UNIVERSIDADE DE ÉVORA

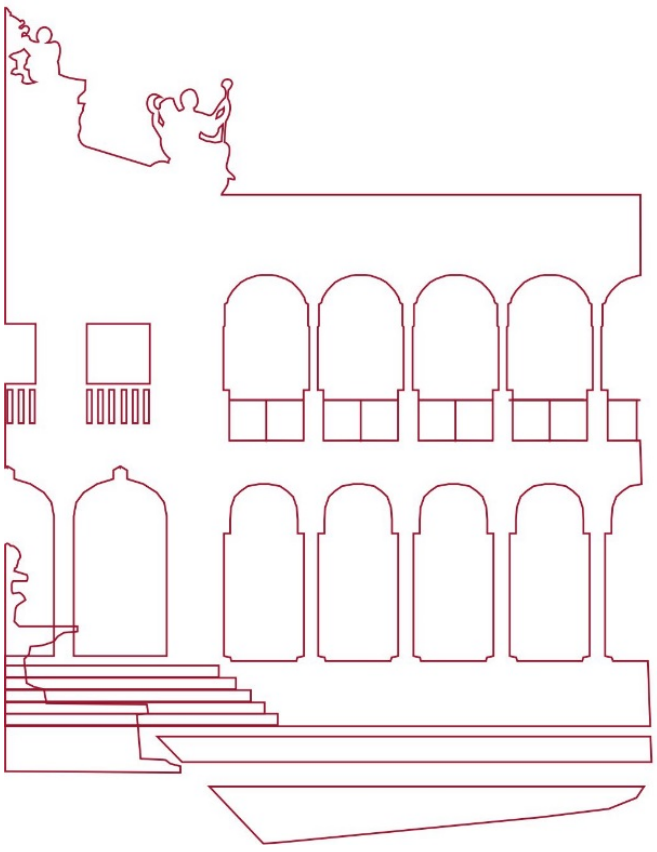
The Relevance of Microcredit and its Impact on East Timor MSEs and Poverty Reduction

Teresa Freitas Belo

Orientadora: Profª Doutora Elisabete Gomes Santana Félix

Tese apresentada à Universidade de Évora para obtenção do Grau de Doutor em Gestão

Évora, 2019



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I would like to dedicate my thesis to:

My beloved parents Rui and Ana for raising me to believe that anything was possible
My beloved husband Altino for making everything possible
My beloved son Rúben for the great inspiration in my life
My beloved sister Cristalina and brother Dudel for everything
My beloved Father and Mother- in-law Fernando and Emilia
My beloved sister-in-law Jenny
My beloved nieces Ana and Icha
And to all my family and friends

The Relevance of Microcredit and its Impact on East Timor MSEs and Poverty Reduction

Abstract

Microcredit has an important role in the growth and productivity of the micro, small and medium enterprises (MSMEs) in East Timor, also on poverty reduction in other countries. The objective of this thesis, comprised of four essays, is to provide empirical evidence of the impact of microcredit on the growth and productivity of MSEs and poverty reduction of a selected set of specific factors. As microcredit is still a relevant issue of concern for some countries, due to their considerable role and functions for the growth and productivity of MSEs, the first paper performs an empirical analysis of MSEs data obtained with the application of a questionnaire in Dili, East Timor. The second paper examines the impact of microcredit on MSEs growth in Dili, East Timor, controlling for MSE age and size, micro saving and also for the firms' activity sector, firm's investment type and the gender of the owner/manager of the firm, with 1-year data. The third paper examines the impact of microcredit on the productivity (measured by single factor productivity (SFP), total factor productivity (TFP) and labor productivity (LP)) of MSEs in East Timor, with 1-year data. Lastly, the fourth paper examines the impact of microcredit, job creation, inflation rates and education on poverty reduction, controlling for income and its distribution, in East Timor, Bangladesh, Indonesia, Philippines, Myanmar, Cambodia, Pakistan, Malaysia, Thailand, Nepal, and Srilanka, with data from 2007-2016.

The results obtained suggest that: (i) the microcredit had a significant contribution on the growth and productivity of MSEs; (ii) the microcredit had positive impact on the growth of MSEs; (iii) the microcredit had a positive impact on MSEs productivity; and (iv) microcredit had a significant impact on the poverty reduction.

Keywords: age, East Timor, education, growth, income, inflation rates, investment, job creation, labor productivity, loan size, microcredit, poverty, productivity, SFP, size, MSEs, TFP

A Relevância do Microcrédito e o seu Impacto nas MPEs de Timor Leste e na Redução da Pobreza

Resumo

O microcrédito tem um papel importante no crescimento e produtividade das micro e pequenas empresas (MPEs), contribuíndo para a redução da pobreza em Timor-Leste tal como acontece em muitos outros países. O objetivo desta tese, composta por quatro artigos científicos, é fornecer evidências empíricas do impacto do microcrédito no crescimento e produtividade das MPEs e redução da pobreza, de um conjunto selecionado de factores específicos. Continuando o microcrédito a ser um fator relevante para alguns países devido ao seu papel e funções consideráveis no crescimento e produtividade das MPE, fizemos em primeiro lugar uma análise da evidência empírica do microcrédito nas MPE de Timor-Leste, com dados de 1 ano, obtidos com o recurso a um questionário. O segundo artigo analisa o impacto do microcrédito no crescimento das MPE em Díli, Timor-Leste, tendo em conta a idade e dimensão das MPE, a micro poupança e, também, o sector de actividade das empresas, o tipo de investimento das empresas e o género do proprietário/gestor da empresa, também com dados de 1 ano. O terceiro artigo examina o impacto do microcrédito na produtividade (medida pela produtividade de fator único (SFP), produtividade total dos fatores (TFP) e produtividade do trabalho (LP)) das MPEs em Timor-Leste, ainda com dados de 1 ano. Por último, o quarto artigo examina o impacto do microcrédito, criação de emprego, taxas de inflação, relação entre educação e redução da pobreza, contorlando a obtenção de rendimento e sua distribuição, em Timor-Leste, Bangladesh, Indonésia, Filipinas, Myanmar, Camboja, Paquistão, Malásia, Tailândia, Nepal e Srilanka, com dados para o período 2007-2016.

Os resultados obtidos sugerem que: (i) o microcrédito teve uma contribuição significativa no crescimento e produtividade das MPE; (ii) o microcrédito teve impacto positivo no crescimento das MPE; (iii) o microcrédito teve um impacto positivo na produtividade das MPE; e (iv) o microcrédito teve um impacto significativo na redução da pobreza.

Palavras-chave: crescimento, criação de emprego, dimensão, educação, idade, investimento, microcrédito, MPEs, pobreza, produtividade, produtividade de trabalho, rendimento, SFP, taxas de inflação, TFP, Timor Leste.

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List of Abbreviations

ADB: Asian Development Bank
AMFITIL: Associação de Microfinanças de Timor-Leste
AR: Arellano-Bond
ASEAN: Association of Southeast Asian Nations
BNCTL: Banco Nacional de Comércio de Timor-Leste
Edu: Education
EL: Employment Level
FE: Fixed Effects
FFIs: Formal Financial Institutions
FGLS: Feasible Generalized Least Squares
GC: Gini Coefficient
GDP: Gross Domestic Product
GDSTL: Directorate General of Statistics of Timor-Leste
GMM: Generalized Method of Moments
HC: Human Capital
HCI: Headcount Index
HDI: Human Development Index
HP: Human Productivity
I: Investment
IADE: Instituto de Apoio ao Desenvolvimento Empresarial
IDB: Inter-American Development Bank
ICT: Information and Communications Technology
ILO: International Labor Organization
IMF: International Monetary Fund
IMFTL: Instituição de Microfinanças de East Timor
JICA: Japan International Coorperation Agency
IR: Inflation Rates
JB: Job Creation
K: Capital Input
L: Labor Input
LP: Labor Productivity
lnGDP: Logarithm of GDP
LDCs: Least Developed Countries
MCLs: Microcredit Loan Size
MDGs: Millennium Development Goals
MFIs: Microfinance Institutions
MPEs: Micro e Pequenas Empresas
MPMEs: Micro, Pequenas e Médias Empresas
MS: Micro Saving
MSEs: Micro and Small Enterprises
MSMEs: Micro, Small and Medium Enterprises
NCC: National Consultative Council of East Timor
NGO: Non-Governmental Organization
PovGap: Poverty Gap
PPP: Purchasing Power Parity
PROAP: Principal Regional Office for Asia and the Pacific
OECD: Organization for Economic Co-operation and Development
OLS: Ordinary Last Squares
RE: Random Effects
R&D: Research and Development

ROA: Return on Asset
SFP: Single Factor Productivity
SMEs: Small and Medium Enterprises
SQR Povgap: Squared Poverty Gap
TE: Trading Economics
TFP: Total Factor Productivity
UNDP: United Nations Development Programme
UNESCO: The United Nations Educational, Scientific and Cultural Organization
UNICEF: United Nations International Children's Emergency Fund
UNMISET: United Nations Mission of Support in East Timor
USAID: United Stated Agency International Development
UNTAET: United Nations Transitional Administration in East Timor

Chapter 1 – Introduction

This chapter provides an overview of the importance of microcredit on growth, the productivity of Micro, Small and Medium Enterprises (MSMEs) and poverty reduction in eleven developing Asian countries. The research objectives and contributions of this thesis are also presented.

1.1. Study Motivation

It is not easy to develop and expand business in East Timor, because it is difficult to get credit to support SMEs. In developing countries, microcredit facilitates the growth and productivity of MSMEs, thus reducing poverty in developing countries. The choice between the various credit facilities of Formal Financial Institutions (FFIs) is limited according to the benefits and loan size in order to support the growth and productivity of the MSEs. In this context, it is important to understand how microcredit affects the growth, productivity of the MSEs and poverty reduction in developing countries.

East Timor has a low-income economy e compared with other Asian countries (World Bank, 2016). A developing country like East Timor needs microfinance institutions (MFIs) to provide loans to support SMEs. It is not easy to develop and expand business in East Timor, because it is difficult to get credit to support SMEs. According to Beck, Demirgüç-Kunt and Maksimovic (2005), higher financing obstacles faced by small firms translate into slower growth. SMEs in East Timor have difficulty to access to the credit from MFIs or banks to support their growth. A mapping exercise conducted by the Ministry of Economy and Development showed that, throughout the country, the main industries existing in East Timor are printing, soap manufacturing, handicrafts, and service-oriented businesses and woven cloth (Conroy, 2006).

Ayyagari, Beck and Demirguc-Kunt (2007) underlined that financing plays an important role in the functioning and growth of SMEs[1], saying that they tend to constitute over 60 percent of total employment in manufacturing in many countries. The Bangladesh case proved that through the SMEs it is possible to reduce the unemployment rate and poverty rate. Banerjee and Duflo (2005) surveyed evidence, from many less developed countries from 1960 to 1990, that borrowing interest rates are often of the order of 60% or above, even the deposit rates being less than half, and defaults are rare. Reinhart and Rogoff (2010) argued that debt had a positive impact on the firms' growth in certain levels only.

As a new nation in the world, East Timor continues to be one of the world's poorest countries, with GDP per capita standing at $986.70 in 2015 (Trading Economics, 2017). According to World Bank reports (2016), about 766 million extremely poor who live under the poverty line of US$ 1.90 a day and about 33% of the world's poorest people, are living in South and East Asia. The role of microcredit was to reduce poverty by creating self-employment in low-income communities (Morduch, Ravi and Bauchet, 2012). Productive and remunerative employment can help ensure that poor people share in the benefits of economic growth (Yunus, 2007). Studying China, Wang (2004) concludes that microcredit had a great impact on poverty reduction through job creation, and the percentage of people living in poverty has declined significantly in recent decades. However, Yunus (2009) found that in Africa and India microcredit is not working to reduce poverty.

As far as we know, this is the first study to examine the impact of microcredit on the growth and productivity on SMEs in East Timor using a unique, hand-collected, database and poverty reduction in eleven developing Asian countries as a contribution to economic growth in those countries.

[1] They defined SMEs with up to 250 employees.

1.2. Objective

The main objective of this thesis is to assess the relevance of microcredit and its impact on East Timor SMEs and poverty reduction. Four specific objectives have been set in accordance with our study as presented below:

1. The purpose of study 1 is to analyze the empirical evidence of microcredit on East Timor MSEs.
2. The purpose of study 2 is to determine the impact of the microcredit on the growth of MSEs in East Timor. This study also intends to find out the fact that through microcredit loans has a great impact on the employment level and return on assets (ROA), especially on the growth of MSEs in Dili, East Timor.
3. To determine the impact of microcredit on the productivity of MSEs in East Timor. This study also intends to find out the fact that through microcredit loans has a great impact on the single factor productivity (SFP), total factor productivity (TFP) and labor productivity (LP) especially on the MSEs productivity in Dili, East Timor.
4. To assess the impact of microcredit on poverty alleviation in eleven developing Asian countries. This study also intends to find out the fact that through microcredit loans has a great impact on the headcount index (HDI), poverty gap (PovGap) and squared poverty gap (SqrPovGap).

1.3. Contributions

The results of this thesis will contribute to the development of microcredit studies and will provide empirical evidence to policymakers, considering the development of policies and plans to inspire sustainable microcredit development in the country. The essential contribution of these studies is to improve and develop microcredit in East Timor.

The contribution of study 1 is intended to understand the general role of microcredit on the growth and productivity of MSEs in Dili, East Timor, through questionnaire analysis.

There are 3 contributions to study 2: firstly, although there are many studies about the impact of microcredit on MSEs growth in some countries, most of them addressed age, size, debt in general concept, access to finance, employment level and ROA on SMEs growth (Cooper, 2012; Maengwe and Otuya, 2016; Memba, Gakure and Karanja, 2012; Mbugua, 2010; Nelson; 2010 and Rhyne and Otero, 1992) and there no studies about microcredit loan size and micro saving on SMEs growth. As far as we know, this is the first study about the impact of microcredit on the growth of MSEs in East Timor that used primary, hand collected, data; Secondly, this study intends to understand the role of microcredit in East Timor economy growth; Lastly, this study, also, intends to recommend to the government to develop microcredit institutions in East Timor.

The contributions of study 3 are: firstly, although there are available studies about the impact of microcredit on MSEs productivity in other countries, as far as we know, this is the first study about the impact of microcredit on the productivity of MSEs in East Timor that used primary and hand-collected data; and, secondly, this study also intends to understand the role of microcredit on Timorese MSEs productivity.

Lastly study 4 contributes are: firstly, although there are many studies about the impact of microcredit on poverty reduction in other countries, most of them addressed debt in general concept, access to finance, job creation, inflation rates, education, GDP per capita and Gini coefficient such as Otero and Rhyne (1994), Wahid (1994), Beck and Levine (2004), Wang (2004) and Yunus (2007) and there no studies about microcredit loan size on poverty reductions. As far as we know, this is the first study in this field to use the GMM system (1998). Secondly, this study intends to understand the role of microcredit on poverty reduction in those eleven developing Asian countries.

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Chapter 2- The Empirical evidence of Microcredit on East Timor MSEs – Analysis of questionnaire

Abstract

Microcredit plays an important role in Micro and Small Enterprises (MSEs) in developing countries, especially in East Timor. Thus, this chapter intends to conduct an empirical analysis of microcredit in the MSEs of East Timor, using descriptive analysis of the data. The study uses primary and unique data, extracted from questionnaires applied on Dili, from March to April 2018. The survey data covers 269 MSEs in Dili, East Timor and it is composed of 255 microenterprises and 14 small enterprises.

The main result is that microcredit allows for improvements on MSEs in Dili, East Timor. Thus, through the microcredit financing of the business, it is possible to boost job creation, increase micro savings, increase investment and increase the number of workers with education and skills in these MSEs.

Keywords: East Timor; Microcredit; MSEs.

2.1. Introduction

Micro, small and medium-sized enterprises (MSMEs) are regarded as an important engine that promotes economic growth. Small enterprises are characterized by three aspects, such as a) uncertainty associated with being a price taker; b) the Limited number of customers and base products; and c) uncertainty associated with a greater diversity of objectives, in relation to large enterprises (Obamuyi, 2011).

Kapila and Mead (2002) argued that access to financial and non-financial service should be made available to MSMEs so lead them to grow and expand their business. In East Timor, it is not easy for micro and small-sized enterprises (MSEs) to access credit from formal financial institutions. According to Quaye (2011) small and medium-sized enterprises (SMEs) cannot provide the collateral security required to cover the high cost demanded by formal institutions.

Like Bauchet and Morduch (2013) argue, microcredit can reduce poverty by creating self-employment in low-income communities.

Based on this, the government has recently transformed the Institute for Microfinance in Timor-Leste (IMFTL) into the National Commercial Bank of Timor-Leste (BNCTL).

The non-farm private sector is mostly made up of informal household activities and MSEs. Informal enterprises are almost exclusively household ventures, in which most workers are family members who are unpaid or paid in non-monetary forms. Almost all informal urban enterprises have 10 or fewer workers, and more than half have only a single worker (UNDP, 2012). Access to credit can provide business capital for MSEs to finance their operations. A loan obtained from microcredit will lead Timorese MSEs to grow and create jobs for themselves and others. Sievers and Vandenberg (2007) found that financial assistance and support to strengthen these small informal and formal businesses can lead to higher profits, wages and employment levels, which in turn can contribute to a bottom-up transition out of poverty for entrepreneurs and workers.

Schiffer and Weder (2001) show that small firms consistently report higher growth obstacles than medium-sized or large firms. According to BNCTL (2011), microenterprises can be risky borrowers because of their characteristics that are: small; informal; use traditional rather than modern technologies; managers are the factory owners; not having formal accounting; and, income (business and household) are not kept separate. Those characteristics also can harm their growth and will difficult for them to get loans from microcredit institutions. Moreover,

MSEs cannot improve their productivity, being stuck with their habits unable to perform changes.

East Timor is a new nation and is one of the poorest countries in the world. The poverty is one big obstacle facing by Timorese people, especially in Dili, East Timor, because the living cost in Dili is more expensive than the minimum wage in East Timor (115 $USD per month). The unemployment rate across the country increased by 4.4%[2] in 2014 (Index Mundi, 2016), with mostly the graduates among the jobless, because of the fewer job opportunities in East Timor. In this situation, microcredit plays an important role to provide loans to support Timorese MSEs, so they can create jobs for Timorese people and, also, allow for self-employment.

Mohammad Yunus was the pioneer of microcredit when he started the Grameen Bank in Bangladesh to help poor people to overcome the problem of poverty in their country (Yunus, 2007). Since then, microcredit has spread throughout the world, but in East Timor context microcredit has only emerged after Indonesia's independence. Timorese people were faced with difficult economic developments since 1999 that was, essentially, reversed in 2006 when the country faced yet another crisis and much of the economic structure was destroyed (Allden, 2009). Majority of microcredit activities are concentrated in Dili, Bobonaro and Covalima districts but IMFTL and credit unions provide their services in 13 districts in East Timor (Conroy, 2006). The micro-enterprises are dominant in our study and they used microcredit loans to start up small business-like roadside kiosks. Thu, Scott and Van Niel (2007) found that small business, even with market limitations, they contributed to reducing poverty in East Timor rural areas.

Studying East Timor, Conroy (2006) found that unregistered companies have difficult to obtain credit to develop and expand their business. Most East Timor enterprises are informal (due to government bureaucracy for the process of registering entrepreneurs, who must complete at least 10 procedures and wait 83 days to get their business license) (World Bank, 2016). Those finds are consistent with World Bank (2003), as cited by Thu et al (2007), where 81% of informal enterprises had limited access to finance in East Timor.

In this chapter, we analyze the impact of microcredit loans through the results of a questionnaire applied to the MSEs in Dili, East Timor. The questionnaire was randomly distributed to 269 MSEs taking a loan from Kaebauk, Moris Rasik and Tuba Rai Metin in Dili, East Timor, from March to April 2018, allowing us to obtain primary data about microcredit.

The results allow us to conclude that microcredit has an impact on the debt, employees, sales and total assets of MSEs, when analyzing the financial structure of MSEs before and after receiving the microcredit.

The chapter is organized as follows. After this introduction section, section 2.2. it presents the methodology and describes the data and variables. Section 2.3. analyses the results and Section 2.4. concludes.

2.2. Methodology, Data and Variables

The data collection methodology used in this study consisted of a hand-collected questionnaire. The questionnaires were applied to randomly chosen companies of the MSEs that received loans from Kaebauk, Moris Rasik and Tuba Rai Metin in Dili, East Timor, so the sample population was taken from Dili district in East Timor. The reason why we choose Dili is that this is the center of the business and economic growth in East Timor. In this research, data cover 269 MSEs (255 of microenterprises and 14 of small enterprises) in Dili, East Timor.

We developed our questionnaire based on the models developed by Mwewa (2013), Waliaula (2013), Maiyo (2016) and Sigey (2017). But we make some modifications and adjustments so that variables were in conformity with the condition of MSMEs in East Timor. The reliability and validity of the content were guaranteed making sure that each question in the questionnaire was legitimate and well-structured for easy understanding. In this study, we did not make pre-testing because we developed our questionnaire based on some authors who

[2] Only the percent of the labor force that is without jobs.

already did so to ensure reliability and because the application of the questionnaire was always performed by the author (thus ensuring any clarifications that were necessary, as well as the correct completion of the questions).

Thus, a questionnaire was developed as a means of data collection by a three-step process. Initially, the questionnaire was developed based on a review of literature related to the concepts of SMEs growth, its principles and determinants. In the second step, the questionnaire was developed in English and translated into Indonesia and Tetum (the national language). And the third step was the data collection in Dili, East Timor. For data collection, we distribute the questionnaire directly and personally to the selected SMEs, in Dili, East Timor. Data collection took place over two months, from March to April, from 2018. The answers of the questionnaires were analyzed using the STATA software. Data analysis relied on descriptive statistics. However, for each set of items within each dimension, a reliability analysis was carried out.

Table 2.1. presents the variables used in this study, along with their descriptions.

Table 2. 1 Variables and Descriptions

Variable	Description
Characteristics of the respondent:	
Dummy male	Dummy variable about the gender of the respondent, in which: 1 = male gender; 0 = female gender
Dummy position	Dummy variable about the position of the respondent at the company, in which: 1 = is the manager; 0 = is the owner
Characteristics of MSEs:	
Age	The number of years since MSE started the activity
Dummy sector tertiary	Dummy variable about the company sector of activity, in which: 1 = sector tertiary; 0 = secondary sector
Dummy service business	Dummy variable about the type of business of the company, in which: 1 = service business; 0 = manufacturing business; 0 = merchandising business
Dummy merchandising business	Dummy variable about the type of business of the company, in which: 1 = merchandising business; 0 = manufacturing business; 0 = service business
Dummy small	Dummy variable about the dimension of the company, in which: 1 = small; 0 = micro
Dummy 1-5 Employees	Dummy variable about the number of employees of the company, in which: 1 = 1-5 employees; 0 = 6-19 employees; 0 = more than 20
Dummy 6-19 Employees	Dummy variable about the number of employees of the company, in which: 0 = 1-5 employees; 1 = 6-19 employees; 0 = more than 20
Dummy Illiteracy	Dummy variable about the level education of workers, in which: 1 = Illiteracy; 0 = secondary; 0 = higher school
Dummy Secondary	Dummy variable about the level education of workers, in which: 1 = secondary; 0 = illiteracy; 0 = higher school
Human capital	Total number of educated and highly-skilled workers
Daily works hours	Daily working hours of MSEs' employees
Products/services produce per hours	Single Factor Productivity, in USD
The Financial structure before receiving MCLs:	
Total debt	Total debt of MSEs, in USD, before receiving microcredit from MFIs
Total Equity	Total equity of MSEs, in USD, before receiving microcredit from MFIs
Total employees	The number of employees of MSEs before receiving microcredit from MFIs
Sales	Average MSEs sales, in USD, before receiving IFM microcredit
Total assets	Total assets of MSEs, in USD, before receiving microcredit loan
The Financial structure after receiving MCLs:	
Total Debt After	Total debt of MSEs, in USD, after receiving microcredit from MFIs
Total Equity After	Total equity of MSEs, in USD, after receiving microcredit from MFIs
Amount of microcredit	The amount of microcredit loan, in USD, received by MSEs
Duration of microcredit	The microcredit loan duration

Variable	Description
Dummy loan dur 6m	Dummy variable about the duration of microcredit, in which: 1 = 6 months; 0 = 6-12 months; 0 = more than 1 year
Dummy loan dur 6 - 12m	Dummy variable about the duration of microcredit, in which: 1 = 6-12 months; 0 = 6 months; 0 = more than 1 year
Total employees after	Total employees of MSEs after receiving microcredit from MFIs
Sales after loan	Average MSEs sales, in USD, after receiving IFM microcredit
Total assets after	Total assets of MSEs, in USD, after receiving microcredit loan
Accessibility and utilization of microcredit by MSEs:	
Dummy loan US$ < 1,000	Dummy variable about the amount of microcredit, in which: 1 = US$ < 1,000; 0 = US$ 1,001-US$3,000; 0 = US$ 3,001-US$ 10,000
Dummy loan US$ 1,001-US$ 3,000	Dummy variable about the amount of microcredit, in which: 1 = US$ 1,001-US$3,000; 0 = US$ 3,001-US$ 10,000; 0 = US$ <1,000
Total Saving	Total saving, in USD, of MSEs
Gross profit	Average gross profit of MSEs, in USD
Net profit	Average of net profit of MSEs, in USD
Dummy Invt ICT	Dummy variable about the new investments that were made after receiving microcredit, in which: 1 = investment in ICT; 0 = investment in product; 0 = investment in process; 0 = investment in human resources
Dummy Invt Product	Dummy variable about the new investments that were made after receiving microcredit, in which: 1 = investment in product; 0 = investment in process; 0 = investment human resources; 0 = investment in ICT
Dummy Invt Process	Dummy variable about the new investments that were made after receiving microcredit, in which: 1 = investment in process; 0 = investment in human resources; 0 = investment in ICT; 0 = investment in product
Investment	Amount of investment done by MSEs, in USD, after receiving microcredit

Source: Developed by the authors

2.3. Results

2.3.1. Descriptive analysis

The questionnaire, as can be seen in Appendix 1, is divided into five parts. The first part, it is about basic information of respondent identification, second part is about basic information about the company, third part are questions about the financial structure of MSEs before receiving loans, fourth part are questions about the financial structure of the MSEs after receiving loans and, lastly, questions on the accessibility and use of microcredit by MSEs in East Timor.

Then, the descriptive analysis of the collected final sample is presented.

2.3.1.1. Characteristics of respondents

In this section we presented our results about the gender and position of respondents in MSEs in Dili, East Timor, as shown in table 2.2 and 2.3 below:

Table 2. 2 Gender of Respondents

Gender	Frequency	Percent
Male	**137**	**51**
Female	132	49
Total	269	100.00

Source: Primary data collected by the authors, 2018

Regarding gender, and according to the data obtained, it is observed that 51% of respondents are males, while 49% correspond to the female gender, as evidenced in table 2.2. These results suggest that males were dominant in the MSEs involved in this study, but we should mention that the difference between genders is quite low. This situation can be attributed by the policy

of the MFI for empowering both men as women economically. This causes microcredit institutions to improve the capacities of income-generating activities among micro-entrepreneurs and provide sustainable livelihoods to the owners of MSEs.

Table 2. 3 Position in the MSEs

Position	**Frequency**	**Percent**
Owner	**253**	**94.05**
Manager	16	5.95
Total	269	100.00

Source: Primary data collected by the authors, 2018

From table 2.3., it is observed that most respondents were company owners (94.05%), while 5.95% were only managers. This result shows that there were more owners involved in our sample than only managers.

2.3.1.2. Characteristics of MSEs

In this section we present our results on the characteristics of MSEs, as shown in table 2.4 below:

Table 2. 4 Characteristics of MSEs

Variables	**Mean**	**Median**	**Mode**
Age	4.7 years old	3	2
Dummy sector tertiary	93%	1	1
Dummy service business	7%	0	0
Dummy merchandising business	88%	1	1
Dummy Small	5%	0	0
Dummy 1-5 Employees	95%	1	1
Dummy 6-19 employees	5%	0	0
Dummy Illiteracy	41%	0	0
Dummy Secondary	58%	1	1
Human capital	1.52	1	0
Daily works hours	9.85 hours	10	8
Products/services produce per hours	81.46 US$	5	0

Source: Primary data collected by the authors, 2018

Young SMEs grow substantially faster, on average, then their older counterparts. Studies in Africa and Latin America show that younger MSEs are more likely to show high rates of growth compared to the MSEs that have existed for the longest time (Mead and Liedholm, 1998; Parker, Riopelle and Steel, 1995). The results of table 2.4 show that the average age of MSEs, in our sample, is 4.7 years of activity. It is therefore concluded that the majority of MSEs in the sample are in young ages.

There are three main types of sectors in which MSEs operate. These sectors form a production chain that provides customers with finished products and/or services that they need. In our sample, and in accordance with table 2.4, most MSEs operate in the tertiary sector (93%), followed by the secondary sector (7%), and none of them work in the primary sector. From our results, we conclude that the dominant sector in MSEs, in Dili East Timor, is the tertiary sector.

Based on the results of table 2.4, the type of business that dominates MSEs, in Dili East Timor, is the merchandising business (88%), the service business represents 7% and manufacturing companies account for only 5%.

In our sample, the percentage of MSEs that have between one and five employees is 95%, with six to nineteen employees is 5%, and none have more than twenty employees. This result

is in agreement with Conroy's (2006), which states that in East Timor micro-enterprises would be defined as those with 1 to 5 workers. We conclude that microenterprise is dominant in this study, representing 95% of the sample.

Education is itself a basic need and equality of access to educational services, particularly in rural areas, is, therefore, an important ingredient of a basic needs' strategy (ILO, 1977). Bigsten, Kebede, Shimeles and Taddesse (2003) concluded that the educational achievement of the head of the family is one of the most important factors associated with a lower level of poverty. The results revealed that, for the sample, 58% of the workers have secondary education, 41% is illiterate and 1% has higher education. The distribution of the education levels among respondents is summarized in table 2.4. These results show that the level of education with the most expression in this sample is secondary. This result is in agreement with the study carried out by Geda, de Jong, Mwabu and Kimenyi (2001) and Oiro, Mwabu and Manda (2004), in which it is said that the level of poverty reduces as the level of education increases, in the case of Kenya. Noor (1980), Cochrane, OHara, and Leslie (1980) and Jeffery and Basu (1996), also described the indirect effect of education on poverty through the fulfillment of basic necessities, as well as their effects on women's behavior in decisions related to fertility, family well-being, and health, among others.

ILO standards on working time, provide the framework for regular working hours, daily and weekly rest periods, and annual holidays. Most countries have statutory limits of weekly working hours of 48 hours or less, and East Timor also adopted the ILO's working time standards. The results of this sample show that: in 44.98% of SMEs workers work 8 hours a day; in 27.51% of SMEs employees work 10 hours a day; in 23.79% of SMEs workers work 12 hours a day; and, in 3.72% of SMEs employees work more than 12 hours a day. Based on these results, an average of 9.85 hours of work was observed. In fact, most workers have excessive hours, with insufficient rest and recovery periods, which can impair their health and increase the risk of accidents at work. In many parts of the world, there is still a significant relationship between low wages and excessive working time. Long working hours prevent workers from resting properly, as well as making it impossible for them to meet family responsibilities and to participate in the community (ILO, 1919). And this is also having a negative effect on MSEs's growth in East Timor.

Finally, through table 2.4, it is observed that, on average, the workers of the MSEs in the sample produce products and/or services, per hour, in the value of 81.46 US$.

2.3.2. The financial structure of MSEs before and after receiving microcredit

In this section, we present the results related to the financial structure of MSEs, in the sample, before and after receiving the financing via microcredit of the MFI. So, note the average values in table 2.5:

Table 2. 5 Financial structure of MSEs Before and After Receiving microcredit

	Mean	
Variable	**Financial structure before received MCL**	**Financial structure after received MCL**
Total debt	US$ 1,381.6	US$ 2,701.04***
Total Equity	US$ 2,442.96	US$ 2,671.93
Total employees	1.55	2.08***
Sales	US$ 523.81	US$ 772.38***
Total Assets	US$ 3,824.56	US$ 8,121.78***
Amount of microcredit	-	US$ 2,779.81
Duration of microcredit	-	15.87 months

	Mean	
Variable	Financial structure before received MCL	Financial structure after received MCL
Dummy 6 Months	-	29%
Dummy 6 - 12 months	-	71%

Source: Primary data collected by the authors, 2018

Note: The second column shows the results of the differences for means tests. The levels of significance are: *** 1%; ** 5%; * 10%.

Consider the values listed in the first column of table 2.5, which relate to information about MSEs before receiving microcredit. Thus, before the receipt of microcredit, the MSEs already had in their capital structure an average value of 1,381.60 US$ of debt. These results show that MSEs in Dili, East Timor, in our sample, already had debts from other sources of funding. So, MSEs already had an obligation to pay these debts. Our result in table 2.5 shows that the average of the total equity of MSEs, before received microcredit loans, is 2442.96 US$. The results show that the MSEs, in Dili, East Timor, had capital of their own to manage their business. It is observed that the capital structure of the MSEs, before microcredit financing, had a higher percentage of equity (63.9%) than debt (36.1%). On average, the MSEs have 1.55 employees. The average of sales of MSEs, before receiving microcredit loan, is 523.82 US$ and the total assets, on average, are 3,824.56 US$. We observed that the sales of goods and services of MSEs, before obtaining microcredit loans from MFIs, was less than 1,000 US$.

Consider, now, the values listed in the second column of table 2.5, which relate to information about MSEs after receiving microcredit. In general, it is observed that the average values, for all variables, are higher. It is possible to see that the average of the total debt of MSEs, after receipt of microcredit, is 2,701.04 US$. This result shows that the MSEs, in Dili, East Timor in the sample, increased their debt by an average value of 1,319.44 US $ (95.50%) compared to their average debt before receiving microcredit from MFI. In this way, the obligation to repay the debt, for these MSEs, has also increased. The average value of equity also increased by presenting an average value of 2,671.93 US $, but this increase is lower than the registered increase in debt, being 228.97 US $ (9.37%). The average of the MSEs workers, after receipt the microcredit, is 2.08 employees. We conclude that MSEs increased the number of employees, after receiving microcredit loan from MFIs, in 34.2%. The average sales of MSEs, after receiving microcredit loan, is 772.38 US$, which also registered an increase in the order of 248.57 US$ (47.45%). Finally, the average value of total assets, after receiving microcredit, is 8,121.78 US$, registering an increase of 4,298.22 US $ (112.4%).

From the general results, it can be concluded that microcredit had an impact on MSEs. In fact, we ran the test of the difference to the means and it was observed that there was a statistically significant difference, at 1%, in the averages of all variables, except in the case of total equity.

With regard to microcredit loan, it is possible to see that, on average, the MSEs of the sample, had received from the MFIs 2,779.81 US$. The average duration of the loan is 15.87 months, with 29% of them lasting less than 6 months and 71% with durations between 6 to 12 months. The specificities of microcredit were evidenced here, as written in the literature.

Let's observe table 2.6 with information related to microcredit and utilization, given by MSEs, to the values obtained with the microcredit.

Table 2. 6 Accessibility and Utilization of Microcredit by MSEs:

Variable	Mean
Dummy US$ <1,000	51%
Dummy US$ 1,001-US$3,000	28%

Variable	Mean
Dummy US$ 3,001-US$ 10,000	18%
Total Saving	US$ 866.50
Gross profit	US$ 834.53
Net profit	US$ 546.25
Dummy ICT	9%
Dummy Product	52%
Dummy Process	9%
Investment	US$ 756.12

Source: Primary data collected by the authors, 2018

The results show that 51% of the microcredit loans obtained are less than 1,000.00 US$, 28% are between 1,001.00 US$ and 3,000.00 US$, 18% are between 3,001.00 US$ and 10,000.00 US$, and 3% are above the 10,001.00 US $. We conclude that, in this sample, microcredit loans obtained by MSEs are microloans, because the majority is less than 1,000.00 US$. From the results in table 2.6 above, it is possible to see that MSEs in this sample are starting to save money on MFIs, being the average of micro-savings 866.50 US$, less than 1,000.00 US$. The results in table 2.6 show that the average gross profit of MSEs was less than 1,000.00 US$, 834,53 US$, and the average net income was 546.25 US$. Finally, the average investment made, after receiving the microcredit loan, was of 756.12 US$, and the majority was distributed for the investment in products (52%), 30% in human resources and the average of ICT and processes was about 9%.

2.4. Conclusion

The aim of this chapter was to analyze the impact of microcredit loans through the results of a questionnaire applied to the MSEs in Dili, East Timor. The questionnaire was personally applied to 269 MSEs, randomly selected from the MSEs that obtained microcredit from Kaebauk, Moris Rasik and Tuba Rai Metin in Dili, East Timor, from March to April 2018.

With this data collection instrument, it was possible to bring together a single primary database for Timorese MSEs. In view of the enormous difficulty in obtaining this type of data for a developing country like East Timor, the information resulting from the analysis of the data obtained is valuable.

In the sample, both the male and female gender presented approximately the same percentage in East Timor's MSEs and this situation can be attributed to the policy of these MFIs to empower both men and women economically. The average age of the East Timor MSEs, of the sample, was less than 4 years of age and has, for the most part, fewer than 5 workers. Thus, from the sample, it was possible to observe that most MSEs are micro-sized and manage their business in merchandising, especially in the tertiary sector.

Education is an important factor in the growth of MSEs, but our findings show that the level of education of most MSEs employees in our study has a secondary school. The daily working hours of MSEs employees are more than 8 hours per day and MSEs employees' produce, per hour, product or services worth 81.46 USD.

We concluded that microcredit had an impact on the debt, employees, sales and total assets of MSEs, when we analyzed the financial structure of MSEs before and after receiving the microcredit. Our findings in this study are that microcredit has enabled the increase in total assets (138%), employees (32%) and sales (162%) of East Timor MSEs. It has also enabled MSEs to make micro-savings and investments (mostly in products and human resources).

Many developing countries, especially as East Timor, still have needs for improvements in microcredit and financial sector development that contributes to economic growth and thus to

the growth and productivity of MSEs. MSEs can seek funding to create or expand their business through loans obtained from microcredit institutions.

This study is not free of limitations. The use of primary data is valuable in terms of empirical studies, however, in the case of the type of questionnaire applied and in the face of the population, it was only possible to request information for one year. Also, the final number of firms (269) in the sample may be considered limited. So, for further investigations we suggest the collection of information for more years and companies, continuing this way the objective of analyzing the impact of microcredit loans on the MSEs in Dili, East Timor.

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Chapter 3- The Impact of Microcredit on the growth of Micro and Small Enterprises in East Timor

Abstract

Microcredit has an important role in the growth of the Micro and Small Enterprises (MSEs) in developing countries, especially East Timor. So, this chapter will examine the impact of microcredit on MSEs growth in Dili, East Timor, controlling for MSE age and size, micro saving and also for the firm's activity sector, firm's investment type and the gender of the owner/manager of the firm.

The study uses a unique primary data, extracted from questionnaires, from 269 MSEs in Dili, East Timor. To which a multiple linear regression was applied.

The main result is that microcredit has a positive impact on the growth of MSEs in Dili, East Timor. Also, the results confirmed that age and size have a negative impact on growth; and that, in the case of East Timor, MSEs belonging to the tertiary sector have a greater chance of growth.

Keywords: age, East Timor, employment levels, growth, microcredit, micro savings, ROA and size.

3.1. Introduction

As we know microcredit has an important role in the growth of the Micro and Small Enterprises (MSEs) in East Timor. The study by Cooper (2012) on the impact of microfinance services on the growth of SMEs in Kenya, found a strong positive relationship between microfinance services and the growth of SMEs. One of the greatest obstacles to developing and expanding a business, in Timor-Leste, is access to credit. But, how does microcredit affect the growth of East Timor's Micro and Small Enterprises? There is not much microfinance to support smaller enterprises. In response, the government has recently transformed the IMFTL into the Banco Nacional de Comércio de East Timor (BNCTL). But why do MSEs have limited access to loans from the microfinance institution in East Timor? Due to high-interest rates, they remain a barrier to access to finance for small businesses. In East Timor, many SMEs had an annual turnover of less than 1,000 USD and a high volume of SMEs started their business with less than a hundred U.S. dollars. Timorese SMEs have limited access to the formal financial sector due to the requirements and the fact that most banks are only available to give credit to larger companies (Conroy, 2006). In fact, the existence of microcredit institutions in Timor-Leste provides credit to most micro, small and medium enterprises (MSMEs) and plays an important role in the growth of these MSMEs.

According to Robinson (1998), microfinance is one instrument to provide micro financial services and products (loans, savings, leasing, insurance, and money transfer) to help poor people to expand or establish their SMEs. How should the status of microfinance be understood today as a pillar of the provision of financial services and products to SMEs? In 2004, the Microfinance Association of East Timor (AMFITIL) reported that the institutions reached 26,600 depositors and 19,200 borrowers and MFIs (excluding the Microfinance Institution of East Timor (IMFTL)) were dealing with more than 20% of poor households (Conroy, 2006). Sustainability is a major problem for Timorese MFIs, who consider capacity-building as a particular need. In addition, the military crisis in 2006 affected the MFIs activities and 13 microcredit institutions closed operations. Only a few microcredit institutions have survived and continue to operate, such as: Kaebauk; Moris Rasik; and, Tuba Rai Metin. All over the world, MFIs have demonstrated their willingness to grant credit to the poor and accept micro savings, while in the case of East Timor, IMFTL has had difficulty conceding credit to the poor, but have legal permission to accept micro savings.

Most of the studies on growth were carried out on the basis of the proportional effects law or the Gibrat law and the companies were classified into three categories: small, medium and large. In this chapter, we focus on the growth of the MSEs fo Dili, East Timor.

Timor-Leste's economy is classified as low-income, compared to other Asian countries (World Bank, 2016). A mapping exercise, conducted by the Ministry of Economics and Development, showed that, throughout the country, the main industries existing in East Timor are: printing; soap manufacturing; handicrafts; and, service-oriented businesses and woven cloth. The majority of micro and small enterprises business sector is non-farm (Conroy, 2006). Most urban enterprises operate in an informal environment, while in the farm and non-farm sectors, the household is the basic unit of economic activity. MFIs play an important role in economic growth by providing loans to MSMEs in developing countries such as East Timor. MSMEs will provide jobs and income for poor people when they have access to financial services. The average number of employees of MSMEs in East Timor are less than 5 workers (Conroy, 2006). Retail and wholesale trade, in East Timor, contributed to 3.70% of jobs and $US 0.9 million in income to the Timorese (DGSTL, 2016). The MSMEs continue to play an important role in the economy of this country.

Studies on the impact of microcredit on SME growth have been carried out in other countries around the world (for instance Cooper (2012), La Rocca, La Rocca and Cariola (2009) and Storey (1994)). We have to say that there is limited access to micro-level data on East Timor MSMEs. This study is the first in the case of East Timor, according to the best knowledge of the authors, and uses unique primary data collected by questionnaire. The aim of this study is to determine the impact of the microcredit on the growth of micro and small enterprises in East Timor, controlling for the impact of age, size, micro saving and, also, for the firm sector of activity, the kind of investment made after received microcredit and the gender of the owner/manager. It is intended to know whether loans to MSEs, on the form of microcredit, have a significant impact on the growth of MSEs in the district of Dili, Timor-Leste, being the growth measured by the level of employment and return on assets.

By this way, we also intend to prove the impact of microcredit on increasing the income of the MSE's and improving the level of living of a society, encouraging economic growth, having roles in achieving national stability in this nation.

To achieve this objective, a sample was formed based on unique primary data extracted from questionnaires applied in Dili from March to April 2018, and multiple linear regression models were used.

This study makes a particular contribution to the literature on microcredit impact on MSEs from developing countries (particular, to East Timor case) by showing that the microcredit has a positive impact on MSEs growth, and also contributes to deepening knowledge about microfinance in general. Specifically, the results confirmed that age and size have a negative and statistically significant impact on growth; it has, also, been demonstrated that, in the case of East Timor, MSEs belonging to the tertiary sector have a greater chance of growth.

The chapter is organized as it follows. After this introduction section, section 2 presents the Literature Review. Section 3 presents the methodology and describes the data. Section 4 discusses the empirical results and Section 5 concludes.

3.2. Literature Review

In this section, we present the basic literature review of the chapter. Thus, it begins with the definition of microcredit, followed by the definition of SME (the general definition and adapted to developing countries) and concluded with the exposition of the main determinants of the growth of SMEs.

3.2.1. Definition of Microcredit

Microcredit provides low-value loans for the poor; the direct benefits consist of creating jobs and income for themselves and their families (Srinivas (1997) and Grameen Bank (2001)). The objective of microcredit is to motivate women to develop their low-income micro-enterprises with no loan's collateral. In other words, the existence of microcredit can help poor people improve their living standards.

Small financial services and products (loans, savings, leasing, insurance and money transfer) are provided by microcredit institutions to help poor people to expand or establish their SMEs (Robinson (1998) and Conroy (2002)). The MFIs is mostly used in developing economies where SMEs have limited access to formal financial institutions. Moreover, the term microfinance can also be defined as the provision of financial services to low-income clients, including the self-employed. Financial services generally include savings and credit; however, some finance organizations also provide insurance and payments services. MFIs have a role of financial intermediation, but also of social intermediation services (group training, development of self-confidence, and training in financial literacy and management capabilities) among its clients (Ledgerwood, 1999). Maria (2004) pointed out that the concept of microcredit is associated with the lender (give credit) and that the concept of microenterprise is associated with the debtor (receiving credit).

The concept of microfinance arose from the need to provide loans to low-income wage earners who were left by formal financial institutions. The practice of microcredit goes back to 1700 and can be traced in the Irish Loan Fund System, which provided small loans without guarantees to the rural poor (Maengwe and Otuya, 2016). Over the years, the concept of microfinance has spread to Latin America, then to Asia and later to Africa. Muhammad Yunus is the micro-financing pioneer when he founded the Grameen Bank in Bangladesh, in the 1970s, to provided loans to poor people to overcome the poverty in that country (Yunus (2007) and Abu (1994)).

The characteristics of microfinance are short-term loans (less than 12 months) and regular working capital with weekly or monthly repayments. MFI also facilitated the way their clients get loans.

Khan (2008) underlined that the requirement for traditional lenders is physical collateral (property), wherein microcredit case it is replaced by the system of collective guarantee from responsible mutual members for ensuring that their loans are repaid.

3.2.2. Definition of Small and Medium Enterprises

In both developing and developed countries, the vast majority of firms are SMEs. For example, approximately 97% of firms in Mexico and Thailand are SMEs (Kantis, 2004 and Simmons, 2004). In the United States, over 96% of businesses similarly have fewer than 50 employees (Nichter and Goldmark, 2009).

SMEs generate substantial employment and economic output in many countries. Its overall employment quota tends to be higher in developing countries, which are typically more focused on small-scale production (Tybout, 2000). Studies conducted in five African countries (Botswana, Kenya, Malawi, Swaziland and Zimbabwe) have found that their SMEs generate almost twice the level of employment that large enterprises registered and the public sector (Mead and Liedholm, 1998). In many Latin American countries, micro and small enterprises employ over half the working population. A study done by the ILO (2003), in Latin American countries, found that firms with fewer than 5 workers had provided 58% of total employment in Paraguay, 54% in Mexico and 53% in Bolivia.

According to the European Union, it is possible to classify companies into three different categories of dimension. Firstly, micro-enterprise is the one with fewer than 10 employees and an annual turnover (total annual balance sheet) less than 2 million euros. Secondly, the small enterprise is defined as a firm with fewer than 50 employees and an annual turnover (total balance sheet) less than 10 million euros. Lastly, the medium enterprise is a firm with less than

250 employees and an annual turnover of less than 50 million euros and annual balance sheet total less than 43 million euros (European Commission, 2015).

This definition, as we know, is of international scope and allows the comparison between studies in several countries. However, when we are examining the case of developing countries the use of this definition becomes difficult if not impossible.

In the case of developing countries, it is normal to use the classification that the World Bank uses, in which the size of the company is only determined by the number of workers. Thus, firms with 5 to 19 employees, are classified as small; with 20 to 99 employees, they are classified as medium-sized; and, firms with 100 or more employees, are classified as large.

For the specific case of micro-enterprises, and in East Timor, micro-enterprises are defined as those with 1 and 5 workers (Conroy, 2006).

3.2.3. Determinants of SMEs Growth

3.2.3.1. Microcredit Loan Size

Microcredit institutions played an important role in the growth of SMEs whose access to formal financial institutions (FFIS) is limited. The definition of loan size, in the financial dictionary, is the amount the borrower promises to reimburse, as set out in the loan agreement. Microcredit has two types of loan models: individual loans; and, group loans. Most microcredit institutions provide group loans. In both developed and emerging economies, small businesses are recognized as the main source of job creation, more than large companies and government administrations. For this reason, small business loans are particularly important for BNCTL, in East Timor, in line with its mission of supporting job creation and contributing to poverty reduction. Cooper (2012) concluded that microfinance services have a strong positive impact on SMEs growth in Kenya.

According to the Operations Manual (BNCTL, 2011), small business loans are aimed at "micro-entrepreneurs to support the acquisition of raw materials, increase inventory and pay for workers' expenses". In other words, the smallest business loans are intended for the purpose of acquiring working capital, although these loans can also be used to finance the purchase of equipment (however, in the case of the latter situation in a very difficult way in relation to the size of the loan value, its allocation selectively and the maximum duration of 36 months (3 years)).

The maximum value of the loan is adapted to the company's scale (and its annual sales) and depends on the calculation of the financing limit made by BNCTL. If his/her business is improving and increasing, which can be seen from the increase of the book value and sales turnover, then the loan provided to the debtor in question is increased, or adjusted, from a small company to a medium company (BNCTL, 2011). According to BNCTL (2011), the micro-enterprises can be risky borrowers, for the following reasons:

- They are typically small, between one and ten employees;
- They are informal, which means they are not registered or licensed, and do not pay taxes;
- They use traditional, rather than modern technologies;
- They are factory-owners;
- They maintain no formal accounting;
- Business and household incomes are not kept separate.

According to Fazzari, Hubbard and Petersen (1988), due to market imperfections, SMEs face difficulties in obtaining external financing, and their growth is especially dependent on internal funding. Baker and Nelson (2005) and George (2005) concluded that, when resorting to debt, SMEs tend to manage their financial resources efficiently, given the need to pay off the debt, and its charges, over a certain period. The possibility for SMEs to effectively manage their

financial resources, particularly when debt is incurred, may mean that debt has a positive effect on SME growth (Ebiringa, 2011).

Young SMEs are more likely to go bankrupt than older SMEs (Ang, 1992; Müller and Zimmermann, 2009) and are also more capable to altering the composition of their assets (Pettit and Singer, 1985) and thus creditors make it particularly difficult for this type of firm to access credit, compared to older SMEs. The greater difficulty to obtain credit, and consequently greater difficulty to managing financial resources, is associated to a greater probability of bankruptcy, this may contribute to help young SMEs achieving particularly efficient use of financial resources. Thus, debt is especially relevant for the growth of young SMEs, compared to what can happen to older SMEs.

In particular, Storey (1994) suggests that firms' growth is affected by the availability and costs of financing. The availability of funding to invest is vital to the sustainability and viability of SMEs (La Rocca et al, 2009). Its growth, considering start-ups and existing companies, depends significantly on access to external financing. Berger and Udell (1998) stressed that small firms had a lack of information, and incentive problems, which limited their ability to obtain external funding. Carpenter and Petersen (2002) and Wagenvoort (2003) show that the source of funding has an impact on SMEs. Therefore, SME growth is, also, affected by capital structure decisions (Gregory, Rutherford, Oswald and Gardiner, 2005).

Hoque (2008) reported that several studies have been done and revealed that microcredit improves the ability to cope with economic difficulties because there is a positive influence on the well-being of borrowers. Despite the positive impacts of microcredit, there are arguments against. The microcredit does not create assets for the poor and the very poor borrowers but increases income to meet daily expenditure. For some, it reduces assets due to the repayment obligation of the loan, because some of the borrowers are obliged to sell assets to be able to pay the loan. Beccheti and Trovato (2002), in a study on the Italian manufacturing industry, argue about the influence of external financing on the firm's growth. The results demonstrated that the growth of SMEs depends on access to funding. Studying debt in general and not microcredit, Serrasqueiro and Nunes (2008) found a negative relationship between growth and debt.

Based on the arguments above, the following hypothesis is formulated:

H1: The Microcredit loan size has a positive impact on the growth of MSEs in Dili East Timor.

Control Variables

3.2.3.2. Age

The relationship between firms age and the small firm's growth in developing countries is particularly robust. Young SMEs grow substantially faster, on average than their older counterparts. Studies in both Africa and Latin America show that young MSEs are more likely to show high rates of growth, compared with SMEs that have been in existence longer (Mead and Liedholm, 1998; Parker, Riopelle and Steel, 1995). A study by the Inter-American Development Bank (IDB) reveals that the largest expansion of dynamic enterprises occurs during their third year of activity (Nichter and Goldmark, 2005), and other studies suggest that the average growth rate of firms decreases with age (Evans, 1987; Dunne, Roberts and Samuelson, 1989).

Serrasqueiro, Nunes, Leitão and Armada (2010) in their study, investigated the possible non-linearity between the growth of Portuguese SMEs and their determinant factors by using the quantile regressions, for the period of 1999 to 2005. They accepted Gibrat's Law for lower levels of growth distribution and rejected Gibrat's Law for the upper level of growth distribution. This means that there were significant non-linearities between SME growth and their determinants. Related to the relationship between age and SME growth over their life-cycle, Lotti, Santarelli and Vivarelli (2009) find a negative and statistically significant relationship between age and

growth in Italian SMEs at the start of their life-cycle, and that the relationship is statistically insignificant when SMEs reach later stages of their life-cycle.

Gonçalves (2010) found that age is a determinant of SME growth. The result also shows that age is negatively related to the growth of young SMEs, but it is not relevant to explaining the growth of older SMEs. Liedholm (2002) found a statistically significant and negative impact, indicating a strong inverse relationship between the company's age and growth. Thus, they are the youngest companies that are more likely to generate more jobs per firm.

Based on the arguments above, we formulate the following hypothesis:

H2: The age of MSEs has a negative impact on the growth of MSEs in Dili East Timor.

3.2.3.3. Size

Davidsson, Kirchhoff, Hatemi-j and Gustavsson (2002) examined the Australian, U.S., Scottish and German economies and explained that location, size, legal form, age, and industry, affect SME growth. Their study focused on the ability of SMEs' manufacturing and the impact of industrial sector differences, among other demographic factors. This study shows that the factors contributing to SME growth are the start-up size, type of ownership, legal form, age, and industrial sector. The main growth factors, in every industry, are age, size, type of industrial sector and own independence.

Mac Bhaird and Lucey (2010) examined the determinants of the capital structure of Irish SMEs, with a sample of 299 SMEs collected through questionnaires and interviews with owners and managers. The findings showed that size, level of activity and provisions of collateral are very significant in the capital structure of different Irish SMEs. Park, Shin and Kim (2010) highlighted the role of the size of SMEs, and industrial networking, in determining SME growth. They analyzed Korean SMEs from different sectors, between 1994 and 2003, and found that size has a negative impact on SMEs growth. These findings were supported by Gonçalves (2010) in his study, which found that size was negatively related to the growth of young SMEs, but it was not relevant to explain the growth of older SMEs.

Evans (1987), including small firms in the sample, concluded that growth rates tend to be negatively related to the size of (surviving) firms. The results showed that the company's growth decreases with the size of the company in 89 of the 100 industries in the manufacturing sector analyzed. Becchetti and Trovato (2002) found the same negative relationship between growth and size, concluding that smaller firms grow faster than larger firms. From the empirical evidence (balance sheet analysis) they found a negative correlation between the size of the firm and the growth (Gjini, 2014). Hall (1986) found a negative relationship between size and growth for the smallest and the largest firms in their sample. This means that Gibrat's Law failed, or in other words, the firm's growth is decreasing with size. Those results are supported by Chen, Babb and Schrader (1985), Kumar (1985) and Hermelo and Vassolo (2007). According to the results of this research, there are other factors more important than the size of the firm to determine the growth of the firms.

Based on the arguments above, we formulate the following hypothesis:

H3: The size of MSEs has a negative impact on the growth of MSEs in Dili East Timor.

3.2.3.4. Micro Savings

As we know from the economy, and from the point of view of an individual, savings consist of saving part of the amount of their income or wages and can later be used as a complement to retirement. For people with knowledge in financial, the money that remains after personal expenses is considered positive, but for those who rely on credit, or loans, it will be difficult to have extra money to save. Savings have a positive impact on companies, helping them meet their goals in the future (purchase of new equipment or vehicles), as well as increase their income.

Microfinance institutions offered micro-savings alternatives to low-income families, small business groups and individuals, as a way to motivate them to save their money for future needs. Micro-savings accounts are similar to a normal savings account but are designed to accumulate and save more reduced amounts of money. The minimum balance requirement does not exist or is greatly reduced, with a view to allowing savers to save a small amount of money, and the service is not charged. In our opinion, micro-savings are tools for better financial planning, allowing a small income to potentially increase over time, for example by allowing accumulated savings to be spent on expanding or business sustainability (covering eventual seasonal deficiencies). Micro-savings should enable those enterprises, with a variable income, to improve their financial planning. For example, saving money for annual farming costs such as seed and fertilizer (Karlan, Ratan and Zinman, 2014).

No study was found on this subject, so it will be tried to formulate the hypothesis about the relationship between micro-savings and MSEs growth. We assume that if micro-savings is increasing then the growth of MSEs will increase too.

Based on this argument, the following hypothesis is formulated:

H4: The micro-savings has a positive impact on the growth of MSEs in Dili East Timor.

3.3. Methodology

3.3.1. Research Design and Data Collection Instruments

The study uses a unique primary data extracted from questionnaires applied in Dili from March to April 2018. This study will focus on the impact of microcredit on the growth of MSEs (measured by employment levels and Return on Assets) in Dili, East Timor, controlling the age and size of MSEs, micro-savings and also for the business sector of enterprises, the type of investment made by the company after receiving microcredit and the gender of the company owner/manager.

The data collection methodology used in this study consisted of a hand-collected questionnaire. The questionnaires were applied to randomly chosen companies of the MSEs that received loans from Kaebauk, Moris Rasik and Tuba Rai Metin in Dili, East Timor, so the sample population was taken from Dili district in East Timor. The reason why we choose Dili is that this is the center of the business and economic growth in East Timor. In this research, data cover 269 MSEs (255 of microenterprises and 14 of small enterprises) in Dili, East Timor.

We developed our questionnaire based on the models developed by Mwewa (2013), Waliaula (2013), Maiyo (2016) and Sigey (2017). But we make some modifications and adjustments so that variables were in conformity with the condition of MSMEs in East Timor. The reliability and validity of the content were guaranteed making sure that each question in the questionnaire was legitimate and well-structured for easy understanding. In this study, we did not make pre-testing because we developed our questionnaire based on some authors who already did so to ensure reliability and because the application of the questionnaire was always performed by the author (thus ensuring any clarifications that were necessary, as well as the correct completion of the questions).

Thus, a questionnaire was developed as a means of data collection by a three-step process. Initially, the questionnaire was developed based on a review of literature related to the concepts of SMEs growth, its principles and determinants. In the second step, the questionnaire was developed in English and translated into Indonesia and Tetum (the national language). And the third step was the data collection in Dili, East Timor. For data collection, we distribute the questionnaire directly and personally to the selected MSEs, in Dili, East Timor.

3.3.2. Variables

To measure the growth of SMEs, different indicators are used. This study will focus on the increase in the employment levels and Return on assets, as a measure of the growth of SMEs.

Firstly, data on the number of employees are generally easier to collect, since they important to the government. Mead and Liedholm (1998) concluded, in their analysis that younger SMEs tend to have higher growth rates, compared to those that had existed for a longer period, in Dominican Republic, Botswana, Kenya, Malawi, Swaziland, and Zimbabwe. Similar results were reported in the Dominican Republic and Kenya. The change in the number of workers, from start-up, will be one of the MSEs growth measures used in this study (USAID and CEU Labor Project, 2002). This variable is easier for respondents to remember and does not need to be deflated. Moreover, Liedholm and Mead (1999) and Voulgaris, Asteriou and Agiomirgianakis (2003) underlined that job creation is one important factor in small enterprises growth. Koech (2011) stressed that employment growth is a better measure of the performance of new and small enterprises than accounting-based measures such as profits, return on investment or market share.

Finally, asset growth is another growth measure that has been considered but measuring growth in terms of assets can be difficult because it is an accounting measure. Bowen, Morara and Mureithi (2009) reported that SMEs in Kenya face challenges of insecurity, competition between themselves and large companies, due to lack of access to credit and debt collection. The Return on assets was calculated as the annual net profit in the percentage of total assets, or the net profit divided by the total average assets:

$$Return\ on\ Assets(ROA) = \frac{Net\ Profit}{Total\ Assets} \times 100\% \qquad (3.1)$$

Thus, the **dependent variables,** which are considered as the growth of MSEs, are:

1) **Level of Employment** (*Growth1*), which is measured by the growth of employees after receiving the microcredit loan. It followed the work of Koech (2011) which revealed that a performance indicator is the creation of jobs by SMEs. It was also followed by USAID and CEU Labor Project (2002), which argued that a standard growth measure, used in studies on SMEs, is the change in the number of workers from the start of the company. To the final variable was applied the logarithm.
2) **Return on assets** (*Growth2*), that will be measured as we presented in equation number 3.1, after receiving the microcredit loan.

And the **independent variables**, we considered were:

1) **SMEs age** (*Age*), which will be measured by the number of years since company began its activity. Gonçalves (2010), who used the number of years since the company started the activity. On the other hand, Serrasqueiro et al (2010) used as a proxy for the age of the company, the logarithm of the number of years that the company has since its constitution. We will use the measured variable in both ways: without and with Logarithm.
2) **SMEs size** (*Size*), is measured by logarithm the number of employees and by the total of assets (*Size1*).
3) **Microcredit loan size** (*MCLs*), is measured by the amount of loan that the MSEs received from MFI's. Which was then applied the logarithm.
4) **Micro-savings** (*MS*), is measured by the total savings, made in US dollars, by MSEs. Which was then applied the logarithm.
5) **Dummytertiary** (*Dummytertiary*), a dummy variable that measures the sector of business, where 1 = sector tertiary and 0 = sector secondary[3].

[3] It should be pointed out that none of the companies that responded to the questionnaire belonged to the primary sector and so it was decided not to put this.

6) **Dummyproduct** (*Dummyproduct*), a dummy variable that measures the investment made with the received money from microcredit loan, if done, where 1 = investment in product, 0 in another type of investment.

7) ***Dummyprocess*** (*Dummyprocess*)***,*** a dummy variable that measures the investment made with the received money from microcredit loan, if done, where 1 = investment in process, 0 in another type of investment.

8) ***DummyICT*** *(DummyICT)*, a dummy variable that measures the investment made with the received money from microcredit loan, if done, where 1 = investment in ICT, 0 in another type of investment.

9) ***Dummymale*** (*Dummymale*), a dummy variable that measures the gender of respondents, where 1 = male gender and 0 = female gender.

The following table shows the variables used in this study, along with their expected measure and impact:

Table 3. 1 Variables and Measures

Variables		Designation	Measures	Expected signal
Independents				
	Age	Age	The number of years since starting activity and the logarithm of the number of years since starting activity.	**(-)**
	Size	Size Size1	Logarithm of the number of employees. Logarithm of the total of assets.	**(-)**
	Microcredit Loan Size	MCLs	Logarithm of the amount of microcredit loan receives by MSEs.	**(+)**
	Micro-savings	MS	Logarithm of total savings made by MSEs.	**(+)**
	Dummytertiary	Dummytertiary	Dummy variable about the company sector of activity, in which: 1 = sector tertiary; 0 = secondary sector.	
	Dummyproduct	Dummyproduct	Dummy variable about the new investments that were made after receiving microcredit, in which: 1 = investment in product, 0 for other investment types.	
	Dummyprocess	Dummyprocess	Dummy variable about the new investments that were made after receiving microcredit, in which: 1 = investment in process, 0 for other investment types.	
	DummyICT	DummyICT	Dummy variable about the new investments that were made after receiving microcredit, in which: 1 = investment in ICT, 0 for other investment types.	
	Dummymale	Dummymale	Dummy variable about the gender of the respondent, in which: 1 = male gender; 0 = female gender.	
Dependent				
Growth	Employment level	Growth1	Logarithm of the growth of employees after received the microcredit loan.	
	ROA	Growth2	Ratio between net profit and total assets.	

3.3.3. Empirical Method

Multiple linear regression was used to analyze the impact of microcredit on the growth of MSEs in Dili, East Timor. A similar approach was used by Nichter and Goldmark (2009), Babajide (2012), Beck, Fuchs, Singer and Witte (2014) and Kisaka and Mwewa (2014) when they studied the growth and impact of microcredit in developing countries.

We assumed a linear relationship between the dependent variable (growth) and the independent variables (age, size, microcredit loan size, and micro-savings, and, also, the company's activity sector, the type of investment made after receiving microcredit and the gender of the owner/manager).

So, a similar approach was adopted, that measures employment level (Growth1) and ROA (Growth2), to investigate the impact of age, size, microcredit loan size and micro saving on the growth of MSEs in East Timor.

By this way, we intend to analyze the impact of a loan obtained on the form of microcredit, but also to analyse the impact of micro-savings (which is expected to improve as more microcredit is granted) on the growth of MSEs in the countries in development like East Timor, also controlling for age and size of the company.

Our general empirical model is given by:

$$Growth_i = \beta_0 + \beta_1 age_i + \beta_2 size_i + \beta_3\, MCLs_i + \beta_4 MS_i\ + \varepsilon_i \qquad (3.2\ )$$

Where *Growth* is the growth of MSE *i* and it is the dependent variable measured by the employment level (*Growth1*) and ROA (*Growth2*); our independents variables are: *age* that represents the age of MSE, in MSE *i*; *size* represents the size of MSE, in MSE *i*; *MCLs* is the amount of microcredit loan received by the MSE, in MSE *i*; and, *MS* is the micro-savings measured by total saving made by the MSE *i*. In Eq. (3.2), the β_i coefficients are the impacts with respect to the corresponding variable and the ε_i are the residual random variable.

Our empirical work begins with the growth function given by the multiple linear regression[4] of the equation number 3.2, and then logarithms were applied to all the variables and the consecutive models, with different combinations of variables with and without the logarithms, were run.

Based on the previous model of equation number 3.2, we present the final model of growth with controlling dummies[5] variables as in the equation below:

$$\begin{aligned} Growth_i = \beta_0 &+ \beta_1 Ln\ age_i + \beta_2 Ln\ size_i + \beta_3 Ln\ MCLs_i \\ &+ \beta_4 Ln\ MS_i + \beta_5 Dummytertiary_i \\ &+ \beta_6 dummyproduct_i + \beta_7 Dummyprocess_i \\ &+ \beta_8 Dummymale_i + \varepsilon_i \end{aligned} \qquad (3.3)$$

Where Growth is the growth of MSE *i* and it is the dependent variable measured by the ROA (*Growth2*); our independents variables are: *age* that represents the age of MSE, in MSE *i*; *size* represents the size of MSE, in MSE *i*; *MCLs* is the amount of microcredit loan received by the MSE, in MSE *i*; *MS* is the micro-savings measured by total saving made by the MSE *i; dummytertiary* is a dummy variable about the company sector of activity, in which: 1 for sector tertiary, and 0 for sector secondary; *dummyproduct* is a dummy variable about the new investments that were made after receiving microcredit, in which: 1 for investment in product, and 0 for other investment type; *dummyprocess* is a dummy variable about the new investments that were made after receiving microcredit, in which: 1 for investment in process, and 0 for other investment types; *dummymale* is a dummy variable about the gender of the respondent, in which: 1 for male gender, and 0 for female gender. In Eq. (3.3), the β_i coefficients are the impacts with respect to the corresponding variable and the ε_i are the residual random variable.

The strength of the relationship between the dependent variable and the independents was measured by carrying out the *F-test* and *student's t-distribution* test to a 5% significance level and 95% confidence level. The test was to determine whether the coefficients β_t (t= 0, … ,8) were

[4]Measures growth without dummies variables.

[5]Measures growth with dummies variables.

significantly different from zero and thus concludes the existence of a strong relationship between the dependent and independent variables.

Since the study uses primary data gathered by a survey, the *svy* module of Stata has been applied that allows us to designate the variables that contain information about the survey design and specify the default method for variance estimation.

We will resort the *F test* for regression, in order to test the meaning of the independent variables. Test *F* and *R-squared* were used to determine which model was most appropriate.

3.4. Empirical Results

The results of the descriptive statistics (Table 3.2) and correlation matrix (Table 3.3) are presented in the Appendix.

Analysing table 3.2 we observe that, in the final sample, the firms have in average 4.7 years old (*age*), with an average dimension, measured by the total of employees after receiving the microcredit (*size*), of 2.1 employees and of 8,121.78 US$ average total assets after receiving the microcredit (*size1*). Those firms received, on average, a total of 2,779.81 US$ from microcredit (*MCLs*) and done, on average, a micro-savings (*MS*) of 866.5 US$. After receiving the microcredit loan, the firms presented an employment level growth (*Growth1*) of 22% and a ROA (*Growth2*) of 11%. It was observed that 93% of firms belonged to the tertiary sector (*dummytertiary*) and 7% to the secondary sector (*dummysecondary*); with the amount received from microcredit, they have done 52% of investments in product (*dummyproduct*), 9% of the investment on process (*dummyprocess*), 9% of the investment in ICT (*dummyICT*), 10% of the investment on human resources (*dummyhumanres*) and 20% did not realize investments; finally, 51% of the owners/managers were males (*dummymale*) and 49% were female.

From the correlation matrix (table 3.3), it is possible to see that all values are below 0.50, except for the correlation between *size* and *growth1*[6], showing there will be no collinearity problems between those independent variables.

Table 3.4, in the appendix, shows the results of the regressions. Model 1 and 2 report the results with the growth measured by the employment level (*Growth1*), and Model 3, 4, 5 and 6 report the results with ROA (*Growth2*).

Observation of Table 3.4 reveals that the results of the *F* statistic for the regression models are significant in every case, with a significance level of 1%. The *R-Squared* values are between 9% to 28% in our study. On the basis of this, the overall results can be considered valid and, consequently, open to interpretation[7].

Overall, we observe that hypotheses 1 to 3 were confirmed, since the *age* variable presents a negative and statistically significant impact on growth, the *size* variable presents a negative and statistically significant impact on growth (except in models 1 and 2), and the microcredit (*MCLs*) variable always has a positive and statistically significant impact on growth.

Let us analyze the impact of each explanatory variable. The MSEs age (*age*) has a negative and statistically significant impact, at the 1% level, on MSEs' growth in the regression model. This result allows us to confirm the second hypothesis and shows that the growth of MSEs decreases with age. This evidence agrees with the argument of Evans (1987), Dunne et al (1989), Mead and Liedholm (1998) and Parker et al (1995) among others. Lotti et al (2009) found a negative and statistically significant relationship between the age and growth in Italian SMEs at a young age, but this relationship was statistically insignificant for SMEs at a mature age. Gonçalves (2010) found that age is negatively related to the growth of young SMEs, but it was not relevant to explain the growth of old SMEs. Liedholm (2002) observed a negative and

[6] The test for multicollinearity (Collin test) was performed and it was revealed that there were no collinearity problems.

[7] The tests to the hypotheses of the multiple linear regression model were performed and validate the use of this type of models in this sample.

statistically significant relationship, indicating a strong inverse relationship between the age of the company and its growth.

The MSEs size (*size* and *size1*) has a negative and statistically significant impact, at a level of 10% and 1%, respectively, when growth is measured by ROA and for models 3 and 4 only but has a positive and significant impact on the growth of SMEs at a level of 1% when growth is measured by the growth in the employment level (models 1 and 2). This result allows us to partially confirm our third hypothesis and shows that MSEs growth decrease with size. This evidence agrees with the argument of Park et al (2010). Gonçalves (2010) found that the size is negatively related to the growth of young SMEs, but which is not relevant to explain the growth of old SMEs. Also, Becchetti and Trovato (2002) found the same negative relationship between growth and size, implying that smaller firms grow faster than larger firms.

The microcredit loan size (*MCLs*) has a positive and statistically significant impact, of 1%, on the growth of MSEs when measured either by the growth of the level of employment and by the ROA (in all models except for first). This result allows us to confirm our first hypothesis and shows that MSEs growth increase with microcredit loan size received by MSEs. This result is consistent with Cooper (2012), La Rocca et al (2009) and Storey (1994). The availability of finance for investment is vital to the sustainability and viability of small and medium-sized firms (La Rocca et al, 2009). Cooper (2012) concluded that microfinance services have a strong positive impact on the growth of SMEs in Kenya.

The micro-savings (*MS*) have a negative, and statistically significant impact at 1%, on the growth of MSEs. This result is not consistent with our fourth hypothesis and it was a surprise. There are no available researches about the impact of this variable on the growth of MSMEs. Maybe this result happens because MSEs, and their owners, in this study have low financial resources and income (remember the average of the variable *MS*). For this reason, the availability of money for the realization of savings is very low or void.

The *dummy tertiary* has a positive and statistically significant impact, at 1%, on the growth of MSEs when measured by ROA. This result shows that firms belonging to the tertiary sector, instead of the secondary, in East Timor have more possibility to grow. This result is supported by Conroy (2006), who says that the economy of East Timor is divided between a farm sector, in which as many of 80% of workers remain, with most of these still dependent on subsistence production and a non-farm sector in which micro and small enterprises are an overwhelming majority. Indeed, the East Timor retail and wholesale trade generated a total income of 905.7 million US$ in 2016 (GDSTL, 2016). This sector also contributes 29% (17,100 persons) of total employment in this country (DGSTL, 2016).

The *dummy product* has a negative and statistically significant impact, at a 1% level, in the growth of MSEs when measured by ROA, and the dummy process does not present a statistically significant impact on growth. This result shows that, for our sample, doing investment in the product, and on the process, does not promote the growth of East Timor MSEs comparatively to doing human resources investment.

The *dummy male* has an insignificant impact on the growth of MSEs (when measured by ROA). This result shows that the fact that the owner/manager is a man has no impact on the growth of MSEs, compared to be a woman.

To sum up, our results indicate that microcredit has a positive impact on East Timor MSEs growth when growth is measured by the growth of the employment level and ROA. These results support those from Cooper (2012), Maengwe and Otuya (2016), Memba, Gakure and Karanja (2012), Mbugua (2010), Nelson (2010) and Rhyne and Otero (1992), who also found that microcredit has an important role on the growth of SMEs.

From our result, it is concluded that Microcredit plays an important role in the growth of MSEs. One possible way to explain the impact of microcredit on the growth of MSEs is through microcredit loan size received by these. In fact, East Timor, as a developing country, is still have needs for improvements in microcredit loan size and development of the financial sector in order to more contributes to economic growth and thereby to the growth of MSEs. MSEs seek

funding to create or expand their businesses through loans to microcredit institutions. The development of financial intermediaries can also contribute to the increase in job creation, as well as to the valuation of the assets of MSE (ROA). Microcredit loan is an important factor in the success of the growth of MSEs, as the lack of access to credit makes it difficult to grow.

A second possible explanation as to why microcredit could be successful in the growth of MSEs is that some microcredit institutions facing competition from banks have also expanded lending to the poor. In fact, some microcredit institutions offer microcredit services to MSEs in many developing countries, poor rural households face extreme requirements when they seek credit from formal lending institutions. The traditional requirements requested by creditors (physical collateral, such as property), are generally replaced by a collective guarantee system, where members of the group are mutually responsible for ensuring that their loans are paid (Khan, 2008).

Finally, about micro-saving. MFIs provide a micro-savings service for their customers, allowing them to save small amounts of money and not be charged for this service. In our view, micro-savings is a tool for better financial planning and allows firms to spend their savings on ICT investments, products, processes, and improving workers' capacity through training activities. The results achieved lead us to suggest government intervention in order to improve the access and use of this type of financial tool.

3.5. Conclusion

This study examines the impact of microcredit on the growth of MSEs from Dili, East Timor, controlling for age, size, and micro-savings, and also controlling for dummies variables like the firms' activity sector, the type of investment made after receiving the microcredit loan and the gender of the owner/manager.

To that effect, we employ multiple linear regressions models on the growth of MSEs (proxied by the growth of the employment level and by ROA). A single MSEs database was used, collected by hand from March to April 2018 in Dili, East Timor.

The variable *age* has a negative and statistically significant impact on growth, the variable *size* has a negative and statistically significant impact on growth (except for models 1 and 2), and the *microcredit lending* variable (MCLs) always presents a positive and statistically significant impact on growth (except for model 1). The *Dummytertiarty* had a positive and significant impact on the growth of MSEs in this study.

By applying regression models to our 2018 database, the result indicates that microcredit has a positive impact on MSEs growth. We can then conclude that microcredit institutions have a significant impact on the growth of MSEs. So, developing and increasing the numbers of microcredit institutions in East Timor can help economic growth, especially through MSEs. But it is still not able to reach all MSEs because of the high interest of loans and they still need for the development of the MSEs. Of the results, it could be noted that the development of financial intermediaries could increase job creation and support MSEs (for instance, increasing their assets, thus improving the ROA levels).

Some studies have reported that microcredit can improve SMEs growth (Cooper, 2012; Maengwe and Otuya, 2016; Memba *et al,* 2012; Mbugua, 2010; Nilsen, 2010 and Rhyne and Otero, 1992), and our results are consistent with the literature when the growth of MSEs is measured by the growth of the employment level and the ROA.

This study is not exempt from limitations, namely: the data relate only to 1 year; the sample used is composed only of 269 MSEs; multiple linear regression was used to analyze our data; the data relate only to companies in Dili, East Timor.

On the basis of the foregoing limitations, there are clues to future research, namely: gathering information for more than one year and for a higher number of firms; in order to test the robustness of the results, we suggested the collection of the same type of data for another developing country; by increasing the number of years and companies in the database, it would be possible to apply other types of models, namely panel data models.

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Appendix

Table 3. 2 Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Growth1	269	0.22	1.67	-1.00	24.00
Growth2	269	0.11	0.18	0	2.50
Age	269	4.70	4.33	0	34.00
Size	268	2.08	2.986	0	25.00
Size1	269	8,121.78	20,469.67	300.00	310,000.00
MCLs	266	2,779.81	9,486.54	150.00	150,000.00
MS	269	866.49	2,138.87	0	15,000.00
Dummytertiary	269	0.93	0.26	0	1
Dummyproduct	268	0.52	0.50	0	1
Dummyprocess	269	0.09	0.29	0	1
DummyICT	269	0.09	0.29	0	1
Dummymale	269	0.51	0.50	0	1

Table 3. 3 Correlation matrix

	Growth1	Growth2	Age	Size	Size1	MCLs	MS
Growth1	1						
Growth2	0.067	1					
Age	0.131*	0.116	1				
Size	0.58**	0.175	0.255**	1			
Size1	0.004	-0.086	0.066	0.157*	1		
MCLs	0.003	-0.065	0.119	0.163**	0.979**	1	
MS	-0.020	-0.028	0.090	0.278**	0.420*	0.410**	1

Significance are: * p<0.01, ** p<0.05

Table 3. 4 Results of Regression Models

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Growth1		Growth2			
Lnage	**-0.532****		**-14.381*****	**-1.758*****	**-17.362*****	**-17.418*****
	(0.283)		(6.079)	(0.858)	(5.913)	(5.974)
Lnsize	**1.632*****		**-10.228***		-7.935	-7.867
	(0.299)		(6.062)		(0.282)	(6.295)
lnMCLs	0.287	**0.692*****	**21.735*****	**25.778*****	**23.337*****	**23.046*****
	(0.237)	(0.256)	(5.960)	(4.577)	(5.734)	(6.128)
lnMS	**-0.337****	**-0.519*****	**-8.405*****	**-9.357*****	**-8.998*****	**-9.002*****
	(0.173)	(0.193)	(3.828)	(3.411)	(3.844)	(3.855)
Age		-0.052				
		(0.042)				
size1				**-0.001*****		
				(0.000)		
MS						
dummytertiarty					**36.191*****	**35.923*****
					(13.462)	(13.530)
dummyproduct					**-21.306*****	**-21.641*****
					(9.712)	(10.020)
dummyprocess					3.111	3.009
					(12.695)	(12.777)
Dummymale						2.303
						(10.594)
Constant	**5.678*****	**4.018*****	20.175	-22.190	-11.862	-10.681
	(1.245)	(1.264)	(36.915)	(28.230)	(36.572)	(38.189)
R-squared	0.2832	0.0910	0.1456	0.1725	0.2015	0.2018
F-statistic	**8.78*****	**24.19*****	**5.64*****	**10.40*****	**6.09*****	**5.29*****
N	**153**	**192**	**151**	**188**	**151**	**151**

In brackets it is presented the standard deviation and significance levels are: *** p<0.01, ** p<0.05, * p<0.10

Chapter 4- The impact of Microcredit on the Productivity of Micro and Small Enterprises in East Timor

Abstract

This chapter intends to discover the impact of microcredit on productivity (measured by single factor productivity (SFP), total factor productivity (TFP) and labor productivity (LP)) of MSEs, controlling the age and size of companies, investment, and human capital in Dili, East Timor.

The study uses a unique primary data, extracted from questionnaires, from 269 MSEs in Dili, East Timor. To which a multiple linear regression was applied.

The main result is that microcredit has a positive impact on the productivity of MSEs in Dili, East Timor. Our results also show a negative impact between age and MSEs productivity. Therefore, investment and human capital have a positive impact on MSEs productivity.

Keywords: age, East Timor, human capital, investment, labor productivity, microcredit, productivity, single factor productivity, size, total factor productivity.

4.1. Introduction

The economy of East Timor has struggled for its recovery since independence in 2002 so far. The gross domestic product (GDP) of East Timor in 2015 was worth 1.41 billion US dollars. The level of income of East Timor, in 2015, belonged to that of a country of lower middle-income (World Bank, 2016). The economy of East Timor is ranked as a low-income economy by the World Bank. It is placed in the 133th place by the Human Development Index (HDI) (UNDP, 2015), indicating a low level of human development. 20% of the population is unemployed and 52.9% live with less than US$1.25 per day. According to Census 2010 data, 87.7% of urban and 18.9% of rural households have electricity, for a global average of 36.7%.

The GDP value of East Timor represents less than 0.01 percent of the world economy. The averaged growth of East Timor GDP is 0.79 USD Billion from 2000 until 2015, reaching an all-time high of 1.41 USD Billion in 2015 and a record low of 0.37 USD Billion in 2000, as shown on the following chart 4.1 below:

Chart 4. 1– Timor Leste Gross Domestic Product Growth Over the last 10 years

Since January 2002, East Timor has adopted the currency of the U.S. dollar as official currency. The initial decision to adopt the US dollar was taken by the United Nations Transitional Administration in East Timor (UNTAET). The decision was made in consultation with the National Consultative Council of East Timor (NCC) and drew on the expert advice of the International

Monetary Fund. After independence in May 2002, the government of East Timor decided to keep the U.S. dollar as the official currency. Since the beginning of the development of this nation, the institutional framework for the growth of the private sector is very weak, and the ranking on how to do business in the country is 178 in a ranking of 190 (World Bank, 2016). The internal conflict in 2006 caused damage to the economy because most of the Timorese people stopped carrying out their activities to make money. Nowadays, credit to the private sector is growing. On the other hand, the government of East Timor is attempting to increase economic growth in order to reduce unemployment and poverty in the country. The main method used by the government is to extend credit to small and medium enterprises (SMEs) in order to improve their financial sustainability. The Bangladesh case proved that through SMEs it is possible to reduce the unemployment rate and poverty rate (Chowdhury, 2009).

Given the importance of SMEs in economic growth, some financial institutions in East Timor are giving credit to help SMEs to maintain their activity. The Banco Nacional de Comércio de East Timor (BNCTL) provides credit to micro business, credit to working capital for productive business, and microscale consumption. Financing facilities are provided, also, to all micro business owners, business groups, and individuals such as traders, farmers, payroll loans, and loans to groups of women. Cecchetti, Mohanty, and Zampolli (2011) studied the effects of debt levels in 18 OECD countries, from 1980 to 2010, and concluded that moderate debt level improves welfare and enhances growth, but high levels can lead to a decline in growth of the firm. SMEs in East Timor have difficulty to access the credit from MFIs, or banks, to support their growth. The overall ease of doing business in Timor-Leste has improved, according to the World Bank (2016), though the country remains a risky place to invest. The government, through the Institute for Business Development Support (IADE), under the Ministry of Economy and Development, offers business training to the public sector and enterprises.

In developing countries, such as East Timor, SMEs assume an important role in economic growth, both by their potential to become large companies, more productive units, to have the ability to invest and adopt new technologies, as well like the ability to adapt to the new circumstances. In addition, SMEs have the opportunity to grow and provide jobs for job seekers. Mead and Liedholm (1999) stressed that most of SMEs could grow significantly (the 'seed-bed for the function of large firms), while many of the microenterprises tend to grow little and therefore do not exceed their size category. SMEs improve their productivity by making investments and changing their technologies. In East Timor, it is very difficult for SMEs to borrow more technology, already available in the rest of the world, compared to large companies that improve their productivity through these services in other countries. In fact, SMEs can obtain capital for their operations, in two different ways. First, they can get indebtedness to financial institutions, and ultimately, through their own capital (equity). In general, the capital of SMEs is limited, and this makes it difficult for them to access foreign direct investment, technology licensing, joint ventures and access to engineering in order to improve their productivity, such as large companies. SMEs would have greater flexibility due to their size, to adapt when facing new circumstances, in relation to large companies.

Studies on the impact of microcredit on MSMEs productivity were made in other countries around the world. We have to say that there is limited access to micro-level data on MSMEs in East Timor. This study in the case of East Timor, according to the authors' knowledge, is the first to use unique primary data that were collected from questionnaires by the authors. The purpose of this study is to determine the impact of the microcredit on the productivity of MSEs in East Timor. We intend to find out if microcredit has an impact on the productivity (measured by single factor productivity (SFP), total factor productivity (TFP) and labor productivity (LP)) of MSEs, in district Dili, East Timor, controlling the company's age, the size of the company, investment made after receiving microcredit and the level of human capital.

To achieve this objective, a sample was formed based on unique primary data extracted from questionnaires applied on Dili from March to April 2018, and multiple linear regression models were used.

This study contributes in particular to the literature on the impact of microcredit on the MSEs of developing countries (in particular, in the case of East Timor), showing that microcredit has a positive impact on the productivity of MSEs, also contributing to the deepening of knowledge about microfinance in general. Specifically, the results show that the size of the microcredit loan has a positive and statistically significant impact on productivity; and, it is confirmed that age has a negative and statistically significant impact on productivity; finally, it has been demonstrated that investment and human capital has a positive impact on MSEs productivity.

After this introduction, the chapter is organized as follows: section 2 presents the Literature Review; section 3 presents the methodology and describes the data; section 4 discusses the empirical results and Section 5 concludes.

4.2. Literature Review

This section will present the concept of microcredit and the determinants of SME productivity.

The firms need capital investment for their operations. They can finance their operations using internal funds, debt and equity. Debt financing is mainly obtained by loans from financial institutions. This study will focus on financing on the form of debt but in terms of microcredit debt.

Productivity is defined by Syverson (2011) as efficiency in production, such as measured in terms of the rate of output per unit of input. There are three different ways to measured productivity: first, is productivity measured by single factor productivity (SFP) (Syverson, 2011); second, productivity measured by total factor productivity (TFP) (Hulten (2001); and Syverson (2011)); and, last one is productivity measured by labor productivity (LP) (Freeman (2008); and Schiffbauer and Ospina (2010)).

4.2.1. Definition of Microcredit

The concept of micro-financing arose from the need to provide a loan to low-income wage earners who were left out by formal financial institutions. The practice of microcredit dates back to as early as 1700 and can be traced in Irish Loan Fund System, which provided small loans to the rural poor with no collateral (Maengwe and Otuya, 2016). Over the years, the concept of microfinance has spread to Latin America, then to Asia and later to Africa. Muhammad Yunus was the pioneer of micro-financing by founding the Grameen Bank in Bangladesh in the 1970s to grant loans to poor people in order to overcome poverty in that country (Yunus (2007); and Wahid (1994)).

Microcredit is a program to extend small loans to the poorest people, and these are owned by self-employment (Srinivas, 1997). Poor people, who have limited access to loans from the formal sector, will benefit from the existence of microcredit to meet their financial needs.

Microfinance is defined as an extension of small grants and products such as small loans, micro savings, micro leasing, micro insurance, and money transfer, to help the poorest people in expanding or establishing their MSEs (Robinson (1998); and Grameen Bank (2001)). MFIs are mostly used in developing economies, where MSEs have limited access to formal financial institutions.

The term microfinance can also be defined as the provision of financial services to low-income customers, including independent workers. Generally, financial services include savings and credit, however some finance organizations also provide insurance and payment services. In addition, many MFIs provide social intermediation services, such as group formation, self-confidence development and training in financial literacy and management capabilities, among members of a group (Ledgerwood, 1999).

The target population of microcredit also includes women holding microenterprises of low-income families and with unwarranted loans.

Conroy (2002) stated that microcredit is the provision of a wide range of financial services (deposits, loans, payment services, money transfers, and insurance) for poor and low-income families and their micro-enterprises. The financial concept of microcredit and microenterprise have associated the terms of loan and savings. Although the terms are used interchangeably, microcredit

represents the field as a whole, while the other two terms are more technical and refer only to the credit provision (Maria, 2004).

The characteristics of microfinance consists of supply of short-term loans, less than 12 months; providing regular working capital, with weekly or monthly refunds. MFIs also facilitated access to loans to its customers. Khan (2008) stated that the requirements for traditional lenders are the physical guarantee (property), but in the case of microcredit this guarantee is replaced by a collective guarantee system, of responsible mutual members that ensure that their loans are reimbursed.

4.2.3. Determinants of SME's Productivity

Pritchard (1995) defined productivity in the broadest way and considered productivity as anything that makes organizations work better. In other words, productivity would include efficiency and effectiveness, but also things like absenteeism, turnover, morale, innovation, etc. Syverson (2011) defined productivity as the connection between the rates of output per unit of input. It is, essentially, the measure of the effectiveness and efficiency of the SMEs in produce output to users of the resources available. Productivity is efficiency in production, in this case, the rate of output per unit of input of firms.

There are three different ways for productivity to be measured. First, productivity is measured by single factor productivity (Syverson, 2011). Second, productivity is measured by total factor productivity (TFP) (Hulten (2001); and Syverson (2011)). The last one is productivity measured by labor productivity (LP) (Freeman (2008); and Schiffbauer and Ospina (2010)).

The practice of business management, based on the productivity concept, should be the aim for effective and efficient procurement and utilization of various resources, and to distribute the gain, fairly, among the stakeholders.

Ichniowski, Shaw and Prennushi (1997) and Haltiwanger, Lane and Spletzer (1999), in their study, showed that human resources are important factors that influenced the company's productivity. Black and Lynch (2001) found that the higher the average level of education of the workers in the production, or the higher the proportion of non-managerial workers who use computers, the higher the productivity of the factories.

Our study intends to analyze the impact of microcredit on MSEs productivity. Next, the determinants of the productivity of the MSEs are presented (and the basis hypotheses presented), starting with the impact of microcredit, followed by the control variables that are: the age of the company; size of the company; investment made by the company after receiving the microcredit; and, human capital level.

4.2.2.1. Microcredit loan size

MSEs need loans on the form of microcredit to finance their business and operations. In a developing country, it is not easy to obtain loans on the part of FFIs. This is supported by Cork and Nisxon (2000) who found that deficient management and accounting practices hinder the ability of small businesses to obtain funding from FFIs. Small firms rely more on internal funds (savings, retained, earning and family network) and the informal sector (money lender) because of their inability to produce the collateral requested by commercial banks (Satta, 2003 and OCDE, 2006). Guangwen, Du Xiaoshan and Zhanwu (2009) found that also the type of SME demand for microfinance services are also diversified, such as microcredit, micro-savings, microinsurance, and investment.

Jaramillo, Schiantarelli and Weiss (1996), in their study of capital market imperfections, financial constraints and investment in Ecuador, concluded that long-term debt financing allows companies to increase their productivity. McMahon (2001) investigated the growth and performance of manufacturing SMEs and noted that external financing has a significant effect on business growth. Nosiru (2010) concluded that if there were more microcredit available, companies would be more

productive because they could access the factors they needed. Fosu (2013) investigated the capital structure, product market competition and performance of companies in South Africa, revealing that the capital structure has a positive impact on corporate performance.

Kristiansen, Furuholt and Wahid (2003) in their study about internet cafe entrepreneurs in Indonesia reveal that financial flexibility has a significant effect on business success. Their study also found that the firms that took advantage of family and external investment, experienced a higher level of success. Dube (2013) investigated the impact of debt financing on the productivity of small and medium-sized enterprises in Zimbabwe and found that debt financing has a positive effect on the firm's productivity.

The study by El-Sayed Ebaid (2009) reveals that the capital structure has a negative impact on the firm's performance. El-Sayed Ebaid (2009) also found that total debt, short-term debt, long-term debt, and financial performance had an insignificant relationship on gross profit margin and ROE. Cecchetti et al (2011) investigated the real effects of debt and stated that debt financing is a two-edged sword that, when used wisely and with some restraint, can enhance welfare, however, when utilized unwisely and in abundance can bring disaster. Soumadi and Hayajneh (2012) investigated the impact of capital structure on corporate performance on Jordanian shareholdings firms over a period of 5 years and found that capital structure had a negative effect on corporate performance. Moreover, this study reveals that financial leverage had no significant effect on corporate performance. Muritala (2012) examined the impact of capital structure on financial performance in Nigeria, revealing that the firm's debt ratio had a negative effect on financial performance. Ogebe, Ogebe and Alewi (2013) investigated the effect of capital structure on corporate performance in Nigeria, from 2000 to 2010, and found that debt financing had a strong impact on corporate performance. Their results also revealed that capital structure has a significant negative effect on corporate performance. Mumtaz, Rauf, Ahmed Noreen (2013) investigated the impact of capital structure on financial performance in Pakistan and their results revealed that debt has a negative impact on firm performance. Therefore, they also found that the capital structure of firms had a negative, but significant effect, on financial performance. Those findings were also supported by Saeed, Gull and Rasheed (2013) in their investigation about the impact of capital structure on banking performance in Pakistan, revealing that the capital structure had a negative impact on banking performance.

There are no available researches about microcredit impact on MSEs productivity so, for this reason, we are trying to formulate our hypothesis about the relation between microcredit loan size and productivity of MSEs. We assume that if microcredit loan size increases, then MSEs productivity will also increase. Based on the arguments above, we formulate the following hypothesis:

H1: The microcredit has a positive impact on the productivity of MSEs in Dili, East Timor.

4.2.2.2. Age

Grabowski and Mueller (1972), in their research, found out that older firms have better performance because of life-cycle effects. Campbell, McCloy, Oppler and Sager (1993), in their research, found that sunk costs give new firms an advantage in acquiring the latest technology. This research is consistent with Power (1998), in which the lower productivity of older firms is similar to that of younger firms. Coad, Segarra and Teruel (2013) revealed that older firms have better financial performance due to the benefits of their long existence (learning by doing effect).

Stinchcombe and March (1965), in their study, found that the younger firms have lack of experience (less experience) which can lead them to bankruptcy. Jovanovic (1982) support the view that older firms enjoy better performance and suggests that there may be "selection effects" that arise when less productive firms are forced to leave, which will lead to higher average productivity even that the productivity levels of the companies that remain active do not change over time. Pakes and Ericson (1998) suggested that older firms should be more productive compared to younger firms. The research of Coad et al. (2013) on the relationship between the age of the

company and the performance (measured by the ratio of profits on sales), in Spanish manufacturing firms for the period 1998-2006, concluded that older firms had higher productivity.

Barron, West and Hannan (1994) revealed that age can have a negative impact on firms' financial performance, because of inertia effects. As a result, firms become inflexible and have difficulties to adapt quickly when their business environment changes. Huergo and Jaumandreu (2004) concluded that the productivity of older firms decreases with age. Loderer and Waelchli (2010) investigated the relationship between the age and performance of companies using a dataset consisting of 10,930 companies listed in the US and covering the years between 1978 and 2004. Their results showed that as firms get older, their return on assets (ROA), profit margins and Tobin's Q ratios deteriorate. Ayele (2012) found that there is no significant relationship between age and profitability. His study also found no significant between age and ROA. Moreover, Nunes, Gonçalves and Serrasqueiro (2013) showed that age is an important factor for young SMEs's growth, but it is not important for the growth of old SMEs. This result is supported by Navaretti, Castellani and Pieri (2014), in their study in French, Italian and Spanish manufacturies, from 2001 to 2008, which concluded that younger firms grow faster compared to older firms.

Based on the arguments above, we formulate the following hypothesis:

H2: The age of MSEs has a negative impact on the productivity of MSMEs in Dili, East Timor.

4.2.2.3. Size

The relationship between size and productivity has been studied for some time, both at the theoretical and empirical level.

Caves and Barton (1990) and Taymaz and Saatçi (1997) have suggested that large enterprises tend to be more efficient than small enterprises. Van Ark and Monnikhof (1996) in their study on the distribution of production volume and employment in manufacturing industries in five OECD countries, from 1960 to 1990, found that all manufacturing plants with fewer than 9 employees had 62 percent of gross output per employee, while manufacturing plants with more than 500 employees had 126 percent of gross output per employee. These results are supported by Taymaz and Saatçi (1997) in their study on the technical change and efficiency in the Turkish manufacturing industries, from 1987 to 1992, which concluded that the size had a positive and significant impact on the productivity of plants or, in other words, large plants are more productive than small plants.

Lee and Tang (2001) in their study about multifactor productivity disparity between Canadian and U.S. manufacturing firms, concluded that firms with more than 500 employees are 18 percent more productive, also firms with less than 500 employees are 15 percent more productive than firms with less than 100 employees, especially in Canada. Baldwin and Gu (2003) in their study about productivity growth in the Canadian retail trade sector, conclude that that small single-plant firms have little impact on labor productivity growth in manufacturing in Canada. Alvarez and Crespi (2003) in their study on determinants of technical efficiency in small Chilean firms, showed that larger firms have better productivity than minors. Taymaz (2005) concluded that in one-third of the sectors, the size of firms has a positive impact on efficiency and that, in half of the sectors, there was no statistically significant impact on efficiency in Turkish manufacturing, from 1987 to 1997. This study also reveals that some small businesses are as efficient as those of a large size when the level of efficiency in the analysis is used.

But, on the contrary, Dhawan (2001) in his study of the size of the company and the differential productivity in US companies, concluded that smaller companies are more productive than the largest, but that can not be more competitive. This result was supported by Ramasamy, Ong, and Yeung (2005) in their study on the size of the company, ownership, and performance in the Malaysian palm oil industry, revealing a negative effect between the size of the company and its performance. Taymaz (2005) conclude that in only a small group of industries the size of firms has a negative impact on their efficiency. Moreover, Salman and Yazdanfar (2012), in their study about profitability in Swedish micro firms, revealed a negative effect between firm size and profitability.

On the other hand, Nunes et al (2013), in their study investigated the influence of size in the growth of SMEs, showing that size is an important factor for the growth of young SMEs, but is not important for the growth of older SMEs.

Based on the arguments above, we formulate the following hypothesis:

H3: The size of MSEs has a negative impact on the productivity of MSEs in Dili, East Timor.

4.2.2.4. Investment

Bustos (2007), Costantini and Melitz (2007), Lileeva and Trefler (2007) explored the linkages between investments in innovation, productivity and the decision to export in the context of the liberalization of trade regimes. On the other hand, Aw, Roberts, and Winston (2007) also observed a significant role in the fact that the company performs investments in research and development (R&D), explaining export patterns of Thai firms, this study reveals that firms that carry out R&D's and export have better productivities.

Fazzari, Hubbard, Petersen, Blinder and Poterba (1988) found that firms with low or no value dividend payment rates were more likely to have the investment that was sensitive to changes in free cash flow. They interpret their results as demonstrating that capital constraints likely affect companies that do not pay dividends as they forego investment when internal cash is not available. Shin and Stulz (1998) showed that investment in smaller divisions of companies of multi-segment is affected by the operating performance of the larger divisions, even if the investment opportunity, in each division, is not related to each other.

Oakey (1984) found that SMEs still in the early stages of development are obliged to seek external investment capital and thus tend to be more geared towards growth. Ericson and Pakes (1995) and Pakes and Ericson (1998), on the other hand, presented an active learning process in which firms not only know their level of efficiency when they participate in the market but can also modify it by means of investment. Pakes and Ericson (1998) mentioned that successful investment will enable the idea to be embodied in a more profitable good or service. The unsuccessful investment, by being made by the company that tries to accompany its competitors, both inside and outside the industry to which it belongs, can convince the entrepreneur that any idea is not worth being pursued as it can lead to the liquidation of the company (Pakes and Ericson, 1998).

On the other hand, Cabral (1995) showed how small firms grow faster because of sunk costs. In this case, the initial investment is a small portion of the optimum production in the long run. Dube (2013) in his study concluded that productivity in a firm was positively related to changes in investment (investment in fixed assets resulted in increased productivity) or, in other words, that most of the SMEs that obtained debt financing invested in fixed assets of the business and increased their productivity.

Based on the arguments above, we formulate the following hypothesis:

H4: The investment has a positive impact on the productivity of MSEs in Dili, East Timor.

4.2.2.5. Human Capital

Human capital, according to Blair (1999), is the idea that much of the skill and knowledge acquired to do a job could only be acquired if some investment is made in time and resources. Human capital can help increase the productivity of a firm, either by hiring more workers or by improving the quality of the human capital.

The OECD (2001) defines human capital as an individual with knowledge, skills, and attributes, which contributes to the well being personal, social and economic. There are two ways to achieving the elements of human capital: the first is innate; and, the second is through learning. The theory of human capital and growth were built based on the hypothesis that humans with knowledge and skills contributed to increase productivity and increase the ability of firms to use new technologies.

De la Fuente (2011) stressed that human capital is an additional input in the standard aggregate production function, linking output (national or regional) to input (production stocks) and to total factor productivity (employment). The literature on the effects of human capital on productivity argues that those workers with better ability to solve problems and communication skills will perform any task that requires more than simple work in a more efficient way (De la Fuente, 2011).

Labor economists have explored the importance of human capital to explaining the differences in productivity (Abowd, Haltiwanger, Jarmin, Lane, Lengermann, McCue and Sandusky (2005); and Fox and Smeets (2011)). Lazear (2000), Ichniowski and Shaw (2003), Bloom, Bond and Van Reenen (2007), Garicano and Heaton (2007) and Bandiera, Baranky and Rasul (2009) revealed the significant impact among workers (human capital) and the productivity of companies, when measured by incentive in terms of salary, other human resources practices, talent and management practices, form organizational and social connections among co-workers.

Schumpeter (1942) underlined that large firms have a financial advantage to become most innovators than small firms. Haltiwanger et al. (1999) used a matched employer-employee dataset and found that labor productivity is associated with certain characteristics of the workforce, such as the proportion of educated workers. The results are consistent with a human capital model, in which more highly-skilled workers make the firm more productive. In addition to the fact that large firms employ a more qualified workforce, it is also possible that the return of human capital is greater in large firms.

Oosterbeek and Van Praag (1995), in their study of the size of the company and wages, revealed that larger firms pay higher returns (wages) to human capital, with other words, human capital has a positive impact on the growth of firms. Tan and Batra (1995), Dearden, Reed and Van Reenen (2000), Jones (2001), Takii (2005) and Ilmakunnas, Maliranta and Vainiomäki (2004) demonstrated a positive association between human capital and productivity at the firm level.

Based on the arguments above, we formulate the following hypothesis:

H5: The human capital has a positive impact on the productivity of MSEs in Dili, East Timor.

4.3. Methodology

4.3.1. Research Design and Data Collection Instruments

The study uses a unique primary data extracted from questionnaires applied in Dili from March to April 2018. And it will focus on the increase in single-factor productivity (SFP); total factor productivity (TFP); and, labor productivity of MSMEs, due to microcredit loan size, the age of the company, the size of the firm, the investment, and the human capital.

The data collection methodology used in this study consisted of a hand-collected questionnaire. The questionnaires were applied to randomly chosen companies of the MSEs that received loans from Kaebauk, Moris Rasik and Tuba Rai Metin in Dili, East Timor, so the sample population was taken from Dili district in East Timor. The reason why we choose Dili is that this is the center of the business and economic growth in East Timor. In this research, data cover 269 MSEs (255 of microenterprises and 14 of small enterprises) in Dili, East Timor.

We developed our questionnaire based on the models developed by Mwewa (2013), Waliaula (2013), Maiyo (2016) and Sigey (2017). But we make some modifications and adjustments so that variables were in conformity with the condition of MSMEs in East Timor. The reliability and validity of the content were guaranteed making sure that each question in the questionnaire was legitimate and well-structured for easy understanding. In this study, we did not make pre-testing because we developed our questionnaire based on some authors who already did so to ensure reliability and because the application of the questionnaire was always performed by the author (thus ensuring any clarifications that were necessary, as well as the correct completion of the questions).

Thus, a questionnaire was developed as a means of data collection by a three-step process. Initially, the questionnaire was developed based on a review of literature related to the concepts of SMEs growth, its principles and determinants. In the second step, the questionnaire was

developed in English and translated into Indonesia and Tetum (the national language). And the third step was the data collection in Dili, East Timor. For data collection, we distribute the questionnaire directly and personally to the selected MSEs, in Dili, East Timor.

4.3.2. Variables

This study will focus on increased productivity of MSEs, measured by Single-factor productivity (*SFP*), Total factor productivity (*TFP*) and Labor productivity (*LP*).

Pritchard (1995) has defined productivity more broadly and considers it to be anything that makes the organization's operation better. In other words, productivity would include efficiency and effectiveness but also things like absenteeism, turnover, morale, innovation, etc. Productivity is defined by Syverson (2011) as efficiency in production, such as measured in terms of the rate of output per unit of input. It is, essentially, the measure of the effectiveness and efficiency of SMEs in the production of outputs for users of available resources.

Studies about productivity used measures such as partial measure of productivity (sales per employee, total asset turnover) (Kirchhoff and Kirchhoff, 1987; McConaughy, Walker, Henderson and Mishra, 1998); Cobb-Douglas production using industry as a proxy for capital intensity (Wall, 1998); Cobb-Douglas production controlling for technology, human resources and organizational characteristics (Bosworth and Lounders, 2002); Cobb-Douglas production function using an intercept dummies variables for family businesses (Barth, Gulbrandsen and Schønea, 2005; Martikainen, Nikkinen and V$\ddot{a}h\ddot{a}$maa, 2009; Barbera and Moores, 2013).

According to Syverson (2011), single-factor productivity is measured by the output produced per unit of a particular input. So:

$$Single\ Factor\ Productivity\ (SFP) = \frac{Total\ output}{Total\ man\ hours} \qquad (4.1)$$

According to Hulten (2001) and Syverson (2011), productivity can also be measured by total factor productivity (TFP). Conceptually, TFP is the difference in output variation produced from a fixed set of inputs. The TFP is traditionally measured by standard Cobb-Douglas production function:

$$P(L,K) = A\left(L^{\alpha}K^{\beta}\right) \qquad (4.2)$$

where: *P* = total production (the monetary value of all goods produced in a year); *L* = labor input (the total number of person-hours worked in a year); *K* = capital input (the monetary worth of all machinery, equipment, and buildings); *A* = total factor productivity, is a constant for all the qualitative forces which contribute to output and that are not yet represented in the quantitative measures of labor and capital (Barbera and Moores, 2013); α and β are the output elasticities of labor and capital, respectively, and are assumed to be fixed, therefore, these values are constant determined by the available technology.

Finally, labor productivity is also used to measure output units production using specific inputs (Freeman, 2008). Schiffbauer and Ospina (2010) used labor productivity to measure the productivity of the firm:

$$Labour\ Productivity = \frac{Firm\ sales}{Human\ capital} \qquad (4.3)$$

Ichniowski et al (1997) and Haltiwager et al (1999) in their study showed that human resources are important factors that influence the firm productivity. Black and Lynch (2001) found that the higher the level of education of the production workers, or the greater the proportion of non-managers who use computers, the greater the productivity of the company.

In our study, we assume that MSEs productivity will be given by single-factor productivity, total factor productivity, and labor productivity as a dependent variable. Therefore, we consider MSEs productivity given by:

1) **Single-factor productivity** (*SFP*), which will be measured as shown in equation number 4.1;
2) **Total factor productivity** (*TFP*), that will be measured as presented in equation number 4.2;
3) **Labor productivity** (*LP*), which will be measured as shown in equation number 4.3.

As independent variables, we consider:

1) **MSEs age** (*age*), which will be measured by the number of years since company began its activity. Like Gonçalves (2010), who used the number of years since the company started the activity. On the other hand, Serrasqueiro, Nunes, Leitão and Armada (2010) used as a proxy for age of the company, the logarithm of the number of years that the company has since its constitution. We will use the variable with Logarithm.
2) **MSEs size** (*size*), it's measured by the number of employees. Based on Castany, López-Bazo and Moreno (2007) and Pervan and Višić (2012) among others, who in their studies used the number of employees of the firm to discover the size of the firm. We will use the variable with Logarithm.
3) **Microcredit loan size** (*MCLs*), is measured as the loan value that MSEs received from MFI's. We will use the variable with Logarithm.
4) **Investment** (*I*), measured by the investment value made after receiving the microcredit loan. We will use the variable with Logarithm.
5) **Human Capital** (*HC*), measured by the total number of educated and highly-skilled workers. Carried out on the basis of Abowd et al (2005) who used the number of educated and highly-skilled workers to measure human capital (Haltiwanger *et al*, 1999). We will use the variable with Logarithm.

The following table 4.1 shows the variables used in this study, along with their expected measure and impact:

Table 4. 1 Variables and Measures

Variables		Designation	Measures	Expected signal
Independents				
	Age	Age	Logarithm of the number of years since starting the activity.	**(-)**
	Size	Size	Logarithm of the number of employees.	**(-)**
	Microcredit loan size	MCLs	Logarithm of the amount of microcredit loan received by MSEs.	**(+)**
	Investment	I	Logarithm of the investment value made after receiving the microcredit loan.	**(+)**
	Human Capital	HC	Logarithm of total educated and highly-skilled workers.	**(+)**
Dependent				
Productivity (*Y*)	SFP	SFP	Logarithm of the Ratio between total output and total man working per hour.	
	TFP	TFP	Logarithm of the Residual from Cobb-Douglas production function.	
	Labor Productivity	LP	Logarithm of the Ratio between firm sales to human capital.	

4.3.3. Empirical Method

To find out if microcredit has an impact on the productivity of MSEs in East Timor, and assuming that productivity is efficiency in production (Syverson, 2011), a multi-linear regression model, with logarithms, was used, where the level of productivity (dependent variable) was calculated in three ways: single factor productivity; labor productivity; and total factor productivity. In the case of total factor productivity, the standard Cobb-Douglas production function was used, suggested by Cobb and Douglas (1928) and already used by Hulten (2001), Syverson (2011) and Barbera and Moores (2013). Barbera and Moores (2013) and Donou-Adonsou and Sylwester (2015), used the model to investigate whether ownership of the company has an impact on the productivity of Australian SMEs and to investigate the macroeconomic effects of microfinance on the productivity of countries in development, respectively.

So, a similar approach was adopted, that measures single factor productivity, total factor productivity and labor productivity, to investigate the impact of microcredit loan size, age, size, investment and human capital on the productivity of MSEs in East Timor.

By this way, we intend to analyse the impact of a loan obtained by microcredit, but also to analyse the impact of investment and human capital (which is expected to be improved as more microcredit is granted) on the productivity of MSEs in developing countries like East Timor, also controlling the age and size of the company.

Our empirical work starts with the standard Cobb-Douglas[8] production function given by equation number 4.2, then the standard log transformation was done, resulting in equation 4.4:

$$ln(P_i) = ln(A_i) + \alpha ln(L_i) + \beta ln(K_i) \qquad (4.4)$$

In which the variables are the same as those indicated in equation 4.2, but with respect to P_i, therefore the total of the output, were considered two different values thus obtaining two different models. In the first case, it was considered as total output the total of the sales after the receipt of the microcredit, and in the second case, it was considered as P_i the variation occurring in the total of the assets after and before the receipt of the microcredit. We follow in this way, similar procedures to those used in the literature notably reported by Syverson (2011).

The MSEs productivity, as already mentioned, will be given in three ways: single-factor productivity; total factor productivity; and, labor productivity. So, single-factor productivity (SFP) will be given by the ratio between total output and total man working per hour, is the total output given by the total production (Syverson, 2011); Labor productivity (LP) is provided as a benchmark, and is measured as a ratio of firms sales to human capital (Schiffbauer and Ospina, 2010 and Syverson, 2011); finally, total factor productivity (TFP) as the residual from Cobb-Douglas production function (Hulten, 2001 and Syverson, 2011).

The final model is:

$$ln(y_i) = \theta_0 + \theta_1 ln(age_i) + \theta_2 ln(size_i) + \theta_3 ln(MCL_i) + \theta_4 ln(I_i) + \theta_5 ln(HC_i) \qquad (4.5)$$

Where y_i is the productivity of MSE *i* and it is the dependent variable measured by the *single factor productivity* (*SFP*), *total factor productivity* (*TFP₁* and *TFP₂*) and *labor productivity* (*LP*). The independent variables are: *age*, that represents the age of MSEs, in MSEs *i*; *size*, it represents the size of MSEs, in MSEs *i*; *MCLs*, is the amount of microcredit loan received by MSEs, in MSEs *i*; *I*, represents the investment measured by the amount of investment made after the receipt of the microcredit loan, in MSEs *i*; and, *HC*, it represents the human capital measured by total educated and highly-skilled workers in MSEs *i*. In equation 4.5, the θ_i coefficients are elasticities with respect to the corresponding variable.

[8]In their analysis, Cobb and Douglas (1928) investigated production in manufacturing firms and, consequently, the land was excluded as a production factor. In this study, also, land was excluded from the analysis.

We will resort the *F test* for regression, for the purpose of testing the significance of the independent variables. Test *F* and *R-squared* were used to determine which model was most appropriate.

4.4. Empirical Results

The results presented in table 4.2, in the appendix, describe the descriptive statistics. Observing the value of the three variables that capture the productivity of the MSEs in the study, we observed that: on average, the MSEs of our sample, produce 81.46 USD of product/service per hour (SFP); on average, the total factor productivity is 6.25 (TFP1) and 0.72 (TFP2); and, labor productivity (LP) is 391.69. Companies have an average of 4.7 years (age), which indicates that MSEs in our sample are young, with an average dimension, measured by the total of employees after receiving the microcredit (size), of 2.08 employees. These firms received, on average, a total of 2,779.81 US$ microcredit (MCLs) and carried out, on average, investments (I) in the order of 756.12 US$. Finally, on average, the firms of the sample have 1.52 educated and highly-skilled workers (HC), we conclude that most of MSEs in Dili, East Timor had less educated and lower-skilled workers.

By analyzing the correlation matrix (table 4.3, in the appendix), it is possible to see that all the values of the independent variables are below 0.50, except for the correlation between size and TFP1 also for HC and size[9], showing that there will be no problem of colinearity between these variables.

Table 4.4, in the appendix, shows the results of the regressions. Model 1 reports the results with *SFP*, Model 2 for *LP*, and Models 3 and 4 for total factor productivity with TFP_1 and TFP_2, as dependent variables that account for the productivity of MSEs.

The observation of Table 4.4 reveals that the results of the *F* statistic for the regression models are significant in all cases, with a significance level of 1%. The *R-Squared* values are between 30% to 87% in our study. Based on these values, the overall results can be considered valid and, consequently, open to interpretation[10].

Overall, it is observed that hypothesis 2 was confirmed and that 3 was partially confirmed, since the variable *age* has a negative and statistically significant impact on productivity (except in model 2 and 3) but the *size* seems to have an impact positively significant to 1% and 5% (except for model 2, where it is negatively significant to 10%) in the productivity of MSEs in East Timor, regardless of what the productivity measure is used. The microcredit (*MCLs*) variable has a positive and statistically significant impact on productivity (except in model 1). The results indicate that microcredit loan size increase MSEs productivity whether it is considered the TFP1, TFP2, and LP, and is significant for 1% and 10%, so our first hypothesis (and main purpose of the study) is confirmed. The result shows that investment (I) increase MSEs productivity, but only for labor productivity, so hypothesis 4 was partially confirmed (only for Model 2). Human capital (HC) has a positive and statistically significant impact at 10% for the third model only, so hypothesis 5 was partially confirmed.

Let us analyze the impact of each explanatory variable. The age of MSEs (*age*) has a negative and statistically significant impact on models 1 and 4, at the 5% and 10% levels, and thus in the productivity of MSEs. This result allows us to confirm our second hypothesis and shows that MSEs productivity decrease with age. This evidence agrees with the argument of Barron et al. (1994) and Loderer and Waelchli (2010), who reported that the productivity of SMEs decreases with age.

The SMEs *size* has a positive and statistically significant impact, at 1% and 5% level in models 3 and 4, respectively, but has a negative and significant impact, at 10% level in model 2, on the productivity of MSEs. The first result allows us to conclude that MSEs productivity increase with size. This evidence agrees with the argument of Serrasqueiro and Nunes (2008), Stierwald (2009),

[9] The test for multicollinearity (Collin test) was performed and it was revealed that there were no collinearity problems.

[10] The tests to the hypotheses of the multiple linear regression model were performed and validate the use of this type of models in this sample.

Vijayakumar and Tamizhselvan (2010), Vijayakumar (2011), Ayele (2012) and Pervan and Višić (2012), as they found that the productivity of SMEs increases with their size. The second result shows that the productivity of MSEs decreases with age. This evidence is supported by Dhawan (2001), Ramasamy et al (2005), Salman and Yazdanfar (2012) and Nunes et al (2013). The fact that there is no consistency in the impact of this variable is in accordance with what is mentioned in the literature, in which it is possible to find both positive and negative impacts.

The microcredit loan size (*MCLs*) has a positive and statistically significant impact, at a 1% level in model 2 and at a 10% level in models 3 and 4, on the productivity of MSEs. This result allows us to confirm our first hypothesis and shows that the productivity of MSEs increases with the size of the microcredit loan received. From the analysis made to the literature on the influence of the capital structure on productivity, as well as from studies on microcredit, we hoped that microcredit would increase the productivity of SMEs. So, this result is consistent with Jaramillo et al (1996), McMahon (2001), Kristiansen et al (2003), Serrasqueiro and Nunes (2008), Ahmad et al (2012), Dube (2013) and Fosu (2013), who found that the productivity of SMEs increased by increasing capital structure.

Investment (*I*) has a positive and statistically significant impact, at a level of 5%, on SME productivity when measured by labor productivity. This result briefly supports our fourth hypothesis and shows that the productivity of MSEs increases with the investment made by these. This result is consistent with Bustos (2007), Costantini and Melitz (2007), Lileeva and Trefler (2007) Aw et al (2007), who found that the investment has a positive impact on the productivity of SMEs.

The human capital (HC) has a positive and statistically significant impact, at a level of 10%, on the MSEs productivity, but only in model 3. This result allows us to briefly confirm our fifth hypothesis and shows that the productivity of MSEs increases with the number of skilled and educated workers. This result is consistent with Tan and Batra (1995), Haltiwanger *et al*. (1999), Dearden et al. (2000), Jones (2001), Ichniowski and Shaw (2003), Takii (2005) and Ilmakunnas et al. (2004), Abowd et al. (2005), Bloom, Bond and Reenen (2007), Bandiera et al (2009), Garicano and Heaton (2007), De la Fuente, (2011), Fox and Smeets (2011), who found that the higher the number of skilled and educated workers the greater the productivity of SMEs.

To sum up, our results indicate that microcredit has an impact on the productivity of MSEs when productivity is measured by SFP, TFP, and LP. These results support those of Conroy (2006), Cooper (2012), Ledgerwood (1999), Maengwe and Otuya (2016), Robinson (1998), Srinivas (1997), Grameen Bank (2001), Yunus (2007) and Wahid (1994), who also find that microcredit plays an important role in the growth of SMEs.

From our result, it is concluded that Microcredit has an important role in the productivity of MSEs. One possible way to explain the impact of microcredit on MSEs productivity is through the size of the microcredit loan received by MSEs. In fact, East Timor, a developing country, is in place 170, in a ranking of 190 countries, with regard to obtained credit (World Bank, 2016). For this reason, East Timor still needs to work hard to improve the service of microcredit institutions and develop the financial sector. Because when it is observed that microcredit contributes to improving the productivity of SMEs this can help to motivate the Timorese to become more involved in conducting business. The development of financial intermediaries can promote the increase of new investments and thus support MSEs in increasing their productivity. Microcredit lending is an important factor in the success of MSEs' growth and productivity, as the lack of access to credit would hinder the productivity of MSEs.

Our results show that the increase in the number of skilled workers is good for the productivity of MSEs, and so, this is good for the growth of the economy. MFIs by providing microcredit to MSEs allows them to invest and improve their employees' skills (through training), or even enable companies to hire more skilled workers. In our view and according to the results achieved, MSEs with skilled and educated workers can increase their productivity levels.

4.5. Conclusion

The purpose of this study was to determine the impact of the microcredit on the productivity of MSEs in East Timor. We intend to find out if the microcredit has an impact on productivity (measured by single factor productivity (SFP), total factor productivity (TFP) and labor productivity (LP)) of MSEs, in district Dili, East Timor, controlling for the age of firm, size of the firm, investment made after receiving the funds of microcredit, and human capital.

To that effect, a multi-linear regression model, with logarithms, was used, where the level of productivity (dependent variable) was calculated in three ways: single factor productivity; total factor productivity; and, labor productivity. As for the independent variables, they were considered: age; size; microcredit loan size; investment; and, human capital. A single MSEs database was used, collected by hand from March to April 2018 in Dili, East Timor.

The results indicate that microcredit increases the productivity of MSEs when it is measured by SFP, TFP and LP. And, also that microcredit loan size, investment and human capital increase productivity. On the age of MSEs, this presents the expected signal with our second hypothesis and this result agrees with the argument of Barron et al (1994) and Loderer and Waelchli (2010). As regards the dimension of MSEs, both positive and negative signs were obtained.

So, it is possible to conclude that microcredit institutions have a significant impact on MSEs productivity in Dili, East Timor. Our result suggests that developing and increasing the number of microcredit institutions in this country can help MSEs to increase their productivity in the future.

The development of financial intermediaries can increase the realization of new investments and support MSEs in increasing their productivity. Microcredit loan is an important factor in the success of the growth and productivity of MSEs, as the lack of access to credit hampers the productivity of MSEs.

Our results regarding microcredit are consistent with literature when the productivity of SMEs is measured by *single factor productivity* (*SFP*), *total factor productivity* (*TFP*) and *labor productivity* (*LP*). For developing countries such as East Timor located at level 170, of a ranking of 190 countries, on obtaining credit (World Bank, 2016), the study of the impact of microcredit on business productivity is important. For this reason, East Timor continues to need work to improve the service of microfinance institutions and the development of the financial sector.

This study is not exempt from limitations, namely: the data relate only to 1 year; the sample used is composed only of 269 MSEs; multiple linear regression was used to analyze our data; the data relate only to companies in Dili, East Timor; and, the fact that no supporting literature has been found on the impact of microcredit on SME productivity, making it more difficult to rationale the first hypothesis.

On the basis of the foregoing limitations, there are clues to future research, namely: gathering information for more than one year and for a higher number of firms; in order to test the robustness of the results, we suggested the collection of the same type of data for another developing country; by increasing the number of years and companies in the database, it would be possible to apply other types of models, namely panel data models; and finally, the deepening of the models that were used to calculate the productivity level of the SMEs.

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Appendix

Table 4. 2 Statistic Descriptive

Variable	Obs	Mean	Std. Dev.	Min	Max
SPF	269	81.46	742.89	0.00	12,000.00
TFP_1	36	6.25	0.80	4.59	7.91
TFP_2	36	0.72	0.38	-0.25	1.24
LP	147	391.69	489.27	12.50	2,800.00
age	269	4.70	4.33	0.00	34.00
size	268	2.08	2.99	0.00	25.00
MCLs	266	2,779.81	9,486.54	150.00	150,000.00
HC	269	1.52	2.18	0.00	15.00
I	269	756.12	1693.14	0.00	15,000.00

Table 4. 3 Matrix correlation

	SFP	TFP_1	TFP_2	*LP*	*Age*	*Size*	*MCLs*	*I*	*HC*
SFP	1.00								
TFP_1	0.49	1.00							
TFP_2	0.45	0.79	1.00						
LP	0.05	0.04	0.13	1.00					
Age	-0.03	0.08	-0.29	-0.161	1.00				
Size	0.02	0.88**	0.60	-0.13	0.25**	1.00			
MCLs	-0.01	0.50	0.47**	0.32	0.12	0.16**	1.00		
I	-0.021	0.16	0.17	0.20	0.01	0.20	0.36	1.00	
HC	0.072	0.82	0.75	-0.13	0.08	0.75**	0.05	0.15	1.00

Significance are: ** p<0.05

Table 4. 4 Results of the regression models

Variables	Model 1	Model 2	Model 3	Model 4
	lnSFP	**lnLP**	**$lnTFP_1$**	**$lnTFP_2$**
lnage	**-0.663****	-0.102	-0.009	**-0.128***
	(0.304)	(0.162)	(0.069)	(0.068)
lnsize	0.138	**-0.467***	**0.679*****	**0.201****
	(0.263)	(0.265)	(0.151)	(0.096)
lnMCLs	-0.216	**0.461*****	**0.127***	**0.110***
	(0.238)	(0.125)	(0.066)	(0.063)
lnI	0.166	**0.248****	-0.019	-0.005
	(0.127)	(0.109)	(0.035)	(0.036)
lnHC	0.112	-0.026	**0.080***	0.049
	(0.082)	(0.131)	(0.046)	(0.046)
Constant	**3.223*****	**6.142*****	**4.944*****	**0.262**
	(0.734)	(0.347)	(0.206)	(0.215)
R-squared	0.304	0.404	0.865	0.652
F-statistic	**4.10*****	**5.86*****	**17.85*****	**9.58*****

In brackets it is presented the standard deviation and significance levels are: *** p<0.01, ** p<0.05, * p<0.10

Chapter 5- The impact of Microcredit on the Poverty Reduction in eleven Asian developing countries[11]

Abstract

This paper examines the impact of microcredit, job creation, inflation rates and education on poverty reduction, controlling for income and its distribution, in East Timor, Bangladesh, Indonesia, Philippines, Myanmar, Cambodia, Pakistan, Malaysia, Thailand, Nepal and Sri Lanka.

Static and dynamic panel data models were used with a panel of 11 developing countries from 2007 to 2016.

The results indicate that microcredit loan size has the capacity to reduce poverty (when measured by the headcount index, poverty gap and squared poverty gap). More importantly, microcredit institutions have a significant impact on poverty reduction, either by financing business or through creating jobs and raising the population's level of education.

***Keywords**:* GDP Per Capita, Gini Coefficient, Headcount Index, Inflation Rates, Job Creation, Level of Education, Microcredit Loan Size, Poverty Gap, Poverty Reduction.

5.1. Introduction

Poverty is a complex phenomenon involving multiple deprivations. The economic definition of poverty states that an individual is deemed poor if unable to attain a minimal standard of living. Poverty alleviation cannot be defined only in economic terms but is also about addressing a much broader set of needs. Amartya Sen (1997), the Nobel Prize-winning economist, eloquently argues that development can be seen as a "process of expanding the real freedoms that people enjoy." Social, cultural, and political freedoms are desirable in and of themselves, and they also enable individual income growth. Services such as public safety, basic education, public health, and infrastructure nurture these freedoms and increase the productivity and employability of the poor, and thus their income and well-being (Yunus, 2009).

Poverty is still one of the world's greatest problems, such that one of the millennium development goals (MDGs) defined in 2015 was to reduce the poverty headcount rate worldwide (Way, 2015).

For example, East Timor, a new nation in the world, continues to be one of the world poorest countries, with GDP per capita of $986.70 in 2015 (Trading Economics, 2017). Under the Indonesian regime, it had a GDP per capita around one-third of the Indonesian national average. Consequently, some 30% of the population (double the rate for Indonesia as a whole) was below the poverty line. In 1993, 71% of all villages in the province were classed by the Indonesian government as *desatertinggal*, or 'backward villages' according to criteria of isolation, infrastructure, housing and physical environment (Conroy, 2006).

East Timor's poverty problem is a major after-effect of the struggle for independence from Indonesia, which seriously damaged infrastructure and dislocated thousands of East Timorese. As a result of the conflict, 95% of schools were destroyed in 1999. As of 2011, 37.4% of civilians live below the international poverty line of $1.25 (in purchasing power parity terms) per day and 40% of the population is malnourished (World Bank, 2003). The ASEAN development report (2017) states that around 90% of the 36 million people in Southeast Asia that live below the international poverty line are Filipinos and Indonesians.

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The aim of microcredit was to reduce poverty by creating self-employment in low-income communities (Bauchet, Morduch and Ravi, 2015). It is not easy to develop and expand business in East Timor, because it is difficult to get credit to support SMEs. In response to this situation, the government has recently transformed the *Instituição de Microfinanças de Timor-Leste* (IMFTL - Institute for Microfinance in East Timor) into the National Commercial Bank of East Timor (BNCTL) (Asian Development Bank, 2012).

In the case of East Timor, the sector consists of two specialized NGOs, several credit unions and a number of microfinance programmes, most of these organizations were members of the Association for Microfinance in East Timor (AMFITIL). *MorisRasik* was established in 2000 and is the largest rural microcredit NGO in the country. The other is *Tuba Rai Metin* which runs microcredit programmes for women in Dili and in the eastern districts. Both organizations are preparing to become Other Deposit Taking Institutions, following the relevant law established in December 2010. There are an estimated 275,300 people (aged 15-64) in need of microfinance services, but high-interest rates continue to be a barrier to accessing small business loans in East Timor (ADB, 2012), as in other developing countries.

Creating opportunities for steady employment at reasonable wages is the best way to take people out of poverty. “Nothing is more fundamental to poverty reduction than employment,” states the ILO (1977). And the United Nations Development Programme agrees: “Employment is a key link between economic growth and poverty reduction. Productive and remunerative employment can help ensure that poor people share in the benefits of economic growth.” (Yunus, 2009). How should microcredit be considered as a pillar of self-employment to alleviate poverty?

Studying China, Wang (2004) concludes that microcredit had a great impact on poverty reduction through job creation, and the percentage of people living in poverty has declined significantly in recent decades. However, Yunus (2009) found that in Africa and India microcredit is not working to reduce poverty. Inequality is increasing around the world while it appears to become more uniform due to the phenomenon of globalization. Even the wealthiest nation has the largest gap between rich and poor. In such a scenario, countries like East Timor face a major challenge in tackling poverty, because the gap between rich and poor is increasing day by day.

Poverty is the greatest challenge faced by a developing country. Poverty leads to illiteracy, unemployment, malnutrition, lack of motivation, a generalization of poverty and other economic and social issues. In order to control these other problems, poverty has to be controlled, and therefore many strategies have been introduced by national governments and at the international level.

The purpose of this study is to see if microcredit can reduce poverty. The original intention was to analyze only the case of East Timor, but due to the impossibility of obtaining a sufficient set of observations for the use of econometric models, information was gathered for the following countries: East Timor, Bangladesh, Indonesia, Philippines, Myanmar, Cambodia, Pakistan, Malaysia, Thailand, Nepal and Sri Lanka.

The paper uses the growth-poverty model initially suggested by Ravallion (1997) and adds the microcredit loan size, job creation, inflation rates and education on poverty reduction, using static and dynamic panel data models. According to the authors ' knowledge, this is the first work that carries this study using the GMM system (Blundell and Bond, 1998).

This study contributes to the literature on microcredit, but also to the literature on the study of developing countries. Improving the initial growth-poverty model suggested by Ravallion (1997) and using the dynamic panel data model with the GMM system (Blundell and Bond, 1998), and thus controlling correctly: endogeneity; time-invariant characteristics; possible collinearity between independent variables; effects of the eventual omission of independent variables; elimination of non-observable individual effects; and, the correct estimate of the relationship between the dependent variable in the previous and current periods. The results allow to conclude that microcredit loan size reduces the poverty when this is measured by headcount index, poverty gap and squared poverty gap, and, also, that *job creation*, *inflation rates* and *education* reduce poverty.

According to World Bank reports (2016), there are about 766 million people living under the poverty line of US$ 1.90 a day, and about 33% of the world's poorest people live in South and East Asia. The reasons for choosing these eleven Asian countries are mainly geographical, economic and cultural. This group of countries is also suppliers of goods and commodities to East Timor. Another reason is that East Timor is in the process of joining the Association of Southeast Asian Nations (ASEAN) and six of those countries (Indonesia, Philippines, Myanmar, Cambodia, Malaysia and Thailand) are members of ASEAN. Besides those reasons, these ten countries have poverty issues similar to East Timor.

We intend to find out whether lending to SMEs, in the form of microcredit, has a significant impact on the Headcount index, poverty gap and squared poverty gap, and especially on poverty reduction in East Timor, Bangladesh, Indonesia, Philippines, Myanmar, Cambodia, Pakistan, Malaysia, Thailand, Nepal and Sri Lanka, from 2007 to 2016. We intend to prove the impact of microcredit on reducing poverty and improved living standards, encouraging economic growth and having a role in stabilizing these countries.

The paper uses the growth-poverty model initially suggested by Ravallion (1997) and adds microcredit loan size, job creation, inflation rates and education as factors determining poverty reduction, using static and dynamic panel data models. As far as we know, this is the first study in this field to use the GMM system (Blundell and Bond, 1998).

This study contributes to the literature on microcredit, but also to the study of developing countries. It improves the initial growth-poverty model suggested by Ravallion (1997), using a dynamic panel data model with the GMM system (Blundell and Bond, 1998), and thus controlling correctly for: endogeneity; time-invariant characteristics; possible collinearity between independent variables; effects of the eventual omission of independent variables; elimination of non- observable individual effects; and correct estimate of the relationship between the dependent variable in the previous and current periods. The results allow the conclusion that microcredit loan size reduces poverty when this is measured by the headcount index, poverty gap and squared poverty gap, and also that job creation, inflation rates and education reduce poverty.

After this introduction, the paper is organized as follows. Section 2 presents the literature review, Section 3 presents the methodology and describes the data, Section 4 discusses the empirical results and Section 5 concludes.

5.2. Literature Review

As Miled and Rejeb (2015) pointed out, we can divide the literature on the impact of microfinance into three categories. The first examines the impact of microfinance on poverty (Hulme and Mosley, 1996; Pitt and Khandker, 1998; Copestake, Johnson and Wright, 2002; Khandker, 2005; Tedeschi, 2010; Samer, Majid. Rizal, Muhamad and Rashid, 2015; Donou-Adonsou and Sylwester, 2016; Rewilak, 2017). The second analyses the impact of microfinance on women's empowerment (Hashemi, Schuler and Riley, 1996; Steele, Amin and Naved, 1998; Rahman, Junankar and Mallik, 2009; Pitt, Khander and Cartwright, 2006; Garikipati, 2012). The last category shows other effects of microfinance, such as the impact on education, health, nutrition, consumption level and built assets (DeLoach and Lamanna, 2011; Gertler, Levine and Moretti, 2009; Jacobsen, 2009; Kouassi, 2008; Leatherman, Metcalfe, Geissler and Dunfor, 2011; Hazarika and Sarangi, 2008).

Authors such as Imai, Gaiha, Thapa and Annim (2012), Ahlin (2011), Donou-Adonsou and Sylwester (2016) and Rewilak (2017) concluded that microfinance is important in reducing poverty. They showed there are fewer poor people in countries where the number of microfinance institutions is higher (Miled and Rejeb, 2015). In this section, we will critically introduce the theory and concepts of microcredit and poverty reduction. We also define microcredit and describe the determinant indicators of poverty reduction. Poverty is one of the biggest obstacles faced by developing countries in increasing their economic growth. So, in this study we also explore the determinants of poverty reduction.

5.2.1. Definition of Microcredit

Otero and Rhyne (1994) considered microcredit as financial supply services to create self-employment for low-income poor and very poor people. Ledgerwood (1999) describes these financial services as including savings and credit services, but may also include other services such as insurance and payment services. Likewise, Schreiner and Colombet (2001) define microcredit as an attempt to improve access to small deposits and small loans for poor households neglected by banks. This implies that microcredit involves poor people in obtaining financial services such as savings, loans, insurance, etc. allowing them to lead a decent life in urban and rural environments where they would be unable to obtain such services from the formal financial sector. Bajwa (2001) defines microcredit as credit provided to poor people with collateral from peers through institutionalized mechanisms. This credit is made available as and when needed, on the client's doorstep.

Conroy (2002) stated that microfinance was the provision of a broad range of financial services such as deposits, loans, payment services, money transfers and insurance to poor and low-income households and their micro enterprises. The term evolved from the concepts of "microcredit" and "micro-enterprise" financing, to include the importance of savings as well as borrowing. Although the terms are used interchangeably, microfinance represents the field as a whole, while the other two terms are more technical and refer only to credit provision (Maria, 2004).

The concept of micro-financing arose out of the need to provide loans to low-earners who were left out by formal financial institutions. The practice of microcredit dates back to as early as 1700 and can be observed in the Irish Loan Fund System, which provided small loans to the rural poor with no collateral (Maengwe and Otuya, 2016). Over the years, the concept of microfinance spread to Latin America, then to Asia and later to Africa. The modern use of the micro-financing expression has its roots in the 1970s, when organizations, such as the Grameen Bank of Bangladesh with the pioneer microfinancier Mohammad Yunus, were starting to shape the modern micro-financing industry (Yunus, 2009 and Wahid, 1994).

Microfinance has the following characteristics: loans are usually relatively short-term, less than 12 months in most instances; and are generally for working capital with immediate regular weekly or monthly repayments. They are also provided quickly after approval, particularly for those seeking repeat loans. Traditional lenders' requirements of physical collateral, such as property, are usually replaced by a collective guarantee system where members are mutually responsible for ensuring their loans are repaid (Khan, 2008).

5.2.2. Determinants of poverty reduction

5.2.2.1. Microcredit Loan Size

Stegman (2010) defined that access to financial services can help promote equity, in this context related to greater economic balance and faster economic growth. Most research has focused on the impact of access to credit on microeconomic development, finding that micro-enterprises' easier access to financial services has a significantly positive impact on a country's income distribution (Westley and Palomas, 2010).

From the literature on financial intermediation and poverty reduction, it is concluded that the development of the financial sector contributes to economic growth and thus to alleviating poverty (Prokopenko and Holden, 2001). A World Bank survey, looking at cross-evidence, found that development of the financial intermediary reduces income inequality by disproportionately boosting the income of the poor and thereby reducing poverty (Beck and Levine, 2004).

In many developing countries, poor rural households face extreme requirements when seeking credit from formal lending institutions. Formal financial services, for example, those offered by banks, are regularly not accessible to those below the poverty line because loans must be supported by collateral. Nor do banks welcome the small amounts the poor want to save. As a result, the poor usually turn first to informal sources, for example, friends, relatives or moneylenders, who lend

small sums and for short periods of time, or to informal, indigenous institutions, for example, savings clubs and lending networks that lend enough to purchase food and other basic necessities.

Microlenders increased the size of the loan not by increasing the actual amount but by stretching its maturity. Looking only at the amount provided, donors would have mistakenly referred to this as unchanged, rather than diminished. The “dollar-years of borrowed resources” should probably be the preferred measure of loan size. In simple terms, “dollar-years of borrowed resources” is the average balance that would be obtained if the loan had a maturity of one year (Schreiner, 2001).

Similarly, loans resulting from microfinance (for example, for the purchase of a fixed asset such as a sewing machine) may differ with regard to their maturity. A given loan is seen as "large" or "small" depends on what aspects are most important. Borrowers concerned about having low monthly payments will be considered a loan lasting 2 years shorter than a loan for 1 year. A borrower concerned about obtaining enough money to make an acquisition will see both loans as equivalents, and a borrower concerned about the cost of interest will see a 30-year loan as greater than one lasting 15 years (Schreiner, 2001).

In both developed and emerging economies, small businesses are recognized as the main source of job creation, more so than large corporations and government administrations. For this reason, small business loans are particularly important for BNCTL in the case of East Timor, to fulfill its mission to support job creation and contribute to poverty reduction. According to the Operations Manual (BNCTL, 2011), small business loans are intended for “micro-entrepreneurs to support the acquisition of raw materials, increased inventory and payment of labor expenses”. In other words, most small business loans are expected to be for working capital purposes. These loans can also be used to finance the acquisition of equipment, but the limited amount will be selective and maximum duration will be 36 months (3 years). The maximum amount of the loan will be adapted to the size of the business (wealth and annual sales) and depends on the calculation of the financing limit by BNCTL. If the business is improving and increasing, this can be seen from the increase in turnover, wealth and sales, so the loan provided to the debtor in question is increased or adjusted from a small business one to a medium-sized one (BNCTL, 2011). According to BNCTL (2011), micro-enterprises can be risky borrowers, for the following reasons:

- They are typically small, between one and ten employees;
- They are informal, which means they are not registered or licensed and do not pay taxes;
- They use traditional, non-modern technologies;
- They are factory owners;
- They maintain no formal accounting;
- Business and family income are not kept separate.

Microcredit loan size is an important factor of successful poverty reduction because the lack of access to credit will hinder SME growth. For this reason, it is assumed that if the amount of loans increases, a reduction in the level of poverty is expected.

Based on this assumption, we formulate the following hypothesis:

H1: The microcredit loan size has a negative impact on poverty in eleven developing Asian countries.

5.2.2.2. Job Creation

Growth in the number of small enterprises contributes to reducing poverty through job creation, either through the emergence of new enterprises or the expansion of existing ones. In developing countries, job creation providing reasonable wages to poor people is the best way to take them out of poverty. Khan (2001) showed that employment expansion plays a major role in poverty reduction. Examining the links between economic growth, employment and poverty reduction, through case studies in Bangladesh, Bolivia, Ethiopia, India, Indonesia, Uganda and Vietnam, Islam

(2002) found that the greater the focus on employment, the more effective the economic growth in the fight against poverty. On the basis of the ILO declaration (2003) where nothing is more fundamental for poverty reduction than employment, job creation offers the opportunity for people to gain income, either consciously or unconsciously, and also encourages entrepreneurs to start new businesses.

In their study about growth issues for poverty alleviation, Loayza and Raddatz (2010) showed that growth in labor-intensive industries reduces poverty. Studying SMEs and employment in Nigeria, Sanda, Dogon-Daji and Abdullah (2006) found that small firms create better job creation opportunities than large ones. Adenutsi (2009) argues that entrepreneurship is the key to economic growth through job creation, income generation and empowerment, as well as poverty reduction in low-income economies. Shariff, Peou and Ali (2010) state that micro, small and medium-sized enterprises (MSMEs) play an important role in developing a country's economic growth, as well as in alleviating poverty by creating new jobs and providing people with income. Focusing on the relationship between economic growth, employment, inequality of income and poverty in Pakistan, Zaman, Shah and Ahmad (2012) found that employment had a positive impact on poverty reduction. Ogbuabor, Malaolu and Elias (2013) examined the effectiveness of the small-scale enterprise known as burnt bricklaying, associated with the economic challenges related to poverty and unemployment in Nigeria, and found a positive relationship between small-scale enterprises and job creation. In a study about the dynamics of employment growth in 18 countries, Criscuolo, Gal and Menon (2014) showed that new entrants are the drivers of job creation. Furthermore, incumbent young firms are also generally net job creators.

Some evidence, from the studies below, rejects the view that SMEs are the engine of job creation. Davis, Haltiwanger and Schuh (1996) investigated small businesses and job creation in the United States manufacturing sector using data between 1972 and 1988, and the net employment rates found did not present a systematic relationship with the size of the company in developed countries. Nasar (1994), as cited in Snodgrass and Biggs (1996), concluded that small manufacturing firms did not consistently create more jobs on a net basis than large firms in the United States, between 1973 and 1988. Biggs, Ramachandran and Shah (1998), in their study of the determinants of growth in MSMEs in Sub-Saharan Africa, showed that large enterprises were the dominant source of job creation in the manufacturing sector. In a study of the contribution of SMEs to job generation in Nigeria, Kadiri (2012) found that SMEs are not able to create jobs because of their inability to obtain adequate funding sources when starting their business. Kerr, Wittenberg and Arrow (2014), in a study of the creation and destruction of employment in South Africa, found that larger companies have better net job creation rates than small ones. They also found that net job creation rates are negative in manufacturing. In their empirical analysis of the determinants of poverty, Pervez and Rizvi (2014) found that employment had a negative impact on poverty reduction in Pakistan.

Based on the above, we formulate the following hypothesis:

H2: Job creation has a negative impact on poverty in eleven developing Asian countries.

5.2.2.3. Inflation rates

De Long and Summers (1992) argued that lower inflation is associated with higher growth. Levine and Renelt (1992) showed that high growth countries have lower inflation. Bruno and Easterly (1996) found no adverse effect of inflation on growth for countries with inflation below 40 percent. This result was supported by Ghosh and Phillips (1998), who showed that, for IMF member states, low inflation is positive for growth, while high inflation, on the contrary, is negative. Judson and Orphanides (1999) presented evidence that, although inflation in general has a negative impact on growth, inflation levels below 10% have no impact on economic growth. In their study of the limits of the effects of the relationship between inflation and growth, Khan and Sendhaji (2002)

showed that the relationship between inflation and poverty in the *Least Developed Countries* (*LDCs*) is more complicated, as in the case of inflation levels exceeding 40%, poverty is not reduced. Talukdar (2012), in his study about the effect of inflation on poverty in developing countries from 1981 to 2008, found that in low-income countries, inflation had a negative impact on poverty in certain conditions. Pervez and Rizvi (2014), in their empirical analysis of the determinants of poverty, found that inflation had no impact on poverty reduction in Pakistan.

In his study about inflation, growth and external debt, Gylfason (1991) found a negative impact of inflation on economic growth. Cukierman (1992) concluded that inflation had a significant negative impact on economic growth. Fischer (1981) found that inflation had a negative impact on economic growth, for all levels but particularly for lower levels of inflation in the Central African Republic and Malawi. De Gregorio (1993) found a negative relationship between inflation and economic growth. Dollar and Kraay (2002) showed that inflation has a negative impact on economic growth. Barro (2013) concluded that high levels of inflation significantly decrease economic growth, the significance emerging only when considering high levels of inflation, with the relationship disappearing in economies with inflation under 15%.

So, we formulate the following hypothesis:

H3: A high inflation rate has a positive impact on the poverty in eleven developing Asian countries.

5.2.2.4. Education

Rosen (1989) defines human capital as the set of skills and productive knowledge incorporated in people. This knowledge, imparted through education, increases people´s productivity and thereby their earnings. The human capital approach regards education as an important instrument for the reduction of poverty. Based on human capital theory, the formation of human capital is an important factor of economic growth through investment in education. Education together with training imparts skills and productive knowledge and transforms human beings into more valuable human capital. The ILO (1977) stated that education is itself a basic necessity, and equal access to educational services, particularly in rural areas, is an important ingredient in the strategy of basic needs. Bigsten, Kebede, Shimeles and Taddesse (2003) concluded that the educational achievement of the head of the family is the most important factor associated with a reduction of poverty. Geda, de Jong, Mwabu and Kimenyi (2001) and Oiro et al (2004), found that poverty diminishes as the level of education increases in Kenya.

Noor (1981), Cochrane, Ohara and Leslie (1980) and Jeffery and Basu (1996), described the indirect effect of education on poverty through the fulfillment of basic needs and the effects on women's behavior in decisions relating to fertility, family welfare and health, among others. The impact of education on poverty reduction is further strengthened, like education and other basic needs reinforce each other (Noor, 1981; Tilak, 1989; Unesco-PROAP, 1998).

Khan and Khan (2008) found that improving human resources and increasing investment in human capital contributed to poverty reduction. But the findings of the study indicate that they are negatively related to each other. Afzal, Farooq, Begum and Quddus (2010) confirm that the short and long-term effect of physical capital on economic growth is positive and significant. Janjua and Kamal (2011) found that education is the most significant factor in alleviating poverty in developing countries.

Based on these assumptions, we formulate the following hypothesis:

H4: Education has a negative impact on poverty in eleven developing Asian countries.

5.2.2.5. GDP Percapita

According to the World Bank (2000) and UNDP (2001), the poverty line is defined at the national level, considering the level of income required to purchase a defined minimum level of food. The poverty line is also defined, at international levels, by considering US$1 and US$2 per head per day as alternative minimum levels of income. Unfortunately, the line of poverty thus defined, national or international, considers the minimum level of income needed for a minimum amount of food for survival, and nothing else. Estimates of poverty, at both the national and international level, are available in a large number of countries.

Bourguignon (2003) presents a study, based on linear regressions, where the evolution of the poverty measure is explained by the growth of income or GDP per capita. Fosu (2010) claims that East Asia and the Pacific have recorded spectacular GDP growth per capita, resulting in substantial reductions in poverty in the two periods from 1981 to 1995 and 1996 to 2005. This contradicts the example of South Asian countries which, despite high GDP growth, have managed to reduce poverty in only relatively modest proportions. Furthermore, moderate GDP growth in the Middle East and North Africa was transformed into appreciable less poverty during the early sub-period, but stronger growth in the last period (1996-2005) resulted in moderate levels of poverty reduction. According to Fosu (2010), both low-income and higher-income countries showed a greater capacity to transform a particular growth rate into poverty reduction. These countries presented higher levels of elasticity. On the contrary, low-income countries will need greater efforts to increase income and decrease inequality to reduce their poverty levels. Donou-Adonsou and Sylwester (2016), in their study of financial development and poverty reduction in developing countries and using panel data from 71 developing countries from 2002 to 2011, found that GDP has a negative, but significant impact on poverty reduction.

Using a data set of 60 developing countries, Adams (2004) found a weak statistical relationship between GDP per capita and poverty reduction. Škare and Družeta (2016) found that economic growth is beneficial for the poorest but is not enough to reduce poverty.

Based on this, we formulate the following hypothesis:

H5: GDP per capita has a positive impact on poverty in eleven developing Asian countries.

5.2.2.6. Gini Coefficient

The Gini coefficient is a number between zero and one, which measures the degree of inequality in the distribution of income in a given society. The World Bank (2016) states that the Gini coefficient is the most commonly used measure of income inequality in countries. The coefficient would be 0 in a society where each member received exactly the same income (Bosch, Rossouw, Claassens and du Plessis, 2010), and would be 1, if a member received all the income and the remainder received nothing (Atkinson and Bourguignon, 2014).

The Gini coefficient is defined, mathematically, based on the Lorenz curve. For Atkinson and Bourguignon (2014), the Gini coefficient is a standard measure of inequality which is scaled between zero (perfect equality) and 100 (perfect inequality). Higher values indicate higher income inequality, so higher negative growth rates indicate faster movement towards income equity. Therefore, the Gini Index can be formulated as follows:

$$G = 1 - \sum_{i=1}^{N} (x_i - x_{i-1})(y_i + y_{i-1}) \qquad (5.1)$$

where: **G**: Gini coefficient; $\mathbf{X_i}$: cumulated proportion of the population variable, for k = 0,...,n, with $X_0 = 0$, $X_n = 1$; $\mathbf{Y_i}$: cumulated proportion of the income variable, for k = 0,...,n, with $Y_0 = 0$, $Y_n = 1$.

Ravallion and Chen (1997), using data from 67 developing and transitional economies in the period 1981-1994, found that the Gini coefficient had a positive impact on poverty reduction. With a data set of 60 developing countries, Adams (2004) found that the Gini coefficient had a positive and significant impact on poverty reduction. Adam and Page (2005) found that the Gini coefficient has a positive impact on poverty reduction in 71 developing countries. Studying financial development and poverty reduction in developing countries and using panel data from 71 developing countries from 2002 to 2011, Donou-Adosou and Sylwester (2016) found that the Gini coefficient has a positive impact and causes a significant reduction in poverty. Based on these studies, we conclude that the Gini coefficient will reduce poverty in a country if the percentage of income inequality is lower, and poverty will increase if the percentage of income inequality is higher.

Therefore, we formulate the following hypothesis:

H6: The Gini coefficient has a positive impact on poverty in eleven developing Asian countries.

5.2.3. Indicators of Poverty reduction

5.2.3.1. Headcount index

The simple Headcount Index is the most commonly used poverty measure. It identifies the share of a population whose income is below the poverty line. The measure literally counts heads, allowing policymakers and researchers to follow the more immediate dimension of the human scale of poverty (Morduch, 2000).

By far the most widely used measure is the *headcount index*, which simply measures the proportion of the population that is considered poor, often denoted by P_0. Formally,

$$P_0 = \frac{N_p}{N} \qquad (5.2)$$

Where N_p is the number of poor and N is the total sample.

$$P_0 = \frac{1}{N}\sum_{i=1}^{N} I(y_i < z) \qquad (5.3)$$

The headcount is calculated by comparing the income y_i of each household to the poverty line z (The index $i = 1.N$, where N is the total number of households in the sample). Especially, an indicator variable is constructed for each household, taking the value of 1 when income falls below the poverty line or 0 otherwise:

$I(y,z) = 1\ if\ yi \leq z$
$I(y,z) = 0\ if\ yi > z$

5.2.3.2. Poverty Gap Index

The poverty gap index is mostly used to measure poverty, which adds the extent to which individuals, on average, stay below the poverty line and express this as a percentage of the poverty line. More specifically, it defines the poverty gap (G_i) as the poverty line (z) less actual income (y_i) for poor individuals; the value is considered to be zero for everyone else. Using the index function as shown below:

$$G_i = (z - y_i)x\ I(y_i < z) \qquad (5.4)$$

The poverty gap index (P_1) may be written as:

$$P_1 = \frac{1}{N}\sum_{i=1}^{N}\frac{G_i}{z} \qquad (5.5)$$

where P_1 is the poverty gap index, N is the total number of households in the sample, G_i is the poverty gap, individuals are indexed by i and z is the poverty line.

5.2.3.3. Squared Poverty Gap (Poverty Severity) Index

The squared poverty gap index is one of the most commonly used poverty measures. This is simply a weighted sum of poverty gaps (as a proportion of the poverty line), where the weights are the proportionate poverty gaps themselves; a poverty gap of, say, 10 percent of the poverty line is given a weight of 10 percent while one of 50 percent is given a weight of 50 percent; this is in contrast with the poverty gap index, where the gaps are weighted equally. Hence, by squaring the poverty gap index, the measure implicitly puts more weight on observations that fall well below the poverty line.

$$P_2 = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{G_i}{z}\right)^2 \qquad (5.6)$$

It is one of a class of poverty measures proposed by Foster, Greer and Thorbecke (1984) which vary the weight of the income (or expenditure) level of the poorest members in society. These measures are additively decomposable. They also allow separating changes into a component resulting from rising average incomes and a component resulting from changes in the distribution of income.

$$P_\alpha = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{G_i}{z}\right)^\alpha, (\alpha \geq 0) \qquad (5.7)$$

where P_α is a class of poverty measures proposed by Foster et al (1984); *z*, the value of per capita expenses for the *i*th person's household is x_i, and the poverty gap for individual *i* is $G_i = z - x_i$ (with $G_i = 0$ when $x_i > z$). When parameter $\alpha = 0$, P_0 is simply the headcount index. When $\alpha = 1$, the index is the poverty gap index P_1, and when α is set equal to 2, P_2 is the poverty severity index. For all $\alpha > 0$, the measure is strictly decreasing in the living standard of the poor (the higher one's standard of living, the less poor one is deemed to be). Furthermore, for $\alpha > 1$ the index also has the property that the increase in measured poverty because of a fall in one's standard of living will be deemed greater the poorer one is. The measure is then said to be "strictly convex" in incomes (and "weakly convex" for $\alpha = 1$).

5.3. Methodology

5.3.1. Research Design and Data Collection Instruments

The study resorts to secondary data extracted from the *World Bank*, *Index Mundi* and *National Directorate of Statistics of East Timor databases.*

For the variables capturing the extent of poverty, we consider the poverty headcount index, the poverty gap, and the squared poverty gap. The first two variables come from the *Poverty and Equity Database* published by the World Bank and the last variable comes from *PovcalNet*, also published by the World Bank, as shown in Table 5.1.

The *World Development Indicators* provides data for the Gini coefficient and GDP per capita ($PPP), as shown in Table 5.1.

The *Index Mundi* and *National Directorate of Statistics of East Timor* provide data for the size of microcredit loans, job creation, inflation rates and education, as shown in table 5.1.

The data covers 11 developing Asian countries from 2007 to 2016. The eleven Asian countries are East Timor, Bangladesh, Indonesia, Philippines, Myanmar, Cambodia, Pakistan, Malaysia, Thailand, Nepal and Sri Lanka.

The summary statistics are provided in Table 5.3, and correlation coefficients in Table 5.4. As in Donou-Adonsou and Sylwester (2016), the correlation coefficients for poverty measures are negatively correlated with the variable of the size of the microcredit loan.

Table 5. 1 Variable description and source.

Variable	Description	Source
Headcount index	Poverty headcount ratio at $1.25 a day 2005 $PPP. The percentage of the population that lives with less than $1.25 a day, at 2005 $PPP, and at international prices.	Index Mundi and Poverty and Equity Database
Poverty gap	Poverty gap at $1.25 a day 2005 $PPP. The mean shortfall from the poverty line expressed as a percentage of the poverty line.	Index Mundi and Poverty and Equity Database
Squared Poverty gap	Squared poverty gap at $1.25 a day 2005 $PPP, defined as a % of the poverty line. An indicator of poverty severity.	PovcalNet
Microcredit loan size	Domestic microcredit to the private sector (% of GDP).	Index Mundi and Poverty and equity database
Job creation	Employment offerings by SMEs (% of total employed).	Index Mundi and Poverty and equity database
Inflation rates	Inflation rate (consumer prices).	Index Mundi
Education	Literacy rate, total adults (% of people aged 15 and above).	Index Mundi and National Statistics Directorate of East Timor
GDP	GDP per capita in PPP (constant 2011 international $).	World development indicators
Gini Coefficient	Measures income inequality. An index of 0 represents perfect equality, while an index of 100 implies perfect inequality.	World development indicators

5.3.2. Variables

As a dependent variable, we considered the level of poverty extension, following Ravallion (1997), Ravallion and Chen (1997), Adams and Page (2005), Donou-Adonsou and Sylwester (2016) and Rewilak (2017). So, the extent of poverty is given by:

1) **Headcount index**, which will be measured as presented in equation number 5.3;
2) **Poverty gap,** which will be measured as presented in equation number 5.5;
3) **Squared Poverty gap,** which will be measured as presented in equation number 5.7.

As independent variables, we considered:

1) **Microcredit loan size,** loan size is an important variable contributing to the growth of SMEs in 11 countries of Asia from 2007 to 2016. In our view, poverty reduction depends on the size of the loan that SMEs have received from the MFI's. An increase in the amount of the loan will affect poverty reduction.
2) **Job creation,** is measured by the employment offerings by SMEs in 11 Asian countries from 2007 to 2016. In our view, poverty reduction depends on the number of jobs offered by SMEs. An increase in the number of jobs will affect poverty reduction.
3) **Inflation rate**, measured by the inflation rate. In our view, poverty will diminish if the rate of inflation is low, but poverty will increase if the rate of inflation is high. Declining inflation rates will affect poverty reduction.

4) **Education**, measured by level of education. Reduction of poverty depends on the level of education. Increased education will affect poverty reduction.
5) **GDP**, we use the percentage of GDP per capita, which is measured by GDP per capita of Purchasing power parity (PPP). An increase in GDP per capita will affect poverty reduction.
6) **Gini Coefficient**, measured as in equation number 5.1.

The following table presents the variables used in this study, together with their corresponding measure.

Table 5. 2 Variables and Measures

Variables		Designation	Measures	Expected Signal
Independent	**Microcredit loan size**	MCIs	The amount of microcredit loans received by SMEs.	(-)
	Job creation	JC	Job offers.	(-)
	Inflation rates	IR	The inflation rates.	(+)
	Education	Edu	Level of education.	(-)
	GDP	GDP	Logarithm of GDP per capita.	(+)
	Gini Coefficient	GC	Logarithm of the Gini coefficient.	(+)
Dependent Poverty reduction (PovRed)	**Headcount index**	HDI	Logarithm of Headcount index.	
	Poverty gap	Povgap	Logarithm of Poverty gap.	
	Squared poverty gap	Sqr Povgap	Logarithm of squared poverty gap.	

5.3.3. Empirical Method

We use the growth-poverty model suggested by Ravallion (1997) and, Ravallion and Chen (1997), and already used by Adams and Page (2005), Donou-Adonsoua and Sylwester (2016) and Rewilak (2017). Adams and Page (2005) used the model to investigate the impact of international migration and remittances on poverty in developing countries, the other authors using it to investigate the impact of financial development and high-inequality on poverty in developing countries.

We have adopted a similar approach, which controls income and its distribution, to investigate the impact of the size of microcredit lending, job creation, inflation rate and education on poverty reduction. In this way, we intend to analyze the impact of the value of a loan obtained by microcredit, but also to analyze the impact of job creation and education (which is expected to improve as more microcredit is granted) on poverty reduction in developing countries.

Our empirical model is given by:

$$ln\ PovRed_{it} = \alpha_i + \beta_1 \ln GDP_{it} + \beta_2 \ln GC_{it} + \beta_3 MCIs_{it} + \beta_4 JC_{it} + \beta_5 IR_{it} + \beta_6 Edu_{it} + \varepsilon_{it} \quad (5.8)$$

where *PovRed* is poverty in country *i* at time *t* and is the dependent variable measured by the *Headcount index* (*HDI*), the *Poverty gap* (*Povgap*) and the *Squared Poverty gap* (*Sqr Povgap*); our independent variables are *GDP,* which represents the average per capita income measured by GDP *per capita* ($PPP), in country *i* at time *t*; *GC* is income inequality measured by the Gini coefficient, in country *i* at time *t*; *MCIs* is the amount of microcredit loan received by SMEs, in country *i* at time *t*; *JC* is the number of jobs created by SMEs, in country *i* at time *t*; *IR* is the rate of inflation, in country *i* at time *t*; *Edu* is the education variable, in country *i* at time *t*; α_i denotes fixed-effect by country and ε is the error term. In Eq. (5.8), β_i coefficients are elastic in relation to the corresponding variable.

We started by using the static panel data models, running fixed effects[12](FE) and random effects (RE) models, such as those used by Donou-Adonsoua and Sylwester (2016), but given the need to control: endogeneity; time-invariant characteristics; possible collinearity between independent variables; effects of the eventual omission of independent variables; elimination of non-observable individual effects; and, the correct estimate of the relationship between the dependent variable in the previous and current periods, we will use dynamic panel data models, in particular, the GMM system (Blundell and Bond, 1998) estimator, applied for the first time in this type of study. Following also Sodokin and Donou-Adonsou (2010) and Rewilak (2017), we used instrumental variable estimators, in particular, the two-step feasible generalized least squares (FGLS).

We will use the *F* test for fixed effects and the Wald´ test for random effects, for the purpose of testing the significance of independent variables. The Hausman test will also be used to determine the most appropriate model for static panel data models.

The validity of the estimated parameters obtained with the GMM system (Blundell and Bond, 1998), depends on whether: i) the restrictions are valid, as a result of using the instruments; and ii) there is no second-order autocorrelation. We run the Sargan-Hansen test to identify restrictions, and the sounder the null hypothesis, the more valid instruments. The Arellano-Bond test for AR (1) and AR (2) allows us to test the second condition.

In Eq. (5.8), and consistent with Ravallion (1997), *per capita income* or *economic growth* is expected to reduce poverty, while for *income inequality* a positive effect on poverty is expected.
As for the *microcredit loan size* indicator, which is an innovation in our model, its relationship with poverty is not clear in the literature. However, following Prokopenko and Holden (2001) and Beck and Levine (2004), who found that microcredit loan size promotes growth and then reduces poverty, we expect the microcredit loan size indicator to reduce poverty.

For the *job creation* indicator, which is another addition to this model, its relationship with poverty is clear in the literature. Based on the studies by ILO (2003), Loayza and Raddatz (2010), Sanda et al (2006), Zaman et al (2012), Ogbuabor et al (2013) and Criscuolo et al (2014), who found that economic growth, through job creation, can reduce poverty, we expect the employment-creation indicator to reduce poverty.

As for the *inflation rates* indicator, another addition to this model, its relationship with poverty is clear in the literature. Based on the studies by de Long and Summers (1992), Levine and Renelt (1992), Bruno and Easterly (1996), Ghosh and Phillips (1998), Judson and Orphanides (1999), Khan and Sendhaji (2000), Talukdar (2012) and Pervez and Rizvi (2014), who found that economic growth, by reducing the rate of inflation, can reduce poverty, we expect the inflation rate indicator to reduce poverty.

Finally, for the *education* indicator, the last addition to the model, its relationship with poverty is clear in the literature. Based on the studies by Noor (1981), Tilak (1989), Jeffery and Basu (1996), Unesco-PROAP (1998), Gede et al (2001), Bigsten et al (2003) and Oiro et al (2004), who found that increased education can reduce poverty, we expect the education indicator to reduce poverty.

5.4. Empirical Results

Table 5.3, in the appendix, presents the descriptive statistics. Looking at the values of the three variables that capture the *level of poverty* in the study we observe that: on average, 31,65% of the population of our sample lives with less than $1.25 per day; on average, there is a need to transfer 13.06 to the poor to bring their income to the poverty line; but considering the inequality among the poor, the average for the squared poverty gap is 300.87, which shows that most of the poor people observed in this study have income below the poverty line. Looking now at the independent variables, we observe that: the average for *microcredit loan size* is 43.80, showing that MFIs have distributed loans to SMEs in order to improve the income of poor families and contribute to poverty

[12]Assuming that independent variables are exogenous.

reduction by an average of 43.80 of GDP; average *job creation* is 41.35, demonstrating that SMEs in these countries contribute, on average, 41.35% to job creation, so they have a major role in creating jobs that enable poor people to come out of poverty; the average *inflation rate* is 5.97%; the average for *education* is 81.15%, this result showing that the majority of the population in this study is literate which can facilitate economic development in these countries and reduce poverty; the mean for *GDP per capita* is 43.84; lastly, the average of the *Gini coefficient* is 33.08, showing that our sample is far from perfect equality.

From the correlation matrix (Table 5.4, in the appendix), all values are seen to be below 0.50, except for the correlation between *Microcredit loan size* and *Gini Coefficient* [13], showing there will be no collinearity problems between those independent variables.

The results reported in Table 5.5, in the appendix, provide the analysis period and the averages of the variables per country. For all variables, we have data from 2007 to 2016. In relation to the variables that capture the *level of poverty*, Bangladesh is the country with the highest average value of *HDI*, 78.78%, against Thailand which presents average values in the order of 1.87%; but when observing the values of the *Povgap* variable, East Timor presents the highest average value, meaning a transfer of 32.86 to the poor must occur to bring their income to the poverty line, whereas in the case of Thailand only an average value in the order of 0.30 (the lowest value of all 11 countries for that variable) will be required. Finally, considering inequality among the poor, East Timor is again the country with the highest average value for the *squared poverty gap*, 1079.78, showing this is the country where the greatest number of poor people observed have income below the poverty line whereas Thailand has the lowest value, 0.11. These results are indicative of the problem of using only HDI as a measure of the level of poverty. This is an easy indicator to use and interpret but does not show the exact severity of poverty in countries. Concerning the independent variables: for the *MCIs*, Malaysia has the highest loan value distributed to SMEs, 113.53, and Myanmar the lowest, 8.81; the highest average value of *job creation* is in Nepal, 75.40, with the lowest in Bangladesh, 1.07; the average *inflation rate* varies from 9.44% to 2.03%, from Pakistan to Thailand, respectively; Malaysia presents 98.10% of the *educated* population, while Nepal has the lowest level, 54.12%; the average *GDP per capita* values range from 0.39 to -0.08, in Malaysia and Nepal, respectively; and finally, for the average values of the *Gini coefficient*, Malaysia presents the highest, 46.21, and Myanmar the lowest, 0.29. However, for the other 9 countries all values of this variable are around 30 to 40, showing that most countries have similar values of inequality.

Table 5.6, in appendix, shows the results of regressions for the: fixed effects models (FE) and random effects (RE) models; for two-step feasible generalized least squares (FGLS); and, for GMM system (Blundell and Bond, 1998) estimator; with the *standard deviation* in brackets and results of the R^2, *F* test, *Wald* test, *Hausman* test, *Sargan-Hansen* test and *Arellano-Bond* test for AR(1) and for AR(2).

Model 1 reports the results with *Headcount index*, Model 2 with the *poverty gap* only, and Model 3 with the *squared poverty gap*, as dependent variables accounting for the poverty reduction.

Table 5.6 reveals that the results of the *F* statistic for the fixed-effect models are significant in all case, with a 1% level of significance. The results of the *Wald* test for the random effects models, FGLS and GMM system are also significant to a 1% significance level. The *R-Squared* values are between 0.31% to 71% which are good values in terms of the explanatory power of the static panel data models. The *Hausman* test is statistically significant for all models, rejecting the null hypothesis of the random effects model to be the most appropriate. The results of the *Sargan-Hansen* test show that we cannot reject the null hypothesis of the lack of validity of the instruments used. In addition, the results of the second-order autocorrelation test indicate that we cannot reject the null hypothesis of the absence of second-order autocorrelation.

On this basis, the overall results can be considered valid and, therefore, open to interpretation.

[13] The test for multicollinearity (Collin test) was performed and no collinearity problems were revealed.

We begin the analysis with the fixed-effects results without using instruments[14]. Controlling the effect of the *Gini coefficient* is that it is positively significant at 1% (except in model 1, where it is significant at 5%) as expected, but *GDP per capita* does not seem to have a significant effect on poverty reduction, regardless of what the poverty measure used. The results indicate that *microcredit loan size* reduces poverty whether considering the Headcount index, poverty gap or squared poverty gap index, but it is only statistically significant at 1% for the first model. The results show that *Job creation* and *education* reduce poverty, but only for the Headcount index case. Nevertheless, only education presents a statistical significance at 1%. The *inflation rate* presents a positive and statistically significant at 1% impact for the first model only. As for the poverty gap and squared poverty gap index (models 2 and 3, respectively), we do not find any significant impact of *job creation*, *inflation rates* and *education* on poverty reduction in the eleven developing countries of East Timor, Bangladesh, Indonesia, Philippines, Myanmar, Cambodia, Pakistan, Malaysia, Thailand, Nepal and Sri Lanka from 2007 to 2016. However, given the possibility of economic growth being endogenous, these estimates can be biased.

Compared to estimates of fixed-effects, FGLS elasticity is statistically stronger (1% significance versus 5% and 10% for fixed-effects estimates) and higher in magnitude in almost all variables. The *GDP Per capita* and the *Gini coefficient* have the expected signs, as in Ravallion (1997) and Adams and Page (2005). More importantly, the magnitudes of elasticity are consistent with those of Ravallion (1997) and Adams and Page (2005). Observing the results for the remaining variables, all of them show the expected sign. So *microcredit loan size* has a negative impact, and statistically significant at 1%, on poverty; job creation has a negative and statistically significant at 1% impact on poverty, but only for model 1 (*Headcount index*); the *rate of inflation* always presents the positive and statistically significant impact at 1% and 5% (for models 1, and 2 and 3, respectively) expected on poverty; and finally, the level of *education* presents the expected negative impact on poverty, being statistically significant at 1% only for models 2 and 3.

Looking now at the reports for the GMM system model, when using the first two lags of microcredit, job creation, inflation rates and education as an instrument for poverty reduction. The results in Table 5.5 indicate that *microcredit*, *job creation*, *inflation rates* and *education* reduce poverty (except the *inflation rate* of model 1, where there is a positive and statistically significant value of 1%), when this is measured by the headcount, poverty gap and squared poverty gap.

In short, our results indicate that microcredit reduces poverty when poverty is measured by the headcount ratio, poverty gap and squared poverty gap. These results support those of Otero and Rhyne (1994), Abu (1994), Beck and Levine (2004), Wang (2004) and Yunus (2009), who also found that microcredit reduces poverty.

From our results, we begin by concluding that microcredit has an impact on poverty reduction. We have demonstrated that a possible way to explain the impact of microcredit on poverty is through the size of loans received by SMEs. In fact, eleven developing countries, EastTimor, Bangladesh, Indonesia, Philippines, Myanmar, Cambodia, Pakistan, Malaysia, Thailand, Nepal and Sri Lanka, still require improvements in the size of microcredit loans and development of the financial sector in order to contribute to economic growth and thus to reducing poverty. SMEs may seek funding to create or expand their business through loans from microcredit institutions. In other words, developments in the financial intermediary reduce income inequality by disproportionately boosting the income of the poor and thus reducing poverty (Beck and Levine, 2004). Loans are important for successful poverty reduction because of the lack of access to credit hinders SME growth.

A second possible explanation as to why microcredit can succeed in eliminating poverty is that some microcredit institutions have faced competition from commercial banks that have also expanded their loans to the poorest. In fact, some microcredit institutions offer microcredit services to SMEs in many developing countries, where poor rural households face extreme requirements when seeking credit from formal lending institutions. Formal financial services, for example, those

[14] We will only analyze the fixed effects estimators, in relation to the *Hausman* test value.

offered by banks, are not accessible to those below the poverty line because of the need for collateral. The growth of small companies contributes to poverty reduction through job creation, either because new companies emerge or existing ones expand. Islam (2002) argues that the growth of job creation is more effective in fighting poverty in Bangladesh, Bolivia, Ethiopia, India, Indonesia, Uganda and Vietnam.

A third possible explanation is that falling inflation rates lead to poverty reduction. Our results show that lower inflation rates are good for economic growth and therefore good for poverty reduction. Talukdar (2012) found that in low-income countries inflation has a negative impact on poverty in certain situations. If the rate of inflation is lower this is good, because some goods may drop in price so that poor people will be able to spend their income on basic necessities like food, clothing and shelter.

A final reason is that education can be a successful tool to alleviate poverty. Education is a basic necessity and some of the poor people working in SMEs will invest in their children's education. Bigsten et al (2003) argue that educational success is one of the most important factors associated with lower poverty levels. Studying Kenya, Geda et al (2001) and Oiro et al (2004) found that poverty decreased as the level of education increased.

5.5. Conclusion

This paper examines the impact of microcredit loan size, job creation, inflation rates and education on poverty reduction, also controlling for income and its distribution, in the case of 11 developing Asian countries.

To that effect, we applied the poverty model developed by Ravillion (1997), which regresses poverty on income per capita and the Gini coefficient, in which we include poverty reduction indicators (microcredit loan size, job creation, inflation rates, education, GDP, Gini coefficient). Static and dynamic panel data models were applied to a panel of 11 developing countries from 2007 to 2016. To the best of the authors' knowledge, this is the first study to apply the GMM system (Blundell and Bond, 1998) estimator to solve the Ravillion (1997) model using this set of variables.

The results indicate that *microcredit loan size* reduces poverty when this is measured by the headcount index, poverty gap and squared poverty gap, and also that *job creation*, *inflation rates* and *education* reduce poverty. *GDP Per capita* and the *Gini coefficient* present the same signs as in Ravallion (1997) and Adams and Page (2005), and the magnitudes of the elasticities are consistent with those of Ravallion (1997) and Adams and Page (2005).

So it is possible to conclude that microcredit institutions have a significant impact on poverty reduction in eleven developing Asian countries. Our result suggests that developing and increasing the number of microcredit institutions in these countries can help eliminate extreme poverty, but may fail to reach the poorest because of the high interest on loans. There still seems to be a long way to go to reduce poverty.

Increased distribution of microcredit to SMEs may create employment that can provide poor people with income; so these people and their families will be able to attain higher levels of education that can get them out of poverty. Therefore, improvements in the variables used will reduce poverty, as our results show.

Some studies have reported that microcredit reduces poverty (Otero and Rhyne, 1994; Abu, 1994; Beck and Levine, 2004; Wang, 2004; and Yunus, 2009), and our results regarding microcredit are consistent with the literature when poverty reduction is measured by the headcount index, poverty gap and squared poverty gap. In many developing countries, poor rural households face stringent requirements when seeking credit from formal lending institutions. Formal financial services, for example, those offered by banks are regularly not accessible to those below the poverty line due to the need for collateral.

Our study also demonstrates that using dynamic panel data models fits the analysis of this type of problem and better captures the relationships between the proxies used. This kind of model can

solve problems like endogeneity; time-invariant characteristics; possible collinearity between independent variable, among others, and therefore seems a better model for this study.

We call for more work in this area in order to better understand the results. One recommendation is the extension of the time series. The data used are secondary, and so it would be interesting to carry out the same level of study but with primary data, in particular concerning the microcredit loan size variable. Finally, we suggest extending the number of countries in order to confirm our results in other similar countries.

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Appendix

Table 5. 3 Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
HDI	110	31.65	26.13	1.17	81.50
Povgap	110	13.06	11.46	0.16	35.47
SQR Povgap	110	300.87	413.18	0.03	1,258.12
MCls	110	43.80	33.52	4.74	120.51
JC	110	41.35	26.14	0.10	82.70
IR	110	5.97	4.69	(0.90)	30.93
Edu	110	81.15	15.94	48.61	98.46
GDP	110	43.84	25.43	1.00	89.00
GC	110	33.08	11.61	0.29	46.26

Table 5. 4 Correlation matrix

Variable	HDI	Povgap	SQR Povgap	MCls	JC	IR	Edu	GDP	GC
HDI	1								
Povgap	0.85	1							
SQR Povgap	0.81	0.96	1						
MCls	-0.44	-0.43	-0.29	1					
JC	-0.38	-0.343	-0.49	0.15	1				
IR	0.36	0.20	0.14	-0.37	-0.02	1			
Edu	-0.73	-0.75	-0.70	0.33	0.01	-0.29	1		
GDP	-0.16	-0.19	-0.17	0.12	-0.07	0.08	0.19	1	
GC	-0.12	0.01	0.03	0.55**	0.31**	- 0.30**	0.074	0.09	1

Significance are: * p<0.01, ** p<0.05

Table 5. 5 Period of analysis and variable averages per country

Countries	Period	HDI	Povgap	SQR Povgap	MCls	JC	IR	Edu	GDP	GC
East Timor	2007-2016	62.28	32.86	1079.78	13.55	1.70	5.69	57.99	-0.03	31.56
Bangladesh	2007-2016	78.78	32.65	1069.37	39.75	1.07	7.63	69.48	0.05	32.21
Indonesia	2007-2016	12.93	14.14	207.25	28.90	59.27	5.52	92.64	0.05	34.07
Philippines	2007-2016	37.87	11.84	140.96	34.53	44.31	3.73	95.14	0.04	43.04
Myanmar	2007-2016	25.60	4.50	21.25	8.81	12.50	8.99	91.65	0.05	0.29
Cambodia	2007-2016	6.15	11.68	155.55	38.49	69.74	3.61	75.40	0.04	32.98
Pakistan	2007-2016	47.45	11.83	142.45	19.78	63.86	9.44	71.59	0.04	30.14
Malaysia	2007-2016	2.71	0.43	0.20	113.53	25.14	2.40	98.10	0.39	46.21
Thailand	2007-2016	1.87	0.30	0.11	101.97	57.08	2.03	95.55	-0.04	39.30
Nepal	2007-2016	56.17	20.22	481.10	55.39	75.40	8.89	54.12	-0.08	35.90
Sri Lanka	2007-2016	16.38	3.26	11.51	27.14	44.74	7.74	91.02	0.24	38.14

Table 5. 6 Results of the regression models

Variables	Model 1				Model 2				Model 3			
	LnHDI				lnPovGap				lnSQRPovGap			
	FE	RE	FGLS	GMM	FE	RE	FGLS	GMM	FE	RE	FGLS	GMM
LnGDP	0.120	0.018	**0.732*** **	**-0.596*** **	-0.184	**-0.408***	**0.603*** **	**-1.010*** **	-0.372	**-0.820***	**1.208*** **	**-2.024*** **
	(0.144)	(0.143)	(0.083)	(0.33)	(0.195)	(0.214)	(0.918)	(0.037)	(0.391)	(0.427)	(0.183)	(0.073)
LnGC	**0.765****	0.153	**0.123****	**-0.227*** **	**2.728*** **	**0.449****	**0.332*** **	**0.451*** **	**5.449*** **	**0.897****	**0.665*** **	**0.904*** **
	(0.347)	(0.154)	(0.071)	(0.012)	(0.471)	(0.196)	(0.795)	(0.014)	(0.943)	(0.392)	(0.159)	(0.027)
MCIs	**-0.010*** **	**-0.012*** **	**-0.026*** **	**-0.018*** **	-0.003	**-0.012*** **	**-0.038*** **	**-0.028*** **	-0.006	**-0.025*** **	**-0.077*** **	**-0.056*** **
	(0.002)	(0.003)	(0.002)	(0.000)	(0.004)	(0.004)	(0.002)	(0.000)	(0.008)	(0.008)	(0.005)	(0.001)
JC	-0.009	**-0.012****	**-0.005****	**-0.016*** **	0.003	-0.002	0.000	**-0.012*** **	0.007	-0.004	0.000	**-0.024*** **
	(0.006)	(0.005)	(0.003)	(0.000)	(0.008)	(0.007)	(0.003)	(0.003)	(0.016)	(0.015)	(0.006)	(0.001)
IR	**0.010*** **	**0.010****	**0.070*** **	**0.038*** **	0.006	0.007	**0.037****	**-0.003*** **	0.012	0.014	**0.075****	-0.007
	(0.004)	(0.004)	(0.017)	(0.003)	(0.005)	(0.006)	(0.019)	(0.003)	(0.111)	(0.013)	(0.038)	(0.007)
Edu	**-0.008*** **	**-0.011*** **	-0.035	**-0.0126*** **	0.000	-0.004	**-0.036*** **	**-0.010*** **	0.001	-0.008	**-0.073*** **	**-0.020*** **
	(0.003)	(0.004)	(0.007)	(0.001)	(0.005)	(0.006)	(0.007)	(0.001)	(0.010)	(0.011)	(0.015)	0.003
Constant	**0.931***	**4.035*** **		**9.568*** **	**-5.236****	**4.859*** **		**11.744*** **	**-10.416*** **	**9.75*** **		**23.519*** **
	(1.713)	(1.285)		(0.219)	(2.324)	(1.851)		(0.242)	(4.656)	(3.704)		(0.484)
R-Squared	0.3267	0.7082			0.4245	0.0031			0.4230	0.0032		
F-Statistic	7.52***				11.44***				11.36***			
Wald chi2		53.75***	1667.64***	7944.33***		44.90***	744.41***	11224.60***		44.79***	742.55***	11220.67***
Log likelihood			-129.52				-140.61				-217.00	
Hausman test		13.91**				33.32***				33.21***		
Sargan-Hansem test				1795.53*				1525.01***				1526.74***
Arellano Bond test AR (1)				0.88*				1.95**				1.97**
Arellano Bond test AR (2)				-1.09				-0.85				-0.85
N	110	110	110	110	110	110	110	110	110	110	110	110

In brackets it is presented the standard deviation and significance levels are: *** p<0.01, ** p<0.05, * p<0.10

Chapter 6- General Conclusion

East Timor has to give importance to the micro, small and medium enterprises because they produce goods and services which help to increase economic growth and contributes significantly to employment creation. It is not easy to develop and expand business in East Timor, because it is difficult to get credit to support SMEs. The most problem face by Timorese MFIs is sustainability and capacity improvement. Based on these facts, this thesis investigates four important and relevant issues of microcredit and its impact on East Timor MSEs and poverty reduction in eleven developing Asian countries. Firstly, it analyses empirical data on microcredit in East Timor MSEs. Second, it examines the impact of microcredit on MSEs growth in Dili, East Timor, controlling for MSEs age and size, micro saving and also for the firm's activity sector, firm's investment type and the gender of the owner/manager of the firm. Third, it examines the impact of microcredit on MSEs productivity in Dili, East Timor, controlling for age and size of companies, investment and human capital in the productivity of these MSEs. Lastly, it examines the impact of microcredit, job creation, inflation rates and education on poverty reduction, controlling income and distribution, in East Timor, Bangladesh, Indonesia, Philippines, Myanmar, Cambodia, Pakistan, Malaysia, Thailand, Nepal and Srilanka.

The objective of the first paper was to conduct an empirical analysis of microcredit in East Timor MSEs, by examining the questionnaire. The result shows that microcredit had a significant impact on the growth and productivity of MSEs after receiving loans from MFIs. In the sample, both the male and female gender presented approximately the same percentage in East Timor's MSEs and this situation can be attributed to the policy of these MFIs to empower both men and women economically. The average age of the East Timor MSEs was less than 4 years old and had, for the most part, less than 5 workers. Thus, from the sample, it was possible to discover that the majority of SMEs are micro-sized and manage their business in merchandising, especially in the tertiary sector. Education is an important factor for the growth of MSEs, and our results show that the majority of MSEs ' employees, in our study, have only secondary education. The employees of MSEs work daily, on average, 9.85 hours per day and the workers of these MSEs produce, on average, products and/or services, per hour, in the value of 81.46 USS. We concluded that microcredit had an impact on the debt, equity, employees, sales and total assets of MSEs when we analyzed the financial structure of MSEs before and after receiving the microcredit. This paper also shows that microcredit has enabled the increase in total assets (138%), employees (32%) and sales (162%) of East Timor MSEs. It has also enabled MSEs to make micro-savings and investments (mainly in products and human resources).

The objective of the second paper was to analyze the impact of microcredit on the growth of MSEs in Dili, East Timor, controlling the age and size of MSEs, micro savings and also the sector of business activities, the type of investment and the gender of the owner/manager of the firm. We employ multiple linear regression models on the growth of MSEs proxied by the growth of the employment level and by ROA. A single database was used, collected from March to April 2018 Dili, East Timor. The result shows that microcredit has a positive impact on Dili, East Timor MSEs growth. So, microcredit institutions have a significant impact on the growth of MSEs, either by financing business as well as the possibility of creating jobs and increasing micro saving of the MSEs. Our result suggests that develop and increase the numbers of microcredit institutions in East Timor can help economic growth, especially MSEs, but may fail to reach all MSEs because of high loans interest and the need to development of MSEs. The development of financial intermediary can increase job creation and support MSEs to increase their assets (ROA). A loan is an important factor on the success of the growth of SMEs because the lack of access to credit it will difficult the growth of MSEs, and the even more important microcredit is for developing countries.

The objective of the third paper was to examine the impact of microcredit on MSEs productivity in Dili, East Timor, controlling for age and size of companies, investment and human capital in the productivity of these MSEs. A multi-linear regression model, with logarithms, was

used, where the level of productivity (dependent variable) was calculated in three ways: single factor productivity (SFP); total factor productivity (TFP); and, labor productivity (LP). As for the independent variables, they were considered: age; size; microcredit loan size; investment; and, human capital. A primary and unique database, collected by hand from March to April 2018 in Dili, East Timor, was used. The results indicate that microcredit has a positive impact on MSEs productivity, in the Dili district of East Timor, when productivity is measured by SFP, TFP and LP. Our results suggest that developing and increasing the number of microcredit institutions in East Timor can help the growth of the economy, especially MSEs. But it still does not reach all MSEs due to high interest, observing that there is a long way to go for the development of MSEs. The development of financial intermediaries can increase the realization of new investments and support SMEs in increasing their productivity. Microcredit loan is an important factor in the success of the growth and productivity of MSEs, as the lack of access to credit hampers the productivity of MSEs.

Lastly, the fourth paper was intended to analyze the impact of microcredit, job creation, inflation rates, and education, on poverty reduction, controlling for income and its distribution, in East Timor, Bangladesh, Indonesia, Philippines, Myanmar, Cambodia, Pakistan, Malaysia, Thailand, Nepal, and Srilanka. We applied the poverty model developed by Ravillion (1997) which regresses poverty over per capita income and the Gini coefficient, in which we include poverty reduction indicators (microcredit loan size, job creation, inflation rates, education, GDP, Gini coefficient). Static and dynamic panel data models were used, applied to a panel of 11 developing countries, from 2007 to 2016. The results indicated that microcredit loan size reduces the poverty when it is measured by the headcount index, poverty gap and squared poverty gap in eleven developing Asian countries. And, also, that job creation, inflation rates and education reduce poverty. Our result suggests that the development and increase in the number of microcredit institutions in these Asian countries can help to eliminate extreme poverty but may fail to reach the poorest because of the high interest of the loans. There still seems to be a long way to go to reduce poverty.

Although this thesis tries to address multiple gaps identified in the literature, it is still subject to a number of limitations. The first paper included only one year of data for analysis of the impact of microcredit on growth and productivity in Dili, East Timor since it was difficult to collect data from MSEs from multiple sources. It is important to mention that there is insufficient data about MSEs in the microcredit databases, so the data were hand collected one by one of the MSEs for each variable. Data availability and data collection were a problem in this study.

Regarding the second and third paper, the data used in this study is only 1 year, so we urge future research to extend more than 1 year of data. In addition, with more years of data, it may be possible to use other econometric models for this topic. Finally, we suggest the continuation of the work in order to increase the number of countries in similar situations.

With respect to the final essay, one of the recommendations is the extension of the time series. The data used are secondary data, it would be interesting to carry out the same type of study but with primary data, especially at the level of the microcredit loan size. Finally, we suggest extending the number of countries in order to ensure confirmation of our results to other similar countries.

6.1. Theoretical and Practical Implications of Research

This research was inspired by the attempt to better understand the empirical phenomenon of microcredit and contributes to new ideas for this complex field of financial research. We contribute to the knowledge of existing literature: expanding the definition of microcredit and the analysis of its impact on MSEs' growth and productivity, as well as poverty reduction; also, in the development of a new model with the variable microcredit (among others) that can be applied both to the development of countries and MSEs, and exploited the determinants of microcredit in the impact of the growth and productivity of MSEs and poverty reduction. Therefore, there are multiple contributions to this research for academia and practitioners.

6.1.1. Academic Contributions

This thesis contributes to the literature on microcredit in various ways. Firstly, the contribution of study 1 is intended to understand the general role of microcredit in growth and productivity, through the empirical analysis of the questionnaire.

The contributions of study 2 are as follows: firstly, although there are many studies on the impact of microcredit on the growth of MSEs in some countries, most of them consider age, size, debt in general terms, access to financing, employment level and ROA on the growth of SMEs (Cooper, 2012; Maengwe and Otuya, 2016; Memba et al., 2012; Mbugua, 2010; Nelson; 2010 and Rhyne and Otero, 1992), but there are no studies on the size of microcredit lending and micro savings in the growth of MSEs. To the best of authors' knowledge, this is the first study about the impact of microcredit on the growth of MSEs in East Timor that used primary, hand-collected data. Secondly, this study intends to understand the role of microcredit in East Timor economy growth.

The contributions of study 3: firstly, although there are available studies about the impact of microcredit on MSEs productivity in other countries, to the best of authors knowledge, this is the first study about the impact of microcredit on the productivity of MSEs in East Timor that used primary, hand collected, data; and, secondly, this study also intends to understand the role of microcredit on Timorese MSEs productivity.

Finally, the contributions of the study 4 are: firstly, although there are many studies on the impact of microcredit on poverty reduction in other countries, most of them have dealt with overall debt, access to finance, job creation, Inflation rates, education, GDP per capita and Gini coefficient such as Otero and Rhyne (1994), Wahid (1994), Beck and Levine (2004), Wang (2004) and Yunus (2009) and there are no studies on the size of microcredit lending in poverty reduction. To the best of authors' knowledge, this is the first study to used dynamic panel data models, especially the GMM system estimator, to analyze the impact of microcredit on poverty reduction in eleven Asian developing countries. Secondly, this study intends to understand the role of microcredit on poverty reduction in those eleven developing Asian countries.

6.1.2. Practical Contributions

Microcredit information is a critical component of the decision of MFIs, MSEs, managers and government interested in investing in a new business or an existing business. It is also beneficial in developing microcredit institutions, so they can improve their service to MSEs in the future. However, theoretical development in this area is less advanced as compared, for example, to the financial structure of large enterprises. The relevant role played by microcredit and MSMEs is important not only to the policymakers of the countries considered in the analysis but also for others that might be in the process of implementing identical measures or may want to do them in the future.

The identification of the failure in financial access by MSEs is beneficial to all stakeholders. Firstly, MFIs can take proactive actions to facilitate access to loans to MSEs. Secondly, it allows MSEs the right choice of funding to avoid potential loss or insolvency. Thirdly, it may permit managers, to maintain their reputation and goodwill. Finally, the government should support and develop microcredit institutions in East Timor.

The identification of the high-interest rates of microcredit is beneficial for all interested parties. Firstly, MFIs can reduce lending interest to facilitate MSE growth. Secondly, it allows MSEs to obtain low-interest loans to avoid potential loss or insolvency. Thirdly, it can allow managers to seek funding through MFIs instead of banks. Finally, the government should regulate the level of interest on loans from microcredit institutions in East Timor.

In addition, the identification of the problem of the duration of the business record is beneficial for all interested parties. First, the government may reduce the time for business registrations in East Timor. Secondly, it allows MSEs to register their business quickly. Thirdly, it

may permit managers to have more time to prepare their financial planning. Finally, MFIs can more easily identify the business status of their customers.

Although our results have several implications and contributions in the microcredit literature, we provide some suggestions that we believe deserve further research. Foremost, the estimated model would also benefit from some additional refinements. The data we used in this study are only 1 year and we urge future research to extend more than 1 year of data. Moreover, we suggest using other econometric models for this topic. Finally, we suggest further work towards increasing the number of countries in the sample.

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Appendix

1. **Research Questionnaire**

Universidade de Évora

Escola de Ciências Sociais

Departamento de Gestão

Part 1: Introduction

This is a questionnaire on the impact of microcredit on the growth of SMEs and the impact of debt financing on productivity of SMEs in Timor-Leste being conducted for the purpose of research at the University of Évora, Portugal.

We would appreciate your taking the time to complete the following questionnaire about the impact of microcredit on the poverty reduction in Timor-Leste. It should take about 30 minutes of your time to answer all the questions below.

Your responses are voluntary and will be confidential. All the responses will be compiled together and used for academic writing only.

Part 2: Basic Information of Respondent

1. **Respondent name:**

2. **Position at the company:**

Part 3: Basic Information of Company

1. Name of company:	
2.Address of company:	
3. E-mail of company:	
4. Telefone/Mobile of company:	
5. Year of establishment:	

6. Business Information	
6.1. Sectors of Business	
1) Primary Sector	
2) Secondary Sector	
3) Tertiary Sector	
6.2. Types of business	

7. Dimension of Business:	
1) Small	
2) Medium	

8. Number of employees	
a) 1-5 person	
b) 6-10 person	
c) 11-15 person	
d) 16-20 person	
e) More than 20	
9. Level education of workers	
Level of Education	**Persons**
a) Master	
b) Bachelor	
c) High school	
d) Junior high school	
e) Primary school	
f) Non-Formal Education, which one:	

Part 4: Structure of finance before receiving loans

1. Propotion of Debt and Equity	
Propotion	**US$**
a) Total of Debt	
b) Total of Equity	

2. How many employees before receiving loans from microcredit?	
	Persons
Total employees:	

3. What were the approximate average sales levels before getting credit?	
	US$
Average Sales:	

Part 5: Structure of finance after receiving loans

1. Propotion of Debt and Equity	
Propotion	**US$**
a) Total of Debt	
b) Total of Equity	

2. When your company start receiving credit from microcredit?
Month:----------Year:----------

3. Amount of loans receive from Microcredit institution:	
	US$
Amount of loans	
4. Duration of loans	
a) 3 Months	
b) 6 Months	
c) 1 Year	
d) 2 Years	
e) 3 years	
f) More than 3 years	

5. How many employees after receiving loans from microcredit?	
	Persons

Total employees:	

6. What were the approximate average sales levels after getting credit?	
	US$
Average Sales:	

Part 6: Accessibility and Utilization of Microcredit by Smes

1. How much total debt does your business have from microcredit?	
a) US$ 1000 or less	
b) US$ 1001-US$ 2000	
c) US$ 2001-US$ 3000	
d) US$ 3001-US$ 5000	
e) US$ 5001-US$ 10000	
f) US$ 10001-US$ 15000	
g) US$ 15001-US$ 20000	
h) More than US$ 20000	

2. Total Assets of Company:	
	US$
Total Assets:	

3. Amount of Saving:	
	US$
Total Saving:	
4. What were the approximate gross profits of your company?	
	US$
Gross Profit:	

5. What were the approximate fixed expenses of your company?	
	US$
Fixed Expenses:	

6. What were the approximate variable expenses of your company?	
	US$
Variable Expenses:	

7. What were the approximate net profits of your company before taxes?	
	US$
Net Profits:	

8. What kind of new investments were made by your firm after receiving loans from microcredit?	
New Investments	**US$**
a) Information and communications Technology (ICT)	
b) Product	
c) Process	
d) Human Resources	

9. How many daily working hours?	
New Investments	
a) 8 hours	
b) 10 hours	
c) 12 hours	
d) More than 12 hours	

10. How many products/services produce per hours by 1 employee?	
	Products/services produces per hours
1 Employee:	Total:

11. How many raw materials used to produce products/services per hours?	
	Products/services produces per hours
Raw Material:	Total:

Thank you