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ENTRY, EXIT AND GROWTH OF MICRO AND SMALL ENTERPRISES IN THE DOMINICAN REPUBLIC 1992-1993

By

Miguel F. Cabal

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ABSTRACT

Entry, Exit and Growth of Micro and Small Enterprises
in the Dominican Republic 1992 - 1993.

By

Miguel F. Cabal

Small scale enterprises in developing countries have emerged as an important sector because of their role in employment and income generation. Despite their importance, little is known about their patterns of growth--entry and exit of enterprises and change in employment of surviving enterprises. Using data sets from repeated nation-wide cluster surveys conducted in the Dominican Republic, this dissertation contributes to the understanding of the dynamics of these enterprises.

For the first time, panel data are used to estimate firms birth, closure and migration rates. The probability of firm failure is estimated using a discrete hazard model, and the risk of business failure for different reasons is examined. This study also estimates the different components of employment growth in the micro and small enterprise sector. The study examines some factors associated with the probability of growth of surviving enterprises using an ordered logit model.

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About one fourth of the enterprises operating at the beginning of a year opened in a one-year period and a similar figure closed in the same period. Closure rates tend to be higher for female-owned enterprises and for those in trade activities. These rates are higher in sectors and in periods where the performance of the economy is improving.

Hazard rates may vary by age of the enterprise and the hazard rate of closing for business reasons is higher than for non-business reasons. The results of the hazard model show an inverse relationship between the probability of failure and both the size and the age of the enterprise. Female-owned businesses and trading enterprises have higher hazard rates. Enterprises receiving formal credit are more likely to survive. Previous experience with failed business increases the hazard rate. These effects remain unchanged across cohorts but they are stronger and more significant for younger firms.

With respect to employment, evidence shows that during years of slow economic growth, birth rates tend to increase but the size of these new firms is smaller. The overall closure rate is lower but relatively more large firms are closing. The proportion of expanding enterprises as well as their growth rates are smaller. During fast economic growth periods, employment generation is lead by expansion of existing firms which implies longer lasting jobs. Job losses are more likely due to business closures than to shrinkage of surviving ones. The effect of the explanatory variables on the chances of hiring and firing workers in the short run varies according to macroeconomic conditions and this is different by type of worker.

ACKNOWLEDGMENTS

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I extend my gratitude to Banco de la República de Colombia for financing part of my studies at Michigan State University. I am also grateful to the United States Agency for International Development and specially FondoMicro for providing funding and facilitating the field work.

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I am very grateful to my parents for their affection and encouragement throughout my graduate studies.

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CHAPTER I

INTRODUCTION

1.1 Introduction

Development is often viewed as a process that entails the transformation of an economy from producing mainly agricultural outputs to producing mainly industrial and service outputs. This process requires the diversification of the economy away from agriculture and rural areas, and thus, involves a major structural transformation (Mellor, 1986). Since structural transformation means adjustment to a new composition of the economy, it implies mobilization of capital and labor in geographical and sectoral terms. Moreover, during this process the economy is transformed from predominantly rural to predominantly urban. Although, this mobilization is inevitable and desirable, it is neither costless nor smooth.

In Latin America, the structural transformation is made evident through two indicators. Both, the share of agriculture in the gross domestic product and the proportion of the economically active population involved in agriculture and located in rural areas, have declined steadily in the last forty years. The structural transformation

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together with the population growth have placed a great challenge in non-agricultural activities to generate employment. In the region, employment growth in the non-agricultural formal sector seems to lag behind the increasing labor supply originated from both population growth and surplus labor from the agricultural sector. Therefore, increasing interest of policy makers as well as researchers has been focused on non-farm sectors that can meet the challenge of generating employment.

From a policy view point, small scale enterprises have emerged as an important sector because of their role in employment and income generation. It has been estimated that as much as a third of the population in developing countries derive their income from the microenterprise sector (Levitsky, 1989).

The interest in small enterprises emerges mainly from their capability of generating employment, since they are labor-intensive production units. In addition, these enterprises have also shown flexibility to market changes and a high capability of using capital productively. Moreover, these enterprises use resources that may otherwise not be used such as workers with limited formal training and scattered local raw materials (Nelson, 1987).

Despite their importance, reliable data sets on small scale enterprises are scarce in developing countries. Moreover, the limited information available deals mainly with static characteristics of these enterprises. Therefore, little is known about their patterns

of growth -- entry and exit of enterprises, and change in employment of surviving enterprises. The limited knowledge on small enterprise dynamics is due, in part, to the lack of cost-efficient methods for collecting data on the dynamics of these enterprises.

The objective of this dissertation is to go beyond static analysis of the firm and contribute to the understanding of the evolution of micro and small scale enterprises over time in the Dominican Republic. The specific objectives of the dissertation are to:

1. Explore methods for collecting information regarding dynamic issues of micro and small enterprises.
2. Estimate and analyze indicators of entry, exit and migration of micro and small enterprises.
3. Examine how some characteristics of micro and small businesses and their owners contribute to the failure or survival of these businesses.
4. Estimate and analyze the different components of aggregate employment change in micro and small enterprises.
5. Examine how some characteristics of surviving enterprises contribute to explain growth of these businesses.

A unique set of data from micro and small enterprises in the Dominican Republic provides the information to achieve those objectives. Repeated nation-wide cluster surveys of micro and small enterprises provide information both about businesses and

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households in survey areas; this allows a follow-up of surviving, new and closed enterprises.

The remainder of this chapter provides an indication of the importance of micro and small enterprises in Latin America and presents a review of some of studies carried out in this geographic area. Chapter II presents a descriptive profile of micro and small enterprises in the Dominican Republic based on three surveys conducted during the period March 1992 to October 1993. It also includes a detailed presentation of the methodology used, for the first time, to collect dynamic information mainly related to enterprises' births and closures. Chapter III estimates firms birth and closure rates for three periods between March 1992 and March 1994. For the first time in developing countries these estimates use prospective data as opposed to retrospective data. Many important methodological issues in this estimation are discussed in this section. Chapter IV examines the probability of firm failure using a discrete hazard model, and explores the risk of business failure for different reasons. It also evaluates changes in hazard rates by birth cohorts. Some of the estimates in this chapter have never before been done in developing countries. Chapter V estimates the different components of employment growth in micro and small enterprises for the first time in developing countries. It also examines the probability of growth of surviving enterprises and some factors associated with employment expansion or contraction. Chapter VI offers main conclusions as well as some methodological and general policy implications.

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1.2 Magnitude of the Microenterprise Sector in Latin America

The definition of a microenterprise varies among countries. In general, there are no lower limits in its definition but the upper limits may be defined in terms of several criteria: amount of fixed assets, value added, total number of people employed, sales volume, total number of costumers, levels of energy required for production, or a combination of some of these criteria (Nelson, 1987).

Even though, there is little agreement on the definition of microenterprise, some agreement has been reached regarding their general characteristics. These enterprises "comprise very small income generating units, possibly of one person or members of a family or a few employees, that might or might not be of a semilegal or informal character, depending on the legal structure of the country concerned." (Levitsky, 1989:xx).

The terms microenterprise and informal sector are often used to refer to the same kind of economic phenomena. This is due in part to the lack of a single definition of each concept. One of the problems in defining the informal sector is the choice of an economic unit (Sethuraman, 1981). One approach is to take the individual as the economic unit, so that the informal sector (IS) is viewed as a labor market segment made up of the workers that do not enjoy the wage level and working conditions prevailing in the formal sector. It may also divide urban workers according to individual

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characteristics such as education, employment status, etc. A second approach focuses on households and the IS is taken to consist of urban households with low incomes. A third approach chooses the enterprise as the economic unit; in this case the IS is defined through characteristics of the enterprises such as number of workers, organization of the production process, relation to the state, etc.

International Labour Organization (ILO) has used a combination of economic activities and characteristics of enterprises as the basis for describing the IS. Initially, the ILO referred to informal activities as "the way of doing things characterized by ease of entry, reliance on indigenous resources, family ownership of enterprises, small scale of operation, labour-intensive and adapted technology, skills acquired outside the formal school system, operating in unregulated and competitive markets" (ILO, 1972:6).

When taking the enterprise as the economic unit, there are several quantitative criteria that may be used to describe the IS. For instance, amount of capital invested per worker, size of the establishment, level of sales or a combination of them. According to the size criterion, the most popular, the IS is composed of enterprises with fewer than certain number of workers. This number varies but generally the limit is set at five, ten or sometimes 20 workers (Haan, 1989).

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In this way, the IS consists of very tiny enterprises or microenterprises including the one-person enterprise. Since microenterprises manifest some (and sometimes all) the features commonly associated with informal sector activities, the two concepts overlap[1].

There is no precise measurement of the magnitude of the microenterprise sector for the entire Latin American region. As mentioned above, this is due in part to the lack of a consistent body of data on small enterprises in this region. In addition, the focus of most of the studies carried out in Latin America has been the informal sector employment. Therefore, the estimate that would be possible to obtain, would refer to informal sector employment in the region. However, in order to have a reliable measure of the labor force engaged in informal activities, surveys of the informal sector establishments should be conducted. Since this approach has been difficult to follow, other proxy variables have been used in the estimation of informal sector employment.

In developing countries, the information about IS employment is usually obtained from national population census or household surveys. These sources of data generally include employment by occupational categories: wage and salary workers, employers, self-employed, and unpaid family workers. Based on these categories, the IS is often represented by self-employed workers and unpaid family workers in all non-agricultural

[1] For some authors "the informal sector enterprises can be interpreted as belonging to the lower end of the urban continuum of enterprises", and the term small enterprise as "belonging to the middle of this continuum; it uses a mode of production and organization somewhat similar to the formal sector but on a relatively smaller scale" (Sethuraman, 1981:17).

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On this basis, the Regional Employment Program for Latin American and the Caribbean (PREALC) estimated that the IS employment in Latin America constituted approximately 14% of the Economically Active Population in the region during 1980 (Table 1.1).

Table 1.1

Latin America: Economically Active Population by Segment, 1950, 1960, 1970, 1980

(%)

	1950	1960	1970	1980
Urban	43.5	50.5	56.7	64.0
Formal	30.1	34.9	39.8	44.6
Informal*	8.7	10.6	11.5	13.8
Domestic Service	4.7	5.0	5.4	5.6
Agriculture	55.3	48.4	42.4	35.3
Mining	1.2	1.1	0.9	0.7
Total Economically Active Population	100.0	100.0	100.0	100.0

Source: PREALC 1982, Mercado de Trabajo en Cifras
* Include self-employed and unpaid family workers.

It should be noted that several problems emerge from accepting the informal employment as defined above. One of them has to do with the multiple criteria used in the definition of the occupational categories which sometimes overlap. A second problem is the underestimation of those participating in the IS since business owners and paid workers in very small enterprises are excluded from the estimation. Some evidence

from Central America shows that these categories may represent an important proportion of the informal employment. For example, Table 1.2 shows that in early 1980s, business owner and paid workers accounted for 48% and 25% of the economically active population engaged in the informal sector in Costa Rica and Nicaragua respectively. Therefore, the magnitude of the IS in Latin America, shown before, may be underestimated.

Table 1.2

Central America: Structure of Informal Sector Employment Around 1982

(%)

	Business Owners	Self-employed	Family workers[1]	Salaried workers[2]
Costa Rica	10	47	6	38
El Salvador[3]	2	63	8	27
Guatemala[3]	4	64	5	27
Honduras	8	52	3	37
Nicaragua	5	68	8	20
Panama	6	71	3	20

Source: Haan, 1989

[1] Unpaid family workers. [2] Non-domestic workers in microenterprises (with fewer than five workers). [3] Estimates for 1980.

1.3 Informal Sector Studies and Small Scale Enterprises in Latin America.

This section briefly reviews some of the studies carried out in Latin American countries, dealing with informal sector employment and microenterprises. Even though the studies have many different primary interests, the magnitude of employment and the number of economic units will be highlighted when possible.

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1.3.1 Informal Sector Studies

The concern about unemployment in developing countries led the ILO to conduct several studies in the past two decades. According to the ILO, the informal sector is, in part, generated in a structural context characterized by lack of well-remunerated job opportunities and by an excess of labor. In the competitive pressure of excess labor, the quest for survival pushes down incomes and generates subsistence activities (Tokman, 1992).

ILO, through PREALC, carried out a research project during the 1975-1976 period that included two Latin American cities: Córdoba (Argentina) and Campiñas (Brazil). The focus of the studies was to understand the conditions under which the informal sector absorbs labor and generates income (Sethuraman, 1981). The studies sought to cover several areas within the city on a sample basis, and attempted to complete a list of enterprises before drawing the sample.

The Córdoba study covered all enterprises with five or fewer workers. The total number of enterprises reported was 2,344, which generated 3,080 jobs. About 86% of the total number of enterprises were one-person operation and only 1% had five paid workers excluding the owner (Sánchez, Palmeiro and Ferrero, 1981).

The study in Campiñas included own-account workers and enterprises with fewer than ten paid workers. The study adopted a stratified random sampling procedure from 40 zones according to the level of employment prevailing in 1975. The sample size of 500 units was divided in a ratio of 20:40:40 between industry, commerce and services respectively (Tosta, Murari, and Cintra, 1981).

The data collected was classified by size of enterprise, that is by the number of wage workers per enterprise excluding the owner. Approximately 50% of the enterprises in the sample were one-person enterprises, and 37% engaged paid workers. The total of enterprises in the sample generated employment for 1,368 people. Thus, implying that the average size of the enterprises was 2.74 persons.

Also following the ILO effort to collect evidence of the informal sector in Latin America, Casanovas (1992) conducted a research in Bolivia in order to quantify the extent of the informal sector. Casanovas took the breakdown of urban Economically Active Population by job category in 1976 and 1987 and found that, during this period, the formal sector's share of total employment decreased from 44.2% to 41.2%. In contrast, the informal sector increased in the percentage share of total urban employment from 44.5% in 1976 to 54.5% in 1987. During this eleven year period, the annual growth rate of total employment was 5.8% while in the informal sector the employment growth was 7.6%. As a result of this trend, 55% of total employment in Bolivia's major cities in 1987 (about 451,000 workers) was related to informal activities (Casanovas,

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1992). In terms of units, the number of informal enterprises in Bolivia's major cities in 1987 was estimated to be about 335,000. Out of this total, 78.5% were classified as family units (composed by self-employed and unpaid family workers) and 21.5% as semienterprises (permanently employing salaried workers although on a small scale).

A second approach toward the conceptualization of the informal sector suggests that the sector is an outcome of the decentralization and reorganization of the production and work process at the global level. According to this approach, the IS is a "process of income-generation characterized by one central feature: it is unregulated by the institutions of society, in a legal and social environment in which similar activities are regulated" (Castells and Portes, 1989:12).

From this view point, the expansion of the informal sector is the result of several causes: 1) reaction against the state's regulation of the economy imposed during the 1960s; 2) efforts to undermine organized labor's control over the work process; 3) integration of national economies into the international system, thus forcing the economy toward labor cost reduction activities; 4) increased flexibility of rules and regulations in newly industrialized countries to obtain comparative advantage for their production relative to more regulated areas of the world economy; and 5) contraction of formal employment due to economic crises since the mid-1970s (Castells and Portes, 1989).

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Following this approach, Roberts (1989) conducted a study of the formal and informal sectors in Guadalajara (Mexico). Roberts defined the informal sector as the set of economic activities often, but not exclusively, carried out in small firms or by the self-employed which elude government requirements such as registration, tax and social security obligations and health and safety rules. In estimating the size of the informal employment and following the categories defined by the 1980 census, Roberts quantified the number of self-employed workers, family workers, and domestic servants, who are unlikely to have social security coverage, and whose work is not subject to contract or protected by labor regulations. The data showed that 22.7% of Guadalajara's metropolitan population was employed informally. However, these figures may be underestimated since some small and large enterprises may hire workers under informal conditions.

In addition, the study conducted a labor market survey in which 800 workers of registered industrial enterprises were interviewed. This information was complemented by case studies of 32 workers in unregistered enterprises, and by a neighborhood sample of 100 low income families. Based on these surveys, estimations showed that 42% of the state's manufacturing labor force, and 40% of Guadalajara's manufacturing labor force worked under informal employment conditions.

Another study following Castells and Portes theoretical approach, was conducted on the articulation of formal and informal sectors in the economy of Bogotá, Colombia.

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Data from a National Survey of Households in 1984, showed that one-third of working age population of Bogotá were unremunerated family workers, domestic servants, or self-employed, which are occupations identified as informal. Also, it was estimated that half of the urban working age population was made up of paid workers (Lanzetta, Murillo, and Triana, 1989).

However, when the concept of informality is based on social security coverage rather than occupational positions, it was found that 46% of the urban working age population was engaged in informal activities and close to one-third of paid workers in formal activities were unprotected by the social security system. This last figure is about 90% for those workers in the informal sector.

A third approach toward informality suggests that "informal activities burgeon when the legal system imposes rules which exceed the socially accepted legal framework -- does not honor the expectations, choices, and preferences of those whom it does not admit within its framework -- and when the state does not have sufficient coercive authority" (De Soto, 1989:12). This approach emphasizes how regulations and the legal system create incentives for choosing informality.

Under this view, a study was carried out in Lima (Perú), which focused on three specific sectors: housing, transport and trade. Informal trade was conceptualized as carried out in the street (street vending) and in markets built by vendors in order to move

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off the streets. A survey of street vendors conducted in Lima in 1985, estimated over 84,000 vendors in the city. A year later, a similar survey estimated over 91,000 vendors. It was also estimated that approximately 439,000 people were dependent directly or indirectly on informal trade carried out both in the streets and in informal markets. Moreover 60% of all sales in Lima were estimated to take place through street vendors.

An important aspect in this study was to determine the costs of formality, that is the specific requirements and costs that enterprises must meet in order to legally exercise an economic activity. The costs of access to formal trade were examined through the simulation of the opening of a small store. It was found that to comply with all bureaucratic procedures took 43 days and cost 15 times the monthly minimum living wage (De Soto, 1989). Based on this finding, De Soto concluded that informal employment is generated by the impossibility of comply with the existing regulatory apparatus.

1.3.2 Small Scale Enterprises Studies

Even though employment has been the primary focus of most of the studies carried out in Latin America, some studies have also taken the enterprise as the focus of analysis. The following are two examples of this type of studies.

With the purpose of identifying the main characteristics of microenterprises and their owners, a survey of microenterprises was undertaken in the Metropolitan area of Mexico City in 1987. For this study, microenterprises were defined as those with fewer than 15 workers and maximum annual sales equivalent to 100 minimum wages (Carvajal, Fiedler and Gonzales, 1990). The survey was carried out in 256 manufacturing microenterprises drawn from 23 districts, which were considered as representative of the microenterprise and industrial activity in the Metropolitan area. The study reported an average size of 4.1 workers per enterprise, with 15% of the enterprises having one worker, and 88% of the units in the sample having 10 or fewer workers. Finally, it was reported that about 35% of their workers were family members.

Liedholm and Mead (1987) reported on a 1980 study of small scale industries in Honduras that provided a descriptive profile of these enterprises regarding magnitude, composition, input structure and growth. For the purpose of the study, small scale was defined as those enterprises with less than fifty workers.

A two stage data collection strategy was developed, in order to get reliable data given the particular characteristics of these enterprises. In a first stage, an enumeration of all the small establishments was conducted in those areas selected using cluster sampling procedures. In a second stage, a sample of firms randomly selected was interviewed weekly over the course of a year to obtain detailed information.

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Results regarding magnitude and importance of small scale firms in the industrial sector showed that these enterprises accounted for 76% of total industrial employment in Honduras. Most of the employment (68%) was concentrated in firms with fewer than 10 workers. These, the smallest enterprises, constituted 99% of manufacturing establishments in Honduras. Similar studies were conducted also in Haiti (Haggblade, 1979) and Jamaica (Fisseha, 1982).

1.3.3 Dynamic Studies

Only a few studies have addressed dynamic issues in micro and small enterprises development in Latin America. One of these studies was carried out in Colombia. Its objective was to gain some insights with respect to the efficiency, contribution to employment, main features of Colombian small and medium industry, and to understand its dynamics-- mainly its rapid growth during the 1970s (Cortés, Berry and Ishaq, 1987). Three size categories were defined: cottage shops which refer to household firms and those with fewer than 5 workers; small and medium industries which refer to manufacturing establishments with 5 to 99 workers; and large industries with 100 or more workers.

Aggregated time-series for all manufacturing industries provided data for the study of the evolution of small and medium industries' employment and output. Since information on cottage shops was available only on a limited basis, employment in these

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enterprises was calculated as residual between total employment, estimated from the national census, and that employment in establishments of 5 or more workers.

In addition, detailed evidence from a non-random sample of firms in the metalworking and food processing industries was obtained to examine questions of efficiency, growth, innovative capacity and sources of entrepreneurship. Since the study focused on small and medium size industries rather than on cottage shops, most of the findings related to the former group. In relation to the evolution of employment, the study found that as late as 1970 the cottage-shop sector accounted for more than half of all manufacturing employment, large factories for about one-quarter, and small and medium factories for about one-quarter. The evolution of employment for several decades until the 1970s, showed an increase in the share of manufacturing output and employment for large industries, while that of cottage shops fell. During the 1970s, the small and medium industries increased their share at the expense of both cottage shops and large industries.

With respect to employment growth, the data for the sample of metalworking firms showed a very rapid average annual growth rate of 15.5% between 1973 and 1977 for all of the 51 firms in the sample. The rate of growth was substantially higher for firms with 1 to 5 workers, as well as for firms with 6 to 10 workers, than for the larger enterprises.

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A second study dealing with dynamic issues was completed in Jamaica. Fisseha (1993) conducted a follow up study of 142 Jamaican micro and small enterprises that were identified in 1980. Micro and small enterprises were defined as manufacturing, commerce and service enterprises whose total labor force was no more than 25 workers, including the proprietor and family workers.

The objective was to identify major changes occurred among the 142 micro and small enterprises in the 1980-1992 period. To relocate the 1980 enterprises, a systematic tracing of the 142 enterprises was carried using addresses from earlier studies. This procedure allowed the researcher to relocate over 90% of the 1980 enterprises.

One of the findings was that 57% of the 1980 micro and small enterprises were still operating, and 35% had completely closed down. On average, the estimated annual closure rate was 4%. With regards to change in the size of the labor force, it was found that, for the enterprises still open, the average labor force size increased by 30.8% in the period 1980-1992.

Since a formal interview was conducted with proprietors who still owned or used to own a micro or small enterprise in 1980, they were asked to evaluate what had happened over the years to the size of the market demand for similar products, volume of sales, income or profits from the enterprise, number of enterprises engaged in similar

activities, qualities of a good manager, and reasons that helped some enterprises to survive over the years.

However, the study estimated changes in relation to one point in time (1980) rather than year by year changes. The study did not collect information about new firms or changes in firms' location. Despite these limitations, the findings shed some light on important dynamic issues such as whether these enterprises tend to live long or short life, especially after they survived the initial critical years when most failures occur.

1.4 Small Scale Enterprises Studies in Africa

An important body of literature about micro and small enterprises has been developed from surveys in several African countries during the past two decades[2]. These studies confirmed the increasing importance of these enterprises for income generation, and provided a descriptive profile of them. Some specific aspects examined include magnitude, composition of employment, characteristic of proprietor, location and size distribution of these activities.

In order to explore key issues in micro and small enterprise such as enterprise growth and change over time, new surveys were designed beginning in 1990[3]. One

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[2] For a reference of these surveys, see Michael McPherson "Growth and Survival of Small Southern African Firms". Ph.D. Dissertation. Michigan State University, 1992.

[3] For a reference of dynamic studies in Africa, see McPherson op. cit. p.7

important work by McPherson (1992) addressed, for the first time, dynamic issues based on data from country wide surveys conducted in five small Southern African countries. This study, explored characteristics of firms and their proprietors which lead to enterprise growth as well as factors related to firm's chances of failing. The specific findings involving micro and small enterprise growth and survival will be discussed later in this dissertation.

Another study concerning dynamic issues of micro and small enterprises was completed in Zimbabwe (Daniels, 1994). The objective of the study was to asses the impact of the Economic Structural Adjustment Program and the 1991/1992 drought on the micro and small enterprise sector. That is, to evaluate the influence of policy changes on growth and contraction of existing enterprises, on the establishment of new enterprises, as well as on the closure of enterprises.

In this study a micro or small enterprise was considered a business activity that employs 100 or fewer workers, and markets at least 50% of its product. The study, carried out in 1993, re-visited a subsample of areas visited in an earlier survey conducted in 1991. In addition, in order to compare the micro and small enterprises in 1991 and 1993, efforts were made to relocate the enterprises enumerated in 1991. Only 55.6% of the 1991 business were found in the 1993 survey. The estimated annual growth rate in the number of micro and small enterprises between 1991 and 1993 was 6.1%.

The retrospective data collected in 1991 as well as in 1993 allowed for the estimation of birth and mortality rates for several years. The study revealed that over time, firms births appear to be negatively correlated with economic growth. The largest number of firm births occurred in low profit, easy-entry sectors. Birth rates indicated that during periods of low growth, births in high-profit sectors decreased while births in low- profit sectors increased. Similarly, firm closures were negatively correlated with economic growth. During slow economic growth periods, the mortality rates of both high and low profit firms increased. In general, findings confirmed the hypothesis that firm births are driven by labor supply.

In relation to employment, creation of jobs in micro and small enterprises increased during the 1991-1993 period, mainly due to firm birth in low-profit sectors. Also, it was found that the percentage of firms that expanded and firm growth rate declined since 1991.

1.5 Conclusions

Despite the diverse objectives, conceptual, and methodological approaches followed in the reviewed studies, all of them show that small scale enterprises, formal or informal, represent a large and increasing share in employment in Latin America. Also, it is expected that their importance will continue to increase in the near future.

Most of the studies conducted in Latin America focus on static characteristics of the enterprises. Very few studies have been carried out in enterprise dynamics. Therefore, the empirical evidence is limited in key aspects such as firms exit and entry, factors that may contribute to firms failure and survival, sources of enterprise growth, and characteristics of enterprises and its owners that may affect the process of growth, etc.

The dynamic studies completed since 1990, mainly in African countries, have provided important empirical results and shed light on the evolution of micro and small business over time. This dissertation builds up on this experience, and makes some important methodological contributions on data collection methodology as well as in the analytical tools needed to examine the nature of employment growth in micro and small enterprises.

CHAPTER II

DESCRIPTIVE PROFILE OF MICRO AND SMALL ENTERPRISES IN THE DOMINICAN REPUBLIC

2.1 Introduction

As a result of its importance in providing employment and income opportunities, many developing countries, including the Dominican Republic, have been increasingly interested in the small enterprises sector during the past two decades. In response to that interest, during the 1980s, several studies were carried out on different aspects of these microenterprises. Even though those studies provided important insights about small enterprises in the Dominican Republic, they also had several shortcomings. First, they were no nation-wide studies; second, the sample of enterprises were not randomly selected, thus no statistically valid inferences could be drawn about the entire population; third, most of them were focused on evaluating the impact of assistance programs, thus limiting the scope of the results.

Therefore, despite the importance of the sector, there was no information regarding its magnitude, characteristics of the enterprises, and most importantly the way

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enterprises and employment change over time. To provide information regarding these aspects, several surveys were designed. The surveys have two specific objectives: first, to provide a descriptive profile of micro and small enterprises in the Dominican Republic; and second, to collect information suited for dynamic analysis using a cost-effective methodology.

For survey purposes, micro and small enterprises (MSEs), are those non-farm activities with 50 or fewer workers including proprietor and unpaid workers. For purposes of this dissertation, the terms enterprises, and firms are used interchangeably.

Studies carried out in other countries have concluded that the macroeconomic environment may contribute to explain changes in enterprises and employment over time. Thus, an overview of the Dominican economy before and during the time of the surveys may contribute to better understand some of the findings.

The objectives of this chapter are: first, to present a brief review of the economic environment in the Dominican Republic before and during the time the surveys were conducted. Second, to provide a detailed description of the methodology followed to collect information suited for dynamic analysis. Third, to report some of the descriptive survey findings. Section 2.2 focusses on the economic environment in the Dominican Republic. Section 2.3 deals with methodological aspects of the surveys. Section 2.4

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provides a descriptive profile of micro and small enterprises in the Dominican Republic. Section 2.5 contains some concluding remarks.

2.2 Economic Environment in the Dominican Republic.

The Dominican Republic is situated in the eastern two-thirds of the island of Hispaniola. With population of about 7.5 million people, its GDP per capita was $940 in 1991. The Dominican economy relies heavily on agricultural production, especially sugar and coffee. Industrial free zones have developed to benefit from the abundant labor supply. Dominican Republic also has a comparative advantage in tourism (World Bank 1993).

In the last two decades, the Dominican economy has experienced major transformations. For example, as a percentage of GDP, agricultural production has decreased from over 23% in 1970, to less than 18% in 1990 (United Nations, 1990). Accordingly, the proportion of labor force engaged in agricultural activities has been decreasing. For instance, this figure was 54% and 41% in 1970 and 1980 respectively.

The change in the structure of the Dominican economy together with relatively high population growth and accelerated internal migration has transformed the population from essentially rural to mainly urban. The proportion of urban population increased

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from 45% in early 1970s to 60% in 1990. Moreover, by 1990, about one-quarter of the Dominican population lived in Santo Domingo, the capital city (World Bank,1992).

These changes in the Dominican economy have increased pressure on job creation in non-agricultural activities. However, the rate of job creation in formal and public sectors has lagged well behind the increase in labor supply. The fact that many Dominicans migrate each year to the U.S. seeking better job opportunities reflects the limited capacity of those sectors to create jobs.

The performance of the Dominican economy has shown abrupt changes in recent years (Table 2.1). After experiencing a period of high rates of growth, the Dominican economy stagnated during the late 1970s deteriorating social conditions. The almost continuous decline in GDP growth rates during the 1980s reflected lower levels of investment and steadily declining investment efficiency. By 1990, the economy was in crisis: output fell by 5% and average consumer price index grew 60% between 1989 and 1990. Moreover, in a December to December basis, inflation stood at 101% in 1990.

In response to this crisis, the government implemented an economic stabilization program in August 1990. Implementation of the program included reduction of fiscal deficit, tight monetary policy, unification of exchange rate system, initiation of important reforms of the tax system, trade regime and financial sector.

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Dominican Republic - Economic Indicators

Annual Average	1980	1985	1990	1991	1992	1993
GDP Growth	1.6	-2.6	-5.1	-0.9	7.8	2.8
Consumer Price Index Growth Rate	16.8	37.5	59.5	53.9	6.7	2.7
Nominal Exchange Rate (DR$/US$)	1.0	3.1	8.5	12.7	12.8	12.7

Source: World Bank. Trends in Developing Countries 1993.
International Monetary Fund. International Financial Statistics. Several Issues.
United Nations. Economic Survey of Latin America and the Caribbean 1990.

As a result of the implementation of this program, economic recovery was initiated in 1991. Inflation was reduced from 60% to 54%, and the decline of GDP was 0.9%. Also, the exchange rate stabilized at about DR$12.7 to the dollar, and international reserves accumulated (World Bank 1993).

In 1992, the Dominican economy experienced high rates of growth. GDP growth reached 7.8%, four times the population growth and one of the highest in Latin America. This performance was fueled by high growth rates in manufacturing and trade sectors.

In 1993, GDP growth rate was moderate, about 1% higher than the estimate population growth rate. Manufacturing and trade growth rates were 0.7% and 2.2% respectively. Inflation has continued under control.

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Since the macroeconomic environment may affect micro and small businesses performance, the strong changes experienced by the Dominican economy in recent years may have had an important impact in the evolution of those businesses in that period.

2.3 Survey Methods

2.3.1 Baseline Survey

A baseline survey of micro and small enterprises was carried out in the Dominican Republic in March 1992. For this survey, a stratified cluster sampling technique was used. With this technique, the country is divided into different strata and within each stratum clusters are chosen at random. These clusters are usually enumeration areas as defined by a national census. Then a complete enumeration of the households and businesses is conducted within each cluster.

The country was divided into 18 strata. First, Santo Domingo, the capital, and Santiago constituted each one a stratum because of their importance due to population size and level of economic activity. Then, each of these cities was further divided into three strata based on income levels. The remainder of the country was divided into three major regions: Central, Southeastern and Southwestern regions. Finally, based on population sizes as estimated by the 1981 national population census, each major region was stratified into four population size categories: secondary towns, those cities with

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population size above 10,000 inhabitants; small towns, with a population of between 2,001 and 10,000; rural towns with population sizes of 201-2,000; and sparse population areas, with less than 200 population size.

Appendix A Tables 1 and 2 show the number of enumeration areas, a population estimate in each stratum for the whole country in 1992 and the sample distribution by stratum in terms of both enumeration areas and population.

As noted by McPherson (1992), these type of surveys show some limitations. Both sampling and non-sampling errors may reduce the precision of the survey. Sampling errors result from the design of the survey and relate to aspects such as the accuracy of the sample in describing the population, the proportion of enterprises within each cluster that can actually be enumerated, and the homogeneity of enterprises within each cluster. Non-sampling errors result from the survey's execution; since it is necessary to rely on the memory of the respondent, they mainly reflect recall errors.

The sample size of the survey was determined considering a desired level of precision of the estimate of the main variables, and the budget and time constrains. As a result, 300 enumeration areas and 23,789 households were visited, and 4,568 MSEs were detected. Appendix A Table 3 shows the distribution of the sample in terms of enterprises and employment by stratum. Field enumeration of the areas was carried out by a total of 30 people who were divided into four teams. Each team of five

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Conducting Baseline Survey

enumerators and a driver had the guidance of a supervisor, and the entire operation was overseen by an overall field supervisor.

Three questionnaires and a route sheet were the survey instruments. While the questionnaires have been used by researchers at Michigan State University in other countries over the past 20 years, the route sheet is an innovative instrument designed and applied for the first time in the Dominican Republic surveys[4].

The first of the three questionnaires, the baseline questionnaire, gathered basic information about the enterprise such as type and size, location, employment composition, etc. This questionnaire was administered to all existing enterprises in selected enumeration areas. A second questionnaire, designed to collect more detailed data, was administered to a random sample equivalent to 10 percent of those enterprises interviewed in the baseline survey. A third questionnaire was administered to all households that had an enterprise which had closed at the time of the survey. This questionnaire collected data regarding characteristics of the closed enterprises[5]

The route sheet registered the address of each business/household visited as well as the name of proprietor and/or head of household. This information was recorded in

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[4] This instrument was designed by the author and the general supervisor of the field work. Appendix B shows both the route sheet designed for the baseline (Figure 1), and the one designed for the follow-up surveys (Figure 2).

[5] For a more detailed description of the questionnaires see Michael McPherson and Joan Parker, **A Manual for Conducting Baseline Surveys of Micro and Small-scale Enterprises**. Gemini, Field Research Paper, February 1993.

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the same sequence as the enumerators visited each business/household. As a result, it was possible to build a list of all households and existing enterprises in the enumerated area. In addition, it was possible to trace the route followed by each enumerator within each area, which became an important input for the follow-up surveys. Besides the information mentioned, enumerators also registered number of people living in the household, whether an interview was rejected or accepted, and the reliability of the information as perceived by the enumerator. This information was very useful later, during the coding process, since it provided control check points for atypical or unusual information.

2.3.2 Follow-up Surveys

The objective of the follow-up surveys was to gather information for monitoring patterns of change among enterprises. The approach used was to conduct repeated censuses of the sample areas at regular intervals (Cabal, 1992a). These follow-up surveys provide information not only about evolution of businesses identified in the baseline survey, but also about new businesses and businesses that migrate in and out of the survey areas. Three follow-up surveys were conducted in March and October 1993 and March 1994[6].

[6] The author was directly involved in the baseline survey and two follow-up surveys. In the third follow-up survey the author participated as advisor to ensure consistency in the methodology used.

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A stratified sampling technique was used to draw a subsample of areas from those enumerated in the baseline survey. First, the country was divided into three strata on the basis of their population sizes, as estimated by national population census of 1981. The strata consisted of Santo Domingo, the capital city with a population of over 1.8 million people; secondary towns, with a population over 10,000 people (including Santiago); and, rural areas which include small towns, rural towns and sparse population areas with a population below 10,000 people. Then, a set of enumeration areas were independent and randomly drawn for each stratum from the sample drawn in the baseline survey.

The sample size was determined by calculating the levels of precision of the estimates according to the variance estimates obtained from the baseline survey. It was determined that a sample size of 500 enterprises would yield a 15 percent margin of error at a probability level of 95 percent. Stratum weight was determined by minimizing the variance of the key estimates subject to costs constraints. The minimization included the standard deviation of the estimates of the means of the following variables: annual growth rate of employment since beginning to March 1992, size of enterprise in March 1992, initial number of workers, and number of enterprises receiving credit. In order to obtain the required number of enterprises within each stratum, the number of areas to be enumerated was determined, based on the average number of businesses per area provided by the baseline survey (Cabal, 1992a).

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In the course of the survey conducted in March 1993, 58 enumeration areas were randomly selected from the 300 areas selected in the baseline survey. In the 58 enumeration areas covered, 3,992 households were visited and 666 enterprises were enumerated. The second follow-up survey conducted in October 1993 covered 57 enumeration areas in which 4,513 households and 725 enterprises were visited[7]. Appendix A Table 4 shows the sample distribution by stratum of enumeration areas, households visited and number of enterprises for March 1993 and October 1993.

Three instruments have been used in the follow-up surveys conducted: a route sheet, a questionnaire administered to all existing enterprises and, a questionnaire that gather information about those business that had disappeared[8].

A key aspect of the methodology is to make sure that the enterprises visited during the follow-up match those enumerated during the baseline survey. The route sheet used in the baseline survey played an important role in achieving this objective. It provided the distinguishing characteristics of the enterprises and the sequential listing of all households in the area.

Therefore, the route sheet was divided into two parts. The first one had the sequential listing of all enterprises and households enumerated in the area in March 1992.

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[7] One enumeration areas was not visited because of political turmoil.

[8] Route sheet and questionnaire of existing enterprises administered during the follow-up surveys were designed by the author.

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It had information regarding address, name of proprietor and/or head of household, type of activity and name of the enterprise. By crosschecking the information provided by the route sheet and the enterprises encountered, enumerators were able to identify existing and closed enterprises.

The second part of the route sheet was devoted to the updating of the information recorded in March 1992. In this part of the sheet, enumerators recorded all new businesses in the area. Any change in the type of activity or ownership of the enterprises between March 1992 and the time of the survey was also recorded. In addition, enumerators corrected some of the errors recorded during the first visit. For example, households or businesses left out in the survey of March 1992, were added to the sequence so that the listing became more accurate for use in future follow-up surveys. This new information also contributed to updating the maps of each area. The route sheet was designed to be updated with the best information collected in the previous survey.

The second instrument in the survey, the questionnaire of existing enterprises was administered to all enterprises operating at the time the survey was conducted. This questionnaire had two sections. The first one was designed to gather the information required to estimate birth and death rates of MSEs.

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Questions in this section of the questionnaire were intended to determine when enterprises started operating. First, it was determined if the enterprise was operating in that particular enumeration area before or after the previous visit. For those enterprises established before, enumerators crosschecked the information in the route sheet to determine if the enterprise was recorded or left out in the previous visit. If the enterprise was omitted, enumerators collected information about the history of the enterprise. If the enterprise was recorded in the previous visit, only information regarding changes was collected.

For those enterprises established after the previous visit, questions were asked to determine if they were a new enterprise, a branch office, or an enterprise that had migrated from any other area.

By precisely identifying those enterprises not recorded by the baseline, this methodology provides, for the first time, an indication of the proportion of enterprises omitted by this type of survey. For the case of the Dominican Republic the follow-up survey conducted in March 1993 showed that 15% of the enterprises operating in March 1992 were omitted by the baseline survey[9].

The methodology also provided for the first time the information for identifying enterprises operating during very short periods of time. These short-cycled enterprises

[9] This figure has been decreasing as additional follow-up surveys are conducted. For example, 5.7% and 3.1% of existing enterprises were omitted by the follow-up surveys conducted in March and October 1993 respectively.

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The second part of the questionnaire administered to existing enterprises gathered information to estimate employment growth rates. It also gathered information about characteristics of the enterprise and proprietor not collected by the baseline survey.

The third questionnaire was administered to those households that had a business which ceased to operate between two follow-up surveys. This questionnaire was basically the same as the one administered in March 1992. However, one important change was made in order to differentiate among enterprises that closed, those that moved to another location and those that became a secondary business for the household. Where proprietors could not be located, whenever possible, information about the closure of the enterprise was collected from other people who knew about it. Enumerators were trained to hook for different sources that might help trace closed enterprises. This information makes possible the estimation of enterprise death rates, since it allows one to differentiate between closed businesses and those that moved out of the sample area.

At this stage of data collection, the enumerating personal was reduced to three teams of three enumerators and a supervisor. The overall field work had the guidance of a general supervisor.

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It should be noted that the percent of missing values on key variables has been decreasing. This result is a combination of several factors. First, the team performing the field work have participated in all surveys, thus their understanding of basic concepts have increased. Second, respondents have become more willing to cooperate since confidentiality has been demonstrated. Third, extra time has been scheduled for field work to allow revisiting of enterprises looking for a more reliable source of information. On the other hand, keeping the same team of enumerators through several surveys may introduce bias in the completion of questionnaires as enumerators become more knowledgeable about the characteristics of the enterprises.

2.4 General Findings

This section presents a descriptive profile of micro and small enterprises in the Dominican Republic. Specifically, it includes aspects such as magnitude, location, size, age and type of activity of those enterprises. The first part of the section reports on the data collected during the baseline survey. The second, deals with information gathered during the follow-up surveys conducted in March and October 1993.

2.4.1 Baseline Survey

Magnitude. The number of enterprises and the total employment in the MSE sector give an indication of the importance of the sector in the economy. Results of the

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baseline survey show that the MSE in the Dominican Republic sector consists of approximately 330,000[10] micro and small enterprises employing about 761,000 persons. A significant proportion of the Economically Active Population (EAP) in the country (26%) was employed in the MSE sector (Cabal, 1992b). McPherson (1992) Showed that the proportion of the EAP in four Southern African countries ranged between 17% in Botswana and 33% in Zimbabwe[11].

Another indicator of the importance of the MSE sector in the economy is the number of MSEs and the MSE employment per 1,000 inhabitants. The enterprise density in the Dominican Republic amounts to 47 enterprises per 1,000 people. This indicator is in the lower end of the enterprise density spectrum when compared with some Southern African countries. McPherson (1991) reported 44, 64 and 78 enterprises per 1000 inhabitants in Lesotho, Swaziland and Zimbabwe respectively. In terms of employment density, it was found that 109 persons out of every 1,000 are involved in MSE activity. As in the enterprise density indicator, the employment density figure is larger than that of Lesotho and smaller than those of Swaziland and Zimbabwe. However, the employment indicator is closer to those of Swaziland and Zimbabwe than the enterprise density indicator[12]. This means that the average enterprise size is higher in the Dominican Republic than in the three Southern African countries mentioned above.

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[10] Include both primary and secondary enterprises. Primary enterprises account for 90 percent of total MSEs.

[11] The other Southern African countries were Lesotho and Swaziland.

[12] The enterprise density indicator in the Dominican Republic is 74% and 60% of those in Swaziland and Zimbabwe while the employment density indicator in the Dominican Republic is 87% and 79% of those in the same Southern African countries.

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Finally, in the Dominican Republic both density indicators are higher in urban areas than in rural areas.

In terms of GDP, an estimate based on information of enterprises sales collected during the baseline survey indicated that in 1991, the Gross Domestic Product generated by microenterprises was equivalent to 23.8% of the total Gross Domestic Product (Dauhajre, 1992)[13].

Location. As Table 2.2 demonstrates, about two-thirds of all MSEs as well as the employment that they generated were located in urban areas[14]. Santo Domingo, the capital city, accounted for about one-third of the total MSEs and MSEs employment. This finding contrasts with studies in African countries where the majority of microenterprises are located in rural areas[15].

Size. The average MSE size in the Dominican Republic is 2.36 workers, including the proprietor[16]. Over half of all MSEs is made up of one-person enterprises which generate 23% of all MSE employment. On the other hand, only 2% of all MSEs

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[13] Dauhajre (1992) uses an average monthly sales of DR$ 13,190 (approximately US$1050) per enterprise. This estimate results on yearly sales of the microenterprise sector of DR$ 51,171 million in 1991. Applying the percentage of value added estimated for the formal economy by sector, he estimates that the GDP of microenterprise sector add up to DR$28,579 million (approximately US$ 2,286 million).

[14] Rural defined as localities with 10,000 inhabitants or less.

[15] This difference may partially explained by the definition of rural areas. Most studies define rural areas as localities with 20,000 inhabitants or less while in the Dominican Republic rural areas are defined as localities with 10,000 inhabitants or less.

[16] A 95% confidence interval for mean size is (2.33, 2.57).

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Table 2.2

Characteristics of Micro and Small Enterprises
in the Dominican Republic March 1992
(Percent of Enterprises and Employment)

	Enterprises	Employment
Location		
Urban	63.9	66.9
Rural	36.1	33.1
Size (Number of Workers)		
1	52.7	22.6
2 - 4	38.5	41.9
5 - 10	6.8	20.0
> 10	2.0	15.5
Industrial Structure		
Manufacturing	18.2	28.5
Trade	67.5	58.7
Service	12.1	10.2
Age of Enterprise (Years)		
< 1	36.3	27.9
1 - 3	26.7	27.1
4 - 10	19.3	21.1
> 10	17.6	23.9
Gender of Proprietor		
Male	45.6	33.4
Female	45.8	54.9
Joint Mixed	8.5	11.7
Receiving Credit		
Never before March 1992	77.0	68.9

Source: Baseline Survey

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have from 11-50 workers but they account for 15% of employment. The size structure is similar to that found in African countries. However, the average size of Dominican MSEs is higher than those of Lesotho, Swaziland and Zimbabwe[17].

Sectoral Distribution. The MSE sector in the Dominican Republic is dominated by trading enterprises. Over two-thirds of all MSEs are engaged in trading activities which generate more than half of all MSE employment. Retail trade (i.e. street vendors, groceries, other retail stores, etc.) is particularly important as it accounts for 57% of all enterprises. Small grocery stores are the most commonly found trading activity. In the Dominican Republic, one out of every four MSEs is a grocery store. The category of restaurants and hotels makes up 9% of both total enterprises and employment.

Manufacturing accounts for 18% of al MSEs which provides 28% of employment. Textiles and garments are the most important manufacturing activity accounting for over 6% of all MSEs. Other important manufacturing activities are metalworking and repair shops which together represent 6% of all MSEs. The service sector, on the other hand, accounts for 12% of MSEs and 10% of employment. Hair salons and barbers are the most frequently encountered enterprises in the service sector. It should be noted that construction, transport, and finance sectors make up only a small fraction of all MSEs.

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[17] McPherson (1991) reported average sizes of 1.6, 1.85 and 1.84 workers per MSE in Lesotho, Swaziland and Zimbabwe respectively.

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Size of enterprise varies significantly according to the economic activity: the highest average size is found in wholesale trade activities (7.8 workers) and the lowest in retailing enterprises (1.8 workers). The average size for enterprises engaged in manufacturing activities was 3.7 workers[18].

Age. The average enterprise age is 5.8 years[19]. Young firms make up a high proportion of all enterprises. For instance, 36% are one year old or less and generate 28% of the MSEs employment. Almost 60% are three years old or less and generate over half the total MSEs employment.

Gender of Proprietor. The ownership of MSEs is evenly distributed between male and female proprietors. Similar studies conducted in African countries have found a higher share of female owned enterprises.

However, in terms of employment, there is a significant difference between male-owned and female-owned enterprises. MSEs run by women accounted for 33% of employment while this figure was 55% for those run by men. This difference can be explained by examining enterprise size. Firms run by women tend to be smaller, with

[18] The difference in the average number of workers in manufacturing activities is statistically significant at 99% confidence level.

[19] A 95% confidence interval for age is (5.6, 6.1).

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average employment at 1.7 workers compared to 2.8 for male-run firms[20]. Moreover, women own 60% of the one-person enterprises in the Dominican Republic.

The share of women in the MSE labor force is relatively low (37%) compared to their share in businesses ownership (46%). This result may be explained by the combination of two facts. First, the average size of enterprises run by women is smaller than that of male-run enterprises. Second, the share of female labor force in male-owned MSEs is very low. Female-owned enterprises employ 5 times more females compared to male-owned enterprises.

In relation to economic activities, the data show that MSEs run by women concentrate in a smaller range of economic activities than their male counterparts. In addition, MSEs run by women are more frequently found in trade and services than enterprises run by men (Cely, 1993).

Credit. Over three-quarters of all MSEs had not received credit since they started operating. Formal sources of credit -- e.g. banks, NGOs, suppliers -- were cited as the main source of credit for 54% of the entrepreneurs receiving credit while informal sources of credit -- e.g. relatives and friend, money lenders -- were mentioned by the remaining 46% of entrepreneurs receiving credit. Moreover relatives and friends were the main source of credit for 35% of the proprietors receiving credit. This source of

[20] This difference is statistically significant at 99% confidence level.

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credit is specially important for enterprises between 1-3 workers, owned by female and those involved in trading and service activities. Financial institutions provided funds to over 6 percent of all MSEs. These institutions are an important source of credit for enterprises with over 20 workers and for those involved in manufacturing activities.

Labor Force Composition. As Table 2.3 shows, 60% of the labor force is made up of proprietors and unpaid family members. It also shows the limited reliance on trainees in these enterprises. This result contrasts the findings from similar studies in Africa, where MSEs show limited reliance on hired workers.

Proprietors is the labor category with the highest percentage in both urban and rural enterprises. They make up half of all labor force in rural-based enterprises and 42% of their urban counterparts. The next labor category with the highest percent is hired workers which account for 40% of the labor force in urban enterprises and 26.7% in rural enterprises. Unpaid labor is relatively more frequent in enterprises located in rural areas (20%) than in urban firms (12.6%). Trainees from the smallest category of employment, contributing 4.4% to enterprise employment in urban areas and 3.2% in rural areas.

The distribution of the labor categories differs across major sectoral grouping of enterprises. At least half of the labor force within manufacturing enterprises is made up of hired workers; proprietors accounted for 30% of the labor force in these enterprises.

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Table 2.3

Labor Force Composition of Micro and Small Enterprises
in the Dominican Republic March 1992
Percent of Total workers

	Proprietors	Unpaid	Hired	Trainees
Location				
Urban	42.5	12.6	40.3	4.4
Rural	50.2	20.0	26.7	3.2
Sectoral Distribution				
Manufacturing	30.0	8.1	50.7	11.2
Trade	53.1	20.5	24.9	1.2
Service	42.5	6.9	49.5	1.1
Gender of Proprietor				
Male	35.5	12.1	46.4	6.0
Female	58.7	20.8	19.3	1.2
Joint Mixed	53.9	14.3	28.9	2.9
Average	45.1	15.1	35.6	4.0

Source: Baseline Survey

Manufacturing employ the highest proportion (11.2%) of trainees.

In the case of trading activities, proprietors made up over half of the labor force; hired workers accounted for one-fourth of the labor force; unpaid family labor was more frequent in trading and contributed about one-fifth of employment in this sector. The proportion of paid and unpaid workers in the service sector is similar to manufacturing, but the proportion of proprietors is much higher in service-oriented enterprises.

Table 2.3 also shows a sharp contrast in the distribution of labor categories between male and female-owned enterprises. The labor category with the highest percentage in enterprises run by women is proprietors (58.7%); unpaid family members and hired workers contribute about 20% each; and the role of trainees is almost insignificant. In contrast, the labor force category with the highest share in enterprises run by men is hired workers (46.4%); proprietors make up 35% of the labor force; unpaid workers account for 12% of the labor force, and, the proportion of trainees is 6%.

Growth. Growth of MESs, as measured by change in number of workers, is made up of two components: first, change in employment of surviving enterprises, which is the net change in employment originated by the expansion and contraction of these enterprises. The second component is the net change in number of workers resulting from the creation and closure of enterprises. The figures show in this section refers to the first component and growth is measured from the beginning of the enterprise to March 1992.

Average employment growth rate of surviving enterprises was estimated at 12.6% per year[21] (Table 2.4). Despite the high average growth rate, over two-thirds of

[21] The compound growth rate is defined as follows: $(A/B)^{1/C}-1$, where A=number of workers at the time of the survey, B=number of initial workers, and C=number years enterprise has been operating. This estimate is higher than the average growth rate with respect to the average number of workers, and it is lower than the average growth rate with respect to the initial number of workers. Also, it should be noted that this simple average estimator of growth may differ significantly from an average weighted by the size of the enterprises.

Table 2.4

Percentage of Enterprises Changing Employment and
Annual Growth Rate of Employment of Surviving MSEs
From beginning to March 1992

	Contraction	No Change	Expansion	Rate
Location				
Urban	4.3	64.9	30.7	13.8
Rural	2.5	70.8	26.8	10.8
Initial Size (Number of Workers)				
1		72.4	27.6	14.7
2	6.8	63.1	30.1	9.1
3 - 5	16.5	45.1	38.4	6.6
6 - 10	34.0	35.5	30.5	1.5
> 10	52.3	21.3	26.4	-4.3
Sectoral Distribution				
Manufacturing	5.1	53.4	41.6	20.0
Trade	2.9	70.6	26.5	11.6
Service	5.3	69.0	25.7	6.9
Other	6.1	68.4	25.5	8.7
Age of Enterprise (Years)				
< = 1	1.6	79.2	19.1	23.4
1 - 2	3.2	67.6	29.3	13.2
2 - 3	3.8	66.5	29.7	8.4
3 - 10	4.3	60.0	35.8	5.6
> 10	6.3	55.5	38.2	2.0
Gender of Proprietor				
Male	4.3	58.1	37.6	15.5
Female	2.8	77.5	19.7	9.4
Joint Mixed	4.4	59.9	35.7	14.4
Average	3.6	67.3	29.1	12.6

Source: Baseline Survey

existing enterprises do not grow at all, and 4% reduce the number of workers over that period of time. This implies that expanding enterprises grow at high rates. In fact, the growth rate of expanding enterprises is 45.8% per year. This finding is consistent with the evidence in other countries.

The proportion of enterprises that present change in employment varies according to different characteristics of the business. Table 2.4 shows that enterprises engaged in manufacturing activities have a higher proportion of expanding businesses than enterprises engaged in trade and services. In addition, among older businesses there is a higher proportion of expanding businesses than among young ones. Also, male-owned businesses present a higher proportion of expanding enterprises than their female-owned counterpart.

There is no significant difference in the proportion of expanding enterprises located in urban areas with respect to their rural counterparts. Finally, there is no significant difference in the proportion of expanding firms across size. However, a large proportion of contracting enterprises is found among larger businesses than among the smaller ones[22].

[22] This result is heavily influenced by higher censoring among one and two-worker shrinking enterprises than among larger enterprises. In other words, one and two-worker enterprises that perform badly drop off the sample of surviving enterprises.

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The average growth rate of employment of existing enterprises is also shown in Table 2.4. According to these figures, average growth rates across location are not significantly different[23]. In contrast, growth rates show considerable variation by initial size of the enterprise. Firms starting with two workers grow significantly faster than those starting with 6-10 workers. These figures suggest an inverse relationship between enterprise's growth rate and its initial size.

Growth rates also vary by sector. Manufacturing is the fastest growing sector at 20% per year, while service is the slowest at a rate of 6.9%. There are also differences in growth rates by gender of entrepreneur. Female-run firms grow at 9.4% annual rate while male-run firms grow at a rate of 15.5%. Finally, growth rates seem inversely related to enterprise's age. For example, the growth rate of firms one year old and less is 23.4% per year while for a firm over 10 years old is 2.0% per year[24].

2.4.2 Follow-up Surveys

This section reports the findings from two follow-up surveys conducted in March and October 1993. For the purpose of this section surviving enterprises are those in existence in March 1992 that were found again in March and October 1993, within the same enumeration area, involve' in the same type of economic activities, and owned by

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[23] Despite the fact that urban enterprises grow at a 13.8% annual rate while rural firms grow at a rate of 10.8%, this difference is not statistically significant.

[24] All the reported differences are significant at 95% confidence level.

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the same household as in March 1992. New enterprises are defined as those that started operating between March 1992 and October 1993. Closed enterprises are those visited in March 1992 but were no longer operating at the time of the follow-up surveys. Some of the main characteristics of these three types of enterprises are summarized in Table 2.5.

Location. The proportion of surviving enterprises in urban areas is slightly higher than that of new and closed enterprises. The largest difference occurs between surviving and closed enterprises; about two-thirds of surviving enterprises and one-half of the closed enterprises are located in urban areas. Assuming that the number of new enterprises is similar to the closed ones this differences may imply first, that urban MSEs are increasing their participation on the total number of firms, and second, that the closure rate in higher in rural areas than in urban ones.

Initial Size. Surviving enterprises began operating with more workers than do new and closed firms. Again, the largest difference occurs between surviving and closed enterprises; about 50% of both surviving and new enterprises are one-person operation while this proportion is near two-thirds for closed enterprises. Assuming that the number of new enterprises is similar to the closed ones, the differences in size distribution among the various types of firms imply that the share of larger enterprises may increase with respect to the smaller ones. Also this may indicate that the closure rate among smaller firms is higher than among larger ones.

Table 2.5

Characteristics of Surviving, New and Closed MSEs March 1992 - October 1993
(Percentage of Each Type of Enterprise)

	Surviving	New	Closed
Location			
Urban	62.0	56.0	51.2
Rural	38.0	44.0	48.8
Initial Size (Number of Workers)			
1	49.8	52.6	68.4
2	22.8	26.6	17.6
3 - 5	19.5	17.6	13.3
6 - 50	7.9	3.3	.7
Average Initial Size	2.35	1.95	1.54
Sectoral Distribution			
Manufacturing	24.2	22.7	11.1
Trade	54.1	60.5	76.3
Services	21.7	16.8	12.6
Age of the Enterprise (Years)			
< = 1	11.5		48.2
1 - 3	26.6		22.6
3 - 10	36.4		18.8
> 10	25.5		13.3
Average age in years	8.00		4.16
Gender of Proprietor			
Male	55.9	49.7	27.7
Female	36.1	45.8	63.6
Joint Mixed	8.0	4.5	8.7

Source: Follow-up Surveys March and October 1993.

Sectoral Distribution. Trading is the most common activity among the three types of enterprises; however, a higher proportion of new and closed than surviving enterprises were devoted to trading activities. About 60% of new and three-quarters of closed enterprises compared to 54% of surviving enterprises were engaged in trading. The next economic activity with the highest percent is manufacturing which accounted for one-quarter of the surviving, 23% of the new, and 11% of the closed enterprises respectively. Finally, in service-oriented activities, the larger difference is observed between surviving and closed enterprises; 22% of the surviving and 13% of the closed enterprises were involved in that activity. These differences suggest that manufacturing and services activities may eventually increase their share in the total number of firms while trade may decrease its share, assuming that the number of new firms is similar to the closed ones.

Age of Enterprise. The average age of surviving enterprises is significantly higher than that of closed enterprises. This result is partially due to the importance of enterprises one year old or less, which account for almost 50% of closed enterprises while this same category is only a little over 11% of the surviving businesses. This difference suggests that the closure rate of one year old enterprises may be higher than that of older enterprises.

Gender of Proprietor. The share of female-owned enterprises is remarkably higher in closed firms than in new and surviving firms. MSEs run by women account for over one-third of surviving, 46% of new and two-thirds of the closed firms. These figures suggest that male-owned enterprise may be increasing their share in the total number of enterprises respect to those enterprises led by women. This trend may be explained more for a high closure rate of female-owned enterprises rather than for a low birth rate of enterprises led by women.

Perceived problems of surviving enterprises. About 62% of proprietors reported having problems that interfere with the good performance of the enterprise at the time of the surveys[25]. The nature of the problems and the percentage of the firms reporting the different types of problems are described in Table 2.6. Also, the last column in Table 2.6 presents the percentage of firms with respect only to the enterprise reporting problems. Most of the problems reported (59% of all MSEs and 95% of the enterprises reporting problems) are business problems. These can be divided into two categories: general and specific problems. The first category, mentioned by two-thirds of the proprietors reporting problems (or 41% of all proprietors), has to do with general performance of the business which may be the result of several factors combined. Among this category, problems of market and demand is the most frequently cited (42% of proprietors reporting problems), followed by financial and profitability problems. Specific problems were listed by 29% of the proprietors reporting problems. Among this

[25] Since these are only proprietors' perceptions, they should not be taken as necessarily reflecting the actual problems in the MSEs sector.

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Table 2.6

Perceived Problems of Surviving Enterprises March 1992 - October 1993
(Percent of Surviving Enterprises)

	Total	With Problems
Have no Problems	**37.5**	-
Business Problems	**59.4**	**95.0**
General Problems	41.5	66.4
Problem of Markets and Demand	26.5	42.4
Financial Problems	8.6	13.8
Low Profitability	6.4	10.2
Specific Problems	17.9	28.6
Utilities Problems	6.6	10.6
Customers not Repaying Credit	3.9	6.2
Problems with Space/ Location	3.7	5.9
Government Regulations Problems	1.1	1.8
Problems of Tools and Machinery	0.9	1.4
Problems Relating to Inputs	0.9	1.4
Labor Problems	0.8	1.3
Non-Business Problems	**3.1**	**5.0**
Personal Problems	1.6	2.6
Lack of Time	0.9	1.4
Other	0.6	1.0

Source: Follow-up Surveys March and October 1993.

category, utilities problems, customers not repaying credit, and the problems with space/location were commonly cited. Finally, 3% of all proprietors or 5% of proprietors with problems reported non-business problems, which have to do mainly with personal problems such as illness, moving, etc.

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Reasons for closure. As shown in Table 2.7, about two-thirds of the proprietors closed their enterprise due to business reasons. General reasons accounted for almost one-half of all closures while low profitability was the most important single reason for closure (31%). Among specific business reasons, which were cited by 14% of the

Table **2.7**

Reasons for Closure of Enterprises March 1992 - October 1993
(Percent of Closed Enterprises)

Business Reasons	**63.4**
General Reasons	49.1
Problem of Markets and Low Demand	11.9
Financial Problems	6.4
Low Profitability	30.8
Specific Reasons	14.3
Utilities Problems	2.0
Customers not Repaying Credit	1.6
Problems with Space/ Location	2.8
Government Regulations Problems	1.7
Problems of Tools and Machinery	1.6
Problems Relating to Inputs	3.4
Labor Problems	1.2
Non-Business Reasons	**36.6**
Personal Problems	25.5
Lack of Time	3.1
Better Opportunities	5.3
Other	2.7

Source: Follow-up Surveys March and October 1993.

proprietors, problems relating to inputs, space/ location, and utilities were the most frequently mentioned.

Non-business reasons were reported by over one-third of all closures. The proportion of enterprises closing for this reason is over seven times higher than the proportion of surviving enterprises with problems which reported non-business problems. This may suggest that non-business problems are not perceived as a problem until they are in a critical stage.

Personal problems, which have to do with illness, migration, etc. were the most important category among non-business reasons and accounted for one-quarter of all closures.

2.5 Conclusions

This chapter has highlighted the importance of a methodology for collecting data suited to perform dynamic analysis of enterprises. Monitoring of micro and small enterprises must be framed in a geographic area. That is, evolution of enterprises over time must be related to a specific geographic area; so that, both businesses and households can be observed over time. This makes it possible not only to monitor surviving and closed enterprises, but also to identify new businesses.

A key aspect in this methodology is the availability of a sequential listing of all businesses and households within each enumeration area. The listing should be built starting with a baseline survey, and updated during each follow-up survey. In addition, this instrument should allow for the distinction between new and moving in, and closed and moving out enterprises.

One of the most important findings of the surveys is the importance of MSEs sector in the Dominican Republic in terms of number of enterprises, employment generation, and share of GDP. Results also show remarkable heterogeneity within this sector. MSEs are mainly small, young, urban-based enterprises, involved in trading activities, and most of them have never received financial loans. Ownership of businesses is evenly distributed between male and females.

Hired workers make up an important proportion of labor force, while reliance on trainees is very limited. Labor force composition varies by location, sector, and gender of the proprietor.

In spite of the high average growth rate of employment among surviving enterprises, only a small proportion of enterprises grow. The expanding enterprises, however, show very high rates of growth. Average growth rates differ across initial size, sector, age of the enterprise, and gender of proprietor.

On average, surviving enterprises are larger and older than new and closed enterprises. Also, they tend to be run by men and are engaged in manufacturing activities.

Issues related to general business performance are both the more frequent problem mentioned by proprietors of surviving enterprises, and the most commonly cited reason for closure of enterprises.

CHAPTER III

ENTRY AND EXIT OF MICRO AND SMALL ENTERPRISES IN THE DOMINICAN REPUBLIC 1992-1993

3.1 Introduction

The pattern of growth of an economic sector is the aggregated result of individual enterprises responding to a number of economic and social forces; therefore they open, close, move from one place to another, hire and fire employees. The effects of these multiple changes offset each other and get buried under the aggregated statistics of change in employment. The components of the aggregate changes are seldom analyzed in developing countries and even less frequently in Latin America. One important constraint to a better understanding of these changes, and the reasons behind them, is a lack of information about those changes and a methodology for measuring and monitoring them over time. Measuring the magnitude of closure, birth and migration rates is crucial in understanding the dynamics of the micro and small business sector. In addition, looking for some common characteristics among enterprises that open, close and migrate, also contributes to this understanding.

This chapter develops a method to estimate indicators of entry, exit and migration of micro and small enterprises and applies it to the Dominican Republic for the 1992-1994 period. The next section presents the methodological approach, section 3.3 discusses the characteristics of the data, section 3.4 presents the results of the birth and closure rates for the Dominican Republic, section 3.5 compares results applying alternative approaches, and the last section presents some concluding remarks.

3.2 Methodological Approach

The unit of observation for this work is the enterprise. Enterprises have a number of characteristics that define them, but it is hard to distinguish between two enterprises that share many of their characteristics. To be able to count closure and births of enterprises, it is important to clearly define the distinguishing characteristics which constitute the essence of an enterprise, thus when one of those characteristics changes, the enterprise should not be considered the same business but a new one. This is not a trivial matter because upon the definition of these distinguishing characteristics depends those changes that are considered to be transformations of the same business, and those that are considered to be a closure of one business and a birth of another.

In this work it is assumed that those essential elements are the ownership of the business and the economic activity of an enterprise. A change in ownership means that the enterprise becomes owned and controlled by a different household. A change in

activity means that the enterprise changes the goods and services that it provides in such a way that it no longer can be classified in the same 4 digits code of the International Standard Industrial Classification (ISIC).

3.2.1 Retrospective vs. Prospective Data

Use of different methods to collect data over time results in different data structure which, in turn, also affects the count of closures and births of enterprises. There are a number of methods for collecting information over time and some of those have been used in the past to estimate births and closures of enterprises in different countries.

First, a retrospective approach has been applied in several African countries. This method combines two instruments: a modified MSE baseline survey and a closed enterprise survey[26]. This method locates households and enterprises on the basis of a single cross-sectional survey and draws retrospective longitudinal data from them. Using a stratified cluster sampling technique information is collected about the main characteristics of existing MSEs. By inquiring about enterprises' start-up year and the number of initial workers, important dynamic information can be collected regarding employment growth and birth rates. The closed enterprise survey collects information about past businesses, that are closed at the time of the survey. This survey obtains

[26] These methods are also known as a retrospective multiple cohort study from a single cross-sectional survey.

information from every household in the survey areas and information about the date of birth and closure of closed business.

The data from the two surveys are then used for estimating the birth and closure rates. This method relies greatly on memory recall, and therefore the results may be biased due to memory decay. For instance, entrepreneurs may not have remembered running a business in the past, especially if the enterprise operated long ago and survived a short time. In addition, some entrepreneurs may not have considered past small commercial ventures as a business. Also, entrepreneurs may not have remembered exactly when the business started.

Moreover, selective reporting may bias the results obtained from this method. There may be a perception of dishonor attached to reporting a failure of a business, therefore people may hide their negative experiences resulting in undereporting of the number of closures and births associated with them. Also, there is the issue of sample attrition due to the migration process. Since, some entrepreneurs may have closed a business and moved out of the sample area those experiences would be lost. To compensate for this undercounting, information about past businesses owned by current residents of survey areas and located on non-survey areas may be included. The most important advantage of this approach is that it is much less expensive, financially and time-wise, than a repeated cross sectional surveys.

Second, a tracer survey begins with a cross- sectional sample, similar to the one described above[27]. This baseline survey provides a list of enterprises that are enumerated again after a number of years. Fisseha (1993) applied this method in Jamaica. Based on a 1980 survey of small manufacturing enterprises, a sub-sample of those business are relocated 12 years later and then, closure rates are estimated. This approach undercounts closure rates, because it fails to account for all businesses that opened and closed during the period. The longer the period and the larger the turnover rate, the larger the downward bias of the estimated closure rates. Also, as Fisseha (1993) reported, when the surveys are far apart, re-locating enterprises that may have moved out of the original area is very difficult. Finally, this method does not provide information about new firms, therefore, birth rates cannot be estimated. Applying this method is more expensive than the retrospective approach but gives interesting insights about surviving businesses.

A third approach, used in this work, is the panel survey. This method combines some elements of the prospective and the retrospective approach. It differs from the tracer survey described above because the panel surveys include information not only about the businesses identified in the baseline survey, but also about all households in the survey areas. In other words, the panel surveys are complete enumerations within each sample area. The baseline survey provides a list of all households and businesses in the base year, and then repeated enumerations are conducted at regular intervals, on those

[27] This method is also known as a prospective follow-up study or a prospective multiple cohort study.

same areas. The retrospective component of this method consists of inquiring in each follow-up survey about enterprises that may have been operating since the last survey, but did not survive until the next survey. Therefore, this method provides information not only about businesses operating in the base year, but also about new businesses, businesses that migrated in and out of the survey areas, and businesses that opened and closed between follow-up surveys. This method permits a much more precise count of births and deaths and allows the counting of short-lived enterprises.

This method, however, also has some limitations. It accounts directly for enterprises that enter and exit survey areas, which is not necessarily the same as births and closures. Therefore, there is some difficulty in distinguishing between firms that moved out of an area and firms that closed. This is particularly difficult when enterprises moved out of the area along with their owners. In this case, the information about them has to be obtained from newcomers, family members or neighbors. Despite the effort to collect second hand information, there are some enterprises that are impossible to trace and then it is unknown what happened to them. For the enterprises that moved into the area, however, it is easier to differentiate between a new business and a change of location. The most important drawback of this method is that is costly and time consuming.

3.2.2 Defining Closure Rates and Birth Rates

Lets assume that in a particular area, there are n_t enterprises at the beginning of a period and n_{t+1} enterprises at the end of the period. Among those firms at the end of a period, there is an important proportion that was operating at the beginning of the period. These enterprises are called preexisting enterprises (*np*). At the end of the period, the operating enterprises are the preexisting enterprises plus the net balance between the business that appeared and the ones that disappeared (Δn). That is $n_{t+1}=np+\Delta n$ enterprises.

The change in the number of enterprises (Δn) is the difference between the enterprises at the end of the period and the enterprises at the beginning. The change in the number of enterprises has several components. First, there are those enterprises that appeared in an area before the beginning of the period and closed before the end of the period. These are called closed or dead businesses (*nc*). Second, There are enterprises that started after the beginning of the period and are still operating at the end of the period. These are called new businesses (*nn*).

Third, there are enterprises that were operating at the beginning of the period, and at the end of the period, but they no longer appeared in the same area but somewhere else. These are called moved out businesses (*no*). Fourth, there are enterprises that, at the beginning of the period, were operating somewhere else and during the period moved

into the area and survived until the end of the period. These are called moved in businesses (*ni*).

Finally, there are enterprises that were not operating either at the beginning or at the end of the period but were operating some time during the period. These are called short-cycled businesses *(ns)*. Of course, the longer the period between the surveys the more important this last category will be and the more difficult to detect. Some of these short cycled businesses may have started in other area and moved into a new area while others may have been new businesses when they started in an area. Also, some of them could have moved out to other areas while others could have closed during the period.

The total number of appearances in an area during a period is made up of new enterprises, the enterprises that migrated into the area and the short-cycled business. This component expressed as a proportion of the number of enterprises at the beginning of the period is called the appearance rate (*A*) and expressed as:

$$A = \frac{nn + ni + ns}{n_t} \tag{3.1}$$

Similarly, the total number of disappearances in an area during a period would consist of the closed enterprises, the enterprises that moved out of the area, and the short-cycled enterprises. As a proportion of the initial number of enterprises, the disappearance rate (*D*) is:

$$D = \frac{nc + no + ns}{n_t} \tag{3.2}$$

The net number of appearances in an area during a period would be the difference between the appearances and the disappearances. As a proportion of the initial number of enterprises the net appearance rate (*NA*) is defined as:

$$NA = A - D = \frac{nn + ni - (nc + no)}{n_t} \tag{3.3}$$

The first three rates refer to movement in and out of a particular area and are important as an indicator of the mobility of employment and other resources from and to different areas. Also, it is useful to separate these rates into their components.

The number of births and the number of enterprises that migrated into an area are the main components of the appearances. The total number of births occurring in an area is made up of the new enterprises and the short-cycled enterprises that are also new (*nsn*). As a proportion of the enterprises existing at the beginning of the period the birth rate (*B*) is defined as:

$$B = \frac{nn + nsn}{n_t} \tag{3.4}$$

The enterprises that moved into an area and the short-cycled enterprises that moved into the area (*nsi*) constitute the total number of enterprises that migrated into that

area. As a percentage of the initial number of enterprises the moved in rate (*MI*) is defined as:

$$MI = \frac{ni + nsi}{n_t} \tag{3.5}$$

The number of closures and the number of enterprises that migrated out of an area are the main components of the total number of disappearances in that area. The total number of closures is made up of the closures and short-cycled enterprises that closed (*nsc*) in that area. As a proportion of the initial number of enterprises the closure rate (*C*) is defined as:

$$C = \frac{nc + nsc}{n_t} \tag{3.6}$$

The enterprises that moved out of an area and the short cycle enterprises that moved out of the area (*nso*) constitute the total number of enterprises that migrated out of that area. As a percentage of the initial number of enterprises the moved out rate (*MO*) is defined as:

$$MO = \frac{no + nso}{n_t} \tag{3.7}$$

Finally, the balance between the new enterprises and the closures is defined as the net number of births, which as a ratio of the initial number of enterprises constitutes the net birth rate (*NB*).

$$NB = B - C = \frac{(nn + nsn) - (nc + nsc)}{n_t} \tag{3.8}$$

3.3 Data

The data to estimate the rates described above were obtained from four visits made in a two year period. The first visit was completed during March 1992 in 300 enumeration areas, randomly selected using a stratified cluster sampling technique, as described in Section 2.3.1. During that visit, a list of all households and businesses located in the sampled areas was obtained. Information about the existing businesses as well as businesses closed in the past was also collected. In each household or business visited, the respondent was asked if any member of the household has had a business at this location that was closed any time in the past, for any particular reason. If the answer to this question was positive, the enumerator inquired about the history of the business (i.e. opening and closure dates, nature of the business, reasons for closure and current occupation of the owner), and other complementary questions. If an operating enterprise were to be found, similar kind of questions were asked about the business and the household.

The second survey was conducted a year later (March 1993) in a subsample of 58 randomly selected areas out of the 300 of the baseline survey (Cabal, 1993). The sampling method is described in Section 2.3.2. The enumerators went back to these areas carrying a list of all households and businesses addresses, the corresponding name of the head of the household, the location of the business found the year before, and a map of the area. As the enumerators collected data in each area, they visited all the households and businesses and updated the list of households and businesses. If they found a business that was not in the 1992 list, they inquired about the nature of the business' appearance (i.e. new business, moved in business, or a business left out in the first visit). Then, they applied a questionnaire for the existing business.

If a business from the 1992 list was not operating in that location anymore, enumerators asked whether the business closed down or moved to some other place. Then, they applied a questionnaire similar to the one used for closed businesses in the baseline survey. In addition, they also, asked in all households whether there were any short-cycled businesses operating on that location between the visits.

A third and fourth visit were completed on September 1993 and March 1994 respectively. The same areas were visited and a procedure similar to the one described above was followed[28]. More detail about the method is described in Chapter II.

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[28] The author was directly involved in the first three visits, while in the fourth, he participated as an advisor to the agency that conducted the survey to ensure that the same method was followed.

3.4 Results

To estimate the country's birth, moved in, closure, moved out, appearances, disappearances and net rates for the Dominican Republic, equations (3.1) to (3.8) were applied to obtain the rates in the three strata; namely Santo Domingo, Secondary Towns and Rural Areas[29]. Then a weighted average of those rates were obtained by weighting the average rate in each stratum by its corresponding share in the total number of enterprises at the beginning of each period[30]. This can be written as:

$$\bar{y} = \sum_{h=1}^{3} R_h \bar{y}_h \tag{3.9}$$

where R_h is the share of the hth stratum on the total number of enterprises at the beginning of the period, $\bar{y}_h$ is the average rate in the hth stratum, and $\bar{y}$ is the country's

[29] Because during the 1992-1993 period only one visit was completed, it was impossible to distinguish between the short cycled enterprises that were new (*nsn*) and the short cycled enterprises that migrated into an area (*nsi*). Therefore, it was impossible to estimate the exact birth and moved-in rates for that period. Even though for the 1993-1994 period it was possible to make that distinction, birth, moved in, closure and moved out rates do not include short cycled enterprises in order to make the comparisons between the two periods consistent. The estimates of the rates that include short cycled enterprises are in column (b) in Table 3.1.

[30] The weights used were Santo Domingo 31.00% for 1992-93, 32.59% for March 1993-October 1993 and March 1993-March 1994 and, and 31.90% for October 1993-March 1994; Secondary Towns 30.30% for 1992-1993, 30.63% for March 1993-October 1993 and March 1993-March 1994 and 31.41% for October 1993-March 1994 and; Rural 38.70% for 1992-93, 36.87% for March 1993-October 1993 and March 1993-March 1994 and 36.69% for October 1993-March 1994.

average rate. It can be shown that if in every stratum the sample estimate is unbiased, $\bar{y}$ is an unbiased estimator of the population mean[31].

To obtain a measurement of the spread of $\bar{y}$ an estimate of the variance was used. With a stratified random sample, an unbiased estimator of the variance of the mean rate was defined as:

$$s^2(\bar{y}) = \sum_{h=1}^{3} \frac{W_h^2 s_h^2}{n_h} - \text{fpc} \qquad (3.10)$$

where s^2_h is an estimate of the variance in the *h*th stratum, n_h is the number of units on the sample, W_h is the share of the stratum in the total number of enumeration areas[32] and *fpc* is a finite population correction term that may be ignored when the share of the sample in the total population is negligible[33]. To estimate the variance of a rate within each stratum, the rate was obtained for each of the enumeration areas in a stratum and an estimate of the variance was obtained with respect to the average rate in the stratum. Then for the whole country, the variance of the average rate was obtained by applying

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[31] For more details see William G. Cochran, Sampling Techniques (New York: John Willey & Sons, 1977) 91-96.

[32] The weights used for all periods were Santo Domingo 27.16%, Secondary Towns 20.12%, and Rural Areas 52.72% which are the share of each stratum in the total number of enumeration areas.

[33] The finite population correction term may be written as:

$$\text{fpc} = \sum_{h=1}^{3} \frac{W_h s_h^2}{N}$$

where *N* is the number of units in the population.

equation 3.10, and finally, the corresponding standard error was obtained as the square root of the estimate of the variance.[34]

3.4.1 Country Birth and Closure Rates

The Table 3.1 shows the average percent rates for two annual periods for the Dominican Republic and their corresponding standard errors. The appearance rate, which includes the total number of enterprises that start up or move into an area in a year, is a good indicator of the volume of enterprises that enter to be a part of the group of enterprises that compete for resources and may become potential clients for assistance programs that work within a specific geographic area. The appearance rate indicates that a number of businesses equivalent to 28% of the enterprises operating in 1992 would have appeared in an average area between March 1992 and March 1993. This figure was 35% for the period March 1993 to March 1994. The two visits conducted in the later period allowed a more precise identification of short-cycled enterprises and thus, explained part of this difference[35].

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[34] It is important to notice that different weights may be used to estimate the standard errors of the average rates in the whole country. The weights used in Tables 3.1 and 3.4, are based on the total number of enumeration areas while in Table 3.3 the weights are based on the total number of enterprises in a particular stratum at the beginning of the period. The weights based on number of enumeration areas give higher standard errors because they give more weight to rural areas which present higher standard errors in all rates than Santo Domingo and Secondary Towns.

[35] If the short-cycled enterprises were to be excluded from the numerator of the appearance rate, the resulting rate would be 24.94% and 27.76% for the 1992-1993 and 1993-1994 periods respectively.

Table 3.1

Birth, Closure, Appearances and Disappearances Rates of Micro and Small Enterprises in the Dominican Republic 1992-1994
(%)

	March 1992-March 1993	March 1993-March 1994	
	(a)	(a)	(b)
A. Appearances	27.98 (3.86)	35.48 (10.15)	
1. Birth	20.61 (3.77)	24.19 (7.95)	31.01 (9.66)
2. Moved In	4.33 (1.44)	3.57 (1.40)	4.47 (1.42)
3. Short Cycled	3.04 (1.31)	7.72 (1.97)	
B. Disappearances	36.78 (4.78)	36.56 (3.90)	
1. Closure	29.01 (5.24)	21.64 (2.66)	27.94 (3.68)
2. Moved Out	4.74 (2.00)	7.20 (1.32)	8.62 (1.48)
3. Short Cycled	3.04 (1.31)	7.72 (1.97)	
C. Net Rates			
1. Net Birth (A.1-B.1)	-8.04 (5.41)	2.55 (7.75)	3.07 (8.26)
2. Net Appearances (A-B)	-8.8 (5.93)	-1.08 (8.78))	
# of Areas	55	56	

Source: Microenterprise surveys March 1992, March 1993, October 1993, March 1994.
(a) Birth ,Moved In ,Closure and Moved Out rates exclude Short Cycle enterprises.
(b) Birth ,Moved In ,Closure and Moved Out rates include Short Cycle Enterprises.
Weighted Standard error in parenthesis. Weighted by the share in the total number of enumeration areas.

The birth rate is the main component of the appearance rate. For the 1992-1993 period, a number of enterprises equivalent to 21% of the enterprises that were operating at the beginning of the period, opened during the period and survived until March 1993. This figure was not significantly different to the one estimated for the 1993-1994 period which was about 24%.

As it was mentioned before, these figures do not include the short-cycled enterprises that were born within those periods (*nsn* enterprises in equation (3.4)), because they were not possible to trace for the 1992-1993 period. However, in the period 1993-1994 two visits were completed and for this reason it was possible to trace the new short-cycled enterprises and included as specified in equation (3.4). If the new short-cycled enterprises are included to estimate the birth rate for the 1993-1994 period, this rate increases from 24% to 31%. This indicates that most of the short-cycled enterprises were new. Consequently, assuming that the same is true for the 1992-1993 period, that is that all short cycled enterprises were new, the birth rate estimate for this period would increase from 21% to around 24%.

The moved in enterprises are also a component of the appearance rate. The results show that in an average area, a number of enterprises equivalent to 4% of the enterprises operating at the beginning of the period would have moved into the area at the end of a one-year period in the 1992-1993 period as well as the 1993-1994 period. If short-cycled enterprises are added in the later period this proportion increases in less than 1%. These

results indicate on one hand, that there is not a significant difference in the migration rates between the two periods, and on the other, that most of the short cycled enterprises are new firms as opposed to moved in enterprises.

Examining the disappearance rate, which includes the total number of enterprises that closed down or move out of an area in a year, is a good indicator of the duration of enterprises in a geographic area. This has a particular importance for many assistance programs whose officials frequently are assigned to work within an established geographic area. The results show that a number of enterprises equivalent to 37% of the enterprises at the beginning of the year closed down or moved out the area during each of the two periods of analysis. The main component of the disappearance rate is the closure rate. The estimate of this rate indicates that 29% and 22% of the enterprises that were operating at the beginning of the one-year period closed by the end of the year for the 1992-1993 and 1993-1994 periods respectively. Adding the short-cycled enterprises that died in the 1993-1994 period, the closure rate increased to 28% in this period. If it is assumed as in the case of the birth rate that all short cycled enterprises closed down as opposed to moved out, the closure rate in the 1992-1993 period would increase from 29% to around 32%.

As it was mentioned in Section 2.2, the Dominican economy grew twice as much in 1992 than in 1993. Even though only there is information available for two years, the

evidence regarding the closure rates of MSEs and the performance of the economy is consistent with the hypothesis that in periods of relatively higher growth rates in the formal economy, the closure rate of MSEs is higher than in periods of poorer performance of the economy.

The moved out rate estimate indicates that about 5% and 8% of the enterprises that were operating at the beginning of the period moved out to some other place or became a secondary source of income for the family in the same location for the 1992-1993 and 1993-1994 period respectively. This figure only increases about 1% when the short-cycled enterprises that moved out of the areas are included in the last period. It is important to notice that theoretically the moved in rate plus the moved out rate should add up to zero. The differences found particularly in the 1993-1994 period are due to sample and measurement errors.

The net balance between births and closures of enterprises resulted in net birth rates that range between -8% and 3% for the different periods, but for neither of the periods was that rate significantly different from zero. This result means that for the whole period the opening of new enterprises compensates for the closure of enterprises. Therefore despite the high birth and closure rates, there is no evidence to reject the hypothesis that the number of enterprises in March 1992 is the same as in March 1994.

Two surveys were conducted during the 1993-1994 year allowing the estimation of semiannual rates. These surveys yielded two types of results. On one hand, it let to verify the existence of seasonal effects during that period; and on the other, it allowed to check if there was any precision gains to estimate the different rates derived from semiannual surveys instead of a yearly one.

Regarding the seasonality aspect, the estimates indicate that both appearances and disappearance rates are higher in the March-September period than in the September-March period (Appendix C Table 1). However these differences are not significantly different of zero at 90% of confidence. Similarly, the birth rate in both periods, March-September 1993 and September 1993- March 1994 was about 15%. This result also indicates that there is no evidence of a seasonality in births during the 1993-1994 year.

The semiannual data show that in either semester of the 1993-1994 period about 13% to 14% of the enterprises that was operating at the beginning of the semester closed by the end of the semester, showing that there was not a significant seasonal effect on that year.

With respect to precision gains of the semiannual surveys the estimates for the 1993-1994 period shows that enterprises that open and closed in a six-month period represent less than 2% of the enterprises at the beginning of the period, for any of the semesters (Appendix C Table 1). This suggests that a follow-up survey every six months

controls for most of the possible measurement errors originating from the short-cycled enterprises.

One effect of the improvement in the precision for tracing short-cycled enterprises is the higher share of short-cycled enterprises in the total number of appearances including the short-cycled firms. While results show that as many as the 22% of those appearances, during the 1993-1994 period, disappeared in the same period, this figure was only 11% for the 1992-1993 period (Appendix C Table 1). The estimation of this rate for each semester of the 1993-1994 year shows that 8% and 4% of the enterprises appeared in the first and second semesters respectively, and disappeared before the semester was over.

3.4.2 Birth and Closure Rates by Location

In other countries, the empirical evidence on the relationship between location and birth and closure rates shows higher rates in rural enterprises than in their urban counterparts (Liedholm and Mead 1990). In the Dominican Republic, estimates of appearances, disappearances, birth and closure rates are higher in rural areas than in Santo Domingo and secondary towns, and higher in secondary towns than in Santo Domingo. However, standard errors are also significantly higher in rural areas than in the other two strata. As a result, the differences observed between the rates are not significant at 90% of confidence.

Table 3.2 shows the estimates for the different rates in the 1992-1993 and 1993-1994 periods. Birth rates and closure rates appear to be higher in rural areas than in secondary towns, which in turn, appear higher than in Santo Domingo in both periods. For example, in the 1992-1993 period the birth rate estimate in rural areas is 6 points above the rate in Santo Domingo. Also, the closure rate in rural areas is 9 points higher than the closure rate in Santo Domingo in the same period. Moreover, in 1993-1994 birth rates are twice as high in rural areas than in Santo Domingo and at the same time the standard error is almost four times higher in rural areas. The closure rate in rural areas is only 4 points above rate in Santo Domingo in that year. It is also interesting to notice that the variability of the estimate rates in rural areas seems to be more pronounced in birth, appearance, and net rates than in closure and disappearance rates.

Table 3.2 also shows that appearance and birth rates are higher in the 1993-1994 period than in the 1992-1993 period in Santo Domingo and Rural areas. This difference is specially noticeable in rural areas. However none of those differences are statistically significant due to the high standard errors of the rural estimates. Also, closure rates are higher in the 1992-1993 period than in the following year. That difference is more noticeable in secondary and rural areas. This difference may be explained by the performance of the main sectors of the Dominican economy. As it was mentioned before in 1992 the Dominican economy grew at outstanding levels while in the following year it grew just above the population growth level. Moreover agriculture remained stagnant during 1993 while the most important sectors in the urban economy, manufacturing and

Table 3.2

Birth, Closure, Appearances and Disappearances Rates of Micro and Small Enterprises by Stratum in the Dominican Republic 1992-1994
(%)

	March 1992-March 1993(a)			March 1993- March 1994(a)		
	Santo Domingo	Secondary Towns	Rural	Santo Domingo	Secondary Towns	Rural
A. Appearances	27.19 (5.62)	27.80 5.86)	28.75 (6.56)	26.53 (5.61)	33.33 (4.47)	45.16 (19.49)
1. Birth	15.62 (3.05)	24.35 (6.43)	21.68 (6.75)	17.20 (4.48)	20.73 (4.27)	33.24 (15.22)
2. Moved In	8.06* (4.57)	1.01* (0.43)	3.94 (1.54)	2.87 (0.80)	4.61 (1.33)	3.32 (2.66)
3. Short Cycle	3.51 (1.33)	2.44 (0.83)	3.13 (2.43)	6.46 (2.63)	8.00 (1.77)	8.60 (3.54)
B. Disappearances	31.58 (3.98)	35.61 (4.85)	41.88 (8.88)	35.71 (5.38)	34.22 (4.79)	39.25 (6.84)
1. Closure	23.26 (6.39)	28.52 (5.02)	34.01 (9.46)	20.84 (3.42)	20.21 (4.13)	23.53 (4.62)
2. Moved Out	4.81 (3.00)	4.66 (1.22)	4.74 (3.55)	8.41 (2.12)	6.01 (1.70)	7.11 (2.24)
3. Short Cycle	3.51 (1.33)	2.44 (0.83)	3.13 (2.43)	6.46 (2.63)	8.00 (1.77)	8.60 (3.54)
C. Net Rates						
1. Net Birth	-7.64 (7.94)	-4.16 (8.90)	-12.32 (9.11)	-3.64 (3.81)	0.51 (3.10)	9.70 (14.93)
2. Net Appearances	-4.39 (7.31)	-7.80 (9.13)	-13.13 (10.39)	-9.18 (4.59)	-0.89 (3.56)	5.91 (16.89)
% Short Cycle/ Appearances	12.90	8.77	10.87	24.36	24.00	19.05
# of Areas	19	15	21	20	16	20

Source: Microenterprise surveys March 1992, March 1993, October 1993, March 1994.
(a) Birth, Moved In, Closure and Moved Out rates exclude Short Cycle enterprises.
Standard errors in parenthesis.
* The difference is significant at 90% of confidence.
* Base of the comparison.

particularly construction, kept growing in 1993. This resulted in that the economic performance of the economy in rural areas was poorer than in Santo Domingo. This is consistent with the hypothesis that, in general, closure rates tend to be higher in sectors and in periods where the performance of the economy is improving and as a result there are better economic alternatives for people involved in businesses performing poorly.

3.4.3 Birth and Closure Rates by Gender

Empirical evidence on appearances, disappearances, birth, and closure rates by gender is limited. However, recent evidence indicates that those rates tend to be higher for female owned enterprises than for their male owned counterpart. The evidence from the Dominican Republic, for the 1992-94 period, indicates that closure and disappearance rates are significantly higher for female-owned enterprises than for male-owned enterprises. Despite the fact that gross birth rates are not significantly different by gender, the net birth rate is significantly higher for male-owned than for female-owned enterprises for both periods.

Table 3.3 shows that the estimated closure rate is about three and two times higher for female enterprises than for male-owned enterprises for the 1992-93 and 1993-94 periods respectively. Similarly, the disappearance rate for female-owned enterprises appears to be more than two times higher than that of male-owned enterprises for the 1992-93 period and about one and a half times higher for the 1993-94 period.

Table 3.3

Birth, Closure, Appearances and Disappearances Rates of Micro and Small Enterprises by Owner's Gender in the Dominican Republic 1992-1994
(%)

	March 1992-March 1993(a)		March 1993- March 1994(a)	
	Female	Male	Female	Male
A. Appearances	34.29 (5.2)	22.97 (5.3)	37.17 (7.5)	34.61 (6.2)
1. Birth	24.11 (4.4)	19.22 (3.6)	23.39 (5.9)	24.98 (4.8)
2. Moved In	5.60 (2.3)	2.80 (4.6)	2.98 (1.0)	3.64 (1.7)
3. Short Cycle	4.58 (3.5)	0.95 (3.7)	10.80 (4.5)	5.99 (4.7)
B. Disappearances	51.60** (4.7)	19.99** (4.6)	46.52** (5.6)	28.01** (4.3)
1. Closure	42.53** (5.6)	13.23** (4.0)	29.72** (4.2)	13.41** (2.5)
2. Moved Out	4.49 (3.1)	5.81 (2.5)	6.00 (1.4)	8.61 (1.8)
3. Short Cycle	4.58 (3.5)	0.95 (3.7)	10.80 (4.5)	5.99 (4.7)
C. Net Rates				
1. Net Birth	-18.43* (7.9)	5.99* (4.7)	-6.33** (5.4)	11.57** (5.2)
2. Net Appearances	-17.31 (7.4)	2.98 (6.7)	-9.35** (5.8)	6.60** (5.7)
% Short Cycle/ Appearances	12.89	3.69	29.63	16.86
# of Areas	54	51	52	56

Source: Microenterprise surveys March 1992, March 1993, October 1993, March 1994.
(a) Birth ,Moved In ,Closure and Moved Out rates exclude Short Cycle enterprises.
Standard Error in parenthesis.
** The difference between female and male owned enterprises is significant at 95% of confidence.
* The difference between female and male owned enterprises is significant at 90% of confidence.

In addition to having net birth rates significantly different for female-owned and male owned enterprises, female-owned enterprises present a negative net birth rate while male owned enterprises appear to be positive[36].

Net appearance rates is negative for female-owned enterprises and positive for male-owned enterprises, but the difference between them is only significant in the 1993-1994 period. Finally, the proportion of appearances that did not survived the first year appear to be considerably higher for female owned than for male owned enterprises.

3.4.4 Birth and Closure Rates by Sector

Recent evidence from Zimbabwe indicates mortality rates vary by sector, although in most of these studies no significance tests on these relationships have been conducted. McPherson (1992) reported significant differences in hazard rates by subsectors for Zimbabwe and Swaziland when controlling for other factors.

The evidence of entry and exit of firms by economic sector in the Dominican Republic for the 1992-1994 period is summarized in Table 3.4. The results indicate that trade activities, as a whole, present significantly higher closure and disappearances rates

[36] On the 1992-93 period, the net birth rate of female-owned enterprises is significantly smaller than zero and that of the male counterpart is not significantly different from zero at 95% of confidence. On the 1993-94 period, the net birth rate of male-owned enterprises is significantly larger than zero and that of the female counterpart is not significantly different form zero at 95% of confidence.

Table 3.4

Birth, Closure, Appearances and Disappearances Rates of Micro and Small Enterprises by Sector in the Dominican Republic 1992-1994
(%)

	March 1992-March 1993(a)			March 1993- March 1994(a)		
	Manufacturing	Trade	Services	Manufacturing	Trade	Services
A. Appearances	27.78 (7.96)	31.18 (4.40)	19.32 (4.30)	38.37 (7.57)	33.38 (10.09)	38.92 (8.27)
1. Birth	17.28 (5.75)	23.59 (4.14)	14.14 (4.05)	23.94 (5.24)	23.78 (7.16)	27.97 (8.05)
2. Moved In	9.10 (3.77)	3.74 (1.23)	2.21 (1.82)	5.00 (3.43)	1.63 (1.22)	6.33 (2.06)
3. Short Cycle	1.40 (2.92)	3.85 (3.46)	2.96 (5.81)	9.42 (5.57)	7.97 (4.27)	4.62 (4.55)
B. Disappearances	23.46* (5.24)	45.19* (4.29)	23.01* (5.40)	33.60 (5.19)	41.57* (4.26)	23.47* (4.48)
1. Closure	13.28* (3.74)	38.29* (5.90)	17.03* (4.35)	13.47* (4.03)	27.82* (2.93)	12.26* (3.76)
2. Moved Out	8.78 (3.38)	3.06 (1.12)	3.02 (1.62)	10.70 (2.54)	5.78 (1.25)	6.59 (1.97)
3. Short Cycle	1.40 (2.92)	3.85 (3.46)	2.96 (5.81)	9.42 (5.57)	7.97 (4.27)	4.62 (4.55)
C. Net Rates						
1. Net Birth	4.00* (7.35)	-14.69* (6.92)	-2.89 (5.84)	10.47 (6.77)	-4.03 (7.59)	15.70 (9.66)
2. Net Appearances	4.31 (10.28)	-14.01 (6.40)	-3.70 (6.30)	4.77 (8.25)	-8.19 (8.52)	15.45 (9.58)
% Short Cycle/ Appearances	4.77	12.16	12.98	25.45	24.16	13.57
# of Areas	44	54	36	47	55	43

Source: Microenterprise surveys March 1992, March 1993, October 1993, March 1994.
(a) Birth ,Moved In ,Closure and Moved Out rates exclude Short Cycle enterprises.
Weighted Standard errors in parenthesis. Weighted by the share in the total number of enumeration areas.
** The difference is significant at 95% of confidence.
* The difference is significant at 90% of confidence.
* Base of the comparison.

than manufacturing and services activities. These results hold for the 1992-93 period as well as for the 1993-94 period. In addition, the net birth rate in trade appears to be negative in both periods but only significantly less than zero for the 1992-93 period. For that period, the estimated birth rate in trade activities is -14%. Moreover, the data show that the net birth rate for trade is significantly different than the one for manufacturing, which is estimated to be about 4% for the 1992-1993 period.

While the estimated annual birth rate in trade remained about 24% for the two year period, in manufacturing this figure was similar to the 24% mark for the 1993-94 year but was slightly smaller for the 1992-93 period. In the case of services, however, the estimate of this rate was significantly different in the two periods ranging from 14% in the 1992-93 year to 28% in the following year.

In the 1993-94 year, the proportion of enterprises that appeared in a particular area and closed or moved to other areas by the end of the period was estimated at about 23% for manufacturing and trade and close to 14% for services. Finally, there is no evidence to support the idea that migration rates among the manufacturing, trade and services sectors are significantly different from each other for any of the two periods.

3.4.5 Closure and Birth Rates Estimates Retrospective vs. Prospective Approach

In section 3.2 of this chapter, the potential implications of using different data collection methods for counting births and closure was discussed. This section seeks to compare the birth and closure estimates resulting from the prospective method based on panel surveys with the ones resulting from the retrospective method based on a modified MSE baseline survey and a closed business survey. Unfortunately, there is not a period in which both approaches were used. However, comparing the magnitude of the rates resulting from the estimates for consecutive periods can shed some light on this important methodological issue.

Table 3.5 shows the estimates of births and closure rates for the 1990-1993 period. The rates presented for the 1990 and 1991 years were estimated based on the MSE baseline survey and the closed enterprise survey applied on March 1992 (retrospective approach). In that year, the information about closures was obtained by asking every household in the sample if any member of the household had a business that closed for any reason in that particular area. Information about births was collected by inquiring about the year when both existing and closed business started. The base for those rates are the businesses that were operating at the beginning of the year. In other words the information about closures is solely based on the closed business questionnaire while the information about births is based on both the baseline survey and the closed business questionnaire.

Table 3.5

Birth and Closure Rates: Retrospective vs. Panel Approach

Year	Birth Rate (%)	Closure Rate (%)
1990(a)	21.2	2.4
1991(a)	28.8	6.5
1992(b)	20.6	29.0
1993(b)	24.2	21.6

Source: Microenterprise surveys March 1992, March 1993, October 1993, March 1994.
(a) Based on the 1992 one retrospective approach based on a baseline questionnaire and a dead firm questionnaire.
(b) Based on the 1993 and 1994 panel surveys based on the repeated application of existing and closed business questionnaires.
Note: These figures exclude short cycle enterprises.

For the 1992 and 1993 years, the births and closure rates were estimated based on the panel surveys as was indicated above in this chapter[37]. Births and closures resulted not only from the report of the people interviewed but also from the comparison between the data collected in previous visits and the current visit and therefore there were several ways to check for accuracy and consistency.

Birth rate estimates appear to be similar on magnitude for all reported years. These estimates range between 21% and 29% a year for the 1990-1993 period. Differences among them could be explained by differences in macroeconomic and social conditions. As it was mention before, in 1990 and 1991 the Dominican economy experienced negative growth rates while in 1992 the economy had a high growth rate, and in 1993 it grew at a rate similar to the population growth rate.

[37] Notice that the 1990 and 1991 birth and closure rates are based on calendar years while 1992 and 1993 rates are for the March to March year periods.

It is also possible that the difference among the birth rates could be explained by the bias present when using the retrospective approach. People may systematically report the appearance of a business in a date closer to the interview than when it really did occur. However to be certain about the magnitude of that bias, information about the starting date collected in different years for the same businesses have to be analyzed. Another source of difference in birth rates may be the variance of the parameter estimate[38].

Unlike the birth rate estimates, the magnitude of the closure rates estimates seems to be very different depending on the method of estimation. The closure rates estimated using the retrospective approach are 2.4% and 6.5% for 1990 and 1991 respectively. Compared to the 1990 figure, the estimate of these rates are about ten times higher for 1992 and 1993. Even compared to the 1991 figure this rate is at least three times higher for the following two years. These results suggest that the retrospective approach produces closure rates smaller of those of the prospective approach used in this thesis which is based on panel surveys.

Part of this may be due to real differences in the closure rates due to dissimilar macroeconomic and sectorial conditions that the Dominican economy experimented on those periods. During the 1990-1991 period the Dominican economy experienced negative growth rates of 5% and 1% respectively while in 1992-1993 period the economy

[38] [13.9%,27.3%] and [12.3%,36.1%] are the 95% confidence interval for the birth rate in 1992-93 and 1993-94 periods respectively assuming that the parameter estimator has a t-student distribution.

grew at 8% and 3% respectively. Under these conditions, it is possible that in the former period, entrepreneurs had to keep open their business even if it was performing poorly because there was not an alternative available to generate income. Then, in 1992 when the Dominican economy showed clear signs of recovery, people involved in low profit business may have had the opportunity to get a job in larger business, government, agriculture, and other small business performing better.

However, perhaps the most important element that may explain the significant difference between the closure rates is the apparent undercounting of closed business when the retrospective approach is used. This undercounting may have different sources. First, the retrospective method does not account for all enterprises that closed in the years before and whose owners have migrated somewhere else. In contrast, panel surveys identify all enterprises that closed because there is a list of enterprises existing a in a previous date. Only enterprises that start up and close down during one period may be left out. However, if the lapse between visits is a year or less there is a good chance that a neighbor may remember the closure of those businesses. Second, there may have been under-reporting of enterprises that occurred long ago, lasted a short time, or represented a frustrating experience for the owner. To control for under-reporting due to the pass of time, the closure rate was estimated only for one and two years before the baseline survey. However, controlling for the other two sources of undercounting is not possible in the retrospective approach. Fortunately in panel surveys that are applied at least every year, there is a list of existing businesses that may help the enumerators to

reduce the under-counting of closed business. Finally, in some instances people remember that their households had an enterprise that fail, but they do not recall when. Therefore, as the closures have to be assigned to a specific period, the cases in which the closure date is missing have to be excluded from the closure rate estimation.

3.5 Conclusions

This chapter develops a method to estimate indicators of entry, exit and migration of micro and small enterprises and their corresponding measurements of the spread of those estimates. Then, the method is applied to the Dominican Republic for the 1992-1994 period. These chapter provide both conclusions regarding the dynamics of the MSE sector in the Dominican Republic in the 1992-1994 period and also conclusions about methodological issues.

With respect to MSE's dynamic, the results show, first, that around one third of enterprises that are working in an average enumeration area during a year disappear by the end of the year because they have closed or migrated to a different area. Also, a number of enterprises equivalent to a similar proportion of the enterprises operating during a year open by the end of the year. For assistance programs working within a specific geographic area this implies that every year one third of their target population changes.

Second, a number of enterprises equivalent to around one fourth of the enterprises operating at the beginning of a year in the Dominican Republic, opened in a one-year period. At the same time, a similar percentage of the same enterprises operating at the beginning a year, closed in the same period. As a result, the combined effect of births and deaths canceled out each other and the number of enterprises seemingly remained unchanged in the period of study.

Third, closure and disappearance rates are found to be significantly higher for female-owned with respect to male-owned enterprises, and for trade enterprises with respect to manufacturing enterprises. Despite the fact that rural based enterprises seemingly show higher exit and entry rates than their urban based counterparts, this difference is not significant due to the extreme variance of those rates in rural areas.

Fourth, the evidence found in the Dominican Republic is consistent with the hypothesis that closure rates tend to be higher in sectors and in period where the performance of the economy is improving and, as a result, there are better economic alternatives for people involved in business performing poorly. Also, the data supports the hypothesis that birth rates tend to be higher in periods during which the economy slows down than when it grows rapidly.

With regard to methodological issues, the most important finding is that unlike the birth rate estimates, the magnitude of the closure rates estimates seems to be very

different according to the type of data used. Initial results for the Dominican Republic suggest that the retrospective approach, based on close enterprise questionnaire, produces closure rates significantly smaller than those using the prospective approach which is based on panel surveys. The repeated application of a existing business questionnaire and the list of enterprises that result from it in every visit of a panel survey, help to reduce dramatically the under-counting of closed business. Moreover, if the panel is collected at least in a yearly bases the undercounting of short cycle enterprises may be reduced even further.

Second, two visits a year greatly improves the identification of short-cycle enterprises that for the Dominican Republic can represent around 10% of the enterprises operating at the beginning of a year. Also, the semiannual data do not support the existence of strong seasonal effects on the entry and exit data for the 1993 year.

Finally, the results indicate that researchers doing following-up surveys of micro and small businesses can find their sample greatly reduced because one third or more of enterprises at the beginning of a year may move out or close during the course of a year.

CHAPTER IV

HAZARD ANALYSIS OF MICRO AND SMALL ENTERPRISES IN THE DOMINICAN REPUBLIC 1992-1993

4.1 Introduction and Basic Definitions

In chapter III a method to estimate enterprises' birth and closure rates was introduced and the estimates of those rates were presented for the Dominican Republic in the March 1992 to March 1994 period. The evidence for the Dominican Republic indicates that, in one year as many as 25% of the enterprises existing at the beginning of the year may close by the end of the year. Despite, the considerable waste of resources and effort that the magnitude of this figure implies, very little is known about the patterns of closure over time and about the characteristics that may be associated with the success and failure of enterprises.

This chapter examines how some characteristics of the micro and small businesses and their owners contribute to the failure or survival of those businesses during the March 1992-October 1993 period in the Dominican Republic. The remainder of this section introduces basic concepts common to the analysis of survival, duration and

mortality. Then, in section 4.2 non-parametric estimates of age-specific hazard rates are presented. Section 4.3 discusses the theoretical grounds of the model and presents the hypothesis of the research. Section 4.4 introduces a discrete hazard model while section 4.5 discusses the data set used to estimate this model. The results are presented in section 4.6; finally, section 4.7 contains some concluding remarks.

While standard analytical techniques, such as regression models, are not well suited to summarize and analyze duration data, survival or hazard analysis is one of the best suited methods. Hazard analysis concentrates on examining patterns of duration of events, in this case, the duration of enterprises.

The main advantage of this method is that it can handle two of the most difficult characteristics of data on duration of the life of the unit of observation (i.e. censoring, and time varying explanatory variables). Regression models are weakened by these two intrinsic characteristics of duration data.

First, censoring in duration data appears when the value of the dependent variable, duration of the enterprise, is unknown for the enterprises that have not failed at the moment of the last interview. This means that a considerable proportion of enterprises may not be observed for the full life time, from the opening of the enterprise to its closure. Regression models cannot handle censoring easily. Second, there are time

varying explanatory variables that can affect the duration and those cannot be incorporated in a regression model.

These characteristics of duration data have led to the development of statistical methods applied mostly for the study of industrial engineering and biomedical issues (Kiefer 1988). The economic issues more widely studied using hazard analysis are the duration of unemployment and demography related issues such as spacing of births, duration of marriages, time to adopt new technologies, etc (Foster et. al. 1986, Allison 1982, Heckman and Walker 1990).

4.2 Nonparametric Hazard Estimates: Life Tables

Life tables are a useful instrument commonly employed by demographers to estimate the age-specific hazard rates. This method is non-parametric because it does not make any assumption about the underlying hazard function. Life table uses the maximum information possible out of the enterprises in a sample by sorting the data by duration time and applying this information to calculate the hazard and survival functions. Each enterprise contributes to the hazard and survival estimates until the moment in which they close or the observation is censored.

Since duration is the key variable in this analysis, its definition must be unambiguous. A complete definition of duration requires a beginning, a time scale, and

a definition of the event ending the duration (Kiefer 1988). For the life table analysis, it is assumed that the beginning of duration is the opening date of the enterprise and its ending is the closure date. The duration is measured in years. It is important to observe that the duration years (or age of the enterprise at closure) do not necessarily coincide with the same calendar years for all the enterprises. For instance, enterprises born on different calendar years experience their duration years in different calendar years. This definition of duration may introduce an important element of heterogeneity and bias that will be discussed later in this chapter, in Section 4.4.1.

Let T be a non-negative discrete random variable representing the failure time or the duration of an enterprise from an homogeneous population. There are five related functions that could represent the process of failure of enterprises. The probability density function of duration is the probability that a firm disappears in a particular duration year, t_k (Equation 4.1). The corresponding cumulative distribution function of duration, is the probability that an enterprise disappears before a particular year (Equation 4.2). The survival function represents the probability that an enterprise operates at least until a particular year. The survival function is also the complement of the cumulative distribution function (Equation 4.3). The hazard function is the probability that a firm disappears in a particular year t_k, given that it survived until the beginning of the period (Equation 4.4). Finally, the integrated hazard function is the sum of the hazard up to t_k (Equation 4.5). Although, the integrated hazard function does not have an interpretation in terms of probability, it is useful in practice as an instrument

to analyze the specification of parametric hazard models (Keiefer 1988). The plots of the integrated hazard function against duration are smoother and easier to interpret than plots of the hazard function.

$$f(t_k) = \Pr(T=t_k) \tag{4.1}$$

$$F(t_k) = \Pr(T<t_k) = \sum_{j<k} f(t_j) \tag{4.2}$$

$$s(t_k) = \Pr(T \geq t_k) = \sum_{j \geq k} f(t_j) = 1 - F(t_k) \tag{4.3}$$

$$h(t_k) = \frac{f(t_k)}{s(t_k)} \tag{4.4}$$

$$H(t_k) = \sum_{j \leq k} h(t_j) \tag{4.5}$$

In absence of censoring, the hazard rate for a particular duration year is the probability of closing an enterprise at a particular age given that the enterprise survived up to that age. An estimate of the hazard rate is the number of closures occurring at one age divided by the number of enterprises at risk. The enterprises at risk are the enterprises that survived up to that particular age. The issue of censoring rises from two sources. First, there are enterprises that at the moment of the last interview have not completed the duration year for which the rate is being estimated. Second, during the observation period, some enterprises move out of the sample areas, and consequently, the researcher loses track of them. Both cases are categorized as censored or losses. Since, it is rarely known exactly when an enterprise is closed or lost, estimators of the hazard functions are based on different assumptions to handle censored and lost observations in a practical manner.

Kaplan and Meier (1958) present several estimators of the hazard function and discuss their advantages and disadvantages. One widely used estimator is the product-limit estimator or Kaplan-Meier estimator. This estimator handles censoring by defining the ranges of duration in such a way that lost observations do not fall into the same range as closures. Following this procedure only the appropriate number of enterprises are included in the risk set. Despite the fact that this is a very efficient estimator of the hazard function, it requires the knowledge of the exact closure time and censoring time, which is seldom the case in the microenterprise data.

Alternatively, the actuarial (or adjusted-observed) estimator requires the knowledge of the population at risk at the beginning of the period but it does not need the exact time within the interval when deaths and losses occur. One version of this estimator adjusts censoring by subtracting one half of the censored observations to the number of observations entering the interval. This estimator assumes that the censoring and the failures occur uniformly throughout the interval, and thus, that half of the losses in the interval precede and half follow the deaths.[39]

The data used to construct the life tables contains information of duration of enterprises operating in March 1992 and also of those born between 1992 and 1993. It

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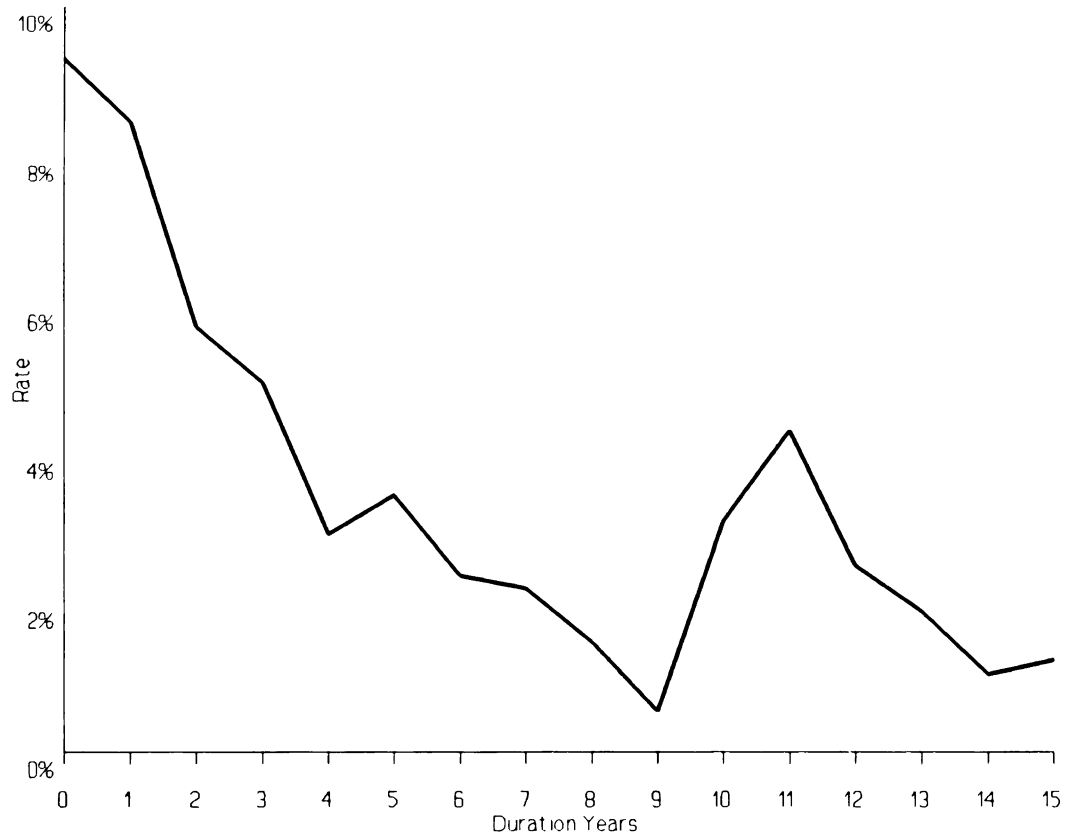
[39] One version of this estimator adjust censoring by subtracting all the censored observations to the number entering the interval or the risk set. Another possibility is to include all the enterprises in the risk set regardless of whether or not they are censored in that duration year (Cox and Oakes 1984, Kiefer 1988, Kaplan and Meier 1958). If the arrangement of deaths and losses within interval is random, the difference between the estimates using alternative assumptions is expected to be random.

is also important to notice that the data set is truncated at the upper level because the set do not include enterprises starting with less than 50 workers that have grown so they have become mid-size enterprises.

Figure 1 shows the plot of the actuarial age-specific hazard rate estimate for the Dominican Republic for the 1992-1993 period, truncated at 15 years of duration[40]. The

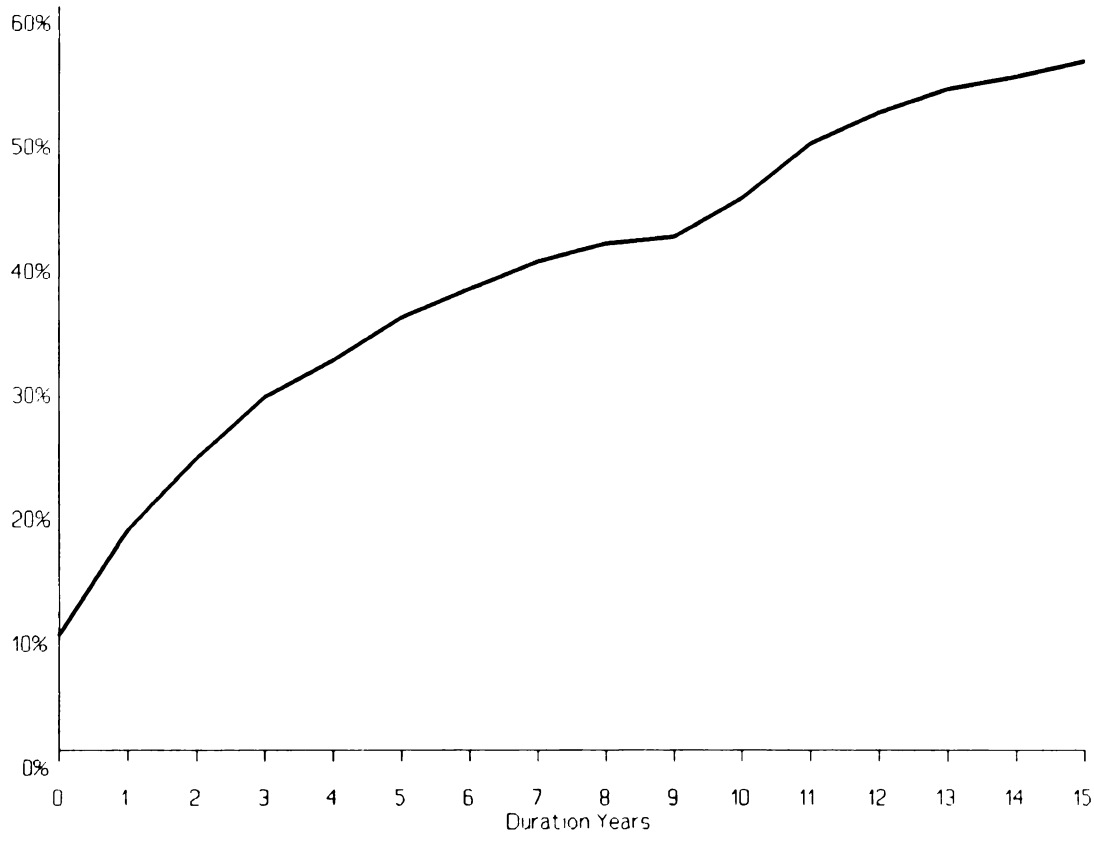
Figure 1
Age Specific Hazard Rate of MSEs in the Dominican Republic
1992-1993



[40] The reason for these plots to be truncated at 15 years is that in the sample there are few enterprises lasting more than 15 years and therefore the significance of the age specific hazard rate is poor for the upper range of the duration spectrum.

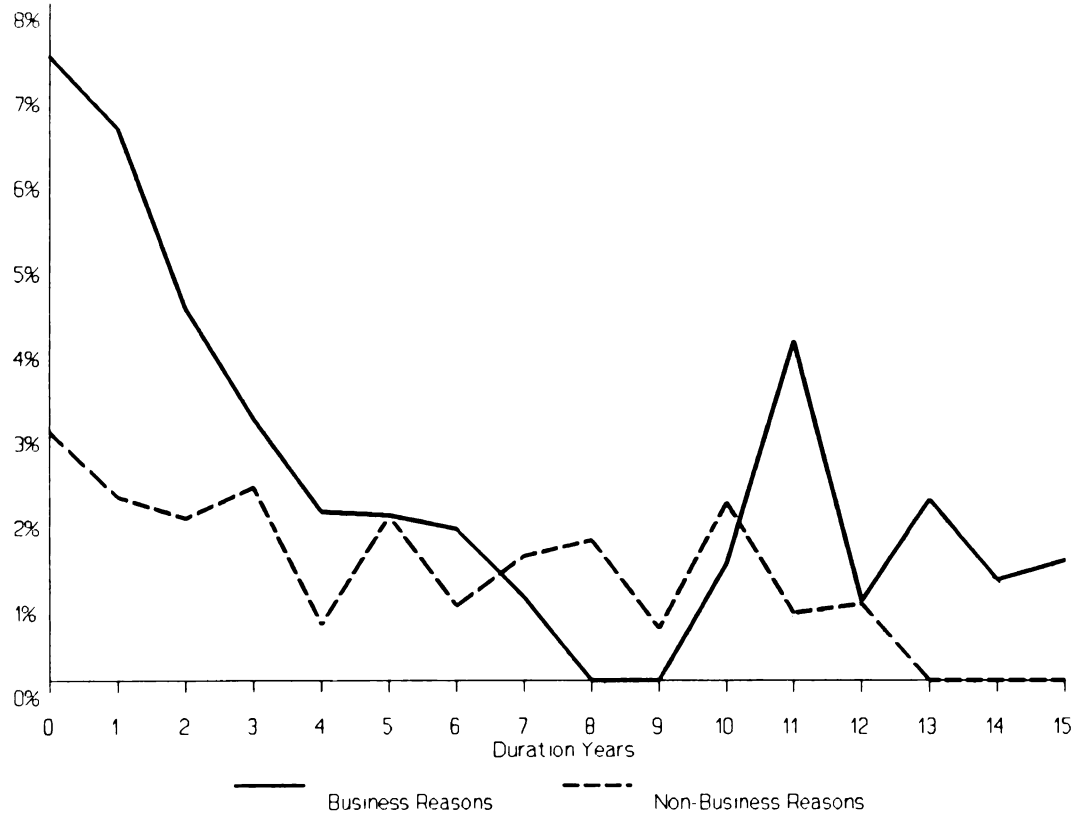
hazard rate seems to decrease remarkably until the end of the fourth duration year. Thereafter, it continues decreasing at a slower pace up to the tenth year, and finally seems to start to increasing again. However, this last increase is not significant. To better observe the general form of the hazard rate against duration, the smoother integrated hazard function is shown in Figure 2. The shape of this function indicates that the decline of the hazard rates decreases with duration. This result suggests that hazard rates may vary by age of the enterprise and moreover, that this relation is stronger among the younger enterprises than among the older ones.

Figure 2
Integrated Hazard Function of MSEs in the Dominican Republic 1992-1993



To check the validity of the hypothesis that enterprises closing after several years of operation are more likely to close for non-business reasons than for business reasons, an age specific hazard function was estimated by reason of closure. Figure 3 show the plots of age-specific hazard functions for business reasons and for non-business reasons[41]. The shape of these functions suggest, first the hazards of closing for business reasons are higher than for non-business reasons, particularly during the initial duration

Figure 3
Age Specific Hazard Rate of MSEs by Reason of Closure
1992-1993



[41] Business reasons include problems of markets and low demand, financial problems, low profitability, utilities problems, customers not repaying credit, problem with space or location, government regulation problems, problems of tools and machinery, problems relating to inputs, and labor problems. Non-business problems refers to personal problems, lack of time, better opportunities, and other problems.

years. Second, the decline of the hazard rate with duration is more evident in the case of business reasons than in the case of non-business reasons. Third, the hazard rate of non-business reasons is more erratic than that of business reasons.

To improve the understanding about the process of closure of enterprises, further analysis of this age-specific hazard estimator is recommended using different assumptions to manage censored observations and discriminating by gender of the entrepreneur, economic sector, size of enterprises, etc.

4.3 Hazard Modeling: Theory and Hypotheses

Most firm dynamic studies focus on testing the validity of Gibrat's law. This hypothesis states that the probability of a proportionate increase in firm size over an interval is the same for all firms regardless of their size at the beginning of the interval. As Variyam and Kraybill (1994) assert, the normative value of the Gibrat's law is that if it holds, size distribution of firms in an industry is trivial for the goal of job creation. However, several studies in developed and developing countries have found a negative relationship between firm size and growth as well as a positive relationship between firm size and survival.

This has led to the development of new theories of firm dynamics. These theories have emphasized the importance of managerial ability and learning by doing. Jovanovic

(1982) has led a very important development in dynamic theory of the firm. His model combines some elements of stochastic theory, along with concepts of managerial ability of entrepreneurs, and some elements of risk[42].

Jovanovic's noisy selection or learning model explains the mechanism by which efficient firms grow and survive while inefficient firms decline and fail. Firms differ in size not only because of fixity of capital but also because, during operation, some enterprises discover that they are more efficient than others, and accordingly increase their size relative to the inefficient ones.

The model assumes that factors are supplied at constant prices, products in an industry are homogeneous and a time path of the demand for the product is deterministic and known. Also, firms are small with respect to the market and therefore an individual firm does not affect output prices. Firms know the equilibrium price in the present as well as in the future, and based on it, they make production, entry, and exit decisions.

There is no uncertainty at the aggregate level. The uncertainty in the model comes from individual costs[43]. Enterprises have different efficiency levels which are

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[42] Some work of the stochastic theory has been developed by Gibrat (1931), Simon and Bonini (1958), Ijiri and Simon (1977), and Scherer (1980). Lucas (1978) introduces the endowment of managerial ability as a determinant of firm performance. Kihlstron and Laffont (1979) incorporated entrepreneurs attitude to risk as a basic element that explains formation, growth and closure of business. Liedholm and Mead (1990) summarizes the key aspects of these theories.

[43] Dixit (1989) explores entry and exit decisions when the output price follows a random walk by making an analogy between real and financial investments decisions. Adding shocks to output markets seems an interesting extension to the Jovanovic model.

randomly distributed. This results on different and randomly distributed costs. The distribution of true costs is known but no firm knows its true cost[44]. In every period the distribution is updated as the firm operates and new evidence about the true cost comes in. Assuming that in an economic sector all firms start with the same beliefs about their true costs, then as firms start operating they discover their real costs. Firms whose actual costs are lower than their initial beliefs will survive and grow. Inversely, firms in which actual costs are higher than their initial beliefs will contract and eventually withdraw from the industry.

Given an output price sequence and information acquired about the firm's cost, the exit decision of a profit-maximizing firm depends on a trade-off between the expected present value of the firm's factors, if they were to be committed to a different activity, and the present value of profits to be earned, if the enterprise stays in the present activity[45]. Jovanovic shows that for any price sequence each firm has a level of expected costs, given the information discovered about its costs, at which it is indifferent between staying or leaving the activity. Then, each firm has a production boundary below which the firm does not produce, but will exit instead. For any price sequence, this boundary defines an exit region and a continuation region.

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[44] The model assumes that individual cost functions are strictly convex in output and that output is a decreasing function in managerial inefficiency.

[45]Formal specification of the model is found in Jovanovic (1982) and Dunne et al (1989). McPherson (1992) also presents the main formal aspects of the Jovanovic Model.

As businesses grow older, they know more about their true efficiency and their prediction about their costs is less likely to differ significantly from the actual cost and fall beyond the exit boundary.

Two basic hypotheses are derived directly from the Jovanovic model. First, holding initial size constant, older firms are less likely to die because the selection process takes care of inefficient ones in previous periods. Older firms are less likely to make predictions about their costs that fall far from the actual value and beyond the exit boundary. Second, smaller firms, from the same vintage are more likely to die than larger ones because efficient firms have received positive information about their cost advantage, therefore, it is likely that they will survive longer. Inversely, smaller firms that have received negative information about their costs are more likely to close. Another reason to expect a positive relationship between initial size and survival is that if firms starting with a larger number of workers also have more assets then, in the presence of economies of size, they are more likely to survive.

Some evidence for developed and developing countries are consistent with the Jovanovic theory. Behrman and Deolalikar (1989) using an Indonesian medium and large scale manufacturing survey, reported that establishments with higher survival duration were typically older and larger. And for the U.S. manufacturing plants, Dunne, et al (1989) found that failure rates decline with size and age. However, McPherson (1992) showed evidence for Zimbabwe indicating that, the larger the size of the enterprise, the

smaller its chances of survival. This result was found using either the initial or the closure size. In Swaziland, McPherson found that the size of the enterprise had no influence on firm survival. In the same study, McPherson found that enterprises that have grown the fastest in the past are more likely to survive in the future.

In addition to these two hypotheses, other issues can be incorporated into the model. One aspect that has been criticized in this model is that the cost parameter can not be changed. It ignores research and investment activities that can increase firms' efficiency level and, therefore, reduce the likelihood of failure. Ericson and Pakes (1987) develop a model in which efficiency levels can change over time as a result of stochastic outcomes of firms' or industries' research and investment activities. This model suggests that indicators of efficiency and learning propensity could help predict firms growth and survival. For example, in the U.S., Bates (1990) found that educational level is an important determinant of business survival. Other variables that can have a positive effect on the managerial ability are previous business experience of the entrepreneur and access to information about technology changes, input prices, and other related issues about the market.

Besides size, business age and managerial ability, there are other aspects that may influence the cost of a particular business as well as the demand for its products. First, there is the issue of gender of the entrepreneur. Several studies have suggested that female owned enterprises could have a higher likelihood of failing and a lower likelihood

of growth than their male-owned counterparts. Downing (1990), suggests that female-owned enterprises have different constraints than their male counterparts resulting in a different growth strategy.

First, female entrepreneurs often show lower levels of reinvestment of profits than their male counterparts. Women invest in household expenditures a larger proportion of their income than men. As a result, women lack of sufficient capital to improve their business by buying more merchandise and inputs; investing in machinery, storage facilities, and transportation; and improving marketing and sales strategies.

Second, productive and reproductive responsibility of women in the society result on additional time and mobility constraints that affect the growth pattern of their business. The different roles traditionally held by men and women in society is another aspect that explains the differences in the dynamics of male and female-lead enterprises. Taking care of the children and the sick, and running the household are roles that frequently are associated with women. The investment in the reproduction of the labor force, place time and mobility constraints on women resulting on difficulties to adjust to new and lower cost technologies, purchase high quality inputs and look for new markets (Bonilla, 1990 and Downing, 1990).

Third, women entrepreneurs may have less access to financial credit and training programs designed to assist small businesses. Many of these programs and policies do

not take into account the different needs and time, mobility and cash flow constraints of enterprises run by women, thus becoming discriminatory against them. For example, the requirement of a collateral in a society where property is male dominated, and the rigidity of payment schedules and business hours can have the same effect as a higher interest rate for female-owned enterprises (Lycett and White, 1989).

As a result of the different constraints faced by female and male entrepreneurs, female entrepreneurs adopt a risk diversification strategy rather than a growth strategy. The result of the different enterprise strategies is that enterprises run by women show a slower growth and a higher likelihood to fail than enterprises run by men. In the Dominican Republic, estimates of disappearance and closure rates presented in Chapter III, indicate that, without controlling for other factors, disappearances and closure rates are higher for female-owned enterprises than for their male-owned counterpart.

Second, location of businesses not only may affect enterprise's costs but also the demand for their products or services. It is not clear, however, the direction of the effect. On one hand, an enterprise located in a busy street in the capital city may have physical space constraints and higher rent or opportunity costs than a rural counterpart. On the other hand, an urban enterprise may have superior access to some non-agricultural inputs, services, trained labor and credit than a rural business. In addition, urban enterprises could expand their market more easily, but at the same time may face more competitors. The mixed results found in the relationship between survival and

growth, and location can be a consequence of this multiple effects[46]. The identification of these effects requires a detailed information on the location characteristics of the different areas which is frequently difficult to obtain.

Third, liquidity constraints and access to credit are often associated with business failure and success. Holtz-Eakin, et. al. (1994) recognize that a problem to test the impact of liquidity constraints on firm behavior is that the measure of liquidity may be endogenous to a number of firm decisions. Using a U.S. data set of tax returns, they analyze the impact of liquidity from a source independent of firm behavior, and find that an increase of liquidity increases the probability of survival. McPherson (1992) finds that enterprises with access to formal credit sources do not have a significantly higher probability of survival than firms without access to credit, either in Zimbabwe or in Swaziland. However, for Swaziland he finds that enterprises that received money from informal sources (family and money lenders) have a higher hazard rate than those that never borrowed from any source. These mixed results on the credit variable may be explained by the fact that entrepreneurs demand credit for different reasons. Some of these reasons are associated with future expansion plans and expectation of growth and success. Other reasons have to do with past administrative or market problems that result in negative cash flows, and consequently the entrepreneur demands credit to

[46] In the Dominican Republic the disappearances and closure rates estimated by stratum, without controlling by other factors, show that the differences observed between enterprises located in Santo Domingo, secondary cities and rural areas are not significant. McPherson (1992) concluded that rural enterprises are more likely to fail than their urban counterpart both in Zimbabwe and Swaziland. Liedholm and Mead (1990) reported that the evidence in Sierra Leone shows that the difference in mortality rates between rural and Urban areas was rather weak.

survive. While the former reason may be associated with a positive relation to survival of the enterprise, the latter may be associated with a negative one. A careful analysis of the demand and supply of credit helps to increase the understanding of the relation between liquidity, credit and survival of the enterprise.

Fourth, differences by sectors regarding asset structure, production technology, and market conditions are some of the reasons to expect different survival and hazard rates across economic activities. In the Jovanovic theoretical framework, exit decisions depend on the enterprise's asset specificity. This suggests that elements affecting the cost of exit may have an effect on the exit rate. Sector specific aspects, such as the degree in which assets and labor are specialized to produce a good or service, may affect the failure rate and explain differences across economic sectors and production technologies. Other things being equal, it is expected that activities requiring more specialized assets and labor would have a lower exit boundary and therefore a lower failure rate. For Zimbabwean and Swazilandean microenterprises, McPherson (1992) found that, controlling for other factors, hazard rates do vary by sector. For the U.S manufacturing sector, Dunne et al. (1989) found that failure rates are significantly different across industries. In the Dominican Republic, the disappearance and closure rates estimates indicate significant differences between manufacturing, trade and services, without controlling for other factors.

Fifth, the level of economic activity may be incorporated into the analysis. Liedholm and Mead (1990) report that while firms disappearance rate might be affected by the aggregate economic activity, this relationship has not been examined in developing countries, and the evidence for the U.S. presented by Phillips and Kirchoff concludes that death rates are not sensitive to business cycles. In the Jovanovic framework, the level of economic activity may affect the market opportunities and prices of the enterprise's products and services, but at the same time may affect the opportunity cost of committing resources to one's business, instead of getting a job somewhere else. These two effects influence the likelihood of exit in opposite directions and may offset each other. For instance, in a year in which economy is performing badly, there are lower opportunities in other sectors, large enterprises, agriculture and government. For this reason, even when microenterprises are performing poorly, entrepreneurs do not have any alternative to generate income in other sectors of the economy and therefore, entrepreneurs may choose to stay in business. However, at the same time, prices and profits of enterprises may decrease and the value of staying in business also declines. The general result, of course, would vary by sector and by the source of the business cycle. This interesting hypothesis may be explored by analyzing different reasons of closure over time, under changing economic conditions.

This section discussed different aspects that are associated with business closure. The hypotheses derived directly from Jovanovic's theory are related to business age and initial size. The other variables are related to Jovanovic's framework but are not

incorporated formally in his theory. To incorporate some of these issues within the learning model may be a path to follow in future theoretical developments.

This research examines the following hypotheses:

i. Holding initial size constant, older firms are less likely to die than younger ones.

ii. Firms from the same vintage that started with one worker are more likely to die than firms that started with more than one worker.

iii. Female-owned enterprises are more likely to die than their male counterparts, controlling for other factors.

iv. Controlling for other factors, the likelihood of failing varies across sectors. Enterprises engaged in manufacturing activities are less likely to die that enterprises engaged in trading activities.

v. Controlling for other factors, location of the enterprise affects the likelihood of failing. Rural enterprises are more likely to close than their urban counterparts. Also, enterprises located in low business density areas are more likely to fail than the ones located in busy commercial areas.

vi. Controlling for other factors, firms receiving credit from a formal source present a higher likelihood of survival than firms that have not received it

4.4 Hazard Modeling

In order to test the hypotheses presented, a discrete hazard model framework will be applied to the Dominican data set. Hazard models can be developed for continuous or discrete duration time. McPherson (1992) chose a continuous-time proportional hazard model.

4.4.1 Continuous vs. Discrete Approach

The choice between a discrete model and a continuous model depends on the structure of the available data and on the definition of duration, which is the dependent variable in the hazard model. First, there are two data sets that could be used to explore the hypotheses of this work. One of those is retrospective based on a modified MSE baseline survey and a close enterprise survey. The other is mainly prospective based on panel surveys. As it was discussed in Chapter III, the retrospective data may have serious shortcomings that would result in biases in the parameters estimates. These biases may be particularly acute if dead businesses of some specific characteristics are systematically more likely to be remember than others. For example, it is possible that failed enterprises that last longer are more likely to be remembered than short economic

ventures, resulting in a biassed estimate of the age parameter. From this stand point, the panel data would give better estimates and therefore, the panel data set will be used for estimating the hazard model.

Second, the definition of duration requires the time of origin to be precisely defined for each enterprise. While it might be more theoretically meaningful to measure time from the beginning of the firm, some issues, such as heterogeneity and time varying hazard rates, may justify one in choosing different definitions of the starting point.

An important characteristic that is pursued when specifying a model is that controlling for all the explanatory variables, enterprises should be as homogeneous as possible in the time origin[47]. Selecting the time of origin to be the beginning of the firm, implies that the heterogeneity among firms from different age or birth cohorts is negligible with respect to the other variables included in the model. For instance, it does not seem plausible that the likelihood of surviving the first year of an enterprise born in 1960, could be explained by the same model used for an enterprise born in 1990, unless some macroeconomic, social, and sectorial variables are included in the model. Heterogeneity originated in differences between calendar year and duration years seems to be extremely important. Therefore it should not be ignored in specifying a hazard model.

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[47] This issue is pointed out by Kiefer (1988) p. 650 and Cox and Oakes (1984) p. 2-4.

For these reasons, in the model below the beginning of duration is assumed to be March 1992 when the first survey was conducted. Accordingly, duration time in the model is considered to be the time that an enterprise survives after the first interview in March 1992. The duration time is observed until October 1993. To be consistent with this definition, enterprises born after March 1992 are excluded from the study. Therefore, the objective population in this study are micro and small businesses that were operating in the Dominican Republic in March 1992. This definition of duration controls for the type of heterogeneity originating in the difference between duration year and the calendar year. In other words, the survival of the first year occurs in the same calendar year for all the enterprises, thus all the enterprises are facing the same macroeconomic conditions.

Although, time of duration as defined, beginning in March 1992, could still be considered a continuous variable, the exact time of closure is not easily recorded. This is mainly because, for an important proportion of closed enterprises, the testimony is collected from relatives and neighbors of the owners. Therefore, their recollection of the exact closure date is poor[48]. Since a panel data collection method was followed, it is known with certainty if the enterprises operating in March 1992 closed between March 1992 and March 1993, or between March 1993 and October 1993, or if they survived until October 1993.

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[48] Even if the exact date were available, a time scale smaller than a month can be even meaningless from the economic stand point.

Consequently, in this model the duration of enterprises is discrete. Enterprises operating on March 1992 could have three mutually exclusive outcomes: close between 1992 and March 1993, close between March 1993 and October 1993, and survive until October 1993.

An additional advantage of choosing a discrete hazard model over the continuous version is that the discrete model is simpler to understand and does not require assumptions about the functional form of the survival or hazard function.

On the other hand, the main shortcomings of the definition of duration in this analysis is that the observation time is only 18 months, and that the length of the discrete duration periods are different. These weaknesses limit the conclusions that can be reached with respect to changes of hazard rates in the two periods.

4.4.2 Discrete-Time Hazard Model

Following Allison 1992 and Foster, et al, 1986, lets assume T is a non-negative random variable that takes values ($t=1,2,3,..$). There are n independent enterprises ($i=1,2,..,n$) observed at the beginning of the period (March 1992) and they are observed until time t_i where the enterprise is either closed down or the observation is censored. x_{it} is a vector of k explanatory variables that can take different values at each discrete time. The discrete-time hazard rate is defined as:

$$P_{it} = \Pr[T_i = t \mid T_i \geq t, x_{it}] \tag{4.6}$$

The logistic form of the relationship between the hazard rate, the explanatory variables over time is given by:

$$\ln[P_{it} \mid (1 - P_{it})] = \alpha_t + \beta' x_{it} \tag{4.7}$$

where β is a vector of k parameters and represents the effect of the explanatory variables on the hazard rate. A positive element of β means that an increase of the corresponding x would increase the likelihood of closing, every thing else assumed equal. The log-likelihood function may be written as:

$$\ln L = \sum_{i=1}^{n} \sum_{j=1}^{t_i} y_{it} \ln\{P_{ij} \mid (1 - P_{ij})\} + \sum_{i=1}^{n} \sum_{j=1}^{t_i} \ln(1 - P_{ij}) \tag{4.8}$$

where y_{it} is a dummy variable set to 1 if the enterprise i experiences an event at t, and zero otherwise. Then, as Allison (1982) concludes, this type of discrete-time hazard model can be estimated by a method commonly used for analyzing dichotomous dependent variables.

There is also a similar approach followed by Cox (1972) and Cox and Oakes (1984) that use a discrete logistic model. They replace the traditional proportional hazard[49] model with the discrete logistic model:

$$\frac{h(t,z)}{1-h(t,z)} = \frac{h_o(t)}{1-h_o(t)} + z\beta' \qquad (4.9)$$

where $h_o(t)$ and $h(t,z)$ are discrete hazard functions. Using the method of partial-likelihood developed by Cox (1972), this model is estimated. Cox's method allows for the estimation of the coefficients without further assumptions about the shape of the hazard function. Both methods, Allison's maximum likelihood logit model, and Cox's partial likelihood model, were estimated using the Dominican data set.

4.5 Data

4.5.1 Introduction: Advantages and Disadvantages

The panel data were generated from one baseline country-wide survey conducted in March 1992, and two follow-up surveys conducted in March 1993 and October 1993[50]. Details about the method of those surveys are described on Chapter II, section 2.3.2 and Chapter III, section 3.2.1. As mentioned before, only enterprises existing in March 1992 were included in the sample. Enterprises born after March 1992 were

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[49] The simple form of the proportional hazard model is expressed as: $h(t,z)=h_o(t)\phi(z,\beta)$ where $h_o(t)$ is an arbitrary baseline hazard function, z is the vector of explanatory variables, β is the vector of parameters and ϕ is a function that is assumed to be exponential, linear, logistic, etc. This is the model used by McPherson (1992).

[50] An additional follow-up survey was conducted again in March 1994 but cleaned data set were not available to be included in this analysis.

excluded from the sample. This yields about 636 enterprises operating in March 1992, 500 of which have complete information in all the explanatory variables.

These data sets are unique and solve one of the main shortcomings encountered by McPherson and others whose works have relied on retrospective data, namely a systematic undereporting of failed enterprises. Undereporting bias is especially problematic if there is a correlation between the undereporting scheme and some of the variables included in the model. In the data set undereporting is limited to some enterprises that were born and died within one year.

Despite the improvement upon data sets used in similar studies, there are several weaknesses that should be recognized. First, one of the main shortcoming of this data set is the presence of a significant number of missing values in some of the variables that enter into the model. About 25% of the observations had to be excluded from the analysis for this reason. Most of these missing values were in the baseline survey of 1992. The magnitude of this survey and the limited time available for the field work did not allow for repeated visits to reinterview the entrepreneur, and therefore many questions remained unanswered. The lack of cooperation of some respondents, and limited experience of the enumerators on this particular type of survey also may have played a role on the high proportion of missing values in the baseline survey. Another source of missing values was that, in some cases, the former owner of a disappeared enterprise moved out of the enumeration area and therefore enumerators had to rely on

members of the owner's family or neighbors. It is assumed that the likelihood of encountering an enterprise with incomplete information is independent of the failure process. The percentage of missing values was dramatically reduced in the follow-up surveys.

Second, besides the missing value issue, the short observation period and the different lengths of the two sub-periods also limits the data and have to be taken into account when analyzing the results and drawing conclusions. The period of time that the enterprises are observed is short relatively to the average survival duration of the enterprises. Thus, two- thirds of the observations are censored in the sense that their life cycle is not complete. This problem will diminish if the sample areas are kept under observation in following years. But for the moment, the conclusion drawn from this data base refers to survival in the following one and half years. Because the first follow-up survey was scheduled one year later and the second six months later, the two sub-periods have different length and therefore some seasonal effects may alter the results. However, preliminary analysis of the third follow-up survey does not indicate serious seasonal effects.

Third, there is the issue of sample selection that affects the symmetry of the data. The set of enterprises belonging to older cohorts is a selection of the most efficient ones while the set of enterprises of younger cohorts is composed by both efficient and

inefficient enterprises. This means that the characteristics of the enterprises not included in the model may vary by cohort generating some bias in the parameter estimates.

Fourth, there is a difference on the initial conditions that enterprises faced when entering the sample because they have experienced different macroeconomic and sectoral conditions during their life cycle. Appendix D Table 1 shows the distribution of the total enterprises operating in March 1992 by birth cohort. About 57% of the enterprises operating in 1992 were born in the 1980's or before when the economic conditions where better than in 1990 and 1991. Even though estimating the model by cohort may correct some of the differences on the initial conditions, It is expected some heterogeneity in the characteristics of the enterprises that are not picked up by the variables included in the model resulting on some bias in the parameters estimates.

Finally, to be able to include a variable in the model, the value of that variable must be available for all enterprises existing in March 1992. However, the number of variables to choose from was limited by the scope of the baseline survey. Particularly, the collection of information of time varying variables such as years of experience, education and training, age of the entrepreneur, characteristics of the enterprise's locations, business practices and other socioeconomic conditions of the owners was restricted. Some of this information was included in the follow-up surveys but it was only collected for the surviving enterprises and therefore can not be used in this model.

4.5.2 Variables Included in the Model

In order to test the hypotheses described above, the following variables are included in the model. To capture the impact of initial size in hazard, a set of 2 dummy variables were included to represent 3 different sizes at entry: one worker, two workers and three or more workers. The one-worker category is the base.

To account for differences in hazard across firms of different vintages, a set of dummy variables were included to represent 3 birth cohorts. Firms born before 1986, firms born between 1986 and 1990, and firms born between 1991 and March 1992. This last cohort is the base category. Also in some of the alternative models the variable, age of the enterprise in 1992, measured in years, was also included in the model.

Gender issues were incorporated by two dummy variables that account for enterprises owned by women, and mixed gender jointly owned enterprises. The base category is male-owned enterprises.

Variation across sectors was modeled with a set of 2 dummy variables. One for manufacturing and other for services. The excluded category was trade[51].

[51] Manufacturing includes all the activities considered by the 1-digit international Standard Industrial Classification (ISIC) while services include, in addition to the service sector, construction, real state and transport sectors.

Locational aspects were included in the model using a set of two dummy variables to account for the difference between Santo Domingo, secondary cities and rural areas; and a variable that accounts for the differences of business density in the different areas. Business density is defined as the number of business encountered in an area divided by the total number of households and business visited in the area.

A set of two dummy variables was included in the model for the enterprises that have received formal and informal credit before March 1992. Formal credit sources consist of banks and other financial institutions, NGOs, and input suppliers while informal ones include family and friends, and money lenders.

Finally, as an indicator of previous experience of the entrepreneur a dummy variable was included to account for those owners that declared being involved in a business that failed before 1992.

4.6 Results

Table 4.1 shows the coefficient estimates for both the discrete logit model, proposed by Allison (1982), and the partial likelihood discrete logit model, proposed by Cox (1972). Each coefficient is the partial derivative of the logit of the hazard function with respect to the corresponding independent variable. A positive coefficient indicates a direct relationship between the hazard rate and the associated variable, while a negative

one means an inverse relationship between the hazard rate and the variable. The relative risk ratios, computed by applying the exponential function to the parameter estimate, are useful to interpret the effect of each regressor on the hazard. For all the dummy variables, the risk ratio is the ratio of the hazard functions between the group for which the variable is equal to one and the group for which the variable is zero. For example, the risk ratio for the variable that accounts for enterprises with two initial workers means that the hazard for the enterprises that started with two workers is about 45% of that of enterprises that started with only one worker.

It is important to notice that the risk ratio is very similar regardless of the estimation method used. That means that for short panel data a logit model such as suggested by Allison (1982) and Foster, et al. (1986) provides a useful tool to study the hazards of micro and small businesses. This type of model can be evaluated using one of the several available statistical package programs that estimate binomial logit models.

The evidence presented in Table 4.1 provides some insight into the hypothesis described above. The coefficient and the risk ratio indicate that the hazard rate of enterprises that started with more that one worker is significantly lower than that of one-person enterprises. However, there is not a notable difference between the risk ratio of enterprises that started with two workers relative to enterprises that started with three or more workers. For both groups the hazard rate is about 44% of that of the one-worker firms. This result is consistent with Jovanovic's learning model and with some evidence

Table 4.1

Discrete Hazard Model: Results

Independent Variable	Allison's LOGIT		Cox Partial Likelihood	
	Coefficient (standard Error)	Risk Ratio	Coefficient (standard Error)	Risk Ratio
Intercept	-0.5768 (0.3497)	0.562	.	.
Dummy: Two Initial Workers	-0.8065 ** (0.2930)	0.446	-0.7747 ** (0.2973)	0.461
Dummy: Three or More Initial Workers	-0.8401 ** (0.3182)	0.432	-0.8135 ** (0.3206)	0.443
Dummy: Birth Cohort Before 1985	-1.1312 ** (0.2614)	0.323	-1.0985 ** (0.2646)	0.333
Dummy: Birth Cohort 1986-90	-0.8285 ** (0.2382)	0.437	0.7981 ** (0.2418)	0.450
Dummy: Female Owned Enterprises	0.9744 ** (0.2278)	2.650	0.9192 ** (0.2308)	2.507
Dummy: Mixed Gender Ownership	1.2143 ** (0.4082)	3.368	1.1793 ** (0.4140)	3.238
Dummy: Manufacturing	-0.5921 * (0.3033)	0.553	-0.5776 * (0.3050)	0.561
Dummy: Services	-0.1748 (0.3007)	0.840	-0.1719 (0.3053)	0.842
Dummy: Located in Santo Domingo	-0.3499 (0.2694)	0.750	-0.3609 (0.2737)	0.697
Dummy: Located in Rural Areas	-0.0597 (0.2392)	0.942	-0.0815 (0.2423)	0.922
Business Density in the Area	-0.9714 (1.1513)	0.379	-1.0681 (1.1666)	0.344
Dummy: Received Formal Credit	-0.8340 * (0.4317)	0.434	-0.7999 * (0.4332)	0.449
Dummy: Received Informal Credit	-0.0497 (0.3266)	0.951	-0.0728 (0.3315)	0.930
Dummy: Household had a Business Failure Before 1992	0.6126 * (0.3448)	1.845	0.54064 (0.3520)	1.717
Number of Closed Businesses	145		145	
Number of Observations	733		429	
-2 Log L	620.8		590.2	

Source: Microenterprise surveys March 1992, March 1993, October 1993.

* Significant at the 90% level

** Significant at the 95% level

for developed and developing countries. However, McPherson (1992) found in Swaziland that firm's survival was not influenced by the size of an enterprise, and in Zimbabwe that this relationship was positive one.

Also, the results indicate that firms of older birth cohorts have lower hazard rates than those of younger cohorts. The hazard rate of firms born before 1985 is 32% of that of firms born in the 1990-92 period, while the hazard rate of firms born during the 1986-90 period is about 44% of the hazard for the 1990-92 cohort, holding everything else constant. Also, this result is consistent with Jovanovic's model and with the empirical work in developing and developed countries.

The model specified above assume that the influence of the explanatory variables, and in particular the influence of age, over hazard remain unchanged over time. That is, the model imposes a restriction over the parameter estimates. To test this assumption the sample was divided in two birth cohorts, --before 1989, and 1990-92 -- and a Cox discrete logit model was estimated for each cohort. At the same time, the variable, age of the enterprise in 1992, was introduced as an independent variable. The results, in Table 4.2, suggest that the older the cohort the closer the risk ratio to one and the less significant the parameter estimate on age. For instance, for the before-1989 birth cohort an enterprise presents a hazard rate smaller, but not significantly different, than that of an enterprise a year younger of the same cohort. In contrast, for the 1990-92 birth

cohort, the hazard rate of an older enterprise is only 58% of the hazard rate presented by an enterprise a year younger of the same cohort.

Female-owned and mixed-gender jointly owned enterprises present a significant higher hazard than enterprises owned by males. The risk ratio indicates that the hazard of female-owned enterprises is more than two times the hazard of male-owned enterprises. As described below in Section 4.6.2, simple competing risks models were also estimated to explore possible differences in hazard rates for different closure reasons --business and non-business reasons. The results suggest that both female and mixed-gender enterprises are more likely to close for personal and other non-business reasons than for business related reasons. This may be interpreted as a preliminary support of the hypotheses presented above that female entrepreneurs face different constraints than their male counterparts. As a result, female entrepreneurs adopt different business strategies than their male counterparts which in turn results in a higher likelihood to fail of female-owned enterprises. However, McPherson (1992) found for Swaziland that, controlling for other factors (size, age, economic sector, etc) gender of the owner has no influence on firm survival. In the same study McPherson found that in Zimbabwe enterprises run by women are more likely to fail.

The evidence related to the main economic sectors show that enterprises engaged in manufacturing are less likely to close than those engaged in trade. The former enterprises show a hazard rate 55% of that of trade enterprises. Services present a

negative coefficient, but not significantly different from zero. The level of aggregation imposed by the sample size, help explain the seemingly weak evidence to support the hypothesis that there are important differences in hazard rates by sector.

On the other hand, the data do not support the hypothesis that location affects hazard rates. The sign of the coefficient of the variables representing enterprises located in Santo Domingo and in rural areas are negative, showing a lower hazard rate with respect to enterprises located in secondary towns. Despite this evidence, the hypothesis that the coefficients are zero cannot be rejected. Similarly, the sign on the parameter estimate of the variable representing the business density in the areas where the enterprises are located suggests that the higher the business density, the smaller the hazard rate. But, again, the coefficient is not significantly different from zero. Researchers might consider collecting other location specific, time varying data, such as infrastructure, access to utilities and government programs, etc.

The data support the hypothesis that enterprises receiving credit from a formal source are more likely to survive than the ones that have not received credit from any source. The hazard rate of enterprises receiving formal credit is 43% of that of enterprises receiving no credit from any source. This result may be a consequence of several effects. On one hand, credit has a positive influence on liquidity of the firm allowing it to finance projects that reduce production costs, and hence, increasing its chances of survival. On the other, there are two selection processes taking place. One

is the selection process that financial institutions make to choose their beneficiaries. This selection is designed to ensure that the enterprise is financially sound, and that the project is successful. Thus, the enterprises more likely to succeed are also the ones more likely to receive credit. Another factor is the self-selection process by which only entrepreneurs with superior financial and managerial skills, or with previous positive experiences are the ones that look for credit. Preliminary evidence for the Dominican Republic indicated that in 1993, about 67% of the entrepreneurs considered that their enterprises did not need additional financial resources (Cabal, 1993)[52]. Moreover, a relationship was established between the use of other financial services, such us bank accounts, and access to credit. In fact, the proportion of enterprises receiving credit is higher among entrepreneurs that keep a bank account than among entrepreneurs that do not. That means that entrepreneurs that have more experience managing financial resources are more likely to have access to credit. Future research should look more closely at other supply and demand credit variables in order to get more conclusive results.

The evidence suggest that firms receiving credit from informal sources do not have a significantly lower hazard than the ones that have not received any credit from any source.

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[52] Among the responses given by the entrepreneurs to why they do not demand credit are: I do not like to work with other's people money (24%), I do not need it (22%), credit is too expensive (11%), I want to avoid legal problems (11%), the situation of the business (10%), I have credit already (9.7%), I do not know how to get it or I will be turn down (6%).

The coefficient for the variable that accounts for previous failed experiences is positive, suggesting a positive relationship between owners with a previous business failure and the hazard rate of the current business. The hypothesis that the coefficient is zero can be rejected at 90% confidence level. This result means that the negative experience of a business that failed do not contributes to increase the likelihood of success but by the contrary it increases the chances of failure. However, this variable may be picking up not only the experience gain of past ventures but also other characteristics of the entrepreneur, such as lack of better alternatives to generate income. Future research should focus on measuring experience in a more precise manner, and therefore, It should collect more data on quantitative and qualitative indicators of entrepreneurs' experiences in current and previous businesses as well as in general education and specific training.

4.6.1 Results by Cohort and Initial Size

To test the restriction imposed on the coefficient to be constant over time and across initial size, the sample was divided into two birth cohorts and two initial enterprise sizes, the variable age of the enterprise in 1992 was introduced as an explanatory variable, and a discrete logistic model was estimated for each cohort and initial enterprise size.

The two birth cohorts considered are before 1989 and 1989-1992. The results of the discrete logit hazard model by cohort are presented in Table 4.2[53]. In general, the results of the analysis by cohort indicate that the direction of the effects observed for the complete sample remain unchanged across cohorts, but the effects seem to be stronger and more significant for younger firms than for older ones.

At it was mentioned before, the parameter estimate on age indicates an inverse relationship between hazard rate and age in both cohorts. Moreover, this relationship is stronger and more significant among younger firms than among older ones. In fact, the risk ratio indicates that the hazard rate of an enterprise belonging to the 1990-1992 cohort is only 58% of the hazard rate of an enterprise a year younger of the same cohort. In contrast, for the before 1989 cohort, the difference in hazard rates among firms of different ages is not significant.

Initial enterprise size seems to be a more important factor among younger firms than among the older ones. In both cohorts the larger the initial size the smaller the hazard rate, but the difference is only significant among younger firms.

The difference between hazard rates of female-owned enterprises and male-owned enterprises wider among firms of the older birth cohort than among firms of the recent

[53] The restricted version of the model -- allowing for changes across cohorts -- showed a significant improvement over the original restricted model. A Chi-square Chow test was applied to test the difference between the likelihood ratio score of the unrestricted model and likelihood ratio score of the restricted model. The value of the Chi-square was 49.589 with 27 degrees of freedom while the Chi-square critical value is 40.113 at 5% significance.

Table 4.2

Discrete Hazard Model: Results by Cohort

Independent Variable	1989 and Before		1990-1992	
	Coefficient (standard Error)	Risk Ratio	Coefficient (standard Error)	Risk Ratio
Enterprise Age in 1992	-0.0172 (0.0217)	0.983	-0.5413** (0.2037)	0.582
Dummy: Two Initial Workers	-0.4965 (0.4414)	0.609	-0.9034** (0.4290)	0.405
Dummy: Three or More Initial Workers	-0.8817 (0.5545)	0.414	-0.8641** (0.4340)	0.421
Dummy: Female Owned Enterprises	1.0904** (0.3664)	2.975	0.7778** (0.3258)	2.177
Dummy: Mixed Gender Ownership	0.7310 (0.6580)	2.077	1.8595** (0.6140)	6.721
Dummy: Manufacturing	-0.2827 (0.4193)	0.754	-0.5483 (0.4927)	0.578
Dummy: Services	-0.1811 (0.4551)	0.834	-0.2116 (0.4693)	0.809
Dummy: Located in Santo Domingo	-0.4539 (0.4528)	0.635	-0.5494 (0.3838)	0.577
Dummy: Located in Rural Areas	0.3872 (0.3789)	1.473	-0.4768 (0.3372)	0.621
Business Density in the Area	0.8309 (1.8306)	2.295	-1.6196 (1.6462)	0.198
Dummy: Received Formal Credit	-0.9949 (0.6467)	0.370	-0.7539 (0.6827)	0.471
Dummy: Received Informal Credit	0.1133 (0.4987)	1.120	-0.0880 (0.4796)	0.916
Dummy: Household had a Business Failure Before 1992	1.0854** (0.4779)	2.961	0.3775 (0.5372)	1.459
Number of Closed Business	50		89	
Number of Observations	230		187	
-2 Log L	251.9		288.7	

Source: Microenterprise surveys March 1992, March 1993, October 1993.
* Significant at the 90% level
** Significant at the 95% level

birth cohort. In contrast, the difference in hazard rates between mixed gender jointly owned enterprises is larger among younger enterprises than among the older ones.

The parameters estimates that capture sectoral differences are not significantly different from zero. However, manufacturing shows a lower hazard rate than trade in both cohorts, but the difference seems to be larger in younger enterprises. Also, enterprises engaged in services do not show any different risk ratios across cohorts.

None of the parameters estimates on firm location was significantly different from zero. However, some preliminary observations may be drawn. The advantage of a lower hazard for enterprises located in Santo Domingo with respect to those located in secondary towns is more apparent in younger firms than in older ones. For the older cohort, enterprises located in rural areas show a higher hazard rate than the ones located in secondary towns but a lower hazard rate for the younger cohort. Higher business density of the area where the enterprise is located, is positively related to the hazard rate of younger firms while it is negatively related to the hazard rate of older ones.

Entrepreneurs having had a business failure is associated with a higher hazard rate than those that have not had a failed business. This result is true for both cohorts, but for older firms it is stronger and more significant. Finally, the effect of formal credit is very similar to the one found in the complete sample in both cohorts, but is not significant.

The results of the discrete hazard model by cohort indicate that there may be significant differences in the parameters that explain hazard rates over time, and that the variables included in the model seem to explain better the difference of hazard rates among the recent birth cohorts than among older ones. Sample attrition present in the retrospective information on age and cohort is one factor that contributes to explaining this result. Inefficient old enterprises have already failed by the time the baseline information is collected, while older surviving firms have learned to deal with most of the advantages and problems represented by the variables included in the model.

One exception to this conclusion is the results found with respect to female-owned enterprises. The higher hazard rates of female-owned enterprises respect to male-owned enterprises is more evident in older firms. This result may be due to the different constraints that affect men and women entrepreneurs. Female entrepreneurs with their combined productive and reproductive responsibilities, may find it difficult to keep a business operating even after the first few years due to personal constraints, while male entrepreneurs do not have to face those constraints in the same degree. This hypothesis is consistent with two results of the competing risk model presented below which indicate first, that female-owned enterprises are more likely to close for non-business reasons -- mainly for personal reasons than their male counterpart, and second that older business are more likely to close for non-business reasons than for business reasons.

In relation to initial size, the sample was divided in two groups according to the initial size of the enterprise. One group was made up of one person businesses while the other included all other enterprises. The unrestricted version of the model -- allowing for changes in the coefficients across size -- did not show any significant improvement over the original (restricted model)[54]. However, one result worth mentioning is that the positive effect of formal credit in reducing the hazard of enterprises is more evident in one person enterprises than in larger enterprises. In fact, the smaller hazard rate of enterprises receiving credit is more pronounced among one person firms than among larger ones.

4.6.2 Competing Risks

In Chapter 2, it was mentioned that enterprises close for different reasons. Most of the reasons have to do with the current business. First, there are reasons related to the general performance of the business, such as, market problems, low profitability, and bankruptcy. Second, there are reasons specific to some area of the business operation, such as, unavailability of inputs, problems with utilities or machinery, conflict with workers, liquidity constrains, etc. But there are reasons that are not closely related to the current business which can equally explain the closure of a business. These non-business related reasons may be personal in nature (e.g., sickness, old age of the

[54] A Chi-square Chow test was applied to test the difference between the likelihood ratio score of the unrestricted model and likelihood ratio score of the restricted model. The value of the Chi-square was 25.828 with 25 degrees of freedom while the Chi-square critical value is 37.653 at 5% significance.

entrepreneur, time constraints) while others have to do with new business or career opportunities.

It is expected that factors explaining closures have different effects on the specific probability of closure for an individual reason. To analyze these differences a multinomial logit model, following Allison (1982), was estimated. This maximum-likelihood method, jointly estimates a logit model simultaneously for all kinds of closures. In this model all enterprises across time are treated as separate and independent observations.

The failure types in the data set were aggregated in two categories. Closures due to business reasons, and closures due to personal and other non-business reasons[55]. Table 4.3 shows the risk ratio for each type of failure and the relative risk ratio, computed by applying the exponential function to the parameter estimated by the multinomial logit model[56]. The risk ratio has the same interpretation as before in this section. The relative risk ratio is the ratio between the hazard of failing for business reasons and the hazard of failing for non-business reasons, with respect to each explanatory variable. For all dummy variables, a relative risk ratio greater than one

[55] Business reasons include problems of markets and low demand, financial problems, low profitability, utilities problems, customers not repaying credit, problem with space or location, government regulation problems, problems of tools and machinery, problems relating to inputs, and labor problems. Non-business problems refers to personal problems, lack of time, better opportunities, and other problems.

[56] Each coefficient is the partial derivative of the logarithm of the ratio between probability of closing for business reasons and the probability of closure for non-business reasons with respect to the corresponding independent variable. Appendix D Table 2 shows the coefficient estimates and their standard errors for the competing risk model.

Table 4.3

Competing Risks Multinomial Logit Model

Independent Variable	Business Reasons Risk Ratio [a]	Non-Business Reasons Risk Ratio [a]	Business/Non-business Relative Risk Ratio [b]
Intercept	0.406 **	0.100 **	4.047 *
Dummy: Two Initial Workers	0.489 *	0.330 **	1.479
Dummy: Three or More Initial Workers	0.411 **	0.332 *	1.235
Dummy: Birth Cohort Before 1985	0.280 **	0.575	0.486
Dummy: Birth Cohort 1986-90	0.381 **	0.688	0.553
Dummy: Female Owned Enterprises	2.717 **	3.543 **	0.767
Dummy: Mixed Gender Ownership	3.299 **	4.890 **	0.675
Dummy: Manufacturing	0.300 **	0.946	0.317 *
Dummy: Services	0.508	0.478	1.064
Dummy: Located in Santo Domingo	0.931	0.777	1.197
Dummy: Located in Rural Areas	0.680	1.886	0.360 **
Business Density in the Area	0.156	0.044	3.558
Dummy: Received Formal Credit	0.129 **	0.599	0.215
Dummy: Received Informal Credit	1.185	1.376	0.861
Dummy: Household had a Business Failure Before 1992	1.978	1.987	0.995
Number of Closed Business	84	53	
Number of Observations		705	
Likelihood Ratio		676	

Source: Microenterprise surveys March 1992, March 1993, October 1993. Appendix D Table 3 present the coefficients and their standard errors.

(a) Computed as $\text{Exp}(\beta_k)$ where β_k is the estimate coefficient of the logit of hazard of failing for an individual reason.

(b) Computed as $\text{Exp}(\beta_k)$ where β_k is the estimate coefficient on the logit of Pr(failing for business reasons)/Pr(failing for non-business reasons).

* Significant at the 90% level

** Significant at the 95% level

indicates that the ratio between the probabilities of closure for business reasons and the probability of closing for non-business reasons is higher among enterprises for which the variable is set to one than for those in the base category.

In general, the effect of the independent variables over the individual hazard rate for each type of closure has the same direction as the effects of those same variables on all closures pooled together. The only significant exception to this general result refers to enterprises located in rural areas. Considering all reasons pooled together, rural based enterprises are less likely to fail than enterprises based in secondary towns. This result holds for business reasons but it is reversed for non-business reasons; rural based enterprises are more likely to close due to non-business reasons than enterprises located in secondary towns. For rural based enterprises, the relative of risk ratio of enterprises closing for business reasons with respect to non-business reason is about 36% of that of enterprises based in secondary towns. Respect to location it is important to notice that enterprises in Santo Domingo are more likely to close for business reasons than their rural counterpart. Also, Enterprises in urban areas -- including Santo Domingo and secondary towns -- have a lower hazard rate for personal reasons than their rural counterpart.

Older businesses seem more likely to close for non-business reasons than for business reasons. For both, enterprises born before 1985 and between 1986 and 1990, the ratio of hazards of non-business closures to business reasons is higher relative to

firms born in the 1990-1992 period. Moreover, this difference is larger for the before 1985 cohort than for the 1986-1990 birth cohort.

Enterprises beginning with two and three workers present a lower hazard rates of closing for business reasons than for other reasons with respect to the one-person enterprise. However, the difference of the risk ratios between the two reason is not significant, either for two or for three worker enterprises.

Female-owned and mixed gender enterprises are more likely to die for non-business reasons than for business reasons with respect to its male-owned counterpart. This difference is stronger for the mixed gender enterprises. As it was mentioned before, this result may be due to the different constraints that affect men and women entrepreneurs. Women's dual productive and reproductive roles may increase the likelihood of closing for non-business reasons -- mainly due to personal reasons and lack of time.

Enterprises in manufacturing have a lower hazard rate of closing for business reasons than for non-business reasons with respect to enterprises engaged in trade activities. In manufacturing, the relative of risk ratio of enterprises closing for business reasons with respect to non-business reason is about 32% of that of trade.

Finally, particularly strong and significant is the evidence suggesting that enterprises receiving formal credit present a hazard rate of closing for business reasons of only 12% of those enterprises not receiving credit of any source. Also, enterprises that have received credit from a formal source have a lower hazard of closing for business reasons than for non-business reasons with respect to enterprises receiving no credit from any source.

4.7 Conclusions

Despite that as many as 25% of the enterprises existing at the beginning of one year may close by the end of the year very little is known about the patterns of closure over time and about the characteristics that may be associated with the success and failure of enterprises. This chapter addresses these two issues for the Dominican Republic. First, presents a non parametric analysis of the age-specific hazard rates (life tables), and second, examines how some characteristics of the micro and small businesses and their owners contribute to the failure or survival of those businesses during the March 1992-October 1993 period in the Dominican Republic.

The results of life tables analysis, suggest that hazard rates may vary by age of the enterprise and that this relation is stronger among the younger enterprises than among the older ones. Moreover, the hazard rate seems to decrease remarkably until the end of the fourth duration year and thereafter, continues decreasing at a slower pace.

Although, after the tenth year the hazard rate seems to increase there is not enough evidence to prove that this increase is statistically significant. The analysis of age-specific hazard function by reason of closure indicates first, that the hazard rate of closing for business reasons are higher than for non-business reasons, particularly during the initial duration years, second, that the decrease of the hazard rate with age of the enterprise is more evident in the case of business reasons, and third, that the shape of the age-specific hazard rate of non-business is more erratic than that of business reasons.

The estimation of the parameters of the model produces results consistent with the Jovanovic learning model. First, the hazard rate of enterprises starting with more than one worker is significantly lower than that for one-person enterprises. Second, firms of older birth cohorts have lower hazard rates than those of more recent cohorts. Also, the results of the discrete hazard model by cohort suggest that the inverse relation between hazard rate and age of the enterprise is stronger and more significant among younger enterprises than among older ones.

Third, female-owned and mixed-gender jointly owned enterprises present a significant higher hazard rates than enterprises owned by males. Also, the results suggest that both female and mixed-gender enterprises are more likely to close for personal and other non-business reasons than for business related reasons. This may be interpreted as a preliminary support of the hypotheses presented above that female entrepreneurs face different constraints than their male counterparts. As a result, female

entrepreneurs adopt different business strategies than their male counterparts which in turn results in a higher likelihood to fail of female-owned enterprises. McPherson (1992) found for Swaziland that, controlling for other factors, gender of the owner has no influence on firm survival while in Zimbabwe he found that enterprises run by women are more likely to fail.

Fourth, the evidence related to the main economic sectors show that enterprises engaged in manufacturing are less likely to close than those engaged in trade. In addition, the results of the competing risk model indicate that manufacturing enterprises have a lower hazard rate of closing for business reasons than for non-business reasons with respect to trading enterprises.

Fifth, the data do not support the hypothesis that location and business density affects hazard rates. One explanation for these results is that locational data available for the Dominican Republic do not pick up the relevant characteristic that affect the performance of the businesses. Researchers might consider collecting other location specific, time varying data, such as infrastructure, access to utilities and government programs, etc.

Sixth, the data support the hypothesis that enterprises receiving credit from a formal source are more likely to survive than the ones that have not received credit from any source. Considering closures for business reasons alone, the evidence indicating that

enterprises receiving credit have a lower hazard rate is particularly strong and significant. In contrast, informal credit seems to have no influence on hazard rates. These results may be the combined effect of several factors. On one hand, the positive effect that credit has on firm's performance. On the other, the screening process that financial institutions make to choose their clients may select the enterprises that are more likely to succeed. Also, enterprises receiving credit implies that the entrepreneur has a positive attitude toward credit which may be related with entrepreneur's financial and managerial skills and experience, and thus, with the likelihood to succeed. To isolate the effect of these elements on survival, researchers should look at more closely other supply and demand variables.

Seventh, entrepreneurs having a previous experience with failed business present a higher hazard rate than those that have not had that experience. However, this variable may be picking up not only the experience gain of past ventures but also other characteristics of the entrepreneur, such as lack of better alternatives to generate income. Future research should focus on measuring experience in the current and previous businesses in a more precise manner, and therefore, more information should be collected on data referring to quantitative and qualitative indicators of entrepreneurs' experiences in current and previous businesses as well as in general education and specific training.

Eighth, discriminating by birth cohort, the results indicate that the direction of the effects observed for the complete sample remain unchanged across cohorts, but the

effects across cohorts seem to be stronger and more significant for younger firms than for older ones.

Finally, discriminating by type of closure, the effect of the independent variables over the individual hazard rate for different types of closure has the same direction as the effects of those same variables on all closures pooled together. Also, the model seems to explain better the closures for business reasons than closures for other reasons.

From the methodological stand point, the results from the discrete hazard model indicate that the estimate of the coefficients produced by the logit model suggested by Allison (1982) is very similar to the ones yield by the Cox partial likelihood model. Therefore, a logit model provides a useful and simple tool to study the hazards of micro and small businesses, which can be evaluated using one of several available statistical package programs that estimate binomial logit models.

CHAPTER V

EMPLOYMENT GROWTH OF MICRO AND SMALL ENTERPRISES IN THE DOMINICAN REPUBLIC 1992-1993

5.1 Introduction

In the previous chapters the importance of the micro and small enterprise sector in the Dominican economy was considered in terms of number of businesses and its share in both labor force and GDP. In addition, relatively high average employment growth among surviving enterprises was found, as measured from their start until March of 1992. Also, it was found that a large proportion of enterprises are born every year, and at the same time an equally important proportion of enterprises close during the same period. The resulting net increase in the number of enterprises approximately equals zero.

These results unveil crucial issues regarding the role of micro and small businesses as an employment generating sector. This chapter deals with several important questions that arise from these findings. First, how do the birth and closure processes, as well as the growth of surviving enterprises affect the aggregate growth of

employment of the MSE sector? Second, how do these patterns vary with the state of the macroeconomy? Third, what can be said about the stability of the jobs created by the MSE sector over time? Fourth, how do some characteristics of surviving micro and small businesses and their owners contribute to an explanation of the chances for growth of those businesses? Fifth, can some of those characteristics explain the way in which enterprises use paid and non-paid workers in the growth process?

The next section deals with the first three questions. It presents an estimate of the aggregate employment growth rate of MSEs by component for the March 1992-1994 period in the Dominican Republic, and discusses the findings. The next three sections (sections 5.3 to 5.5) deal with the fourth and fifth questions. Section 5.3 introduces the hypotheses to be tested about the factors that may affect the chances for growth of surviving businesses, section 5.4 introduces a model to test the hypotheses and discusses the data used in its estimation. The results are presented in section 5.5, and section 5.6 contains some concluding remarks.

5.2 Aggregate Net Employment Growth by Component

The aggregate change in employment can be divided in two components. First, the birth-closure component is the balance between the jobs generated by birth of enterprises and the jobs lost by closure of businesses during a period. Second, the surviving enterprises component is the balance between jobs created by expansion of

enterprises and jobs lost by contraction of shrinking enterprises that survive during a period.

From a policy view point, it is important to identify the source of the aggregate change in employment for two reasons. First, the jobs generated through expansion of surviving enterprises seem to be more stable over time than those created through new start-ups. As it was shown in Chapter III, the likelihood of closing an enterprise decreases with age of the enterprise. Therefore, in the near future, older growing businesses are less likely to close than new businesses. Thus, the jobs created through new start-ups, are more likely to be lost in the following few years.

Second, policy strategies designed to affect each of the two components may differ in orientation and focus. For instance, in promoting employment growth of surviving enterprises, traditional credit programs as well as policies designed to expand markets are well suited to increase both the proportion of enterprises that grow and the rate at which they grow. On the other hand, policies designed to increase employment through the birth-closure component should focus on reducing the closure rate, for example, by promoting the knowledge of the market and improving management techniques of newly open business.

In the estimating procedure, the aggregate employment growth is the result of adding the net job change of the birth-closure component and the net job change of the

surviving component. As a proportion of the total employment in the MSE sector at the beginning of a period, net employment growth rate is defined as:

$$\frac{\Delta e}{e_t} = \left[\frac{en}{e_t} - \frac{ec}{e_t}\right] + \left[\frac{\Delta ep^x}{e_t} - \frac{\Delta ep^c}{e_t}\right] \qquad (5.1)$$

Where *en* is the number of jobs generated by new start ups, *ec* is the number of jobs lost by closed enterprises, Δep^x is the increase in employment of expanding enterprises, Δep^c is the cutback in employment of contracting enterprises, and e^t is the employment at the beginning of the period. Therefore, the first part of the mathematical expression represents the contribution of the birth-closure component to the MSE employment growth while the second represents that of the surviving component.

5.2.1 Birth-Closure Component

An estimate of the employment generated by new enterprises (*en*) is defined as the number of workers laboring on new businesses at the end of the period. The total number of enterprises born in a period is estimated as the product of the birth rate and the number of enterprises at the beginning of the period.

Correspondingly, an estimate of job losses through businesses closure (*ec*) is defined as the number workers that were laboring on closed enterprises at the beginning of the period. In turn, the number of enterprises closed in a period is estimated as the product of the closure rate and the number of enterprises at the beginning of the period.

The birth and closure rates used for this estimation are the average birth and closure rates presented in Chapter III. The employment in new and closed enterprises was estimated from the data collected in the baseline and the follow-up surveys.

The estimated aggregate employment growth rates of the MSE sector for the 1992-1993 and 1993-1994 periods are shown in Table 5.1. The first part of the Table (part A) indicates that the new jobs in micro and small enterprises generated by new start-ups represent around 17% of the total jobs in the MSE sector at the beginning of the period in both years[57]. The Table also indicates that the jobs lost due to closure of enterprises are 21% and 14% for the first and second years respectively[58]. As a result, the employment growth rate through the birth-closure component is negative in the first year and positive in the second year. However, the employment growth rate of this component is not significantly different from zero at a 95% confidence level in either year[59].

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[57] Standard errors and their corresponding confidence intervals were estimated for all the components of the employment growth rate. Standard errors of the birth-closure component were estimated assuming that the birth and closure rates shown in Chapter III were the true values of the parameters. This assumption may underestimate the standard error of the employment growth estimators. Then, using weighted standard errors of the average size of new enterprises and the average size of closed enterprises, a 95% confidence intervals were constructed for the total employment gained through new enterprises and the employment lost through closures. Using these results, a 95% confidence intervals for the average growth of employment through new start ups, with respect to the employment in the MSE sector are (15.2%, 20.0%) and (14.8%, 18.0%) for the 1992-1993 and 1993-1994 period respectively.

[58] Following the method described in the last footnote, a 95% confidence intervals for the average decline of employment through closures, with respect to the initial employment are (18.0%, 23.5%) and (10.1%, 18.0%) for the 1992-1993 and 1993-1994 periods respectively.

[59] 95% confidence interval for the employment growth of the birth-closure component with respect to the initial employment in the MSE sector are (-8.3%, 2.0%) and (-3.2%, 7.9%) for the 1992-1993 and 1993-1994 respectively.

Table 5.1

Aggregate Employment Growth Rate of Micro and Small Enterprises
by Component in the Dominican Republic 1992-1994
(As a Percent of employment in the MSE sector at the beginning of the year)

	March 1992-1993	March 1993-1994
A. Birth-Closure Component (a.1-a.2)	**-3.2**	**2.3**
a.1. Births	17.6	16.4
a.2. Closures	20.7	14.1
B. Surviving Enterprises Component (b.1-b.2)	**11.1**	**-0.8**
b.1. Expansion	21.8	9.7
b.2. Contraction	10.7	10.6
C. Net Employment Growth (A+B)	**7.9**	**1.5**
D. Gross Job Creation (a.1+b.1)	**39.4**	**26.1**
% from Births (a.1/D)	44.7	62.8
% from Expansion (b.1/D)	55.3	37.2
E. Gross Job Losses (a.2+b.2)	**31.5**	**24.6**
% from Closures (a.2/E)	65.9	57.1
% from Contraction (b.2/E)	34.1	42.9

Source: Microenterprise surveys March 1992, March 1993, October 1993, March 1994.

Comparing the results of the birth-closure component in the two periods (1992-1993 and 1993-1994), it is noticeable that the positive contribution of this component in the second period respect to the first one is due to a decrease in job losses through closure rather than to an increase in the employment created through new start-ups. Moreover, the employment generated by new enterprises decreased in 1.2 percent points between the two periods, while the losses fell in 6.6 percent points. In addition, as shown in Chapter III, the birth rate of MSEs in the second period was larger than in the first period by a margin of 3 percent points while the closure rate of MSEs was smaller

in the second period by a margin of 7.4 percent points. This apparent contradiction, a larger birth rates and a smaller contribution of the employment generated by those births in the second period, is due to the smaller size of the enterprises starting on the second period in comparison with the enterprises starting in the first period.

Considering that in the 1992-93 year the Dominican Republic had better economic performance than in the 1993-94 year, the evidence suggests that first, during periods of bad economic performance not only the birth rates tend to be higher but also the size of new enterprises tend to be smaller than during periods of good economic performance. Second, during a period of bad economic performance the closure rate is lower and the size of the enterprises that close is larger with respect to periods of good economic performance. Because, the data only cover a two-year period, a statistical test can not be developed to prove the strength of the relationship, however these results may be helpful to state hypotheses for future research.

5.2.2 Surviving Enterprises Component

An estimate of the employment generated by expanding enterprises (Δep^{x}) is the number of expanding enterprises times the average increase in employment in those enterprises. Similarly, an estimate of jobs lost in shrinking enterprises (Δep^{c}) is the number of contracting enterprises times the average number of jobs lost in those

enterprises. The estimate of the proportion of expanding and shrinking enterprises was based on the results of the follow-up surveys.

It was estimated that the proportion of expanding enterprises in the 1992-93 and 1993-94 years were 37.8% and 24.8% respectively while the proportion of shrinking enterprises were 21.6% and 25.4% for the first and second years respectively. The proportion of enterprises that did not grow were 40.6% and 49.8% for the 1992-93 and the 1993-94 years respectively. These figures indicate that during the year in which the Dominican economy experimented a lower growth rate, the proportion of enterprises that shrank as well as the proportion of enterprises that did not grow were higher than when the Dominican economy was growing at a faster pace.

Part B of Table 5.1 shows employment growth results for the surviving enterprises component. The expansion in employment with respect to the total employment in the MSE sector at the beginning of the year varies dramatically over time. In the 1992-1993 year, the growth of expanding enterprises represents an increase of almost 22% of the initial employment in the MSE sector while in the 1993-1994 period this indicator is near 10%[60]. The sources of this fall are both a decrease of the

[60] The difference of these rates are significantly different at 95% of confidence. 95% confidence intervals for this figure are (5.5%, 14%) and (16.9%, 26.7%) for the first and second years respectively. Standard errors and their corresponding confidence intervals were estimated for all the components of the employment growth rate. Standard errors of the surviving enterprise component were estimated assuming that the proportion of expanding and shrinking enterprises shown above were the true values of the parameters. This assumption may underestimate the standard error of the employment growth estimators. Then, using weighted standard errors of the average change in employment of expanding and shrinking enterprises, a 95% confidence intervals were constructed for the total employment gained through expanding enterprises and the employment lost through shrinking enterprises.

proportion of enterprises that expanded and a smaller average increase in employment of the enterprises that did expand. On the other hand,job losses as a proportion of total employment in the MSE sector is approximately 11% in both years[61]. The stability of this indicator across the two periods is due to both a similar proportion of enterprises that shrank and a similar average loss of workers of shrinking enterprises. The outcome of the surviving enterprises component shows a positive balance for the 1992-93 year while for the 1993-1994 year the balance is negative and close to zero[62]. Considering the state of the macroeconomy in the two periods, the evidence presented for the Dominican Republic indicates that during periods of lower growth of the economy the proportion of expanding enterprises is smaller while the ones that grow incorporate fewer workers in average than in periods of fast economic growth.

5.2.3 Net Employment Growth

Part C in Table 5.1 shows the net employment growth rate resulting from the two components previously discussed. The net growth rate was close to 8% in the 1992-1993 period while only 1.5% in the 1993-1994 period. The difference between the net growth rate in the two periods is significant at 95% of confidence level[63]. In the first period,

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[61] Intervals for this figure at 95% of confidence level are (3.0%, 18.4%) and (7.61%, 13.5%) for the first and second years respectively.

[62] The growth rate for the 1992-93 year is significantly larger that zero while in the following year that rate is not significantly different form zero at a 95% confidence level. Confidence intervals at 95% of confidence are (9.1%, 13.1%) and (-1.8%, 0.2%) for the first and second years respectively.

[63] Confidence intervals for the net growth rate at the 95% level are (0.8%, 15.1%) and (-5.0%, 8.5%) for the 1992-1993 year and 1993-1994 respectively.

the employment growth was led by an outstanding growth of the surviving enterprises component which surpassed the negative effect of the birth-closure component. The slow growth in the second period was the result of bad performance of surviving enterprises and a small positive balance of birth-closure component. It should be noted that during the observation period both components showed a positive contribution to employment growth in one year and a negative one in the other.

The differences over time in the aggregate net growth, and the contribution of the birth-closure component and the surviving enterprise component may be explained by the changing economic environment. In Chapter II, it was mentioned that the Dominican economy grew at a rate of 7.9% in 1992 after experiencing a deep economic depression for several years. It is not surprising that, as the economy improved, small businesses having excess capacity experienced impressive employment growth. Also, owners of low return businesses may have decided to close the business and get a job in another sector of the economy. Firms starting out during this fast growing year had a larger average size than firms starting out during the slow growing period and, therefore, even with a smaller birth rate in the fast growing period, the larger closure rate of that period was partially offset. In 1993, when the economy grew at moderate rates, surviving enterprises showed a lower rate of growth and, even though the birth rate of the MSE sector was larger, the size of those enterprises was smaller than in the previous period. Fewer businesses failed during the second period but their size was larger than the size of firms that failed in the fast growing period.

Table 5.1 (part D), shows the share of jobs coming from new start-ups and the share of jobs coming from expansion of surviving enterprises. During the 1992-93 year, 55% of the total jobs created came from expansion of growing enterprises while this proportion decreased to 37% during the 1993-94 year. This means that in fast growing periods, employment creation is lead by expansion of existing enterprises rather than by new start-ups. This implies that jobs created in fast growing periods are likely to last longer than those generated in slow growing periods. The formal proof of this hypothesis exceeds the availability of data at this point but may be explored in future research.

Table 5.1 (part D) shows the share of jobs lost through firm closures in the MSE sector and the share of jobs lost through shrinking of surviving enterprises for the 1992-93 and 1993-94 years. During the first year, 66% of all job losses in the MSE sector were due to closure of firms while this proportion fell to 57% during the 1993-94 year. This means that during fast growing periods job losses are more likely to be lead by business closures than by shrinkage of surviving enterprises. This implies that a large closure rate is not necessarily a negative sign of the development of the MSE sector. Relatively large closure rates may indicate that in other sectors of the economy, as well as, in larger MSEs there is a better opportunity of income generation than in a low profit businesses. Therefore, an important issue in the dynamics of the MSE sector is to qualify firm closures according to aspects that may indicate enterprise growth potential.

Entrepreneur's managerial skills, labor composition of the firm and average sales per worker are examples of qualifying aspects.

In summary, the evidence of employment change in the MSE sector in a two-year period is consistent with a positive relation between MSE employment growth and general performance of the economy. In addition, the source of those changes seems to vary dramatically over time. When the economy is doing well, employment creation in the MSE sector is led by an outstanding growth of the expanding enterprise that exceeds the large closure rates. During the slow economic growth period, the moderate increase in MSE employment is due to a decrease in closure rates and an increase in birth rates rather than an expansion of existing enterprises.

5.3 Employment Growth of Surviving Enterprises: Theory and Hypotheses

In the previous sections of this chapter, the importance of the expansion of surviving enterprises as a source of growth of the MSE sector was explored. It has been found that in the 1992-93 year, about 38% of the surviving enterprises increased the number of workers while 22% reduced it. Both the proportion of enterprises that added workers and the proportion of enterprises that decreased them were about 25% of the surviving enterprises during the 1993-94 year. The remaining sections of this chapter examine some of the characteristics of micro and small surviving enterprises and their owners, and how they are associated with the chances of hiring and firing workers in the

Dominican Republic during the March 1992 to October 1993 period. Moreover, the focus of this analysis is the decision of increasing, decreasing, and not changing the number of wage and non-wage workers[64].

Both Jovanovic's theory of firm dynamics, and evidence collected in both developed and developing countries support the hypothesis that age and size affect the chances of growth and the growth rate of surviving enterprises. With respect to size, Jovanovic's model predicts that the average growth rate of surviving enterprises is a decreasing function of size, holding age constant. This prediction is based on the assumption that the efficiency level is bounded, thus as enterprises increase in size there is less room for further increases and more room for decreases (Dunne et al, 1989). However, this does not necessarily mean that the predicted negative relationship between size and growth of surviving enterprises is monotonic.

In this regard, McPherson (1992) found that in four out of the five African countries, there was an inverse relationship between size and employment growth at the mean and minimum age levels[65]. However, in two of these countries, the relation between size and growth became positive at upper levels of the age of enterprises.

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[64] Wage workers include paid workers and trainees and non-wage workers includes proprietors and non-paid workers.

[65] These countries are South Africa, Swaziland, Zimbabwe, Lesotho and Botswana.

With respect to enterprise age, Jovanovic's model predicts that, holding size constant, business age should have a negative effect on the mean and variance of the growth rate of successful enterprises. McPherson (1992) found that age and growth follows an inverse pattern for three out of the five African countries studied, once other factors are controlled for. However, in one of the five countries, the relationship between age and growth became significantly positive at the upper age levels.

It seems that the evidence of a negative relation between both age and size with growth predicted by the Jovanovic's model is stronger among younger and smaller enterprises than among older and larger ones.

The predictions of Jovanovic's model as well as the evidence on the relationship between growth and size and age refer to average growth rates over a relatively long time span. Little can be drawn from these models with respect to changes in the labor force over shorter periods of time, such as a year, and, under changing economic conditions. In micro and small businesses the addition or dismissal of workers occurs gradually, and seldom involves a large number of workers at one time. Also the pace at which different types of workers are hired or fired varies because negotiating with each type of worker implies different costs and benefits for the enterprise. Employing a wage worker implies a regular workday and a minimum output level to cover the wage of the new worker[66]. Therefore, before hiring a wage worker a small employer must

[66] Also, employing a non-wage family worker may be due to personal and non-business reasons while in the case of a wage worker the decision is generally related to business reasons.

be sure that the stability of future demand allows one to meet the financial and contractual responsibilities for the new employee.

Evidence from two manufacturing subsectors in the Dominican Republic indicates that one of the biggest constraints to growth of small businesses is the adjustment of the management function that must occur when the decision to hire wage workers is made. Successful one-person enterprises generally react to increasing demand for their product by extending the workday. When this way of expanding output is exhausted, the proprietor seeks help on relatives and close friends on a non-wage basis. Finally, when this source of increasing output is consumed, the entrepreneur considers hiring a wage employee. Enterprises employing wage workers have to make several organizational adjustments in their businesses. These adjustments usually involve changing labor management practices, such as control and supervision, allocation of workers among tasks, and other administrative changes which require extra time from the entrepreneur (Cabal and Cely, 1994a).

Enterprises that have hired wage workers in the past are more likely to understand what hiring new wage-workers entails and then they may be more cautious when deciding to hire wage-workers. On the other hand entrepreneurs that have hired wage workers in the past are also more likely to have made the organizational changes required to handle new workers and therefore, they may be more likely to hire additional wage workers when demand increases. In general, it is hypothesized that characteristics of the

enterprise and its owner affect differently the decision of hiring wage and non-wage workers. The hypotheses to be explored in the remainder of this chapter are:

1. Enterprises that started with different composition of labor force present different likelihood of increase total, wage and non-wage workers.

2. Characteristics of the proprietor such as gender, experience, and education of the owner affect the chances of increasing total, wage and non-wage workers.

3. The effect of the explanatory variables on the probability of hiring and firing workers varies by type of worker.

5.4 Model and Data

The model establishes a relationship between the probability of increasing workers and a number of explanatory variables. The number of workers are divided into wage and non-wage workers, and the estimation for each type of worker is carried out independently. An ordered logit model is used to estimate the parameters of the model.

The dependent variable is the change in the number of workers and has three possible outcomes for each type of worker, namely, shrink, no change and increase.

Panel data is used to estimate the change in the number of workers. The data is available for two periods, a one year period between March 1992 and March 1993 and a six month period from March to September 1993.

As it was mentioned in section 4.5.1 the panel data solve many shortcomings encountered by studies that relied on retrospective data. However, most of the weaknesses recognized in that section are still present in the surviving enterprise data set. Particularly, high proportion of missing data and different lengths of the two sub-periods may limit the conclusions derived from the model. In addition, the issue of sample selection may affect the symmetry of the model. Since the sample only include surviving MSEs, those with higher likelihood of closure would eventually be excluded from the sample. That is, under adverse economic conditions, one-person enterprises may have to close and thus, they would be recorded as closed enterprises and they no longer would be part of the surviving enterprises data set. This may introduce biases on the results and should be taken into account when drawing conclusions.

To test the hypotheses described above the following set of variables were included in the model. The first group captures the impact of initial size of the enterprises in terms of the number of workers by type -- wage and non-wage workers. With regards to workers, a set of two dummy variables is introduced for each type of worker. The three categories of non-wage workers are one, two, and three or more non-

wage workers. The three categories of wage workers are zero, one, and two or more wage workers.

To capture birth cohort effects a group of four dummy variables are included: before 1980, 1981-1985, 1986-1989 and 1992. The base birth cohort is the 1990-91 period which was a particularly slow growth period for the Dominican economy.

A set of dummy variables are included to capture characteristics of the proprietor including gender, household responsibility, education and experience in similar business and having a previously failed business.

In terms of machinery three groups are considered: no initial investment in machinery, up to $5,000, and more than $5,000 investment in machinery.

A group of dummy variables are included to capture whether enterprises have grown or shrunk in previous periods. Because it is assumed that changing the number of wage workers in comparison to non-wage workers involves different costs and benefits for the entrepreneur, change in the number of workers is distinguished by type of worker.

To account for sectoral differences a set of two dummy variables are included in the model one for enterprises in manufacturing and another for enterprises engaged in services.

Locational aspects were included into the model using a set of two dummy variables to account for differences between Santo Domingo, secondary cities and rural areas. Rural areas is the base category. Also a variable that accounts for the differences of business density in the different areas was included[67].

Finally, a set of two dummy variables was included in the model for the enterprises that have received formal and informal credit before March 1992[68].

5.5 Results

Table 5.2 presents the coefficient estimates and their corresponding standard errors from the ordered logit model for two periods --March 1992-March 1993 and March 1993-October 1993-- for the total number of workers. Table 5.3 shows the coefficient estimates and their corresponding standard errors of two separate models for each type of worker --wage and non-wage workers-- for the same periods. This later

[67] Business density is defined as the number of business encountered in an area divided by the total number of households and businesses visited in the area.

[68] Formal credit sources consist of banks and other financial institutions, NGOs, and input suppliers while informal ones include family and friends, and money lenders.

model also includes a group of variables that indicate whether the enterprises have grown or shrunk in previous periods. In both tables a positive coefficient indicates a direct relationship between the probability of growth and the corresponding variable, while a negative coefficient represents an inverse relationship between the probability of growth and the variable.

With respect to initial size, the results indicate that enterprises that started out with at least two non-wage worker were more likely to add workers in the first period and less likely to increase their size in the second period, relative to enterprises that started out with only one non-wage worker. The reason for this result is two folded. First, the difference between the two periods may be explained by changes in macroeconomic conditions. The result may suggest that firms hiring family workers may respond faster to both upward and downward changes in the economic environment. Second, there may be a bias due to sample selection. That is, expansion of one non-wage worker enterprises is recorded in the surviving enterprises data set. In contrast, shrinkage of this enterprises implies their exclusion from the surviving enterprises sample and their inclusion in the closed enterprises data set. Therefore, only changes toward size expansion are observable while changes toward contraction are hidden by the attrition effect. This means that only larger enterprises are able to both decrease the number of workers and remain in the surviving enterprise sample.

Table 5.2

Employment Growth Ordered Logit Model: Results

Independent Variable	Total Number of Workers	
	March 1993-1992	March-October 1993
Intercept 1	-2.1101**	-1.7996**
	(0.7059)	(0.7211)
Intercept 2	-0.0952	0.5353
	(0.6885)	(0.7131)
One Initial Paid Worker	-0.2916	0.3026
	(0.4218)	(0.4251)
Two or More Initial Paid Workers	0.5682	-0.3887
	(0.4699)	(0.4633)
Two Initial Non Paid Workers	1.3748**	-1.3496**
	(0.3753)	(0.3830)
Three or More Initial Non Paid Workers	2.0327**	-1.7582**
	(0.4667)	(0.4509)
Birth Cohort Before 1980	-0.0946	-0.9383**
	(0.4271)	(0.4327)
Birth Cohort 1981-1985	0.3093	-0.9178**
	(0.4199)	(0.4200)
Birth Cohort 1986-1989	0.2467	-1.0471**
	(0.3861)	(0.3933)
Birth Cohort 1992	0.3468	-0.2724
	(0.6185)	(0.6119)
Female Owned Enterprises	-0.2045	-0.0009
	(0.3167)	(0.3197)
Mixed Gender Ownership	-0.3225	0.4871
	(0.5992)	(0.5990)
Manufacturing	0.0931	-0.1538
	(0.3512)	(0.3535)
Services	-0.2489	0.1761
	(0.4243)	(0.4261)
One to 5 Years of Experience	0.1247	-0.0710
	(0.3548)	(0.3555)
More than 5 Years of Experience	-0.2436	0.3987
	(0.3288)	(0.3302)

Source: Microenterprise surveys March 1992, March 1993, October 1993.
* Significant at the 90% level
** Significant at the 95% level
Standard errors in parenthesis.

Table 5.2 (Continuation)

Employment Growth Ordered Logit Model: Results

Independent Variable	Total Number of Workers	
	March 1993-1992	March-October 1993
Primary Education	1.0491* (0.5362)	1.1864** (0.5624)
Secondary Education	1.1319* (0.6144)	1.2109* (0.6391)
College and Vocational Education	1.6723** (0.6757)	0.9409 (0.6881)
Located in Santo Domingo	-0.0468 (0.4030)	0.0949 (0.4062)
Located in Secondary Towns	0.3859 (0.3741)	0.0109 (0.3740)
Business Density in the Area	-0.8819 (1.4138)	0.3962 (1.4287)
Dummy: Received Formal Credit	-0.7697** (0.3903)	0.1404 (0.3884)
Dummy: Received Informal Credit	-0.6804 (0.4531)	-0.0002 (0.4537)
Dummy: Household had a Business Failure Before 1992	-0.8227* (0.5042)	0.3275 (0.4956)
Number of Observations	214	214
-2 Log L	415.4	407.8
Chi-Square	50.40 (p=.0008)	42.90 (p=.0071)

Source: Microenterprise surveys March 1992, March 1993, October 1993.
* Significant at the 90% level.
** Significant at the 95% level
Standard Errors in parenthesis

The initial number of wage workers does not seem to influence the likelihood of growth once it is controlled by other variables. This result may indicate that firms using more wage-workers are more reluctant to change the number of wage workers when economic conditions change.

Distinguishing by type of worker (Table 5.3), the results indicate that enterprises started out with two or more wage-workers were more likely to add wage workers

Table 5.3

Employment Growth Ordered Logit Model: Results by Type of Worker

Independent Variable	Wage Workers		Non-Wage Workers	
	March 1993-1992	March-October 1993	March 1993-1992	March-October 1993
Intercept 1	-3.9895** (0.8928)	-4.0224** (0.9103)	-4.9783** (0.9744)	-5.1358** (0.9542)
Intercept 2	0.5059 (0.8206)	0.3240 (0.8421)	-1.0137 (0.8829)	-1.2093 (0.8715)
One Initial Paid Worker	0.5186 (0.5639)	0.6908 (0.5679)	0.0872 (0.6111)	-0.7505 (0.5725)
Two or More Initial Paid Workers	0.3442 (0.7012)	1.9256** (0.7193)	-0.0028 (0.8003)	-0.6127 (0.7024)
Two Initial Non Paid Workers	0.1954 (0.5135)	-0.0392 (0.5086)	0.2669 (0.5396)	2.7276** (0.5650)
Three or More Initial Non Paid Workers	1.3413* (0.7494)	-0.0249 (0.7447)	-0.0480 (0.8129)	3.1794** (0.7874)
Birth Cohort Before 1980	-0.1757 (0.5434)	0.9201* (0.5472)	-0.5017 (0.5766)	-0.2248 (0.5236)
Birth Cohort 1981-1985	-1.4538** (0.5083)	1.3085** (0.5152)	0.0372 (0.5289)	0.1473 (0.4951)
Birth Cohort 1986-1989	-0.7261 (0.4673)	0.9566** (0.4667)	-0.5151 (0.4841)	0.2929 (0.4569)
Birth Cohort 1992	0.1366 (0.7208)	0.6984 (0.7070)	0.0534 (0.7744)	-0.0765 (0.7055)
Female Owned Enterprises	0.5679 (0.4193)	-0.3557 (0.4197)	-0.6241 (0.4354)	-0.9309** (0.4221)
Mixed Gender Ownership	0.2883 (0.7662)	-1.3389* (0.7727)	-1.8827** (0.8102)	-1.2736 (0.7806)
Owner is Not Head of Household	-0.5927 (0.4426)	0.4920 (0.4443)	0.9810** (0.4766)	1.1413** (0.4439)
Manufacturing	-0.0278 (0.4366)	0.0873 (0.4286)	-0.0752 (0.4536)	0.2281 (0.4211)
Services	0.5236 (0.5126)	-0.1795 (0.5120)	0.1893 (0.5530)	0.0344 (0.5105)
Up to $5,000 Machinery	-0.5876 (0.3645)	0.3007 (0.3623)	-0.4697 (0.3855)	0.1108 (0.3519)
More than $5,000 Machinery	-2.4943** (0.6870)	-0.5668 (0.6326)	-0.0277 (0.6733)	0.6847 (0.6431)
One to 5 Years of Experience	-0.3434 (0.4291)	0.1122 (0.4292)	0.3657 (0.4565)	-0.0276 (0.4219)
More than 5 Years of Experience	0.0935 (0.3932)	-0.6332 (0.3894)	0.7785* (0.4217)	-0.2764 (0.3864)

Source: Microenterprise surveys March 1992, March 1993, October 1993.

* Significant at the 90% level

** Significant at the 95% level

Standard errors in parenthesis.

Table 5.3 (Continuation)

Employment Growth Ordered Logit Model: Results by Type of Worker

Independent Variable	Wage Workers		Non-Wage Workers	
	March 1993-1992	March-October 1993	March 1993-1992	March-October 1993
Primary Education	1.6474** (0.6246)	0.9649 (0.6262)	1.6323** (0.6718)	1.4590** (0.6458)
Secondary Education	1.3617* (0.7240)	0.6248 (0.7184)	1.0105 (0.7655)	0.8691 (0.7279)
College and Vocational Education	0.4894 (0.7729)	0.3781 (0.7657)	1.5883* (0.8388)	2.1744** (0.7997)
Expand Paid Workers Since Start to 1992	2.7576** (0.5423)	2.0646** (0.6555)	1.0008* (0.5698)	1.0205 (0.6533)
Shrink Paid Workers Since Start to 1992	-2.8241** (0.7308)	0.4759 (0.6994)	0.3327 (0.7344)	1.5570** (0.7133)
Expand Non Paid Workers Since Start to 1992	0.0302 (0.4153)	1.0569* (0.6266)	4.2159** (0.5600)	1.7138** (0.6352)
Shrink Non Paid Workers Since Start to 1992	-0.9710 (0.6307)	0.8321 (0.6625)	-3.2438** (0.7360)	-1.7353** (0.6879)
Expand Paid Workers 1992-1993	n.a	-0.3245 (0.4556)	n.a	-1.7642** (0.4792)
Shrink Paid Workers 1992-1993	n.a	-3.1764** (0.7632)	n.a	-0.7761 (0.7452)
Expand Non Paid Workers 1992-1993	n.a	-1.0169** (0.4769)	n.a	2.7629** (0.5262)
Shrink Non Paid Workers 1992-1993	n.a	-0.8164 (0.6408)	n.a	-1.8330** (0.6522)
Located in Santo Domingo	0.4869 (0.4986)	0.5001 (0.4923)	1.1508** (0.5159)	1.6986** (0.5050)
Located in Secondary Towns	0.4344 (0.4620)	0.5515 (0.4584)	1.2232** (0.4713)	1.4114** (0.4590)
Business Density in the Area	1.7875 (1.7369)	-0.9550 (1.7373)	-0.4795 (1.9287)	0.3391 (1.6972)
Dummy: Received Formal Credit	-0.8196* (0.4556)	-0.7439 (0.4613)	0.3073 (0.4913)	-0.0366 (0.4652)
Dummy: Received Informal Credit	-0.2906 (0.5437)	0.4518 (0.5480)	0.6548 (0.5880)	-1.1610** (0.5239)
Dummy: Household had a Business Failure Before 1992	-0.0243 (0.6113)	-0.8029 (0.6006)	-0.1043 (0.6754)	-0.3386 (0.5839)
Number of Observations	214	214	214	214
-2 Log L	283.2	295.78	256.7	299.2
Chi-Square	91.98 (p=.0001)	65.67 (p=.0009)	199.62 (p=0.0001)	125.58 (p=0.0001)

Source: Microenterprise surveys March 1992, March 1993, October 1993.

* Significant at the 90% level. ** Significant at the 95% level

Standard Errors in parenthesis

respect to enterprises that started out with only non-wage workers in the second period. However, in the first period the difference is not significant. This result may indicate some lagged effect between change in economic conditions and firm's response about changing the number of wage workers.

In the first period, when the economy grew, enterprises that started out with more than three non-wage workers were more likely to increase wage workers than enterprises that started with only one non-wage worker. In addition, enterprises that started out with more than two non-wage workers were more likely to increase the number of non-wage workers in the second period with respect to enterprises that started out with only one non-wage worker. In general, the results regarding size of the enterprise suggest that initial number of workers and labor composition seem to affect the likelihood of growth in a different direction over time.

The results with respect to past performance in terms of employment expansion or contraction by type of worker indicate that enterprises hiring wage-workers before 1992 were more likely to add wage workers in both periods with respect to enterprises that did not change the number of wage-workers. Also, enterprises hiring wage workers before 1992 were more likely to add non-wage workers in the first period. Enterprises that reduced the number of wage-workers before 1992 continued decreasing wage-workers in the fist period. Enterprises that had increased (decreased) the number of non-

wage workers before 1992 were more likely to increase (decrease) non-workers in both periods.

The recent performance of enterprises indicates that employment expansion or contraction by type of worker may be a result of change in the labor force composition. Enterprises that have added wage workers in the recent past (1992-1993) were more likely to decrease the number of non-wage workers in the second period. Similarly, enterprises that added non-wage workers in the first period, decreased the number of wage-workers and increased the number of non-wage workers in the second period.

These results indicate that performance of the enterprises, considered since it started out, may be a good indicator of future performance when changes on economic conditions are considered. In addition, a change in the type of workers hired in the near past, may indicate a trend towards changing the labor force composition of the enterprise in the future.

The evidence regarding birth cohorts indicates that enterprises that started out before 1990 were more likely to decrease the total number of workers during the second period with respect to enterprises that started out during the 1990-1991 period. However, enterprises that started out before 1990 were more likely to hire wage-workers than enterprises that started out during the 1990-1991 economic recession. This means that older enterprises may increase the share of wage workers while holding constant the size

of the enterprise. This result suggests that indicators of enterprise performance should include not only size of the enterprise, in terms of number of workers, but also composition of its labor force.

There is strong evidence supporting the proposition that entrepreneurs with some education are more likely to increase the number of total workers than entrepreneurs with no formal education, regardless of the period. The positive relationship between employment expansion and level of education seems to hold by type of worker. These results are consistent with those presented by Parker (1994).

In regard to initial investment in machinery, results show that enterprises that started out with some level of investment are less likely to add wage-workers during the first period than enterprises with no initial investment in machinery. This result may reflect an excess of capacity in the more capital intensive MSEs during the first year of economic growth after several years of stagnation.

Female-owned enterprises were not more nor less likely to expand or contract that their male counterparts in either of the periods once it is controlled for other variables. Mixed gender jointly owned enterprises were less likely to expand both wage and non-wage workers in the second and first periods respectively. Entrepreneurs that are not head of their household were more likely to hire non-wage workers during both periods.

Enterprises located in urban areas were more likely to increase the number of non-wage workers than their rural counterpart in both periods. The results for wage workers show the same relationship but the parameters estimates are not statistically significant.

Enterprises receiving credit from a formal source before 1992 were less likely to increase the total number of workers in the 1992-1993 period than enterprises not receiving credit from any source after it is controlled for other variables. This result holds for wage-workers for the same period. Also, during the March-October 1993 period, enterprises receiving credit from an informal source before 1992 were less likely to increase the number of non-wage workers than those that had not received credit from any source.

Finally, entrepreneurs that had a business failure before 1992 were less likely to expand their business during the 1992-1993 period. This may indicate that entrepreneurs with a negative past experience may be more reluctant to respond to positive changes in the economic environment.

5.6 Conclusions

This chapter explored how the birth and closure processes as well as the expansion of surviving firms affect the aggregate growth of employment of the MSE

sector. Also, it explored the extent to which some characteristics of the enterprises and their owners may explain the chances of hiring and firing workers.

With respect to the different components of the aggregate employment expansion of the MSE sector, the evidence shows that first, during a period of bad economic performance both the birth rate of MSEs tends to be higher and the size of the new start-ups tends to be smaller than those in periods of good economic performance. Second, during a bad economic period, the closure rate is lower but the size of the closed enterprises is larger than during years of good economic performance. Third, the evidence suggests that during years of low economic growth, the proportion of MSEs that grow is smaller and the ones that do grow incorporate fewer workers than when the economy grows at a faster pace. Forth, during fast economic growth periods, employment growth is led by expansion of existing enterprises rather than by the creation of new enterprises. This implies that the new jobs created in fast growing periods are likely to last longer than those created in slow growing periods. Fifth, during fast economic growth periods, job losses are more likely caused by firm closures than by shrinkage of surviving enterprises. This means that a large closure rate is not necessarily a negative sign of the performance of the MSE sector but a sign of positive selection towards a more efficient sector.

With respect to the variables that help to explain the chances of hiring and firing workers, the results show that first, the evidence is consistent with the hypothesis that

enterprises that expand based on non-wage workers may respond faster to both upward and downward changes in economic environment while enterprises that hire wage workers are more reluctant to change the number of wage workers when economic conditions change. This may be explained by the fact that changes in non-wage workers are more flexible, in terms of financial and contractual arrangements, than changes in wage workers, therefore, the decision of hiring or firing wage workers is less responsive to short term changes on economic conditions. Also, the results show that long term past performance --including growth trend since start and past business failure -- may be a good indicator of present and future performance while changes in short term labor composition may indicate changes in the structure of the enterprise responding to changes in the economic environment.

Second, with respect to birth cohorts, evidence shows that older enterprises may have a trend towards hiring a larger proportion of wage-workers even if the size of the enterprise does not increase. Third, entrepreneurs with higher levels of education are more likely to increase both wage and non-wage workers. Fourth, enterprises with larger initial investment in machinery may be less likely to increase wage workers during the first year of recovery after a period of economic stagnation. Fifth, the evidence from the data is not strong enough to reject the hypothesis that gender and sector does not affect the chances of expanding an enterprise. Finally, once it is controlled for other variables, enterprises receiving credit in the past were less likely to increase the number of workers during the first year of the economic recovery.

In general, the evidence shows that the effect of the explanatory variables on the chances of hiring and firing workers in the short run varies according to the conditions of the macroeconomy and the type of worker. Although the limited available data at this point prevent from performing a formal proof of some of the findings, it raises the issue that labor force composition and the economic environment are crucial aspects in understanding microenterprise dynamics.

CHAPTER VI

CONCLUSIONS

Several studies conducted under different points of view, agree on one point: that is the large magnitude and the increasing share in employment of the micro and small enterprise sector in Latin America. Despite its importance, the lack of a systematic and consistent data for the region makes it difficult to study the current structure of the micro and small enterprise sector. The evidence in Latin America is even scarcer for issues regarding firm dynamics. This dissertation is aimed to shed light on these issues.

This chapter summarizes the main findings of this work, draws some policy implications and underlines some methodological aspects that may contribute to future studies on enterprise dynamics.

6.1 Research Findings

Surveys showed that the MSE sector in the Dominican Republic is of major significance in terms of number of enterprises, employment generation, and share of GDP. It is made up of a large number of heterogeneous units. In spite of the diversity,

some features can be said to characterize this sector. Some of these characteristics resemble and some of them contrast with the findings of similar studies in Southern African countries. Very small and young economic units are found in the Dominican Republic as well as in African countries. Also the low proportion of MSEs receiving credit is a shared characteristic with African countries.

On the other hand, there are differences between Dominican and Southern African MSEs in relation to location, sectoral distribution, gender of the owner and composition of the labor force. MSEs in the Dominican Republic are mostly located on urban areas, a strikingly large proportion of MSEs is engaged in retail trading activities, MSE's ownership is evenly distributed between male and female proprietors, and hired workers account for an important proportion of the labor force in MSEs. In contrast, the majority of MSEs in Southern African countries are located in rural areas, a larger proportion is engaged in manufacturing activities, most are run by women, and reliance significantly in family workers and trainees rather than on hired workers.

Data from the Dominican Republic not only provide important information about static characteristics of MSEs in this country, but also, an opportunity to explore some issues of micro and small enterprise dynamics. In terms of employment, a positive relationship was found between aggregate employment growth of the MSE sector and the general performance of the economy. Fast economic growth periods result in high employment growth rates in the MSE sector while slow economic growth periods result

in low employment growth rate in the sector. Growth of MSEs, as measured by change in number of workers, is made up of two components: first, the net change in the number of workers resulting from the creation and closure of enterprises -- birth-closure component. The second component is the change in employment of surviving enterprises, which is the net change in employment originated by the expansion and contraction of these enterprises -- surviving enterprise component.

Moreover, the evidence shows that the share of each of these two components in net employment growth changes over time according to macroeconomic conditions. During fast economic growth periods, the surviving component is the main source of aggregated employment growth while this role is played by the birth-closure component, during slow economic growth periods.

With respect to the birth-closure component, it is found that during a period of bad economic conditions both the birth rate of MSEs tends to be higher and the size of the new start-ups tends to be smaller than those found when the economy is doing well. Also, during a bad economic period, the closure rate is lower but closed enterprises are larger than during years of good economic performance. With respect to the surviving enterprise component, the evidence suggests that during years of low economic growth, the proportion of MSEs that grow is smaller and the ones that do grow incorporate fewer workers than in periods when the economy grows at a faster pace.

As a result of these effects, during fast economic growth periods, employment growth is led by expansion of existing enterprises rather than by the creation of new enterprises. Conversely, during low economic growth periods, employment growth is led by new start-ups rather than by expansion of surviving enterprises. Considering that older enterprises are more likely to survive than new ones, this result implies that the new jobs created in fast growth periods are likely to last longer than those created in slow growth periods. Also, during fast economic growth periods, job losses are more likely to be caused by firm closures than by shrinkage of surviving enterprises. Conversely, during slow growth periods job losses are caused mainly by shrinkage of surviving enterprises rather than by closure of businesses. This means that a large closure rate is not necessarily a negative sign of the performance of the MSE sector but a sign of positive selection towards a more efficient sector.

Analyzing the birth-closure component alone, in terms of number of businesses, it was found that a number of enterprises equivalent to one fourth of existing enterprises open and close each year. Since about the same number of openings and closures occur each year, the number of enterprises remains relatively unchanged during the period under study. Closure and disappearance rates are found to be significantly higher for female-owned with respect to male-owned enterprises, and for trading enterprises with respect to manufacturing enterprises.

Another important finding is that hazard rates decrease dramatically in the first four years of firm's existence, and thereafter, it continues decreasing at a slower pace. In addition, it was found that the hazard rate of closing due to business reasons is higher than for non-business reasons, and that the first one shows a decreasing trend while the non-business reasons hazard rate shows an up and down pattern. In order to improve our understanding of the relationship between hazard rate and age of enterprise, further analysis of age specific hazard rates should be pursued using different assumptions to handle censored observations and classifying by reasons of closure, gender of the entrepreneur, economic sector and size of the enterprise.

The analysis of the relationship between the chances of survival and some characteristics of the enterprises and their owners shows that even controlling by other factors, larger and older firms present a lower probability of failure than smaller and younger firms respectively. These findings are consistent with Jovanivic's learning model and with other evidence from developed and developing countries. Also the effect of age on hazard rate is stronger among younger than among older enterprises. This means that an additional year of experience has a larger effect in reducing the probability of closure during the earlier years of the firm's existence than during the latter ones.

The evidence shows that female-owned and mixed-gender jointly owned enterprises have a significantly higher failure rate than their male counterparts. Also, the results suggest that both female and mixed-gender enterprises are more likely to close for

personal and other non-business reasons than for business related reasons. This may be interpreted as a preliminary support of the hypothesis presented above which states that, in terms of managing the business, the constraints faced by female entrepreneurs are different from the ones faced by their male counterparts. As a result, female entrepreneurs adopt business strategies that differ form the ones adopted by their male counterparts which in turn result in a higher likelihood of failure of female lead business.

With respect to the main economic sectors, evidence shows that enterprises engaged in manufacturing are less likely to close than those engaged in trading activities. In addition, manufacturing enterprises have a lower hazard rate of closing for business reasons than trading enterprises.

Also, the results indicate that enterprises receiving credit from a formal source are more likely to survive than those that have not received credit from any source. The evidence indicating that enterprises receiving credit have a lower hazard rate is particularly strong and significant when only closures for business reasons are considered. These results may be the combined effect of several factors. On one hand, the positive effect of credit on firm's performance. On the other, the screening process performed by financial institutions when choosing their clients may lead to select those enterprise more likely to succeed. Also, the fact that an enterprise receives credit implies that the entrepreneur has a positive attitude toward credit which may be related with entrepreneur's financial and managerial skills, and thus, with the likelihood of success.

To isolate the effect of these elements on firm's survival, researchers should study more closely other credit supply and demand variables.

Taking surviving enterprise alone, the research in the Dominican Republic shows a high average growth rate of surviving MSEs. Despite this high growth rate only a small proportion of MSEs grows, which implies that the ones that do grow present extraordinarily high average growth rates. This finding is consistent with the finding of similar studies in African countries. The research also shows that enterprises engaged in manufacturing and male-owned enterprises present both a higher proportion of expanding enterprises and a higher average growth rate than their corresponding counterparts. Enterprises with 3 to 5 workers show the largest proportion of expanding enterprises, while one person enterprises show the highest average growth rate. In terms of age of the enterprise, the older the enterprises, the larger the proportion of expanding enterprises, and the younger the enterprise, the higher the average growth rates.

The relationship between the probability of increasing the number of total, wage and non-wage workers, and some characteristics of the enterprises and their owners were analyzed for two periods. The results vary over time and more significantly by type of worker. However, there is strong evidence indicating that entrepreneurs with primary, secondary and vocational education are more likely to grow than entrepreneurs with no formal education. Entrepreneurs with primary and vocational education were more likely to increase both wage and non-wage workers during both periods. This implies that the

level of education may constitute a good predictor of the performance of MSEs. Also, increasing the level of education of the owner may be an important requirement for microenterprise growth and development.

There are other interesting findings regarding variables that explain the likelihood of hiring and firing workers. First, enterprises that expand based on non-wage workers may respond faster to both upward and downward changes in economic environment while enterprises that expand hiring wage workers are more reluctant to adjust the number of wage workers under changing economic conditions. This is due to the fact that changes in non-wage workers are less demanding, in terms of financial and contractual arrangements, than changes in wage workers, therefore, the decision of hiring or firing wage workers is not as responsive to short term changes on economic conditions as the decision of hiring or firing non-wage workers. Second, past performance -- including growth trend since firm started out and past business failure -- may be good indicators of present and future performance while recent changes in labor composition may indicate changes in the structure of the enterprise responding to changes in the economic environment.

Third, with respect to birth cohorts, evidence shows that older enterprises may have a trend towards hiring a larger proportion of wage-workers even if the size of the enterprise does not increase. Fourth, enterprises with relatively higher initial investment in machinery may be less likely to increase wage workers during the first year of

recovery after a period of economic stagnation. Fifth, the evidence from the data is not strong enough to reject the hypotheses that gender and sector do not affect the chances of expanding an enterprise. Finally, after controlling for other variables, enterprises receiving credit in the past were less likely to increase the number of workers during the first year of the economic recovery.

In general, the evidence shows that the effect of the explanatory variables on the chances of hiring and firing workers in the short run varies according to the conditions of the macroeconomy and the type of worker. Although the limited available data at this point prevent from performing a formal proof of some of the findings, it raises the issue that labor force composition and the economic environment are crucial aspects in understanding microenterprise dynamics. The collection of data and the analysis of changes in the number of workers by type of worker and over time is important to shed light about the way in which MSEs adjust to changing economic conditions.

6.2 Implications for Policy and Future Research

From a macroeconomic view point, one of the most important issues raised by policy makers, MSE's program and project officials, and researchers is the role played by the MSE sector in developing countries. Some argue that the main role of the MSE sector is to serve as a buffer during economic cycles. That is, during economic down turns, the MSEs sector provides an employment opportunity for those that have lost their

jobs, and during economic expansion the MSE sector provides the labor force needed in other sectors of the economy.

Others argue that the main role of the MSE sector is to lead the economic development and provide the employment that other sectors have been unable to create. Although solving this issue exceeds the scope of this work, three important findings can be drawn from the Dominican Republic evidence. First, that the MSE sector plays both roles, second that each of these roles is played by a different type of enterprise and third, that only a very small percentage of enterprises may play both roles.

The buffer role of the MSE sector results in a large percentage of enterprises that started out and close down every year. In the Dominican Republic, this role is mostly played by small, young enterprises engaged in retail trading activities and run by women. The main objectives of this type of businesses are to survive and provide household income, while a better opportunity comes along, rather than endure and grow. The proportion of new enterprises created as temporary alternative source of income depends on the particular macroeconomic and sectoral condition under which they started out. During low economic growth years, the proportion of new enterprises that appear for these reasons seems to be higher than during fast economic growth years.

The leading role of the MSE sector results in high average employment growth rate of a relative small proportion of enterprises. In the Dominican Republic, the

businesses that play this role started out with more than one worker, are engaged mainly in manufacturing, survive more than four years, are controlled by males, have had more access to credit, rely on wage workers, and their owners have a higher educational level. Businesses playing this role grow substantially during periods of economic expansion but are greatly affected by economic down turns because of their close linkage with the rest of the economy.

Between these two extremes, there is a significant proportion of enterprises that survive longer than enterprises that play the buffer role but do not grow as much as the enterprises that play the leading role. These enterprises depend on a narrow market and do not have close linkages with other sectors of the economy.

On this framework, there are some general MSEs policy objectives that may be considered. First, there should be an effort toward avoiding closure of leading enterprises. This includes currently leading enterprises as well as stagnant enterprises with leading potential. Second, the growth process of enterprises with leading potential may be speeded up. Supporting their technical innovation process, improving their marketing and managerial strategies, and providing them with appropriate financial services will contribute to improve their efficiency and competitiveness.

Third, enterprises that play the buffer role may benefit from short term working capital loans and training. These loans may help them go through difficult economic

conditions. Training increases owner's qualification, and as it was noted above, it could have a positive impact in enterprise performance. Alternatively, if a number of owners decide to close the business and get a job in other sector of the economy, training may make them more productive workers. Although a very small number of these enterprises will transform over time, eventually, some of them may improve their performance and become leading enterprises.

With respect to future research, many aspects would be of great relevance in understanding micro and small enterprises dynamics. Based on the findings of this research, some of these aspects are mentioned. A more complete characterization of the enterprises that play the different roles in the economy may be obtained by studying birth and closure rates during longer periods, analyzing the characteristics of new, surviving and closed enterprises and their owners, and examining the reasons for starting out and ending up businesses under different macroeconomic and sectoral conditions. Also, a better understanding of MSE's productivity levels and a precise qualification of these enterprises may shed light on the relationship between employment growth and labor productivity. Another interesting aspect for future research is the development of additional indicators of business performance that allows a more complete understanding of MSEs' dynamic. These indicators might include labor force composition of enterprise, sales and production levels, use of machinery, sales or units of product per worker, managerial and businesses practices (accounting practices, owner's time allocation among different business activities) and market linkages.

In terms of objectives and design of specific policies and programs to promote the MSE sector, several lessons can be learnt from the Dominican Republic research. First, the performance of the MSEs, specially the leading ones, is affected by macroeconomic conditions; thus, the performance of assistance programs is also affected by macroeconomic and sectoral conditions. The design and operation of assistance programs should consider this relationship and make the programs flexible enough to accommodate to different economic conditions such as inflation, economic prosperity and economic downturns. For example, during bad economic conditions lending programs will find that loan repayment deteriorates and program's bad debt increases. Consequently, program officials should increase loan loss reserves to prevent a financial crisis.

Second, the needs of the enterprises and therefore the demand for assistance services changes according to economic conditions. Programs supporting MSEs may need to change the share of resources spent in the services they provide to attend new needs and demands resulting from changes in economic conditions. For example, during economic stagnation periods, enterprises may postpone expansion projects and some may face liquidity problems. As a result, lending programs may find that the demand for investment loans decreases with respect to working capital loans and that the size of the loans also decreases. Lending programs should take into account this changes in demand and reallocate the financial resources by increasing the share of short term working capital loans with respect to long term investment loans. Fixed loan portfolio composition may result in financial failure.

Third, the composition of the MSE sector in terms of the share of enterprises that play the buffer role and those that play the leading role also changes according to economic conditions. In slow economic growth periods, the share of the first type of enterprises increases while the second type is significantly affected by economic crisis. Conversely, in fast economic growth periods, the large proportion of enterprises that play the buffer role decreases and the leading enterprises expand vigorously. Assistance programs should consider this changing composition of the sector and adjust their services to these changes.

Fourth, to improve the efficiency of assistance programs target groups of MSEs should be clearly identified and be consistent with the objectives of the programs. In defining target groups, programs' designers should take into account that enterprises have different objectives, characteristics, constraints and needs, and that consequently, each target group presents different opportunities, costs and risks. In addition, reaching different target groups implies the usage of different instruments as well as different methods of assistance.

For example, programs interested in reaching the poorest segment of the MSE sector may be interested in supporting enterprises which are created during economic downturns as a source of income for poor households. Program officials should consider that this group of MSEs is made of very small, young enterprises, lead by women and engaged in trade activities. In addition, a large percentage of these enterprises may be

located in rural areas, have no experience with credit or other financial services, and their owners have low education and training profile. Only a small proportion of this type of enterprises would last more than a year, and only a small proportion of their owners may have entrepreneurial skills.

The characteristics of this type of enterprises do not imply that they should not be supported. It implies that reaching them has high cost but it also implies that the assistance will have large impact on the poorest households. These entrepreneurs may be assisted with short term, small credits, and with technical training that allows them to improve their productivity when they return to the labor market. In addition, some of these entrepreneurs may be interested in acquiring managerial skills to use in the future. Also, these entrepreneurs may benefit from advise regarding the activities that are more profitable and basic principles for starting out a business. Program officials should have in mind that long term investment credit and more advanced managerial training may be beyond the interests of these entrepreneurs.

MSEs created with expanding and enduring purposes and with growth potential are easier to reach and may benefit from technical and managerial assistance (finance, marketing and accounting) and a combination of investment credit and working capital credit. In selecting the instruments to support enduring enterprises, programs' officials can take advantage of the information about the main obstacles that MSEs face as well as the main reason for closure of businesses as perceived by proprietors. Entrepreneurs'

opinion may guide them to understand the demand for assistance services. In the Dominican Republic, almost 60% of entrepreneurs of surviving business reported having a business related problem, 70% of which pointed out a general business problem. The most important general problems reported by proprietors of surviving enterprises are market problems followed by financial and profitability problems. This type of general problems may be the result of several factors combined which have not been identified by the proprietor. For example, market problems may result from low quality product, wrong pricing policies, lack of an appropriate market strategy, or a combination of these factors. Also, financial problems may be the result of managerial inefficiencies such as keeping inputs or outputs inventories at unnecessarily high levels, using funds for non-business activities, etc.

Looking at the perceptions of proprietors of closed enterprises about the causes of the closure, it was found that most enterprises close for business reasons, in particular, due to general performance of the business. Among these reasons, low profitability is the most important single reason for closure followed by problems of demand.

Market problems are the most important for surviving enterprises and they are also the second most important reason for closure of businesses. In fact, evidence showed that the main buyers of their products are individuals within the same neighborhood in which the enterprise is located and that they have remained the firms' principal clients since enterprise started out.

Low profitability is the main reason for closure and the second most common problem mentioned by proprietors of surviving enterprises. It includes a set of problems mentioned such as "low revenues" and "business is not doing well". Since profitability is the result of several factors combined, "low profitability" may indicate that the proprietor is unable to identify a specific problem. If this is the case, an important proportion of entrepreneurs are unable to identify the problem or problems that are affecting the performance of their business and as a consequence they are unable to solve it.

Financial problems are also mentioned frequently by proprietors of surviving and closed enterprises. These problems have to do mainly with lack of working capital.

These top three problems relate to different aspects of management of the business: expanding markets, obtaining financial resources needed and identifying factors that affect business profitability. Therefore, proprietors of micro and small enterprises in the Dominican Republic might benefit greatly from assistance programs aimed at improving their managerial skills. These programs should include different aspects such as basic accounting concepts, development of primary marketing skills, and learning of basic methods for evaluating the performance of the business.

6.3 Methodological Aspects

From a methodological perspective, this dissertation has emphasized the importance of having a method for collecting data suited to perform dynamic analysis of enterprises. Monitoring of micro and small enterprises must be framed in a geographic area. That is, evolution of enterprises over time must be related to a specific geographic area, so that both, businesses and household can be observed over time. This makes it possible not only to monitor surviving and closed enterprises but also to identify new business. A key aspect of this method is the availability of a sequential listing of all business and households within each enumeration area. The listing should be built starting with the baseline survey, and be updated during each follow-up survey. In addition this instrument should allow for the distinction between new and moving-in enterprises and closed and moving-out enterprises. In future studies, information about characteristics of the specific geographic area should also be collected, since they may affect enterprises birth and closure rates as well as MSEs' employment growth.

Another important methodological aspect is that unlike the birth rate estimates, the magnitude of the closure rates estimates seem to be very different according to the type of data used. Initial results for the Dominican Republic suggest that the retrospective approach, based on close enterprises questionnaire, produces closure rates significantly smaller than those using the prospective approach which is based on panel surveys. The repeated application of existing business questionnaire and the follow-up

of enterprises and households in every visit of a panel survey, help reduce dramatically the under-counting of closed business.

It was also observed that, two visits a year greatly improves the identification of short-cycle enterprises that for the Dominican Republic can represent around 10% of the enterprises operating at the beginning of a year. Also, the semiannual data do not support the existence of strong seasonal effects on the entry and exit data for the 1993 year.

In addition, the results indicate that researchers doing following-up surveys of micro and small businesses can find their sample greatly reduced because one third or more of enterprises at the beginning of a year may move out or close during the course of a year.

With respect to the data set, it was found that using panel data sets for hazard analysis of MSEs solves one of the main shortcomings encountered by McPherson and others whose works relied on retrospective data: a systematic undereporting of failed enterprises. Undereporting bias is specially problematic in hazard modeling, if there is a correlation between the undereporting scheme and some variables included in the model. In the data set used in this work, undereporting is limited to some enterprises that started out and closed down within one year. However, the data set still has some

limitations including high proportion of missing values, short period of observation, sample selection, and heterogeneity of initial conditions.

Finally, discrete hazard analysis seems to provid an appropriate framework within which to examine survival of micro and small enterprises. This model may be estimated using one of the many statistical packages designed to analyze limited dependent variables. The ease of access to this tool and the straight forward interpretation of the results from this model may facilitate future studies of enterprise dynamics.

APPENDIX A

APPENDIX A Table 1

Dominican Republic: Population and Enumeration Areas by Stratum

STRATUM	Enumeration Areas		Population 1981	Population Growth Rate 1981-1992	Population 1992	
	#	%				%
SANTO DOMINGO	**4,774**	**27.16**	**1,300,322**	**3.46**	**1,842,439**	**26.42**
High Income	565	3.21	148,971	2.10	184,338	2.64
Medium Income	2,471	14.06	678,629	2.10	839,743	12.04
Low Income	1,738	9.89	472,722	5.50	818,358	11.73
SANTIAGO	**982**	**5.59**	**259,178**	**3.41**	**365,615**	**5.24**
High Income	84	0.48	21,466	1.81	25,799	0.37
Medium Income	398	2.26	104,813	1.81	125,970	1.81
Low Income	500	2.84	132,899	4.75	213,846	3.07
CENTRAL	**5,406**	**30.75**	**1,923,489**	**1.54**	**2,249,625**	**32.26**
Secondary towns	1,002	5.70	313,404	4.02	469,410	6.73
Small towns	128	0.73	58,320	2.51	75,192	1.08
Rural towns	3,516	20.00	1,427,334	1.00	1,580,592	22.66
Sparse Pop. areas	760	4.32	124,431	0.00	124,431	1.78
SOUTHWESTERN	**1,898**	**10.80**	**680,776**	**1.20**	**769,663**	**11.04**
Secondary towns	381	2.17	153,005	2.17	190,665	2.73
Small towns	64	0.36	30,945	1.59	36,376	0.52
Rural towns	1,010	5.75	426,519	1.00	472,316	6.77
Sparse Pop. areas	443	2.52	70,307	0.00	70,307	1.01
SOUTHEASTERN	**4,520**	**25.71**	**1,368,535**	**2.41**	**1,746,624**	**25.04**
Secondary towns	1,172	6.67	321,697	.82	574,469	8.24
Small towns	252	1.43	95,102	3.41	134,108	1.92
Rural towns	2,203	12.53	803,839	1.00	890,150	12.76
Sparse Pop. areas	893	5.08	147,897	0.00	147,897	2.12
TOTAL	**17,580**	**100.00**	**5,532,300**	**2.29**	**6,973,966**	**100.00**
URBAN	8,755	49.80	2,531,973	3.74	3,688,274	52.89
RURAL	8,825	50.20	3,000,327	0.89	3,285,692	47.11

Source: Oficina Nacional de Estadística, Centro de cómputo Crecimiento intercensal en los principales centros urbanos 1970-1981

APPENDIX A Table 2

Sample Distribution: Areas, Visits and Population by Stratum

Stratum	Enumeration Areas		Visits		Population	
	#	%	#	%	#	%
SANTO DOMINGO	**119**	**39.7**	**8,853**	**37.2**	**35,518**	**38.1**
High Income	17	5.7	1,393	5.9	4,868	5.2
Medium Income	60	20.0	4,204	17.7	16,172	17.4
Low Income	42	14.0	3,256	13.7	14,479	15.5
SANTIAGO	**26**	**8.7**	**1,917**	**8.1**	**7,564**	**8.1**
High Income	3	1.0	242	1.0	940	1.0
Medium Income	10	3.3	603	2.5	2,345	2.5
Low Income	13	4.3	1,072	4.5	4,279	4.6
CENTRAL	**68**	**22.7**	**4,724**	**19.9**	**17,732**	**19.0**
Secondary towns	19	6.3	1,915	8.0	6,984	7.5
Small towns	3	1.0	248	1.0	968	1.0
Rural towns	36	12.0	2,305	9.7	8,813	9.5
Sparse Pop. areas	10	3.3	256	1.1	967	1.0
SOUTHWESTERN	**27**	**9.0**	**2,236**	**9.4**	**9,710**	**10.4**
Secondary towns	7	2.3	643	2.7	2,869	3.1
Small towns	3	1.0	424	1.8	1,832	2.0
Rural towns	11	3.7	840	3.5	3,636	3.9
Sparse Pop. areas	6	2.0	329	1.4	1,373	1.5
SOUTHEASTERN	**60**	**20.0**	**6,059**	**25.5**	**22,620**	**24.3**
Secondary towns	22	7.3	1,879	7.9	6,331	6.8
Small towns	3	1.0	351	1.5	1,354	1.5
Rural towns	24	8.0	3,356	14.1	13,238	14.2
Sparse Pop. areas	11	3.7	473	2.0	1,697	1.8
TOTAL	**300**	**100.0**	**23,789**	**100.0**	**93,143**	**100.0**
URBAN	202	67.3	16,230	68.2	63,420	68.1
RURAL	98	32.7	7,559	31.8	29,724	31.9

Source: Route Sheet - Baseline Survey, March 1992.

APPENDIX A Table 3

Sample Results: Number of Enterprises and Employment by Stratum*

Stratum	Enterprises		Employment		Density per 1,000 Inhabitants	
	#	%	#	%	MSEs	Employment
SANTO DOMINGO	**1,965**	**43.0**	**4,658**	**45.2**	**55**	**131**
High Income	261	5.7	867	8.4	54	178
Medium Income	1074	23.5	2,979	28.9	66	184
Low Income	630	13.8	812	7.9	44	56
SANTIAGO	**356**	**7.8**	**869**	**8.4**	**47**	**115**
High Income	15	0.3	38	0.4	16	40
Medium Income	106	2.3	381	3.7	45	163
Low Income	235	5.1	450	4.4	55	105
CENTRAL	**812**	**17.8**	**1,754**	**17.0**	**46**	**99**
Secondary towns	425	9.3	943	9.1	61	135
Small towns	29	0.6	53	0.5	30	55
Rural towns	336	7.4	727	7.1	38	82
Sparse Pop. areas	22	0.5	32	0.3	23	33
SOUTHWESTERN	**367**	**8.0**	**746**	**7.2**	**38**	**77**
Secondary towns	159	3.5	341	3.3	55	119
Small towns	60	1.3	112	1.1	33	61
Rural towns	137	3.0	271	2.6	38	74
Sparse Pop. areas	11	0.2	21	0.2	8	16
SOUTHEASTERN	**1,068**	**23.4**	**2,277**	**22.1**	**47**	**101**
Secondary towns	486	10.6	1,015	9.9	77	160
Small towns	52	1.1	115	1.1	38	85
Rural towns	437	9.6	966	9.4	33	73
Sparse Pop. areas	93	2.0	181	1.8	55	106
TOTAL	**4,568**	**100.0**	**10,304**	**100.0**	**49**	**111**
URBAN	3,532	77.3	8,106	78.7	56	128
RURAL	1,036	22.7	2,198	21.3	35	74

Source: Baseline Survey, March 1992.

* Include primary and secondary enterprises.

APPENDIX A Table 4

Sample Distribution: Number of Enumeration Areas, Visits and Enterprises

Stratum	Areas		Visits		Enterprises	
	March/93	Oct/93	March/93	Oct/93	March/93	Oct/93
Santo Domingo	20	20	1,436	1,509	286	313
Secondary Towns	16	16	1,247	1,403	200	209
Rural Areas	22	21	1,309	1,601	142	204
TOTAL	58	57	3,992	4,513	628	726

Source: Route Sheet, Follow-up Survey, March 1993.

APPENDIX B

APPENDIX B Figure 1

Dominican Republic. Route Sheet. Baseline Survey. March 1992.

Household ID	Household/Business Address	Name head of Household	# of people living in Household	Existing MPE		Dead MPE		Closed Household		Interview	
				Yes	No	Yes	No	Inhabitated	Empty	Rejected	No Reliable
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

APPENDIX B Figure 2

Dominican Republic. Route Sheet. Follow-up Survey, October 1993

1.	Area: __ __ - __ __ - __ __ - __ __ __	Date of Interview:	Page Number:
		Supervisor - Date:	Enumerator:
2.	Stratum: Sto. Dgo.__ Secondary towns__ Rural Areas__	Coder - Date:	Date of Previous Interview:

# Sequence	# Enterprise	Household/ Business Address	Name Head Household	# People living in Household	Closed Household		Activity and Name of Enterprise	Owner's Name	Number MPEs		Disappeared MPEs Mar/Oct 93	Changes		Rejected/ not reliable	ID number
					Inhabitated	Empty			Mar. 93	Oct. 93		Ownership	Activity		

APPENDIX C

APPENDIX C Figure 1

Semiannual Birth, Closure, Appearances and Disappearances Rates
of Micro and Small Enterprises in the Dominican Republic 1993-1994
(%)

	March 1993- September 1993 (a)	September 1993- March 1994 (a)
A. Appearances	20.21 (4.04)	17.76 (2.78)
1. Birth	15.88 (3.44)	15.14 (2.70)
2. Moved In	2.70 (1.08)	1.84 (0.50)
3. Short Cycled	1.62 (1.30)	0.78 (0.21)
B. Disappearances	20.88 (2.35)	16.99 (2.62)
1. Closure	14.20 (2.07)	12.57 (2.06)
2. Moved Out	5.06 (0.95)	3.63 (0.82)
3. Short Cycled	1.62 (1.30)	0.78 (0.21)
C. Net Rates		
1. Net Birth	1.69 (3.51)	2.57 (2.99)
2. Net Appearances	-0.67 (3.94)	0.77 (3.58)
% Short Cycled/ Appearances	8.12	4.4
# of Areas	56	58

Source: Microenterprise surveys March 1992, March 1993, October 1993, March 1994.
(a) Birth ,Moved In ,Closure and Moved Out rates exclude Short Cycle enterprises.
(b) Birth ,Moved In ,Closure and Moved Out rates include Short Cycle Enterprises.
Standard error in parenthesis.

APPENDIX D

APPENDIX D Figure 1

Existing Enterprises in March 1992.
Distribution of Disappearing and Surviving Enterprises by Cohort 1992 - 1993
(%)

Cohort	Disappearing			Surviving	Total
	1992	1993	Total		
Before 1980	10.6	10.8	10.7	21.4	17.9
1981 - 1985	5.9	15.3	11.2	18.2	16.0
1986 - 1989	11.8	24.3	18.9	25.2	23.2
1990	20.0	12.6	15.8	11.2	12.7
1991	28.2	23.4	25.5	15.0	18.4
1992	23.5	13.5	17.9	9.0	11.8
Total	100.0	100.0	100.0	100.0	100.0
Number of Enterprises	85	111	196	412	608

Source: Baseline Survey, March 1992 and Follow-up Surveys, March and October 1993.

APPENDIX D Figure 2

Competing Risks Multinomial Logit Model

Independent Variable	Business Reasons Coefficients (Standard errors)	Non-Business Reasons Coefficients (Standard errors)	Business/Non-business Coefficients (Standard errors)
Intercept	-0.9025** (0.4578)	-2.3004** (0.6717)	1.3979* (0.7663)
Dummy: Two Initial Workers	-0.7162* (0.3801)	-1.1078** (0.5375)	0.3916 (0.6252)
Dummy: Three or More Initial Workers	-0.8899** (0.4426)	-1.1013* (0.6025)	0.2114 (0.7195)
Dummy: Birth Cohort Before 1985	-1.2746** (0.3570)	-0.5539 (0.4270)	-0.7207 (0.5196)
Dummy: Birth Cohort 1986-90	-0.9655** (0.3162)	-0.3737 (0.3964)	-0.5918 (0.4662)
Dummy: Female Owned Enterprises	0.9994** (0.3067)	1.2649** (0.4117)	-0.2655 (0.4894)
Dummy: Mixed Gender Ownership	1.1937** (0.5504)	1.5872** (0.6804)	-0.3935 (0.8183)
Dummy: Manufacturing	-1.2040** (0.4983)	-0.0556 (0.4258)	-1.1484* (0.6231)
Dummy: Services	-0.6773 (0.4442)	-0.7389 (0.6437)	0.0616 (0.7520)
Dummy: Located in Santo Domingo	-0.0718 (0.3409)	-0.2519 (0.5086)	0.1801 (0.5768)
Dummy: Located in Rural Areas	-0.3863 (0.3286)	0.6346 (0.3910)	-1.0209** (0.4697)
Business Density in the Area	-1.8576 (1.5556)	-3.1268 (2.3299)	1.2692 (2.6606)
Dummy: Received Formal Credit	-2.0502 ** (1.0290)	-0.5125 (0.6546)	-1.5380 (1.1926)
Dummy: Received Informal Credit	0.1697 (0.3973)	0.3193 (0.5055)	-0.1496 (0.5871)
Dummy: Household had a Business Failure Before 1992	0.6819 (0.4487)	0.6865 (0.5478)	-0.0046 (0.6395)
Number of Closed Business	84	53	
Number of Observations		705	
Likelihood Ratio		676	

Source: Microenterprise surveys March 1992, March 1993, October 1993.

* Significant at the 90% level ** Significant at the 95% level

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