CHAPTER 3

METHODOLOGY AND MODEL SPECIFICATION

3.1 INTRODUCTION

Many studies view interest rate ceilings in micro lending market as a harmful to the citizens that they were apparently designed to protect. In an attempt to analyse and explore the implications of interest rate ceilings on the micro lending in South Africa, various methods are employed in this study. The study employs both quantitative and qualitative research methods, and relies on several sources for information.

3.2 SOURCE OF DATA

The study used secondary information obtained from the Department of Trade and Industry study conducted in 2000, which was determining the cost and structure of small loan finance sector. This study is further supplemented by various studies and research documents in this field. The study focused on information from the Internet, journals, industry comments and reports submitted by various micro-lending institutions.

This study employs data consisting of monthly observations of operational statistics of a micro lending company. This is the data obtained from the DTI (2000) study, which determined the cost structure and interest rates of small loan sector. The data employed is from March 1999 to March 2000 and it is used in this study to demonstrate the impact of rate ceilings in the micro lending market. Data on financial statement of micro lenders is also sourced form the Department of Trade and Industry is employed in this study.

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3.3   TECHNIQUES OF DATA ANALYSIS

Two approaches using quantitative data are employed to accomplish the objective of this study. These two approaches were selected in order to show the implications of interest rate ceilings on both the lender and the borrower. In the first approach the study uses the financial statements of a micro lender to evaluate the effect of a change in the maximum interest rate that could be charged by a micro lender. This approach is aimed at showing the impact of interest rate ceiling towards the lender, when interest rate are capped at various levels.

The second approach uses data consisting of monthly observations of operational statistics of a micro lending company. In this approach simple and multiple regression techniques are performed on these data. This approach is explained in detail later in this chapter.

3.4   ANALYTICAL FRAMEWORK

Goudzwaard (1968) applied empirical analysis to this topic by using simple regression analysis to financial data from 32 States Small Loan Licensee Reports of lender operations in the USA during 1964 to demonstrate the credit reallocation impact of rate ceilings. The following variables were used in his study.

Dependent variables:

Y_1 =   Average credit losses to average loans outstanding

Y_2 =   Average credit losses and salary and administrative expenses to average loan outstanding.

Primary independent variable:

X_1 =   average gross finance charges to average loans outstanding

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Control variables:

$X_2 =$ Average loan size

$X_3 =$ Average size of loan office- amount of loans outstanding per loan office

$X_4 =$ Lender concentration- number of consumer finance company offices per unit or urban population.

$X_5 =$ Average per capita income

The relationship between risk level and rate ceiling was first tested in the following three equations where the dependent variable, credit loss rate, (Y_1) is presumed a proxy for credit availability.

$$Y_1 = a + b_1 X_1$$
$$Y_1 = a + b_1 X_1 + b_2 X_2$$
$$Y_1 = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5$$

Credit losses here represent the degree of lender portfolio risk, and the types of credit standard policies in force at consumer finance companies. Higher credit losses generally mean that lenders have relaxed standards to include marginal accounts previously ineligible for credit allocation. Likewise, lower credit losses indicate tighter credit standards. Therefore average credit loss rate, the percentage of credit losses to average loans outstanding, is the dependent variable representing credit availability at consumer finance companies.

Since salary and administrative expenses may substitute for credit losses, the regression is repeated with the sum of these two expense rates as the dependent variable in the following three equations.

$$Y_2 = a + b_1 X_1$$
$$Y_2 = a + b_1 X_1 + b_2 X_2$$
$$Y_2 = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5$$

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Another measure of credit risk and credit availability is the sum of credit loss and salary and administrative expense as a percentage of average loans outstanding. This expense rate is the dependent variable in the above equations. Goudzwaard (1968) points out that this variable may not be a precise proxy for credit availability since many other factors effect salary and administration expense. Salary expense would be more appropriate than the sum of salary and administrative expense, but in most cases they are grouped together in financial statements, making it difficult to distinguish between the two in a fair and consistent manner.

The results of the analysis by Goudzwaard (1968) demonstrated that any rate ceiling would very likely affect consumer credit allocation, and that price controls will definitely lead to credit rationing. The regression coefficients showed a strong and significant relationship between average credit loss rate and average gross finance rate, thereby supporting the contention that rate ceilings affect borrower loan eligibility at consumer finance companies.

3.5   MODEL SPECIFICATION

Regression analysis is concerned with the study of the dependence of one variable, the dependent variable, on one or more other variables, the independent variables (Gujarati, 1995). Gujarati (1995) further a state that if one wishes to study the dependence of a variable on only a single independent variable then such study is known as simple regression analysis. And if one wishes to study the dependence of one variable on more than one independent variables then such study is known as multiple regression analysis. The above definition is further explained with the aid of equations sourced form Gujarati (1995)

$Y_1 = b_0 + b_1 X_1 + e$, is a simple regression equation and

$Y_1 = b_0 + b_1 X_1 + b_2 X_2 + e$, is a multiple regression equation, where:

Y_1 is dependent variable,

X's $(X_1, X_2,... X_k)$ are independent variables

b's $(b_1, b_2,... b_k)$

e is an error term

The models considered in this study draws on that of Goudzwaard (1968) on price ceilings and credit rationing, though they have been modified to suit data used in this study. This study employs both simple and multiple regression techniques on the availabe data. The variables used to specify the models (equation 1 to 6 below) are as follows.

Dependent variables:

Y_1 = Debtors in arrears

Y_2 = Number of branches

Y_3 = Average number of loans per branch

Primary independent variables:

X_1 = Interest received

Control variables:

X_2 = Average loan

X_3 = Average number of loans per branch

X_4 = Number of branches

3.5.1   Regulation and Borrower Risk

For the purpose of this study, risk has been measured by debtors' in arrears (Y_1). The relationship between risk level and rate ceilings is first tested in the following two equations. In equation one a simple regression analysis is conducted to test the relationship between risk level and interest received (X_1). In the second equation another variable, average loan (X_2) was added to test whether a positive significant correlation between rate and risk would still hold even if the effects of this variable on risk have been taken into account.

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Equation 1

$$Y_1 = b_0 + b_1 X_1 + e$$

Equation 2

$$Y_1 = b_0 + b_1 X_1 + b_2 X_2 + e$$

3.5.2   Regulation and Market Structure

Equations three to six below were formulated to illustrate the impact of rate ceilings on the market structure and size of a micro lender with various outlets. The market structure characteristics, which are analysed, are the number of branches (Y_2) and the average number of loans per branch (Y_3). The number of branches is used as measure of the size of the micro lender and the number of loans extended per branch is used as a measure of outreach.

The relationship between the (Y_2) and rate ceilings is tested in equation 3. This equation is expected to yield a positive significant correlation between the interest received and the number of branches. In equation 4 average number of loans per branch (X_3) is added to test whether a positive significant correlation between interest received and the number of branches would still hold even if the effects of (X_3) on number of branches have been taken into account. The relationship between number of loans (Y_3) extended and interest received is tested in equation 5.

Equation 3

$$Y_2 = b_0 + b_1 X_1 + e$$

Equation 4

$$Y_2 = b_0 + b_1 X_1 + b_3 X_3 + e$$

Equation 5

$$Y_3 = b_0 + b_1 X_1 + e$$

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Equation 6

$$Y_3 = b_0 + b_1X_1 + b_4X_4 + e$$