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ENTRY, EXIT, AND GROWTH AMONG SMALL-SCALE ENTERPRISES IN ZIMBABWE

BY

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ABSTRACT

ENTRY, EXIT, AND GROWTH AMONG SMALL-SCALE ENTERPRISES IN ZIMBABWE

By

Lisa Daniels

This study examines entry, exit, and growth among micro- and small-scale enterprises (MSEs) in Zimbabwe. Unlike previous studies that focus on a set of firms at one point in time, this study collected information on existing MSEs and MSEs that folded prior to the survey. Using industrial organization theory and a random effects model, the factors that influence entry and exit within industries were then examined over an eight-year period. An ordinary least squares (OLS) model was also used to explore the determinants of employment growth within firms under periods of increasing and decreasing economic growth.

The results from the entry and exit models show that both the labor-supply and output-demand hypotheses may play a role in MSE dynamics. The labor-supply hypothesis suggests that the MSE sector is driven by an excess supply of labor. This was supported in low-profit industries where turnover was high and traditional barriers to entry were not significant. More importantly, the negative relationship between economic growth and entry indicated that more people turn to low-profit industries as the economy declines. Furthermore, the expansion rate (entry minus exit) increases among low-profit industries as the gross domestic product (GDP) declines. The output-demand hypothesis suggests that the MSE

sector is driven by market demand. Although this was not confirmed among high-profit industries, entry was unrelated to economic growth and it was characterized by high barriers to entry, including experience, capital, and licensing requirements.

The employment growth model addressed two limitations of previous studies. First, paid and unpaid employment growth were examined separately. The results from this analysis showed significant differences among the factors that influence the two types of growth. Most importantly, paid employment growth was positively related to profits and credit whereas unpaid employment growth was not related to either factor. Second, growth was measured in one-year time periods of increasing and decreasing GDP rather than over the life of the firm. The results showed that economic conditions affect employment growth within the firm and within industries.

DEDICATION

Nick -- On that warm Friday afternoon of April 7, 1989, did I ask you out or did you ask me out? Although we may never know the answer, at least we know there really are happy endings in life.

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CHAPTER ONE

INTRODUCTION

1.1 Background

Micro- and small-scale enterprises (MSEs) in developing countries are an important source of employment. Recent studies conducted in the southern African region show that 17 to 33 percent of the work force in Botswana, Lesotho, Malawi, Swaziland, and Zimbabwe is engaged in small-scale activities.[1] Although many of these activities are undertaken in addition to farming, half to three-quarters of the small-scale activities provide 50 percent or more of household income. These activities include any nonfarm enterprise that employs 50 or fewer workers and markets at least 50 percent of its output.[2]

Because of their importance as a source of income and employment, MSEs have been the focus of many studies since the 1960's. These studies have covered a wide range of issues including urban and rural employment, policy effects on MSEs, training, nonfarm linkages to agriculture, credit, and gender issues. Despite the large body of literature on the MSE sector, most studies have focused

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[1] See for example: Daniels, 1994; Daniels and Fisseha, 1992; Fisseha, 1991; Daniels and Ngwira, 1992; and Fisseha and McPherson, 1991.

[2] Nonfarm enterprises may include agricultural production if at least 50 percent of the product is marketed. Other types of agricultural-related activities are also included such as food processing, trading, and transportation of agricultural goods.

on a set of firms at a given point in time. Information on entry and exit of MSEs in developing countries is practically nonexistent.

Entry of MSEs is examined in only two developing countries, Sierra Leone and Colombia (Chuta and Liedholm, 1985; Cortes *et al.*, 1987). While these studies report entry rates by size of localities, they do not explore the factors that lead to firm entry. Furthermore, accurate measures of entry rates require information on both existing firms at the time of the survey and firms that have opened and closed prior to the survey.

Evidence on firm disappearance or exit rates is greater, however, it is still limited. Exit rates by size, age, and sector are examined in five developing countries, without providing detailed information on the cause of disappearance (Cortes *et al.*, 1987; Chuta and Liedholm, 1985; Frishman, 1988; Anderson and Khambata, 1981; and Nag, 1980). More recently, studies of MSEs in Kenya, Swaziland, Zimbabwe, Botswana, and Malawi have included limited information on causes of firm exit (Parker and Aleke Dondo, 1991; Fisseha and McPherson, 1991; McPherson, 1992; Daniels and Fisseha, 1992; Daniels and Ngwira, 1992).

The literature on growth of MSEs in developing countries has increased over the past few years, focusing primarily on employment growth rates (Cortes *et al.*, 1987; Little et al 1987; Chuta, 1990; Liedholm and Mead, 1993). Growth rates reported in this literature, however, measure growth over the life of the firm. Because this method does not reveal the exact time of growth, the influence of

macroeconomic conditions on growth cannot be determined. Furthermore, an accurate relationship between growth and other factors cannot be estimated. The relationship between growth and the age of the firm, for example, cannot be measured since the age when growth occurred is unknown.

In addition to concealing the exact time of growth, previous studies have measured employment growth as the combined change in paid and unpaid workers. The forces that drive these two types of employment may differ significantly. For example, an increase in paid employees may reflect an increase in profits. Alternatively, an increase in unpaid employees may reflect the lack of employment opportunities for family members.

Based on the current literature described above, there are several gaps in the information on entry, exit, and growth of MSEs. First, accurate measures of entry and exit are not available because of the lack of information on MSEs that opened and closed prior to existing enterprise surveys. Furthermore, the conditions that drive entry and exit have not been thoroughly explored. By using information from two surveys on closed enterprises as well as an existing enterprise survey, this study attempts to measure entry and exit of MSEs in Zimbabwe. It also explores the conditions that drive entry and exit.

With regard to employment growth, the measurement of growth over the life of the firm has limited the ability of previous studies to examine the influence of macroeconomic conditions on employment growth. In addition, information on

the relationship between growth and other factors, such as proprietor characteristics, firm characteristics, and government regulations has been limited by the methods used to measure growth. By asking retrospective questions about the two years prior to the survey, this study examines growth in two one-year periods. In the first period, economic growth was declining, while in the second period economic growth was increasing. Furthermore, paid and unpaid employment growth are examined separately to determine the influence of economic growth and other factors on these two types of employment growth.

1.2 Objectives of the study

Based on the gap identified in the literature, this research has three principal objectives. The first objective is to measure MSE entry, exit, and employment growth in Zimbabwe. This information will shed light on the employment creation within the MSE sector. Combined with information on profits, the sustainability of MSE employment can be examined.

The second objective is to examine factors that influence MSE entry and exit. As discussed above, limited information on patterns of firm entry and exit is available while factors that drive firm entry and exit have not been rigorously examined in developing countries. An understanding of these factors may help policy makers to create a supportive environment for the formation of MSEs and for a longer life span. For example, governments policy often includes the

development of an "enabling environment" for micro and small enterprises. This environment cannot be created, however, without a thorough understanding of the forces that drive entry and exit of MSEs. Information on these forces could lead to a more supportive policy toward MSEs.

The third objective is to determine factors that influence MSE employment growth, particularly related to economic growth. As stated earlier, the exact time of growth has not been measured in previous studies. Therefore, economic conditions that affect growth in a given set of firms cannot be assumed to be the same for all firms. By measuring growth within the two-year period prior to the survey, all firms faced the same economic conditions. Growth related to these conditions can therefore be examined. Also, by measuring the influence of macroeconomic conditions and other factors on paid and unpaid employment separately, a more accurate assessment of the forces that drive each type of growth can be determined. This information will help policy makers to determine the type of growth that should be supported and a better understanding of how to create a supportive environment.

1.3 Organization of the study

This study is organized into seven chapters. Chapter Two describes Zimbabwe, including both current and historical events which influence the MSE environment. This is followed in Chapter Three by a detailed review of the

literature on entry, exit, and growth of MSEs. The methods used to meet the research objectives are presented in Chapter Four followed by the results in Chapters Five and Six. Finally, Chapter Seven offers a brief summary of the results, implications for policy and research methods, and suggestions for further research.

CHAPTER TWO

BACKGROUND ON ZIMBABWE

This chapter provides a brief description of Zimbabwe, including the geography, people, and the history leading up the current economic reforms. This information is necessary to understand the operating environment of MSEs in Zimbabwe today.

2.1 Description of Zimbabwe

2.1.1 Geography

Zimbabwe is a landlocked country surrounded by Zambia, Botswana, South Africa, and Mozambique. It covers a land area of 390,700 square kilometers, which is divided into five natural regions based on soil types and climatic factors. Within these regions, there are four primary types of agricultural systems: large-scale commercial farms, small-scale commercial farms, resettlement areas, and communal land areas. Natural Region 1 has the highest rainfall, receiving more than 1,000 millimeters per year in areas below 1,700 meters. Seventy-four percent of this area is occupied by large-scale commercial farms. Natural Region 5 has the lowest rainfall, which is too low and erratic for most crops including drought-resistant grain crops (Tabex, 1987). Forty-five percent of Natural Region 5 comprises communal lands with the remaining area

divided between large-scale commercial farms and national parks. This organization of farming areas is an outgrowth of historical events which are described in Section 2.1.3.

2.1.2 People

The 1992 census in Zimbabwe revealed a population of 10,407,767 with an intercensal growth rate of 3.13 percent. The population density was estimated at 26.62 persons per square kilometer. Twenty percent of the population is located in the two largest cities of Harare (including Chitungwiza) and Bulawayo.

The population can be divided into several ethnic groups including: Shona, Ndebele, Europeans, Asians, and Mixed Race groups. The Shona represent the largest group and occupy the north, center and eastern part of the country. The Ndebele occupy the western part of the country. The non-Africans in the remaining groups have never represented more than 6 percent of the population (Tabex, 1987). There are also some smaller African groups scattered throughout the country.

2.1.3 History

Four distinct historical periods in Zimbabwe have led to the current operating environment of MSEs in Zimbabwe: (1) the colonization of Zimbabwe

from 1894 to 1965; (2) the Unilateral Declaration of Independence (UDI) in 1965 up to independence in 1980; (3) independence in 1980 up to 1990; and (4) the introduction of the economic structural adjustment program in 1991 to the current day including the 1991/92 drought. These are described briefly below.

With the death of a local chief in 1894, Cecil Rhodes claimed all arable and grazing land in Zimbabwe for the British South Africa Company and the Crown. The indigenous population was settled in "Native Reserves" and "Native Purchase Areas," now know as communal and small-scale commercial lands described above. Within these areas, no land ownership rights were granted. This reallocation of land as well as treatment of the indigenous population led to periodic uprisings against colonial domination from 1894 to 1965.

In 1965, Ian Smith, leader of the colonial government at the time, declared an illegal "Unilateral Declaration of Independence." The British government responded by imposing economic sanctions. These included termination of assistance and trade. Other countries joined Britain by discontinuing trade with Zimbabwe, then know as Rhodesia. The colonial government responded by implementing a highly regulated economic system. For example, controls were imposed on foreign exchange, prices, wages, interest rates, and trade. Emphasis was also placed on import substitution industries and foreign exchange earning potential. These regulations led to a protected operating environment for businesses, or the lack of competition from outside forces.

During this same period from 1965 to 1979, the indigenous population began the war for liberation. Fighting between the colonialists and the indigenous population finally led to independence in 1980. At this time, general elections were held and the ZANU (PF) party, led by Robert Mugabe, won the victory at the polls. Independence was granted on 18 April 1980 with Canaan Banana as the first president and Robert Mugabe as the Prime Minister.

From 1980 to 1990, the new government adopted socialist policies and a stricter set of industrial policies. In particular, four key policies were used to control the industrial sector. First, extensive price controls were implemented including set prices for essential products and cost-plus pricing for other products. Second, the government set wages and implemented restrictive labor laws that inhibited firing of employees. Third, foreign exchange controls were tightened. Finally, the government obtained shares in large companies to reduce monopoly and oligopoly power (USAID, 1992). Because of these policies, monopoly powers were limited, however, barriers to entry were created. The foreign exchange allocation, price controls, and licensing system acted as disincentives to enter the industrial sector. For those firms already operating, the policies created incentives to focus on the domestic market without improving quality of their products.

By the end of the 1980's, the government realized the need to change economic policies to foster investment and growth. It was also necessary to

reduce the fiscal deficit which had grown substantially due to increased spending on health and education. At this time, the government decided to introduce the Economic Structural Adjustment Program (ESAP) which officially began in 1991.

2.1.4 Structural adjustment program and the 1991/92 drought

The structural adjustment program was introduced in Zimbabwe to promote higher medium- and long-term growth and reduce poverty (Government of Zimbabwe, 1991). It is a five-year program with four primary components: (1) deregulation, (2) trade liberalization, (3) fiscal policy reforms, and (4) monetary policy reforms. The first component, deregulation, deals with the removal of many regulations currently controlling business activities. For example, zoning, licensing, registration, labor market regulations, and price and marketing controls have often been identified as impediments to MSE activities (Harbin, 1993: Hess, 1993; Robinson, 1991; ENDA, 1990; IMANI 1990; Saito and Van Dijk, 1990; ILO/SATEP, 1989; Konrad Adenauer Foundation, 1988; UNIDO, 1988; Jasset and Jirira, 1987; and Price Waterhouse, 1986). Under ESAP, plans to change these regulations should ease the operating environment for MSEs in Zimbabwe.

Trade liberalization, the second component of ESAP, also has implications for MSEs. Foreign exchange allocation changes and removal of import restrictions under ESAP may have both a positive and negative impact on MSEs. For example, foreign exchange liberalization and removal of import restrictions

should alleviate input or raw material shortages frequently identified as a major constraint to MSE activity. (Mead and Kunjeku, 1993; Zimconsult, 1992; McPherson 1991; IMANI, 1990; Price Waterhouse 1986). Stronger competition with imported goods, however, may increase MSE failure rates.

The third component of ESAP, fiscal policy reforms, includes tax and expenditure reductions. Currently, corporate taxes are 45 percent while individual taxes are as high as 60 percent. This tax structure has repeatedly been cited as an impediment to MSE activity (Robinson, 1991; Human Resources, 1990; IMANI, 1990; USAID, 1990; Price Waterhouse, 1986).

Under the fourth component, monetary policy reforms, interest rates have been liberalized and now play a greater role in allocating credit. Previously banks had a strong incentive to limit credit to larger, well-established firms. With higher interest rates, investment by larger firms may decline, however, credit is now available to a wider range of firms. The beneficiaries of this policy are more likely to be medium-sized firms rather than micro or small enterprises.

In addition to the key components of structural adjustment reviewed above, sectoral initiatives have also been introduced both prior to ESAP and since ESAP began. In particular, micro and small enterprises have been targeted though several promotional measures including: the Small Enterprise Development Corporation (SEDCO), the small enterprise scheme of Zimbank, the Zimbabwe Development Bank (ZDB) fund for capital equipment, the African Development

Bank (ADB) soft loan window, and ZDB surplus funds facility (Government of Zimbabwe, 1991). These programs may provide more capital to the MSE sector.

While many changes since 1991 have been attributed to the structural adjustment program, the MSE operating environment has also been affected by the drought of the 1991/92 agricultural season. During this period, the southern African region experienced the worst drought of the century. Rainfall in Zimbabwe was only 43 percent of average annual rainfall from 1970 to 1991.

Although it is difficult to separate the effects on the economy from the drought and ESAP reforms, the World Bank estimated that the external debt increased to over Z$50 billion in 1992 because of the drought (The Herald, 12/3/92).[3] This was partially caused by an 80 percent reduction in the maize harvest and a 35% reduction in agricultural output compared to the previous year. Based on these shortages, high interest rates, and reduced consumer demand, real Gross Domestic Product (GDP) fell by 7.7 percent in 1992. While the economy has improved since 1992, ripple effects created by the drought are expected for several years.

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[3] The exchange rate in December 1992 was US$1.00 = Z$5.40.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

As mentioned in the introduction, a large body of literature exists on the MSE sector that covers a wide range of topics. The literature review in this section focuses on the two key areas identified in the objectives of this study: entry and exit of MSEs, and growth of MSEs. Sections 3.2 and 3.3 begin with an examination of the rates of entry and exit, respectively. The rates are followed by a theoretical framework for analysis of entry and exit based on microeconomic theory and industrial organization. Using this framework, a review of the measurement and determinants of entry and exit follows. Section 3.4 introduces theories of entrepreneurial choice as an alternative framework to analyze entry. This is followed by a comparison of industrial organization and entrepreneurial choice theories in Section 3.5. Finally, Section 3.6 presents growth rates of MSEs followed by a literature review of the factors that influence growth.

3.2 Firm entry

3.2.1 Firm entry rates

Firm entry has rarely been studied in developing countries. This is partly due to the lack of statistics on micro and small enterprises in developing

countries and the survey methods used to study MSEs. Frequently, survey methods involve repeated visits to a set of firms, yielding information on firm growth and exit for that particular set of firms. This method, however, does not provide information on firm entry for the MSE sector. Other studies have used a single-visit survey to estimate annual entry rates based on the existing set of firms at the time of the survey. This method underestimates entry rates since it excludes firms that opened and closed prior to the survey. Nonetheless, it does give some indication of entry rates in developing countries. Entry rates estimated from existing firms in developing countries are reviewed below as well as a comparison to entry rates in the United States and Canada.

Liedholm (1990) reviewed the frequency of firm births in Sierra Leone. He found a 12.8 percent annual average birth rate. He also showed that birth rates were higher in localities with more than 20,000 residents. In Colombia, from 1970 to 1975, Cortes *et al.* (1987), reported an average annual birth rate of 8.1 percent. These figures closely correspond with estimates of birth rates in the U.S. where Phillips and Kirchhoff (1988) showed that small firm birth rates ranged form 8.9 to 12.1 percent while large firm birth rates ranged from 2.4 percent to 4.9 percent. Combining all firm sizes, Baldwin and Gorecki (1991) estimated an entry rate of 5 percent for Canadian manufacturing firms in the 1970s.

3.2.2 Theoretical framework for analysis of entry

While the estimates reviewed above indicate the magnitude of entry, they do not reveal factors that influence entry. According to microeconomic theory, firms will enter an industry characterized by free entry whenever profits are positive. An industry is defined as "the set of firms that produce products that are viewed as close substitutes by consumers (Varian, 1987)." This entry process into an industry continues until profits are driven to zero. Similarly, if profits are negative, firms will exit an industry until profits are zero. In a long-run equilibrium, factors of production are paid their market price. Under this scenario, there are no incentives to attract new factors of production to the industry since each factor of production is earning the same amount that it could earn elsewhere.

The long-run equilibrium described above is based on the assumptions of a perfectly competitive industry. These assumptions include: a large number of firms producing homogeneous products; profit maximization within firms; each firm is a price taker; free mobility of all resources, including free entry and exit of firms; and perfect knowledge. Although perfect competition is often used as a framework to study industry organization and behavior, economists recognize that the assumptions of perfect competition are not realistic. Based on the weaknesses of this model, a new framework of analysis called industrial organization (IO)

emerged in the 1930s and was later developed by other scholars (Mason, 1939; Bain, 1959; Shaffer, 1980; Scherer, 1980; Caves, 1982; and Marion, 1986).

Industrial organization has been defined by Scherer as "how productive activities are brought into harmony with society's demands for goods and services through some organizing mechanism such as a free market, and how variations and imperfections in the organizing mechanism affect the degree of success achieved by producers in satisfying society's wants (Scherer, 1980, p.1)." Industrial organization uses the basic theory of the market from microeconomics and adds an institutional dimension and an emphasis on behavior. More specifically, the ultimate performance of the market depends on the conduct of buyers and sellers, which in turn depends on market structure. Both conduct and market structure also depend on basic conditions that are a function of the particular industry being reviewed. Combined, these elements, illustrated in Table 3-1, make up the structure-conduct-performance (SCP) paradigm.

Rather than using pure microeconomic theory, IO theorists use the SCP paradigm to study firm entry. Entry no longer depends strictly on profit levels in a perfectly competitive industry. Instead, entry is studied in a more realistic setting where basic conditions, market structure, and conduct can affect entry patterns. These studies of entry are reviewed below.

Table 3-1: A model of industrial organization analysis

BASIC CONDITIONS

Supply	Demand
Raw materials	Price elasticity
Technology	Substitutes
Unionization	Rate of growth
Product durability	Cyclical and seasonal character
Value/weight	Purchasing method
Public policies	Marketing type

MARKET STRUCTURE

Number of sellers and buyers
Product differentiation
Barriers to entry
Cost structures
Vertical integration
Conglomerateness

CONDUCT

Pricing behavior
Product strategy and advertising
Research and innovation
Plant investment
Legal tactics

PERFORMANCE

Production and allocative efficiency
Progress
Full employment
Equity

Source: Scherer (1980)

3.2.3 Measurement of firm entry

Many authors have used IO theory to examine the factors that influence firm entry in the United States and Canada. Under this theory, entry is examined at the industry level since basic conditions, structure, and conduct specific to an industry will affect firm entry patterns. More generally, Dunne, Roberts, and Samuelson (1988) suggest that impact of entry is related to markets. Therefore, entry measures should be specific to markets rather than aggregated across markets. Assuming that industries, defined by microeconomics above, represent separate markets, industries are typically specified as the Standard Industrial Classification (SIC) four-digit industries in the United States and three-digit industries in Canada.

There are several ways to measure entry as illustrated by different studies. MacDonald (1986) and Khemani and Shapiro (1986), for example, use gross entry as the dependent variable to examine the factors that influence firm births. Gross entry is defined as the absolute number of new firm entrants in a given industry over a specified time period. Alternatively, Orr (1974) uses net entry as the dependent variable to examine factors that influence firm births. In this case, net entry is defined as the absolute number of firm births minus firm closures in a given industry over a specified time period. Hamilton (1985) and Khemani and Shapiro (1986) argue that gross entry is more appropriate than net entry because net entry conceals the magnitude of gross entry over time. Furthermore, Khemani

and Shapiro (1986) maintain that net entry is simply calculated from published data as the change in the number firms from period t to t + n. This calculation leads to measurement errors since it aggregates entry, exit, mergers, and diversification of firms. Orr (1974) also acknowledges that gross entry is more appropriate than net entry, however gross entry data were not available for his study.

In addition to the net and gross entry of the absolute number of firms described above, several authors use net and gross entry *rates* to examine the factors that influence entry. For example, Mansfield (1962), Gorecki (1975), and Duetsch (1975) define the net entry rate as the change in the number of existing firms from period t-1 to t divided by the number of existing firms at the end of the period t-1 (or the beginning of period t). Hamilton (1975) and MacDonald (1986) use the gross entry rate defined as the number of new firms in period t divided by the existing stock of firms at the beginning of period t. In distinguishing between net entry rates and gross entry rates, Duetsch (1984) points out a number of flaws with the net entry rate. These include the following: (1) the net entry may be much lower than gross entry if a large number of firms have exited the industry; (2) the net entry rate does not reveal any change when a firm is taken over by a new owner; and (3) when one firm enters and two firms merge, there is no change in the entry rate. Overall, these flaws reduce the explanatory power of the model according to Duetsch. Similarly, Mansfield and Gorecki

acknowledge that gross entry rates would be preferred for their studies, however, the available data dictated the use of net entry rates.

Comparing the absolute number of new firms to entry rates, Mansfield (1962) argues that entry rates are more appropriate since the absolute measurement does not control for industry size. He points out, for example, that the entry of two new firms into an industry that only has two firms represents a different set of dynamics than the entry of two new firms in an industry that has 100 firms. Orr (1974) also argues that entry must be correlated with industry size. Since larger industries will tend to have a higher number of entries, this factor must be controlled for in the model. In contrast, Khemani and Shapiro (1986) argue that the size of the industry is partly determined by the barriers to entry. An examination of the factors that influence entry should not, therefore, use industry size in the dependent variable. They claim that the coefficients on barriers to entry will be biased toward zero since the positive correlation between absolute entry and size of an industry will lead to relatively constant entry rates despite inter-industry differences in barriers to entry.

While Khemani and Shapiro argue against entry rates, all of the remaining authors reviewed in this section have used rates or controlled for size of the industry by including a size measurement in the dependent variable or among the independent variables. For example, Mansfield (1962), Gorecki (1975), Duetsch (1975), Duetsch (1984), Hamilton (1985), and MacDonald (1986) used entry rates

as their dependent variables. Acs and Audretsch (1989) and Hause and Du Rietz (1984) use the ratio of new firm employment to initial industry employment to control for the size of the industry. Finally, Orr (1974) adds industry sales as an independent variable to account for the correlation between industry entry and size. Considering the significant results estimated by these studies that control for size, Khemani and Shapiro's argument that coefficients are biased toward zero is not supported.

As mentioned above, two studies measure entry through employment rather than the number of firms (Acs and Audretsch, 1989; Hause and Du Rietz, 1984). This alternative measure of firm entry is employed to account for entry by firm size. Acs and Audretsch argue, for example, that treating each new firm as one entry tends to understate entry when new firms are large and overstate entry when new firms are small. Duetsch (1975) supports this argument by stating that entry rates based on firms give too much weight to the turnover of a large number of small firms. Hause and Du Rietz employ a different argument to use employment rather than firms. They claim that entry measured through employment is a proxy for product market shares of new firms which is a more direct measure of the impact of entry than the traditional use of the number of firms.

The entry measurements reviewed above included gross and net absolute firm entry, gross and net firm entry rates, and entry measured through employment. In addition to the debate on how to numerically measure entry,

there is also a debate on the definition of entry. For example, Gorecki (1975) and MacDonald (1986) distinguish between diversified firms and new or specialized firms. In both cases, the determinants of entry vary by the type of entry under examination. Similarly, Hamilton (1985) makes the distinction between independent firms that are not part of another organization and dependent firms that are branches or subsidiaries within larger corporations. Again, he finds by estimating separate regressions that independent and dependent firms respond differently to the same entry determinants. Khemani and Shapiro (1986) and Duetsch (1975) also acknowledge differences in entry patterns by limiting their studies to new plants created by new firms and independent firms, respectively. Finally, Acs and Audretsch (1989) distinguish between size categories within industries by estimating separate regressions for firms with fewer than 100 workers, fewer than 500 workers, and 500 or more workers. They find contrasting entry behavior among size categories within the same industries. Combined, these results show that refined definitions of entry are an improvement over the aggregation of all types of firms.

3.2.4 Determinants of firm entry

The factors that influence firm entry are typically categorized as barriers to entry and entry-inducing factors. Barriers to entry reflect market structure characteristics and are expected to be inversely related to entry. High

levels of market concentration and economies of scale, for example, are expected to inhibit new firm entrants. Alternatively, entry-inducing factors are expected to be positively correlated with entry. These factors are represented by industry profitability and growth. In addition to barriers to entry and entry-inducing factors, Acs and Audretsch (1989) suggest a third category called the technological environment. While many authors have included technological innovations in their models of firm entry, there is a debate over the relationship between firm entry and technology. Because of the mixed results, it is difficult to classify technological innovations as a barrier or an entry-inducing factor. Results from all three categories are presented below.

Barriers to entry

As mentioned above, barriers to entry are typically market structure characteristics that inhibit new firm entrants. One of the most frequently cited barriers to entry is the level of market concentration. High levels of market concentration are expected to deter new firm entrants. Khemani and Shapiro (1986), Orr (1974), and Hause and Du Rietz (1984) provide evidence that support this hypothesis using three measurements of concentration: (1) the Herfindahl Hirschman Index; (2) a ranking based on concentration ratios; and (3) a dummy variable to represent the existence of a significant registered cartel agreement. Market concentration was not, however, a significant factor in all studies. For

example, based on the percent of industry employment in plants with more than 500 people, and a measurement of market power, Hamilton (1985), and Duetsch (1984) found that market concentration was not significant. In a third case, Duetsch (1975) found that market concentration measured by the concentration ratio (CR4) was positive. Acs and Audretsch (1989) suggest that these mixed results reflect the aggregation of all firm sizes. By running separate regression for firms with one to 99 workers, one to 499 workers, and 500 or more workers, Acs and Audretsch show that market concentration is a barrier to entry for firms with 499 or fewer workers. For larger firms, however, market concentration is positively correlated with entry. Acs and Audretsch suggest that this positive relationship reflects a large-firm advantage in concentrated markets.

Higher levels of capital expenditure required to start a business are also expected to pose barriers to entry. This hypothesis is supported by numerous empirical results that used various measurements of capital expenditure. For example, Orr (1974) and Mansfield (1962) used the level of investment required to establish a firm of minimum efficient size to show that capital is a barrier to entry. Hamilton (1985) employed the capital expenditure associated with entry at the modal employment size in each industry as a measure of capital expenditures. Macdonald (1986) measured capital barriers as the asset value of an efficiently sized plant. This was calculated as the ratio of fixed assets to sales in industry multiplied by the minimum efficient scale of plant. Khemani and Shapiro (1986)

used the cost of fuel and electricity required for a minimum efficient size plant. Finally, Duetsch (1984) calculated capital requirements for each industry by the average shipments of the largest plants accounting for 50 percent of industry shipments multiplied by the industry assets/shipments ratio. In all cases, capital was a significant factor and negatively correlated with entry.

Advertising or product differentiation by established firms is also expected to discourage new or potential entrants. In this situation, new firms must spend a large sum of money to win market shares from existing firms. Acs and Audretsch (1989), Duetsch (1975), Gorecki (1975), Khemani and Shapiro (1986), and Orr (1974) have shown that advertising expenditure by established firms is a barrier to entry.

Economies of scale have also been identified as barriers to entry. When economies of scale exist, new entrants must capture a substantial portion of market share to generate profits. Because economies of scale are difficult to measure, authors have used proxies such as the minimum efficient plant size and the small-firm cost disadvantage. For example, the former was measured by Duetsch (1984) as the ratio of the value added per worker in the largest plants that generate 50 percent of industry output to value added per worker in the remaining plants. Gorecki (1975) measured economies of scale as the ratio of the minimum efficient size plant size to the size of the industry as a whole. The minimum efficient plant size was estimated by the average size of the plant in terms of net output.

Similarly, Hause and Du Rietz (1984) measured the minimum efficient size as the average size of firms in the industry. In their study, however, employment was used instead of net output. The small-firm cost disadvantage was measured by Acs and Audretsch (1989) as the small-firms sales-per-employee divided by the industry sales-per-employee. In all cases, economies of scale was a statistically significant barrier to entry.

In addition to the more common barriers to entry reviewed above, some authors have tested other barriers to entry such as human capital requirements, tariffs, risk, and multiplant operations. Acs and Audretsch (1989), for example, show that high levels of human capital present a barrier to entry for firms with one to 499 employees, however it is not a barrier for larger firms. Tariffs were tested by Khemani and Shapiro (1986) to account for foreign competition. Using the nominal tariff rate, they found that tariffs do pose a barrier to entry. Orr (1974) included risk as deviations from the average profits within an industry and found that it was negatively correlated with entry. Finally, Duetsch (1984) found that the extent of multiplant operations within an industry was a barrier to entry. He hypothesized that multiplant firms "have potential economies . . . over single-plant firms in spreading risks, raising capital, procuring materials, supporting research and development, and engaging in sales promotion activities (p. 477)."

Entry-inducing factors

As discussed above, microeconomic theory predicts that an industry characterized by positive profits will attract new firms, assuming there are no barriers to entry. Entry-inducing factors are, therefore, typically represented by industry profitability measures. These include the price-cost margin, industry sales growth, industry employment growth, or some other measure of profitability. Measures of these variables and the significance of their impact on entry are reviewed below.

Numerous studies have incorporated published data on industry price-cost margins as a determinant of firm entry. For example, Duetsch (1975), Duetsch (1984), Hamilton (1985), and Khemani and Shapiro (1986) found that price-cost margins were significant and positively correlated with entry. In the studies conducted by Acs and Audretsch (1989) and MacDonald (1986), however, price-cost margins were not significant. In the latter case, MacDonald (1986) used the residual from a regression of price-cost margin as a function of capital and advertising.

Industry sales growth, measured as the percentage growth in sales, was a positive determinant of new entrants in the studies conducted by Acs and Audretsch (1989) and Gorecki (1975). Similarly, industry employment growth was also a positive determinant of new entrants in studies conducted by Hamilton (1985) and Hause and Du Rietz (1984).

Other measures of industry profits or growth were also incorporated into studies of new firm entrants. For example, Duetsch (1975) estimated the entry rate as a function of the price-cost margin which in turn was a function of demand growth. In this case, demand growth was a positive determinant of the price-cost margin. Duetsch (1984) measured industry growth as the percentage growth in the value of shipments and found that it was a significant determinant of entry. Khemani and Shapiro (1986) divided industry growth by the minimum efficient plant size as a percentage of the market and found that it was significantly positive. They argue that their measurement is more accurate than industry growth alone because entry will only rise if industry growth is high enough to allow efficient operation of plants of minimum efficient size. Finally, Orr measured industry growth as the percentage change in value added over a certain time period, which was a positive determinant of firm entry.

Technological environment

As mentioned above, barriers to entry are negatively correlated with entry while entry-inducing factors are positively related to entry. Technological innovations, however, do not fit neatly into one of these categories. Some authors argue that established firms use technological innovation to deter new entrants. Alternatively, a technological environment may increase entry since new firms can use innovations as a means to attract market shares.

Using research and development (R&D) expenditures as a proportion of industry sales, Orr (1974) found a negative relationship between R&D and entry. In contrast, Highfield and Smiley (1987) found a positive relationship and Khemani and Shapiro (1986) found no significant relationship using the same measurement.

Acs and Audretsch (1989) calculated the number of small firm innovations divided by the total number of innovations as a measurement of R&D within an industry. Their results indicate a positive relationship between R&D and entry, however, a high technological environment is more conducive to large firm entrants.

3.3 Firm exit

3.3.1 Firm exit rates

Similar to firm entry rates, firm exit rates have rarely been studied in developing countries. Again, this reflects a lack of statistics on micro and small enterprises in developing countries and the survey methods used to study MSEs. While repeated visits to a set of firms yields information on exit for that set of firms, it does not reveal firm exit rates or behavior for the MSE sector as a whole. Surveys that cover MSEs that folded would be a more appropriate method to record exit rates and behavior over time. Because these types of studies have not

previously been available, exit rates based on visits to the same set of firms in developing countries are reviewed below.

Exit rates were studied by Frishman (1988) in Nigeria and Chuta and Liedholm (1985) in Sierra Leone. Frishman found only 39.7 percent of a subset of firms one year after the original contact. After a seven-year period, Frishman tried to find a subset of firms from permanent sites. Only 27.5 percent of these firms were located. Similarly, Chuta and Liedholm tried to find 60 firms after a six-year period. They found 43 percent of the firms in Freetown and only 34 percent of firms in smaller localities.

Compared to exit rates studied elsewhere, the exit rates described above are high. Using data from five developing countries and the United States, Liedholm (1990) showed that exit rates ranged from 1.3 percent to 12.5 percent in the manufacturing sector. He also showed that annual exit rates for micro enterprises are higher than exit rates for small and medium firms with ten to 199 workers. For example, in the U.S., micro enterprises had an annual exit rate of 12.5 percent compared to 8.3 percent for medium firms in the 1976 to 1982 period. Baldwin and Gorecki (1991) also estimated a low exit rate of 6.5 percent for manufacturing firms in the U.S. during the 1970s.

3.3.2 Theoretical framework for analysis of exit

While the estimates reviewed above give some indication of the magnitude of firm exit, they do not reveal factors that influence firm exit. The study of exit behavior is based on the same theoretical framework as the analysis of firm entry. In the case of firm exit, microeconomic theory predicts that firms will exit an industry when profits are negative. This process will continue until economic profits are zero. Again, this theory is based on the assumptions of a perfectly competitive industry. Because these assumptions are unrealistic, the IO framework reviewed above is a more appropriate method to study the factors that influence exit behavior. Similar to firm entry, the IO framework acknowledges the influence of basic conditions, market structure, and conduct on firm exit.

3.3.3 Measurement of firm exit

Unlike firm entry, very few authors have studied firm exit in the United States and Canada. For those studies that are available, IO theory is used to examine the factors that influence firm exit. Again, similar to entry, exit is examined at the industry level since basic conditions, structure, and conduct specific to the industry will affect exit behavior.

Both MacDonald (1986) and Dunne, Roberts, and Samuelson (1988) use gross exit rates to examine the determinants and patterns of firm exit. The gross exit rate is defined as the number of firms that exit from a given industry in a

specified time period divided by the number of firms alive at the beginning of the time period for that industry.

Although both studies use the same numerical measurement of exit, their definitions of exit differ. MacDonald (1986), for example, distinguishes between the exit of "specialist" firms and "diversified" firms. Specialist firms represent those firms for which the largest share of employment is engaged in production of the product for their industrial classification. Alternatively, diversified firms represent those firms for which the industry is secondary. In this case, the largest share of employment within the firm is engaged in the production of products outside of its industrial classification. Dunne, Roberts, and Samuelson (1988) define exit in ways that are consistent with definitions used for entry. For example, exit of firms that started as new or diversified firms is examined as well as the method of entry. The method of entry includes firms that started by constructing a new plant or firms that started in an industry by changing the product mix within existing plants.

Caves and Porter (1976) use a completely different approach for both the numerical measure of exit and the definition of exit. Instead of aggregating firms within an industry, they assume that one business represents an industry. The

dependent variable is then a binary variable which equals one if a major competitor has exited from the industry and zero if otherwise.[4]

3.3.4 Determinants of firm exit

Similar to firm entry, determinants of firm exit can be categorized as barriers to exit and exit-inducing factors. Some authors argue that there is a high degree of symmetry between exit and entry determinants. Khemani and Shapiro (1986), for example, report high degrees of correlation between entry and exit barriers. Caves and Porter (1976) also note the "structural symmetries" between barriers to entry and exit. For example, high expenditures on capital equipment that act as barriers to entry will also act as barriers to exit due to the high level of sunk costs. While there is very little statistical evidence to support the relationships between entry and exit determinants, the effects of exit determinants, reported hypotheses, and evidence are reviewed below.

Barriers to exit

Barriers to exit are expected to be negatively correlated with exit rates. One of the most frequently cited barriers to exit is the level of capital

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[4] In a second set of analyses, Caves and Porter change the dependent variable to equal one if the before-tax return on investment was less than a cutoff value and zero if otherwise. In this case, the association between exit barriers and the presence of firms with persistently low profits was measured. Most of the hypotheses discussed below were supported by this alternative measurement of exit behavior.

expenditure. More specifically, Caves and Porter (1976) define this barrier as the ownership of "durable and specific assets." Because durable and specific assets cannot be easily transferred to another type of activity, firms may continue to operate despite low profits. According to Caves and Porter, "assets may be specific to the particular business or productive activity, to the company employing them, to the physical location, or to any combination of these (p. 40)."

Although durable and specific assets are typically associated with large machinery or indivisible equipment, Caves and Porter (1976) describe both tangible and intangible fixed assets. Tangible assets may include skilled labor, indivisible equipment, and inventories of inputs or final products with limited salvage. Intangible assets include trademarks and good will developed by the business. Investment in either type of asset may impede exit.

To test the significance of durable and fixed assets, Caves and Porter (1976) employed three variables related to plant and equipment and one variable related to trademarks. In the first case, the variables related to plant and equipment were not significant. These included the following: (1) the average investment of fixed and working capital divided by full capacity sales; (2) the annual depreciation charge on major fixed assets divided by the net book value of plant and equipment; and (3) the net book value of plant and equipment divided by gross book value of plant and equipment. MacDonald (1986), however, found a significant negative relationship between capital commitments and the exit rate by

using the ratio of fixed assets to sales in an industry multiplied by the minimum efficient scale of a plant. As a proxy for intangible fixed capital, Caves and Porter (1976) used advertising and sales promotion expenses plus product research and development expense divided by net sales. They found a significant negative relationship between this proxy and the exit rate.

In addition to durable and specific assets, Caves and Porter (1976) also included a set of variables that represented "jointness." For example, a diversified firm may share marketing channels, facilities, and equipment for several product lines. In this case, a higher level of jointness may lead to lower exit rates as firms subsidize low-profit products with revenue from high-profit products. The results, however, indicated a positive relationship between several of the jointness variables and the exit rate. Caves and Porter suggest that this may be due to the inadequacies of using a single firm to represent the industry as a whole.

Caves and Porter (1976) also suggest that managerial behavior can affect exit rates. For example, managers may be reluctant to close a firm since it may reflect on their managerial abilities. Also, managers may be loyal to a community or hesitant to lay off workers. Although these are difficult to measure, Caves and Porter included measures of diversity and the growth rate of the company as proxies for the managerial factor. They suggest that higher levels of diversity and growth rates should reduce the pressure to eliminate unprofitable businesses. Neither of these variables, however, was significant. Again, Caves and Porter

suggest that the insignificance may reflect the inadequacy of the dependent variable.

A generational or turnover variable was also included in the analysis conducted by Caves and Porter (1976). This is measured as a binary variable that indicates if a major competitor has entered the business. Caves and Porter (1976) suggest that this entry variable represents the "unknown underlying forces that speed the generational turnover of sellers (p. 56)."

Exit-inducing factors

Exit-inducing factors are expected to be negatively correlated with exit rates in contrast to entry-inducing factors that are positively correlated with entry. For example, as industry growth decreases, exit rates should rise. Both MacDonald (1986) and Caves and Porter (1976) use measures of industry growth to test this relationship. MacDonald included the percentage change in industry employment as a measure of growth, which was not significant. Caves and Porter measured growth through the change in industry shipments, which was inversely related to exit as expected.

3.4 Theories of entrepreneurial choice

The models reviewed above used IO theory to study firm entry and exit. Firms were aggregated at the industry level under the assumption that each

industry represented a separate market. Industrial organization theory was then used as a framework to examine the impact of the basic conditions, market structure, and the conduct of market participants on entry and exit.

In addition to the use of IO theory, theories of entrepreneurial choice have been developed to study entry and exit. Under these theories, the individual choice to become an entrepreneur or to work for someone else is examined. Kihlstrom and Laffont (1979), for example, develop a model that focuses on risk. The individual has a choice between operating a risky firm or working for a riskless wage. The choice is based on a comparison of the expected utility derived from profits or wages from the two options. To make this choice, the individual considers his or her abilities, labor skills, attitudes toward risk, and initial access to capital. The model shows that less risk averse individuals become entrepreneurs while more risk averse individuals work as laborers.

Kanbur (1979) also developed a model of entrepreneurial choice based on risk. In his model, individuals choose between becoming an entrepreneur or a laborer. Using a general equilibrium framework, he shows that societies that are less risk averse do not necessarily have higher national income or greater income inequalities.

In a model that focuses on managerial ability, Lucas (1978) examines entry, exit, and the size distribution of businesses. In his model, people with greater managerial ability become entrepreneurs while those with less managerial

ability supply labor. Entry and exit occur as those with marginal ability move between roles as entrepreneurs and workers. Based on this model and the assumption of decreasing returns to scale, Lucas predicts the size-distribution of firms assuming a given distribution of managerial talent. He also uses empirical results to show that firm sizes increase as the economy becomes wealthier.

Brock and Evans (1986) also developed a model to study entrepreneurial choice. In their model, an individual maximizes expected utility which is a function of wage or earnings. Wages or earnings are in turn a function of individual characteristics, including demographic and human capital indicators. Using only men who worked full time in the preceding year, Brock and Evans examine the characteristics of self-employed versus wage workers. Their results indicate that education, income earned by a spouse, immigrant status, and marital and family status are not significant determinants in the choice between self-employment and labor supply. Significant determinants include age, race, and location. More specifically, as men become older, self-employment increases at a decreasing rate and African Americans and urban dwellers are less likely to become entrepreneurs.

3.5 Comparison of industrial organization and entrepreneurial choice theories

Both the entrepreneurial choice and industrial organization theories attempt to explain firm entry. Although there are differences, entrepreneurial choice and

industrial organization do not represent competing theories of firm entry. Instead, the two theories complement each other and have a large degree of overlap. A comparison of the two theories is presented below beginning with the question addressed by the two theories, the unit of analysis, the assumptions, and the independent variables of the two theories.

3.5.1 Question addressed and unit of analysis

The entrepreneurial choice theory addresses the question "What factors affect an individual decision to start a business?" The question under industrial organization theory is "What factors affect entry within specific industries?" Under entrepreneurial choice theory, the unit of analysis is the individual. Industrial organization theory takes a different perspective by reflecting the sum of individual decisions to start a business and using the industry entry rate as the unit of analysis.

3.5.2 Assumptions

Under the entrepreneurial choice theory, the individual assumes that industry structure, profits, and prices are given. The individual then compares expected income from various industries as well as other alternatives based on his or her skills, attitudes toward risk, and access to capital.

Industrial organization theory incorporates the effect of individual decisions in determining market structure for specific industries. It then assumes that the market structure will affect market conduct and ultimately market performance. For example, an industry represented by a large number of sellers (or individuals making the decision to enter a certain industry) should be characterized by more competitive pricing and thus more efficient allocation of productive resources.

3.5.3 Independent variables

Because industrial organization theory implicitly reflects the sum of individual decisions from entrepreneurial choice theory, there is a large degree of overlap between the independent variables used in the two theories. For example, entrepreneurial choice theory incorporates human capital as one component of an individual decision to start a business. Industrial organization theory combines individual human capital to determine the average human capital level within industry as a barrier to entry. Similarly, capital requirements are considered in both theories. Under entrepreneurial choice theory, an individual examines his or her initial access to capital and the amount of capital required to start a business. Industrial organization theory combines individual capital expenditures within an industry to determine the average capital expenditure within an industry as a potential barrier to entry.

In addition to incorporating individual characteristics from entrepreneurial choice theory into industrial organization theory, individual alternatives are incorporated into both models. Under entrepreneurial choice theory, the individual considers expected profits from various alternatives. The expected profits from becoming an entrepreneur are derived from the average profits generated within specific industries being considered. Industrial organization theory also uses profits as a determinant of entry. High profits are expected to attract new entrants whereas declining profits should lead firms to exit from the industry to pursue other alternatives.

In summary, entrepreneurial choice theory considers the decisions of individuals to start a business. It begins with the set of all individuals, whether or not they will become entrepreneurs. Industrial organization theory reflects the combined decisions of those individuals who choose to become entrepreneurs to determine industry characteristics. Thus, entrepreneurial choice theory is incorporated into industrial organization theory by combining individual decisions and characteristics to determine industry-level characteristics.

This study examines industry-level characteristics to examine firm entry. Although industrial organization theory is the basis for this study, entrepreneurial choice theory is incorporated into the analysis as described above. In addition, however, this study extends the industrial organization model by including other "non-entrepreneurial" alternatives in the analysis. For example, as mentioned

above, the industrial organization model assumes that profits *within the industry* are a key determinant of firm entry and exit. In a more dynamic setting, however, entrepreneurs will continue to examine not only the profits of their own business, but profits in other industries and expected earnings from other activities such as working for someone else or farming. For this reason, wages outside of the MSE sector and farming are included as other alternatives that may affect entry and exit rates. These are described in Chapter Four.

3.6 Growth Patterns of Micro and Small Enterprises

3.6.1 Growth rates

Employment growth has been more widely studied than entry and exit of firms in developing countries. In a cross-country comparison, for example, Liedholm and Mead (forthcoming) show that the average annual growth rate of MSEs, defined as the percentage change in the number of employees since the firm started divided by the number of years the firm has operated, is 11.3 percent for five countries in southern and eastern Africa. Including Niger and the Dominican Republic, the average annual growth rate is 11.4 percent. Within these countries, the growth rate ranges from 6.6 percent in Swaziland to 29 percent in Kenya.

Using only urban growth rates, Liedholm and Mead (forthcoming) use 13 countries in Asia, Africa, and Latin America to show that the growth rate is 14.9

percent on average. Again, there is a wide range from 8.5 percent in Niger to 25 percent in Kenya.

3.6.2 Theoretical framework for analysis of growth

While the estimates reviewed above give some indication of the magnitude of growth, they do not reveal factors that affect employment growth. Neoclassical economic theory suggests that firms increase employment when the value of marginal product of labor increases beyond the market wage. This may occur with an increase in the product price, a technological improvement, or a decrease in market wages.

Stochastic theories of growth contend that firm growth is a random process. These theories are based on Gibrat's "Law" which hypothesizes that firm growth is independent of firm size (Gibrat, 1931). Furthermore, growth is not dependent on the proprietor in stochastic theories. Numerous empirical studies, however, have shown that Gibrat's Law does not hold (Evans, 1987; McPherson, 1992; Liedholm and Mead, forthcoming; Hall 1987).

More recently, Jovanovic (1982) developed a growth model that focuses on the manager. He suggests that each manager is aware of the distribution of abilities of other managers but uncertain about his or her own ability. The manager, therefore, assumes that his or her own abilities are average. Over time, managers learn about their abilities and adjust their perceptions which become

increasingly more accurate. Based on this theory, growth is dependent on both firm age and size. Pakes and Ericson (1987) broaden this theory by allowing managerial efficiency to increase through human capital investment. As this level of efficiency increases, firms grow more rapidly.

3.6.3 Measurement of growth

Firm growth can be measured through a variety of ways including increases in employment, sales, profits, or fixed assets. Many studies typically use employment growth due to the ease of measurement. For example, most firms in the MSE sector do not keep written records of sales and profits. Employment change, however, is easier to measure and recall in a single-visit survey. Although sales or profits may be more desirable than employment changes, Parker and Aleke Dondo (1991) showed that there is a significant positive correlation between sales and employment growth. In most of the studies reviewed below, employment change is used as the measure of growth. It is typically calculated as the annual average growth rate or the percentage change in the number of employees since birth divided by the number of years that the firm has been in operation.

3.6.4 Determinants of growth

Determinants of growth can be divided into three categories including: proprietor characteristics, firm characteristics, and government regulations. Empirical evidence on each of these categories is presented below.

Proprietor characteristics

As discussed in Jovanovic's theory above, proprietor characteristics are expected to have an impact on firm growth. Furthermore, additional investment in human capital, as suggested by Pakes and Ericson (1987) should lead to more efficient management and subsequent growth. Pack (1993) also suggests that improvements in industrial productivity can only be achieved by using more experienced managers. The impact of education on growth in Africa, however, is not uniform. For example, McPherson (1992) found that education did not affect growth rates in Swaziland and Botswana, however, proprietors that had completed secondary school in Zimbabwe experienced higher employment growth rates.

Experience is also be expected to be positively correlated with growth. This is supported by both Jovanovic (1982) and Pakes and Ericson (1987) theoretical work. Empirical evidence in two southern African countries, however, is mixed. McPherson (1992) showed that the years of proprietor experience was

positively related to growth in Swaziland and not a significant determinant of growth in Botswana.

The gender of the proprietor is expected to influence employment growth within the firm. Downing (1990) suggests, for example, that female proprietors avoid risk and are therefore less likely to expand their businesses. Rather than investing in one business, Downing suggests that women diversify their activities as a source of income security. McPherson (1992) found, however, mixed results. In Lesotho, Botswana, and Zimbabwe, employment growth rates did not differ by male- and female-owned firms. In contrast, female-owned firms exhibited significantly lower growth rates in South Africa and Swaziland. Liedholm and Mead (forthcoming) also found that female-owned firms experienced significantly lower growth rates in a regression that combined growth rates from six countries in southern and eastern Africa.

Marital status may also affect employment growth rates. As suggested above, married women with children may diversify rather than expand one business in order to maintain income security. Alternatively, married men may be able to afford the risk of expansion if their wives provide an income security base.

Firm characteristics

There are several firm characteristics that may affect employment growth. These include the following: age, size, industry, location, linkages of the

firm, profits, investment, credit, and support from agricultural income. In the first case, Jovanovic's theory of firm growth hypothesizes an inverse relationship between firm growth and firm age. Numerous studies have found that this relationship holds. For example, Cortes *et al.* (1987), found a distinct drop in the growth rate after firms reach the age of ten years in Colombia. Chuta (1990) also found a strong inverse relationship between growth and age in northern Nigeria for existing firms in all subsectors. Comparing five countries, McPherson found a negative relationship between age and growth in South Africa, Swaziland, and Zimbabwe. Similarly, combining six countries in southern and eastern Africa, Liedholm and Mead (forthcoming) found a negative relationship. Finally, in the U.S., Evans (1987) studied the relationship between growth and age for 100 industries and found a significant negative relationship in three-fourths of the industries.

The relationship between the size of the firm and growth is also expected to be negative according to Jovanovic (1982). This was true in several African countries where McPherson (1992) found a negative relationship between growth and firm size in Swaziland, Lesotho, South Africa, and Botswana. He did not find a significant relationship, however, in Zimbabwe. Liedholm and Mead (forthcoming) also found a negative relationship between growth and size when combining six African countries. In the U.S., Evans (1987) shows a strong negative relationship between firm growth and size even when controlling for

sample censoring arising from firm exit. Using the U.S. manufacturing sector, Hall (1987) weakly rejects Gibrat's Law for smaller firms, but accepts it for larger firms.

Growth may also vary by industry as illustrated by Phillips and Kirchoff (1988) who showed significant differences in small firm growth rates by industry in the U.S. McPherson (1992) also showed varying growth rates among industries within the same country in southern Africa, however, he did not identify a pattern across countries. Using one-digit industries and combining six countries, Liedholm and Mead (forthcoming) also show a significant difference in the growth rates of trading, manufacturing, and services.

Growth rates are also expected to differ by regional location. Urban-based MSEs, for example, should have higher grow rates because of a larger market for MSE products. McPherson (1992), however, found mixed results. Urban-based MSEs did not have higher growth rates in Zimbabwe, Lesotho and Botswana, however, they did exhibit higher growth rates in Swaziland. Liedholm and Mead (forthcoming) also showed that MSEs in rural towns and villages had significantly lower growth rates in a model that combined six countries in southern and eastern Africa. Chuta and Liedholm (1985) also found that firms in localities with less than 2,000 inhabitants in Sierra Leone did not grow, while two-thirds of the firms in Freetown with more than 100,000 inhabitants expanded.

MSEs located in commercial or industrial shops are also expected to have higher growth rates than those located at home, in markets, or on the roadside. McPherson (1992) showed, for example, that commercial-based shops had higher growth rates in Botswana, Swaziland, and Zimbabwe. Liedholm and Mead (forthcoming) also showed similar results by combining six African countries.

Forward and backward linkages are expected to have a positive effect on employment growth. For example, businesses that sell products to retailers, wholesalers, or the export market may display higher employment growth rates.

Profits, investment, credit, and support from agricultural income are expected to have an impact on employment growth. Because these are difficult to measure in developing countries, however, there is very little empirical evidence to document these relationships. Parker and Aleke Dondo (1991) showed a positive correlation between sales and employment growth for two manufacturing industries near Nairobi, Kenya. Profits, however, were not measured by Parker and Aleke Dondo. The relationship between investment and growth was positive in a study of the U.S. manufacturing sector as demonstrated by Hall (1987). He found that a four million-dollar increase in physical investment is associated with a 1 percent increase in industry employment growth. Although there is no empirical evidence on the relationship between credit and growth, higher levels of credit and corresponding investment may lead to higher growth rates. Finally, some studies suggest that the transfer of income from farm activities to nonfarm activities may

affect employment growth. According to Haggblade, Hazell, and Brown (1987) for example, diversified activities allow households to reduce risk by shifting capital between activities. This diversification may lead to lower profits for each activity as suggested by Kilby (1971).

Government regulations

As discussed in Chapter Two, there are numerous government regulations in Zimbabwe that may inhibit MSE growth. Licensing, registration, and title deeds are three areas that are repeatedly cited as impediments to the MSE sector. In the case of licensing, there are numerous types of licenses required by specific types of businesses in Zimbabwe. These include shop, trading, factory, vendors, hawkers, and liquor licenses. Each license serves a different purpose and is administered by a different branch of the government. Although the process to obtain a license may not be costly or time consuming, information on which types of businesses need which licenses is difficult to obtain.

Registration is a separate process from licensing that is both costly and time consuming. For example, a recent study found that registration could take from two to eight months (Hess, 1993) and cost from Z$200 to Z$1,700.[5] Although registration offers the advantages of limited liability, and access to credit and subcontracting, it also has several disadvantages. These include preparation of

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[5] US$1.00 = Z$6.70

financial statements and payment of taxes based on income. Because most MSEs do not keep records, these requirements are difficult to meet.

Some studies have suggested that firms remain small to avoid the licensing and registration process and government taxation. If this is true, firms that do not have licenses or are not registered may exhibit lower growth rates. Alternatively, title deeds, or property rights, are expected to be positively related to employment growth. For example, proprietors that own title deeds can use title deeds as collateral for loans. Also, title deeds may provide the incentives to proprietors to invest more in their property.

3.6.5 Timing of growth

While numerous studies have explored determinants of growth as discussed above, very few studies have addressed the timing of growth. This partially reflects the nature of single-visit surveys that cannot accurately portray firm histories. Liedholm (1990) suggests that firm growth does not occur gradually. Instead, it takes place very rapidly in a limited period of time. This is supported by Chuta's (1990) work in northern Nigeria that revealed limited periods of rapid growth for over two-thirds of the firms studied. Chuta also showed that 51 percent of growth took place between the ages of five and ten years old. Similarly, Phillips and Kirchhoff (1988) showed that few firms grew during the first four years in their study of Canadian firms.

CHAPTER FOUR

RESEARCH METHODS

4.1 Overview of research approach

This chapter describes the research methods used in this study. It begins with a description of the data collection, including the sampling method, survey instruments, extrapolation of the results, and survey limitations. The econometric techniques are then described including: a review of econometric techniques for panel data, justification for using a random effects model for the entry and exit models, and an explanation of the random effects model. Finally, the data and specifications used in the three models, including the expected sign of each variable, are presented.

4.2 Data collection

The data for this study were collected by two nationwide surveys of micro and small enterprises in Zimbabwe funded by the United States Agency for International Development (USAID). An MSE was defined as any business activity that employed 50 or fewer employees and marketed at least 50 percent of its product. The first study, conducted in 1991, provided information on the number and types of MSEs in Zimbabwe as well as MSE constraints and credit sources. The second study, conducted in 1993, examined changes in the MSE

sector from 1991 to 1993. Particular emphasis was placed on the impact of the Economic Structural Adjustment Program (ESAP) on the MSE sector (see Section 2.2 for information on ESAP).

4.2.1 Sampling method

The sample for the 1991 survey was selected by using a stratified, one-stage cluster sampling technique. This involved three steps. First, the country was divided into eight strata based on population density and commercial activities. Urban areas were defined as cities with more than 20,000 inhabitants as estimated by the 1982 census. Within this group, four strata were used: high-density areas, low-density areas, commercial districts, and industrial areas.[6] The remaining four strata in rural areas included small towns, growth points, district councils, and rural councils.[7] Second, a random sample of enumeration areas (EAs) within each stratum was selected. Finally, all households, businesses, and mobile vendors in each selected EA were interviewed.

In the 1993 survey, a subset of EAs from the 1991 study was revisited. The reduction in the number of EAs was based on an ex post analysis of the sample size in 1991 that indicated over-sampling in low density areas, commercial

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[6] High-density areas are typically inhabited by low-income households while low-density areas are inhabited by high-income households.

[7] Growth points are towns designated by the government to promote rural development. Incentives are provided in these towns to promote establishment and growth of businesses.

Table 4-1: Sample sizes for the 1991 and 1993 surveys

Survey	1991 Survey		1993 Survey	
EAs	Strata	Number of EAs	Strata	Number of EAs
	High-density Areas	9	High-density Areas	8
	Low-density Areas	12	Low-density Areas	6
	Commercial Districts	9	Commercial Districts	4
	Industrial Areas	8	Industrial Areas	4
	District Councils	7	District Councils	7
	Rural Councils	4	Rural Councils	4
	Smaller Towns	4	Smaller Towns	4
	Growth Points	5	Growth Points	3
	Total EAs	58	Total EAs	40
Sample Size	Households Visited	14,035	Households Visited	11,762
	MSEs Interviewed	6,769	MSEs Interviewed	5,356
	Folded MSEs	1,101	Folded MSEs	706

districts, industrial areas, and growth points and under-sampling in the remaining strata (McPherson and Parker, 1993). Ideally, all EAs should have been revisited in addition to new EAs in the under-sampled areas. Due to budget constraints and a longer questionnaire, however, the number of EAs in the over-sampled areas was reduced and all EAs in the under-sampled strata were revisited. Information on the sample size for the two surveys is illustrated in Table 4.1.

4.2.2 Survey instruments

At each household or site, enumerators asked if anyone was currently operating an MSE on the premises or if anyone had operated an MSE that had folded.[8] If a business was currently in operation, an existing enterprise questionnaire (EEQ) was administered. Similarly, a dead enterprise questionnaire (DEQ) was administered to anyone who had previously operated a business. The 1991 survey also administered a supplementary questionnaire that provided more detailed information on a subset of MSEs. Because the 1993 EEQ was significantly longer than the 1991 EEQ, a supplementary questionnaire was not necessary.

4.2.3 Extrapolation of results

The sample data collected by the survey were extrapolated to produce national estimates of the MSE sector in 1991 and 1993. The weights for each stratum were based on the probability of a household being selected, and the probability of a respondent being home to answer the questions. This is represented in equation 4-1.

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[8] Only existing enterprises *on the premises* are enumerated to avoid double counting. For example, two enumerators may visit members of the same households in different locations. If the enumerators inquired about businesses operated from the household, businesses would be counted twice. Micro and small enterprises that had operated in the past, however, are based on businesses operated anywhere in the country. This does not lead to double counting since individuals are asked about businesses that they personally operated.

$$WT_i = \left(\frac{HHS_i}{HHE_i}\right)\left(\frac{MSEOP_i + MSECL_i}{MSEOP_i}\right)$$

where:
WT = *weight*
i = *stratumi, i* = 1,2,..,8
HHS = *total number of households in the stratum*
HHE = *total number of households enumerated in the stratum*
MSEOP = *number of MSEs at open households where someone was home*
MSECL = *number of MSEs at closed households where no one was home*

(4-1)

The first term in the equation is the reciprocal of the probability of being selected. The second term is used to account for closed households. Closed households are defined as households visited but where no one was at home at the time of the survey. The weighting factors take these households into account by assuming that a proportion of closed households in each stratum have MSEs. This assumption was based on a return visit to 17 percent of all closed households during the survey period.

4.2.4 Survey Limitations

There are several limitations of the survey which should be recognized when interpreting the results. First, only 55.6 percent of the businesses enumerated in 1991 were found during the 1993 survey. The 1993 survey also identified 2,457 MSEs born prior to or during 1991 that were not included in the 1991 survey. Because of these differences in the two surveys,

information on existing MSEs from the 1991 survey was not included in the entry model. Instead, information on existing MSEs from the 1993 survey and closed MSEs from the 1991 and 1993 surveys was used in the entry model.

Closed households, or households where no one was home at the time of the survey, also represent a survey limitation. In 1993, for example, there were 2,884 households where no one was at home. To determine what proportion of these households had MSEs, enumerators returned to 758 closed households. The proportion of closed households with businesses in each stratum was then used to make assumptions about the number of businesses missed at closed households. Unfortunately, however, these households were not randomly selected.[9]

In addition to the sampling errors described above, non-sampling errors should also be considered. In particular, the respondents in 1991 were asked to recall all businesses that they operated during their lifetime. Since entrepreneurs may open and close numerous businesses in their lifetime, they may not be able to or want to accurately recall all past businesses and the year in which in each business was started. This inability to recall past businesses may reduce the number of firm entries reported in earlier years.

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[9] Closed households were not randomly selected partly due to the lack of addresses in rural areas. Without specific addresses, enumerators could not return to closed households in these areas.

4.3 Econometric techniques for entry and exit

By using retrospective data on firm entry from the 1993 existing enterprise survey and the two closed enterprise surveys, the information on firm entry and exit are represented by panel data sets. The N industries represent the cross-sectional units, which are observed over T time periods. Both data sets, therefore, consist of NT observations.

Panel data sets offer several advantages. First, they allow for variation across firms and over time. Additionally, panel data collection techniques may also increase the reliability of the data. For example, repeated sampling may reduce the imprecision due to poor respondent recall if the interviews are spaced close together. Furthermore, repeated contact with respondents may raise the quality of the data by increasing respondent trust and the credibility of the enumerator.

Panel data may also have some disadvantages. While repeated interviews may raise the quality of the data, multiple interviews could also affect the respondents behavior between interviews and their responses. Because the surveys in this study were two years apart, however, the responses should not be affected by repeat visits. Another disadvantage is that many respondents may drop out of the sample over time. As noted above in Section 4.2.4, many respondents were not available for the second round of data collection. This may affect the results of the survey.

Methods for analyzing panel data can be grouped into three basic categories: (1) pooled cross-section models; (2) fixed effects or covariance models; and (3) random effects or error components models. These models are described below following a brief review of ordinary least squares (OLS) that is presented as a basis for a discussion of the three models.

4.3.1 Ordinary least squares

The classical normal linear regression model comprises the

$$y_i = \alpha + Bx_i + \epsilon_i, \quad i = 1,...n \tag{4-2}$$

regression equation 4.2 and the five basic assumptions below.

1. Normality:	ϵ_i is normally distributed
2. Zero mean:	$E[\epsilon_i] = 0$ for all i
3. Homoskedasticity:	$Var[\epsilon_i] = \sigma^2$, a constant for all i
4. Independent Errors[10]:	$Cov[\epsilon_i,\epsilon_j] = 0$ if $i \neq j$.
5. Nonstochastic X:	X is a nonstochastic variable with values fixed in repeated samples

[10] Nonautocorrelation is typically used to describe this assumption under OLS. The term independent errors is used throughout the remainder of the discussion, however, because the assumption with pooled data must be that there is no correlation of errors in observations of different firms or different time periods.

By definition, the variance of ϵ is $E[\epsilon - E(\epsilon)]^2$ and the covariance of $\epsilon_i\epsilon_j$ is $E[(\epsilon_i - E(\epsilon_i)(\epsilon_j - E(\epsilon_j))]$. According to assumption two, however, $E(\epsilon) = 0$. Therefore, the variance of ϵ can be written as $E(\epsilon^2)$ and the covariance of $\epsilon_i\epsilon_j$ can be written as $E[\epsilon_i\epsilon_j]$. Using matrix notation, this is written as follows.

$$E(\epsilon\ \epsilon') = \begin{bmatrix} E(\epsilon_1^2) & E(\epsilon_1\epsilon_2) & \dots & E(\epsilon_1\epsilon_n) \\ E(\epsilon_2\epsilon_1) & E(\epsilon_2^2) & \dots & E(\epsilon_2\epsilon_n) \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ E(\epsilon_n\epsilon_1) & E(\epsilon_n\epsilon_2) & \dots & E(\epsilon_n^2) \end{bmatrix} \quad \textbf{(4-3)}$$

Using assumptions three and four, however, $E[\epsilon_i^2]$ is σ^2 and all of the covariances are equal to zero. Therefore, 4-3 can be rewritten as follows:

$$E(\epsilon\ \epsilon') = \begin{bmatrix} \sigma^2 & 0 & \dots & 0 \\ 0 & \sigma^2 & \dots & 0 \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ 0 & 0 & \dots & \sigma^2 \end{bmatrix} = \sigma^2 I_n \quad \textbf{(4-4)}$$

Under these assumptions, the best, linear, unbiased estimator of ß is

$$\hat{B}_{OLS} = (X'X)^{-1}X'y \qquad (4\text{-}5)$$

which is derived by minimizing the sum of squared residuals with respect to ß.

If all of the assumptions described above hold, OLS is an appropriate technique to model the relationship between the dependent and independent variables. The assumptions about the regression disturbance, however, are restrictive. For example, the firm size used in this study ranges from one-person firms up to firms with 50 employees. Variances of firm entry and growth rates over this wide range of firm sizes may vary and therefore violate the homoskedasticity assumption. Similarly, correlation among errors may be present when using time-series data. For example, a random shock such as the drought in Zimbabwe could have ripple effects for several time periods. If either heteroskedasticity or non-independent errors are present, OLS procedures no longer produce minimum-variance estimates because the classical assumptions are violated. More important, the estimated variance of the OLS coefficient estimates will be biased. This bias invalidates standard statistical tests by producing wider or narrower confidence intervals than they should be depending on the direction of the bias.

In summary, the consequences of using OLS when the assumptions are violated leads to unbiased but inefficient estimators and biased estimates of σ^2 that invalidate statistical tests. With these consequences in mind, three techniques to analyze panel data are reviewed below.

4.3.2 Pooled cross-section

The pooled cross-section model simply pools all cross-section units over T time periods and treats each observation as independent. Ordinary least squares (OLS) is then used to estimate the model. While this method is simple and yields unbiased estimates of the model parameters, the assumptions of homoskedasticity and independent errors under OLS are likely to be violated. As mentioned above, heteroskedasticity is likely to occur in a cross-section data set that measures employment growth as a function of firm size. Similarly, non-independent errors may occur in a time-series data set.

In addition to violating the classical assumptions, using OLS procedures on pooled cross-section data assumes a constant intercept and slope. This implies that regression parameters are the same for all units, at all times.

Given the limitations of OLS applied to pooled cross-section data, the fixed effect and random effects models should be considered. These models are described below.

4.3.3 Fixed effects or covariance model

The general form of both the fixed effects and random effects model is illustrated in equation 4-6.

$$Y_{it} = X_{it}\beta + \alpha_{it} + \epsilon_{it} \quad i=1,...,N, \quad t=1,...,T \tag{4-6}$$

Y_{it} is the dependent variable for unit i and time period t; X_{it} is a 1xK vector of explanatory variables; ß is a Kx1 vector of parameters; α_i is the unobserved individual effect; and ϵ_{it} is the random error. The errors ϵ_{it} are assumed to be independently and identically distributed (i.i.d.).

The fixed effects and random effects models differ primarily in their assumptions about α_i. In the fixed effects model, the α_i are treated as fixed or constant over time, whereas the random effects model treats the α_i as random. These assumptions lead to different estimation techniques that are described below.

The fixed effect model is generally treated within the framework of the classical regression model. Under the assumptions described in Section 4.3.1, the least squares dummy variable estimator is the best linear unbiased estimator, and is consistent as either N, T, or both go toward infinity (Hsiao, 1986). Nonetheless, the assumptions of homoskedasticity and independent errors used in the classical regression model may be violated as in the pooled cross-section techniques described above.

An advantage of the fixed effect model is that it introduces dummy variables that allow the intercept to vary over cross-section units and/or time periods. This is a more reasonable assumption than the pooled cross-section estimation that assumed that the regression parameters were the same for all units

over all time periods. The addition of dummy variables, however, also reduces degrees of freedom and may substantially decrease the statistical power of the model. Furthermore, the dummy variables do not identify the variables that cause the regression line to shift over time or firms.

Addition of dummy variables in the fixed effects model also creates complications if there are time invariant regressors. For example, if gender is included in a model that specifies firm growth as the dependent variable, gender will not vary over time for that firm. The fixed effect for that firm is then perfectly collinear with gender and the least squares dummy variable estimator cannot be estimated (Greene, 1993).

Another limitation of the fixed effects model is that it only considers variation within firms or individuals. It does not consider the variation between firms. Therefore, the estimator is not efficient for a small number of time periods (Judge *et al.*, 1985).

In addition to the advantages and disadvantages listed above, the decision to use the fixed effects model may be based on the choice between conditional and unconditional inference. When the α_i are fixed, the inference is conditional on the cross-sectional units or the firms in the sample. This is appropriate if the firms in the data set cannot be regarded as a random sample from some larger population or if the research is particularly focused on those firms in the sample. If inferences will be drawn about a larger population from which the firms are

drawn, then the unconditional inference used in the random effects model is more appropriate (Judge, et al., 1982).

In summary, there are numerous disadvantages of the fixed effect model. These include the following: (1) the restrictive assumptions concerning the behavior of the regression disturbance; (2) the loss of degrees of freedom due to the addition of dummy variables; (3) the inability to use time-invariant regressors; and (4) the inability to consider variation between firms. Also, while the fixed effect model may be appropriate for conditional inference, the data in this study are drawn from a larger population and therefore require unconditional inference. Based on these limitations, the random effects model is more appropriate for this study. This model is described in detail below.

4.3.4 Random effects or error components model

The random effects model is specified by equation 4-6 above and assumes that the unobserved individual effects, α_i, are random. Unlike the pooled cross-section technique and the fixed effect model that use the classical regression model, the random effect model uses generalized least squares (GLS) to estimate the model. In this case the assumptions about the regression disturbance are not as restrictive. For example, repeating 4-3 below

$$E(\epsilon\ \epsilon') = \begin{bmatrix} E(\epsilon_1^2) & E(\epsilon_1\epsilon_2) & \dots & E(\epsilon_1\epsilon_n) \\ E(\epsilon_2\epsilon_1) & E(\epsilon_2^2) & \dots & E(\epsilon_2\epsilon_n) \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ E(\epsilon_n\epsilon_1) & E(\epsilon_n\epsilon_2) & \dots & E(\epsilon_n^2) \end{bmatrix} \quad (4\text{-}7)$$

Using the assumptions of homoskedasticity and independent errors, 4-3 was rewritten as 4-4 or $E[\epsilon\epsilon'] = \sigma^2 I_n$. When the assumptions do not hold, however, the more general case can be written as

$$E(\epsilon\ \epsilon') = \Omega = \begin{bmatrix} \sigma_1^2 & \sigma_{12} & \dots & \sigma_{1n} \\ \sigma_{21} & \sigma_2^2 & \dots & \sigma_{2n} \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ \sigma_{n1} & \sigma_{n2} & \dots & \sigma_n^2 \end{bmatrix} \quad (4\text{-}8)$$

which allows for the variances to differ across the conditional distributions of ϵ and allows for correlation among the disturbance terms.

Derivation of a best linear unbiased estimator for ß when $E(\epsilon\epsilon') = \Omega = \sigma^2\Psi$ is presented in Judge *et al.* (1982). First, the model $y = X\beta + \epsilon$ must be transformed by multiplying it by a (T X T) matrix P which has the property $P\Psi P' = I_t$. This yields the following

$$Py = PXB + Pe \tag{4-9}$$

or

$$y^* = X^*\beta + e^* \tag{4-10}$$

The transformed error vector e* has the mean

$$E[e^*] = E[Pe] = PE[e] = 0 \tag{4-11}$$

and the covariance matrix

$$E[e^*e^{*\prime}] = E[Pee'P'] = PE[ee']P' = \sigma^2 P\Omega P' = \sigma^2 I_t \tag{4-12}$$

Based on 4-11 and 4-12, the transformed error vector maintains the assumptions of zero mean, homoskedasticity, and independent errors of the error term in the classical normal linear regression model. The best linear unbiased estimator is therefore

$$\hat{B} = (X^{*\prime}X^*)^{-1}X^{*\prime}y^* \tag{4-13}$$

Filling in the values for X^* and y^*

$$\hat{B} = (X'P'PX)^{-1}X'P'Py \tag{4-14}$$

Since $P\Psi P' = I_t$, then $\Psi = P^{-1}P'^{-1}$ and $\Psi^{-1} = P'P$. Therefore, the least squares estimator of the transformed equation is

$$\hat{B}_{GLS} = (X'\psi^{-1}X)^{-1}X'\psi^{-1}y \tag{4-15}$$

which is the GLS estimator. This estimator is consistent and asymptotically efficient. Furthermore, it is asymptotically more efficient that the estimator used in the fixed effects model. This efficiency gain is due to the consideration of both within and between (across firms) variation. The efficiency gain disappears, however, as T goes to infinity. The disadvantage of the GLS estimator is that the estimates may be biased if there are any omitted variables that are correlated with the explanatory variables, i.e., if the α_i are correlated with X.

Using GLS, the regression equation for the random effects model can be written as

$$Y_{it} = X_{it}B + v_{it} \qquad i=1,...N, \quad t=1,...T$$
$$\textit{where} \quad v_{it} = \alpha_i + \epsilon_{it} \tag{4-16}$$

The α_i are assumed to be i.i.d, with the $E(\alpha_i)=0$, and the variance of α_i equal to σ_α^2. It is also assumed that α is independent of X and ϵ.

Combining all NT observations, the regression equation can be written as

$$Y = XB + v$$
$$\textit{where } v = G\alpha + \epsilon \tag{4-17}$$

and

$$G = I_N \otimes e_T = \begin{bmatrix} e_t & 0 & \dots & 0 \\ 0 & e_t & \dots & 0 \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ 0 & 0 & \dots & e_t \end{bmatrix} \tag{4-18}$$

Because the variance components are not known, a two-stage approach is used to derive the GLS estimator. First, variance components are estimated using the residuals from a simple OLS regression. Feasible GLS coefficient estimates are then computed based on this estimated variance.

4.4 Econometric techniques for employment growth model

Unlike the entry and exit models, the employment growth model is based on a cross-section of N firms. Although different time periods of growth are examined, the analyses are no longer based on a panel data set. Instead, separate ordinary least squares regressions are estimated for growth in each time period. The data and specification for this model are described below following a description of the entry and exit models.

4.5 Data and specification

Based on the literature review in Chapter Three, the situation in Zimbabwe, and the available data, variables were selected for the firm entry, exit, and growth models. These are presented below.

4.5.1 Entry model

A random effects model using a linear functional form will be used to estimate the entry and exit models. As described in Chapter Three, the empirical analysis uses industrial organization theory as a framework to analyze the determinants of firm entry and exit. Following previous work in this area, entry is examined through industry-level statistics. More specifically, the dependent variable, ENTRY, is measured as the gross entry rate. This is defined as the number of firms that enter industry i in period t divided by the number of

firms existing in industry i at the beginning of period t. In this case, 21 industries at the International Standard Industrial Classification (ISIC) four-digit level will be examined.

The gross entry *rate* was chosen over other measures of entry such as net entry, gross entry, net entry rate, and employment based on arguments presented in the literature review. For example, net entry and net entry rates conceal information on the actual level entry that occurs within an industry over time. Also, gross entry rates are preferred to the absolute number of entrants in order to control for the size of the industry. Finally, in studies that include firms with one to more than 500 employees, employment is an appropriate measure to account for the impact of the size of new firms. In this study, however, more than 90 percent of all new firms have four or fewer employees. Determinants of entry for various firm sizes will, therefore, not be examined.

Explanatory factors to be included in the regression are categorized as barriers to entry and entry-inducing factors as suggested by previous literature. The technological environment is not included as a category of entry determinants since the majority of micro and small enterprises in Zimbabwe do not engage in research and development. The barriers to entry included in the model are defined first followed by entry-inducing factors. All definitions and expected signs are summarized in Table 4-2.

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The first barrier to entry described in the literature review, market concentration, is expected to be negatively correlated with entry. Market concentration (CONC) for this study is defined as the percentage of firms in industry i with 20 or more employees for all existing firms in period t.[11] While market concentration ratios would be preferred to this measure, data on sales and market shares are not available for the majority of micro and small enterprises in Zimbabwe. Capital expenditure (CAPITAL) is also hypothesized to be negatively correlated with entry. In this case capital is defined as the average amount of expenditures in hundreds of Zimbabwe dollars on equipment and buildings to start a business in industry i. The square of capital (SQCAPITAL) is also included. Working capital (WORKCAP) may also be a barrier to entry in Zimbabwe where access to capital throughout the life of the business is limited. This is measured as the average value of working capital in hundreds of Zimbabwe dollars per firm on a weekly basis in industry i.

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[11] The market concentration variable (CONC) is based on the weighted sample of firms with up to 100 employees. Although a concentration variable based on all firms in an industry would be more appropriate, complete information on firms with greater than 100 employees was not available. This was due to a lack of cooperation from larger firms during the fieldwork. For example, enumerators were instructed to interview all firms, regardless of size. Many larger firms, however, refused to be interviewed. In these cases, the type of firm is recorded, however, information on the size of the firm is missing. Nonetheless, this does not represent a serious limitation since only 0.5 percent of all firms were recorded with missing information on the number of employees and only 0.1 percent of larger firms that did cooperate had more than 100 workers.

Economies of scale (SIZE) is expected to be negatively correlated with entry as illustrated by several studies (Duetsch, 1984; Gorecki, 1975; Hause and Du Rietz, 1984; and Acs and Audretsch, 1989). The average size of a firm in industry i during period t is used as a proxy for economies of scale.[12]

Human capital requirements are also included as a barrier to entry by including proprietor characteristics such as education (EDUCATN) and experience (EXPERNC). As illustrated by Acs and Audretsch (1989), high levels of human capital are expected to be negatively correlated with entry. Education is measured as the average number of years of schooling completed by proprietors in industry i and experience is measured as the average number of years that proprietors have worked in industry i.

In addition to the traditional barriers to entry included in previous studies, two other barriers are considered in this analysis. First, government regulations are frequently cited as an impediment to micro and small enterprises in Zimbabwe. These include zoning, licensing, labor market regulations, and price and marketing controls (Harbin, 1993: Hess, 1993; Robinson, 1991; ENDA, 1990; IMANI 1990; Saito and Van Dijk, 1990; ILO/SATEP, 1989; Konrad Adenauer Foundation, 1988: UNIDO, 1988; Jasset and Jirira, 1987; and Price Waterhouse, 1986). While proxies are not available for each of these regulations, the proportion of existing firms in industry i during period t that have licenses (LIC) is included as

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[12] Similar to the market concentration variable, the size variable is limited by the lack of cooperation from larger firms. See the previous footnote for more details.

an explanatory variable. Licensing is expected to be negatively correlated with entry. A higher proportion of licenses is expected to signify stronger enforcement of licensing within certain industries. This enforcement should discourage new firm entrants.

The second barrier to entry not included in previous studies is the type of site where the firm operates. In most previous studies, the site of the firm, an industrial plant, is homogeneous across industries. In Zimbabwe, however, micro and small enterprises are located in homes, commercial shops, traditional markets, on the roadside, or they are mobile. Although most MSEs are located at the home, the proportion of each type of location varies by industry. The type of site (SHOP) is therefore included to control for firm site. It is defined as the proportion of all existing firms in industry i located in commercial shops during period t. The proportion of commercial shops was chosen because it is the most difficult site to obtain in Zimbabwe where zoning regulations are enforced and rents are high in commercial areas. Location is, therefore, expected to be negatively correlated with entry.

Entry-inducing factors are typically represented by industry profitability and growth. As reviewed in the literature, the price-cost margin, industry sales growth, and industry employment growth are three typical measures used as proxies for entry-inducing factors. Similar measures will be used in this study. First, profits (PROFITS) will be measured as the average level of profits per firm

in industry i, or the returns to both labor and capital. Although profit per unit of capital or investment could also be used, very few firms in Zimbabwe reported capital expenditures. For example 46 percent of all firms used in the entry model reported that they spent nothing on capital to start the business and two-thirds spent less than US$10.00 on capital. Only 13 percent spent more than US$100 on capital to start the business. Capital expenditures following start-up were even lower. For example, 82 percent of proprietors reported that they spent no additional money on capital after starting the business and 90 percent spent less than US$10.00. Only three percent of all firms had spent more than US$100 on capital equipment following their start-up. Because of these low capital expenditures, profits per firm is a fairly uniform measure to estimates profits.

Industry growth will be measured by employment growth. Unlike the studies reviewed earlier, however, MSEs in Zimbabwe employ both paid and unpaid employees. Unpaid employees are typically immediate family members or distant relatives that may not have other employment opportunities. This type of employment does not necessarily represent industry growth or positive profits. Paid employment growth, however, should represent industry growth. These two types of employment will be measured separately as the number of paid (GROWTHPD) or unpaid (GROWTHUP) employees added or subtracted since the start of the business.

As mentioned earlier, positive profits and industry employment growth are expected to attract new entrants. This may not be true in Zimbabwe, however, where businesses are driven by different factors than businesses in the U.S. or Canada. For example, the businesses included in the U.S. studies were typically large, employing from 100 to 500 employees. In Zimbabwe, however, 96 percent of the existing businesses in 1993 had only one to four workers. Furthermore, Zimbabwean proprietors typically have low levels of education, skills, and access to capital. For example, only 16.7 percent of proprietors had completed secondary school and only 0.7 percent of all firms had received credit from a formal institution. With these constraints, proprietors in Zimbabwe may not have the option to choose an industry based on profits. Instead, proprietors compare the option of starting a business in an industry that requires low skills, capital, and can be opened at their location to the alternatives of working for someone else at a low wage, being unemployed, or possibly turning to agriculture on a full-time basis as a source of income.

Because profits may not be a driving force of firm entry and individuals continually examine the other alternatives mentioned above, two additional variables are included in the analysis to represent these alternatives. First, wage (WAGE) and the square of wage (SQWAGE) will be included to represent the opportunity cost of lost wages outside of the MSE sector. It will be defined as the real minimum wage in time period t as measured by the monthly salary of

domestic workers in 1990 Zimbabwe dollars. This wage was chosen because it is the minimum wage of all industries monitored by the government. Although some entrepreneurs may find higher paying jobs outside of the MSE sector, many entrepreneurs do not have the skills or experience necessary to acquire these jobs. It is therefore hypothesized that as the minimum wage decreases, entry may rise as proprietors compare lower wages of working for someone else with potential earnings from starting a business.

Second, agriculture will be included as an alternative to the MSE sector. It will be measured by the average kilograms of maize harvested by MSE owners in industry i from 1991 to 1993 in thousands of kilograms. It is hypothesized that industries characterized by proprietors that are also engaged in agriculture will experience lower entry rates. This is because agriculture may provide a source of income and subsequently reduce the search for alternative income sources in the MSE sector.

The gross domestic product (GDP) will be included as a measure of the performance of the economy. More specifically, GDP reflects primarily changes in the formal sector, or activities which are included national statistics. Small agricultural units and small businesses in rural areas are not typically included in national statistics because of collection difficulties. Therefore, changes in entry caused by changes in the formal sector are measured by including GDP. In this case, as GDP decreases, entry may increase as individuals have fewer alternatives

in the formal sector. GDP will be measured as the percent change in GDP in period t expressed in constant 1980 dollars using 1990 weights.

Finally, the regional location of the proprietor, should be controlled for in the analysis of entry. As mentioned above, proprietors are constrained by their location. They may not have the option of moving to new location where market demand is greater. The regional location (URBAN) will therefore be included as the proportion of all exiting MSES in industry i during period t that are located in urban areas. This is expected to be positively correlated with entry for two reasons. First, entry rates in urban areas may be higher due to a larger market for MSE products. Second, agriculture may not be a viable alternative source of income in urban areas. Therefore, more people may turn to MSEs as a source of income in urban areas.

4.5.2 Exit model

Similar to firm entry, exit is examined using industrial organization as a framework for analysis. Exit (EXIT) is defined as the number of firms that exit an industry in period t divided by the number of existing firms in industry i at the beginning of period t. This is the gross exit rate, which again is more appropriate than the net exit rate or absolute measures of exit based on the arguments presented in Sections 3.2.3 and 3.3.3 above. The 21 sectors at the ISIC four-digit level used in the entry analysis will also be used for the exit

Table 4-2: Variables definitions for the entry model

Variable name	Definition	Expected Sign
	BARRIERS TO ENTRY	
CONC	The proportion of firms in industry i, period t, with 20 or more employees	-
CAPITAL	Average expenditure in hundreds of Zimbabwe dollars on equipment and buildings to start a business in industry i	-
SQCAPITAL	Square of CAPITAL	+
WORKCAP	Average value of expenditures on variable costs during the week prior to the survey in industry i in hundreds of Zimbabwe dollars	-
SIZE	Average size of firms in industry i, period t measured by the number of workers	-
EDUCATN	Average number of years of schooling completed by proprietors in industry i	-
EXPERNC	Average number of years that proprietors have operated in industry i	-
LIC	Percentage of firms that have licenses in industry i during period t	-
SHOP	Percentage of firms in industry i during period t located in a commercial shop	-
	ENTRY-INDUCING FACTORS	
PROFITS	Average annual profits in industry i in Zimbabwe dollars	ns
GROWTHPD	Average number of paid employees added or subtracted since the start of the business in industry i	ns
GROWTHUP	Average number of unpaid employees added or subtracted since the start of the business in industry i	ns
WAGE	Domestic worker's salary in 1990 Zimbabwe dollars per month	-
SQWAGE	Square of WAGE	+
GDP	Percentage change in GDP in period t expressed in constant 1980 dollars using 1990 weights	+
MAIZE	Average kilograms of maize harvested by proprietors in industry i from 1991 to 1993 in thousands of kilograms	-
URBAN	Percentage of firms in industry i during period t located in urban areas	+

ns = These variables are expected to be not significant despite their significance in U.S. and Canadian studies.

analysis. Again, a random effects model using a linear functional form is estimated.

Explanatory factors to be included in the regression include barriers to exit and exit-inducing factors. As pointed out by Caves and Porter (1976) and Khemani and Shapiro (1986), symmetries between barriers to entry and barrier to exit may exist. Some of the same variables from the entry model will, therefore, be included in the exit model and retain the same definitions. The variable definitions and expected signs for the exit model are illustrated in Table 4-3.

One of the most common barriers to exit, capital expenditures (CAPITAL), is expected to be negatively correlated with exit. As discussed in Section 3.3.4, high levels of capital expenditure represent high levels of sunk costs. If the assets in the industry are not easily transferrable, firms may continue to operate despite low profits.

Economies of scale (SIZE) is also included as an explanatory factor. Although economies of scale may not typically exist in micro and small enterprises, exit may be lower in industries characterized by larger firms. Within these industries, for example, firms may have easier access to credit and other resources and therefore be less likely to exit.

Working capital (WORKCAP) may not be symmetrical in the entry and exit models. For example, working capital is expected to be a barrier in the entry model, however, it may act as an exit-inducing factor in Zimbabwe. Industries

characterized by high levels of working capital may exhibit higher levels of exit as firms struggle to survive. Working capital is therefore hypothesized to be negatively correlated with exit.

Exit-inducing factors, similar to entry-inducing factors, will be included as determinants of exit. These include profitability and growth. Profits (PROFITS) are expected to be negatively correlated with exit. Again, however, Zimbabwean proprietors may not necessarily make decisions based on profits. For example, 25 percent of MSEs closed from 1991 to 1993 due to personal or health reasons compared to 22 percent that closed for financial reasons.

Industry growth will again be measured by growth in paid (GROWTHPD) and unpaid (GROWTHUP) employees. Growth in paid employment should indicate positive growth and therefore lower exit rates. Industries characterized by growth in unpaid employment may be a sign of unproductive growth and lead to higher exit rates.

Similar to the entry model, proprietor alternatives such as working for someone else, being unemployed, or turning to agriculture need to be considered as determinants of exit. The real minimum wage (WAGE) and a quadratic term will again be used to represent the possibility of working for someone else and is expected to be positively correlated with exit. Increases in GDP (GDP) may also lead to higher exit rates as more jobs become available in the formal sector. Alternatively, GDP increases could lead to higher demand for MSE products and

thereby fewer exits. Industries characterized by high levels of agriculture (MAIZE) within the proprietors household could exhibit higher exit rates since proprietors have the option of turning to agriculture in good agricultural years or when business is slow.

The regional location (URBAN) will be used in the exit model to control for location. In this case, the sign is ambiguous. Exit rates may be higher in industries with a high proportion of urban enterprises due to a larger turnover. Controlling for turnover as discussed below, however, exit may be negatively correlated with a high proportion of urban enterprises if people do not have many other sources of income.

Entry (ENTRY) will also be included as an explanatory factor. As suggested by Caves and Porter (1976), entry represents the generational turnover that is typical of an industry.

4.5.3 Employment growth model

As described above, growth patterns will be explored using OLS estimation with a linear functional form that includes a set of interactive and squared terms for age and size. Unlike the entry and exit models, where *rates* were more appropriate than *absolute* numbers for the dependent variable, the employment growth model will use the absolute number of employees added or subtracted in the specified time period as the dependent variable. This is because

Table 4-3: Variable definitions for the exit model

Variable name	Definition	Expected Sign
	BARRIERS TO EXIT	
CAPITAL	Average expenditure in hundreds of Zimbabwe dollars on equipment and buildings to start a business in industry i	-
SIZE	Average size of a firm in industry i, period t as measured by the total number of workers	-
	EXIT-INDUCING FACTORS	
WORKCAP	Average value of expenditures on variable costs during the week prior to the survey in industry i in hundreds of Zimbabwe dollars	+
PROFITS	Average annual profits in industry i in Zimbabwe dollars	-
GROWTHPD	Average number of paid employees added or subtracted since the start of the business in industry i	-
GROWTHUP	Average number of unpaid employees added or subtracted since the start of the business in industry i	+
WAGE	Domestic worker's salary in 1990 Zimbabwe dollars per month	+
GDP	Percentage change in GDP in period t expressed in constant 1980 dollars using 1990 weights	?
MAIZE	Average kilograms of maize harvested by proprietors in industry i from 1991 to 1993 in thousands of kilograms	+
URBAN	Percentage of firms in industry i during period t located in urban areas	-
ENTRY	Gross entry rate of industry i during period t	+

size has been identified in numerous studies as a significant determinant of firm growth. Therefore, rather than controlling for size by using the growth rate, the relationship between growth and size should be estimated.

Explanatory factors to be included in the regression are categorized as proprietor characteristics, firm characteristics, and government regulations. The variable names, definitions, and expected signs for the growth model are summarized in Table 4-4. Within the first category, proprietor characteristics, education (EDUC) is expected to be positively correlated with employment growth. Higher education levels may lead to more efficient management techniques and thereby increase employment growth. Education is measured as the number of years of schooling completed by the proprietor in firm i.

Experience (EXPERNC) is also expected to be positively correlated with growth. As proprietors gain more experience over time, their firms should grow as they become more efficient. Experience is defined as the number of years the proprietor in firm i has been engaged in the current type of business in time t. Similarly, experience in other types of businesses (OTHEXP) should also be positively correlated with growth. This is measured as the number of years the proprietor in firm i has been engaged in some other type of business.

The gender of the proprietor is expected to influence employment growth within the firm. Downing (1990) suggests, for example, that female proprietors avoid risk and are therefore less likely to expand their businesses. Based on this

hypothesis, female-owned firms are expected to have lower growth than male-owned firms. This will be measured by including a dummy variable for the gender of the proprietor.

The marital status of the proprietor may also influence growth. Married proprietors may, for example, have access to capital through their spouses. Also, married proprietors may be more willing to take risks if their spouse is also providing an income to the household. This will be measured by including a dummy variable for the marital status of the proprietor.

Firm characteristics that may affect growth include age, size, industry, location, linkages, profits, investment, credit, and support from agricultural income. Beginning with age (AGEPER) and size (SIZESTPR), several studies have shown an inverse relationship between growth and age and size as mentioned earlier. Age will be measured as the number of years that the firm has been in operation in period t. Size will be measured as the number of workers at the beginning of the period. A set of interactive terms between size and age will also be included.

Industries are expected to exhibit different growth patterns depending on market demand and supply conditions. A dummy variable for industry will, therefore, be included in the model.

Growth patterns are also expected to differ by regional location. Urban-based MSEs, for example, may have higher growth rates because of a larger

market for MSE products. This will be measured by including a dummy variable for the regional location. Similarly, the type of location should have an impact on growth. For example, MSEs based in commercial shops are expected to have higher growth rates than MSEs based at home. Again, a dummy variable will be included to measure these differences.

Forward and backward linkages are expected to have a positive impact on growth. As suggested earlier, businesses that sell products to retailers, wholesalers, or the export market may display higher growth rates. This will be measured by including a set of dummy variables for the types of linkages associated with each firm.

Profits (PROFITS) are also expected to be positively related to employment growth. As profits increase, the business should expand and therefore add more employees. This will be measured by the amount of annual profits in Zimbabwe dollars earned by the business.

Higher initial capital investments (CAPITAL) are expected to be positively related to employment growth. Capital will be defined as the amount of expenditures in hundreds of Zimbabwe dollars on equipment and buildings to start a business.

Many studies suggest that credit is a primary constraints faced by MSEs. If this constraint were relieved, MSEs would expand. Credit (CREDIT) will

therefore be included as the amount of credit received over the life of the business in Zimbabwe dollars.

In addition to profits, investment, and credit, several studies suggest that rural households supplement business activities with income generated from agricultural activities. Kilby (1971) argues that this may lead to lower profits for each activity as people diversify. This type of financial support will be measured by including a dummy variable for those households that use agricultural income to support their business activities.

The last set of determinants is related to government regulations. As suggested in Chapter Two, numerous regulations have been cited as impediments to MSE growth. Licensing and registration, for example, may force firms to remain small in order to avoid government regulations and taxation. If this is true, firms that do not have licenses or are not registered may exhibit lower growth rates. This will be measured by including dummy variables for both licensing and registration.

Finally, firms with title deeds may experience higher growth rates since title deeds may be used as collateral for loans. Also, people may be more willing to invest in their businesses if they own the property. Again, a dummy variable will be included to indicate if a proprietor owns a title deed.

Table 4-4: Variable definitions for the growth model

Variable name	Definition	Expected Sign
Proprietor Characteristics		
EDUC	Number of years of schooling completed by the proprietor in firm i.	+
EXPERMC	Number of years the proprietor has been engaged in the current type of business in time t	+
OTHEXP	Number of years the proprietor has been engaged in other types of businesses	+
MALE	Dummy for male-owned firms (female omitted)	+
MIXED	Dummy for firms owned by men and women	+
MARRIED	Dummy for married proprietors	+
Firm Characteristics		
AGEPER	Age of firm i, period t	-
SIZESTPR	Size of firm i at beginning of the period t as measured by the total number of workers	-
INDUSTRY	Industry of firm as measured by dummy variables	*
URBAN	Dummy for urban-based firms (rural omitted)	+
LOCATION	Set of dummy variables for home vs. shop-based MSEs	*
LINKAGES	Set of dummy variables for linkages	*
Profits and Access to Capital		
PROFITS	Profits earned in firm i in Zimbabwe dollars	+
CAPITAL	Expenditure on equipment and buildings to start a business in hundreds of Zimbabwe dollars	+
CREDIT	Amount of credit received over the life of the firm in Zimbabwe dollars	+
AGINCOME	Dummy for firms supported by agricultural income	-
Government Regulations		
LIC	Dummy for firms that own licenses	+
REG	Dummy for firms that are registered	+
TITLE	Dummy for firms that own title deeds	+

CHAPTER FIVE

RESULTS OF THE ENTRY AND EXIT MODELS

This chapter begins with entry and exit rates of MSEs in Zimbabwe. This is followed by the results of the random effects entry and exit models in sections 5.2 and 5.3, respectively. Descriptive statistics are also used throughout Chapter Five to support the interpretation of the random effects model.

5.1 Entry and Exit Rates of MSEs in Zimbabwe

As described in the literature review, entry rates of MSEs are available in only two developing countries. In Sierra Leone, Liedholm (1990) found a 12.8 percent annual average entry rate with higher entry rates in localities with more than 20,000 residents. Cortes *et al.* (1987) reported an annual average entry rate of 8.1 percent in Colombia. These results are similar to a U.S. study where entry rates ranged from 8.9 to 12.1 percent for small firms (Phillips and Kirchhoff, 1988).

The evidence on exit rates indicates a wider variation than entry rates. For example, Liedholm (1990) estimated exit rates from 1.3 percent to 12.5 percent for the manufacturing sector in five developing countries. In the United States, Baldwin and Gorecki (1991) estimated a low exit rate of 6.5 percent for manufacturing firms in the U.S. during the 1970s.

Table 5-1: Entry rates by industry, Zimbabwe 1989 to 1993

Industry	Entry Rates by Industry, Zimbabwe					Five Year Avg.
	1989	1990	1991	1992	1993	
Manufacturing Total	**15.4**	**21.8**	**15.4**	**21.1**	**11.6**	**17.1**
Dressmaking	13.6	13.4	11.4	14.0	34.2	17.3
Tailoring	11.5	31.3	6.7	19.6	5.1	14.8
Knitting	10.2	18.7	15.0	22.7	11.6	15.6
Other Textile	22.4	18.7	7.5	6.7	7.8	12.6
Crocheting	20.8	23.9	17.0	28.7	11.0	20.3
Shoe work	13.3	33.3	8.2	24.7	42.5	24.4
Grass/Cane	10.9	34.9	25.9	22.2	10.7	20.9
Wood	18.7	6.0	5.5	17.7	.2	9.6
Carpentry	19.3	3.4	7.9	1.7	2.3	6.9
Welding	78.1	47.5	9.0	9.9	9.7	30.8
Auto works	1.2	7.0	1.7	2.1	4.9	3.4
Electrical Repair	19.7	5.6	2.7	6.5	28.5	12.6
Construction	**11.3**	**0.6**	**1.3**	**7.7**	**17.3**	**7.6**
Trade Total	**15.8**	**24.1**	**15.6**	**40.2**	**44.1**	**28.0**
Vending Foods	5.8	11.6	51.7	20.8	34.6	24.9
Vending Farm Prod.	23.2	35.4	20.9	66.3	55.9	40.4
Vending Garments	18.5	21.5	13.0	21.7	44.1	23.8
Grocery	24.0	19.9	.6	20.2	20.9	17.1
Retail Garments	14.4	32.4	14.3	15.0	20.3	19.3
General Trader	.6	10.7	1.2	25.5	24.8	12.6
Services Total	**8.7**	**25.0**	**7.5**	**8.3**	**5.4**	**11.0**
Traditional Healer	2.5	1.2	2.4	0.0	0.0	1.2
Hairdresser/Barber	31.2	96.2	15.8	19.8	11.7	35.0
TOTAL, ALL ENTERPRISES	**15.0**	**20.9**	**14.4**	**23.5**	**18.2**	**18.4**

Note: Only industries with more than 30 observations are included in this table. The entry rates at the ISIC one-digit level and in the last row are not simple averages of the column figures. They are based on the total number of enterprises born in the industry, e.g., manufacturing, divided by the number alive in the industry.

Entry and exit rates of MSEs in Zimbabwe are illustrated in Tables 5-1 and 5-2, respectively. Overall, the average annual entry rate for the five-year period from 1989 to 1993 was 18.4 percent. This is significantly higher than entry rates estimated in previous studies. Table 5-1 also shows that the entry rates vary widely by industry. Among four-digit industries, the lowest entry rates are in the traditional healing industry (2.4%) compared to the highest entry rates in vending of farm products (40.4%). Overall, among one-digit industries, the highest entry rates occurred in trade, while the lowest entry rates were in construction.

The average annual exit rate for the same five-year period was 6.2 percent.[13] Again, however, there is a range of exit rates among industries. The highest exit rates occurred in the garment vending industry (19.7%), compared to the lowest exit rates in general traders (0.2%) and traditional healers (0.2%). Overall, the highest exit rates occurred in trade, while the lowest exit rates were in services.

The high levels of entry and exit in trade suggest a positive relationship between entry and exit. Dunne, Roberts, and Samuelson (1988), for example, found a positive correlation between entry and exit rates. Using four-year periods,

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[13] Although proprietors are asked about all MSEs that they owned over their lifetime, entry and exit rates are under-reported due to recall difficulties. For example, an effort was made to locate all MSEs that had opened and closed in a one-year period in the Dominican Republic (Cabal, 1994). Cabal found that including these MSEs would increase the number of new firms by 12 percent and the entry rate would increase by 6.5 percent. Similarly, the exit rate would also increase by including these firms.

Table 5-2: Exit rates by industry, Zimbabwe 1989 to 1993

Industry	Exit Rates by Industry, Zimbabwe					Five Year Avg.
	1989	1990	1991	1992	1993	
Manufacturing Total	**1.8**	**6.8**	**1.4**	**8.6**	**5.2**	**4.8**
Dressmaking	.2	7.5	.6	12.6	10.3	6.2
Tailoring	4.2	17.2	4.0	7.0	1.2	6.7
Knitting	.8	8.5	2.1	6.0	7.7	5.0
Other Textile	1.8	4.5	1.8	22.3	1.7	6.4
Crocheting	2.0	3.1	.7	6.6	6.2	3.7
Shoe work	0.0	.7	.7	3.6	0.0	1.0
Grass/Cane	3.6	10.2	2.2	11.1	3.2	6.1
Wood	.3	7.8	0.0	9.3	5.0	4.5
Carpentry	.2	.8	0.0	.2	.3	.3
Welding	1.9	7.4	0.0	22.3	1.9	6.7
Auto works	0.0	0.0	0.0	0.0	2.5	.5
Electrical Repair	6.7	0.0	0.0	0.0	0.0	1.3
Construction	**.4**	**2.8**	**.8**	**1.1**	**10.2**	**3.7**
Trade Total	**10.2**	**13.2**	**19.1**	**11.7**	**12.9**	**13.4**
Vending Foods	13.1	1.2	32.8	15.8	17.5	16.1
Vending Farm Prod.	13.7	18.8	26.5	12.5	13.8	17.1
Vending Garments	16.3	17.8	20.2	20.0	24.3	19.7
Grocery	.6	11.5	12.5	0.0	.6	5.0
Retail Garments	15.0	30.1	26.4	15.1	6.1	18.5
General Trader	0.0	1.0	0.0	0.0	.3	.2
Services Total	**2.5**	**1.9**	**0.9**	**1.0**	**1.2**	**1.5**
Traditional Healer	1.1	0.0	0.0	0.0	0.0	0.2
Hairdresser/Barber	7.8	7.8	2.2	2.5	2.5	4.6
TOTAL, ALL ENTERPRISES	**3.4**	**7.7**	**4.6**	**8.6**	**6.9**	**6.2**

Note:
Only sectors with more than 30 observations are included in this table.
The exit rates for the ISIC one-digit level and in the last row (Total, all enterprises) are not simple averages of the column figures. They represent the number of firms that exit in a sector, e.g. manufacturing, divided by the number of firms alive in the sector.

Table 5-3: Correlations between industry entry and exit rates

	1989	1990	1991	1992	1993
			Exit rate		
Entry rate					
1989	.035	.143	-.077	.457	-.088
1990	.296	.350	.086	.210	-.061
1991	.557*	.132	.640**	.450	.546*
1992	.421	.419	.487	.183	.388
1993	.556*	.243	.587*	.232	.585*

* = 1-tail significance at α = 0.01
** = 1-tail significance at α = 0.001

they showed that correlation is highest between entry in one four-year period and exit in the following four-year period. The correlation between entry and exit rates in Zimbabwe is illustrated in Table 5-3. Similar to the results of Dunne, Roberts, and Samuelson, entry is positively correlated with exit in the same year and all succeeding years, except for three correlations that are close to zero.

5.2 Results of the random effects entry model

5.2.1 Entry model: all industries combined

As described in Section 4.3.4, a random effects model was used to examine factors that influence entry rates of MSEs in Zimbabwe. The results of the model are presented in Table 5-4. The correlation coefficient (R-square) is .29 and the F-statistic rejects the null hypothesis that all coefficients are equal to zero.

Table 5-4: Random effects entry model results

Dependent variable: gross entry rate		
Variable	Coefficient	t-ratio
Capital	-0.40**	-3.29
Sqcapital	0.78E-05**	3.25
Workcap	1.03**	2.08
Expernc	-1.56**	-5.25
Lic	-0.13**	-2.15
Growthup	103.60**	4.27
Wage	-3.04**	-2.87
Sqwage	0.14E-01**	2.85
GDP	-0.60**	-2.26
Maize	-0.59*	-1.75
Urban	0.21**	2.65
Constant	182.87**	3.32
Regression Statistics		
No. of observations (21 industries x 8 time periods)	168	
R-square	.29	
F-statistic	5.88	

* = significant at $\alpha = 0.10$
** = significant at $\alpha = 0.05$

The dependent variable is the gross entry rate of firms within a four-digit industry during time period t. All variables that were not significant at the 10 percent level were dropped from the estimation, however, an explanation for their insignificance if offered in the discussion below.

The coefficients can be interpreted as follows. There are three types of variables in the model: (1) those that vary over industry (cross-section), (2) those that vary over time (time-series), and (3) those that vary over industry and time

(cross-section and time-series combined). In the first case, the coefficient of working capital, for example, can be interpreted as a comparison of working capital use across industries. For every Z$100 increase in working capital used across industries, the entry rate increases by 1.03 percent, holding all other variables constant. Variables that vary over time, such as GDP, can be interpreted as a 1 percentage point increase in the real GDP growth rate leads to a 0.6 percent decrease in the entry rate, holding other variables constant. Finally, variables that vary over industry and time, such as license, can be interpreted as a one percentage point increase in the proportion of firms that have licenses across industries and over time leads to a 0.13 percentage point decrease in the entry rate, holding all other variables constant.

Barriers to entry

The results in Table 5-4 can be used to examine the predicted signs of the variables described in Section 4.4. Beginning with barriers to entry, market concentration is not a significant determinant of entry and therefore was removed from the model. This is not surprising given the low levels of concentration in micro and small enterprise industries. For example, 71.4 percent of all industries over the six-year time period had no market concentration as measured by the proportion of firms in industry i with 20 or more employees. Furthermore, 98.9 percent of all industries had less than 1.7 percent of all firms with 20 or more

employees. The highest level of concentration was in the other textile industry with 10.7 percent of all firms with 20 or more employees in 1991.

The second barrier to entry, capital expenditure, was a significant determinant of entry. The results show that high levels of expenditure on building and equipment to start a business lead to lower entry rates. This is not surprising given the limited amount of credit available to the MSE sector. Among all existing firms in 1993, only 0.7 percent had received credit from a formal institution. Furthermore, 89 percent of all existing firms had not received any type of credit, including loans from family and friends.

Working capital was also predicted to be a barrier to entry. Surprisingly, however, working capital was positively correlated with entry. This may reflect the positive correlation between working capital and profits.[14] Rather than posing a barrier to entry, higher working capital may, therefore, reflect more profitable industries.

Economies of scale were not a significant determinant of entry. Again, this is not surprising given the large proportion of micro and small enterprises in Zimbabwe. Ninety-six percent of all firms had four or fewer workers in 1993.

The results for human capital barriers to entry were mixed. Education was not a significant determinant of entry. This may reflect the small range of average education levels within the industries. For example, average education levels at

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[14] The correlation coefficient between working capital and profits was .482 which was significant at the .001 level.

the industry level ranged from some primary education to completion of secondary school. This low range of education level may not lead to barriers to entry within an industry. Experience, however, was a significant determinant of entry rates. Assuming that experience is a proxy for skills required to enter an industry, the results indicate that higher levels of experience act as barriers to entry.

Using licensing as a proxy for government regulation, entry rates were lower in industries characterized by higher levels of licensing. More specifically, a one percentage point increase in the number of firms with licenses in industry i, time t, leads to a 0.13 percent decrease in the entry rate for that industry and time period, holding all other variables constant. As discussed in section 4.4.1, a higher proportion of licenses is expected to signify stronger enforcement of licensing within certain industries. The results indicate that this enforcement may discourage new firm entrants.

The type of site where a business operates was not a significant barrier to entry. As discussed in Section 4.4.1, micro and small enterprises in Zimbabwe are located in homes, commercial shops, markets, on the roadside, or they are mobile. Shops are the most difficult location to maintain due to high rents and zoning regulations in Zimbabwe. It was expected, therefore, that industries characterized by a high proportion of businesses in commercial shops would exhibit low entry rates. The insignificance of the type of site may reflect the fact that only two of the 21 industries used in the study had two-thirds or more

businesses located in shops. The remaining industries had zero to 18.9 percent of businesses in shops.

Entry-inducing factors

As suggested by the literature review, profits and industry growth are the most common variables included as entry-inducing factors. High profits in an industry are expected to attract new entrants until profits are zero. In Zimbabwe, however, profit was not a significant determinant of entry. As mentioned earlier, Zimbabwean proprietors typically have low levels of education, skills, and access to capital. They may also be confined to their physical location. The choice to open a business may, therefore, be based on other factors. In particular, proprietors may compare the option of starting a business in an industry that requires low skills and capital to the alternatives of working for someone else at a low wage, being unemployed, or possibly turning to agriculture on a full-time basis as a source of income. It is not surprising, therefore, that profits were not a driving force of entry in Zimbabwe. Similarly, growth in paid employment was not a significant entry-inducing factor.

Growth in unpaid employment was positively related to entry. As discussed earlier, unpaid employment growth may reflect expansion in low-profit industries. For example, micro enterprises may use family members or distant relatives who do not have other employment opportunities. Addition of these

members, therefore, may not represent profitable growth of the business. The hypothesis that unpaid employment growth is not positively correlated with profits is supported by the employment growth model in Chapter Six. Using two periods of decreasing GDP and increasing GDP, profits were negatively correlated with unpaid employment growth under decreasing GDP and not significant during the period of increasing GDP.

The wage rate and GDP were also included to incorporate alternatives faced by Zimbabwean proprietors. Unlike traditional entry-inducing factors, however, these should be negatively correlated with entry. For example, as wage rates decline in the formal sector, entry is expected to increase as people search for better sources of income. Also, low wage rates may indicate an excess supply of labor and thus very few alternatives. As predicted, wages were inversely related to entry as illustrated by Table 5-4. There was also, however, a turning point. At higher wage levels, entry rates begin to rise. This could imply that the demand for labor in the formal sector is inelastic. As minimum wage levels rise, the demand for labor will decrease significantly, forcing people to turn to the MSE industry for employment. Higher wage rates could also create greater demand for MSE products, thereby leading to higher MSE entry rates.

GDP, which was included as a proxy for the performance of the economy, was negatively related to entry. This may indicate that decreases in GDP lead to higher entry rates as people search for alternative income sources. It also supports

the hypothesis that entry is driven by an excess supply of labor rather than demand for MSE products.

Considering agriculture as an alternative source of income, the level of maize production was included as a proxy for the average agricultural production by proprietor households within each industry. It was hypothesized that industries characterized by proprietors that are also engaged in agriculture will experience lower entry rates. As predicted, the level of maize production was negatively correlated with entry. Again, this suggests that entry does not occur as frequently in industries with high levels of agricultural production by proprietors due to the availability of alternative sources of income.

A proxy was also included to control for the dominant regional location of an industry. It was represented by the proportion of firms in an industry that are located in urban areas. As hypothesized, the proportion of firms located in urban areas was positively related to entry. Entry may be higher in urban-based industries due to a larger market for MSE products. Also, with high unemployment rates in urban areas, alternative income sources may not be available.

5.2.2 Entry model: high- and low-profit industries

As suggested throughout the discussion above, micro and small enterprise industries in Zimbabwe comprise a range of skills, profits, access to

capital, and growth patterns. This range may help explain two conflicting hypotheses about the forces that drive firm entry: the output-demand hypothesis and the labor-supply hypothesis. The output-demand hypothesis assumes that firm entry is primarily driven by consumer demand for particular products. This implies that most firms would be profitable and may require high capital and skill levels. The output-demand hypothesis has been supported by several studies that have shown that the demand for small-scale enterprise products increases as rural household income increases (Deb and Hossain, 1984; Hazell and Roell, 1983; and King and Byerlee, 1978). Alternatively, the labor-supply hypothesis assumes that firm births are driven by an excess supply of labor. In this case, people enter the MSE industry in search of alternative income sources regardless of demand for MSE products. Firms in this category would be characterized by low profits and low costs of entry. This hypothesis has not been empirically supported, however, profit measures taken in Zimbabwe showed that the majority of firms are in low-profit industries (Daniels, 1994).

Rather than assuming that only one hypothesis is correct, both the output-demand and labor-supply hypotheses may play a role in driving firm entry. For example, high-profit industries with corresponding high levels of skills and capital are more likely to be driven by market demand forces. Alternatively, low-profit industries may be driven by an excess supply of labor. If these statements are true, then the barriers to entry and entry-inducing factors reviewed above should

Table 5-5: Profits and start-up costs by industry

Industry	Avg. Annual Profits (Zimbabwe Dollars)	Avg. Cost of Entry (Zimbabwe Dollars)
Retail Garments	97,630	2,060
Auto Works	71,388	3,034
General Trader	28,970	5,911
Grocery	13,817	40,408
Construction	9,126	787
Welding	8,619	4,040
Hairdresser/Barber	7,078	3,783
Vending Garments	6,027	534
Carpentry	5,560	104
Electrical Repair	5,512	18,815
Dressmaking	4,233	702
Tailoring	3,817	570
Shoework	3,813	699
Other Textile	3,709	87
Vending Foods	2,674	102
Knitting	2,417	539
Grass/Cane	2,045	1
Crocheting	1,355	32
Vending Farm Products	1,142	49
Traditional Healer	1,003	*
Wood Carving	607	26

* Not available
US$1.00 = Z$6.70

have a different impact on the two types of industries. This hypothesis can be tested by estimating the entry model separately for high- and low-profit industries. Using the minimum taxable income of Z$4,801, ten of the 21 industries from Table 5-5 fall into the high-profit category, while the remaining industries can be categorized as low-profit industries.

Table 5-6 presents the results of the entry model for high- and low-profit industries. As predicted, the forces that drive entry are different for the two categories. Beginning with barriers to entry, capital is not a significant barrier to

Table 5-6: Random effects entry model results: high- and low-profit industries

Dependent variable: gross entry rate

	High-profit industries		Low-profit industries	
Variable	Coefficient	t-statistic	Coefficient	t-statistic
Capital	-0.60**	-3.472	-0.63	-0.095
Sqcapital	0.12E-04**	3.425	-0.94E-03	-0.085
Workcap	1.70**	2.678	3.53	0.037
Expernc	-1.92**	-4.077	-1.49	-0.914
Lic	-0.38**	-3.335	-0.19	-0.998
Growthup	33.71	0.712	57.93	0.374
Wage	-4.40**	-2.895	-1.62*	-1.844
Sqwage	0.02**	2.918	0.72E-02*	1.752
GDP	-0.38	-1.001	-0.64**	-2.895
Maize	-1.40**	-2.427	-1.42	-0.947
Urban	0.28**	2.476	0.56**	5.082
Constant	276.19**	3.485	118.35**	2.326
Regression Statistics				
No. of observations	80		88	
R-square	.43		.32	
F-statistic	4.64		3.67	

* = significant at the α = 0.10 level
** = significant at the α = 0.05 level

entry for low-profit industries. This result is compatible with the labor-supply hypothesis that assumes proprietors choose industries that require low-capital levels. Table 5-5 shows, for example, that the average cost of entry for low-profit

industries is only Z$281 compared to Z$7,947 for high-profit industries. It is also reasonable to assume that capital would be a barrier to entry for high-profit industries where higher levels of capital are necessary. This assumption is supported by the results in Table 5-6.

The effect of working capital is also different for the two types of industries. Low-profit industries are not affected by working capital requirements whereas entry into high-profit industries is positively correlated with working capital requirements. As suggested in the entry model that combined all industries, this positive relationship could reflect the correlation between profits and working capital. Since working capital is positively correlated with profits, entry driven by profits may be higher in industries characterized by greater working capital requirements.

Experience was not a significant determinant of entry in low-profit industries. Again, this supports the labor-supply hypothesis that proprietors are driven into low-skill industries due to an excess supply of labor and limited options. Experience is a barrier to entry, however, in high-profit industries where technical and marketing skills are necessary.

Licensing as a proxy for government regulations appears to be a significant barrier to entry in high-profit industries, however, low-profit industries are not affected according to the results. Although licensing may not affect entry in low-profit industries, licenses are required by a number of industries in this category.

The differences between the high- and low-profit industries may, therefore, reflect a higher level of enforcement within high-profit industries. These results also support the suggestion that proprietors that have the option of expanding into profitable industries may choose other options due to the penalties placed on "visible" firms. Visible firms are those firms that are subject to government regulation and taxes.

Wage rates are negatively correlated with entry in both high- and low-profit industries. Again, however, there is a turning point in both types of industries. Initially, entry decreases as wage rates rise. After the turning point, wage rates are positively correlated with entry. This turning point occurs, however, at a lower wage in high-profit industries. This may suggest that high-profit industries are driven more quickly by output demand if increasing wages lead to higher demand for MSE products.

The growth rate of GDP was negatively related to entry in low-profit industries. Again, this supports the labor-supply hypothesis. As the macro economy declines, more people turn to low-profit industries as an alternative means of income. In the high-profit industries, GDP was not a significant determinant of entry. This is surprising since the output-demand hypothesis suggests that higher levels of income should lead to an increase in demand for MSE products. Entry in high-profit industries would, therefore, expected to be positively related to GDP growth. Nonetheless, the fact that GDP is not

significant suggests that people do not turn to high-profit industries as an alternative source of income when the macro economy declines.

Surprisingly, the level of maize production within proprietor households is not significant in low-profit industries, however, it is inversely related to entry in high-profit industries. There is no clear explanation for this pattern.

The variable used as a proxy for the dominant regional location of an industry was negatively related to entry in both types of industries. A higher proportion of firms located in urban areas is therefore associated with higher entry rates. Within high-profit industries, this could reflect a larger market for MSE products in urban areas. For lower-profit industries, higher entry rates for industries in urban areas could reflect an excess supply of labor in urban areas and a lack of alternative income sources.

In addition to the variables in Table 5-6, other variables tested in the general model that combined all industries were also included in the high- and low-profit entry models. These included market concentration, economies of scale, education, the type of site, profits, and growth in paid employment. None of these variables were significant determinants of entry in high- or low-profit industries.

In summary, the labor-supply hypothesis appears to be supported by the results of the low-profit entry model. The insignificance of capital expenditures and experience indicate that proprietors with low capital and skills can easily enter

these industries as an alternative source of income. This is further supported by the inverse relationship between GDP and the entry rate. As GDP declines, more people turn to these industries as a source of income.

The results of the high-profit entry model suggest that capital, experience, and government regulations are barriers to entry. Furthermore, entry into these industries is not driven by changes in GDP as in low-profit industries. Although these results do not necessarily support the output-demand hypothesis for high-profit industries, they do not coincide with the labor-supply hypothesis. Firms within these industries do not appear to be driven by an excess supply of labor.

5.3 Results of the random effects exit model

Similar to the entry model, a random effects model was used to examine factors that influence exit rates of MSEs in Zimbabwe. The results of the model are presented in Table 5-7. The dependent variable is the gross exit rate of firms within a four-digit industry during time period t. Again, the coefficients can be interpreted as the partial derivative of the exit rate with respect to the associated regressor.

Three exit models are presented in Table 5-7. The first column represents the results used in a general model that combines all industries. The last two columns represent the results from the model using only high- and low-profit industries, respectively. The definitions of high- and low-profit industries are the

Table 5-7: Results of the random effects exit model

Dependent variable: gross exit rate

	All industries	High-profit industries	Low-profit industries
Variable	Coefficient (t-ratio)	Coefficient (t-ratio)	Coefficient (t-ratio)
Workcap	-0.01	-0.17	41.49**
	(-0.07)	(-0.62)	(2.59)
Growthpd	-0.77	-1.10	139.89
	(-.43)	(-0.50)	(1.19)
Growthup	-4.80	-39.56	62.58*
	(-0.26)	(-1.20)	(1.72)
GDP	-0.09	0.14	-0.30**
	(-0.86)	(1.29)	(-2.67)
Urban	0.05	0.02	-0.15216**
	(1.06)	(0.49)	(-2.67)
Entry	0.07**	0.03	0.10932**
	(2.15)	(0.89)	(2.76)
Constant	1.64	8.85**	1.7835
	(0.47)	(2.00)	(0.87)
No. of observations	168	80	88
R-square	.13	.20	.37
F-statistic	4.72	5.92	8.14

* = significant at $\alpha = 0.10$
** = significant at $\alpha = 0.05$

same as those used in the entry model.

Beginning with barriers to exit, only two factors were tested in the exit models, capital expenditures and economies of scale. Neither of these variables was significant in the three models. This is not surprising given the low levels of capital expenditures in Zimbabwean micro and small enterprise industries compared to the studies conducted in the U.S. and Canada. Furthermore, Caves

and Porter (1976) identify durable and specific assets associated with high capital expenditure that act as barriers to exit. These include large machinery and inventories of inputs and final products with limited salvage value. Again, capital expenditures are relatively low in Zimbabwe. Furthermore, even larger firms did not necessarily keep large inventories due to the lack of inputs and final products prior to the structural adjustment program. The insignificance of economies of scale as an exit barrier can be explained by the lack of economies of scale in most Zimbabwean industries studied here.

Working capital was hypothesized to be an exit-inducing factor. For example, industries characterized by high levels of working capital may exhibit higher levels of exit rates as firms struggle to survive. The results of the model show that this was true only for low-profit industries. This suggests that access to working capital is not readily available to firms in low-profit industries.

Industry growth as measured by growth in paid and unpaid employment was not significant in the general model or the high-profit industry model. In low-profit industries, however, increases in unpaid employment were a significant exit-inducing factor. As mentioned earlier, previous studies have hypothesized that employment growth, as measured by increases in paid and unpaid employment combined, is a sign of profitability. The results from this study show, however, that the two types of employment growth may have very different effects on entry and exit. In fact, unpaid employment growth was a negative determinant of entry

and a positive determinant of exit in low-profit industries. These results indicate that unpaid employment growth may be negatively correlated with profits rather than the positive correlation suggested by previous studies. This interpretation is also supported in the employment growth model in Chapter Six that shows a positive relationship between profits and paid employment growth and an insignificant relationship between profits and unpaid employment growth.

Table 5-8: Results of the random effects net entry model

Dependent variable: net entry rate (entry minus exit) for low-profit industries

Variable	Coefficient	t-ratio
Capital	2.45	0.40
Sqcapital	-0.005	-0.44
Workcap	-55.26	-0.59
Expernc	-1.73	-1.10
Lic	-0.17	-0.86
Growthup	18.36	0.12
Wage	-1.92**	-1.97
Sqwage	0.009**	1.93
GDP	-0.37*	-1.49
Maize	-1.25	-0.82
Urban	0.63**	5.23
Constant	129.22**	2.33
Regression Statistics		
No. of observations	88	
R-square	.16	
F-statistic	1.93	

* = significant at $\alpha = 0.10$, one-tailed test
** = significant at $\alpha = 0.05$

Increases in GDP could have two opposite effects on exit rates. First, exit rates could increase as more jobs become available in the formal sector. Alternatively, GDP increases could lead to higher demand for MSE products and thereby fewer exits. The results show that GDP is inversely related to exit in low-profit industries only. This supports the latter effect that an increase in GDP leads to lower exit rates. Combining the results from the entry and exit models of low-profit industries, however, an increase in GDP *ceterus paribus* leads to a net decrease in the expansion rate (entry rate minus exit rate) as illustrated in Table 5-8. The overall effect of an increase in GDP is, therefore, a decrease in the expansion rate of firms in low-profit industries or an increase when GDP declines. The inverse relationship between GDP and the expansion rate supports that labor-supply hypothesis that low-profit industries are driven by an excess supply of labor.

The regional location was a significant factor in the low-profit industry model. The inverse relationship between the proportion of firms in urban areas and exit rates suggests that markets are larger in urban areas or that proprietors have few alternatives. Because regional location was significant only in low-profit industries, the latter conclusion is more likely.

A generational or turnover variable was also included in the exit model. As suggested by Caves and Porter (1976), the entry variable represents the "unknown underlying forces that speed the generational turnover of sellers

(p.56)." This variable was positively correlated with exit in the low-profit industry model and the general model that combined all industries. The fact that entry was not correlated with exit in the high-profit industry model suggests an irregular pattern of generational turnover in high-profit industries.

Profits and wages were also included in the exit model, however, these variables were not significant determinants of exit. It was hypothesized that profits would be negatively correlated with exit, while wages were expected to be positively related to exit.

CHAPTER SIX

RESULTS OF THE EMPLOYMENT GROWTH MODEL

This chapter begins with a review of MSE employment growth rates in Zimbabwe. This is followed the results of an OLS employment growth model based on three perspectives. In the first case, paid, unpaid, and total employment growth are compared in section 6.2.1. Section 6.2.2 then examines paid employment growth in two time periods under decreasing and increasing GDP. Similarly, unpaid employment growth is examined under decreasing and increasing GDP in section 6.2.3.

6.1 Growth rates of MSEs in Zimbabwe

As discussed in the literature review, employment growth rates have been more widely studied than entry or exit of MSEs in developing countries. In a cross-country comparison, for example, Liedholm and Mead (forthcoming) show that the average annual growth rate of MSEs, defined as the percentage change in the number of employees since the firm started divided by the number of years the firms has operated, is 11.3 percent for five countries in southern and eastern Africa. Including Niger and the Dominican Republic, the average annual growth rate is 11.4 percent. Within these countries, the growth rate ranges from 6.6 percent in Swaziland to 29 percent in Kenya.

Table 6-1: Average annual employment growth rates by industry, Zimbabwe

Industry	Growth Rate*
Manufacturing Total	1.0%
Dressmaking	1.3%
Tailoring	0.4%
Knitting	0.6%
Other textile mfg	2.7%
Crocheting	0.7%
Shoework and repairs	0.8%
Grass/cane/bamboo work	1.9%
Carpentry	3.0%
Construction Total	18.2%
Trade Total	4.4%
Vending foods	1.9%
Vending drinks	9.6%
Vending farm products	5.5%
Vending garments	0.4%
Vending other	3.1%
General trader/dealer	5.5%
Tuckshop	5.2%
Services Total	6.1%
Hairdresser/Barber	6.1%
Total	2.5%

* The growth rate is calculated as the percentage change in the number of employees added or subtracted since the start of the business divided by the number of years the business has been in existence.
This table is based on all industries that had enough firms to represent at least one percent of the sample. It includes only existing firms in 1993.

The average annual employment growth rates of firms in Zimbabwe are illustrated in Table 6-1. The overall growth rate is low compared to previous studies. This low growth rate could represent the impact of the drought in 1991/92. During this period, for example, the GDP fell by 6.6 percent. Despite the low overall growth rate, some four-digit industries experienced higher growth rates, such as construction, vending drinks, and hair dressing. Among the ISIC one-digit industries, construction and services exhibited the highest growth rates while manufacturing growth rates were the lowest.

While the results in Table 6-1 give some indication of the rate of employment growth, they do not reveal the factors that drive employment growth. This is explored in more detail below including a comparison of the results to studies from other countries.

6.2 Results of the employment growth model

As mentioned above, several studies have examined employment growth rates and the factors that drive firm growth in developing countries. Employment growth is typically defined in these studies as the percentage change in the number of employees since the firm started divided by the number of years that the firm has operated. While these studies provide valuable information on firm growth, there are two limitations with this method that are described below.

First, the use of an annual average employment growth rate does not reveal the exact time period of the growth. The influence of macroeconomic factors on growth, therefore, cannot be determined since the time period for growth of individual firms is not uniform. Furthermore, an accurate relationship between growth and other factors cannot be estimated. For example, estimating growth over the life of the firm as a function of the size of the firm when it started is inaccurate since growth may have occurred in several stages. In this case, each time that the firm added employees, it started as a different size. Similarly, estimating the percentage change in the number of employees as a function of age in the current period is inaccurate. Again, this is because the exact age or time period when the growth occurred is unknown. A third example is the measure of growth as a function of experience of the proprietor. If a firm has high growth and it has operated for 20 years, the results may indicate that growth is high because the proprietor has run the business for 20 years. The growth may have occurred, however, in the first year of the business.

The second limitation with the average annual employment growth rate concerns the type of employment growth. As defined above and in previous studies, employment growth includes the combined change in the number of proprietors, paid employees, unpaid employees, and trainees. The forces that drive changes in these different types of employment may vary significantly. As mentioned in Chapter Four, for example, unpaid employees are often immediate

family members or distant relatives that may not have other employment opportunities. Alternatively, paid employment growth may indicate profitable growth in the firm. In Zimbabwe, the majority of the change in the number of employees occurred in unpaid and paid employment growth. For example, 47 percent of the change in the number of employees occurred in unpaid employment growth and 43 percent occurred in paid employment. Only six percent of the total change in employment occurred in proprietors and 4 percent in trainees.

To address these limitations, employment growth will be examined from several perspectives using ordinary least squares. First, growth in paid and unpaid employment will be addressed separately within the same time period to determine the factors that influence growth in different types of employment. These results will be compared to the combination of all types of growth in the same time period. Second, growth in paid employment will be examined in two time periods to determine the impact of macroeconomic factors on paid employment growth. Similarly, growth in unpaid employment growth will be examined in two time periods to determine the impact of macroeconomic factors. In the first time period from August 1991 to August 1992, GDP was declining whereas in the second time period, from September 1992 to September 1993, GDP was rising. More specifically, the GDP growth rate changed from 4.1 percent in 1991 to -6.6 in 1992. In 1993, the GDP growth rate was 4.2 percent.

6.2.1 A comparison of paid, unpaid, and total employment growth

Table 6-2 illustrates the results of the employment growth model from September 1992 to September 1993. The dependent variable in the first two equations is the absolute change in the number of paid and unpaid employees, respectively. The third equation uses the absolute change in the number of paid and unpaid employees combined from September 1992 to September 1993 as the dependent variable. The coefficients can be interpreted as the partial derivative of the change in the number of employees with respect to the associated regressor, holding all other variables constant. In contrast to Chapter Five, insignificant variables were maintained in each estimation in order to compare the significance of variables across the different time periods and their effect (or lack of effect) on different types of employment growth.

The F-statistic in all three equations rejects the null hypothesis that all coefficients are equal to zero. The adjusted R-square for the three equations is .42, .02, and .33, for paid, unpaid, and total employment growth, respectively. These correlation coefficients suggest that a much higher proportion of the variation in paid employment growth can be explained by the regressors than in the unpaid employment growth equation. As mentioned earlier, unpaid employment growth may result from personal favors to unemployed relatives and thus may not reflect profitable growth in the business. In these cases, typical

regressors in a growth model such as firm age, size, profits, and location are not likely to have any influence on the use of unpaid employees.

Proprietor characteristics

The first set of regressors in the model represents proprietor characteristics. Education, for example, is expected to be positively correlated with employment growth. In all three equations, education was not a significant determinant of growth. McPherson (1992) found similar results in Swaziland and Botswana where completion of secondary school did not affect employment growth. Using a 1991 data set from Zimbabwe, however, McPherson did find that firms run by proprietors that completed secondary school had higher growth rates than firms run by proprietors with less than a secondary school education. This difference may reflect several factors. First, McPherson used a much smaller sample of 345 firms that were not randomly selected compared to the sample 3,613 firms that were randomly selected. Second, the definition of growth and the time period differ in the two models. For example, McPherson measures growth as the percentage change in employment over the life of the firm. The results in Table 6-2, however, reflect growth in one year, which allows for the control of macroeconomic variables.

Table 6-2: OLS employment growth model results

Independent Variables	Dependent Variable		
	Change in Paid Employees Coefficient (t-statistic)	Change in Unpaid Employees Coefficient (t-statistic)	Change in Paid and Unpaid Employees Coefficient (t-statistic)
Constant	-0.10E-01	0.12E-01	0.20E-02
	(-0.278)	(0.513)	(0.043)
Educ	-0.17E-02	0.31E-03	-0.14E-02
	(-0.623)	(0.171)	(-0.410)
Expernc	0.40E-03	-0.35E-03	0.60E-04
	(0.197)	(-0.259)	(0.023)
Othexp	0.25E-03	-0.17E-04	0.23E-03
	(0.115)	(-0.012)	(0.086)
Male	-0.48E-01*	0.76E-02	-0.40E-01
	(-1.888)	(0.463)	(-1.270)
Mixed	0.20 **	0.23 **	0.42 **
	(3.407)	(5.624)	(5.640)
Married	-0.33E-02	-0.86E-02	-0.12E-01
	(-0.168)	(-0.672)	(-0.482)
Ageper	0.60E-02**	-0.23E-02	0.37E-02
	(2.064)	(-1.225)	(1.016)
Sizestpr	0.11 **	0.26E-01**	0.14 **
	(6.947)	(2.535)	(6.872)
Agexsize	-0.40E-01**	-0.49E-02**	-0.45E-01**
	(15.923)	(-2.977)	(14.283)
Age^2	-0.17E-03**	0.49E-04	-0.12E-03
	(-2.080)	(0.935)	(-1.180)
$Size^2$	-0.22E-01**	-0.92E-03**	-0.23E-01**
	(30.894)	(-2.022)	(-25.766)
Age^2xsize	0.93E-03**	0.44E-04	0.98E-03**
	(15.647)	(1.135)	(13.108)
$Agexsize^2$	0.37E-02**	0.12E-03	0.38E-02**
	(29.695)	(1.477)	(24.525)
Age^2xsize^2	-0.10E-03**	0.96E-06	-0.10E-03**
	(23.846)	(0.340)	(-18.903)
Dummy for industry omitted category: crocheting			
dressmaking	-0.46E-01*	-0.64E-02	-0.53E-01
	(-1.669)	(-0.357)	(-1.520)
Tailor	-0.69E-01	-0.20E-01	-0.88E-01*
	(-1.579)	(-0.695)	(-1.624)
Knit	-0.35E-01	-0.39E-02	-0.39E-01
	(-1.596)	(-0.279)	(-1.421)
Other textile	0.17E-01	-0.21E-01	-0.33E-02
	(0.407)	(-0.747)	(-0.061)

Table 6-2 (cont'd)

Independent Variables	Dependent Variable		
	Change in Paid Employees	Change in Unpaid Employees	Change in Paid and Unpaid Employees
Shoe work	-0.72E-01	0.27E-01	-0.44E-01
	(-1.090)	(0.640)	(-0.540)
Grass/cane work	-0.13 **	0.14E-01	-0.11 **
	(-2.862)	(0.505)	(-2.028)
Carpentry	0.38E-01	-0.17E-01	0.26E-01
	(0.573)	(-0.272)	(0.317)
Construction	-0.20 **	0.11 **	-0.87E-01
	(-3.073)	(2.661)	(-1.079)
Vending food	-0.11E-01	0.53E-01	0.42E-01
	(-0.211)	(1.522)	(0.620)
Vending drinks	0.34E-01	-0.35E-01	-0.12E-02
	(0.674)	(-1.077)	(-0.019)
Vending farm prod.	0.13E-01	0.37E-01**	0.51E-01
	(0.516)	(2.219)	(1.563)
Vending garments	-0.44E-01	0.28E-03	-0.44E-01
	(-1.192)	(0.012)	(-0.948)
Vending other	-0.36E-01	0.31E-01	-0.51E-02
	(-1.028)	(1.358)	(-0.118)
General trader	-1.43 **	-0.11 *	-1.5 **
	(-14.609)	(-1.715)	(-12.577)
Tuckshop	-0.83E-01*	-0.11 **	-0.19 **
	(-1.729)	(-3.490)	(-3.192)
Hair dresser	-0.68E-01	0.52E-01	-0.16E-01
	(-1.328)	(1.577)	(-0.245)
Dummy for urban location	-0.17E-01	0.176E-01	-0.55E-02
	(-1.039)	(1.088)	(-0.268)
Dummy for location omitted category: home			
Market	-0.12E-01	-0.43E-02	-0.16E-01
	(-0.282)	(-0.157)	(-0.307)
Shop	0.19 **	0.23E-01	0.22 **
	(4.413)	(0.807)	(3.949)
Road	0.26E-01	-0.81E-02	0.18E-01
	(0.836)	(-0.397)	(0.463)
Mobile	0.31E-01	-0.32E-01	-0.63E-03
	(0.897)	(-1.413)	(-0.015)
Industrial site	1.19 **	0.14E-02	1.19 **
	(4.257)	(0.008)	(3.410)
Other	-0.11	-0.37E-01	-0.15
	(-0.715)	(-0.369)	(-0.764)

Table 6-2 (cont'd)

Independent Variables	Dependent Variable		
	Change in Paid Employees	Change in Unpaid Employees	Change in Paid and Unpaid Employees
Dummy for linkages omitted category: consumer			
Other	0.16E-01	-0.42E-01	-0.26E-01
	(0.086)	(-0.349)	(-0.112)
Retail	-0.16E-01	0.14 **	0.12
	(-0.161)	(2.130)	(0.975)
Wholesalers	0.11	0.11E-01	0.13
	(0.278)	(0.041)	(0.244)
Export	0.46E-01	-0.24E-01	0.22E-01
	(0.677)	(-0.540)	(0.262)
Manufacturer	0.17	-0.58E-01	0.11
	(0.924)	(-0.487)	(0.487)
Profits	0.12E-04**	0.30E-06	0.12E-04**
	(26.955)	(1.024)	(22.098)
Capital	0.22E-04**	0.23E-06	0.22E-04**
	(9.698)	(0.162)	(7.844)
Credit	0.59E-05**	-0.46E-06	0.54E-05**
	(4.068)	(-0.489)	(3.001)
Ag income	0.14E-01	0.47E-03	0.14E-01
	(1.356)	(0.071)	(1.122)
License	-0.26E-01	-0.16E-01	-0.42E-01
	(-1.238)	(-1.164)	(-1.593)
Reg	0.76E-01*	0.45E-01*	0.12 **
	(1.917)	(1.734)	(2.432)
Title	0.10E-01	0.56E-01**	0.66E-01**
	(0.546)	(4.692)	(2.868)
Degrees of Freedom	3,563	3,563	3,563
Adj. R-square	.42	.02	.33
F-statistic	54.80	2.72	37.18

* = significant at $\alpha = 0.10$
** = significant at $\alpha = 0.05$

The experience of the proprietor is also expected to be positively correlated with employment growth. Experience in similar types of businesses and other types of businesses, however, was not significant determinants of growth. These results contradict Jovanovic's (1992) hypothesis that firms grow as managers gain more experience and learn about their firm.

The gender of the proprietor is expected to influence employment growth within the firm. Downing (1990) suggests, for example, that female proprietors avoid risk and are therefore less likely to expand their businesses. Rather than investing in one business, Downing suggests that women diversify their activities as a source of income security. In contrast, the results in Table 6-2 show that female-owned firms actually exhibit higher paid employment growth rates than male-owned firms. There is no significant difference, however, in the growth of unpaid employees between male- and female-owned firms. Combining both types of employment growth in equation three, male- and female-owned firms do not exhibit significant differences in growth rates. McPherson (1992) found similar results in Lesotho, Botswana, and Zimbabwe where the employment growth rates of male- and female-owned firms did not differ. In South Africa and Swaziland, however, McPherson found that female-owned firms did exhibit significantly lower growth rates. Liedholm and Mead (forthcoming) also found that female-owned firms experienced significantly lower growth rates in a regression that combined growth rates from six countries in southern and eastern Africa.

In addition to male- and female-owned firms, 2 percent of the firms examined were owned by both men and women. The results in Table 6-2 show that these firms exhibit significantly higher employment growth rates than female-owned firms in all three equations. These results may reflect a stronger capital base through the combination of several sources of income.

The marital status of the proprietor was also included as an explanatory factor, however, it was not significant. These results are similar to McPherson's study (1992) that found that marital status was not a significant determinant of growth in Swaziland or Botswana.

Firm characteristics

The second set of regressors in Table 6-2 relates to firm characteristics. Beginning with age and size, several studies have shown an inverse relationship between employment growth and the age and size of the firm. For example, Cortes *et al.*, found a decrease in employment growth after ten years of operation. Chuta (1990) also found an inverse relationship between growth and age for all sectors in northern Nigeria. In the United States, Evans (1987) found a negative relationship between growth and age in three-quarters of all industries and a negative relationship between growth and size. McPherson (1992) also found a negative relationship between growth and age in South Africa, Swaziland, and

Zimbabwe and a negative relationship between growth and size in South Africa, Swaziland, Lesotho, and Botswana.

Table 6-2 shows the results for the relationship between growth and firm age. Following Evans (1987), Dunne, et al. (1989) and McPherson (1992), a complete set of interactive terms for age and size has been included. Taking the partial derivative of growth with respect to age, as illustrated in Table 6-3, there is a significant negative relationship between growth and age in both paid and unpaid employment. Regarding size, however, the relationship differs for paid and unpaid employment. In the case of paid employment, size is inversely related to employment growth. Alternatively, unpaid employment growth is not significantly related to the size of the firm. Combined, the two types of employment growth show a significant negative relationship between employment growth and size. These results show that the combination of paid and unpaid employment in equation 3 conceal information about the relationship between unpaid employment and the size of the firm. Furthermore, the results support the hypothesis that the factors that drive unpaid employment changes differ from the factors that influence changes in paid employment.

Industries are expected to exhibit different growth rates depending on market demand and supply conditions. Using the predominant type of MSE in 1993, crocheting, as the base category, the results from the first equation show

Table 6-3: Partial derivatives of growth with respect to age and size

Partial derivatives	Dependent Variable		
	Change in Paid Employees	Change in Unpaid Employees	Change in Paid and Unpaid Employees
∂Growth/∂Age	-0.53 ** (-2.44)	-0.31 ** (-2.21)	-0.01 ** (-3.10)
∂Growth/∂Size	-0.11 ** (-11.32)	-0.003 (-0.53)	-0.11 ** (-9.33)

t-statistics are in parentheses
** = significant at α = .05
All partial derivatives were calculated at the mean value of the variables age and size.

The formulas, based on age, are as follows:
∂Growth/∂Age =
b(8)+(b(10)*size)+(2*b(11)*age)+(2*b(13)*age*size)+(b(14)*size^2)+(2*b(15)* age*size^2)
where:b(8) = the eighth beta coefficient, etc

t-statistic for ∂Growth/∂Age = (∂Growth/∂Age)/((Var ∂Growth/∂Age)$^{.5}$) =
(varb(8)+(4*age^2*varb(11))+(4*age^2*size^2*varb(13))+(size^4*varb(14))+(4*age^2*size^4*varb(15))+2*((size*cov(b8,b10))+(2*age*cov(b8,b11))+(2*age*size*cov(b8,b13))+(size^2*cov(b8,b14))+(2*age*size^2*cov(b8,b15))+(size*2*age*cov(b10,b11))+(size*2*age*size*cov(b10,b13))+(size*size^2*cov(b10,b14))+(size*2*age*size^2*cov(b10,b15))+(2*age*2*age*size*cov(b11,b13))+(2*age*size^2*cov(b11,b14))+(2*age*2*age*size^2*cov(b11,b15))+(2*age*size*size^2*cov(b13,b14))+(2*age*size*2*age*size^2+cov(b13,b15))+(size^2*2*age*size^2*cov(b14,b15))))$^{.5}$

that the dressmaking, grass/cane, construction, general trading, and tuckshop industries exhibited lower growth in paid employment from September 1992 to September 1993. In the second equation, the construction and vending farm products industries exhibited higher growth in unpaid employment than crocheting, whereas general trading and tuckshops exhibited lower growth in unpaid employment. Combining the two types of employment growth in equation three, the tailoring, grass/cane, general trading, and tuckshop industries exhibited significantly lower growth rates than crocheting. Again, these results show that growth of paid and unpaid employment within industries differs. For example, the construction industry experienced significantly *lower paid* employment growth rates and significantly *higher unpaid* employment growth rates than crocheting. By combining paid and unpaid employment in equation three, the results show that employment changes in construction were not significantly different from crocheting.

Growth rates are also expected to differ by regional location. Urban-based MSEs, for example, should have higher growth rates because of a larger market for MSE products. The results from Table 6-2, however, do not show any significant difference in the growth rates between urban and rural-based firms in all three equations. McPherson (1992) found similar results for Zimbabwe using an earlier data set. He also showed that urban-based MSEs did not have higher growth rates in Lesotho and Botswana, however, they did exhibit higher growth

rates in Swaziland. Liedholm and Mead (forthcoming) also showed that MSEs in rural towns and villages had significantly lower growth rates in a model that combined six countries in southern and eastern Africa.

MSEs located in commercial or industrial shops are also expected to have higher growth rates than those located at home, in markets, or on the roadside. McPherson (1992) showed, for example, that commercial-based shops had higher growth rates in Botswana, Swaziland, and Zimbabwe. Liedholm and Mead (forthcoming) also showed similar results by combining six countries. The results from this study show that paid employment growth was significantly higher for MSEs located in commercial and industrial shops compared to home-based MSEs. Unpaid employment growth, however, did not vary by location. Combining both paid and unpaid employment growth in equation three, commercial and industrial shops displayed higher growth than home-based MSEs.

Forward and backward linkages are expected to have a positive effect on employment growth. For example, businesses that sell products to retailers, wholesalers, or the export market may display higher employment growth rates. The dummy variables that represent forward and backward linkages, however, were not significantly different from zero as a group in all three equations.

Many authors have suggested that profits and sales should be positively correlated with employment growth. As businesses become more profitable, they will expand by adding new employees. Parker and Aleke Dondo (1991), for

example, showed a positive correlation between sales and employment growth for two manufacturing industries near Nairobi, Kenya. The results in Table 6-2 show that this is true for paid employment growth. Profits are a positive determinant of paid employment growth. Equation 2 shows, however, that there is not significant relationship between profits and unpaid employment growth. Combining paid and unpaid employment growth in Equation 3, profits are a significant determinant of employment growth. These results highlight the limitation of combining paid and unpaid employment growth as a measure of success. Paid and unpaid employment growth are driven by separate factors as illustrated by the results in Table 6-2.

Similar to profits, higher initial investments are expected to lead to employment growth. Again, the results show that capital investment is positively correlated with paid employment growth, however, there is no significant relationship between investment and unpaid employment growth. Combining paid and unpaid employment growth in Equation 3, which shows a positive relationship between investment and total employment growth, conceals this information.

Many studies have suggested that credit is a primary constraint faced by MSEs. Liedholm and Mead (forthcoming) show, for example, that capital is reported as one of the three leading problems of MSEs in five African countries. Furthermore, numerous assistance programs focus on credit as a means of improving the MSE sector. The results in Table 6-2 show that credit is positively correlated with the growth of paid employment. Unpaid employment growth in

Equation 2, however, is not correlated with the amount of credit received by the business. These results suggest that paid employment growth within industries may be a more important criteria to determine profitability.

Several studies have suggested that rural households engage in numerous income-generating activities. According to Haggblade, Hazell, and Brown (1987) for example, diversified activities allow households to reduce risk by shifting capital between activities. In particular, non-farm activities are often supported by agricultural income. This diversification may lead to lower profits for each activity as suggested by Kilby (1971). The results in Table 6-2 show agricultural income used to support small businesses is not a significant determinant of employment growth in all three equations.

Government regulations

As discussed in Chapter Two, there are numerous government regulations in Zimbabwe that may inhibit MSE growth. Licensing, registration, and title deeds are three areas that are repeatedly cited as impediments to the MSE sector. In the case of licensing and registration requirements, it has been suggested that firms remain small in order to avoid government regulations and taxes that are administered to licensed or registered firms. The results in Table 6-2 show that license ownership is not a significant determinant of employment growth. Registration, however, does affect employment growth. In all three

equations, firms that are registered exhibit significantly higher growth rates than firms that are not registered. These results support the hypothesis that unregistered firms may remain small to avoid government regulations.

Title deeds, or property rights, are expected to be positively related to employment growth. For example, proprietors that own title deeds can use them as collateral for loans or they may invest more in their property. In the case of paid employment growth, title deeds were not a significant determinant of employment growth. Unpaid employment growth, however, was positively affected by title deeds. In this case, firms that owned title deeds added more unpaid employees. Combining both types of employment growth in Equation 3, firms with title deeds experience higher employment growth.

Summary of paid, unpaid, and total employment growth differences

The differences between the paid and unpaid employment growth models are highlighted in Table 6-4. The numerous disparities indicate that paid and unpaid employment growth are influenced by different factors. The most important difference is the relationship between growth and profits. Paid employment growth is positively related to profits whereas there is no significant relationship between unpaid employment growth and profits. Because employment growth is often used as a proxy for profits or a measure of success, combining paid and unpaid employment growth is misleading. A second important result is

the relationship between credit and employment growth. Paid employment growth is positively related to credit, while unpaid employment growth is not significantly related to credit. Finally, the low correlation coefficient of the unpaid employment growth equation indicates that a very small proportion of the variation in unpaid employment can be explained by common regressors used in employment growth models. Again, this suggests that unpaid employment may be influenced by non-market factors.

6.2.2 Paid employment growth under increasing and decreasing GDP

The previous section highlighted the differences between the factors that influence growth in paid and unpaid employment in the same time period. It did not, however, address the impact of macroeconomic factors on employment growth. In the next two sections, employment growth is examined in two time periods. The first time period, from August 1991 to August 1992, represents a period when GDP was decreasing from a 4.1 percent growth rate in 1991 to a -6.6 percent growth rate in 1992. The second time period, from September 1992 to September 1993 represents a period when GDP was increasing from a -6.6 growth rate in 1992 to a 4.2 percent growth rate in 1993. Paid employment growth is examined first followed by unpaid employment growth in the next section.

Table 6-5 shows the results of the OLS model of paid employment growth in two time periods. During the time period covered in equation one, GDP was

Table 6-4: Differences between paid and unpaid growth models

Variable/ Statistic	Dependent Variable		
	Paid employment growth	Unpaid employment growth	Combined employment growth
Adjusted R^2	.42	.02	.33
Female-owned firms	Higher growth	N.S. (-)	N.S. (+)
Size	Negative	N.S. (-)	Negative
Sector - Crocheting omitted	Dressmaking (-) Grass/cane (-) Construction (-) General trading (-) Tuckshop (-)	Construction (+) Vend farm products (+) General trading (-) Tuckshops (-)	Tailor (-) Grass/cane (-) General trading (-) Tuckshop (-)
Commercial and Industrial Shops	Higher growth	N.S. (+)	Higher growth
Profits	Positive	N.S. (+)	Positive
Investment	Positive	N.S. (+)	Positive
Credit	Positive	N.S. (-)	Positive
Title deeds	N.S. (+)	Higher growth with title deeds	Higher growth with title deeds

N.S. = not significant
+ or - indicates the sign of the coefficient that was not significant.

decreasing. In equation two, repeated from Table 6-2 above, GDP was increasing during the time period covered. As before, the dependent variable is the absolute change in the number of paid employees. The coefficients can be interpreted as the partial derivative of the change in the number of paid employees with respect to the associated regressor and its quadratic and interactive terms, holding all other variables constant.

The F-statistic in both equations rejects the null hypothesis that all coefficients are equal to zero. The adjusted R-square is .07 and .42 for equations one and two, respectively. Before examining the individual regressors, it is apparent that a much higher proportion of the variation in growth can be explained by the regressors in equation two when GDP was rising. This may suggest that employment growth is affected by more typical forces during economic growth. Under poor economic conditions, patterns of growth may be less predictable.

Proprietor characteristics

The results in Table 6-5 show that education and experience do not have an impact on paid employment growth in either time period. The difference between the paid employment growth of male- and female-owned firms, however, differed. Under decreasing GDP, there was no significant difference between paid employment growth of male- and female-owned firms. During the period of increasing GDP, however, female-owned firms had significantly higher growth

Table 6-5: OLS employment growth model: paid employment

Independent Variables	Dependent Variable: Change in paid employees	
	Time 1: Decreasing GDP	Time 2: Increasing GDP
	Coefficient (t-statistic)	Coefficient (t-statistic)
Constant	0.41E-02	-0.10E-01
	(0.175)	(-0.278)
Educ	-0.16E-02	-0.17E-02
	(-0.885)	(-0.623)
Expernc	-0.86E-03	0.41E-03
	(-0.639)	(0.197)
Othexp	0.12E-02	0.25E-03
	(0.929)	(0.115)
Male	-0.17E-01	-0.48E-01*
	(-1.038)	(-1.888)
Mixed	0.67E-01*	0.20 **
	(1.720)	(3.407)
Married	0.51E-02	-0.33E-02
	(0.402)	(-0.168)
Ageper	-0.36E-03	0.60E-02**
	(-0.191)	(2.064)
Sizestpr	-0.11E-01	0.11 **
	(-1.018)	(6.947)
Agexsize	-0.51E-02**	-0.40E-01**
	(-2.857)	(15.923)
Age^2	0.10E-04	-0.17E-03**
	(0.202)	(-2.080)
$Size^2$	-0.15E-02**	-0.22E-01**
	(-2.222)	(-30.894)
Age^2xsize	0.14E-03**	0.93E-03**
	(2.521)	(15.647)
Agexsize^2	0.47E-03**	0.37E-02**
	(3.749)	(29.695)
Age^2x$size^2$	-0.21E-04**	-0.10E-03**
	(-3.436)	(-23.846)
Industry dummy omitted category: crocheting		
Dressmaking	-0.10E-01	-0.46E-01*
	(-0.585)	(-1.669)
Tailor	-0.70E-02	-0.69E-01
	(-0.266)	(-1.579)
Knit	0.63E-02	-0.35E-01
	(0.472)	(-1.596)

Table 6-5 (cont'd)

Independent Variables	Dependent Variable: Change in paid employees	
	Time 1: Decreasing GDP	Time 2: Increasing GDP
Other textile	-0.73E-02	0.17E-01
	(-0.288)	(0.407)
Shoe work	0.41E-01	-0.72E-01
	(0.983)	(-1.090)
Grass/cane work	0.32E-03	-0.13 **
	(0.012)	(-2.862)
Carpentry	0.20E-01	0.38E-01
	(0.499)	(0.573)
Construction	0.51E-02	-0.20 **
	(0.120)	(-3.073)
Vending food	-0.18E-01	-0.11E-01
	(-0.493)	(-0.211)
Vending drinks	0.29E-02	0.34E-01
	(0.080)	(0.674)
Vending farm prod.	-0.14E-01	0.13E-01
	(-0.813)	(0.516)
Vending garments	-0.54E-01**	-0.44E-01
	(-2.304)	(-1.192)
Vending other	-0.14E-01	-0.36E-01
	(-0.585)	(-1.028)
General trader	-0.39 **	-1.43 **
	(-5.269)	(14.609)
Tuckshop	-0.51E-02	-0.83E-01*
	(-0.152)	(-1.729)
Hair dresser	0.26E-01	-0.68E-01
	(0.828)	(-1.328)
Dummy for urban location	0.24E-02	-0.17E-01
	(0.232)	(-1.039)
Dummy for location omitted category: home		
Market	0.27E-01	-0.12E-01
	(1.009)	(-0.282)
Shop	0.13 **	0.19 **
	(4.916)	(4.413)
Road	-0.18E-01	0.26E-01
	(-0.837)	(0.836)
Mobile	0.41E-01*	0.31E-01
	(1.795)	(0.897)
Industrial site	0.76E-01	1.1932**
	(0.459)	(4.257)

Table 6-5 (cont'd)

Independent Variables	Dependent Variable: Change in paid employees	
	Time 1: Decreasing GDP	Time 2: Increasing GDP
Other	0.15E-02	-0.11
	(0.017)	(-0.715)
Dummy for linkages omitted category: consumer		
Other	-0.69E-02	0.16E-01
	(-0.051)	(0.086)
Retail	-0.10E-01	-0.16E-01
	(-0.167)	(-0.161)
Wholesalers	0.15E-01	0.11
	(0.066)	(0.278)
Export	-0.34E-02	0.46E-01
	(-0.084)	(0.677)
Manufacturer	-0.11E-01	0.17
	(-0.094)	(0.924)
Profits	0.17E-05**	0.12E-04**
	(4.426)	(26.955)
Capital	0.36E-05	0.22E-04**
	(1.035)	(9.698)
Credit	0.81E-05**	0.59E-05**
	(9.226)	(4.068)
Ag income	0.38E-02	0.14E-01
	(0.591)	(1.356)
License	-0.36E-02	-0.26E-01
	(-0.278)	(-1.238)
Reg	0.60E-01**	0.76E-01*
	(2.512)	(1.917)
Title	0.21E-01*	0.10E-01
	(1.804)	(0.546)
Degrees of Freedom	2,936	3,563
Adj. R-square	.07	.42
F-statistic	5.70	54.80

* = significant at $\alpha = 0.10$
** = significant at $\alpha = 0.05$

rates than male-owned firms. This suggests that female-owned firms do not grow more slowly than male-owned firms as reported in many studies. One explanation may be, however, that men leave the MSE sector for jobs in the formal sector when the economy improves. If this is true, female-owned firms may have the opportunity to expand as the number of MSEs decrease. Firms owned jointly by men and women experienced significantly higher growth rates than female-owned firms in both time periods. Finally, the marital status of the proprietor did not have a significant effect on paid employment growth rates in either time period.

Firm characteristics

The age and size of the firm are expected to be inversely related to growth as discussed earlier. Taking the partial derivative, as illustrated in Table 6-6, size was negatively related to paid employment growth in both time periods at the mean, however, the effect of age differed. During the decreasing GDP period, age was not a significant determinant of paid employment growth. In contrast, age was a negative determinant of paid employment growth during the period of increasing GDP. Again, this may suggest that many hypotheses related to growth are relevant under good economic conditions. Under poor economic conditions, a different set of factors may influence growth.

Table 6-6: Partial derivatives of growth with respect to age and size: paid employment in two time periods

Partial derivatives	Dependent Variable: Change in paid employees	
	Time 1: Decreasing GDP	Time 2: Increasing GDP
∂Growth/∂Age	-0.001 (-0.87)	-0.01 ** (-2.44)
∂Growth/∂Size	-0.04 ** (-6.11)	-0.11 ** (-11.32)

t-statistics are in parentheses
** = significant at α = .05
All partial derivatives were calculated at the mean value of the variables age and size.

The formulas to calculate the partial derivatives and the t-statistic can be found in Table 6-3.

Industry growth rates are expected to differ depending on market supply and demand conditions as mentioned earlier. Using crocheting as the base category, only vending of garments and general trading exhibited significantly lower growth rates under decreasing GDP. Under increasing GDP, dressmaking, grass/cane work, construction, general trading, and the tuckshop industries experienced lower growth rates. These results indicate that growth rates within the same industry vary with economic conditions.

The regional location was not significantly related to growth rates in either time period. Firms located in shops, however, exhibited significantly higher growth rates than home-based firms in both time periods. In the decreasing GDP period, mobile MSEs also experienced higher growth rates than home-based

MSEs. In the increasing GDP period, firms in industrial sites experienced higher growth rates than home-based firms.

Forward and backward linkages were expected to be positively related to growth as described earlier. In both time periods, however, linkages were not significantly related to paid employment growth.

Profits, investment, and the amount of credit received by a firm are all expected to be positively related to employment growth. During the period of decreasing GDP, profits and the amount of credit received were positively related to growth; however, investment was not a significant determinant of growth. During the period of increasing GDP, all three variables were positively related to employment growth. This suggests that under poor economic conditions, the level of initial investment in the firm may not be relevant. Instead, market conditions or demand may play a stronger role in determining employment growth.

The use of agricultural income to support a business may lead to lower profits and possibly lower employment growth as suggested by Kilby (1971). The results in Table 6-5 show, however, that agricultural income used to support the business did not affect employment growth in either time period.

Government regulations

Licensing, registration, and title deeds were three types of regulations cited as impediments to MSE activity in Zimbabwe. In the case of licensing, firms that owned licenses did not experience e significantly different growth rates than firms without licenses in either period. Registered firms, however did exhibit higher growth rates than non-registered firms in both periods. Ownership of title deeds led to higher employment growth under decreasing GDP, however, it was not a significant factor during the period of rising GDP. This may suggest that firms that own titled deeds are more likely to succeed under poor economic conditions.

Summary of paid employment growth in two time periods

The differences between the two OLS models of paid employment growth in two time periods are summarized in Table 6-7. First, the adjusted R-square under increasing GDP suggests that a much higher proportion of employment growth can be explained by the regressors used in the model. Among proprietor characteristics, only the influence of gender was different between the two periods. Female-owned firms appeared to have higher growth rates during the period of increasing GDP than male-owned firms. Among firm characteristics, age was no longer significant under decreasing GDP. These results contradict many previous studies and may indicate that age in combination with high levels

of GDP is negatively related to growth. Under poor economic conditions, age does not appear to affect growth. Industries also experienced different growth patterns during the two time periods. This suggests that growth is not uniform across time periods. Instead, economic conditions will affect growth within industries. The initial level of investment also affects growth differently in the two time periods. Under poor economic conditions, investment is not significantly related to growth. During the period of increasing GDP, investment was positively related to growth. These results suggest that high levels of investment will not affect firm growth under poor economic conditions. Finally, title deed ownership led to higher growth during decreasing GDP, but had no impact during increasing GDP.

Overall, macroeconomic conditions do affect paid employment growth patterns. Analyses of growth over the life of the firm, therefore do not accurately portray the influence of individual regressors. Growth should be examined within specified time periods whenever possible.

6.2.3 Unpaid employment growth under increasing and decreasing GDP

This section reviews two OLS estimations of unpaid employment growth in Table 6-8. The same two periods used for the paid employment growth model are used again. The first period represents decreasing GDP while the second period represents increasing GDP. The dependent variable is the absolute

Table 6-7: Differences between paid employment growth models in two time periods

Variable/ Statistic	Macroeconomic conditions of paid employment model	
	Decreasing GDP	Increasing GDP
Adjusted R^2	.07	.42
Female-owned firms	N.S. (+)	Higher growth
Firm Age	N.S. (-)	Negative
Industries Crocheting omitted	Vending garments (-) General Trading (-)	Dressmaking (-) Grass/cane work (-) Construction (-) General trading (-) Tuckshop (-)
Location - home omitted	Mobile (+) Commercial shops (+)	Industrial sites (+) Commercial shops (+)
Initial investment	N.S. (+)	Positive
Title deeds	Higher growth	N.S. (+)

+ or - indicates the sign of the variable that was not significant.

change in the number of unpaid employees. The coefficients can be interpreted as the partial derivative of the change in the number of unpaid employees with respect to the associated regressor and its quadratic or interactive terms, holding all other variables constant.

The F-statistic in both equations rejects the null hypothesis that all coefficients are equal to zero. The adjusted R-square is .08 and .02 for equations one and two, respectively. These low correlation coefficients suggest that a very low proportion of the variation in the number of unpaid employees can be explained by the regressors in the equations. Again, this may suggest that unpaid

employment is driven by a different set of factors than paid employment growth. Personal reasons for hiring unpaid employees, which are not easily measured, may be more important determinants of unpaid employment changes.

Proprietor characteristics

The results in Table 6-8 show that education and experience in similar types of businesses do not affect unpaid employment growth in either time period. Experience in other types of businesses, however, was positively related to unpaid employment growth in equation one. The gender of the proprietor did not affect employment growth in either time period, however, married proprietors had significantly higher growth in unpaid employees than unmarried proprietors during the period of decreasing GDP.

Firm characteristics

The age of the firm was negatively related to unpaid employment growth in both time periods as illustrated by the partial derivatives in Table 6-9. The size of the firm, however, was negatively related to growth only during the period of decreasing GDP. In equation two, size was not a significant determinant of unpaid employment growth.

Although some of the individual coefficients for the industry dummy variables have significant t-statistics in Equation 1, the dummy variables

Table 6-8: OLS employment growth model: unpaid employment growth

Independent Variables	Dependent Variable: Change in unpaid employment	
	Time 1: Decreasing GDP Coefficient (t-statistic)	Time 2: Increasing GDP Coefficient (t-statistic)
Constant	-0.37E-01* (-1.689)	0.12E-01 (0.513)
Educ	0.69E-03 (0.424)	0.31E-03 (0.171)
Expernc	0.53E-03 (0.425)	-0.35E-03 (-0.259)
Othexp	0.27E-02** (2.244)	-0.17E-04 (-0.012)
Male	0.23E-01 (1.522)	0.76E-02 (0.463)
Mixed	-0.47E-01 (-1.302)	0.22 ** (5.624)
Married	0.21E-01* (1.793)	-0.86E-02 (-0.672)
Ageper	-0.85E-03 (-0.494)	-0.23E-02 (-1.225)
Sizestpr	-0.50E-01** (-5.074)	0.26E-01** (2.535)
Agexsize	-0.62E-02** (-3.755)	-0.49E-02** (-2.977)
Age^2	0.49E-05 (0.104)	0.49E-04 (0.935)
$Size^2$	0.27E-02** (4.429)	-0.92E-03** (-2.022)
Age^2xsize	0.13E-03** (2.558)	0.44E-04 (1.135)
Agexsize^2	-0.19E-03* (-1.630)	0.12E-03 (1.477)
Age^2xsize^2	0.12E-04** (2.097)	0.96E-06 (0.340)
Dummy for industry omitted category: crocheting		
Dressmaking	-0.36E-01** (-2.243)	-0.64E-02 (-0.357)
Tailor	-0.25E-01 (-1.047)	-0.20E-01 (-0.695)
Knit	-0.13E-01 (-1.027)	-0.39E-02 (-0.279)
Other textile	-0.13E-01 (-0.575)	-0.21E-01 (-0.747)
Shoe work	-0.36E-01 (-0.942)	0.27E-01 (0.640)

Table 6-8 (cont'd)

Independent Variables	Dependent Variable: Change in unpaid employment	
	Time 1: Decreasing GDP	Time 2: Increasing GDP
Grass/cane work	0.65E-02	0.14E-01
	(0.266)	(0.505)
Carpentry	-0.11E-01	-0.12E-01
	(-0.302)	(-0.272)
Construction	0.67E-01*	0.11 **
	(1.711)	(2.661)
Vending food	-0.13E-01	0.53E-01
	(-0.395)	(1.522)
Vending drinks	-0.28E-01	-0.35E-01
	(-0.838)	(-1.077)
Vending farm prod.	0.76E-02	0.37E-01**
	(0.480)	(2.219)
Vending garments	-0.79E-02	0.28E-03
	(-0.366)	(0.012)
Vending other	0.27E-02	0.31E-01
	(0.124)	(1.358)
General trader	-0.86E-01	-0.11 *
	(-1.257)	(-1.715)
Tuckshop	0.35E-01	-0.11 **
	(1.119)	(-3.490)
Hair dresser	0.59E-02	0.52E-01
	(0.202)	(1.577)
Dummy for urban location	0.14E-01	0.12E-01
	(1.434)	(1.088)
Dummy for location omitted category: home		
Market	0.37E-01	-0.43E-02
	(1.517)	(-0.157)
Shop	0.53E-01**	0.23E-01
	(2.077)	(0.807)
Road	0.23E-01	-0.81E-02
	(1.123)	(-0.397)
Mobile	0.20E-01	-0.32E-01
	(0.952)	(-1.413)
Industrial site	0.91E-01	0.14E-02
	(0.596)	(0.008)
Other	0.16E-01	-0.37E-01
	(0.193)	(-0.369)
Dummy for linkages omitted category: consumer		
Other	-0.89E-02	-0.42E-01
	(-0.071)	(-0.349)
Retail	0.29E-01	0.14 **
	(0.520)	(2.130)
Wholesalers	0.57E-01	0.11E-01
	(0.263)	(0.041)

Table 6-8 (cont'd)

Independent Variables	Dependent Variable: Change in unpaid employment	
	Time 1: Decreasing GDP	Time 2: Increasing GDP
Export	-0.73E-02	-0.24E-01
	(-0.198)	(-0.540)
Manufacturer	-0.66E-01	-0.58E-01
	(-0.607)	(-0.487)
Profits	-0.99E-06**	0.30E-06
	(-2.817)	(1.024)
Capital	0.62E-05**	0.23E-06
	(1.938)	(0.162)
Credit	0.26E-05**	-0.46E-06
	(3.220)	(-0.489)
Ag income	0.65E-02	0.47E-03
	(1.093)	(0.071)
License	-0.16E-01	-0.16E-01
	(-1.290)	(-1.164)
Reg	0.62E-01**	0.45E-01*
	(2.835)	(1.734)
Title	0.12E-01	0.56E-01**
	(1.139)	(4.692)
Degrees of Freedom	2,936	3,563
Adj. R-square	.08	.02
F-statistic	6.44	2.72

* = significant at $\alpha = 0.10$
** = significant at $\alpha = 0.05$

representing industry were not jointly significantly different from zero. Under increasing GDP, construction and vending farm products had higher unpaid employment growth while general trading and tuckshops had lower unpaid employment growth than the omitted category during the period of increasing GDP.

F-tests of the groups of dummies for linkages and location showed that they were not jointly significantly different from zero in either time period. Similarly, the regional location did not have a significant effect on changes in unpaid employment levels.

Table 6-9: Partial derivatives of growth with respect to age and size: unpaid employment in two time periods

Partial derivatives	Dependent Variable: Change in paid employees	
	Time 1: Decreasing GDP	Time 2: Increasing GDP
∂Growth/∂Age	-0.22 *	-0.31 **
	(-1.68)	(-2.21)
∂Growth/∂Size	-0.83 **	-0.003
	(-14.74)	(-0.53)

t-statistics are in parentheses
* = significant at α = .10
** = significant at α = .05
All partial derivatives were calculated at the mean value of the variables age and size.

The formulas to calculate the partial derivatives and the t-statistic can be found in Table 6-3.

Profits and access to capital

As mentioned earlier, profits are expected to be positively correlated with employment growth. During the period of decreasing GDP, however, profits were negatively correlated with growth in unpaid employment. In the period of increasing GDP, profits were not a significant determinant of unpaid employment growth. Compared to paid employment growth, which was positively related to profits in both periods, these results suggest that there is no positive correlation between profits and unpaid employment growth. Unpaid employment should, therefore, not be automatically categorized as a sign of success.

Initial investments and credit are also expected to be positively related to employment growth. During the period of decreasing GDP, both investment and credit were positively related to growth. During the period of increasing GDP, however, investment and credit were not significant determinants of unpaid employment growth.

Agricultural income used to support the MSE is expected to result in lower profits and possibly lower employment growth rates as mentioned earlier. In both periods, the use of agricultural income to support MSEs was not a significant determinant of unpaid employment growth.

Government regulations

As reviewed above, licensing, registration, and title deeds are expected to affect employment growth of small firms. The results in Table 6-8 show that license ownership does not have a significant impact on growth of unpaid employment. Firms that are registered, however, had higher unpaid employment growth rates in both periods. Finally, title deed ownership is not significantly related to unpaid employment growth during the period of decreasing GDP, however, firms with title deeds experienced higher growth in unpaid employment during the period of increasing GDP.

Summary of unpaid employment growth in two time periods

The differences between the two OLS models of unpaid employment growth in two time periods are summarized in Table 6-10. As mentioned earlier, the low R-squares for the two equations suggest that the factors that affect unpaid employment growth are not closely tied to typical market forces examined in employment growth models. Personal reasons for hiring unpaid employees, which are difficult to measure, may provide a stronger explanation of the factors that influence growth in this area. Overall, the most interesting results from the unpaid employment growth models is the relationship between profits and unpaid employment growth. During decreasing GDP, profits are negatively correlated with unpaid employment growth and insignificantly related to growth during the period of rising GDP. Again, these results suggest that unpaid employment growth may not be a sign of a successful business.

Table 6-10: Differences in unpaid employment growth models in two time periods

Variable/ Statistic	Macroeconomic conditions of unpaid employment model	
	Decreasing GDP	Increasing GDP
Adjusted R^2	.08	.02
Other experience	Positive	N.S. (-)
Married	Higher growth	N.S. (-)
Size	Negative	N.S. (-)
Industries - Crocheting omitted	N.S.	Construction (+) Vending Farm Products (+) General Trading (-) Tuckshops (-)
Profit	Negative	N.S. (+)
Initial investment	Positive	N.S. (+)
Credit	Positive	N.S. (-)
Title deed ownership	N.S. (+)	Higher growth

+ or - indicates the sign of the variable that was not significant.

CHAPTER SEVEN

SUMMARY AND IMPLICATIONS

This chapter presents a brief review of the objectives and a summary of the entry, exit, and growth model results in Sections 7.1 and 7.2. This is followed by the implications of the results for policy in Section 7.3 and the implications for research methods in Section 7.4. Finally, Section 7.5 suggests issues for further research based on the findings of this study.

7.1 Objectives

Micro and small enterprises represent an important source of income and employment in Zimbabwe. Twenty-nine percent of the working-age population is engaged in MSE activities and one out of every three households owns or operates an MSE. Because of their importance as a source of income, the Government of Zimbabwe has called for an "enabling" environment for the MSE sector. In order to provide that environment, however, some basic questions need to be answered. For example, what drives the entry and exit of MSEs? What factors influence employment growth within MSEs. Are MSEs a sustainable source of employment creation? Based on these questions, this research had three objectives: (1) to measure MSE entry, exit, and employment growth; (2) to examine the factors that

influence MSE entry and exit; and (3) to explore the factors that influence employment growth within MSEs.

7.2 Summary of results

7.2.1 Entry and exit results

Firm entry rates were significantly higher in Zimbabwe compared to studies of entry in other developing countries and the United Sates. These higher entry rates could reflect a more accurate measurement of entry through the use of both existing enterprise questionnaires and surveys administered to firms that had folded prior to the survey. Firm exit rates in Zimbabwe were comparable to previous studies.

There was a significant positive correlation between entry and exit rates within specific industries. This suggests that high entry rates do not necessarily imply profitable industries. Instead, it may signal an industry with high turnover and possibly low barriers to entry and exit.

Using industrial organization theory as a framework, entry was first examined by combining all industries in a random effects model that estimated the significance of barriers to entry and entry-inducing factors. Although several of the factors were significant, the wide range of skills, profits, access to capital, and growth patterns exhibited by Zimbabwean firms called for separate analyses to determine if the factors that affect entry were the same for all groups. This was

achieved by dividing the industries into two groups, high- and low-profit industries.

Among high-profit industries, capital, experience, and licensing were significant barriers to entry. These same factors, however, were not significant barriers to entry in low-profit industries. These results support both the labor-supply and output-demand hypotheses of firm entry. As described earlier, the labor-supply hypothesis suggests that firm entry is driven by an excess supply of labor and therefore entry should be characterized by low costs and low profits. As shown in the low-profit industries, capital and experience are not barriers to entry. Alternatively, if entry is driven by demand for MSE output, then entry may be characterized by higher capital and skill requirements. Again, this was true in the case of higher-profit industries where capital and experience were barriers to entry.

Among entry-inducing factors, wage was negatively correlated with entry in both high- and low-profit industries and exhibited a turning point. As wage rates increased, entry rates declined initially suggesting that people turn to the MSE sector as a source of income. At higher wage rates, however, entry increase. This turning point occurs at a lower wage rate in higher-profit industries and could imply that higher-profit industries respond more quickly to output-demand generated by increased wages.

The relationship between GDP and entry differed between high- and low-profit industries. In the high profit industries, there was no significant relationship between entry and GDP. Among low-profit industries, as GDP increased, entry declined. Again this supports the labor-supply hypothesis. As the economy declines, more people turn to the low-profit industries with low barriers to entry as a source of alternative income.

The exit model was also estimated separately for high- and low-profit industries to determine if the same set of forces affected exit in the two categories of industries. Growth in unpaid employment in low-profit industries is associated with higher exit rates, however, it was not significant in high-profit industries. This suggests that growth in unpaid employment is not a sign of increased sales or profits. GDP was not a significant factor in high-profit industries, however, it was negatively correlated with exit in low-profit industries. Combining these results with the entry model, an increase in GDP leads to an overall decrease in the expansion rate (entry rate minus exit rate). Again, this supports the labor-supply hypothesis in low-profit industries. The exit model also showed that exit rates were positively related to entry rates in low-profit industries, however, the relationship was not significant in high-profit industries. This suggests a higher turnover in low-profit industries.

7.2.2 Employment growth results

The employment growth rate of Zimbabwean MSEs is low compared to other developing countries. Nonetheless, there is a wide rage of growth rates among the four-digit industries. The factors that drive these growth rates were examined with an ordinary least squares estimation. Unlike previous studies, however, where the dependent variable was the average annual growth rate, the absolute growth for a given time period was examined. This new measurement of growth addressed two limitations. First, the annual average employment growth rate does not reveal the exact time period of growth. The influence of macroeconomic factors on growth, therefore, cannot be determined since the time period for growth of individual firms is not uniform. Also, the exact relationship between growth and other factors, such as age, cannot be determined since the age when growth occurred is unknown. Second, previous studies measured employment growth as the combined change in four types of employees: proprietors, paid workers, unpaid workers, and trainees. Growth in proprietors and trainees is minimal while growth in paid and unpaid workers represent 90 percent of all change in employment in Zimbabwe. The factors that drive paid and unpaid employment may vary significantly and therefore should be examined separately as done in this study.

Comparing paid and unpaid employment growth in the same time period, the results showed significant differences between the paid and unpaid employment

growth models. The most important difference was the relationship between growth and profits. Paid employment growth is positively related to profits whereas there is no significant relationship between unpaid employment growth and profits. Because employment growth is often used as a proxy for profits or a measure of success, combining paid and unpaid employment growth is misleading. The relationship between credit and employment growth also differed in the two models. Paid employment growth was positively related to the amount of credit received by the firms, however, unpaid employment growth was not significantly related to credit. Finally, the low correlation coefficient of the unpaid employment growth model suggests that unpaid employment is not driven by typical factors used in employment growth models. Instead, non-market forces may play a role.

Comparing paid employment growth during periods of increasing and decreasing GDP showed that female-owned firms had higher employment growth during increasing GDP than male-owned firms. Also, age was no longer a significant determinant under decreasing GDP. This result contradicts many previous studies that indicate that age is negatively related to growth. Industries also experienced different growth patterns during the two time periods suggesting that growth within industries is affected by macroeconomic conditions. Overall, the differences in the two estimations showed that macroeconomic conditions do

affect paid employment growth patterns. Analyses of growth over the life of the firms, therefore, do not accurately portray the influence of individual regressors.

Comparing unpaid employment growth during periods of increasing and decreasing GDP showed extremely low correlation coefficients in both time periods. Again, this suggests that the factors that affect unpaid employment growth are not closely tied to typical market forces. This is supported by the relationship between profit and unpaid employment growth in the two time periods. During decreasing GDP, profits are negatively correlated with unpaid employment growth and insignificantly related to growth during the period of increasing GDP. Again, these results suggest that unpaid employment growth may not be a sign of a successful business.

7.3 Implications for policy

7.3.1 Entry and exit policy implications

Numerous organizations exist in Zimbabwe to assist the micro and small enterprise sector. These include the Business Extension and Advisory Program (BESA), the Canadian Executive Service Organization (CESO), the Environmental Development Agency (ENDA), the Friedrich Naumann Foundation, the Indigenous Business Development Center (IBDC), the Improve Your Business (IYB) program from the International Labor Organization, the Small Enterprise Development Company (SEDCO), and Zambuko Trust. Despite

their efforts, the level of assistance is low compared to the MSE sector, which employs close to one-third of the working-age population. The use of these resources should, therefore, be carefully planned to have the greatest impact. How to achieve the greatest impact, however, is not obvious. Some authors argue for a poverty alleviation strategy that targets the poorest microentrepreneurs to lift them out of poverty or to subsidize the meager earnings of the household. Others argue for a growth-oriented strategy that targets firms with the potential to grow and contribute to economic growth. According to this argument, economic growth will create a greater number of jobs and more sustainable jobs that will ultimately assist the poorest households. Finally, some organizations do not have any target. Instead, assistance is provided to all types of firms.

The results from study suggest that low-profit industries are a less sustainable form of employment creation than high-profit industries. The lack of capital and skill requirements lead to high entry and exit rates. They are also influenced by changes in macroeconomic conditions. As the economy improves, more people leave these low-profit industries in search of better employment. Resources devoted to these industries may, therefore, have a low return in the long run. Alternatively, high-profit industries with low exit rates, higher capital and skill requirements, and less sensitivity to macroeconomic conditions, may have a higher economic return.

Developing an assistance strategy with the economic return in mind may not require a choice between entrepreneurs within the two categories of high- and low-profit industries. Instead, high-profit industries could be supported while entrepreneurs in low-profit industries could be directed toward more dynamic industries. This could be achieved by addressing barriers to entry within high-profit industries and assistance to entrepreneurs from low-profit industries. Licensing, for example, was a significant barrier to entry in high-profit industries. The licensing system should therefore be examined to determine if it is necessary to maintain this regulation. Removal of this constraint could help entrepreneurs from low-profit industries to make a transition to a higher-profit industry. Capital constraints, identified as a barrier in high-profit industries, could also be alleviated by credit programs. Finally, experience as a barrier to entry could be addressed through training or apprentice programs to assist with a transition. This transition does not imply a change from the "informal to formal sector" as frequently described in past literature. Instead, the transition from crocheting to dressmaking represents a significant increase in skills and more than a 200 percent increase in profits. Furthermore, all three types of assistance would apply to both current entrepreneurs within the high-profit industries and potential entrepreneurs from the low-profit industries.

Although removal of regulations would help all potential entrepreneurs, the resources are not available to provide credit and training programs to all

entrepreneurs in the low-profit industries to make a transition. Entrepreneurs should, therefore, be screened for potential success. Some insights for the methods of screening can be gleaned from the growth model results and their implications for policy described below.

7.3.2 Employment growth policy implications

The results from the employment growth model showed that increases in paid employment were a sign of success. Paid employment increases were positively correlated with profits, investment, and credit received by the business. In contrast, increases in unpaid employment were negatively related to profits during a period of decreasing GDP and not significantly related to profits during an increase in GDP. These results suggest that paid employment growth is one criteria that can be used to evaluate the potential success of a business.

Using paid employment increases as a criteria or goal, proprietor, firm, and regulatory characteristics can be examined to determine the necessary steps to support paid employment increases or to assess a firm's potential for an assistance program. Using the period of increasing GDP, education was not a significant factor leading to paid employment increases. Furthermore, education was not a barrier to entry in high-profit industries. These combined results suggest that education may not be a key factor in the success of a business.

Although experience was not significantly related to paid employment growth, it was a barrier to entry in high-profit industries. Again, this barrier could be addressed through training or apprentice programs.

Female proprietors had significantly higher paid employment growth than male proprietors under good economic conditions. This suggests that female-owned enterprises are not less dynamic as often implied by development literature. Based on these results, female-owned firms should be given more consideration by assistance programs. Furthermore, female entrepreneurs make up the bulk of the MSE sector, representing 71 percent of all MSE proprietors.

Considering the location, MSEs located in commercial shops and industrial sites had significantly higher paid employment growth rates than MSEs located at the home. Assistance programs should therefore support shop-based MSEs and the transition from home-based to shop-based MSEs. Government regulations could also support this transition by examining zoning laws which inhibit development of new shops. For example, shops are only allowed in commercial areas where rents are high. Many entrepreneurs cannot afford these rents. Furthermore, many of the markets for MSE products are in residential areas. In many cases, however, home-based MSEs are illegal and forced to remain small to avoid police harassment. Again, these laws should be reviewed.

Initial investment and credit were positively related to paid employment growth. This suggests that credit programs have a positive impact on MSE growth

and should be supported. More credit programs could be developed through loan guarantee programs that operate through commercial banks or Non-Government Organizations.

Finally, registered firms had significantly higher paid employment growth than unregistered firms. Despite this success among registered firms, only 6.7 percent of all firms in Zimbabwe are registered. This low proportion reflects the current incentive structure, which encourages registration among large firms while discouraging registration among small firms. For example, the advantages of registration include limited liability, access to credit, subcontracting possibilities, and access to foreign exchange prior to the economic reform program. All of these incentives attract large-scale firms. A one-person enterprise, such as crocheter operating from the home, may not require limited liability or access to credit. In addition to the lack of incentives for small-scale firms, there are also numerous disincentives. For example, the registration process can take from two to eight months and requires large fees and preparation of financial statements. Overall, it appears that registration is a proxy for more sophisticated firms with larger markets. Simplification of registration procedures may, therefore, not lead to paid employment growth among the majority of smaller firms in less dynamic industries. Nonetheless, for the minority of firms with the potential to become registered firms, registration procedures could be reviewed to ensure that registration is not a barrier to entry.

7.4 Implications for research methods

7.4.1 Entry and exit research methods implications

There are several implications for research methods that can be drawn from this study. First, an accurate measure of entry and exit requires gross measures rather net measures. As discussed in the literature review, net entry measures simply subtract the number of existing in period t-1 from the number of firms existing in period t. This measure does not reveal the actual turnover between the two time periods. By using both an existing enterprise questionnaire and a questionnaire administered to MSEs that folded prior to the survey, gross measures of firm entry can be obtained. Studies that use only existing enterprises will most likely underestimate firm entry.

Entry and exit models typically combine all industries to examine barriers to entry and entry-inducing factors. While this may be appropriate for studies of U.S. and Canadian firms, the results from this study showed that the forces that drive entry and exit differ between high- and low-profit industries. Although the range of profits between the two groups is not large, the capital and skill levels may vary significantly. For policy-making purposes, therefore, disaggregation of high- and low-profit industries offers a clearer view of how to promote high-profit industries.

7.4.2 Employment growth research methods implications

Employment growth measures in previous studies used employment changes over the life of the firm. This type of measurement does not reveal the exact time period of growth and therefore it cannot be linked to macroeconomic conditions. Furthermore, accurate relationships between growth and other factors, such as size or age, cannot be measured since the exact time of growth is unknown. By adding retrospective questions or repeating surveys, growth within specific time periods can be measured. As illustrated by the results of this study, this is a better method to measure the impact of different factors on employment growth. For example, the factors that significantly affected growth of paid employment varied between the two time periods when macroeconomic conditions differed.

The study of employment changes in previous studies combined changes in proprietors, trainees, and paid and unpaid employees. As illustrated by the results in this study, this type of measurement is misleading. The factors that drive paid and unpaid employment changes differ significantly. It is important, therefore, to list the number of each type of employee separately on the questionnaire for each time period under consideration, including the number of each type at start-up.

7.5 Need for future research

There are several areas for future research that arise from this study. First, in the area of entry and exit, only traditional market forces were examined. Numerous studies have revealed, however, that personal reasons play a strong role in the entry and particularly exit of micro and small enterprises in developing countries. For example, old age, health, and family responsibilities are often cited as reasons for exit. This type of information could be explored in greater depth to examine more closely the causes of exit.

Gender issues that also play an important role in entry and exit are not examined here. Child care responsibilities, for example, may interfere with women's business activities unlike their male counterparts. A separate analyses could be undertaken to examine entry and exit of female- and male-owned firms, similar to the high- and low-profit distinction. This may reveal more information on how to assist male and female proprietors appropriately.

The profit measures developed for this survey provided rough approximations of firm-level profits. Further refinements of these measures are needed to more accurately measure profit. Furthermore, profits should be measured in several time periods for the same set of firms to determine how profits change under changing economic conditions. This would require repeated surveys with profit questions in all time periods.

As mentioned earlier, the results showed that traditional market forces may not influence changes in unpaid employment. This needs to be examined further to determine the reasons for use of unpaid employees.

A comparison of paid employment growth under decreasing and increasing GDP showed that a much greater proportion of the variation in employment growth was explained by the regressors during the period of increasing GDP. A closer examination of paid employment growth during periods of low economic growth could, therefore, be undertaken. The most appropriate assistance policies or programs, for example, may vary depending upon the current economic conditions.

Because registered firms exhibited higher paid employment growth, these firms should be studied to determine the characteristics that led to employment growth. Also, the registration process, which has been described as cumbersome, could be examined with the assistance of these firms.

Finally, the minimum wage of a domestic worker was used as the opportunity cost of jobs in the formal sector. While many MSE proprietors could not expect jobs above this level, proprietors from industries with higher skill requirements may compare the profits from running their own business to working for someone else in the same industry. In this case, wage rates within the industry would be more appropriate. While these are often hard to acquire, wage rates

could be determined from those businesses that have paid employees and used for further analysis.

The results from this study provided new information about the entry, exit, and growth of micro and small enterprises in Zimbabwe. In particular, the factors that drive high- and low-profit firms were highlighted. Furthermore, the factors that affect paid and unpaid employment growth under good and poor economic conditions were examined. Based on these results traditional forms of support such as credit and training were suggested combined with a closer examination of how to effectively allocate scarce resources. A review of government regulations is also necessary to provide a supportive environment that will help the MSE sector play a productive role in the economic growth of Zimbabwe.

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