

**On the Effectiveness of Microcredit and Health Insurance Access on
Vulnerable People:
*Evidence from Cameroon***

Abstract

Using secondary data collected from Dschang in the West region of Cameroon, we examined the effectiveness of micro-credit and health insurance access on vulnerable groups which includes the physically disabled and other forms of vulnerability. We undertook a statistical and qualitative econometric analysis using a logit model and obtained the following results: microcredit and health insurance access reduce the vulnerability of people via their health, financial and social status. Our findings open the way for some economic measures that should be taken to assist vulnerable people. From a macroeconomic perspective, these measures include the implementation of a food policy targeted towards increasing access to nutrition; a financial policy to improve access to drugs for individuals, and a social policy to achieve a high level of integration of vulnerable peoples and a high level of literacy of individuals. From a microeconomic perspective, we recommend that microfinance managers develop more products specific to and targeting the vulnerable population as well as those involved in small jobs and the informal sector with specific loans that can help them move to formal and more conventional jobs. To the best of our knowledge, this is the first paper with this objective and methodology focusing on the dataset along with the same case study.

Keywords: Micro-Credit - Health Insurance–Logit models - Vulnerable Groups - Physically Disabled.

JEL Classification: G21; I32; I13; I18; P46.

1. Introduction

Despite progress toward the Millennium Development Goals between 2000 and 2015, results have been uneven (United Nations, 2015). One billion people continue to live in extreme poverty (United Nations, 2015). Also, national performance measures often mask persistent disparities within countries, such as unequal access to health services and income-generating activities for women, the rural poor, and indigenous groups (World Health Organization, 2013). The Sustainable Development Goals aim, in part, to address the twin challenges of eradicating poverty and ensuring healthy lives (United Nations, 2015). However, strategies to achieve these goals are not well defined and solutions organized and implemented in firms remain inadequate (Buse & Hawkes, 2015). These solutions are unable to reliably address the intertwined issues of access to care, health and nutritional status, health systems capacity, and poverty. The poor, in particular, need access to an integrated package of financial and health services to achieve a higher level of income security and better health.

One of the worst shocks to households is the serious illness of a household member. Illness entails two important economic costs: the cost of medical care and the loss of income due to the reduced labour force (Asenso-Okyere, Anum et al., 1998). The unpredictable nature of the shocks and these two costs make it difficult for households to smooth their consumption during periods of serious illness (Islam & Maitra, 2012). This is particularly true in developing countries where few people have health insurance or access to formal credit markets (Linh, Long, Chi et al., 2019). The poor must rely on informal coping mechanisms such as the use of savings, the sale of assets, family transfers, or social support networks. Low-income households that do not have access to these mechanisms are more likely to fall into poverty. The burden of health care can push individuals into poverty or extreme poverty.

According to Brule & Eckstein (2016), vulnerable groups include humans considered particularly susceptible to coercion or undue influence. People in developing countries are poor largely due to external factors beyond their control. Conflict, low economic growth, unfair trading agreements, a narrow industrial base, high inflation, low levels of tax collection, poor standards of health care and education, inadequate infrastructure, and corruption. As an example of vulnerable people, the disabled face as many difficulties in breaking out of poverty as others but have the added disadvantage of low access to education, training, employment, and credit schemes.

However, to the best of our knowledge, there is no evidence that a decrease in poverty will reduce vulnerability given the fact that there are many approaches to vulnerability. However, a non-exhaustive list of groups considered vulnerable across many fields includes children, the elderly, single parents, people with disabilities, ethnic minorities, the homeless, economically disadvantaged, poor, illiterate, or unemployed, etc.

There is growing awareness that building financial systems for the poor means building sound domestic financial intermediaries that can mobilize and recycle domestic savings. Most leading microfinance institutions¹ today operate on a commercial basis using the techniques and disciplines of commercial finance; they are no longer focused on their social objectives at the

¹ MFIs

origin of their creation. Their contribution to health-financial access for poor people is therefore questionable.

In Cameroon, Health insurance is almost non-existent or not fully effective in terms of satisfying the population; finding adequate levels of private coverage has proven to be a concern for the local population. Generally, the patient and his family members are responsible for the cost of all medical treatments. This often leaves families with huge debts and heavy financial burdens which intend to have severe consequences. Individuals with such burdens are considered vulnerable as they may, for various reasons, have a diminished capacity to anticipate, cope with, resist, and/or recover from the impact of a natural or man-made hazard. Vulnerable groups may also consist of individuals who are unable to care for themselves and/or may have an increased chance of suicide, self-harm, or the likelihood of harming others. Vulnerability can be narrowed down to health which explains that people are vulnerable due to their health status. This can be seen in people who are physically disabled as well as other forms of vulnerability on which this research focuses.

People with disabilities are expected to benefit from microcredit to the same extent and probably more than others although they continue to be an excluded group when it comes to these socioeconomic interventions. It appears to be a general concern that people with disabilities do not have the same level of access to microcredit as their non-disabled peers, especially in developing countries. The prevalence of microfinance institutions is important since vulnerable groups would rather go towards these institutions with favorable conditions for them.

In the district of Dschang, these groups face a lot of difficulties since the social security system is not optimal. We intend to fill the existing gap in the literature by examining the effectiveness of micro-credit/health insurance on vulnerable groups in the health district of Dschang. We focus on the following three main dimensions of effectiveness: financial status, health status, and social status. Moreover, the existing literature on the topic is mainly restricted to a descriptive analysis of sub-groups of the population but lacks empirical support due to data limitations (Zaman, 1999; Montgomery & Weiss, 2005). Thus, this paper contributes to the scarce empirical literature on the subject from at least two points: Firstly, we collect primary data and apply the research question to a new population where vulnerable groups face a lot of difficulties given a weak social security system; secondly, we use a logit method to estimate our model.

This study provides new insights into the effects of microcredit provided to vulnerable groups in poverty reduction. To the professionals and practitioners, the study reveals the factors which hinder access to microcredit to people living with vulnerabilities and therefore have made it possible for remedial actions to be taken to address some, if not all problems related to access to microcredit by vulnerable groups. The findings might help policymakers to make appropriate decisions regarding the implementation of proper strategies for the provision of micro-credit to vulnerable groups as a poverty reduction strategy.

The rest of the paper is divided into the following main parts: the literature review section, followed by the methodology, the statistical analysis, the results discussion and the conclusion.

2. The effectiveness of microcredit and health insurance on vulnerable people: a literature review

2.1. Conceptual and theoretical framework literature review

In this sub-section, we intend to present a review of the literature on the theory behind our empirical model and the main concepts used in this paper, namely microcredit, health insurance, and vulnerable groups.

2.1.1 Conceptual framework literature review

Microcredit is used to describe small loans granted to low-income individuals. It is part of the larger microfinance industry, which provides not only credit, but also savings, insurance, and other basic financial services to the poor. The term ‘micro’ stems from the relatively small amounts of money that are being borrowed or saved (Elahi & Rahman, 2006). By definition, MFIs seek to make a profit. Micro-finance is defined as a development approach that provides financial as well as social intermediation (Ledgerwood, 1999; Robinson, 2002). Financial intermediation includes the provision of savings, credit, and insurance services, while social intermediation involves organizing groups to voice their aspirations raise concerns for consideration by policymakers and develop their self-confidence. They provide loans, savings, insurance, transfer services, and other financial products targeted at low-income clients.

The birth of ‘modern’ micro-finance is said to have occurred in the mid-1970s in rural Bangladesh. There, during a famine, Yunus (2004) was becoming disillusioned with the abstract theories of economics that failed to explain why so many poor people were starving in Bangladesh. The Grameen Bank Project (Grameen Bank, 2004), translated as “Village Bank”, was born, and today works in over eighty-thousand villages with more than six million borrowers. In 2006, both Yunus and Grameen were awarded the Nobel Peace Prize for their work with the poor. Inspired by the success of the Grameen Bank, the 1970s and 80s saw rapid growth in the number of new micro-finance institutions appearing around the world, many of them started by NGOs and funded by grants and subsidies from public and private sources. They demonstrated that the poor could be relied on to repay their loans, even without collateral.

Health insurance is a device responsible for ensuring an individual faces a financial risk of care in case of illness, as well as a minimum income when the illness deprives the person of work. Put differently, from the point of view of insurance, medical expenses are uncertain, (Arrow, 1963). In Cameroon, there exists what is called mutual health insurance (*mutuelles de santé*) Also known as community-based health insurance (CBHI). Bennett (2004) defines them as any scheme managed and operated by an organization, other than a government or private profit-seeking company which provides risk pooling to cover all or part of the costs of health care services; he emphasizes the management component.

The core idea underlying vulnerability is that individuals face significant obstacles to receiving appropriate medical treatment and preventive services. These obstacles to health insurance coverage can arise from many factors, but several prove especially important for the population concerned, which in this case are referred to as vulnerable persons.

A vulnerable group includes persons who may be incapable of understanding what it means to participate in research and/or who may not understand what constitutes an informed consent. Individuals considered vulnerable may, for various reasons, have a diminished capacity to anticipate, cope with, resist, and/or recover from the impact of a natural or man-made hazard. (Brule & Eckstein, 2017). Within this framework, we can more narrowly identify particular groups that are examples of these problems of vulnerability. These vulnerable populations include people with low incomes; children; racial/ethnic minorities, immigrants; the elderly; as well as individuals with chronic diseases.

These characteristics of vulnerability create a dependency or reliance on family and other caregivers, medical providers and social service organizations, and government programs for economic support. Some vulnerabilities are common. Many people face the risks of illness and may have insufficient financial resources to pay for needed services. Along each dimension, if the limitations are severe enough, we can classify a person as being a member of a particular “vulnerable” population. Vulnerability in the context of this study can take physical and non-physical forms:

✓ *Physical disability*: The traditional view of disability focuses on the individual who is thought to be incapable of performing certain activities due to one or more functional impairments. The individual is ‘handicapped’, independently of the prevailing surroundings. This has been and still is the medical point of departure (Michallakis, 2009). Thus, whether an individual is disabled or not depends on his/her clinical status. Impairment is a phenomenon established through a diagnosis, through a medical examination. We can take into account;

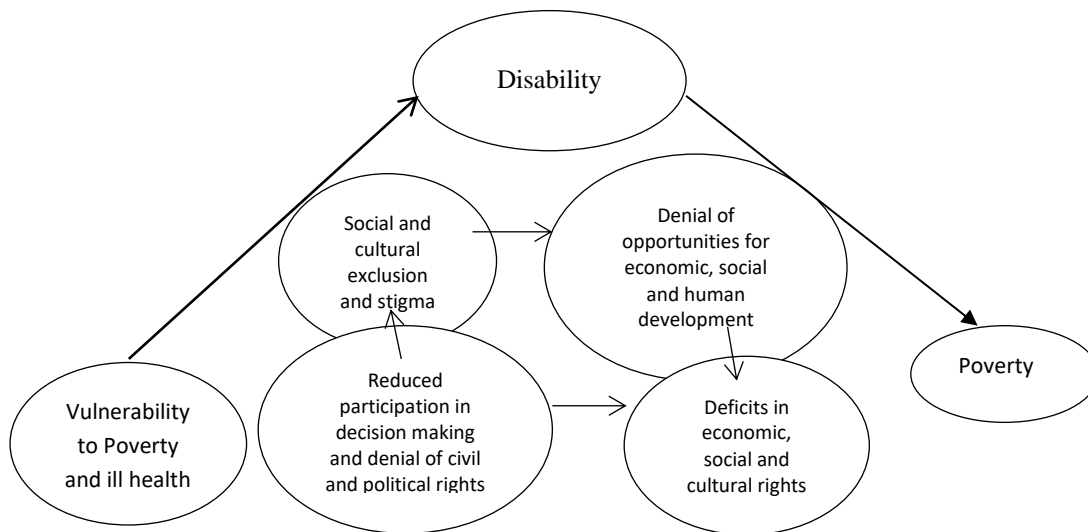
✓ *Non-Physical Disability*: According to Brule & Eckstein, (2016), many different types of vulnerability contribute to vulnerable group status. Being homeless, using particular drugs, being a (legal or illegal) sex worker, or living in a war-torn country are examples of external vulnerabilities determined by the structural norms or environmental factors in a given culture. Vulnerability may depend not only on how a cultural label is employed but also on how the participants themselves perceive their vulnerable status. Emic vulnerabilities are those for which participants possess particular self-awareness and in the context of our study, we shall look at: displaced due to the Anglophone crisis; less paid people or persons with small jobs; and people with the AIDS virus.

2.1.2 Theoretical framework literature review

2.1.2.1 Physical disability and its relationship with vulnerability via poverty

Disability has a direct effect on poor people and despite the development interventions running throughout the world to ensure positive changes in the lives of poor people, they are limited to specific segments. Disabled people face extreme poverty because of their vulnerability. They are excluded from normal social life and in most cases; they don’t get sufficient economic support to be self-sustainable.

Figure 1: Relationship between disability, vulnerability and poverty



Source: Disability, poverty and development, DFID, 2000 (p.-4)

Poverty can cause as well as be a consequence of disability. For example, malnutrition is a consequence of poverty and a cause of disability. On the other hand, having a disability can lead to unemployment, which is a cause of poverty. Thus poverty and disability reinforce each other, contributing to increased vulnerability and exclusion.

2.1.2.2 People with physical disabilities and their exclusion from microcredit

In this study, the term PwD (people with disabilities) has uniformly been used or ‘disability’ as an umbrella term for impairments, activity limitations, or participation restrictions. PwD’s are being compared with ‘other vulnerable people’ which are people vulnerable as a consequence of factors other than being disabled; unemployed, very poor, woman, widowed, etc. Simanowitz (2001) describes four mechanisms leading to the marginalization and exclusion of the poor from microcredit: self-exclusion, exclusion by others, exclusion by staff, and exclusion by design. Mersland (2008) adds the mechanism ‘exclusion from physical and informational barriers stemming from the disability itself’ to the list.

✓ *Self-exclusion:* The lack of confidence of poor people constrains their capacity to believe the programs can be beneficial to them, which leads to self-exclusion from public and private services (ILO, 2002). Besides, some PwD’s and their families may expect to constantly receive charity (Thomas, 2000; Lewis, 2004; Handicap International, 2006). Such an attitude is incompatible with sustainable MFIs and naturally leads to exclusion from services (Mersland, 2008). In the literature, it is also indicated that PwD’s are not accustomed to applying for microcredit (Handicap International, 2006) and experience a lack of knowledge and/or language skills (Siewertsen, 2005);

✓ *Exclusion by others:* Exclusion by others occurs especially in group lending (MFI’s, self-help groups, solidarity groups, village banking). In these schemes, the members themselves decide who to include in the group. There is an incentive for stronger people in the community to exclude the poorer ones or PwD’s because all the members are jointly liable for each individual’s loan and including these people may be perceived as a risk or will not happen because of local stigmatization and prejudices (Thomas, 2000);

✓ *Exclusion by staff*: The perception that Loans and credit offered to the poor have a higher risk for sustainable entrepreneurship leads to exclusion. Mersland (2008) adds that due to attitudes and prejudices in society, the staff of an MFI will often deliberately or unconsciously exclude PwD's. The personnel is often lacking the necessary experience and training to distinguish between real credit risk and perceived credit risk;

✓ *Exclusion because of physical and informational barriers*: The disability itself can be a barrier to accessing offices or information according to Mersland (2008). The information that is given by the MFI's is in both verbal (like training and meetings) and written (the actual contract) form which is usually inaccessible to many deaf or blind persons. Branches can be located far away from people's homes and to enter the building, stairs often have to be climbed and crowds have to be penetrated. Mersland (2008) claims that removing the physical and informational barriers also sends a message of aiming at the inclusiveness of PwD's in practice. Considering this conceptual and theoretical framework, in the next section, we present the empirical works done to date on the effectiveness of microcredit/health insurance on vulnerable people.

2.2. Selected empirical literature review

Thang & Pham Hoang (2019) provide new evidence on the impact of health insurance coverage on household vulnerability using the Vietnam Access to Resources Household Surveys (VARHS) for 2010 and 2012 and the propensity score matching methodology to address the non-random selection of households into health insurance status. They find that health insurance helps rural households in Vietnam reduce household vulnerability and the probability of becoming poor. To the best of our knowledge, this paper is the first to measure the impact of health insurance coverage on household ex-ante vulnerability. They recommended that expanding access, reducing costs and improving efficiency in health care would have large benefits in reducing vulnerability for the poor.

Khan (2014) carried out a study on how microcredit reduces household vulnerability in Bangladesh. Using data collected from rural northern Bangladesh, the author applies the "Structured Personal Interview" method. In this study, the author finds that having access to micro-credit leads to an increase in vulnerability to poverty, especially for the groups of households that consist of the chronically poor.

Bali and Floro (2010) explore an important dimension of household welfare that conventional measures of poverty do not address, namely vulnerability. They examine the likely effect of Self-Help microfinance groups (SHG) on the vulnerability of participating member households using an Indian household sample survey data from 2003. The authors find that a household's ability to mitigate risk and cope with shocks is enhanced through SHG participation by increasing household earnings through the provision of microfinance and training. The results show that vulnerability is not significantly different among SHG member households as compared to those who are non-participants (control group), even though SHG-member households are found to be poorer than the non-SHG member (control group) households. These results are found to be robust using the sensitivity analysis and Rosenbaum bounds

method. In conclusion, Microfinance, in this case, provides an additional resource for consumption thus reducing the variability in food consumption levels.

According to Ali & Alam (2010), Microfinance is the most important resource to provide loans and other basic financial services to increase the employment rate, productivity, and earning capacity. It has an impact on the lives of people living with vulnerabilities through reducing poverty and improving living standards such as health, education, food, and other social impacts. The microfinance sector develops day by day in Tanzania.

Knight & Farhad (2008) find that microfinance directly improves the quality of life and promotes vulnerability reduction. By getting loans, vulnerable groups become self-employed and protect themselves from external threats. By getting employment, they rise above the poverty line and poverty decreases. Microfinance is in the initial stages and in these stages, most people do not know about the reality of microfinance. Some people take the example of microfinance where the result of microfinance is negative. It is more important than examples where the result of microfinance is more positive than negative should be highlighted so that more and more people benefit from microfinance and cross the poverty line.

According to Kimenyi (2005), analyzing and achieving proper growth is the basis of microfinance; improving and offering self-employment possibilities is an approach based on the knowledge that “low employment growth has been a major correlate of slow poverty reduction in developing countries” (Khan, 2007). This fact illustrates that employment has an important role in achieving pro-poor growth (Khan, 2007).

Seibel (2003) shows through a survey that microcredit is that chemical through which the germ of poverty can be killed. The study also shows that microfinance is equally profitable in poor countries as in rich countries. The author rejects the concept that Microfinance is a poor solution for poor countries. If properly regulated and supervised, it has great potential in poverty alleviation and development, both in rural and urban areas.

Amin et al. (2001) find that a poor person is more vulnerable than a richer one. However, among poor people, the causes of poverty and vulnerability may vary. Sarkerin (2001) carries out a study on the contribution of microfinance to disabled people and gives an outline of a list of factors via which microfinance contributes to the lives of the disabled; the author concludes that MFIs face numerous challenges to including disabled people in their programs but that they should always try to be innovative in designing programs and ways of implementation. By providing credit, savings facilities, insurance, and other innovative ways like the credit plus approach, MFIs can contribute to the lives of disabled people. The size of the market for disabled people is quite large and MFIs can get ‘win-win’ benefits for their clients and themselves. MFIs should try to remove all barriers to provide equal access to disabled people.

Overall, current work on the relationship between micro-credit and vulnerability is restricted to a descriptive analysis of sub-groups of the population but lacks empirical support due to data limitations (Zaman, 1999; Montgomery & Weiss, 2005). Thus, this paper contributes to the scarce empirical literature on the subject from at least the following two points: Firstly, we collect primary data and apply the research question to a new population where vulnerable

groups face a lot of difficulties given a weak social security system; secondly, we use a logit method to estimate our model.

3. The effectiveness of microcredit and health insurance on vulnerable people: methodology

For the empirical needs, we carried out a survey focused on Dschang which is one of the 20 districts in the West region of Cameroon. Dschang is located in the Menoua division and is one of the six sub-divisions of this division. The Dschang health district covers four districts namely: Dschang, Fokoué, Nkong-Ni, Fongo-Tongo, and Fondonera group in Santchou. Table A1 in the appendix presents a picture of the situation of micro-finance establishments and health insurance in the Dschang health district.

3.1: Instrument of data collection and sample Size

The administrated questionnaire presented in the appendix comprises background questions about gender, age, education, marital status, type of vulnerability, etc. Structured questions and some dichotomous questions are also asked to collect the information from the respondents. The same context of questions is given to all interviewees and they receive the same interview stimulus. Questions are specific with a fixed range of answers. Our structured questionnaire has multiple-choice questions in which the researcher provides a choice of answers and respondents are asked to select one or more of the alternatives and dichotomous questions that have only two response alternatives, yes or no. We also use scaled questions (considered on a 1-10 points scale) to measure the respondents' perceptions based on a few statements to perceive the impact of microcredit and health insurance on their overall living standards. The points of the scale indicate the degree of satisfaction or agreement level of the household or person after he or she has received a loan from an MFI. '1' represents the lowest level of satisfaction or high disagreement, whereas '10' represents the highest level of satisfaction or high agreement.

In our model, the above inclusion criteria permitted us to select our sample size. Thus, we sample 140 persons considered vulnerable. The vulnerability is divided into whether they are physically disabled or have other forms. We apply a stratified and convenient sampling procedure; the population is divided into groups called strata, and then within each group, a probability sample is selected for the district of Dschang by moving to various quarters and Centers for the disabled and campuses in order to avoid duplication.

3.2: Preliminary results of data analysis

We perform a preliminary statistical analysis of the relationship between health insurance and living conditions to bring out an idea of how health insurance and microcredit are effective. The various proportions of improvement in living conditions are presented in Table 1 and Figure 1 for health insurance subscriptions and Table 2 and Figure 2 for possible health insurance subscriptions.

Table 1 and Figure 1 show those who are insured; hence, we are dealing with real or concrete results. People who have improved living conditions through insurance are much more those with primary and secondary school levels respectively. Uneducated people have a slight improvement, mainly in the health sector, because of lack of information. For those with higher

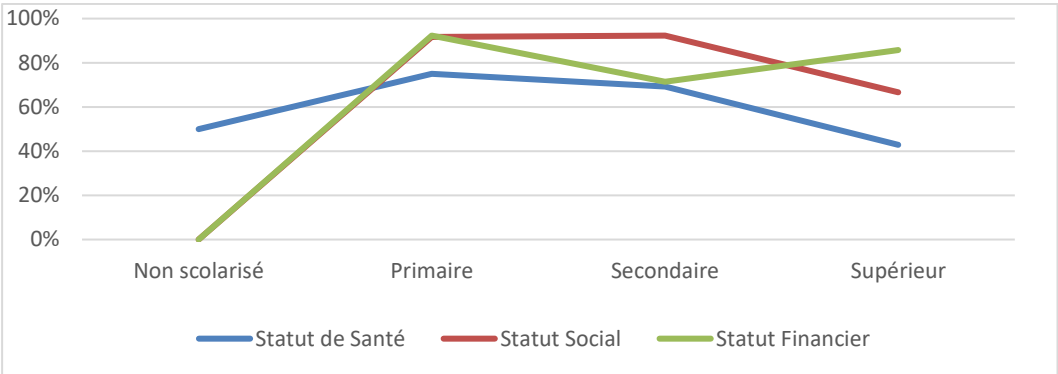
levels of education, their living conditions are improved, but less than those with primary and secondary school levels in the social and health sectors.

Table 1: Average improvement in living conditions related to insurance, given specific educational levels

	Health status	Social status	Financial status
Uneducated	50%	0%	/
Primary	75%	91,67%	92,31%
Secondary	69,23%	92,31%	71,43%
Higher education	42,86%	66,67%	85,71%

Source: survey data collected by the author; May 2019.

Figure 1: Average improvement in living conditions related to insurance and given specific educational levels



Source: survey data collected by the author in May 2019.

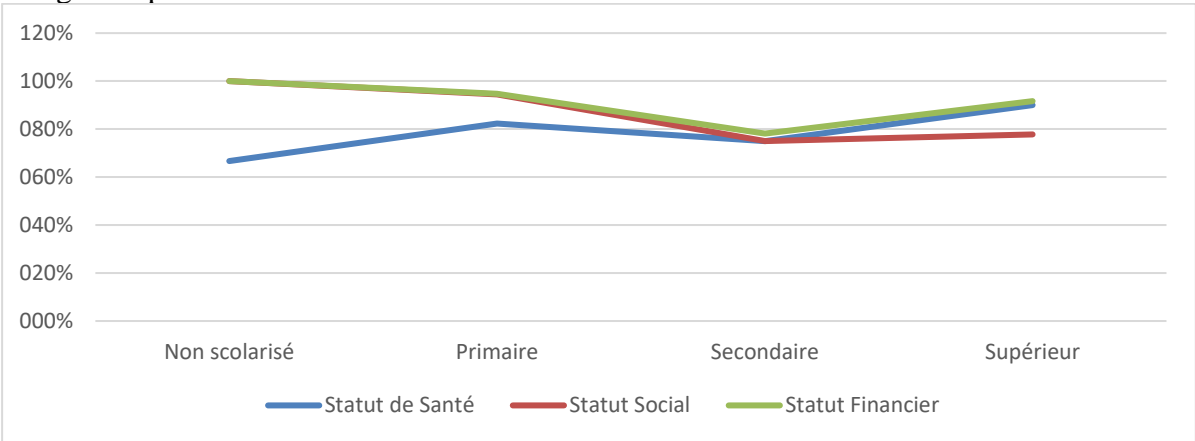
Table 2 and Figure 2 show clear results based on subjective answers given by the respondents on how they perceive the idea of getting microcredit and health insurance. The situation here is different from the one above since we are dealing with those uninsured. Hence, our results are based on the subjective perception the respondents give on how they feel microcredit/health insurance will be effective in their lives. The prospective for improving living conditions through insurance and microcredit has a high overall trend, exceeding 60% for all levels of education represented. Among the uneducated, who consider the least an improvement in their health status, there is the greatest level of opportunity for improving their social and financial status. Among those with a secondary level of education, the ratio of people who are considering an improvement in living conditions is 3/4. For individuals with a higher level of education, the purchase of insurance would improve financial, health, and social status in descending order. These orders, for each level of education, show more or less the order (orders) of interest of the different sectors of the population.

Table 2: Average possibility of improvement of living conditions related to possible insurance and given specific educational levels

	Health status	Social status	Financial status
Uneducated	66,67%	100%	100%
Primary	82,35%	94,44%	94,74%
Secondary	75%	75%	78,12%
Higher education	90%	77,78%	91,67%

Source: survey data collected by the author; May 2019.

Figure 2: Average possibility of improvement of living conditions related to possible insurance and given specific educational levels



Source: survey data collected by the author in May 2019.

3.3: Data presentation, model Specification and justification

This work aims to analyze the effectiveness of microcredit/health insurance on vulnerable persons in Dschang. To be specific, we analyze from an econometric point of view the problem of vulnerable groups taking into consideration the handicapped and non-handicapped and thus the performance of an inclusive financial system, that is to say, its ability to promote their transformation from vulnerability to non-vulnerability; and study the transmission channels.

Thus, the methodological approach adopted in this work allows us to model on the one hand the probabilities of people being vulnerable. The modelling of qualitative variables requires the use of particular models such as logit and probit models. The latter are special cases of univariate dichotomous models while the probit model is an intermediate model between qualitative models and the general linear model. The dichotomous probit and logit models admit dependent variables which do not have a quantitative coding associated with the realization of an event (as in the case of the linear specification), but rather the probability of occurrence of this event conditional on the exogenous variables (Hurlin, 2003).

$$P_{i1} = P(y_{i1} = 1) = \frac{\exp(\alpha_0 + \sum_{j=1}^k \alpha_j X_{ij})}{1 + \exp(\alpha_0 + \sum_{j=1}^k \alpha_j X_{ij})} \dots\dots\dots(3.1)$$

$$P_{i2} = P(y_{i2} = 1|y_{i1} = 1) = \frac{\exp(\beta_0 + \sum_{j=1}^k \beta_j X_{ij})}{1 + \exp(\beta_0 + \sum_{j=1}^k \beta_j X_{ij})} \dots\dots\dots (3.2)$$

y_{i1} is the handicapped or non-handicapped character of the vulnerable group (1 if the person is non-handicapped, 0 otherwise). y_{i2} is the observation of the transmission channels of the change in the livelihood of the person e.g. (1 if better health, 0 if otherwise). The observation of vulnerable groups and their transmission channels is supposed to be guided by latent phenomena y^*_{i1} , and y^*_{i2} respectively. The development of effective microcredit/ health insurance for vulnerable groups and its transmission channels are then observed when these latent phenomena exceed a certain critical threshold normalized to zero, that is to say by noting the stages of occurrence of the two phenomena:

$$\begin{cases} y_{ij} = 1 & \text{si } y_{ij}^* \geq 0 \\ y_{ij} = 0 & \text{si } y_{ij}^* < 0 \end{cases} \dots\dots\dots(3.3)$$

The application of these models takes into account the dichotomous nature of the explained variable. In studying the impact of microcredit /health insurance, it is important to distinguish between being a physically and non-physically disabled person. Although the logit and probit models differ in the laws that their error term follows, they are otherwise similar in that they generally give the same results even if they are not directly comparable. However, we use a logit specification because of the transformation of the coefficients to obtain the odds ratios to which we give a relevant interpretation.

This methodological choice seems to be better adapted. Logit models are used whenever the dependent variable is binary (also called dummy) which takes values 0 or 1. Logit regression is a nonlinear regression model that forces the output (predicted values) to be either 0 or 1. Logit models estimate the probability of your dependent variable to be 1 ($Y=1$). This is the probability that an event will happen. We shall therefore use a multinomial logit model for our analysis. Table A2 in the appendix presents the different variables we use for our analysis which is provided by the exploitation of the database based on the survey undertaken.

Note: y is the dependent variable, and $x = (x_1, x_2, \dots, x_j)$ the explanatory variables. In the context of binary logistic regression, the vulnerability variable can take two forms: non-handicap (1) or handicap (0). This can be written in the analytic form as follows:

$$y = \begin{cases} 1 & \text{not - handicaped} \\ 0 & \text{handicaped} \end{cases}$$

The variables x_j are qualitative and have several modalities.

Our model can be presented in the following form:

$$y_i = \beta_0 + \beta_1 x_i + \varepsilon_i \dots\dots\dots(3.4)$$

The variables are described as follows: y_i = vulnerability variable; x_i = Nutrition access - Hygiene access - Medicine access - Doctor access - Saving access - Respect access - Integration access - Confidence access - Gender - Presence of physical handicap - Matrimonial Status - Education level – Profession and β_0 represent the constant. This can be presented as follows:

$$\text{State of vulnerability} = f(\text{access to nutrition, access to hygiene, access to drugs, access to a physician, access to savings, access to respect, access to confidence, Gender, presence of handicap, marital status, level of education, profession}) \dots\dots\dots(3.5)$$

Our estimation strategy consists of making two successive logistic regressions: the second will be conditioned by the observation of the appropriate channels by which the change in the livelihood of vulnerable groups is examined.

The main variables consist of our core variables i.e. the dependent variable and independent variables. They include Microcredit², vulnerability³ and insurance⁴. Control variables are variables said to be neither dependent nor independent variables but can have effects on our results given the model we have; they are Gender, profession, level of education and presence of physical disability... etc.

Therefore, we want to model the behaviour of these phenomena and the factors that contribute to giving them values above the thresholds, which means that if the person is handicapped, whatever the transmission channel by which the microcredit/health insurance influences the latter, the figure below is a sketch of this statement. It is assumed that similar, but to varying degrees, mechanisms underpin the propensity of vulnerable groups. In summary, we will apply a two-step methodology as follows:

✓ *Effectiveness of microcredit/health insurance on vulnerable groups with physically disabled on one hand and non-disabled on the other.*

Analysis from an econometric point of view, the effectiveness of microcredit/health insurance on vulnerable groups with clear distinctions on those insured and those un-insured

✓ *Identification of the transmission channels through which we see clearly how this vulnerability changed.*

4. The effectiveness of microcredit and health insurance on vulnerable people: presentation and discussion of results

In this section, we present and discuss the main results of our econometric investigation in Table 3 below.

Table 3: Results of estimation

Logistic regression		Number of observations = 400		
LR chi2 (14) = 145,85		Prob > chi2 = 0,0000		
Log likelihood = -181,44788		Pseudo R ² = 0,2867		
Vulnerability	Coefficient	Robust Std. Err.	Z	P> z
Key Variables Related To Microcredit / Health Insurance Access				
<i>Health status</i>				
Nutrition access	Reference			
Do not access to good nutrition	- 2,535062	1,13029**	- 2,24	0.025
<i>Financial status</i>				
Medicine access	Reference			
Bad access	- 2,467913	0,5175503***	4,77	0.000
<i>Social status</i>				
Integration access	Reference			
Bad integration	-0,8760078	0,4646271*	-1,89	0.059
OTHER CONTROL VARIABLES				
<i>Gender</i>				
Male	Reference			

² For this variable, we shall mainly ask questions on whether or not the respondents have benefitted from microcredit and move forward to look at the effect on their livelihood.

³ Here, we want to know the form of the vulnerability of every respondent by asking questions on the description of their disability as well as their incomes and other questions.

⁴ Here we simply demand if the respondent is either insured or not as well as the effect of this insurance on their livelihood.

Female	0,5357985	0,3131741*	1,71	0.087
<i>Presence of physical handicap</i>				
Presence of physical handicaps	Reference			
There is no physical handicap	1,716857	0,2952166***	-5,82	0.000
<i>Matrimonial Status</i>				
Married or single	Reference			
Divorced or Widower/free relation	1,55755	0,3257803***	4,78	0.000
<i>Education level</i>				
Un educated	Reference			
Primary education	0,8403996	0,3202299***	2,62	0.009
Secondary education	3,345559	0,9109163***	3,67	0,000
Higher education	0,7151393	0,4303678*	1,66	0.097
<i>Profession</i>				
Trader	Reference			
Civil servant	-0,5637222	0,2845413**	-1,98	0.048
Small jobs	-2,808006	1,154572**	-2,43	0.015
Unemployed	0,042117	0,672302	0,06	0.950
Informal sector	-1,050362	0,4736067**	-2,22	0.027
Constant	3,243044	1,230021***	2,64	0.008

Source: Author based on survey data.

Note: The estimation method was logistic regression and the dependent variable is the vulnerability (the reference modality being the handicap); The non-significant variables named “Hygiene access”, “Doctor access”, “Saving access”, “Respect access” and “Confidence access” were removed from the database which was used to estimate to ensure the robustness of our results. * = 10% significance, ** = 5% significance, *** = 1% significance. Overall, we have presented the statistical analysis results along with the econometric method in this chapter. The results obtained from our econometric regression have also been presented. The next section will mainly focus on the summary of findings conclusion and economic policy recommendations.

As regards the *health status*, the category corresponding to less access to good nutrition is less likely (-2.53506) than the reference modality which is high nutrition access. In other words, the individual presenting with high nutrition access is more likely to benefit from a less vulnerable state than the one that presents less access to good nutrition. This situation can be explained by the fact that nutrition access gives good body health and thus contributes to reducing vulnerability and/or avoiding it.

Concerning the *financial status*, the modality corresponding to bad access to medicine is less likely (-2,467913) than the reference to good access to medicine. This could be explained by the fact that access to medicine related to good financial status can help in reducing a vulnerable status.

As regards *social status*, the modality corresponding to bad integration into society is less likely (-0,8760078) than the reference modality corresponding to good integration. This could be explained by the fact that good integration contributes to a good social status and thus can help for the non-vulnerability status since the non-integration in the society can explain and/or foster the vulnerability.

Concerning *gender*, the modality corresponding to females is more likely (0,5357985) than the reference to males. This could be explained by the fact that women are closer to being vulnerable so men usually present a higher willingness to engage in activities at risk than women do. Also women on their nature of getting pregnant as well as a weaker sex account for this

Concerning the *presence of a physical handicap*, the absence of a physical handicap reduces by -1.71685 the possibilities of general vulnerable status; That is, the individual with an absence of a physical handicap is less likely (-1.71685) to have features of the existence of vulnerability status than the one with a physical handicap (reference category).

For the *matrimonial status*, an observation of the coefficient shows that an individual who is divorced or widowed or involved in a free relation has 1.55755 times the chance of not being vulnerable than an individual who is married or single (which is the reference modality and its coefficient is 1). This situation can be explained by the fact that generally, being divorced and/or a widow can be seen as an escape from a relationship with high exposure to risk (risky partners) as well as getting involved in a free union which is generally without high constraint.

On the *educational level*, the terms corresponding to individuals with primary school education level, with secondary education, and with higher education have coefficients of 0.84039, 3.34555, and 0.7151393 respectively; This means that individuals with any education level are more likely to have reduced vulnerability than an uneducated one. In fact, in the context of the fight against illiteracy by promoting education access, the education level usually reduces the potential to become vulnerable.

In the case of *profession*, the terms corresponding to civil servant, small jobs, unemployed and informal sector respectively have the coefficients 0.56372, -2.8080, 0.042117, and -1.050362. This means that on one hand, civil servants and unemployed individuals are more likely to have a reduction in vulnerability than the trading profession (reference); and on the other hand, individuals with small jobs and acting in the informal sector are closer to the vulnerability status than trader (reference). This situation of an individual with small jobs and acting in the informal sector which increases the probability of vulnerability can be explained by the fact that this type of activity presents a higher risk than other types of activities.

5. Conclusion and economic policy recommendation

When trying to relate micro-credit and health insurance with vulnerability a problem comes in which is that the financial sector in developing countries especially in Cameroon has not developed, despite its efforts to reduce poverty or vulnerability of these persons via micro-credit and health insurance. Overall, this study seeks to fill the gap in the literature by examining the effectiveness of micro-credit/health insurance on vulnerable groups with the physically disabled on one hand and people with other forms of vulnerability on the other in the district of Dschang. The main objective is to examine the effectiveness of microfinance institutions in Cameroon via microcredit/health insurance to reduce the level of vulnerability. Thus, the specific objectives are first of all to know how effective is microcredit/health insurance on vulnerable people with a physical disability and secondly, to verify how effective are microcredit/health insurance on other types of vulnerable persons.

The confrontation of the rich empirical and theoretical literature review on the effectiveness of microfinance institutions via microcredit/health insurance to reduce vulnerability in people with the reality in the country of the study is very helpful to highlight the previous problem along with the formulation of the hypothesis of our study. Our statistical analysis provides a very good picture of the situation and some stylized facts. The frequency of vulnerability

highlights that there is 52% of physical handicaps and 48% of other vulnerable persons. Additionally, a higher number of vulnerable persons perceive a better diet, perceive good hygiene, buy drugs, and access medical consultation due to the acquisition of microcredit or health insurance. Our econometric analysis using a logit approach yields some results which allow us to highlight qualitatively and quantitatively, the responsibility of the economic agents like the state, microfinance managers, and financial institutions. This is the basis of the following recommendations;

We begin with some measures that should be taken by the government as the regulator of the economic activity in Cameroon in the light of our results to unleash the effectiveness of microcredit/health insurance impact on vulnerable people; in order to achieve its objective of assistance to vulnerable people, the government should implement a:

- i. Food policy with a target to increase nutrition access;
- ii. Financial/medical policy to improve access to drugs by individuals;
- iii. Social policy for a high level of integration of vulnerable peoples and a high literacy level of individuals.

The microfinance owners to ensure the effectiveness of microcredit/health insurance impact on vulnerable people should:

- i. Develop more products specific to and targeting the vulnerable population;
- ii. Target people involved in small jobs and the informal sector with specific loans that can help them move to formal and more conventional jobs.

Finally, financial institutions and regulators should contribute to the effectiveness of microcredit/health insurance impact on the vulnerable by implementing and/or facilitating the implementation of the previous policies.

6. Appendix

Table A1: Presentation of the situation of micro-finance establishments and health insurance in the Dschang health district

Establishment	Type Of Structure	Presence Of Health Insurance
1-AREA	Insurance	Yes
2-NOFIA	Microfinance	No
3-SAHAM	Micro Finance	Yes
4-NSIA	Insurance	Yes Companies Only
6-BAA	Insurance	No, Not Any More
7-CECAW	Microfinance	Yes
8-MUPECI	Microfinance	No
9-MC2	Microfinance	Yes
10-EXPRESS UNION	Microfinance	No
11-ACEP	Microfinance	No
12-FINEC	Microfinance	No
13-COMECCI	Microfinance	No
14-FIRST TRUST	Microfinance	
15-SECUDS	Microfinance	

16-CPA	Insurance	
17-SOCOOPECBAT	Microfinance	No
18-UNITED CREDIT	Microfinance	No

Table A2: Table of variables

Variables	Definition
<i>DEPENDENT VARIABLE (ENDOGENOUS)</i>	
Vulnerability	1 if vulnerable, 0 if not
<i>INDEPENDENT VARIABLES (EXOGENOUS)</i>	
key variables related to microcredit/health insurance access	
A. Health status	
• Nutrition access	1= if I eat healthier, 0 = if not
• Hygiene access	1= if better hygiene, 0 = if not
B. Financial status	
• Medicine access	1= if the medicine is purchased at an earlier stage, 0 = if not
• Doctor access	1= if access to the doctor sooner than before, 0 = if not
• Saving access	1= if save more, 0 = if not
C. Social status	
• Respect access	1= if gain more respect from family, 0 = if not
• Integration access	1= if gain more integration in the community, 0 = if not
• Confidence access	1= if gains more confidence in himself, 0 = if not
<i>CONTROL VARIABLES</i>	
• Gender	1 = Male, 0 = Female
• Presence of physical handicap	1 = presence of physical handicap, 0 = if not
• Matrimonial Status	Reference
Married or single	1 = if married, 0 = if not
Divorced or Widower/free relation	1 = if divorced of Widower/free relation, 0 = if not
• Education level	Reference
Un educated	1 = if Un educated, 0 = if not
Primary education	1 = if primary education, 0 = if not
Secondary education	1 = if secondary education, 0 = if not
Higher education	1 = if higher education, 0 = if not
• Profession	Reference
Trader	1 = if he is trader, 0 = if not
Civil servant	1 = if he is a Civil servant, 0 = if not
Small jobs	1 = if he is Small jobs, 0 = if not
unemployed	1 = if he is unemployed, 0 = if not
Informal sector	1 = if he is Informal sector, 0 = if not

Source: Author construction

7. LIST OF ABBREVIATION

1-AIDS: Sida;

2-PwD's: People with Disabilities.

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