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Dynamic Interaction Between Microfinance and Household Well-Being: Evidence from the Microcredit Progressive Model for Sustainable Development

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Abstract: Microfinance aims to promote financial inclusion among underprivileged individuals, particularly through progressive microcredit, which enables borrowers to access increasing loan amounts over time. This study examines the conditions under which progressive microcredit positively impacts both small business performance and household well-being, considering borrower characteristics and business activity conditions. Using a dataset of 278 households across 110 administrative sectors in Tunisia from 2012 to 2020, this study employs two-stage least squares (2SLS) and three-stage least squares (3SLS) econometric techniques to estimate simultaneous equation models. The findings reveal that the cumulative amount of progressive microcredit received is mainly determined by project capital, suggesting that businesses with higher capital requirements tend to secure larger loans over successive cycles. Household well-being is significantly influenced by progressive microcredit, household income, net business benefit, rate of development index, and homeownership. Meanwhile, business profitability is driven by project capital and total fixed assets, highlighting the long-term impact of microcredit. The results highlight the critical role of microfinance in enabling small-scale entrepreneurs to expand their businesses while simultaneously improving household financial security. By promoting sustainable income generation, progressive microcredit serves as a key instrument in poverty alleviation and economic stability. This study underscores the necessity for microfinance institutions (MFIs) to tailor their lending strategies, ensuring optimal loan progression that balances business expansion with financial sustainability. Additionally, policymakers should refine microcredit frameworks to enhance accessibility and long-term economic benefits for low-income borrowers. Overall, these insights contribute to the broader discourse on financial inclusion and sustainable development, emphasizing that progressive microcredit not only facilitates entrepreneurship, but also serves as a driver of socioeconomic mobility.

Keywords: progressive microcredit; sustainable development small business; household welfare; net benefit; simultaneous equations

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1. Introduction

Microfinance has the potential to develop the sustainability of households and small- and medium-sized enterprises (SMEs) in developing countries and ensure that the industrialization of sub-Saharan Africa adopts a climate-friendly model because it addresses several of the UN Sustainable Development Goals, such as no poverty, decent work, and economic growth. Therefore, the UN Development Program recommends cooperation between microfinance institutions (MFIs), civil society, governments, and the private sector to achieve sustainable development and foster economic growth (United Nations, 2008). In the face of economic, health, and environmental crises, social and political turbulence at the global level, transformed into a crisis of confidence, impacts the activity of organizations (Arslan & Alqatan, 2020). In this context, profound changes and transformations are needed to meet societal challenges. Consequently, there needs to be a significant rise in the capacity of countries, especially developing countries, to finance sustainable development objectives. Scholars argued that the most crucial challenges are policy uniformity between climate change and sustainability and investment in disaster risk mitigation (Arslan et al., 2021; Hunjra et al., 2023; Orazayeva & Arslan, 2024). The financial sector needs to be at the forefront of addressing these challenges. One of the primary obstacles to addressing these issues and achieving fair and sustainable growth within the boundaries of ecological sustainability is a lack of financial resources (Arslan et al., 2024; Bhattacharyya, 2022).

The European Union (EU) has an ambitious goal of prioritizing Europe's transition to a sustainable economy and climate neutrality by 2050. Therefore, the EU is committed to ensuring sustainable development through the European Green Deal. The resilience and recovery package for Next Generation EU aimed to tackle the effects of the COVID-19 outbreak and focus on sustainable investments. The EU Taxonomy Regulation fosters transparency and the labeling of financial products and sustainable investments. European microfinance institutions (MFIs) have a window of opportunity to assist their clients' changing demands and Europe's shift to a sustainable economy through the creation of green finance solutions. It needs more information and assistance from microenterprises and the self-employed to implement sustainable ways of doing business (Hunjra et al., 2022). Financial inclusion plays an important role in resolving sustainability challenges, especially in developing countries that are facing extreme climate change disasters affecting health and welfare. Scholars argued for the need for a better loaning policy that could enhance access to credit for farmers, enabling them to adopt advanced technology and face sustainability challenges more effectively (Hunjra et al., 2023; Singh et al., 2022). Financial inclusion endorses saving habits for positive investments and plays an imperative role in the well-being of societies (Alqatan & Hichri, 2025; Fry-McKibbin & McKinnon, 2023; Shobande & Shodipe, 2021). Nevertheless, lower- and middle-income countries have low saving rates and limited access to international loans and/or foreign direct investment and, therefore, find it difficult to meet their financial needs. It highlights the need to examine the nexus between financial development and sustainable economic growth in these countries. Microfinance, particularly microcredit, was perceived as a miracle cure for poverty alleviation.

Muhammad (1976) founded microfinance in Bangladesh in 1976. The latter mentioned a philosophy of making extremely tiny loans to people who do not have access to traditional banks. The basic goal of microfinance is to provide financial inclusion to the poorest members of society. In similar vein, Ferri and Acosta (2019) argued that microfinance is introduced as a different market that has reached the people at the bottom of the pyramid and highlights the key role it will play to bring financial inclusion. Hence, microfinance has numerous innovative features to reduce the flaws of traditional banking, which does not cater to the poorest households. It primarily provides credit to a group of people to

guarantee repayment in the event of a member's default (Kapila & Kalia, 2022; Morduch, 2011), borrowing from women, largely excluded, who can start a small business and become autonomous and empowered (Haque, 2021; Sanyal, 2009). However, after the failure of many microfinance programs since 1990, many studies claimed that it was necessary to include some improvements (Rosenberg, 1994). Progressive lending is the main additional innovation, with the distinguishing feature of joint liability lending that offers advantages over traditional lending methods (Hering & Musshoff, 2017).

Robinson (2001) pioneered the use of the 'win–win' notion in microfinance, signifying that social impact can align with financial sustainability, or even profitability. Microfinance institutions (MFIs) have proven to be potentially viable and profitable businesses beyond their success in achieving social goals. MFIs have achieved notable success in implementing programs tailored to the needs of developing countries while maintaining impressive repayment rates. MFIs grant loans to borrowers in small installments over time. The customer must pay in weekly installments over the course of a year. After the first year, the loan is increased based on his trustworthiness (Egli, 2004). Given the paradoxical findings regarding the impact of microcredit access on customer welfare (Kabeer, 2005), numerous empirical studies have been conducted to test the impact of microcredit on household welfare (e.g., Mosley & Hulme, 1998; Hofmann & Kamala, 2003; Zaman, 1999). In this regard, some studies have declared that microcredit influences household welfare positively (Dwivedi & Dwivedi, 2022; Haque, 2021; Kajwang, 2022), while others have found a negative relationship (Kabeer, 2005). However, the majority of these studies did not look at the size of the microcredit that the customers received over time. Thus, researchers were interested in the microcredit progressive model. This system often functions in conjunction with dynamic incentives such as pledges not to refinance debtors who are in default. The mounting acceptance of progressive lending systems among MFIs is based on theoretical analyses, suggesting that progressive lending may help to reduce strategic defaults if the threat of no further financing is credible (Armendáriz de Aghion & Morduch, 2000; Egli, 2004).

Empirical studies have also confirmed that progressive microcredit reduces defaults (Cecchi et al., 2021; Dhib & Ashta, 2021). In other contexts, such as consumer loans, the negative effect on repayment has been widely demonstrated (e.g., Keys & Wang, 2019; Stewart et al., 2010). Particularly, Cecchi et al. (2021) investigated liquidity defaults and progressive lending in Bolivian microfinance. They looked at how progressive lending affected over-indebtedness and liquidity risk. Their findings demonstrated that, when compared to participants who did not engage in progressive lending, those who borrowed over multiple cycles with incremental borrowing caps showed an increase in liquidity defaults once the caps became unrestricted. According to Alexander-Tedeschi and Karlan (2006), for progressive lending to work, the borrower's profitability must be high, lending costs must be low, the risky group of borrowers cannot be overly risky, and the average probability of default must be low. She did not, however, examine the variety of loan sizes for which progressive lending might be effective. Baklouti (2013) conducted a study in Tunisia and found that factors such as loan amount, business sector, educational level, number of previous loans, borrower age, marital status, and gender significantly influence the loan repayment strategy. Ferri et al. (2014) argued that in the presence of tightened monetary policy, larger banks are relatively better capitalized and are less prone to decrease their lending supply. These studies, with different conclusions on the impact of microcredit on people's well-being, did not simultaneously examine the beneficial role of microcredit on small business performance while taking into account the entrepreneur's period of membership with the MFI and household well-being. In Tunisia, microcredit is primarily regulated by the Microfinance Supervisory Authority (MSA). The MSA is an independent

body responsible for overseeing the microfinance sector and it ensures that MFIs operate in a stable and sustainable manner, aiming to promote financial inclusion for low-income individuals and small businesses. Additionally, the Tunisian Central Bank plays a role in overseeing financial institutions, including MFIs, but the direct regulation and supervision of microcredit activities is primarily under the authority of the MSA.

Our research helps in examining the role of the progressive small loan in the performance of small businesses and household welfare. It takes into account the size of the microcredit received as a key factor in influencing the borrower's welfare. It primarily examines the determinants of microcredit amount (size), then the impact of progressive microcredit on small activity performance and household welfare while considering the customer's period of adhesion, the customer's characteristics (gender, marital status, education, age adhesion, age of project), small business characteristics (current assets, fixed assets, project age, capital), household characteristics (size, expenses, revenue, home ownership), the interest rate, and delegation development rate. In microfinance, the period of adhesion refers to the time that a borrower remains engaged with an MFI, typically from the moment they first receive financial services (such as a loan, savings account, or insurance) until they exit the program. This period is imperative in assessing customer retention, financial inclusion impact, and long-term borrower sustainability. In our case, the microcredit progressively received is a quantitative variable, and all people received a small loan progressively by cycle[1]. Our goal is to analyze under what activity conditions and borrower characteristics, the microcredit amount will be beneficial for both small activities performance and household welfare. Thus, this study analyses the progressive lending model and identify the microcredit amount (size) determinants. The study also investigates the dynamic relationship of progressive small loans with household welfare and small business performance. The structure of the paper is as follows: Section 1 discusses the introduction. Section 2 presents the literature review. Section 3 presents the methodology, while Section 4 presents the results and discussion. At the end, Section 5 presents the conclusion and significance of the study.

2. Literature Review and Hypotheses Development

2.1. Literature Review

The microfinance literature is instructive, first on the factors influencing microcredit demand, and then on research assessing the impact of microfinance on household well-being. The key drivers of microcredit demand identified in the research were age, marital status, supplementary income, business experience, purpose of credit (consumption or investment), amount of credit, and credit period (Honlonkou et al., 2006). Furthermore, Abalo (2007) stated that in the case of Togo, age, yearly turnover, number of years in business (experience), and larger profitability are drivers of microcredit demand. In this respect, Li et al. (2011) claimed for the case of rural households in China that household characteristics such as education level, family size, household income, and interest rate are important determinants of microcredit access. Pitt and Khandker (1998) conducted a study in Bangladesh and found that microcredit demand is determined by village features, household characteristics, and household head characteristics (age, education, etc.), particularly gender. They revealed that women are more likely to be qualified for larger microcredit amounts. S. Khandker (1998) argued that participation in microcredit programs is measured by the cumulative microcredit amount. In this way, Rashid and Townsend (1993) considered that credit access and the impact of this credit on household output are determined by the gender and other characteristics of borrowers. The interest rate set by MFI is another crucial factor in determining microcredit demand that has been examined in the literature (Yunus, 2009). Saad et al. (2024) found that an increase in home credit

increases home prices and vice versa. Microfinance is used to support sustainable household and business development. Microfinance institutions (MFIs) should set up a system of microcredits, which are small loans typically used to launch new businesses. These credits should be given to extremely low-income households and small- and medium-sized enterprises (SMEs) in developing countries that have limited access to banks and funds to support their investments in energy-efficient and renewable energy technology to mitigate the effects of climate change. For instance, MFIs could collaborate with impact investors and nonprofit organizations to offer loans that encourage organic farming practices, waste reduction and recycling initiatives, and sustainable agriculture technology that uses less water. The preference for microloans and credit should be given to those firms that have action plans addressing sustainability. According to Hunjra et al. (2023), green financing and environmental degradation play a significant role in the ability of developing nations to achieve sustainable development. Concerning the influence of microcredit on customer welfare, the major measurements required are, first, employing a participation dummy, and second, measuring the marginal return of borrowing by the total amount of microcredit borrowed (Khandker, 1998). Scholars (Copestake, 1995; Lapenu & Zeller, 2001; Pitt & Khandker, 1998) used household expenses as a proxy to quantify the impact of MFIs on household welfare. The contribution of microcredit varies depending on the characteristics of the household. Then, depending on the distribution of targeted families, the helpful or detrimental consequences could vary (Araujo et al., 2008; Mansuri & Rao, 2004; Platteau, 2004). Recently, Dwivedi and Dwivedi (2022) examined the influence of microcredit on the socio-economic status of women in India. They found women who pursue entrepreneurial careers might use microcredit as an empowering tool, thereby increasing their well-being. Recently, Hasan et al. (2022) examined the effect of microfinance on the well-being of the urban poor in India. They showed that microfinance has a substantial influence on the standard of living, poverty reduction, and social well-being. Kandie and Islam (2022) studied the influence of digital micro-credits on poverty alleviation. They claimed that digital micro-credits significantly alleviate poverty. Tazkiyah et al. (2022) established that microcredit affects household welfare in Indonesia. Microcredit, according to Alemu and Ganewo (2023), has a positive and significant influence on borrowers' income. The findings also show that the estimated impact is unaffected by unobserved selection bias, indicating that formal microcredit has a genuine effect. As a result, microfinance institutions and other governmental and non-governmental organizations involved in credit provision should expand access to credit for rural households as part of poverty alleviation strategies. Kajwang (2022) used a desk-top approach and discovered that microcredit was an effective instrument for mitigating the effects of covariate shocks and safeguarding the poor and their assets from adverse external shocks. Haque (2021) explored the effect of microcredit on improving the nourishment and well-being status of rural poor women in Bangladesh. They demonstrated that microcredit mediation significantly increased the borrowers' household food consumption expenditure. Additionally, Ngo and Wahhaj (2012) argued that easier access to microloans can have a positive impact on women's welfare and intra-household decision-making, and it depends mainly on the initial conditions. They further argued that women can only profit from microcredit if they can use it to invest in productive joint ventures. The women borrowers might see a reduction in their well-being if they fail to invest it in productive joint ventures and when a sizable amount of their household budget goes to the consumption of public goods. Bruhn and Love (2014) found the significant positive impact of green microcredit on the employment and income levels of individuals, particularly those who were living in areas of low income and with lesser pre-existing bank penetration. Similarly, Arouri et al. (2015) found that households can improve their resilience to natural catastrophes by having access to microcredit, internal

remittances, and social allowances. Kaboski and Townsend (2012) argued that microcredit lines may raise consumption, total short-term credit, green investment, income growth (from labor and business), and wages on the one hand, but will reduce overall asset growth. Schicks (2014) offers strategies for policymakers to deal with the possible over-indebtedness that arises from microcredit. He further examined the sacrifices connected to microloans and found that over-indebtedness is lower among borrowers with high debt literacy levels. He also found that male borrowers have higher over-indebtedness compared to female borrowers. Allcott (2015) conducted a case study of microfinance trails and proposed that the size of trial samples could have an impact on default rates. Several studies, however, have found that microcredit has no meaningful influence on welfare and poverty reduction (Bauchet & Morduch, 2013; Kabeer, 2005). Also, Morduch (1999), S. R. Khandker (2005), and Ayayi (2012) found that microcredit applies only to certain types of poor people, those with at least a minimum level of entrepreneurial skills, who could use the borrowed money to develop sustainable microbusinesses. Whereas Morduch (1999) demonstrated that the possible impacts of Grameen Bank microcredit were reducing vulnerability rather than poverty. Furthermore, microcredit did not have a statistically significant effect on Malawian household income. For his part, Coleman (1999) discovered that a microcredit program in Thailand had a little effect on household welfare. Others have discovered a negative impact on household final consumption but a positive influence on microentrepreneur activities (Gine & Giné, 2006; Karlan & Zinman, 2010). Otherwise, one of the first major criticisms leveled at microfinance by the welfare approach was that it does not reach the very poor, and the participants in the programs that benefit the most are those who are already well-off or who have the entrepreneurial ability to succeed, even without loans from microfinance institutions. Microfinance did not eliminate poverty in various situations, but MFIs provided microcredit to fund small companies for people who could not have access to traditional banks due to the lack of guarantees. This little loan has a significant impact on both business benefits and home consumption. These impacts, however, differ among households (Karlan & Zinman, 2010). Bauer (2016) suggested that the impact of microcredit on income is substantially greater for wealthier households. Shehu et al. (2021) examined how the microcredit scheme affected Nigeria's entrepreneurial development. They revealed that the service quality of the microcredit schemes had a favorable influence on entrepreneurial growth in the Northwest geopolitical zone. According to Thanh et al. (2019), microcredit increases household self-employment in Vietnam. The suggested advantages of microcredit as a prominent instrument for tackling credit limitations and poverty (e.g., Angelucci et al., 2015; A. Banerjee et al., 2015; Bocher et al., 2017; Tarozzi et al., 2015), particularly when based on entrepreneurial undertakings (e.g., Alvarez & Barney, 2014), and the Nobel Prize awarded to Banerjee, Duflo, and Kremer in 2019 for their research on various approaches to reducing poverty also explain the increase in studies on the potential of microfinance and microcredit to produce positive outcomes, such as education and empowerment, in addition to generating wealth (A. V. Banerjee et al., 2016). Several scholars (such as A. Banerjee et al., 2015; Angelucci et al., 2015; Tarozzi et al., 2015) questioned microcredit's ability to work as a tool for development and transformation of society. Angelucci et al. (2015) and Tarozzi et al. (2015) argued that microfinance, despite providing a significant increase in credit availability, is only moderately effective in fostering micro-entrepreneurship, income, the labor market, consumption, social status, subjective well-being, education, or empowerment. Borrowing is increased by microcredit and is primarily consumed for investing and risk management. Nevertheless, this greater access to credit results in relatively little gain in female decision-making, trust, and firm size, with little effect on overcoming debt traps (Angelucci et al., 2015). Similarly, Crépon et al. (2015) argued that the outcomes of microcredit are primarily derived from borrower

characteristics rather than from externalities. The greater access to microcredit results in a notable increase in the assets dedicated to self-employment activities and a rise in profits for households with greater borrowing capacities. Even though numerous studies on the impact of microfinance have been conducted, very few studies have examined the existence of a threshold effect for loan amounts to be beneficial, particularly in the relationship between progressive access to microfinance services and the continuous improvement of welfare recipients. Some have attempted to examine the long-term implications of beneficiaries' repayment behavior (Menon, 2002; Zaman, 1999). Particularly, Honlonkou et al. (2006) discovered the existence of a year's number threshold in Benin. They claimed that contrary to the belief that the more a customer interacts with an MFI, the better he is known by the latter and its performance in terms of payback is high, their findings support the hypothesis of no linearity based on years of experience in terms of repayment quality.

2.2. Hypotheses Development

The above literature findings lead us to hypothesize that microcredit improves both small business benefit and household well-being, but this improvement depends on loan amount and other households' characteristics. The findings of the empirical research continue to offer a highly intriguing viewpoint on the effect of microfinance on household welfare, which we sought to examine in this research. Since microcredit loans are typically aimed at relieving poverty, one of the Sustainable Development Goals, there may be a limit on the borrower's income. Those with incomes above a certain level may not be eligible to borrow. Then, the microcredit demand is determined by household revenue in reverse. Otherwise, for some, microfinance benefits the least poor households (wealthier clients), whereas for others, microfinance benefits the poorest households (the original mission of MFI is to help the poorest people). Indeed, the social performance of MFIs is often evaluated based on average loan size; if there is an impact on household welfare, the MFI is performing well, and then the poorest household requests a small loan, and generally, the wealthier clients request a higher loan size (Armendáriz & Szafarz, 2011). In this way, Weiss and Montgomery (2005) asserted that the increase in income associated with participation in a microfinance program should be put into perspective. The relationship between microcredit size and income is not always significant, in particular when the credit size promotes consumption rather than investment. Income growth is sometimes positively correlated with the initial income. Given that the goal of microcredit is to fund small activities rather than consumption, we can assume that the amount of microcredit obtained progressively is determined by household wealth (wealthier households have higher revenue). The following hypotheses were developed:

H1: *The size of the microcredit amount granted is determined positively by household revenue.*

We expect a positive relationship between the cumulative microcredit amount and household revenue. Otherwise, the microcredit amount effect is not only determined by the characteristics of the entrepreneur and the small activity nature, but also by the microloan size.

H2-a: *If the microcredit amount size is higher, household welfare (household expenses) will improve.*

H2-b: *If the size of the microcredit amount is higher, the project benefit will be improved.*

Honlonkou et al. (2006) argued that the microcredit effect is determined by the period adhesion, which outlines the customer–MFI relationship. Following their findings, and based on our three-year dataset, we developed Hypothesis 3:

H3: *If the period of adhesion is longer, the project benefit is improved.*

3. Methodology

3.1. Population and Sample

Seven microfinance institutions operate in Tunisia. These institutions are subject to anti-money laundering, anti-terrorism financing, and client protection regulation. We selected ENDA, because it is a prominent microfinance institution in Tunisia, dedicated to economically empowering marginalized households, particularly women and youth, by providing a comprehensive range of high-quality financial services and fostering micro-entrepreneurship. It follows a progressive lending model, which is distinct from traditional banking. This study employs data from ENDA inter-Arab, Tunisia's leading non-governmental microfinance institution providing progressive loans. A dataset of 278 households across 110 administrative sectors were analyzed, based on loan records collected between January 2012 and March 2020. ENDA operates on a progressive lending model, where borrowers start with small loans that gradually increase with each successful repayment cycle. This system promotes financial discipline and enables clients to access larger credit amounts over time.

This study examines factors influencing the microloan amount received and its impact on small business performance and household welfare. Key determinants include borrower characteristics (gender, marital status, education, age at loan adhesion, and project duration), small business attributes (total current assets, capital, and adhesion period), and household factors (size, income, and homeownership). Additionally, external variables such as interest rates and rates of development index are considered in the analysis. All time-related variables in this study are measured in years.

Dependent Variable

- The progressive microcredit determinants

According to Pitt and Khandker (1998), participation in microcredit programs is assessed by the total quantity of microcredit received, which has a major impact on various households' outcomes. Also, Zaman (1999) fixed a threshold for the cumulative value of the loan amount to be beneficial and have a positive impact on welfare and vulnerability reduction. The cumulative microcredit is chosen as a dependent variable that describes the loan obtained by the customer throughout all cycles, and it is considered to modify the small business benefit and household welfare positively. Following Pitt and Khandker (1998) and Morduch (1999), we specify the loan size received as a function of activity and household characteristics. Customer's characteristics such as gender, age, education levels, and household's characteristics such as household size, household revenue (including project revenue), and homeownership. The age of the project, period of adhesion, and small project capital are included as determinants of microcredit size, since microcredit is issued to fund the period project rather than consumption. Furthermore, we postulate that the interest rate and the delegation's rate of development where the project is started explaining the microcredit received.

- Net benefit determinants

The study objective is also to examine whether the microcredit size affects small business performance and household welfare. The net benefit is used to measure small business performance. It is considered the dependent variable, and we assume that it is affected by progressive microcredit and period adhesion. Furthermore, the household expenses, which define household welfare, the project characteristics (capital, age project,

total fixed assets, and total current assets), the interest rate, and the development rate are the other independent variables included in this analysis.

- Household expenses determinants

According to Pitt and Khandker (1998), consumption expenses are a popular indicator of household welfare. In this study, the total household expenses per month are used as a proxy for household welfare. According to the literature, household expenses are determined by household characteristics, customer characteristics, the progressive microcredit size, the net benefit, and rate of development index.

3.2. Model Specifications

Following Karlan and Zinman (2010), we first applied pooled OLS regression. This model is appropriate when individual effects are uncorrelated with explanatory variables and assuming no heterogeneity. In existing microfinance studies, Blanco-Oliver et al. (2023) used the seemingly unrelated regression (SUR) model. In microfinance, household well-being and business profitability are interdependent, making SUR an efficient method. Additionally, this model is used when there are multiple equations with correlated error terms. Both of these models can produce biased and inconsistent estimates in the presence of endogeneity. Due to the nature of the dataset used in this study, it is important to address endogeneity, particularly when explanatory variables are correlated with the error term.

We followed S. R. Khandker (2005) and Baltagi and Chang (2000), and used 2SLS and 3SLS models. In microfinance, selection bias occurs because loan amounts depend on borrower characteristics and require instrumental variables. 2SLS corrects for endogeneity by using valid instruments. It also helps estimate the causal effect of microcredit on household welfare and business performance. Additionally, 3SLS extends SUR and 2SLS models, improves efficiency, and accounts for endogeneity via instrumental variables in a simultaneous equation system.

The household expenses and the project net benefit are defined as a function of the progressive loans and other exogenous variables (customer characteristics and household characteristics). Our specification of the simultaneous equation system with incomplete panel data is as follows:

$$\begin{aligned}\text{loan_cumul}_{it} = {} & \alpha_0 + \alpha_1 \text{tfixed_assets}_{it} + \alpha_2 \text{h_revenue}_{it} + \alpha_3 \text{interest_rate}_{it} + \alpha_4 \text{marital}_{it} + \alpha_5 \text{gender}_{it} \\ & + \alpha_6 \text{education}_{it} + \alpha_7 \text{homeownership}_{it} + \alpha_8 \text{RDI}_{it} + \alpha_9 \text{h_size}_{it} + \alpha_{10} \text{capital}_{it} \\ & + \alpha_{11} \text{age_adhesion}_{it} + \alpha_{12} \text{period_adhesion}_{it} + \alpha_{13} \text{age_project}_{it} + \varepsilon_{it}\end{aligned} \tag{1}$$

$$\begin{aligned}\text{h_expenses}_{it} = {} & \beta_0 + \beta_1 \text{loan_cumul}_{it} + \beta_2 \text{h_revenue}_{it} + \beta_3 \text{marital}_{it} + \beta_4 \text{gender}_{it} \\ & + \beta_5 \text{Education}_{it} + \beta_6 \text{homeownership}_{it} + \beta_7 \text{RDI}_{it} + \beta_8 \text{h_size}_{it} + \beta_9 \text{net_benefit}_{it} \\ & + \beta_{10} \text{age_adhesion}_{it} + \varepsilon_{it}\end{aligned} \tag{2}$$

$$\begin{aligned}\text{net_benefit}_{it} = {} & \gamma_0 + \gamma_1 \text{loan_cumul}_{it} + \gamma_2 \text{h_expenses}_{it} + \gamma_3 \text{tfixed_assets}_{it} + \gamma_4 \text{interest_rate}_{it} + \gamma_5 \text{RDI}_{it} \\ & + \gamma_6 \text{tcurrent_assets}_{it} + \gamma_7 \text{capital}_{it} + \gamma_8 \text{period_adhesion}_{it} + \gamma_9 \text{age_project}_{it} + \varepsilon_{it}\end{aligned} \tag{3}$$

where

loan_cumul_{it}	Cumulative microcredit amount in Tunisian dinar (TND) of customer i in cycle t
$\text{tfixed_assets}_{it}$	The total fixed assets in Tunisian dinar (TND) of a small business i in cycle t
h_revenue_{it}	The household revenue including the project revenue in Tunisian dinar (TND) for customer i in cycle t
$\text{interest_rate}_{it}$	The interest rate fixed by ENDA for customer i in cycle t
marital	The marital status of customer, i.e., single or married

gender	The gender of customer, i.e., male or female
education	The education level of customer, i.e., primary, secondary, superior, or illiterate
homeownership	The household homeownership of customer, i.e., tenant or owner
RDI	Rate of development index, i.e., second, third, last, or higher level of development
h_size_{it}	Household size for customer i in cycle t
capital	The capital of a small activity (project) in Tunisian dinar (TND) for customer i in cycle t
$age_adhesion_{it}$	The age of customer i when he receives the microcredit in cycle t
$period_adhesion_{it}$	The period that defines the relation between customers i and ENDA in cycle t (since the first microcredit is obtained)
$age_project_{it}$	Project age for customer i in cycle t
$h_expenses_{it}$	The household expenditure in Tunisian dinar (TND) for customer i in cycle t
$net_benefit_{it}$	Net benefits of a small activity in Tunisian dinar (TND) for customer i in cycle t
$tcurrent_assets_{it}$	The total current assets of a small business in Tunisian dinar (TND) for customer i in cycle t

Descriptive Statistics

Table 1 presents summary statistics of key variables such as loan amount, household revenue, household expenses, total fixed assets, and net benefits related to progressive microcredit, household characteristics, and small business performance. The statistics show that the variables have very high variances compared to the means. The mean loan amount is 1020.38 TND and ranges from 200 TND to 5000 TND. Similarly, the mean cumulative loan amount is 1598.53 TND and ranges from 200 TND to 11,000 TND. The high variance in cumulative loans (std. dev. = 1539.44) suggests substantial differences in how much credit customers receive over time. This also indicates that borrowers tend to take additional credit in subsequent cycles and supports the progressive lending model (Blanco-Oliver et al., 2023; Egli, 2004). The household revenue (h_revenue) has mean value of 764.97. Some households reported zero revenue while others up to 5750 TND. The mean householder expenses (h_expenses) are 587.72 TND and ranges from zero to 4930 TND. The gap between revenue and expenses suggests that some households can save, while others may be highly vulnerable to financial instability. The means of total fixed assets (tfixed_assets) and current assets (tcurrent_assets) are 6436.69 TND and 2949. 67 TND, respectively. The disparity in asset values suggests that some borrowers invest significantly in business infrastructure, while others operate with minimal assets. The relatively high standard deviation (1085.92) of net benefit (net_benefit) further indicates that business performance varies significantly among borrowers, underlining the need for targeted financial literacy programs to improve loan utilization. The mean of household size (h_size) is 4.38 members, with a range of 1 to 11. Larger households may require greater financial support, which could expound higher credit demand in some cases. The mean of project capital (capital) is 7369.36 TND and ranges up to 188,000 TND. The mean project age (age_project) is 4.98 years, indicating that many businesses are relatively young. Table 1 reveals that the customers had a mean adhesion age (age_adhesion) of 39.4 years, with some as young as 19 and others up to 65 years old. Similarly, the mean value is 1.22 years for period of adhesion (period_adhesion) which suggests that most borrowers are relatively new clients of ENDA. These figures indicate that microcredit is supporting both newly launched businesses and more established enterprises. At the end, the mean

interest rate (interest_rate) is 31.36% and ranges from 21.6% to 36%. The high interest rates might discourage borrowing or affect loan repayment capacity.

Table 1. Descriptive statistics.

	Mean	Median	Min	Max	Std. Dev.
loan_amount	1020.38	800.00	200.00	5000.00	849.16
loan_cumul	1598.53	1100.00	200.00	11,000.00	1539.44
h_revenue	764.97	650.00	0.00	5750.00	621.46
h_expenses	587.72	500.00	0.00	4930.00	385.30
tfixed_assets	6436.69	1230.00	0.00	607,000.00	28,259.02
net_benefit	743.78	445.00	0.00	15,064.00	1085.92
h_size	4.38	4.00	1.00	11.00	1.62
tcurrent_assets	2949.66	1210.00	0.00	88,500.00	6700.00
capital	7369.36	2800.00	0.00	188,000.00	14,335.55
age_project	4.98	2.97	0.00	25.95	5.36
age_adhesion	39.40	38.43	19.20	65.06	10.17
period_adhesion	1.22	1.22	0.00	2.87	0.71
interest_rate	31.36	33.60	21.60	36.00	5.04

Table 2 categorizes qualitative variables such as marital status, gender, education, homeownership, and rate of development index (RDI) as described by the MFI-ENDA. Marital status is a widely used variable (for example as an indicator of responsibility, reliability, and financial maturity) in the literature on loan default and repayment behavior. The existing literature reveals mixed findings on its influence. Dinh and Kleimeier (2007) argued that married borrowers face higher probability of defaults compared to single borrowers. In contrast, Vogelgesang (2003) argued that single borrowers may have lower financial stability and responsibility, and may exhibit a higher likelihood of default. Similarly, scholars also argued that females show higher repayment rates compared to their male counterparts (Dinh & Kleimeier, 2007; Roslan & Karim, 2009). Similarly, the high educational borrowers are expected to have greater financial stability and decision-making skills. Additionally, education fosters financial resilience, increasing the likelihood of timely loan repayment.

Table 2. Qualitative variables.

	Arrangements	Codification
Marital status	Single Married	Dichotomous—it takes the value of 1 if the beneficiary is married and 0 otherwise
Gender	Woman Man	1 2
Education	Primary Secondary Superior Illiterate	1 2 3 4
Homeownership	Tenant Owner	1 2
Rate of development index (RDI)	Second level of development Third level of development Last level of development Higher level of development	1 2 3 4

4. Results and Discussion

The findings demonstrate the overall significance of all models. Table 3 shows the pooled OLS and SUR results, respectively. The interest rate has significant negative effect on the cumulative amount of microcredit received because of highly significant negative

coefficient ($p < 0.01$). This finding is well supported by Karlan and Zinman (2010) and (Armendáriz de Aghion & Morduch, 2000) who argued that higher interest rates discourage the borrowing, mainly among financially constraints households. The project capital has a significant positive cumulative effect. It implies that ENDA may prioritize businesses with higher capital when granting loans. This is aligned with finance theory that larger capital investments typically require higher credit amounts (Blanco-Oliver et al., 2023). The finding reveals that longer adhesion periods negatively affect cumulative microcredit amount. This aligns with the study of Honlonkou et al. (2006), who argued that borrowers reduce the adhesion period when their projects are performing well and move on to the larger funding sources. Similarly, Dhib and Ashta (2021) argued that progressive lending systems reduce strategic defaults.

Table 3. Results of pooled OLS and SUR estimations.

	Pooled OLS			**Pooled SUR**		
	Loan_Cumul	**h_Expenses**	**Net_Benefit**	**Loan_Cumul**	**h_Expenses**	**Net_Benefit**
Intercept	7282.56 ***	208.1696 *	1684.02 ***	7277.68 ***	159.3847	1400.89 ***
	(0.0000)	(0.0287)	(0.000)	(0.0000)	(0.0867)	(0.0000)
loan_cumul		0.0435 ***	0.06076 *		0.0417 ***	0.05591 *
		(0.0000)	(0.0560)		(0.0000)	(0.0740)
h_expenses			0.3512 ***			0.6695 ***
			(0.00004)			(0.0000)
tfixed_ assets	−0.00204		0.00619 *	−0.00195		0.0059 *
	(0.4964)		(0.0139)	(0.5086)		(0.0151)
h_revenue	−0.06168	0.2859 ***		−0.06219	0.2690 ***	
	(0.3163)	0.0000		(0.3072)	(0.0000)	
interest_rate	−144.583 ***		−46.9900 ***	−144.518 ***		−42.1302 ***
	(0.0000)		(0.0000)	(0.0000)		(0.0000)
marital	35.8155	−21.0057		36.5735	−18.6040	
	(0.5550)	(0.2649)		(0.5423)	(0.3119)	
gender	−72.7421	13.1228		−72.5587	30.5102	
	(0.4005)	(0.6260)		(0.3966)	(0.2465)	
education	−15.8331	6.8236		−15.6622	6.1243	
	(0.7535)	(0.6711)		(0.7535)	(0.6964)	
homeownership	−183.216 *	−73.6523 **		−182.917 *	−65.1468 **	
	(0.0111)	(0.0012)		(0.0104)	(0.0035)	
rdi	−24.7777	46.6106 ***	5.5290	−24.3989 *	44.8057 ***	−13.5399
	(0.4248)	(0.0000)	(0.8297)	(0.4270)	(0.0000)	(0.5955)
h_size	21.9700	11.7276		21.8382	9.8278	
	(0.3594)	11.7277		(0.3572)	(0.1853)	
tcurrent_assets			−0.0127 *			−0.0133 *
			(0.0583)			(0.0423)
capital	0.02833 ***		0.01658 ***	0.02831 ***		0.01600 ***
	(0.0000)		(0.00005)	(0.0000)		(0.00007)
net_benefit		0.0983 ***			0.14902 ***	
		(0.0000)			(0.0000)	
age_adhesion	3.3599	−0.6075		2.9496	−0.7635	
				(0.4374)	(0.5167)	
period_adhesion	−815.829 ***		81.7118 *	−815.918 ***		91.0488 *
	(0.0000)		(0.1045)	(0.0000)		(0.0644)
age_project	−0.3630		−4.9117	1.1292		−3.9152
	(0.9591)		(0.3866)	(0.8717)		(0.4803)
Observations	6,710,000	6,740,000	6,710,000	6,710,000	6,710,000	6,710,000
Multiple R_squared	0.6187	0.3933	0.3248	0.6187	0.3786	0.3104
Adjusted R_squared	0.6119	0.3842	0.3156	0.6111	0.3793	0.3010
Residual Std-error	948.8686	303.337	776.560	948.8783	306.8241	784.8026

t values are in parentheses. *, **, and *** show the significance at 10%, 5%, and 1% levels, respectively.

Nevertheless, homeownership and the rate of development index do impact microcredit, suggesting that asset ownership provides a form of security that facilitates loan approvals (Armendáriz de Aghion & Morduch, 2000). Additionally, microcredit is more critical for non-homeowners (Armendáriz de Aghion & Morduch, 2000), while property ownership may reduce credit dependence. Interestingly, the coefficient of household revenue is not significant, the customer's wealth does not affect the microcredit received, and it rejects our first hypothesis (H1).

Microcredit size (loan_cumul) positively affects household expenses, implying that access to larger loans enhances household welfare. This is supported by Karlan and Zinman (2010) who argued that microcredit improves financial security and allows families to increase consumption. Thus, it supports our hypothesis H2-a that the size of the microcredit has a favorable effect on household welfare.

Additionally, household revenue significantly increases household expenses but has no significant impact on loan size (loan_cumul). This is extremely rational and supports the economic theory that expenses rise as income rises. This also supports Engel's law, that higher-income households spend more on consumption (Pitt & Khandker, 1998).

Higher RDI positively affects household expenses but has no effect on net benefits. In a similar vein, Ribeiro et al. (2022) argued that households in more developed regions face higher living costs and thus their expenses increase. Homeownership negatively affects cumulative microcredit, indicating that homeowners rely less on microfinance. Net benefit is positively influenced by microcredit amount (loan_cumul) and project capital but negatively affected by total current assets. It implies that microcredit enhances business profitability; however, excessive liquidity in current assets may indicate inefficiency. Blanco-Oliver et al. (2023) argued that microfinance should encourage investment in productive assets rather than cash reserves. This is aligned with our H2-b hypothesis, which assumes that larger loans lead to better business performance by increasing working capital and investment in productive assets. The findings reject hypothesis H2-b, as microcredit size does not significantly affect small business profitability. The net business benefit (net_benefit) is positively influenced by project capital and total fixed assets, but not by loan size. The negative relationship between current assets and net benefit implies that some businesses might be holding excess liquidity instead of investing in productive assets. According to Nelson et al. (1996) and Creevey (1996), the fixed asset is a variable of sustainability. If the overall fixed assets are greater, the capital is greater, and the project is more profitable. The net benefit is inversely related to the interest rate, with the coefficient of interest rate being significantly negative at 1%. Project capital has a positive and significant effect on cumulative microcredit amount (loan_cumul) and net business benefit (net_benefit). It implies that project capital signals creditworthiness and growth potential.

Finally, according to the SUR method, the period adhesion coefficient is significantly positive at 10%; as the relationship with ENDA MFI grows, so does the net benefit. This finding supports the findings of Honlonkou et al. (2006). We confirm our hypothesis (H3) using the SUR method; as the period adhesion increases, so does the project's benefit. The combined pooled OLS and SUR methods are significant. However, for incomplete panels, these models may produce inefficient estimators; therefore, we investigate the 2SLS and 3SLS to obtain more relevant estimators. According to the 2SLS and 3SLS models (Table 4), the interest rate determines the size of the microcredit (the coefficient is significant and negative), indicating that the microcredit decreases as the interest rate rises. Furthermore, the microcredit is determined by project capital (the coefficient is significant and positive); as project capital increases, so does the microcredit size. Furthermore, the relationship between microcredit and period adhesion is negative. However, if the coefficient of household

revenue is not significant, then the household revenue does not determine the microcredit size, so we reject our hypothesis (H1). Interestingly, the further analysis reveals no significant effect of gender, marital status, or education on loan size, challenging traditional assumptions that demographic factors play a crucial role in microcredit allocation. This aligns with the study of Karlan and Zinman (2010), who found that MFIs may prioritize business potential over demographic characteristics. In terms of the factors affecting household welfare, the microcredit size coefficient is positive and significant; as loan size increases, household expenses increase, and so household welfare improves. The findings highlight that microcredit allocation is largely driven by economic factors rather than social or demographic characteristics. Similarly, Ribeiro et al. (2022) suggested the adoption of a holistic approach to boost microfinance outcomes through a better understanding of their beneficiaries due to having more financial obligations.

Table 4. Results of 2SLS and 3SLS estimations.

	2SLS			**3SLS**		
	Loan_Cumul	**h_Expenses**	**Net_Benefit**	**Loan_Cumul**	**h_Expenses**	**Net_Benefit**
Intercept	7282.56 ***	123.3106	1974.30	7279.20 ***	138.2567	1978.21
	(0.0000)	(0.2343)	(0.3280)	(0.0000)	(0.1811)	(0.3270)
loan_cumul		0.0441 *	0.0944		0.0438 *	0.0923
		(0.0111)	(0.7335)		(0.01165)	(0.7391)
H_expenses			−0.2056			−0.2053
			(0.2580)			(0.2587)
tfixed_assets	−0.00204		0.00698 **	−0.0604		0.0071 **
	(0.5725)		(0.0086)	(0.3262)		(0.0073)
h_revenue	−0.0616	0.2847 ***		−0.0604	0.2857 ***	
	(0.3163)	(0.0000)		(0.3262)	(0.0000)	
interest_rate	−144.583 ***		−51.4914	−144.314 ***		−51.6522
	(0.0000)		(0.1905)	(0.0000)		(0.2213)
marital	35.8155	−19.9940		36.7133	−19.9202	
	(0.5550)	(0.3057)		(0.5450)	(0.3056)	
gender	−72.7421	47.2116		−77.6537	40.0230	
	(0.4005)	(0.1301)		(0.3693)	(0.1978)	
education	−15.8331	1.8762		−13.9248	4.3029	
	(0.7897)	(0.9094)		(0.7823)	(0.7934)	
homeownership	−183.216 *	−68.8593 **		−183.299 **	−69.0505 **	
	(0.0111)	(0.0028)		(0.0110)	(0.0028)	
rdi	−24.7777	44.3531 ***	41.1540	−24.5178	44.3480 ***	41.3843
	(0.4248)	(0.0000)	(0.1566)	(0.7429)	(0.0000)	(0.1543)
h_size	21.9700	12.5396		21.1397	11.5600	
	(0.3594)	(0.1043)		(0.3777)	(0.1329)	
tcurrent_assets			−0.0105			−0.0103
			(0.1279)			(0.1356)
capital	0.0283 ***		0.0017 *	0.0282 ***		0.01705 *
	(0.0000)		(0.0653)	(0.0000)		(0.0663)
net_benefit		0.1503 ***			0.1483 ***	
		(0.00067)			(0.0007)	
age_adhesion	3.0359	−0.8072		2.9150	−0.8427	
	(0.4711)	(0.5111)		(0.4475)	(0.4911)	
period_adhesion	−815.829 ***		85.0488	−815.220 ***		83.8531
	(0.0000)		(0.7064)	(0.0000)		(0.5916)
age_project	0.3630		−3.9936	1.2788		−3.1552
	(0.9591)		(0.4987)	(0.8562)		(0.5916)
Observations	6,710,000	6,710,000	6,710,000	6,710,000	6,710,000	6,710,000
Multiple R_squared	0.6187	0.3808	0.2806	0.6187	0.3819	0.2807
Adjusted R_squared	0.6111	0.3714	0.2708	0.6111	0.3725	0.2709
Residual Std-error	948.8686	307.0994	801.6029	948.8871	306.828	801.5408

t values are in parentheses. *, **, and *** show the significance at 10%, 5%, and 1% levels, respectively.

Numerous studies emphasize the link between expanding access to microfinance services and raising household welfare (Khandker, 1998; Menon, 2002, 2006; Zaman, 1999). Then, we reinforce the earlier findings by confirming our hypothesis (H2-a), which states that the progressive loan improves the household's well-being, reduces vulnerability, and promotes sustainable development. In particular, the H2-a hypothesis assumes that larger loans provide more financial flexibility, increasing household spending on essentials like food, education, and healthcare. The coefficient of household revenue is likewise significant and positive; as revenue increases, expenses rise and welfare improves, as confirmed by economic theory. When revenue increases, household well-being improves. This implies that microcredit may help smooth household consumption and protect against financial shocks. Furthermore, the net benefit coefficient is positively significant, implying that the small business benefit affects household welfare positively.

Furthermore, the development indicator (RDI) and homeownership have an impact on household welfare. Overall, the primary factors that affect household well-being are the size of the microcredit (we confirm H2-a), household income, net benefit, RDI, and homeownership. Regarding the project benefit determinants, the coefficient of project capital is substantial and positive, implying that as capital increases, so does the net benefit. The total fixed assets coefficient is positive and significant; as total fixed assets increase, so does the net benefit. The possession of assets was kept as a welfare variable because it indicates the long-term impact of microcredit (Creevey, 1996; Nelson et al., 1996; Sinha & Matin, 1998). The pooled OLS and SUR models support hypothesis H3, i.e., the longer adhesion positively impacts project benefits. However, 2SLS and 3SLS models reject H3, meaning that in a more controlled setting, adhesion period does not significantly affect net benefit. Consequently, the period of adherence does not affect the net benefit in Tunisian context. Given the heterogeneity of project types among customers and the heterogeneity of activities and sectors, the size of the loan does not determine the project benefit because some projects need a small loan compared to other projects. All other variables are insignificant and do not influence the project's benefit. The models 2SLS and 3SLS are significant overall, and the Hausman (1978); Hausman and Taylor (1981) test of endogeneity is acceptable; the H0 is validated, and the non-correlation between exogenous variables and the error term is confirmed. In general, the findings corroborated earlier research. The most important finding is that loan size has a favorable effect on household welfare.

5. Conclusions

The study explores how microfinance contributes to household well-being and sustainable development and helps borrowers build wealth and take control of their lives. It discussed the role of ENDA MFIs in Tunisia using the progressive microcredit model, as well as their contribution to business performance, household welfare, and sustainable development. Simultaneous equations are generated using partial panel data, with the dependent variables being the progressive microcredit amount, household well-being, and net benefit. The 2SLS and 3SLS results reveal that project capital, interest rate, homeownership, and term adhesion have an impact on progressive microcredit. However, because household income does not impact microcredit size, we reject the research hypothesis (H1). The findings also demonstrate that household well-being is mostly influenced by the microcredit progressively received, household income, net benefit, RDI, and homeownership. We confirm (H2-a) that increasing the size of microcredit will improve household well-being and sustainable development. However, the net benefit is dictated by capital and fixed assets, but it is unaffected by microcredit size (H2-b is rejected) or period adhesion (reject H3). As a result, we conclude that progressive microcredit enhances household well-being in Tunisia and that this welfare enhancement is also influenced by household revenue,

small business benefit, homeownership, and delegation development. The benefit of a small business, on the other hand, is decided by total fixed assets and capital; an indirect influence of loan size via fixed assets is underlined. Finally, we conclude that our findings are in line with previous research. Microcredit size in Tunisia is mostly influenced by small business capital, homeownership, and the interest rate, and it promotes household welfare. The impact of progressive microcredit on household welfare is influenced by factors like household characteristics (household income and homeownership), the benefits to small businesses, and the rate of development. However, gender, marital status, age, and education level have no effect on microcredit size, neither on household welfare nor on small business benefits. Indeed, in the literature, these characteristics of customers affect microcredit access, but we test the effect of the microcredit size on people's access to microfinance services.

5.1. Practical and Social Implications

The research has many practical and social implications for both academicians and practitioners. First, the current study's primary goal is to outline the factors that determine progressive microcredit (social, economic, and demographic factors), which will assist MFIs in selecting the appropriate products and services for bettering poor people's financial inclusion and sustainable development. The study's findings will encourage MFIs to assist in improving household well-being, reducing vulnerability, promoting sustainable development, financing small businesses, and strengthening financial stability. Third, considerable research has been devoted to examining the role of progressive microcredit on household well-being; however, far less attention has been paid to testing simultaneously the microcredit determinants and the beneficial role of progressive microcredit on small business performance while taking the entrepreneur's period of membership with the MFI into account, as well as on household well-being.

5.2. Policy Recommendations

This study offers several policy implications that can enhance the effectiveness and sustainability of microfinance institutions (MFIs) in promoting financial inclusion and economic empowerment in Tunisia. First, policymakers should focus on improving regulatory frameworks for MFIs to ensure accountability, transparency, and consumer protection. Second, Tunisian government can consider subsidizing interest rates for microloans, particularly for low-income entrepreneurs, youth, women, and rural communities. Third, it is crucial to integrate financial literacy programs into microfinance initiatives for enhancing borrowers' financial decision-making skills. Besides these, it is imperative to foster partnerships between MFIs, banks, and government agencies for the creation of a more inclusive financial ecosystems.

5.3. Limitation and Suggestions for Future Research

The study's uniqueness stems from the updated database gathered in 2020, as well as the simultaneous equation analysis used to investigate microcredit determinants, the impact of progressive microcredit on small business performance, household well-being, and sustainable development. Additionally, this is the first study conducted in Tunisia examining the role of progressive microcredit on small activities and household welfare solely for MFIs (ENDA). However, as with any research area within microfinance and microcredit, this study has some limitations. We only took data from ENDA; future studies can be conducted by including other MFIs. As we included many factors that affect progressive microcredit in terms of household and small business characteristics, we may have missed other relevant factors that can contribute to enhancing MFI services, microfinance recipients' selection, and internal policies to alleviate poverty and boost

economic and human development in Tunisia. This study has not investigated the effect of loan duration, capture and socioeconomic disparities. Further research could delve deeper into the approach and look for additional factors like entrepreneur skills, loan duration, socio-economic disparities, capture, and financial technology innovation, as well as advanced techniques to produce more efficient and relevant results.

This study examines period adhesion; however, it does not delve into whether borrowers become "captured" by the institution. This can be investigated in future research studies. We applied 2SLS and 3SLS econometric models, which are well-established in economic research. However, future studies can use machine learning techniques. Furthermore, as an emerging country, facilitating Tunisian women's financial inclusion by investigating the conditions under which progressive microcredit improves their well-being will help strengthen their role in the country's economic development and sustainability. Finally, it is critical to investigate the role of progressive microcredit in preserving Tunisia's regional balance between rural and urban areas. Although green microfinance is still in its early days, to successfully implement sustainable lending practices, there needs to be strong industry partnerships, for example, between MFIs and energy-efficient oven manufacturers or recycling businesses.

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Notes

[1] Microcredit is granted progressively by period or cycle. This period is irregular, and not all customers experience the same number of cycles (from two to five cycles).

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