSE	0.00	0.00	0.00
*+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001*			

4.3 Regression results for Rural and Cooperative Banks

Table 5 below displays how disaster occurrence affects total bank lending for RCBs. Statistical significance is found for the numerical variable 'DDisaster' across all three leads. It should be noted that RCBs have provided quarterly, rather than monthly, bank lending data. Therefore, a lead of one corresponds to three months, a lead of two to six months, and a lead of three to nine months.

If 'DDisaster' increases by one unit, 'Total bank lending per month' decreases by approximately 20,000 units for all three leads at the 10 percent significance level. Thus, the greater the severity of a disaster, the more bank lending to MSMEs declines over the subsequent three, six, and nine month periods in the RCB category. When disasters occur, MSMEs experience reduced access to credit from RCBs, and this decrease in access persists in the medium-term. As shown in Figure 4 in Chapter 2.1, RCBs are the main lenders to micro and small firms in rural areas. These results therefore highlight how disasters can severely impact MSMEs in the most vulnerable regions, since even RCBs are unable to extend additional loans to support their resilience. Similar to the case of TBs, the results confirm that **H1** holds for RCBs as well: a negative correlation between disaster occurrence and 'Total bank lending per month' is evident in the data.

TABLE 5. Regression of Disaster Occurrence on Total Bank Lending by RCBs with Leads of 3, 6 and 9 Months

	RCB_Total_lead_1	RCB_Total_lead_2	RCB_Total_lead_3
(Intercept)	69290.471620***	70797.932660***	71167.136035***
	(10612.505328)	(11257.580744)	(11501.908098)
DDisaster	-19508.433007+	-19838.715972+	-20347.021783+
	(10257.799373)	(10881.314178)	(11014.601820)
Total_Affected	0.003789	0.003245	0.003267
	(0.002545)	(0.002699)	(0.002720)
Total_Damage_adj	-0.018942	-0.013970	-0.012187
	(0.023189)	(0.024598)	(0.024614)
Num.Obs.	24	24	23
R2	0.157	0.159	0.175
R2 Adj.	0.030	0.033	0.045
AIC	514.7	517.5	495.4
BIC	520.6	523.4	501.0
Log.Lik.	-252.334	-253.750	-242.678
RMSE	8910.28	9451.88	9248.90

*+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001*

Regarding how NPL rates are influenced by disasters for RCBs, it can be observed that **H2** holds true for the independent variable 'DDisaster', but not for 'Total Affected', as shown in Table 6 below. If 'DDisaster' increases by one unit, the 'NPL rate per month' rises by 0.00459 percent at a five percent significance level (Table 6). Therefore, the larger the disaster, the higher the NPL rate for MSMEs borrowing from RCBs, with a lead of two. Consequently, six months after the disaster occurs, MSMEs experience higher loan defaults at a statistically significant level of five percent. Hence, the greater the disaster, the larger the credit default. A positive relationship between disaster occurrence and NPL rates is evident in the data for the independent variable 'DDisaster'.

For a lead of three, corresponding to nine months after disaster occurrence, the relationship between 'DDisaster' and 'NPL rate per month' remains consistent with the regression results for a lead of two (Table 6). If 'DDisaster' increases by one unit, then the 'NPL rate per month' increases by 0.004115% at a 10 percent significance level for a lead of three. Thus, the larger the disaster, the higher the NPL rate for RCBs lending to MSMEs, even with a lead of nine months. These results suggest that loan non-performance in the RCB category tends to persist for an extended period following disaster occurrence.

However, the results also suggest that if 'Total Affected' increases by one unit, the 'NPL rate per month' decreases by 0.000000001 percent on a 10 percent significance level and for a lead of two (Table 6). This contrasts with the findings for TBs, where 'Total Affected' and 'NPL rate per month' show a positive relationship. For RCBs a negative relationship is observed. This contrast can likely be explained by the fact that RCBs are smaller-scale, rural banks that lend to only a small fraction of the total number of MSMEs in the Philippines, meaning that the number of total affected, as a proxy for country-wide disaster occurrences, may not adequately represent rural bank lending dynamics. The results might be stronger if more granular, region-specific data were available.

TABLE 6. Regression of Disaster Occurrence on the NPL Rate of RBs with Leads of 1, 2 and 3 Months

	RCB_NPL_lead_1	RCB_NPL_lead_2	RCB_NPL_lead_3
(Intercept)	0.008773137**	0.008104136**	0.008296442**
	(0.002360571)	(0.002225268)	(0.002448134)
DDisaster	0.003776408	0.004590524*	0.004114898+
	(0.002281672)	(0.002150892)	(0.002344413)
Total_Affected	-0.000000001	-0.000000001+	-0.000000001
	(0.000000001)	(0.000000001)	(0.000000001)
Total_Damage_adj	0.000000007	0.000000006	0.000000006
	(0.000000005)	(0.000000005)	(0.000000005)
Num.Obs.	24	24	23
R2	0.128	0.186	0.141
R2 Adj.	-0.003	0.064	0.006
AIC	-220.6	-223.5	-211.3
BIC	-214.7	-217.6	-205.7
Log.Lik.	115.314	116.730	110.664
RMSE	0.00	0.00	0.00

*+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$*

5. CONCLUSIONS AND POLICY RECOMMENDATIONS

This paper has analyzed how disasters impact bank lending to MSMEs in the Philippines from 2014 to 2024. An econometric analysis was conducted using MSME bank lending data provided by the BSP, merged with country-level disaster data from Dryden.[25]

The results were statistically significant for TBs and RCBs, while UKBs did not show any statistically relevant reaction to disaster occurrences. For TBs, total bank lending decreases, whereas NPL rates increase following disaster events. If the total number of affected people increases by one unit, total bank lending by TBs decreases by 0.002906 units at the five percent significance level, for a lead of three months. Thus, TBs tend to reduce lending to MSMEs after disasters. Furthermore, with a lead of two months, NPL rates increase by 0.000000001 percent at the 10 percent significance level, indicating a higher likelihood of MSME defaults following disasters.

For RCBs, total bank lending decreases and NPL rates either increase or decrease after disasters, depending on the proxy used for disaster occurrence. Results show that nine months after a disaster, RCBs reduce bank lending to MSMEs by 20,347 units when disaster severity increases by one unit, at the 10 percent significance level. Hence, disasters lead to reduced MSME lending in the RCB category as well. In addition, the analysis found that if 'DDisaster' increases by one unit, NPL rates increase by 0.004591 percent at the five percent significance level six months after a disaster. Therefore, the larger the disaster, the higher the NPL rate for MSMEs borrowing from RCBs. Overall, the regression results suggest that **H1** and **H2,** developed in Chapter 3.1, hold for both the TB and RCB categories.

Research consistently demonstrates that MSMEs face significant financial constraints in accessing credit, largely due to information opacity and other factors.[26] The findings in this paper suggest that an increase in the occurrence of large disasters further compounds these access-to-finance problems for MSMEs. This can lead to a vicious cycle, where financial exclusion exacerbates economic instability and vice versa.[27] While MSMEs are hit most severely by disasters and, therefore, need more rather than less financing to deal with damages, they are often excessively denied access to credit.

Consequently, climate change intensifies social inequalities and aggravates economic vulnerabilities. Climate change mitigation and adaptation frameworks must therefore consider social dimensions when designing policies, ensuring that climate strategies are both green and inclusive.[28] To secure a just transition and a resilient economy, green finance policies must be integrated with financial inclusion initiatives, as proposed by the IGF framework.[29]

The findings of this study reveal that climate disasters negatively affect bank lending to MSMEs in the Philippines, especially among thrift banks and rural and cooperative banks, and are associated with increases in non-performing loans. Although the analysis faced data limitations and statistically insignificant results for universal and commercial banks, the patterns observed support the hypothesis that disasters exacerbate financial exclusion for MSMEs. This has broader implications for both financial stability and economic resilience, particularly in developing countries.

This research underscores the urgent need for inclusive and green financial frameworks that enable MSMEs to access affordable financing for climate resilience, adaptation, and the adoption of clean technologies. Because MSMEs are disproportionately vulnerable to climate-related disasters, addressing their financial exclusion is not only a development priority but also a critical step toward economic and financial stability. Based on these findings, this paper proposes three complementary sets of policy actions.

---

[25] Dryden, A. 2025.

[26] Stiglitz, J.E. and Weiss, A. 1981; Berger, A.N. and Udell, G.F. 1998; Berger, A.N. and Udell, G.F. 2002; Berger, A.N., Klapper, L.F. and Udell, G.F. 2001.

[27] Volz and Knaack. 2023.

[28] Schaer, C. and Kuruppu, N.D. 2018. Private-sector action in adaptation: Perspectives on the role of micro, small and medium size enterprises. UNEP DTU Partnership. Available at: https://unepccc.org/wp-content/uploads/2019/04/msme-adaptation-updated-web-2.pdf; Malerba, D. 2022. Just transitions: a review of how to decarbonise energy systems while addressing poverty and inequality reduction. Available at: https://doi.org/10.23661/DP6.2022; United Nations DESA. 2024. A Globally Just Transition: Perspectives from the Committee for Development Policy: Committee for Development Policy. Available at: https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/2023-cdp-policy-dec.pdf

[29] Volz, U. et al. 2020; Alliance for Financial Inclusion. 2021. Promoting Inclusive Green Finance Initiatives and Policies. Available at: https://www.afi-global.org/wp-content/uploads/2024/10/AFI_IGF_promoting_sp_AW_digital_isbn2.pdf; Volz and Knaack. 2023.

5.1 Raise awareness and acknowledge the heightened vulnerability of MSMEs to post-disaster financial exclusion

Policymakers and financial institutions must first recognize that MSMEs face significantly higher barriers to accessing finance following disasters. This recurring exclusion deepens social and financial inequalities, creating a vicious cycle that undermines resilience and inclusion. Raising awareness of the dynamics behind restricted financial access for MSMEs is a crucial first step toward building capacity for IGF policies. Disseminating the findings of this paper across relevant government agencies, central bank departments, NDBs, and MDBs through relevant webinars, panel discussions, and conferences can facilitate open communication about the financial vulnerabilities that MSMEs face when disasters occur. Such engagement allows relevant policymakers to treat financial inclusion amid climate-related shocks as an urgent policy priority.

5.2 Build institutional capacity to design and implement IGF policies that address MSME vulnerability

Capacity building is essential to turn awareness into action. Governments, central banks, NDBs, and MDBs must invest in internal capacities to formulate and operationalize IGF policies that enhance access to finance for MSMEs, particularly in the aftermath of disasters. This includes developing roadmaps, allocating resources, establishing dedicated teams or units, and strengthening collaboration across financial institutions, regulatory bodies, and the private sector. Internal capacity building may involve mapping out detailed roadmaps and action plans to understand the steps that institutions need to take to deliver relevant IGF policies, such as determining budget requirements, forming new departments specifically focused on developing and implementing IGF policies, or merging existing departments that align with IGF policy priorities.

5.3 Channel green finance toward vulnerable MSMEs through targeted and market-shaping IGF instruments

In collaboration with governments, central banks, NDBs, and MDBs, AFI as well as other experts in this field should cooperate to deliver targeted IGF policies. Direct interventions can include green credit guarantee schemes, in which central banks provide the enabling policy and regulatory framework, while fiscal authorities issue guarantees to partially cover credit risk. These mechanisms reduce lending risk for financial institutions and allow them to offer more affordable financing to MSMEs, thereby strengthening their resilience before and after climate-related disasters.[30] Other direct approaches include targeted refinancing options, micro-investment facilities, and direct lending policies.[31] Indirect IGF approaches, also known as market-shaping strategies, feature digital finance tools to support digital infrastructure for mobile money as a source of peer financing and informal credit during emergencies.[32] It also includes enabling microinsurance and ensuring that Environmental and Social Risk Management guidelines for banks are proportionate.[33]

To secure a just transition and build a resilient future, financial policy frameworks must be both green and inclusive. This dual focus is the only sustainable path toward mitigating climate risks while enabling equitable growth.

Future research would benefit from more granular, regionally disaggregated, and firm-level bank lending data to assess the nuanced impacts of disasters on financial access. Integrating gender-disaggregated data would also be valuable, as the current study could not examine the gendered impacts of financial exclusion due to limited data availability.

Partnerships with central banks to access detailed datasets, or leveraging firm-level surveys, would significantly enrich research. Future work should also analyze **best practice policy interventions** and their effectiveness in advancing financial inclusion through IGF, contributing to a global knowledge base on what works to support MSMEs in the face of climate change.

[30] Volz and Knaack. 2023.

[31] Ibid.

[32] Volz, U. et al. 2020; Volz and Knaack. 2023.

[33] Volz and Knaack. 2023.

REFERENCES

Alliance for Financial Inclusion. 2021. Promoting Inclusive Green Finance Initiatives and Policies. Available at: https://www.afi-global.org/wp-content/uploads/2024/10/AFI_IGF_promoting_sp_AW_digital_isbn2.pdf

Bae, K.-H., Bailey, W. and Kang, J. 2021. Why is stock market concentration bad for the economy? Journal of Financial Economics. Available at: https://doi.org/10.1016/j.jfineco.2021.01.002

Bangko Sentral ng Pilipinas. 2023. Primer on BSP's COVID-19 response toolkit. Supervisory Policy and Research Department. Available at: https://www.bsp.gov.ph/Media_And_Research/Primers%20Faqs/Primer_on_Regulatory_Relief_Measures.pdf

Bangko Sentral ng Pilipinas. 2024. Report on the Philippine Financial System Available at: https://www.bsp.gov.ph/Lists/Report%20on%20the%20Philippine%20Financial%20System/Attachments/33/StatRep_2Sem2024.pdf

Beck, T. and Demirguc-Kunt, A. 2006. Small and medium-size enterprises: Access to finance as a growth constraint. Journal of Banking & Finance. Available at: https://doi.org/10.1016/j.jbankfin.2006.05.009

Berger, A.N., Klapper, L.F. and Udell, G.F. 2001. The ability of banks to lend to informationally opaque small businesses. Journal of Banking and Finance. Available at: https://doi.org/10.1016/S0378-4266(01)00189-3

Berger, A.N. and Udell, G.F. 1998. The economics of small business Ænance: The roles of private equity and debt markets in the Ænancial growth cycle. Journal of Banking & Finance. Available at: https://doi.org/10.1016/S0378-4266(98)00038-7

Berger, A.N. and Udell, G.F. 2002. Small Business Credit Availability and Relationship Lending: The Importance of Bank Organisational Structure. Available at: https://www.federalreserve.gov/pubs/feds/2001/200136/200136pap.pdf

Dryden, A. 2025. Natural Disasters, Sovereign Defaults & Debt Restructurings: Paper presented at the World Bank's Public Debt Management Conference in Washington DC on 3-4 October 2025

Department of Trade and Industry Philippines. 2023. 2023 Philippine MSME Statistics. Available at: https://www.dti.gov.ph/resources/msme-statistics/

Hallegatte, S. et al. 2014. Climate Change and Poverty — An Analytical Framework. The World Bank. Available at: https://doi.org/10.1596/1813-9450-7126

Islam, S.N. and Winkel, J. 2017. Climate Change and Social Inequality. United Nations Department of Economic & Social Affairs. Available at: https://www.un.org/esa/desa/papers/2017/wp152_2017.pdf

Kling, G. et al. 2021. The impact of climate vulnerability on firms' cost of capital and access to finance. World Development. Available at: https://doi.org/10.1016/j.worlddev.2020.105131

Malerba, D. 2022. Just transitions: a review of how to decarbonise energy systems while addressing poverty and inequality reduction. Available at: https://doi.org/10.23661/DP6.2022

Mkhaiber, A. and Werner, R.A. 2021. The relationship between bank size and the propensity to lend to small firms: New empirical evidence from a large sample. Journal of International Money and Finance. Available at: https://doi.org/10.1016/j.jimonfin.2020.102281

Riding, A.L. 2001. Loan Guarantees: Costs of Default and Benefits to Small Firms. Available at: https://doi.org/10.1016/S0883-9026(00)00050-1

Schaer, C. and Kuruppu, N.D. 2018. Private-sector action in adaptation: Perspectives on the role of micro, small and medium size enterprises. UNEP DTU Partnership. Available at: https://unepccc.org/wp-content/uploads/2019/04/msme-adaptation-updated-web-2.pdf

Stiglitz, J.E. and Weiss, A. 1981. Credit Rationing in Markets with Imperfect Information. The American Economic Review. Available at: https://pages.ucsd.edu/~aronatas/project/academic/Stiglitz%20credit.pdf

United Nations DESA. 2024. A Globally Just Transition: Perspectives from the Committee for Development Policy: Committee for Development Policy. Available at: https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/2023-cdp-policy-dec.pdf

United Nations. 2015. Paris Agreement. Available at: https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf

Volz, U. 2010. An Empirical Examination of Firms' Financing Conditions in Transition Countries. International Journal of Emerging and Transition Economies. Available at: https://www.idos-research.de/uploads/media/Volz_2008_an_empirical_examination_of_firm_s_financing_conditions_in_TCs.pdf

Volz, U. et al. 2020. Inclusive Green Finance: From Concept to Practice. Alliance for Financial Inclusion and SOAS University of London. Available at: https://eprints.soas.ac.uk/34540/1/AFI_IGF_SOAS_digital.pdf

Volz, U. and Knaack, P. 2023. Inclusive green finance: A new agenda for central banks and financial supervisors. The INSPIRE Sustainable Central Banking Toolbox. Available at: https://doi.org/10.1163/9789004322714_cclc_2023-0148-0700

Alliance for Financial Inclusion
AFI, Sasana Kijang, 2, Jalan Dato' Onn, 50480 Kuala Lumpur, Malaysia
t +60 3 2776 9000 **e** info@afi-global.org **www.afi-global.org**
Alliance for Financial Inclusion AFI.History @NewsAFI @afinetwork