

JICA Ogata Research Institute Discussion Paper

# **Impact Investors in the Microfinance Sector: Empirical Analysis of Debt Investment in Normal and Crisis Periods**

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**No. 38**  
April 2025

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This paper has been prepared as a part of the research project “Study on the Promotion of Financial Inclusion: The Case of Cambodia” conducted by the JICA Ogata Sadako Research Institute for Peace and Development.

The views expressed in this paper series are those of the author(s) and do not necessarily represent the official positions of either JICA or the JICA Ogata Research Institute.

Suggested Citation: Aiba, D. and Heng,B. 2025. Impact Investors in the Microfinance Sector: Empirical Analysis of Debt Investment in Normal and Crisis Periods. JICA Ogata Research Institute Discussion Paper No.38.Tokyo: JICA Ogata Research Institute for Peace and Development.

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## Impact Investors in the Microfinance Sector: Empirical Analysis of Debt Investment in Normal and Crisis Periods

Daiju Aiba\* and Bomakara Heng†

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### Abstract

The microfinance sector relies heavily on foreign funding sources, making it vulnerable to fluctuations in international capital flows. Moreover, unlike conventional financial institutions, microfinance institutions (MFIs) rely on socially responsible investment from impact investors, including microfinance investment vehicles, development agencies, and governments. This study investigates the patterns of debt investment in Cambodian MFIs from 2017Q1 to 2021Q4, covering the COVID-19 pandemic. We constructed a unique dataset that contains detailed information on debt investment in Cambodian MFIs, such as the amount of debt disbursement, interest rate, maturity, and investor identity. Furthermore, we employed the difference-in-differences approach to examine how debt conditions changed before and after the COVID-19 pandemic. The results revealed differences in investment decision between impact investors and non-impact investors. Impact investors are more likely to select MFIs with broader outreach; however, the debt investments of impact investors are concentrated on large-scale MFIs. Furthermore, we found no robust evidence that impact investors extend loans at lower interest rates than institutional investors. At the same time, investors generally tend to put a risk premium on the interest rate for MFIs with higher outreach; however, we found that impact investors continue to extend debts to MFIs and provide debts at lower interest rates than non-impact investors during the COVID-19 pandemic. The results may suggest that funding from impact investors could serve as a buffer against the negative economic shocks to sustain microfinance businesses during crises in the financial market.

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**Keywords:** Impact Investment, ESG Investment, Microfinance, Financial Inclusion, COVID-19 Pandemic, Difference-in-Differences Analysis

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## 1. Introduction

Unlike traditional financial institutions, socially responsible investment (SRI), including investment from impact investors (such as microfinance investment vehicles, bilateral and multilateral development agencies, and the government), are significant funding sources for microfinance institutions (MFIs).<sup>1</sup> For MFIs, low-cost funding sources are crucial for the sustainability of lending to people with low incomes, as lending to such people is usually risky and labor-intensive. Empirical evidence suggests that funding from impact investors has low interest rates and longer tenors (Block et al., 2021), indicating that the role of impact investors is important in supporting the growth of MFIs and sustainability in lending to impoverished households and individuals<sup>2</sup>; however, little empirical evidence exists on the investing behavior of impact investors in the microfinance sector.

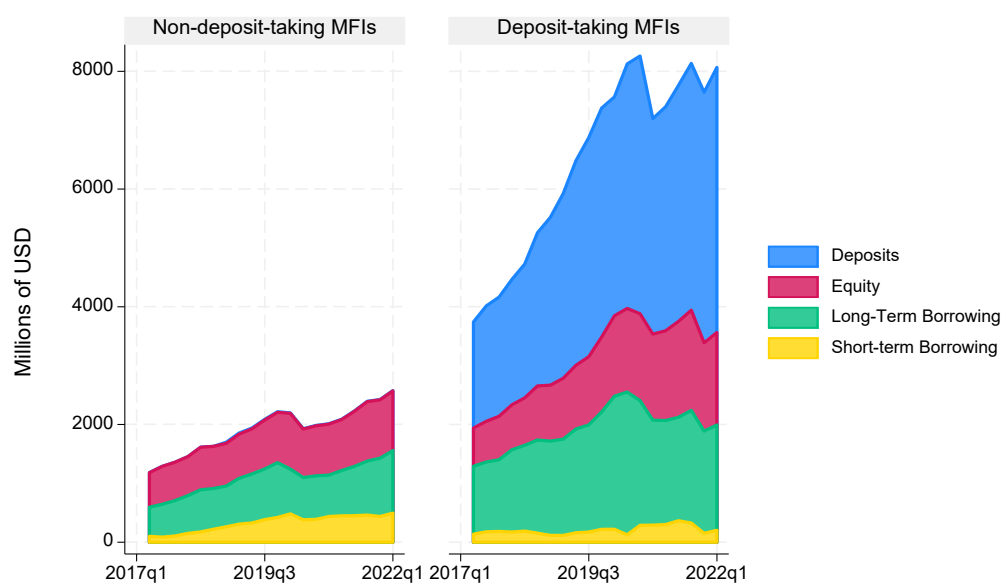
This study examines the patterns of debt investment in Cambodian MFIs from 2017Q1 to 2021Q4, covering the period that coincided with the coronavirus (COVID-19) pandemic. Our dataset provides comprehensive information on MFIs' wholesale borrowing each quarter for each MFI-investor pair. This information includes outstanding amounts, interest rates, maturity, and the identities and nationalities of the investors. Leveraging this unique dataset, we explore the investment behaviors of public investors (such as development financial institutions and governments) and prosocial investors, such as microfinance investment vehicles (MIVs) and private lenders recognized as social investors. We investigate the characteristics of MFIs to determine the factors associated with lenders' investment decisions.

Furthermore, we analyze changes in investment behavior in response to the global pandemic; specifically, we use a difference-in-difference and triple-differences approach to assess how debt conditions shifted before and after the crisis period. The microfinance sector is susceptible to shocks in international capital inflows, as most funding sources for MFIs are from abroad (Wagner and Winkler, 2013). During the COVID-19 pandemic, the United Nations Development Program (UNDP) estimated that investment capital flows into Cambodia decreased by approximately 3.6 billion United States dollars (USD) in 2020, representing a decline of 19.8% of total capital inflows (UNDP, 2021). Figure 1 shows that approximately 70% of liabilities are in the form of borrowings for non-deposit-taking MFIs (non-MDIs), and it is approximately 40% for deposit-taking MFIs (MDIs) in Cambodia. Therefore, there is a concern that the worldwide decline in international capital flows will negatively impact Cambodia's financial inclusion.

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<sup>1</sup> We refer to MFIs as both microfinance deposit-taking institutions (MDIs) and microfinance non-deposit taking institutions (non-MDIs).

<sup>2</sup> An impact investor is an individual, organization, or fund that seeks to generate both financial returns and positive social or environmental impact through their investments (double bottom line).

**Figure 1: Structure of Liabilities in the Cambodian MFI Sector**

Source: National Bank of Cambodia, Author's calculation

Note: The figure shows aggregated amounts of equity, deposits, and borrowings for non-deposit-taking MFIs and deposit-taking MFIs.

Our study presents the first empirical analysis of the role of impact investors in the sustainability of MFIs. Previous studies have primarily examined the determinants of MFI investment at the institutional level (Dorfleitner et al., 2017) without identifying factors that influence lenders' and borrowers' decisions separately. Compared to prior studies, our study utilizes novel and unique borrower-lender-pair data, allowing us to examine how debt-investment preferences (target MFIs) vary across lender types. We also assess whether borrowings from impact lenders serve as crucial buffers for local MFIs during periods of downturn in the international capital market.

We conducted several empirical analyses, discovering that impact investors were more inclined to select MFIs with higher outreach. Conversely, non-impact investors tend to prefer MFIs with lower outreach. Additionally, our research reveals that institutional investors attach a risk premium to interest rates offered by MFIs that are highly engaged in financial inclusion. Interestingly, we found no evidence supporting the idea that impact investors provide loans at lower interest rates than other institutional investors. Instead, impact investors tend to impose a risk premium on MFIs, prioritizing financial inclusion. Examining vulnerability during the pandemic reveals that impact investors offered debt at interest rates approximately 1.5% lower than those provided by non-impact foreign investors. Moreover, impact investors maintained the size of their debt disbursements during the pandemic; conversely, non-impact domestic investors reduced their disbursement levels. Additionally, while MFIs were less affected by the pandemic

in terms of investment opportunities, larger MFIs experienced a significant decline in investment. These findings indicate that funding from impact investors acts as a counter-cyclical measure against adverse economic shocks. Wagner and Winkler (2013) documented that MFIs are vulnerable during the international financial crisis as they depend on foreign funding sources. In contrast, our analysis suggests that financial support from impact investors serves as a buffer for MFIs, enabling them to sustain operations during times of crisis in the financial market.

The rest of the paper is organized as follows. Section 2 reviews the relevant literature on impact investors and investment in MFIs, and Section 3 develops the hypotheses to be examined. Section 4 describes the empirical analysis of the differences in investment patterns between impact and other investors. Section 5 presents an empirical analysis of the impact of the pandemic on investors' investment decisions, and Section 6 discusses policy implications. Section 7 presents the conclusion.

## 2. Related literature

### 2.1 Impact investors and their preference on investment

An impact investor is an individual, organization, or fund that seeks to generate financial returns and positive social or environmental impacts through their investments (double bottom line). Impact investors are considered to actively allocate capital to businesses, projects, or initiatives that address pressing social or environmental challenges while delivering a financial return on investment.<sup>3</sup> Impact investors also actively seek to place capital in businesses, nonprofits, and funds in industries like renewable energy, housing, healthcare, education, microfinance, and sustainable agriculture. The impact investor market includes networks, social investment advisors, social venture capital funds, ethical banks, social stock exchanges, and crowdfunding platforms (Spiess-Knafl and Sreck, 2017)<sup>4</sup>.

Several empirical studies analyzed impact investors' behavior regarding the companies they prefer to invest in, revealing mixed results. For example, Block et al. (2021) compared the importance of these screening criteria across different types of impact investors (i.e., donors, equity investors, and debt investors). Then, they presented findings that donors pay more attention to the importance of the societal problem and less attention to financial sustainability than equity

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<sup>3</sup> In the SRI literature, many researchers from the UK and Europe dubbed it “social finance,” while researchers from North America dubbed it “impact investing” for social-oriented investment; however, most researchers have used either impact investing or social investing/finance after 2007 (Agrawal and Hockerts, 2021; Dagers and Nicholls, 2017; Höchstädter and Scheck, 2014).

<sup>4</sup> **Impact funds** include Blue Orchard (<https://www.blueorchard.com/>); Symbiotics S.A. (<https://symbioticsgroup.com/>); Microvest (<https://microvestfund.com/our-firm/>); and Triple Jump, ResponSibility (<https://www.responsibility.com/>). **The crowdfunding platform** includes Lendahand (<https://www.lendahand.com/en-EU>). **Ethical banks** include Triodos Bank (<https://www.triodos.co.uk/>)

and debt investors. Cole et al. (2023) also investigated the investment portfolio of impact investors who exhibit more risk tolerance and patience and are more likely to invest in disadvantaged areas and nascent industries. Their analysis revealed that only 12% of the impact investors contributed to expanding the investors' funding opportunities. In other words, no evidence exists that impact investors lead traditional investors to impactful portfolio companies that would have otherwise been overlooked. Furthermore, Kollenda (2022) used transaction-level data from a peer-to-peer lending platform in low-income countries to empirically examine the relationship between financial return and investment decisions of retail impact investors. The author determined that investment decisions are predominantly driven by considerations of financial returns, even though expected social returns vary across investors; however, heterogeneity was documented in the investment preference—for example, female investors prefer to invest in female companies.

The extant literature provides various definitions of impact investors, as illustrated in Table 1. No established comprehensive database of impact investors currently exists. Researchers have employed different methods, individually or in combination, to identify impact investors. Researchers have employed these methods to define and select impact investors for their studies. These methods include the following.

1. Selecting well-known ethical banks, such as Triodos Banks, as representatives of impact investors (Valls Martínez et al., 2020; Glänzel and Scheuerle, 2016)
2. Identifying impact investors through relevant reports, such as the Annual Impact Investor Survey published by the Global Impact Investing Network (GIIN), the Impact Database, or the Operating Principles for Impact Management (OPIM) Signatory Platform (Chiappini, 2017; Bandini et al., 2022; Mudaliar and Dithrich, 2019; Islam and Habib, 2023; Block et al., 2021; Cole et al., 2023)
3. Assessing impact investment missions or social investment deals indicated on the official websites of investors (Glänzel and Scheuerle, 2016; Agrawal and Hockerts, 2019; Barber et al., 2021; Islam and Habib, 2023; Block et al., 2021)
4. Including retail investors from peer-to-peer (P2P) lending platforms (Kollenda, 2022)
5. Consulting industry experts to identify prosocial investors (Agrawal and Hockerts, 2019; Bandini et al., 2022)

**Table 1: Definition of impact investors in the prior studies**

<b>Author</b>	<b>Selection methods of impact investors (Social-oriented investors)</b>
Agrawal and Hockerts (2019)	The selected cases identified themselves as impact investing firms. The websites indicate a clear mission statement identifying as social impact first investment funds. A group of industry experts was consulted as part of the case selection, and they recognized the selected organizations as important actors in the field of impact investment in India.
Barber et al. (2021)	We manually isolate 159 of these funds as being impact funds using a strict criterion that the fund must state dual objectives in its motivation. (Please refer to the paper for more details)
Block et al. (2021)	First, the authors conducted a computerized search strategy since an established database of impact investors does not exist. Using the keywords “impact investing,” “social investing,” “philanthropic investing,” and “social entrepreneurship,” we identified impact investors from the social network platforms LinkedIn and XING (which is a German professional social networking site). We provided the impact investors with individual links to our experiment and survey. In this step, we identified 763 individuals (67.6%) for our sample population. In the second step, we identified an additional set of 366 (32.4%) investors through a manual search of impact investors’ and SEs’ websites.
Bandini et al. (2022)	First, an initial screening of the ones intentionally seeking a measurable social impact and a financial return using the most relevant industry reports. Second, to confirm the validity of our case selection, we conducted 2h in-depth interviews with three key informants.
Chiappini (2017)	The research sample includes funds identified as impact investments oriented through the declaration of funds registration in the Impact-Base or in the Global Impact Investment Network (GIIN). The GIIN is considered ‘the facto impact investing industry body, promoting standardized reporting, transparency and advancement of the industry’.
Climent (2018)	The author selected Triodos Bank as an impact investor.
Cole et al (2023)	The authors define the impact investors if the investor is listed or registered in global impact investor platforms or reports about impact investors.
Glänzel and Scheuerle (2016)	<b>14 high-profile social entrepreneurs:</b> They were selected based on desktop research about their growth plans and how to finance growth; six of them already had signed a social investment deal or were in final negotiations; the rest of the investee part of the sample was ready for and willing to take investment as far as could be seen at this stage of the research. <b>5 investment intermediaries:</b> based on their respective relevance to the social finance market in Germany: 3 of the most relevant social venture capital funds (SVCFs) in Germany investing nationally and internationally; 1 venture philanthropy fund working with interest-free loans beyond grants; and 1 newly emerging IA organization that works on building an ‘investment pipeline’ to connect investors and SCVFs with social enterprises
Islam and Habib (2023)	First, to use archival data from the Operating Principles for Impact Management (OPIM) Signatory Platform. In 2019, IFC, along with several impact investors, intermediaries, and relevant industry networks, created this platform to bring transparency and discipline around impact investing and learn best practices in managing impact investments from one another (International Finance Corporation, 2019). Impact investing organizations can become a signatory to this platform who then need to publicly demonstrate their effort and activities to manage investments’ impact via publishing an annual Disclosure Statement on the Signatory Platform. Second, to visit the official website of these impact investing organizations to better understand their mission, vision, and operations.
Kollenda (2022)	Investors on the Lendahand peer-to-peer lending platform that inter- mediates loans to firms in low-income countries are considered as retail impact investors.
Mudaliar and Dithrich (2019)	To build the list, the team drew from a variety of sources, including datasets owned by the GIIN from past research studies and the GIIN’s own membership network. The list also includes organizations that are members of other impact investing networks worldwide, such as the New Ventures Network, Mission Investors Exchange, and the Indian Impact Investors Council.
Mersland and Urgeghe (2013)	Lenders of MFIs are categorized into two categories. One is commercial funding sources and the other is subsidized funding sources. If MFIs has to pay interest at the market rate, the loans are labeled as “commercial.” If the interest rate is below the market rate, the loans are labeled as subsidized.
Valls Marti’nez et al. (2020)	The author selected Triodos Bank, the main European ethical bank belonging to the Global Alliance for Banking, as impact investor.



## **2.2 Financial turmoil and impact investor behavior**

Many empirical studies have examined changes in environmental, social, and governance (ESG)/socially responsible investment (SRI) during financial crises. For example, Lins et al. (2017) argued that the trust between a firm and its stakeholders and investors (built through investments in social capital) pays off when the overall level of trust in corporations and markets suffers a negative shock. They measured social capital as the intensity of corporate social responsibility (CSR) and found that high-CSR firms experienced high profitability, growth rate, and sales during financial crises.

Several recent studies investigated equity markets during the COVID-19 crisis period, which led to unprecedented output contraction and worldwide adverse shocks in financial markets. During the COVID-19 pandemic, the S&P500 index experienced its steepest descent in living memory, losing 34% of its value in the 5 weeks between February 19 and March 23, 2020; it bounced back by over 30% by the end of April (Pastor and Vorsatz, 2020). Using the pooled data of retail and institutional funds, Pastor and Vorsatz (2020) found that ESG fund flows remained stable regarding the cumulative flows after the onset of the crisis. Furthermore, Ding et al. (2021) measured the global exposure of the COVID-19 pandemic for each firm on the stock market. They found that the firms engaging in more CSR activities experienced milder adverse shocks in the stock market price. Similarly, Albuquerque et al. (2020) presented empirical evidence that stocks with higher environmental and social ratings have significantly higher returns, lower return volatility, and higher operating profit margins during the first quarter of 2020. In contrast, Bae et al. (2021) empirically investigated the relationship between the overall CSR score and stock market performance; however, they did not find significant results on the positive relationship both in normal and crisis periods. They documented that the association between CSR and stock returns during the crisis caused by the pandemic was strengthened when CSR aligned with a firm's institutional environment. Their finding suggests that investors may consider the commitments to and quality of firms' CSR activities.

Conversely, a difference in investment behavior and sensitivity to financial crises between institutional and retail investors has been suggested. Retail investors have limited capital and tend to reallocate investments across different funds more than institutional investors. Using fund flow data, Döttling and Kim (2022) found that the negative income shock and ensuing economic distress imposed by the COVID-19 crisis shifted investor demand away from sustainable investments. Their finding is consistent with retail investors facing higher marginal costs of pursuing prosocial preferences during the economic downturn.

### **2.3 Investment in MFIs**

The literature on investments in MFIs has used various versions of the MixMarket dataset to analyze the determinants of capital investment and the sensitivity of microfinance performance to macroeconomic conditions. For example, Mersland and Urgeghe (2013) explored the factors influencing debt capital from commercial and prosocial lenders. Their findings indicate that commercial debt inflows are positively associated with MFIs' financial performance; MFIs with a higher return on assets and lower operating expenses are more likely to attract funding from commercial sources. In contrast, debt inflows from prosocial lenders are linked to factors like average loan size, the proportion of female borrowers, and the MFI's age. Additionally, the presence of internal auditors significantly correlated with lender types; MFIs with internal auditors are likelier to access commercial lenders and less likely to rely on prosocial lenders.

Several studies have examined the flow of MFI debt investments during international financial crises. Following the 2007 financial crisis, capital inflows into the microfinance sector declined significantly, leading to a contraction in MFI lending. Using the MixMarket database, Wagner and Winkler (2013) identified a statistically significant correlation between foreign funding growth and MFI credit growth from 2007 to 2009. Their findings highlight the vulnerability of the microfinance sector to capital inflow shocks, similar to the commercial banking sector.

Regarding MFI accessibility to prosocial lenders, Dorfleitner et al. (2017) analyzed the MixMarket database from 2007 to 2010. They found a positive relationship between debt capital from microfinance investment vehicles (MIVs) and the maturity of MFIs. Furthermore, MFIs with strong financial performance, particularly in portfolio quality, demonstrated better access to funding. The study also suggests that MFIs that uphold their social mission find it easier to secure funding from MIVs.

Galema et al. (2011) investigated whether investments in MFIs are advantageous for private investors. They used MixMarket data from 1997–2007 to analyze individual MFI data and applied mean-variance spanning tests to assess whether international asset portfolios are enhanced by including MFI funds. They concluded that adding MFIs with specific characteristics—such as operating in rural areas or regions like Latin America—improves the risk-return profile of investment portfolios.

## **3. Empirical methodology**

### **3.1 Data**

We employ data on debt disbursement at the MFI-investor pair level every quarter, covering from 2017Q1 to 2021Q4. The data on MFI debt disbursement is sourced from the National Bank of Cambodia (NBC). The data covers information on the wholesale borrowing of regulated financial

institutions on the quarterly data on MFI borrowing at the MFI-investor pair level.<sup>5</sup> Additionally, data on MFI lending is from the CMA-NIX database, maintained by the Cambodia Microfinance Association. This database allows us to extract quarterly data on MFI lending at the MFI-district pair level. We also incorporate financial condition data for each MFI, sourced from the annual supervision reports publicly available on the NBC website.

In our dataset, we identified 574 investors between 2017Q1 and 2021Q4. Among these, 223 were classified as institutional investors, while the remaining were categorized as individual investors; however, challenges exist in tracking the same individual investors over time and across different MFIs. Consequently, we identify individual investors only within the same MFI and do not track them across multiple MFIs.

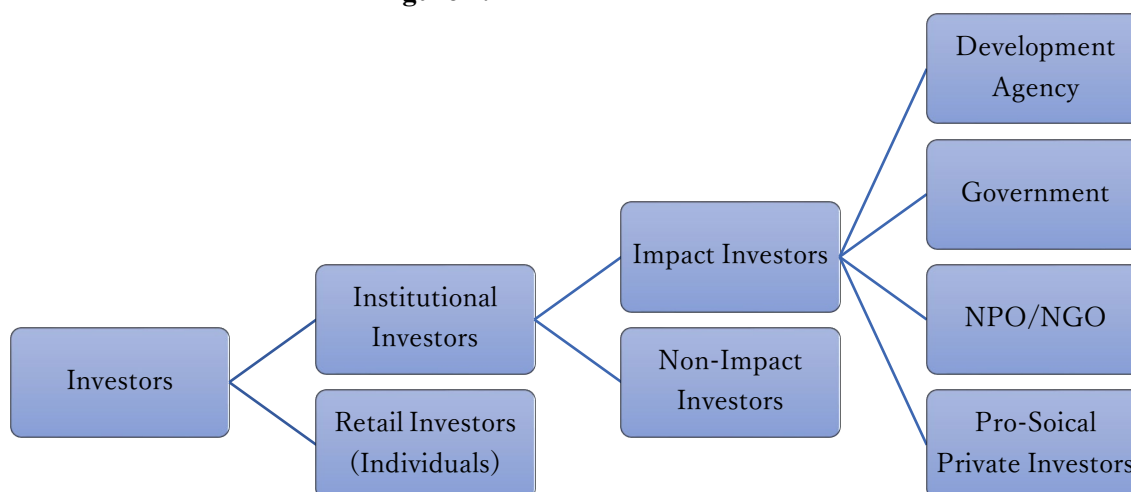
### **3.2 Definition of investor types**

The definition of the types of investors is crucial in the empirical analysis. Figure 2 illustrates the tree of investor categorization in our study. We mainly categorize the investors in two dimensions: (1) institutional or retail lenders and (2) impact investors or other private investors. Furthermore, we categorize investors into foreign or domestic investors based on the location of institutions. Regarding institutional and retail lenders, we categorize individual investors of MFIs as retail investors and others as institutional investors. Regarding the definition of foreign and domestic investors, our data covers the investors' country of origin. We define domestic investors as their country of origin in Cambodia and foreign investors as their origin outside Cambodia.

We include development agencies, the government, non-profit/non-government organizations (NPOs/NGOs), and prosocial private investors in the category of impact investors. Otherwise, we define investors as non-impact investors. Development agencies are defined as bilateral or multilateral development financial institutions. Furthermore, we define private investors' impact as those with clear objectives for social performance in their investments.

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<sup>5</sup> The data collection format for wholesale borrowing is presented in [Appendix Table 1](#).

**Figure 2: Definition of investors**

Identifying prosocial private investors poses a challenge, as other investor categories can be identified based on their legal status. Our study follows the approach used in previous research (Bandini et al., 2022; Mudaliar & Dithrich, 2019; Chiappini, 2017; Islam & Habib, 2023; Block et al., 2021; Cole et al., 2023), identifying investors listed on impact investment platforms; however, while some financial institutions may engage in prosocial investing, not all their projects necessarily qualify as impact investments.

We identified 27 prosocial investors from our sample, as detailed in Appendix Table 3. Our sample includes nine development agencies and five NPOs, which we classify as impact investors for this study; however, we excluded government investment data from our analysis due to the limited number of observations (only two cases) involving debt investments by local governments.

### 3.3 Measure of financial inclusion

We extracted a sample of MFIs from the CMA-NIX database to measure the outreach extent of each MFI. The observation unit in the CMA-NIX database is a district-MFI pair; therefore, we first aggregated the data at the MFI level before conducting a factor analysis on four outreach-related variables at the MFI level. We employed a pooled sample of MFIs from 2017Q1 to 2021Q4, with a total sample size of 1,784 observations.

The CMA-NIX database provides four potential variables for measuring MFI outreach: the female borrower ratio, the rural borrower ratio, the number of borrowers, and the average loan size. The number of borrowers is commonly used to measure outreach or the breadth of financial development, while the average loan size, female borrower ratio, and rural borrower ratio characterize borrower types in the financial inclusion literature. Nonetheless, these outreach-

related variables tend to be highly correlated, raising multicollinearity concerns if all are included in the analysis. Therefore, we used factor analysis to capture the common variation across these variables, mitigating multicollinearity issues.

Table 2 presents the factor analysis results of the four outreach measures. Two factors were retained, with the first explaining most of the common variation among the variables. Table 3 provides the factor loadings for the retained factors, showing that the first factor has high loadings across all four variables. Therefore, we selected the first factor as the composite measure of MFI outreach.

**Table 2:** Results of factor analysis

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	1.58	1.51	1.21	1.21
Factor2	0.07	0.15	0.05	1.27
Factor3	-0.08	0.18	-0.06	1.20
Factor4	-0.27	.	-0.20	1.00

*Source:* Authors' calculation on data from the CMA-NIX database.

**Table 3:** Factor loadings on the variables of financial inclusion

Variable	Factor1	Factor2	Uniqueness
# Borrowers (Log.)	0.63	0.12	0.59
Average Loan Size (Log.)	-0.60	0.15	0.62
Female Borrower Ratio	0.65	-0.12	0.57
Rural Borrower Ratio	0.64	0.14	0.58

*Source:* Authors' calculation on data from the CMA-NIX database.

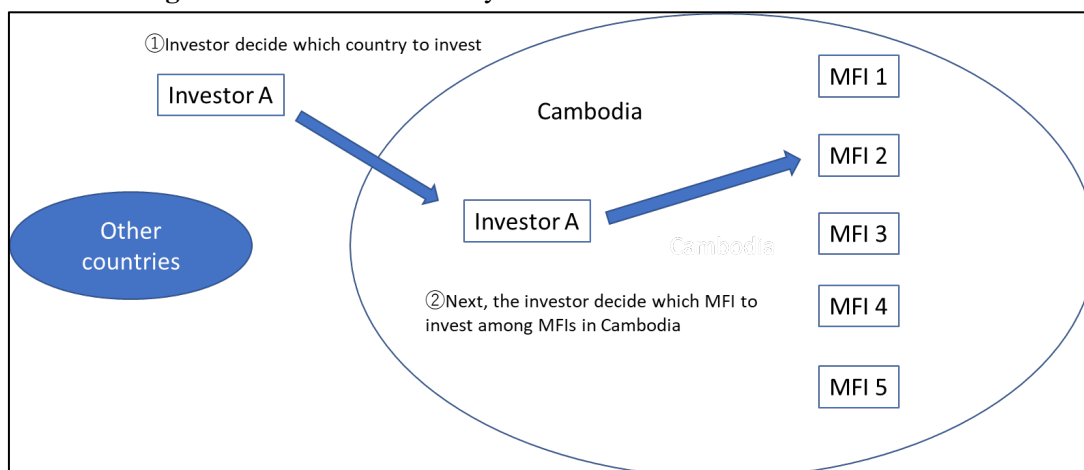
## 4. Empirical analysis of the pattern of investment decisions

### 4.1 Empirical model

We examine the pattern of investment decisions in two different dimensions: extensive margin and intensive margin. The extensive margin decides which MFI an investor selects to invest. The intensive margin decides the conditions under which an investor provides debts with MFIs. In both analyses, we assume that the investor's decision can be divided into three stages. First, investors select a country in which to invest. Second, investors select an MFI in which to invest. Third, investors decide the debt conditions, such as the number of loans and interest rates. Figure 3 illustrates the assumption of investor behavior. For simplicity of analysis, we focus on investor behavior after they decide to enter the Cambodian microfinance sector: the second and third stages of investor behavior; thus, it is assumed that the characteristics of other MFIs or other MFI

markets outside the market do not affect the lender's decision inside the market.<sup>6</sup> For example, even though some MFIs in India showed improved financial performance, investors' decisions for Cambodian MFIs did not change.

**Figure 3:** Framework of analysis on the investment decisions of investors



*Note:* The figure illustrates the assumption in our analysis of the investor's decision-making process. We assume that investors choose which country to invest in the first phase and then choose the MFI. In other words, we assume that investor decisions in Cambodia are not affected by changes in MFIs in other countries.

For the intensive margin, we used the following specifications to examine factors associated with the number of debt disbursements and the interest rate.

$$\ln(\text{Debt Amount}_{ijt}) = \alpha + \beta_1 X_{it} + \beta_2 \text{Impact}_j * X_{it} + f_i + f_c + f_l + f_t + u_{ijt} \quad (1)$$

$$\text{Interest rate}_{ijt} = \alpha + \beta_1 X_{it} + \beta_2 \text{Impact}_j * X_{it} + f_i + f_c + f_l + f_t + u_{ijt} \quad (2)$$

The observation unit in our data is the new debt disbursement of investors into Cambodian MFIs every quarter.  $\ln(\text{Debt Amount}_{ijt})$  is natural logarithm of the amount of debt disbursement of MFI  $i$  from investor  $j$  in period  $t$ .  $X_{it}$  represents MFI characteristics, such as outreach measures and the MFI sizes.  $\text{Impact}_j$  is a dummy variable that represents impact investors. We also consider the MFI-fixed effect, investor's home country fixed effect, investor type fixed effect, and time fixed effect, respectively, as  $f_i, f_c, f_l, f_t$ . Since some investors appear only a few times in the data set, we do not control the investor-fixed effect; instead, we control the fixed effect of six investor categories. Global factors could also affect investment decisions; for instance, the monetary policy rate of the US Federal Reserve possibly affects global liquidity. The time fixed effect captures these possible global factors in our model. Furthermore, we calculate two-way

<sup>6</sup> Our analysis includes the time effect and time trend in the model. Even though the assumption does not hold in our analysis, the changes in other factors outside Cambodia are mitigated by controlling the time effects and trends.

cluster-robust standard errors at the MFI and period levels.

For modeling the decision to invest in MFIs, we employ the following linear probability model:

$$\begin{aligned}
 \text{Investment Decision}_{ijt} & \\
 &= \alpha + \beta_1 X_{it} + \beta_2 \text{Impact}_j * X_{it} + \beta_3 \text{Domestic}_j * X_{it} + f_i \\
 &+ f_c + f_l + f_t + u_{ijt}
 \end{aligned} \tag{3}$$

where the unit of observation is a pair of MFI investors every quarter. **Investment Decision<sub>ijt</sub>** is binary variable that takes a value of one if MFI *i* has a new debt investment from investor *j* in period *t*; otherwise, it is zero. In other words, we consider all possible MFI pairs and investors in each period. **X<sub>it</sub>** represents MFI characteristics, such as outreach measures and the size of Cambodian MFIs. **Impact<sub>j</sub>** is a dummy variable that represents impact investors. We also consider the MFI-fixed effect, investor’s home country fixed effect, investor type fixed effect, and time fixed effect, respectively, as **f<sub>i</sub>, f<sub>c</sub>, f<sub>l</sub>, f<sub>t</sub>**.

#### 4.2 Descriptive analysis

Table 4 presents the summary statistics on debt disbursement, yearly interest rates, and maturity (monthly basis) across investor types. Investor types are categorized into development agencies, individuals, NPOs/NGOs, prosocial private investors, and non-impact investors. The data include each variable’s sample size, mean, and standard deviation (SD). The data highlights the distinct characteristics of lending practices and terms associated with each investor type. Development Agencies disburse the largest average amount of debt (USD 8.187 million) with the highest variability (SD = USD 10.794 million), while individuals disbursed the smallest average amount (USD 0.165 million). Individuals have the highest average yearly interest rate (7.4%), while development agencies have the lowest (5.2%). Maturity varies significantly; NPOs/NGOs offer the longest average maturity period (914.353 months), while individuals have the shortest (73.757 months).

**Table 4: Summary statistics (by types of investors)**

Investor Type	Sample Size	Debt Disbursement (Millions of USD)		Yearly Interest Rate		Maturity	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
Development Agency	120	8.187	10.794	0.052	0.032	32.252	22.204
Individuals	2675	0.165	0.539	0.074	0.036	73.757	272.002
NPOs/NGOs	75	0.883	0.983	0.025	0.037	914.353	662.439
Pro-social Private Investors	724	2.303	2.400	0.076	0.019	36.392	53.689
Non-Impact Investors	2469	2.389	3.764	0.057	0.027	38.134	74.906

Source: Authors’ calculation on debt disbursement data of MFIs.

Table 5 provides summary statistics for debt disbursement, yearly interest rates, and maturity, further categorized by the investors' origin (foreign vs. domestic) and investor type (institutional vs. individual). Institutional investors disburse significantly more debt on average (USD 2.856 million) than individual investors (USD 0.118 million). The maturity for institutional foreign loans is the longest (64.666 months on average), while individual foreign loans have a much shorter average maturity (23.658 months). Institutional domestic investors disbursed an average of USD 2.049 million, while individual domestic investors disbursed USD 0.181 million. Domestic individual investors offer the longest average maturity period (91.036 months). In contrast, institutional investors' loans have shorter maturity (41.466 months). Interest rates are generally higher for domestic individual investors (7.0%) than domestic institutional investors (6.6%).

**Table 5:** Summary statistics (foreign vs. domestic investors)

	Sample Size	Debt Disbursement (Millions of USD)		Yearly Interest Rate		Maturity (Months)	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
<b>Foreign</b>							
Institutional	2144	2.856	4.647	0.056	0.028	64.666	215.690
Individual	686	0.118	0.347	0.086	0.015	23.658	76.823
<b>Domestic</b>							
Institutional	1309	2.049	2.893	0.066	0.026	41.466	53.495
Individual	1989	0.181	0.591	0.070	0.040	91.036	310.349

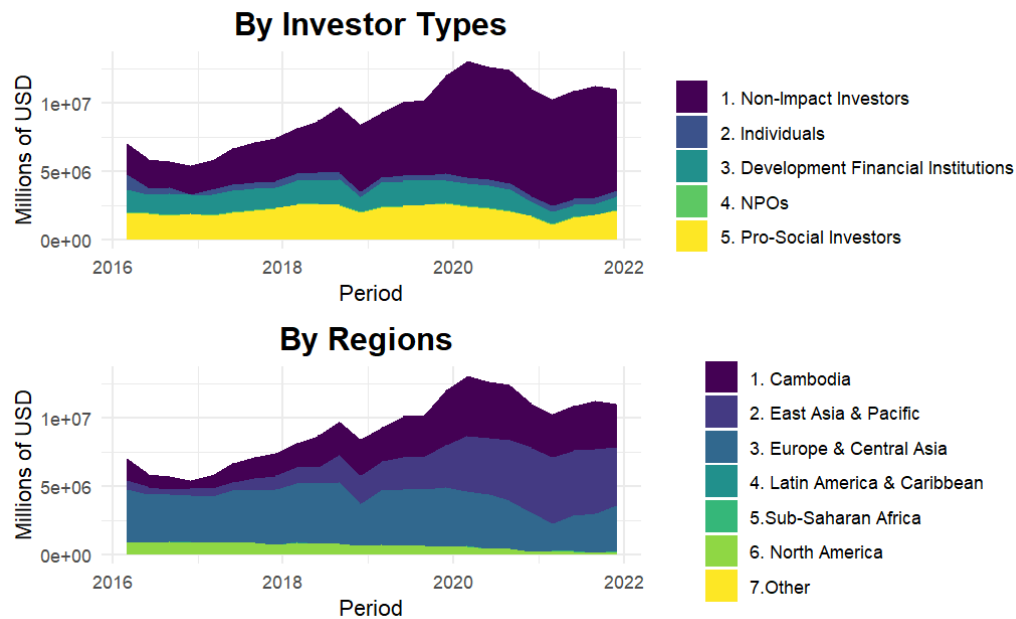
*Source:* Authors' calculation on debt disbursement data of MFIs.

We use the outstanding amounts of debt for each MFI-investor pair to illustrate the aggregated totals over the sample period in Figure 4. The figure shows that the outstanding amounts of MFI borrowing increased steadily until the outbreak of the global COVID-19 pandemic, after which borrowing declined. It also highlights the aggregated amounts of debt disbursement by investor type, revealing that most debt investments in MFIs come from non-impact investors, increasing consistently in the pre-pandemic period; however, the pandemic saw a relatively large decline in the outstanding debt investments from non-impact investors.

The outstanding debt amounts from development financial institutions remained relatively small in recent periods but demonstrated stability even during the pandemic. Foreign investors account for a larger share of debt than domestic investors, indicating that MFIs depend highly on foreign funding sources. Interestingly, domestic and foreign investors reduced their debt investments following the outbreak of the COVID-19 pandemic.



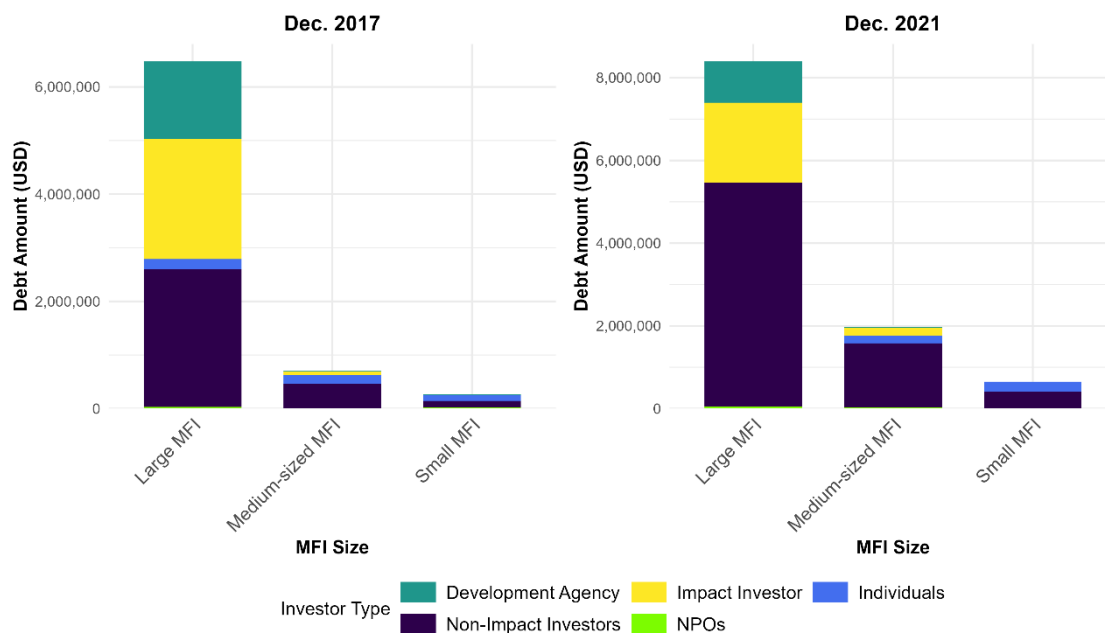
**Figure 4: Aggregated numbers of outstanding debts to MFIs**



Source: Authors' calculation on debt disbursement data of MFIs.

Figure 5 illustrates total amounts of outstanding debts by MFI Sizes. The figure shows that large MFIs hold a significant share of the outstanding debt from impact investors (development agencies and private impact investors). In contrast, small- and medium-sized MFIs tend to rely more heavily on non-impact or individual investors. Figure 5 also demonstrates a significant decline in reliance on impact investors across all MFI size categories between Q1 2017 and Q4 2021. Concurrently, the share of non-impact investors in MFI funding increased for every size category.

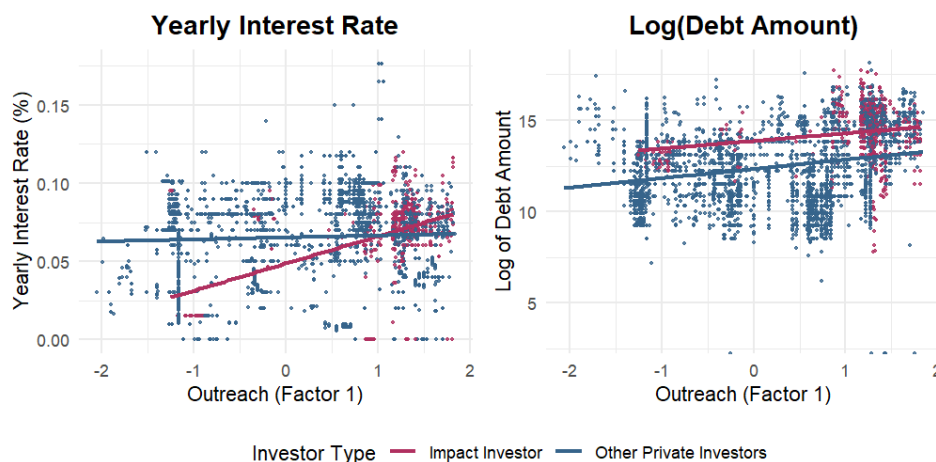
**Figure 5: Total Amounts of Outstanding Debts by MFI sizes**



Source: Authors' calculation on debt disbursement data of MFIs.

We describe the characteristics and trends in debt investment into Cambodian MFIs by looking at the scatter plot of the conditions of debt and MFI characteristics. Figure 6 presents the scatter plots of the debt conditions and MFI characteristics relating to outreach, indicating that the numbers of debt disbursements positively correlate to all the outreach measures. For example, if the female borrower ratio is high in the recipient MFI, the debt disbursements will likely be considerable. Thus, higher outreach MFIs tend to receive more significant debt investment in the case of Cambodia; however, regarding the cost of funding, the relationship was the opposite. We found that the yearly interest rates positively correlate with outreach measures, indicating that high-outreach MFIs will likely receive debt investment at higher interest rates. In other words, the high-outreach MFIs are owed the higher cost of funding in their operation. This finding could reflect that the interest rates might need to cover the high-risk profiles of female borrowers and those in rural areas.

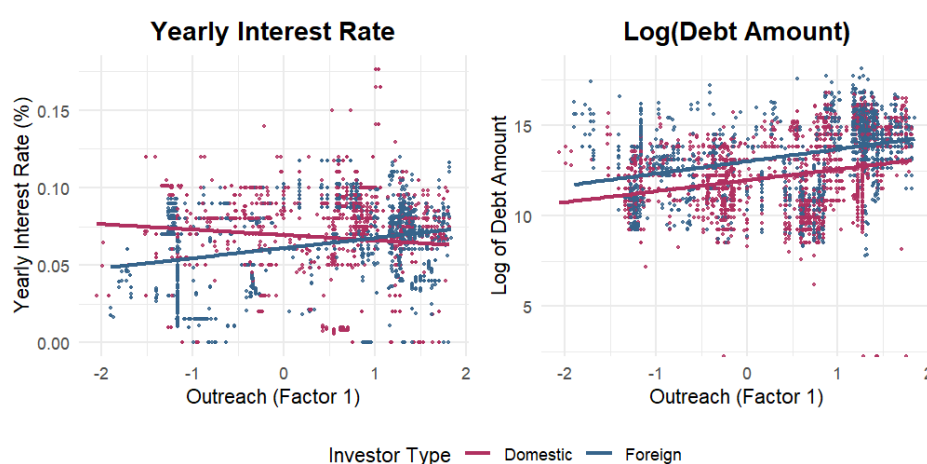
**Figure 6:** Relationship between debt conditions and outreach measure (impact and non-impact investors)



Source: Authors' calculation on debt disbursement data of MFIs.

Figure 7 presents the scatter plots of the debt conditions and MFI characteristics relating to the outreach for foreign and domestic investors. The relationship between outreach and debt conditions is similar in Figure 6; however, the relationship between the yearly interest rate and outreach is negative for domestic borrowers. The result suggests that domestic investors provide debt at lower interest rates to MFIs with higher outreach. Domestic investors have the advantage of collecting information on local MFIs; thus, they may put less premium on the interest rates on debts, implying intensive information asymmetry between foreign investors and local MFIs compared to domestic investors.

**Figure 7:** Relationship between debt conditions and outreach measures (domestic and foreign)



Source: Authors' calculation on debt disbursement data of MFIs.

**Table 6: Variables and definitions**

<b>Variable</b>	<b>Definition</b>	<b>Source</b>	<b>Frequency</b>
<b>Borrower (MFI) characteristics</b>			
Size of the MFI	The gross amount of the outstanding loan	CMA-NIX	Quarterly
Outreach of the MFI	A variable created by factor analysis using the following four variables. The variables used for factor analysis are as follow:	CMA-NIX	Quarterly
1) Average loan size per borrower	Gross amount of outstanding loans divided by the number of borrowers	CMA-NIX	Quarterly
2) Number of borrowers	Number of borrowers	CMA-NIX	Quarterly
3) Rural borrower ratio	The ratio of the number of borrowers living outside Phnom Penh to total borrowers	CMA-NIX	Quarterly
4) Female borrower ratio	The ratio of the number of female borrowers to total borrowers	CMA-NIX	Quarterly
<b>Lender characteristics</b>			
Investor type		Debt disbursement data (NBC)	Quarterly
• Impact investors	The dummy variable takes a value of one if investors are listed in the impact investor database.		
• Domestic investors	If the investors' country of origin is Cambodia, the dummy variable takes a value of one.		
Country origin	Investor's country of origin	Debt disbursement data (NBC)	Quarterly

### 4.3 Results of analysis of the patterns of investment decision

We further investigate the patterns between the conditions of debt investment and MFI characteristics by types of investors. Behavior during the pandemic (before 2020Q1) could differ from that during normal periods; therefore, we used the subsample from the pre-pandemic period for the estimation. Using this subsample, we estimated Equations (1) and (2) for the intensive margin of investors' debt investment decisions and Equation (3) for the extensive margin. Table 6 presents the definitions of the variables used in the regression models.

Table 7 presents the estimation results. Columns (1)–(8) present the estimations for the intensive margin (Equations 1 and 2), and columns (9)–(12) show the results for the extensive margin (Equation 3). Regarding MFI characteristics, we found no statistically significant positive correlation between the composite measure of outreach and the size of debt disbursements (columns 1–4 of Table 7). Additionally, we found no statistically significant correlation between MFI size (total loan outstanding) and the yearly interest rate.

Regarding the size of the debt disbursement, statistical significance was found only in the interaction terms of outreach and the domestic investor dummy. This result suggests that domestic investors provide larger amounts of debt to higher outreach MFIs regardless of the MFI's size.

For interest rates (columns 5–8), the interaction term of outreach and the impact investor dummy

was estimated as positive, and the interaction term of MFI size and the impact investor dummy was estimated as negative; both were statistically significant. Contrary to our predictions, these results suggest that impact investors apply a premium to interest rates for higher outreach MFIs and set lower interest rates for larger MFIs. Moreover, the interaction term of MFI size and the domestic investor dummy was estimated as negative (column 7), meaning domestic investors set lower interest rates on MFIs with higher outreach. This result aligns with the information asymmetry hypothesis as domestic investors generally have the advantage in collecting the information of local MFIs.

In column (12), the extensive margin analysis indicates that the outreach interaction term and the impact investor dummy were estimated as positive with statistical significance. Similarly, the outreach and domestic investor dummy interaction terms were positive and statistically significant. These results imply that MFIs with higher outreach are more likely to receive debt from impact and/or domestic investors; however, the single term of the outreach measure shows a negative correlation with the investment decision dummy. This outcome indicates that non-impact investors are generally less likely to disburse debt to MFIs with higher outreach.

**Table 7: Regression Results**

	Log Debt Amount				Interest Rate				Investment Decision			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Outreach Measure	-0.242 (0.148)	-0.261 (0.123)	-0.244 (0.204)	-0.293 (0.166)	0.004 (0.004)	0.002 (0.002)	0.005 (0.004)	0.002 (0.002)	0.001 (0.003)	-0.002 (0.001)	-0.001 (0.007)	-0.008** (0.002)
MFI Size	-0.058 (0.042)	-0.062 (0.038)	-0.035 (0.067)	-0.037 (0.057)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.002 (0.001)	0.007** (0.001)	0.005 (0.003)	0.008*** (0.001)	0.005 (0.003)
Outreach × Impact Investor		0.116 (0.155)		0.237 (0.147)		0.012*** (0.002)		0.012*** (0.002)		0.010 (0.006)		0.015* (0.005)
MFI Size × Impact Investor		-0.061 (0.044)		-0.065 (0.060)		-0.003* (0.001)		-0.005* (0.002)		0.006 (0.003)		0.006 (0.004)
Outreach × Domestic Investor			0.201** (0.046)	0.278** (0.071)			-0.007* (0.002)	-0.003 (0.002)			0.004 (0.007)	0.011*** (0.002)
MFI Size × Domestic Investor			0.046 (0.047)	0.004 (0.037)			0.000 (0.002)	-0.003 (0.002)			-0.003 (0.002)	-0.001 (0.001)
Mean of Dependent Variable	14.083	14.083	14.083	14.083	0.064	0.064	0.064	0.064	0.024	0.024	0.024	0.024
Num.Obs.	1675	1675	1675	1675	1678	1678	1678	1678	35032	35032	35032	35032
R2	0.641	0.641	0.643	0.644	0.780	0.787	0.787	0.794	0.076	0.079	0.076	0.079
R2 Adj.	0.619	0.619	0.621	0.621	0.767	0.774	0.774	0.781	0.073	0.075	0.073	0.076
MFI Fixed Effect	X	X	X	X	X	X	X	X	X	X	X	X
Investor Type Fixed Effect	X	X	X	X	X	X	X	X	X	X	X	X
Time Fixed Effect	X	X	X	X	X	X	X	X	X	X	X	X
Creditor Country Fixed Effect	X	X	X	X	X	X	X	X	X	X	X	X
Control Variables	X	X	X	X	X	X	X	X				

Source: Authors' calculation

Note: This table presents the results for estimating the differences between impact and non-impact and domestic and foreign investors. In Columns 1-4, the dependent variables are the logarithm of the size of debt disbursement. In Columns 5-8, the dependent variables are the yearly interest rate on debt disbursement. In Columns 9-12, the dependent variables are binary variables of the investment decision. The subsample of the pre-pandemic period (before 2020Q1) was used for the estimation. Definitions of the explanatory variables are given in Table 6. \*\*\*, \*\*, and \* denote the significance level at 1%, 5%, and 10%, respectively. Clustered robust standard errors at the MFI, investor type, time, and investor's country level are presented in parentheses.

## 5. Difference-in-Difference analysis on the impact of the corona pandemic

### 5.1 Empirical model

Our data captures both the pre- and post-pandemic periods; thus, taking advantage of the data, we apply the event-study difference-in-differences approach to estimate the difference in investors' decisions during the pandemic period. We treated the period for the COVID-19 pandemic as 2020Q1, corresponding to the worldwide onset.

$$\ln(\text{Debt Amount}_{ijt}) = \beta_1 X_{it} + \sum_k \beta_k \text{Impact}_j \cdot I(t = k) + f_i + f_j + f_c + f_t + u_{ijt} \quad (4)$$

$$\text{Interest rate}_{ijt} = \beta_1 X_{it} + \sum_k \beta_k \text{Impact}_j \cdot I(t = k) + f_i + f_j + f_c + f_t + u_{ijt} \quad (5)$$

As in Equations 1 and 2, we also include the MFI-fixed effect, investor type fixed effect, country fixed effect, and time fixed effect, respectively, as  $f_j, f_i, f_c, f_t$ .

Furthermore, we applied the triple-differences approach to investigate the heterogeneous impacts across the MFI characteristics. Using the interaction terms of the pandemic dummy and MFI/investor variables ( $X_{it} \cdot I(t \geq 2020Q1)$ ,  $\text{Impact}_{jt} \cdot I(t \geq 2020Q1)$ , and  $X_{it} \cdot \text{Impact}_j \cdot I(t \geq 2020Q1)$ ), we examined whether a change occurred in the tendency of lenders' investment decisions.

$$\begin{aligned} \ln(\text{Debt Amount}_{ijt}) &= \beta_1 X_{it} + \beta_2 \text{Impact} \cdot X_{it} + \beta_3 \text{Impact}_j \cdot I(t \geq 2020Q1) + \beta_4 X_{it} \\ &\cdot I(t \geq 2020Q1) + \beta_5 X_{it} \cdot \text{Impact}_j \cdot I(t \geq 2020Q1) + f_i + f_j + f_c \\ &+ f_t + u_{ijt} \end{aligned} \quad (6)$$

$$\begin{aligned} \text{Interest rate}_{ijt} &= \beta_1 X_{it} + \beta_2 \text{Impact} \cdot X_{it} + \beta_3 \text{Impact}_j \cdot I(t \geq 2020Q1) + \beta_4 X_{it} \\ &\cdot I(t \geq 2020Q1) + \beta_5 X_{it} \cdot \text{Impact}_j \cdot I(t \geq 2020Q1) + f_i + f_j + f_c \\ &+ f_t + u_{ijt} \end{aligned} \quad (7)$$

$$\begin{aligned} \text{Investment Decision}_{ijt} &= \beta_1 X_{it} + \beta_2 \text{Impact} \cdot X_{it} + \beta_3 \text{Impact}_j \cdot I(t \geq 2020Q1) + \beta_4 X_{it} \\ &\cdot I(t \geq 2020Q1) + \beta_5 X_{it} \cdot \text{Impact}_j \cdot I(t \geq 2020Q1) + f_i + f_j + f_c \\ &+ f_t + u_{ijt} \end{aligned} \quad (8)$$

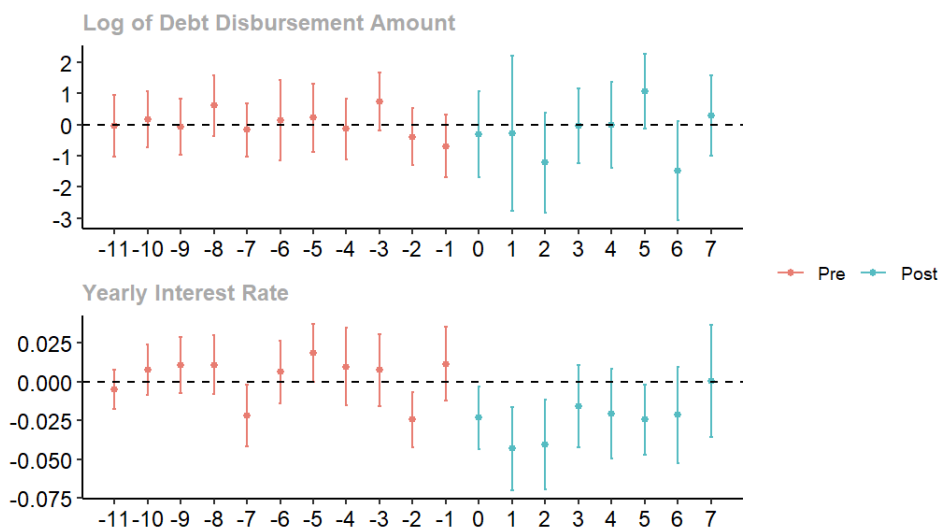
In each model, the differences in the impact of the COVID-19 pandemic across investor types are captured by the coefficient of the triple-interaction term,  $\beta_5$ . If a differential impact affects

investor behavior between types of investors, it is expected that  $\beta_5 \neq 0$ .

### 5.2 Results of analysis with the difference-in-differences approach

We examined the differences in the impact of the COVID-19 pandemic on the international capital market. Specifically, we conducted an event-study difference-in-differences analysis using three sub-samples: (1) impact and non-impact foreign investors, (2) impact foreign investors and non-impact domestic investors, and (3) non-impact foreign investors and non-impact domestic investors. We applied difference-in-differences estimation to each sub-sample. This approach enabled us to estimate the differential effects between impact and non-impact foreign investors, as well as between impact foreign and non-impact domestic investors, and between non-impact foreign and non-impact domestic investors. However, due to the limited number of observations for domestic impact investors, it is challenging to draw clear conclusions based on the two axes of impact/non-impact and foreign/domestic. Therefore, we do not conduct estimations for this sub-sample. The analysis was based on Equations (4) and (5) for the respective sub-samples; Figures 8 and 9 present the results.

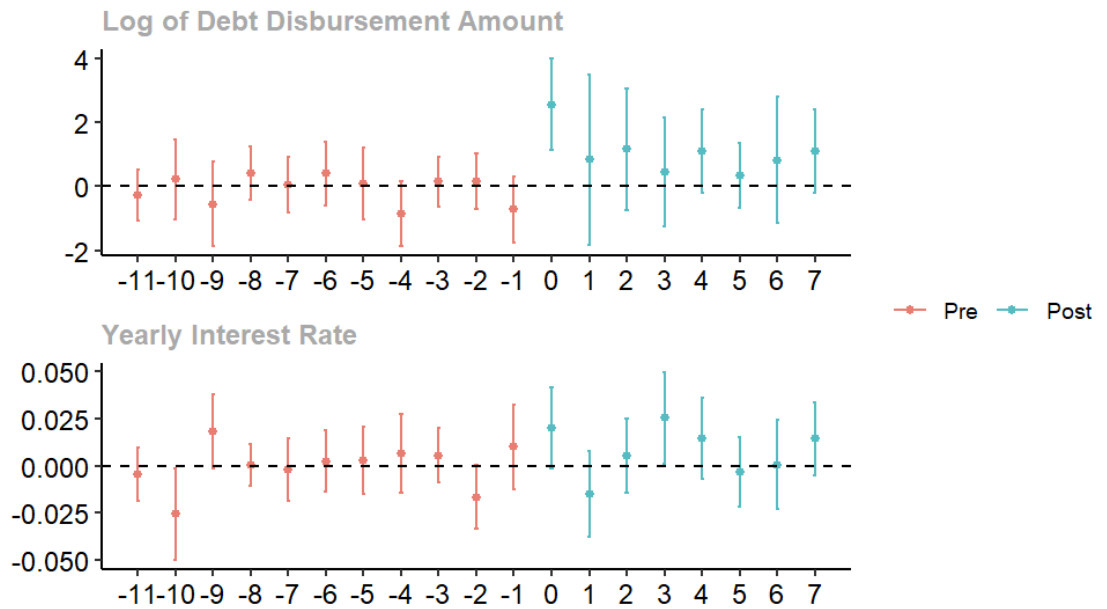
**Figure 8:** Event-study difference-in-differences analysis (impact foreign investors vs. non-impact foreign investors)



*Note:* The figure shows the estimated ATEs over the periods of exposure to treatment. The data used for the estimation spanned from 2017Q1 to 2021Q4. Estimation is performed with standard errors clustered at the MFI level.

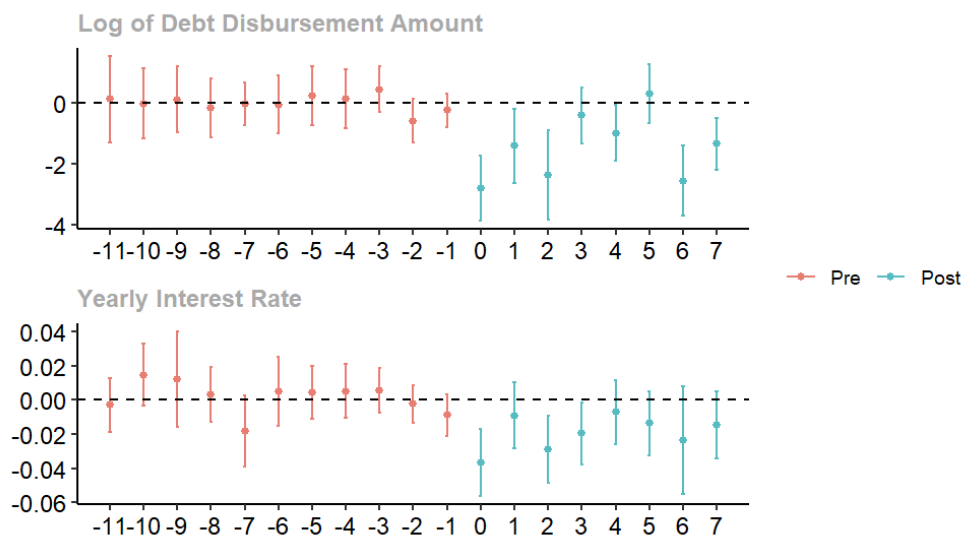


**Figure 9:** Event-study difference-in-differences analysis (impact foreign investors vs. non-impact domestic investors)



*Note:* The figure shows the estimated ATTs in each period of exposure to treatment. The data used for the estimation spanned from 2017Q1 to 2021Q4. Estimation is performed with standard errors clustered at the MFI level.

**Figure 10:** Event-study difference-in-differences analysis (non-impact domestic investors vs. non-impact foreign investors)



*Note:* The figure shows the estimated ATTs in each period of exposure to treatment. The data used for the estimation spanned from 2017Q1 to 2021Q4. Estimation is performed with standard errors clustered at the MFI level.

Regarding the differential impact of the pandemic between impact and non-impact foreign investors, the interest rates on debt disbursements were lower for impact investors than for non-impact foreign investors (Figure 8); however, we found no statistically significant difference in the size of debt disbursements. Table 8 shows that the average treatment effect on the treated (ATT) for interest rates was estimated at  $-0.015$ , indicating that impact foreign investors provided debt with interest rates 1.5% lower than those of non-impact foreign investors. We also confirmed no statistical significance in the test for the existence of a pre-trend.

Figure 9 presents the analysis results comparing the impact of foreign and non-impact domestic investors, showing that the size of the debt disbursements tended to increase for domestic investors after the pandemic. Table 8 estimates the ATT at 1.043, suggesting that the impact of the COVID-19 pandemic is smaller for impact foreign investors than non-impact domestic investors regarding the size of debt disbursements to less than half of the pre-pandemic levels. As with the previous analysis, we found no statistical significance in the test for the existence of a pre-trend.

Figure 10 presents the analysis results comparing non-impact foreign and non-impact domestic investors, indicating that the size of debt disbursements decreased for domestic investors after the pandemic. Table 8 estimates the ATT at  $-1.436$ , suggesting that domestic investors reduced the size of debt disbursements to less than half of the pre-pandemic levels. As with the previous analysis, we found no statistical significance in the test for the existence of a pre-trend.

**Table 8:** Estimation of ATTs

	ATT	S.D.	[95% Confident Interval]	
<b>Impact Foreign Investor vs. Non-Impact Foreign Investors</b>				
Log of Debt Amount	-0.372	0.350	-1.057	0.314
Yearly Interest Rate	-0.015	0.007	-0.028	-0.002
<b>Impact Foreign Investor vs. Non-Impact Domestic Investors</b>				
Log of Debt Amount	1.043	0.309	0.437	1.650
Yearly Interest Rate	0.008	0.006	-0.004	0.020
<b>Non-Impact Domestic vs. Non-Impact Foreign Investors</b>				
Log of Debt Amount	-1.436	0.198	-1.823	-1.049
Yearly Interest Rate	-0.007	0.005	-0.017	0.003

Source: Authors' calculation.

To examine which MFIs experienced changes in debt conditions from their investors, we further estimated models with triple-interaction terms (Equations 6–8). Table 9 presents the results. In

the model with debt amounts as the dependent variable (column 1), the triple-interaction term of MFI outreach, impact investor dummy, and the pandemic dummy was negative and statistically significant. In contrast, the triple-interaction term of the MFI size, impact investor dummy, and pandemic dummy was positive and statistically significant. Regarding domestic investors, the triple-interaction term of MFI outreach, domestic investor dummy, and pandemic dummy was positive and statistically significant. In contrast, the triple-interaction term of MFI size, domestic investor dummy, and pandemic dummy was negative and statistically significant. These results suggest that MFIs with higher outreach were likely to experience a decrease in the size of debt disbursements from impact investors, while larger MFIs faced fewer negative impacts; however, domestic investors exhibited the opposite pattern compared to impact investors.

For interest rates (column 2), the triple-interaction term of MFI outreach, impact investor dummy, and pandemic dummy was negative and statistically significant. In contrast, the triple-interaction term of MFI size, impact investor dummy, and pandemic dummy was positive and statistically significant. Regarding domestic investors, we found no statistically significant results for the triple-interaction terms.

For investment decisions (column 3), the triple-interaction term of MFI outreach, impact investor dummy, and the pandemic dummy was not statistically significant. In contrast, the triple-interaction term of MFI size, impact investor dummy, and pandemic dummy was negative and statistically significant. These findings suggest that smaller MFIs were less affected by the pandemic in terms of investment opportunities from impact investors, whereas larger MFIs experienced a decline. Furthermore, the interaction term of the impact investor dummy and the pandemic dummy was positive and statistically significant, indicating that the pandemic's impact was less pronounced for impact investors in terms of debt provision. Regarding domestic investors, we found no statistically significant results for the triple-interaction terms; however, the interaction term of the domestic investor dummy and the pandemic dummy was positive, suggesting that domestic investors did not decrease their investment in MFIs compared to foreign investors.

**Table 9: Regression analysis of the impact of the pandemic**

	(1)	(2)	(3)
	Log of Debt Amount	Yearly Interest Rate	Investment Decision
Outreach Measure	-0.329 (0.292)	0.005 (0.004)	-0.002 (0.002)
MFI Size	0.041 (0.059)	0.000 (0.001)	0.011** (0.002)
Outreach × Impact Investor	0.162 (0.225)	0.008 (0.006)	0.016* (0.006)
MFI Size × Impact Investor	0.036 (0.070)	-0.003 (0.002)	0.006* (0.002)
Outreach × Domestic Investor	0.050 (0.142)	-0.004 (0.003)	0.011** (0.002)
MFI Size × Domestic Investor	-0.012 (0.021)	-0.003 (0.002)	-0.001 (0.002)
Outreach × Pandemic Period	-0.112 (0.145)	0.012** (0.005)	-0.005 (0.002)
MFI Size × Pandemic Period	-0.116 (0.093)	-0.007*** (0.002)	0.001 (0.001)
Pandemic Period × Impact Investor	-3.475 (2.064)	-0.084** (0.031)	0.040** (0.011)
Outreach × Impact Investor × Pandemic Period	-1.003** (0.435)	-0.011** (0.005)	0.004 (0.004)
MFI Size × Impact Investor × Pandemic Period	0.305* (0.152)	0.007** (0.002)	-0.004** (0.001)
Pandemic Period × Domestic Investor	6.756*** (0.809)	-0.003 (0.025)	0.007* (0.002)
Outreach × Domestic Investor × Pandemic Period	1.092*** (0.151)	-0.010 (0.006)	-0.001 (0.003)
MFI Size × Domestic Investor × Pandemic Period	-0.641*** (0.072)	0.000 (0.002)	-0.001 (0.000)
Mean of Dependent Variable	13.947	0.059	0.021
Num.Obs.	2787	2784	62499
R2	0.549	0.684	0.039
R2 Adj.	0.534	0.674	0.038
MFI Fixed Effect	X	X	X
InvestType Fixed Effect	X	X	X
Tiem Fixed Effect	X	X	X
Creditor Country Fixed Effect	X	X	X
Control Variables	X	X	

*Source:* Authors' calculation.

*Note:* This table presents the results for estimating the differences between impact and non-impact and domestic and foreign investors. In Columns 1 and 2, the dependent variables are the logarithm of the size of debt disbursement. In Columns 3 and 4, the dependent variables are the yearly interest rate on debt disbursement. In Columns 5 and 6, the dependent variables are binary variables of the investor's investment decision. Definitions of the explanatory variables are given in Table 6. \*\*\*, \*\*, and \* denote the significance level at 1%, 5%, and 10%, respectively. Clustered robust standard errors at the MFI level are presented in parentheses.

## 6. Discussion and policy implications

We examined the investment patterns of impact and non-impact investors in Cambodian MFIs during periods of global financial instability, particularly during the COVID-19 pandemic. Our analysis confirmed that impact investors provided debt at interest rates approximately 1.5% lower than non-impact foreign investors. Furthermore, impact investors tended to maintain the size of debt disbursement during the pandemic, while non-impact domestic investors decreased the size of debt disbursement (Table 8). Additionally, while MFIs were less affected overall by the pandemic regarding investment opportunities, large MFIs experienced a notable decline in investment (Table 9).

Regarding the vulnerability of investment flows, our findings align with Döttling and Kim (2022), suggesting that impact investors are more stable funding sources among institutional investors, offering consistent access and lower funding costs for the microfinance sector.<sup>7</sup>

Wagner and Winkler (2013) highlighted the vulnerability of MFIs to international financial crises. Our study suggests that funding from impact investors is counter-cyclical to adverse economic shocks, meaning it can serve as a buffer to help MFIs sustain microfinance services for target borrowers during financial crises. Attracting more impact investment into the sector is a key strategy to address this vulnerability.

Regarding investment patterns during stable periods, impact investors tended to favor MFIs with high outreach (Table 7), consistent with Cole et al. (2023). Conversely, our analysis revealed that impact investors apply higher interest rates to MFIs with higher outreach, likely reflecting a risk premium. In contrast, domestic investors tend to offer lower interest rates to MFIs with higher outreach (Figure 7 and Table 7). Furthermore, impact investors' debt investments tend to concentrate on large-scale MFIs (Figure 5). Given their advantage in gathering information on local MFIs, this discrepancy suggests that information asymmetry may lead to higher perceived risks and a premium on investments by foreign impact investors; therefore, reducing information asymmetry could improve investment conditions and attract more impact investments regardless of the MFIs' size. One potential strategy is establishing a committee to facilitate information disclosure, allowing foreign investors to understand local MFIs. Another approach could involve rating MFIs based on their ESG activities. Maintaining a strong reputation at the sector level is also essential for attracting impact investors; however, Figures 4 and 5 show that the proportion of impact investors in the Cambodian microfinance sector has decreased, while non-impact

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<sup>7</sup> Including the sample of retail (individual) investors, we also confirmed that the institutional investors were more stable in the period of the COVID-19 pandemic, in line with Döttling and Kim (2022).

investors have significantly increased. As Aiba (2024) pointed out, investments by commercial investors may shift MFIs from their poverty-reduction mission, underscoring the urgent need for action to sustain the sector's focus on social objectives.

Finally, our unique dataset indicates that the overall outstanding debt investment in the Cambodian microfinance sector declined significantly during the pandemic (Figure 4). Impact investors were more persistent in investing in MFIs than non-impact investors; however, the decline in aggregated outstanding debt was substantial. The sector may require liquidity support to ensure the continuity of microfinance services for target borrowers during economic and financial turmoil.

## **7. Conclusion**

We analyzed the patterns of debt investments in MFIs concerning MFI characteristics and investor types. Additionally, we examined how the COVID-19 pandemic affected the investment behaviors of investors in the Cambodian microfinance sector, one of the largest microfinance industries globally. Our analysis utilized a novel dataset comprising comprehensive records of debt financing for Cambodian MFIs provided by the National Bank of Cambodia. This dataset was combined with the MFI characteristic data supplied by the Cambodian Microfinance Association.

The 2020 COVID-19 pandemic triggered a global economic downturn and financial turmoil. Developing countries, including Cambodia, experienced a decline in investment flows to the microfinance sector, which serves as a critical funding source for impoverished individuals in Cambodia. Our findings suggest that impact investments can be a stable funding source during crises. We propose that measures to attract impact investments to local MFIs could help mitigate the risks of sudden funding disruptions in the microfinance sector.

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**Appendix Table 1: Template of the original data collection**

MFI Name	Period (year & quarter)	Name of Creditors	Countries (*)	Type of loan (***)	Amount Approved	Amount Disbursed	Currency	Conditions					Payment				Balance Loan Outstanding			
								Interest Rate	Per Annum	Term of Payment	Approved Date	Maturity Date	Date	Principle		Interest				
														Current	Accumulat ed	Current		Accumulat ed		

**Appendix Table 2: List of databases and reports for identifying impact investors**

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List of impact investors in Japan by GSG-NAB Japan

- [https://impactinvestment.jp/user/media/resources-pdf/gsg-2021\\_en.pdf](https://impactinvestment.jp/user/media/resources-pdf/gsg-2021_en.pdf)
- [https://impactinvestment.jp/user/media/resources-pdf/gsg-2020\\_en.pdf](https://impactinvestment.jp/user/media/resources-pdf/gsg-2020_en.pdf)
- <http://impactinvestment.jp/user/media/resources-pdf/gsg-2019-E.pdf>

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Membership or signatory of impact investing networks

- PRI signatory: <https://www.unpri.org/signatories/signatory-resources/signatory-directory>
- Operating Principles for Impact Management (OPIM) Signatory Platform: <https://www.impactprinciples.org/signatories-reporting>
- (Global Impact Investing Network) GIIN, which represents the largest global community of impact investors (asset owners and asset managers) and service providers engaged in impact investing: <https://thegiin.org/current-members/>
- New Ventures Network
- Mission Investors Exchange
- The Indian Impact Investors Council

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Related report (Bandini et al., 2020; Mudaliar and Dithrich, 2019):

- Annual impact investor survey.
- Investing for Impact—EVPA Impact Strategy Paper
- Tiresia Impact Outlook
- The State of Impact Measurement & Management Practice: <https://thegiin.org/research/publication/imm-survey-second-edition/>
- GIIN regional landscaping studies
- GIIN Impact Investing Benchmarks

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Other lists:

- <https://www.impactfoundation.org/blog/35-players-in-the-impact-investing-space>
- <https://www.goodfinance.org.uk/investors-advisors>

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**Appendix Table 3: List of impact investors in Cambodian MFIs**

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1. ADVANS SA, SICAR	15. BONDS SA,
2. ALTERFIN	16. Microfinance Solidaire
3. Asia Investment Capital Holdings	17. Microvest
4. Blue Orchard	18. OVBIAM
5. BOPA Pte [USD]	19. Oikocredit
6. CARD NGO	20. PG Impact
7. Developing the World Market	21. responsibility
8. GLOBAL CLIMATE PARTNERSHIP FUND	22. Symbiotic
9. Gojo Company Inc.	23. Triodos-KHR
10. Good Return	24. Triple Jump
11. IIX	25. Vision Fund International
12. LEAP PHILANTHROPY LTD-USD	26. Water Equity
13. LMDF	27. World Vision International-Cambodia
14. MICRO, SMALL & MEDIUM ENTERPRISES	

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**Abstract (in Japanese)****要 約**

マイクロファイナンス部門は外国資金に大きく依存しており、国際的な資本市場の変動に対して脆弱である。また、マイクロファイナンス機関（MFI）は、伝統的な金融機関とは異なり、マイクロファイナンス専門の投資機関、開発金融機関、政府などのいわゆる「インパクト投資家」による社会的責任投資（SRI）に依存する傾向にある。本研究では、2017年第1四半期から2021年第4四半期におけるカンボジアのMFIへの債務投資のパターンを調査し、世界的なコロナウイルスのパンデミックの期間を含めて分析した。

本研究では、カンボジアのMFIへの債務投資(debt investment)に関する詳細な情報（債務の貸出額、金利、満期、投資家の属性など）を含む独自のデータセットを構築し、コロナウイルスパンデミック前後で債務条件がどのように変化したかを、差分の差(Difference-in-Differences)手法を用いて検証した。

その結果、インパクト投資家と非インパクト投資家の間で投資行動の違いが見られることが分かった。インパクト投資家は、アウトリーチの高いMFIを選択する傾向が強いことがわかった。しかし、その債務投資は主に大規模なMFIに集中していた。また、インパクト投資家は他の機関投資家よりも低金利で貸し付けを行っているという明確な統計的な結果は得られなかった。

しかし、インパクト投資家はパンデミックの期間中もMFIへの債務提供を継続し、非インパクト投資家よりもパンデミックの金利上昇への影響が小さいことが確認された。この結果は、インパクト投資家からの資金提供は経済的なショックに対して頑健である可能性を示唆しており、インパクト投資家からの資金は、金融市場の危機時にMFIが貧困層への貸出事業を継続するためのバッファとなる可能性があることを示唆している。

**キーワード:** インパクト投資家、マイクロファイナンス、ESG投資、金融包摂、COVID-19、差と差の分析