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JOAN C. PARKER

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Harold M. Riley
Major professor

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Donald C. Mead
Thesis Supervisor

PATTERNS OF BUSINESS GROWTH: MICRO AND SMALL ENTERPRISES IN KENYA

By

Joan Chamberlin Parker

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ABSTRACT

PATTERNS OF BUSINESS GROWTH:
MICRO AND SMALL ENTERPRISES IN KENYA

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While it is clear that micro and small enterprises in developing countries provide an important source of employment and income, two questions remain unanswered: once opened, to what extent and under what conditions are enterprises able to absorb additional employment; and what is the nature of this employment creation process? This thesis explores both the characteristics and process of micro and small enterprise growth, based on the case of Kenya. It first examines the determinants of employment growth based on cross-sectional national data, then analyzes the process of enterprise growth, by transforming a small-sample retrospective survey into a time-series data set.

The thesis is based on data collected by the author in two sets of surveys. The first surveys, undertaken in a low-income settlement in Nairobi, Kenya in 1990-1991, included rapid appraisal subsector studies and intensive retrospective interviews with a random sample of subsector participants. The second survey was a national baseline of all micro and small enterprises in 1993, based on a stratified cluster sampling method. The analyses use multiple regression techniques, both for the cross-sectional analysis of extent of growth and for the analysis of the panel data developed from the retrospective survey.

Analysis of the extent of growth shows the influence of business starting size, sector, location, and proprietor gender and skills on business growth. Examining the process of growth, the effect of business age on growth is discovered to be highly variable, a finding

which contradicts previous research. The process of enterprise expansion is smoother if undertaken in small increments and if the proprietor has more formal education. Enterprises show positive, but small, growth in employment accruing to expanding national incomes or improved community services. Larger growth effects are related to type of industry, human capital endowments, and level of mechanization. In addition, negative external shocks affecting the enterprises cause significant declines in employment, pointing to the high level of risk facing enterprises in the sector.

DEDICATION

This thesis is dedicated to my husband, David, for his unflagging support at every stage of the process and to two-year-old Alexander, whose buoyant presence gave me the energy to bring this work to fruition.

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CHAPTER I: INTRODUCTION

> "Africa needs its entrepreneurs.... During the next three decades the population of Sub-Saharan Africa is expected to grow by at least 600 million persons -- more than doubling the size of the labor force. Africa's entrepreneurs must create these jobs." (World Bank, 1989, p. 135)

1.1 An Evolving Vision of Micro and Small Enterprises

As African countries search for ways to provide productive employment for an expanding population, policy makers and development practitioners increasingly turn their attention to the role of micro and small enterprises. Under the glare of increasing attention, the once invisible micro and small enterprise sector[1] has emerged as a critical source of employment for men and women, both rural and urban, in developing countries worldwide.

One of the first glimpses into the potential of the sector was provided by the 1972 International Labour Organizations's study of informal enterprises in Kenya (ILO, 1972). This study served to legitimize what had previously been considered "illegal" businesses for operating outside of tax and labor laws, instead shifting the focus to these enterprises' ability to improve individual welfare and economic equality. In addition, the study was an important catalyst in initiating increasingly serious examination of the role of the sector in development,

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[1] In this thesis, "microenterprise" refers to all non-agricultural income-earning activities which involve between one and ten workers (including the proprietor). "Small enterprises" are those with between eleven and fifty workers.

both in Kenya and elsewhere.

Early research on micro and small enterprises focused on revealing the magnitude of the sector. In 1974 Chuta and Liedholm undertook a comprehensive survey of microenterprises in Sierra Leone, thereby uncovering a sector employing nearly twice the number of people previously estimated by Government sources (Chuta and Liedholm, 1985). With baseline survey results from over a dozen African countries, it now appears that such underestimates are commonplace, resulting from the relative invisibility of micro and small enterprise activities. In fact, nearly one out of four households in all countries examined have some non-agricultural income-earning activity.

In the 1980s, data from multiple time periods revealed that micro and small enterprise sectors were expanding over time, thereby becoming increasingly important sources of employment creation. This was an auspicious finding, particularly for countries facing downsizing of public sector employment in the process of macroeconomic reform. At the same time, donor appreciation for microenterprises' role in development increased, manifested by expanded funding for microenterprise development programs.

As the 1980s drew to a close, however, general concern with budgets and accountability in the donor countries led to increased demands that development programs demonstrate quantifiable results. In the microenterprise area, such results meant proof that programs assisting individual businesses have an impact on business-level income or employment. Now, as programs search for ways to maximize their effectiveness, a third phase of research on the micro and small enterprise sector has begun with the goal of identifying types of enterprises that show potential for employment creation and the conditions that encourage and accelerate growth. In search of the driving forces of change

in the sector, this most recent body of research focuses on understanding the dynamics of enterprises within the sector, and can be broken into examination of the process by which enterprises are created, grow, decline, and eventually close. As part of this emerging literature, this thesis sheds new light on one component of this lifecycle: the process of enterprise expansion.

1.2 The Role of Micro and Small Enterprises in Kenya

In examining growth of micro and small enterprises, this thesis focuses on the case of Kenya, a country with a population of 24 million individuals, and growing at roughly four percent annually (World Bank, 1992). The 1980s was a period of tremendous change for the Kenyan economy. Slow and even negative economic growth in the early 1980s led to strict structural adjustment programs designed to increase private sector economic activity while reigning in government spending. Thus, following a period of economic decline, GDP began to rise in 1986, averaging growth of 5.3 percent per annum until 1990 (World Bank, 1992).

During these same years, public sector hiring slowed dramatically. In fact, between 1985 and 1990, the public payroll added only 13,000 workers, while 1,622,000 individuals entered the labor force (UNDP, 1992). Unfortunately, formal private sector enterprises were unable to absorb the remaining workers. As of 1992, a total of only 272,000 individuals were employed in that sector, or 17 percent of the number of new entrants (USAID, 1993). Those employed also saw a progressive deterioration in real earnings. From 1980 to 1990, real wages in the private sector fell by 12 percent, while public sector wages dropped by 22 percent (World Bank, 1992). Thus, as the 1980s drew to a close, the economy showed a picture of falling real wages and few formal private or public sector opportunities for the huge

numbers of new entrants into the workforce.

In this context, policy makers and development planners look increasingly to the micro and small enterprise sector to provide jobs for workers entering the Kenyan labor force. Using data from the 1993 Kenya survey, Mead estimates that micro and small enterprises in fact provided employment for 25 percent of entrants into Kenya's labor force between 1980 and 1990, again illustrating the critical role played by this largely invisible sector (Mead, forthcoming).

1.3 Objectives of the Research

Using the case of Kenya, this thesis explores enterprise growth from two perspectives. First, it examines the factors that contribute to the net growth of enterprises in Kenya. In this area, it complements the work of McPherson (1992), which analyzed the determinants of growth of micro and small enterprises in southern African countries. Second, this research provides the first view into the path of growth traveled by enterprises over time, and examines the determinants of year-to-year changes in enterprise size. In so doing, it moves the focus from a cross-sectional to a time-series perspective of enterprise growth.

Data on Kenyan micro and small enterprises were collected in two distinct rounds of fieldwork. A national survey of the micro and small enterprise sector was carried out in 1993. Following a stratified random sampling method (McPherson and Parker, 1993), the survey was designed to estimate the extent, major characteristics, and growth of the micro and small enterprise sector in Kenya. Between October 1990 and August 1991, a separate set of surveys was carried out in Kibera, a low-income slum near Nairobi. These surveys included a complete census of Kibera's business activities, rapid appraisal surveys of two industries,

and a detailed retrospective survey of randomly selected firms in the same industries. Both the 1993 national and 1990-1992 Kibera-specific data provide information on net growth of enterprises. In addition, the retrospective Kibera surveys provide sufficient time-specific information to allow their conversion into a time-series data set.

1.4 Structure of the Thesis

Before turning to the analysis of determinants of growth, Chapter II discusses alternative measures of firm growth. Given that subsequent chapters focus on the growth of enterprises with respect to number of workers, this chapter focuses on the comparability of size and growth as measured in terms of sales on one hand and number of workers on the other. Chapter III examines the determinants of net growth of enterprises for Kenya as a whole. Chapter IV moves from a national to an urban and sectoral perspective, providing detailed information on two Kibera-based activities -- shoe-making and furniture-making -- then re-estimates the equation on net growth for this restricted sample. In hopes of revealing more about patterns of enterprise growth, the data are then converted from a cross-sectional to a panel data set in Chapter V. Determinants of annual absolute changes are then examined, as is the path by which enterprises travel over time. Finally, Chapter VI compares the results of the preceding three chapters, searching for new insights on the determinants and process of enterprise growth.

CHAPTER II:

DEFINING ENTERPRISE GROWTH

Before embarking on the analysis of amount and pattern of growth presented in Chapters III, IV and V, it is important to examine what is meant by "enterprise growth." This chapter explores two different definitions of growth and the efficacy of using one measure as a proxy for another measure in analysis.

2.1 Defining and Measuring Growth of a Business

"Business growth" is the expansion of a business according to some specific measure of size. One of the most frequently used measures of size and growth is number of workers. Other measures based on financial information include sales, profits, or value added. Data on two of these measures -- number of workers and sales -- were collected in intensive interviews with 40 shoemakers and 39 furniture-makers in Kibera in 1991, the same enterprises which are analyzed at length in Chapters IV and V. Below is a brief discussion of the two measures: their definition and methods of calculation.

2.1.1 Number of Workers

Number of workers is a popular measure of business growth in that it estimates the employment potential of both individual enterprises and, once aggregated, the sector at large.

In addition, researchers have confidence when measuring growth in number of workers due to the ability to accurately count individuals, the ease with which proprietors remember former workers, and the independence of the unit from inflationary forces.[2]

In this survey, the firm's workforce was divided into four categories of workers: (1) working proprietors, (2) unpaid family workers, (3) paid workers, both family and non-family, and (4) unpaid apprentices. These categories help to illuminate (i) the total number of individuals actively involved in some capacity in the small enterprise sector, (ii) the number providing low- or no-cost labor, (iii) the number fully remunerated for their work, and (iv) the number being trained.

Data on number of workers were collected for both the time when the business started and the time of the interviews. The total number of workers both at start and currently was calculated by adding the four categories of workers. This total number of workers served as a measure of business size, both when the business was first opened and currently. Then the number of workers at start was subtracted from the number of workers at the time of the interview to arrive at the growth in number of workers, which was annualized by dividing by the number of years the enterprise had been in operation.

The calculation of growth in number of workers in this thesis differs from the measures used in similar research in the past. Rather than the traditional method of calculating change in number of workers as a growth rate, the analyses in subsequent chapters

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[2] Despite these benefits, measuring number of workers in microenterprises remains complicated by issues of both worker quality and quantity. Quantity issues involve measuring number of hours worked, as well as amount of excess capacity in the workforce. Quality issues involve worker skills and levels of remuneration. These issues are not discussed in greater length in this thesis due to lack of data.

are based on the number of actual workers added to a given enterprise in a specified time period. Equation (2.1) shows the traditional linear growth rate equation, and Equation (2.2) shows the calculation of actual change in number of workers. Both are annualized to account for the varying longevity of different enterprises.

$$\text{(2.1) Growth Rate} = \frac{\text{(Size Currently - Size at Start)/Size at Start}}{\text{Number of years in operation}}$$

$$\text{(2.2) Absolute Annual Growth} = \frac{\text{(Size Currently - Size at Start)}}{\text{Number of years in operation}}$$

Growth rates have two particularly appealing aspects. First, they provide easily interpretable results. Second, they are standardized, so that comparisons can be made between growth measured by different units. In fact, growth rates will be used for one part of the analysis below, given their standardized nature that allows comparison of growth in workers and growth in sales.

However, growth rates also have an important failing, which is particularly troubling for calculating growth in number of workers. Namely, the calculated value is heavily dependent on the size of the enterprise at start, where smaller enterprises appear to grow faster than larger enterprises, as shown by the example below.

In the example, one worker has been added to two three-year-old firms, one starting with one worker and the other starting with four workers. In such a case, the one-worker firm shows a growth rate of 33.3 percent (calculated as ((2-1)/1)/3), while the four worker firm shows a growth rate of 8.3 percent (calculated as ((5-4)/4)/3), despite the fact that they

have added the same number of workers. The one-worker firm shows growth rates four times that of the four-worker firm, though the actual number of workers added is the same.[3] Even when the four-worker firm adds two workers, it appears to be growing more slowly than the one-worker firm that added only one worker. For samples where the majority of enterprises are one-worker firms, such as in microenterprise research, this technique can inflate growth rates dramatically.

Secondly, by analyzing the absolute number of workers added rather than growth rates, an accurate assessment can be made of which businesses have added the greatest number of workers. Such an interpretation is particularly appealing for those concerned with the sector's actual employment creation experience.

As a final note, an important variation on measures of growth in number of workers omits apprentices from the count of workers. Since apprentices are unpaid and temporary workers, they can inflate short-term business size and growth. As a result, sustainable size and growth may more appropriately be estimated by excluding them from the analysis. In the remainder of this chapter, both measures of number of workers are provided to allow comparison. In subsequent chapters, choice of definition will depend on data availability.

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[3] This patterns holds, but weakens, if the current size of the enterprise is used as the divisor of the numerator rather than starting size. In the example above, the one-worker firm then shows growth of 16.7 percent, while the four-worker firm shows growth of 6.7 percent. Thus, this problem exists whether the growth rate is calculated in the most liberal or most conservative way.

2.1.2 Business Sales

Sales are a less common measure of size than number of workers in microenterprise surveys for two major reasons. First, due to the absence of written records, sales data are subject to recall error, particularly when collected in an aggregate form.[4] Second, when financial measures of sales are used, inflation must be factored out to get a real measure of relative size between time periods. Unfortunately, appropriate inflation indexes are rarely available. This problem can be remedied by collecting sales data solely on physical quantities sold, then weighting the units by current prices, as was done in this survey. This solution, however, requires that a much greater quantity of data be collected to compile a measure of sales.

Calculating sales is still less data-intensive than measuring profits or value added, which provide better pictures of changes in proprietor welfare than do gross sales figures. Unfortunately, however, profits and value added require valuing costs of production, both variable and fixed, for all time periods under consideration. These data requirements make these measures subject to nearly unlimited recall error in a retrospective survey of this type. For that reason, these measures of size and growth were not used here. To minimize the problems of recall error and inflationary bias, the Kibera study collected data on sales in the following manner. First, respondents were asked to list all products sold on a regular basis. Miscellaneous items sold only rarely were excluded from the analysis. Respondents were then asked about the average number of each item sold in a "good week" and a "bad week". For both activities, proprietors reported that two weeks (namely, the first week of the month after

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[4] For example, recall error is likely to be high if the proprietor is asked: "What was the value of total sales in an average week when your business first opened?".

payday and the week at mid-month when workers receive salary advances) are good weeks for business, while the intervening two weeks show few sales. Thus, mean weekly sales were calculated as the average of sales in good weeks and sales in bad weeks.

The data described above were collected for all products currently sold and for all products sold when the business first opened. In addition, current prices for each item were collected, which provided a non-inflationary value for weighting the physical output, both currently and at start. To do this, the physical quantity of each item sold was multiplied by current prices to provide a "weekly value of sales per item". Finally, weekly values of sales for all items produced were added together to generate the "total value of sales in an average week", both for the current period and at start. "Total sales at start" was then subtracted from "total sales currently" to get a measure of change in sales.

This method of measuring size and growth in sales was deemed the "best available". However, the technique does make the assumption that relative prices between items have not changed over time. Error introduced by this assumption is expected to be lower than that of both recall error in collecting prices at start and errors inherent in inflationary corrections.

Of greater concern is the general impression that sales figures for "good" periods are inflated, as proprietors reminisce about the best weeks of production around holidays, or infrequent outstanding sales weeks. This type of measurement error is impossible to detect in a retrospective sample. If it exists for both period of start and the current period, the net effect on measuring growth may be zero. On the other hand, if proprietors tend to be more optimistic about good weeks currently, growth will be skewed upwards.

2.2 Enterprise Size

Using the methods described above, initial size and current size of the enterprise were calculated using each of the three measures discussed. Descriptive data on size are provided in Table 2.1 below. Sales data are recorded in Kenyan Shillings, which at the time of the survey, converted into US Dollars at a rate of 28.5 to the Dollar. Given the size disparities between shoemaking and furniture-making enterprises, size calculations are presented for each activity separately.

Table 2.1 illustrates two points. First, the data confirm the dissimilarity in size between shoemaking and furniture-making businesses, regardless of measure used. Second, for both activities there is a great deal of variation in size -- regardless of measure -- both at start and currently as illustrated by high standard deviations. In sales, where the range is the greatest, standard deviations are 1.5 to 2.5 times as high as the mean in all cases.

While illuminating absolute size, the numbers in Table 2.1 fail to provide any comparison of the three definitions of size, given their different units of measure. To compare the three definitions, a standardized scale is required. Ranking in size provides one such gauge, where businesses are ordered by size for each measure and for each time period. A simple correlation statistic then indicates whether businesses hold roughly similar ranks under the different measures. Tables 2.2(a) and 2.2(b) provide correlation matrices for the two time periods.

Table 2.1
Average Enterprise Size at Start and Currently by Activity

	Size at Start	Size Currently
1. Shoemaking		
SALES (Ksh.):		
Mean weekly sales	3339	6126
Standard deviation	(5699)	(9690)
SD:Mean ratio	1.7	1.6
TOTAL NUMBER WORKERS:		
Mean number workers	1.5	2.6
Standard deviation	(0.9)	(5.3)
SD:Mean ratio	0.6	2.0
TOTAL WORKERS WITHOUT APPRENTICES:		
Mean number workers	1.3	2.0
Standard deviation	(0.7)	(4.1)
SD:Mean ratio	0.5	2.1
2. Furniture-making		
SALES (Ksh.):		
Mean weekly sales	16,403	16,510
Standard deviation	(41,042)	(24,018)
SD:Mean ratio	2.5	1.5
TOTAL NUMBER WORKERS:		
Mean number workers	3.2	4.4
Standard deviation	(2.2)	(3.2)
SD:Mean ratio	0.7	0.7
TOTAL WORKERS WITHOUT APPRENTICES:		
Mean number workers	2.5	3.7
Standard deviation	(1.7)	(2.8)
SD:Mean ratio	0.7	0.8

Table 2.2(a)
Correlations: Amount of Sales and Number of Workers at Start

	Ranking: Total Workers	Ranking: Non- Apprentice Workers
Ranking: Sales	.150 (P=.105)	.144 (P=.113)
Ranking: Total Workers	--	.878 (P=.000)

Table 2.2(b)
Correlations: Amount of Sales and Number of Workers Currently

	Ranking: Total Workers	Ranking: Non- Apprentice Workers
Ranking: Sales	.641 (P=.000)	.633 (P=.000)
Ranking: Total Workers	--	.987 (P=.000)

First, Tables 2.2(a)-(b) show that the ranking of businesses by the two measures of number of workers proves to be nearly identical. In addition, ranking of sales is equally correlated with number of workers with or without apprentices. These findings both suggest that the net effect of counting apprentices in the workforce is minimal in assessing the relative size of enterprises.

Second, the relationship between amount of sales and number of workers shows an evolution, where the rankings of the two measures become increasingly correlated over time. This suggests that while there may be some early mismatch in terms of number of workers

hired for a given amount of output, over time businesses reach a similar balance in terms of number of workers required to maintain a given level of sales.[5] Thus, it appears that the measures are better proxies for each other when examining the current situation rather than the start-up period.

2.3 Predicting the Dynamism of the Sample

Clearly, the simple results provided in Section 2.2 point out that the sample is evolving as businesses change their size, either growing or declining in terms of either number of workers or sales. Of the total sample, how many businesses actually account for this evolution? Does the sample show the same number of enterprises growing regardless of the yardstick used? Table 2.3 provides a breakdown of the percent of enterprises declining, remaining the same size, or expanding by the three measures used above.

Table 2.3 tells two important stories. First, the sales measure portrays a sample that appears to be much more dynamic than that shown by number of workers. However, this is not necessarily the case. Instead, this result points to the incremental nature of changes in sales, where even relatively stagnant businesses will show some increase or decrease in sales over time. Labor, on the other hand, is a lumpier measure, where adding or subtracting even one worker signifies a substantial change in business size. Since the entire sample started with nine or fewer workers, the addition or loss of one worker is, at minimum, a 11 percent change

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[5] Disaggregating further, it is the correlation between the rankings by sales and non-apprentice workers in shoemaking that shows the greatest improvement in correlation between the current period and start-up (moving from P=.190 to P=.003). This suggests that shoemakers may rely more heavily on apprentices in the beginning, switching to other workers to maintain a given sales volume over time.

Table 2.3
Percent of Enterprises Changing Size

	% of Enterprises Declining in Size	% of Enterprises with no Change in Size	% of Enterprises Increasing in Size
Sales	28%	0%	72%
Total Workers	23%	22%	55%
Workers w/o Apprentices	15%	48%	37%

in size. This accounts for the greater number of enterprises showing no change when growth is measured in terms of number of workers.

The second story illustrates the consequences of including apprentices in measures of business growth. Once apprentices are omitted from the calculation, the number of enterprises changing size (either upward or downward) drops noticeably. When not counting apprentices, only 52 percent of enterprises change size, compared to 78 percent when including apprentices. Overall, this signifies the major role played by apprentices in size oscillations.

2.4 Identifying Growing Enterprises

Table 2.3 suggests that various measures may give observers a different set of expectations in terms of the dynamism of the population at large. When it comes to predicting which enterprises may grow, an even more important question arises. Are the same enterprises said to be growing by one definition also growing by another definition? Using what appears to be the most conservative measure of growth -- number of non-

apprentice workers -- Table 2.4 examines the percent of enterprises categorized as "growing" or "declining" by the other measures as well.

Table 2.4
Are Businesses Classified the Same Way by Different Measures?

Of the total number identified as "growing" or "declining" in terms of non-apprentice workers, how many are categorized the same way by the other two measures?		
	Sales	Total Workers
Growing	19 of 26 (73%)	27 of 29 (93%)
Declining	4 of 10 (40%)	9 of 12 (75%)
Chi-square statistic (Significance Level)	χ^2=.58 (.45)	χ^2=33.03 (.000)

Given the insignificant Chi-square statistic in the sales column of Table 2.4, it appears that businesses are not classified similarly by growth in sales and growth in non-apprentice workers. While 52 of 72 enterprises of the total sample showed some growth in sales, that group does not include seven of the 26 businesses said to be growing in terms of non-apprentice workers. This is indeed surprising, as one would expect that non-apprentice workers would be added primarily to increase sales. Instead, it appears that the addition of non-apprentice workers was associated with a decline in sales in 27 percent of the cases. Similarly, of those enterprises that downsized in terms of non-apprentice workers, 60 percent appear to have increased their sales. These figures both provide good reason to doubt the accuracy of the sales figures provided by proprietors.

In general, there is a good match between growth calculated in number of workers including apprentices and workers without apprentices, as evidenced by the significant Chi-square statistic in Table 2.4. Even so, 25 percent of businesses that downsized when omitting apprentices appeared to stay the same size when including apprentices, suggesting that for these cases, apprentice labor is brought on to replace paid labor. This raises the issue of whether apprentices are added to fulfill a training function or to meet labor demand of the enterprise.[6]

2.5 Measuring Amount of Growth

Subsequent chapters of this thesis focus on predicting the amount of growth businesses will sustain under different sets of conditions. For lack of adequate sales data, the analyses will measure growth in terms of number of workers only. How closely will the results approximate the amount of growth one would expect from these businesses in terms of sales? A comparison of general patterns of growth in sales and number of workers may clarify this issue.

As amount of growth is again tied to a unit of measure, a comparison requires a standardized yardstick for measuring amount of growth by different definitions. By calculating an annual rate of growth instead of absolute amount of growth, the units can again be compared. The annual rate of growth for each measure is calculated as in Equation 2.1.

Correlation statistics were then calculated for the three measures' growth rates. The results are provided in Table 2.5. For all three pairs, the correlation is positive and highly

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[6] While not addressed in this thesis, this issue is explored in greater depth in Parker (1991).

significant, suggesting that if the sample exhibits positive growth rates by one measure, one can be fairly confident that it is also growing with respect to the other measures.

Table 2.5
Correlation Statistics:
Annual Growth Rates By Three Measures

	Total Workers	Non- Apprentice Workers
Sales	.615 (P=.000)	.600 (P=.000)
Total Workers	--	.822 (P=.000)

Do the three measures predict the same speed of growth? Table 2.6 provides the mean annual growth rate for each definition of growth. Overall, growth is fastest when measuring in terms of sales, at a rate over twice that of growth in workers. Growth is slowest when measuring non-apprentice workers. This may reflect the lumpy nature of adding non-apprentice workers, where sales must go up by a certain margin before an additional worker is hired. The sales measure also demonstrates the greatest variation in growth, exhibiting both the greatest decline and greatest expansion in any single enterprise, and a standard deviation nearly three times the mean.

Table 2.6
Average Annual Growth by Measure

Definition	Mean Annual Growth Rate	Standard Deviation	Minimum growth rate	Maximum growth rate
Sales	69%	181	-54%	1257%
Total workers	25%	52	-17%	325%
Non-apprentice workers	18%	46	-25%	288%

Overall, Table 2.6 suggests that growth rate in number of workers can be used as a lower bound for the growth rate of sales. Indeed, labor growth is lower than sales growth rates for all subsets of enterprises examined, holding true for businesses regardless of type of activity, starting size, location, type of market served, level of vertical integration, or quality of product.[7] Similarly, in all cases, growth in non-apprentice workers provides an even more conservative estimate for growth in sales.

Finally, it is important to check whether the three definitions suggest the same relationships between growth and other conditions facing the enterprise. Table 2.7 describes the relationship between growth by each measure and different variables, as tested by either correlation statistics or T-tests.[8]

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[7] The one exception to this rule is for enterprises starting with three workers. For this group of eight enterprises, sales grew at 19 percent per year, total workers at 31 percent, and workers without apprentices at 23 percent.

[8] For this table, statistical insignificance is considered all results with statistical significance at a level of .15 or higher.

Table 2.7
Relating Growth to Other Variables

Hypothesis:	Growth in Sales	Growth in Total Workers	Growth in Non-Apprentice Workers
Growth rates are lower for older than for younger enterprises	Yes (signif. at .00)	Yes (signif. at .00)	Yes (signif. at .01)
Growth rates are higher for more educated proprietors	Yes (signif. at .12)	Yes (signif. at .03)	Yes (signif. at .05)
Growth rates are higher for more experienced proprietors	Yes but insignificant	Yes but insignificant	Yes (signif. at .09)
Growth rates are higher for more vertically integrated enterprises	Yes (signif. at .02)	Yes but insignificant	Yes but insignificant
Growth rates are higher for furniture-making enterprises	No (signif. at .12)	Yes but insignificant	Yes but insignificant
Growth rates are higher for enterprises serving a non-Kibera market	Yes but insignificant	Yes (signif. at .08)	Yes (signif. at .02)

With one exception, the sign of the relationships between growth rates and the different variables is consistent for all three measures. For two variables -- business age and level of proprietor education -- the relationships are statistically significant for all three measures, suggesting a similar relationship regardless of definition of growth. The other variables show weaker relationships to some measures of growth, which may lead to different predictions on which variables have significant effects on growth. For example, more vertically integrated enterprises show consistently higher growth in sales than less integrated businesses. While positive, however, the relationship is statistically insignificant for growth in number of workers. Finally, the measures actually conflict in their prediction in growth by type of activity. This is a major caveat, since a principal purpose of growth analysis is to identify activities that demonstrate greater growth potential.

Overall, when examining amount of growth, the three measures have strong similarities. Growth rates are highly correlated as seen in Table 2.5, and are generally consistent in their relationship with other variables. Despite this optimistic outlook, however, the contrast in the relationship between sales and number of workers to type of activity serves as a reminder that growth by different definitions may measure separate phenomena and should not be seen as substitutes.

2.6 Is Labor a Proxy for Sales?

The analysis in the remainder of the thesis is based solely on the measurement of growth in terms of number of workers.[9] To what extent do the findings on growth in workers illuminate the amount of growth in enterprise sales? In general, the accumulated evidence suggests that labor provides a more conservative and more stable estimate of size and growth than does sales, thereby providing a lower bound proxy for growth in sales.

In the period of business start-up, there appears to be less similarity between size measured by sales and by number of workers than in later periods, where the correlation between the two measures strengthens markedly. This phenomenon may be the result of a greater degree of recall error for the period at start, which is expected to be particularly acute for sales data.[10] Alternatively, the divergence may result from a mismatch in number of

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[9] In Chapters III and IV, the relevant dependent variable is total number of workers, including apprentices. In Chapter V, however, the analysis excludes apprentices.

[10] In studies using recall data to reconstruct a situation in a previous time period there is much room for error in the data. In discussing the time the enterprise first opened, it appeared that respondents were not as sure of the number of units sold in a "good" or "bad" week as they were about number of workers. Thus, recall error is expected to be greater in sales data than in employment data. In addition, without written records it is impossible to

workers and sales early in the business, where either temporary workers were hired to produce more or excess workers produced below capacity, until number of workers came closer in line with sales output in later years.

A second disparity appears when examining which enterprises are considered to be "growing". While sales data predict a much higher percent of businesses growing, they are not the same enterprises considered growing in terms of non-apprentice workers. This is a surprising finding, suggesting that those that increase sales do not necessarily hire more workers, and conversely, those that increase their workforce do not necessarily increase sales. Such a result suggests that either workers are hired for non-demand reasons, or that errors in the data are driving size and growth measures.

On a more positive note, correlations between annualized growth rates in sales and number of workers are positive and highly significant. On average, sales growth rates are over twice the size of growth rates in workers and show a greater degree of variation. Therefore, labor serves as a more conservative proxy for sales, particularly if measuring only non-apprentice workers. Finally, while the different measures show similarities in predicting the characteristics of growing businesses, they fail one key test, indicating the fragility of the comparison.

Overall, it appears that labor serves as an adequate proxy for sales in only a few cases, and then with some basic qualifications. First, growth in number of workers is likely to occur after some measure of growth in sales, thus will lag behind in predicting both the number of growing firms and the growth rate of firms. This is expected, due to the lumpier nature of

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identify the amount by which sales were overestimated or underestimated.

changes in labor. Second, labor is a better proxy for sales when discussing changes in the aggregate, such as general measures of business size and growth for the sample at large. When attempting to predict where growth will occur, however, labor is a poor proxy for changes in sales, as evidenced by the unlike categorizations of "growing" enterprises. Thus, the following chapters which identify determinants of growth in employment for individual firms are likely to reveal little about which characteristics lead to growth in sales.

Finally, it appears that measuring number of workers with or without apprentices yield very similar results. The more conservative measure is undoubtedly non-apprentice workers, which avoids size or growth inflation of short-term apprentice workers, showing fewer enterprises growing and a more slowly growing sample in general.

Having made these statements based upon the data available, it is critical to close by again pointing to the undoubted presence of recall error. Future research, ideally collected through repeat panel surveys, should retest the relationships between different measures of size and growth discussed here.

CHAPTER III:

THE EXTENT OF GROWTH OF MICROENTERPRISES

3.1 Introduction

Until the early 1980s, the ability of the micro and small enterprise sector to provide jobs was estimated using aggregate data. While instructive of the number of jobs provided or lost by the sector in a given time period, the lack of firm-level data obscured analysis of which enterprises in the sector were providing jobs, and which were in fact losing workers over time. As development agencies increasingly move funding to support development of the micro and small enterprise sector, new questions have arisen as to which businesses in the sector are growing. Even more importantly, as donors decide on the type of assistance to provide, they seek information on which characteristics of entrepreneurs and businesses are most important in determining the extent to which businesses add workers so that they may invest their funds for the maximum effect on employment creation. This chapter explores these questions for the case of Kenya.

Growth of an enterprise can be measured in many ways, as discussed in Chapter II. This analysis examines the extent to which microenterprises add workers, an appropriate measure of growth when the goal of the analysis is to assess the potential of the sector to provide employment.

The chapter begins with two formal theories of enterprise growth, which are presented

along with key hypotheses they suggest for empirical testing. Three less formally constructed models are also offered that examine important aspects of enterprise growth that are not sufficiently explored in the formal models. Section 3.3 presents a brief review of empirical findings to date on the determinants of growth, drawing both from the literature for developing countries and the United States. Section 3.4 presents a multiple regression equation to measure and explore the determinants of business growth in Kenya, using data collected in the 1993 Kenya National Baseline Survey (Parker, 1994). Finally, Section 3.5 provides the results of the regression.

3.2 Theoretical Models of Enterprise Growth

To date, there is no unifying theory of firm growth in the field of economics. Formal models of enterprise growth fall into two camps: neoclassical microeconomic theory and its extensions, and stochastic models and their extensions, such as learning theory.

3.2.1 Neoclassical Theory of Enterprise Growth

There is no well-established neoclassical theory of enterprise growth. Rather, standard microeconomic theory of the firm identifies optimal ranges of production, given a set of production and cost conditions. It then provides insights on how production decisions will be made based on producer goals (such as profit maximization), demand, and changing market conditions. As such, it makes predictions on the conditions under which firms will increase or decrease the amount of output produced.

Industries, or industry niches, in which large numbers of micro and small enterprises

appear typically fit the model of a perfectly competitive industry, comprised of a large number of small producers, all of which are price-takers. In such industries, barriers to entry are low, leading to easy entry and exit, depending on the relationship between production costs and the market-determined output price.

Most industries have technologies such that at low output levels firms face increasing returns to scale, while at high output levels they face diminishing returns to scale. Firms facing increasing returns to scale have an incentive to expand production, as long as the requisite inputs are available.[11] Firms are likely to expand into the region where they face diminishing returns to scale, but never to the point where marginal returns are zero or negative. Hence, most industries will be populated by firms facing diminishing returns to scale, which results in the classical U-shaped cost curves so familiar in the theory of the firm.

In perfectly competitive markets characterized by diminishing returns to scale, producers will remain in business as long as the market price is higher than the minimum average cost of production. While in business, profit-maximizing firms will produce at the point where the marginal cost of producing another unit of output exactly equals the market price of that good or service (Allen, 1988). As price changes, firms will respond by expanding or contracting output until the marginal cost again equals the market price. At any single price, firms will differ in their short-run profit-maximizing output levels, depending on the amount of fixed resources embodied in the firm, such as production space, managerial skills, or equipment.

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[11] In the case of the microenterprise sector, firms may choose not to expand output despite facing increasing returns to scale for a variety of reasons: (1) if one-worker sole proprietorships, they may be unwilling to delegate to other workers; or (2) entrepreneurs may be risk-averse, therefore unwilling to attempt an expansion of output.

The above discussion pertains to short-run production decisions, which is typically the time frame captured in analysis of microenterprise growth. However, there is also a long-run equilibrium, which pertains to the time period when all inputs are variable. Clearly, what constitutes "long-run" varies by industry and by type of enterprise within an industry. At what point do all inputs become variable for enterprises in the microenterprise sector? For this type of enterprise, the long run is the time period after which entrepreneurs can increase managerials skills embodied in the enterprise (by training or by hiring managerial workers) and can access capital. Therefore, in the developing country microenterprise case, the "short-run" may be a longer period than if examining larger enterprises. However, assuming that eventually all inputs do become variable, long-run analysis of firm growth would entail movement of the enterprise from the optimal output level on the short-run cost curves to the optimal long-term output level, occuring on the lowest average cost curve in the industry. Inevitably, this movement must occur, as market price is bid down by new entrants, forcing those who do not move to lower-cost production methods to exit.

There may also be industries characterized by constant returns to scale, where average cost equals marginal cost, and there is no single profit-maximizing output level. In such cases, neoclassical theory of the firm has no predictive power regarding the process of growth. One variant of the stochastic theories of enterprise growth, examined below, is based on the assumption of constant returns to scale. A brief overview of this, and subsequent stochastic models, is presented below.

3.2.2 Stochastic Theories of Enterprise Growth

All of the stochastic theories of growth posit a random process of growth. Examples of stochastic theory can found in Simon and Bononi (1958) and Lucas (1978), and are discussed by Evans (1986) and McPherson (1992). These stochastic theories accept the assumption of constant returns to scale. Under this assumption there is no optimal firm size; instead, growth is a matter of a random draw.

Jovanovic's learning theory (1982) moves beyond a strictly stochastic framework to allow for differences in firm efficiencies, which lead to different cost curves, and hence different optimal sizes.[12] These variations in costs may be based on unequal abilities of entrepreneurs or unequal access to markets or information. Regardless of the cause of the differences, however, Jovanovic's model predicts that the size an enterprise can attain is based on an efficiency parameter assigned to the enterprise, which is drawn randomly from a known distribution and is immutable. Over time, the entrepreneur learns about his efficiency parameter through a Bayesian learning process. Very inefficient firms will exit. Other firms will approach their optimal size given their efficiency parameter. As entrepreneurs increasingly understand their efficiency parameter over time, they will increasingly approximate their optimal firm size. The technicalities of Jovanovic's model are discussed in detail by Evans (1986). Jovanovic's model produces two important hypotheses about firm growth:

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[12] In Jovanovic's model, total costs are calculated with a stochastic efficiency multiplier, θ. The total cost equation is: $TC(q_t)=C(q_t)*S(\theta+\epsilon_t)$, where ϵ_t are firm-specific shocks. If θ is high, efficiency is low. Conversely, if θ is low, efficiency is high. It is this randomly-assigned parameter that places Jovanovic's learning theory within the family of stochastic growth models.

The larger a firm grows, the closer it comes to its optimal size, given its efficiency parameter. Thus, firm growth is negatively related to enterprise size.

The longer the business is in operation, the better the entrepreneur understands the limitations of his efficiency parameter, and the closer he comes to reaching the limits of the enterprise's abilities. In effect, growth asymptotically approaches zero as the business ages. Therefore, firm growth and firm age are negatively related.

Finally, a model by Ericson and Pakes (1989) extends the learning model by allowing the entrepreneur to actively explore his economic environment. While the model allows the entrepreneur to evolve and change his investment strategy in response to changing opportunities, the model assumes that the outcome of the exploration is stochastic, leading to either success or failure.

3.2.3 Less Formal Models of Firm Growth

The formal theories presented above can be augmented by less formal models of business growth developed specifically to examine developing country situations. These less formal models can be seen as extensions of the neoclassical model, exploring such situations as non-profit-maximizing behavior, the role of unequal market information and access, and the importance of entrepreneurial talents as an input into the production process.

Indeed, a developing country economic environment includes many obstacles which may be more severe than those found in industrialized countries, such as the lack of a publicly-provided economic safety net, unequally distributed market information, widely dispersed markets ill-served by modern communication or transportation services, and a diverse group of entrepreneurs entering the sector from unemployment, agriculture, previous

employment, business, or civil service. These characteristics bring into question the goals of those who go into business, the basket of skills encompassed in entrepreneurs, and the effects of locating businesses in areas better equipped to provide services and products, including market information and infrastructure services. To capture some of this richness, three less formally constructed models are presented below. Each provides an additional set of variables to include in the analysis of determinants of enterprise growth.

3.2.3.1 The influence of proprietor gender on growth

In developing countries, there is a general absence of formal economic safety nets, either for the unemployed or the aged. Thus, while such functions are generally considered public goods in industrialized countries, they are private goods in developing countries, provided by family or community systems. As documented by Gupta (1994), these private economic security systems are largely maintained by women. Given these tasks of ensuring economic security to a circle of dependents, Downing (1990) asserts that women entrepreneurs do not necessarily follow a profit maximization goal. Instead, many will make investment and growth decisions based on a bundle of welfare goals that prioritize first income stability, then financial security, both for the entrepreneur and for an extended circle of dependents. Downing's work proposes the following hypothesis:

> Women-run enterprises will grow more slowly than men-owned enterprises because women reduce their risk by diversifying economic activities rather than expanding specific activities.

Thus, it may be appropriate to add the entrepreneur's gender to the list of determinants that affect enterprise growth.

3.2.3.2 The effect of agglomeration on growth

Location may also be an important component in enterprise growth. As discussed by McPherson (forthcoming), there may be positive "agglomeration externalities" of locating a business in areas where there is a critical mass of economic activity. Several business-enhancing conditions are more likely to exist in well-developed market and population centers than in remote areas such as: (1) a variety of suppliers of material and equipment inputs (including both a wider choice of items and some price competition between suppliers), (2) a diverse and skilled labor pool, (3) better information about market services and characteristics, and (4) a concentration of customers for one's goods or services. These conditions provide positive externalities that do not accrue to firms locating elsewhere.

There may also be negative agglomeration externalities, the most obvious of which is a higher level of competition between enterprises in such areas. A second negative externality for small enterprises is the cost paid for becoming visible to local authorities, either in terms of petty harassment or in having to meet such legal requirements as licensing, worker or health standards, and taxation.

Agglomeration effects may appear in two ways. First, urban-based enterprises are expected to face more agglomeration externalities, both positive and negative, than those in rural areas. Second, within either urban or rural areas, enterprises based in commercial areas or along well-traveled roads are likely to have more agglomeration effects than the most

hidden enterprises, specifically those based within the entrepreneur's home or those traveling from place to place with no fixed location.

It is unknown whether, on balance, agglomeration externalities are positive or negative, or where they are the strongest. However, the issue can be phrased as the following hypotheses:

> Enterprises in urban areas show higher growth than those in rural areas. This is due to net positive agglomeration externalities in the urban areas.
>
> Enterprises in visible locations, such as commercial areas or along roads, have higher growth than those in less visible locations. This is due to net positive agglomeration externalities of operating in visible locations.

If, instead, empirical tests show these relationships to be negative, one may conclude that, on balance, agglomeration externalities are negative for enterprises in those locations.

3.2.3.3 The influence of human capital endowments on growth

Brock and Evans (1986) examine the assumptions about entrepreneurship in the formal models discussed above. In general, the models focus on the distribution of and awareness of innate entrepreneurial ability. None attempt to model the determinants of entrepreneurial skill. This points to a gap in the economic literature between those who study the origins of entrepreneurial talent and those who model business growth.

Kilby (1971) endeavors to bridge that gap. Following a thorough review of the literature, he dissects the necessary skills required in an entrepreneur, listing four areas in which an entrepreneur must operate: (1) exchange relationships, (2) political administration,

(3) management, and (4) technology choice and use. Kilby hypothesizes that for the typical developing country business proprietor, the critical entrepreneurial bottleneck to growth appears in the areas of management and technology. Kilby's work leads to the following hypothesis:

> Entrepreneurs with stronger technical backgrounds or with greater levels of management skill are more likely to have businesses with stronger growth.

While Kilby does not expect an entrepreneur's ability to undertake exchange relationships to be the binding constraint to business growth, his work suggests that decisions on marketing issues should be examined for their effects on growth. Businesses in the commerce sector may be particularly affected by the types of exchange relationships undertaken. A hypothesis can be added as follows:

> The type of market the entrepreneur targets affects the extent of business growth.

Kilby's arguments can be extended to consider the human capital embodied in an enterprise's workers. Indeed, as enterprises grow beyond one-worker concerns, entrepreneur have the option of hiring workers who possess the skills that they need but lack. This ability to purchase necessary skills is particularly helpful in accessing technical skills.[13] This leads

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[13] In the microenterprise population at issue, it is not until the firm reaches a much larger size that an entrepreneur is likely to hire a professional manager. In addition, it is unlikely that workers will undertake the marketing or political administration functions, which will again depend on the entrepreneur's own skills. Therefore, it is expected that entrepreneurial bottlenecks will appear in these functions after technical deficiencies have

to a final testable hypothesis:

> Enterprises that have workers with greater skill endowments, particularly technical skills, will show higher growth than those with less trained workers.

Overall, the formal and informal models suggest that sector, business size, age and location, and entrepreneur and worker characteristics may all play a part in determining the extent of growth. The section below examines the empirical evidence of these relationships.

3.3 Empirical Evidence to Date

Regardless of the theoretical construct used, the empirical evidence overwhelmingly supports the negative relationships between (1) firm size and net growth and (2) firm age and net growth, as hypothesized by Jovanovic. Such findings are reported by Evans (1986) for the United States, McPherson (1992) for four southern African countries, Cortes, et. al., (1987) for Colombia, and Little, et.al., (1987) for India. In addition, several of the studies point to the higher variance of growth for the smallest or youngest enterprises, suggesting the heteroskedastic relationship also predicted by Jovanovic's model.

Second, there is considerable evidence that growth varies by sector, though the ranking varies by country. Chuta and Liedholm (1985) ranked high to low growth sectors for Sierra Leone, McPherson (1992) did the same for Southern Africa, while Phillips and Kirchhoff (1988) found a sectoral pattern of growth for the United States. One finding mentioned by McPherson was the unique sectoral patterns for each country he examined.

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been remedied by hiring skilled workers.

When examining other regions, patterns of sectoral growth again change and no commonalities emerge.[14]

Empirical work also supports Downing's hypothesis that women-run enterprises will grow more slowly than their men-run counterparts. Such evidence is provided in Cely (1993) for the Dominican Republic, and Downing and Daniels (1992) and McPherson (1992) for southern Africa.

Evidence also points to the existence of agglomeration externalities, which appear to be related both to the degree of urbanization and the specific type of location chosen for the enterprise. McPherson (1992) found that for southern Africa, enterprises operating from central business districts showed greater growth than those operating from the home. Likewise, he found positive agglomeration externalities for firms locating in areas with populations of over 20,000. There is some evidence that human capital endowments affect business growth. The difficulties come in accurately capturing entrepreneurial capacity in measurable variables. For example, Chuta and Liedholm (1985), along with other studies, found a negative relationship between an entrepreneur's education and growth, suggesting that education is not a good measure of entrepreneurial capacity. On the other hand, McPherson (1992) found a positive relationship between growth and education in Zimbabwe, but not in the other countries he examined. Similarly, he found that formal business training had a positive impact on growth in Lesotho, but not in any other country. In Swaziland and Botswana, on the other hand, McPherson found a positive relationship between growth and

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[14] Each source cited here has used a slightly different method of defining and ranking sectors. As a result, it is difficult to present a single table that compares "high" or "low" growth sectors across countries.

experience in similar activities. Thus, the search continues for a composite of operational variables that can explain entrepreneurial abilities in a wide range of settings.

Finally, to date there has been little examination of the type of skills embodied in the enterprise's workforce and its impact on growth. This omission may stem from the difficulties of acquiring the necessary data. In addition, however, it is likely that researchers consider quality of labor issues as an endogenous rather than explanatory variable, therefore omit it from study.

Having presented many threads of the enterprise growth literature in Section 3.2 and the empirical evidence in Section 3.3, it is now appropriate to look specifically at the Kenyan case, and weave these threads together in the form of a testable equation. This is presented in the section below.

3.4 Looking for Determinants of Enterprise Growth in Kenya

3.4.1 Kenya's Micro and Small Enterprise Population

The 1993 national baseline survey of micro and small enterprises in Kenya collected data on key characteristics of 4535 businesses, including information on enterprise size at start and currently (based on the total number of workers actively involved in the enterprise), enterprise age, location, and sector, as well as proprietor and worker characteristics. From this data, a descriptive profile of the small and microenterprise sector was developed, including preliminary information on enterprise growth (Parker, 1994).

The Kenya micro and small enterprise sector is composed of over 900,000 enterprises which employ two million people, or roughly 16 percent of the labor force. Nationwide, one

quarter of all households engage in some form of business activity. The vast majority (98 percent) of Kenyan enterprises are "microenterprises", employing between one and ten workers. Nearly half (47 percent) are strictly self-employment activities, engaging the proprietor only. The bulk of the remaining enterprises have between two and five workers, many of which grew up from one-person enterprises at start.

As in other African countries, the majority (78 percent) of Kenya's enterprises are rural, based in areas with populations of under 2000. Roughly half are run by women, and nearly one-third operate from the proprietor's home. The sector is dominated by commerce and trade activities, which make up 61 percent of enterprises, followed by manufacturing (27 percent), then services (13 percent). Three-fourths of all businesses report a workforce that has no training, either formal or informal.

Growth of existing enterprises is an important component of job creation in the sector. Thirty percent of current employment (or 600,000 jobs) was generated by the expansion of existing businesses, while the other 70 percent was generated at the time of business start-up. However, only 38 percent of enterprises show any expansion since opening. Another 4 percent have declined in size, while the majority (58 percent) have not added any workers since opening. Thus, jobs from expansions are generated by a minority of enterprises. What characteristics define these growing firms? In fact, enterprise growth appears to be related to many of the characteristics mentioned above.

- Starting size: Enterprises that start smallest (with one worker) add more workers per firm annually than those that start larger. Larger enterprises, those starting with 11-50 workers, actually show sharp declines in numbers of workers.

- Sector: Manufacturing and service enterprises show a higher percentage of growing enterprises than businesses in commerce or trade.
- Location: Enterprises in commercial and industrial areas show higher growth than those located outside of these areas.
- Proprietor Gender: Women-run businesses show a smaller percentage of enterprises growing than men-owned or group-owned enterprises.
- Worker Skills: A higher percentage of enterprises with trained workers grow than those with untrained workers.

While these findings are illuminating, a more appropriate statistical test would be to examine each variable's effect on growth while holding other factors constant. Therefore, the next step in sorting out the importance of these characteristics is to test their relationship to enterprise growth using multiple regression techniques.

3.4.2 A Multiple Regression Equation

To test the importance of different factors on enterprise growth, the equation below was developed, which includes the elements discussed above in a multiple regression framework:

$$(3.1)\quad GROWTH_j = \alpha + \beta SIZE_j + \gamma AGE_j + \Sigma \delta_i SECTOR_{ij} + \Sigma \lambda_i LOCATION_{ij} + \theta GENDER_j + \Sigma \phi_i PROPRIETOR\ SKILLS_{ij} + \Sigma \psi_i WORKER\ SKILLS_{ij} + \epsilon_j$$

3.4.2.1 Functional Form

In his examination of firm growth data in the United States, Evans (1987) looked closely at functional form issues. He pointed out three possible problems that can arise in the data: non-linearity, heteroskedasticity, and selection bias. The choice of model specification used here is guided by his work.

First, selectivity bias issues arise from the fact that growth data pertain only to those enterprises currently in operation, in essence including only the very young or the "winners". There is a distinct possibility, therefore, that coefficient estimates and levels of significance are biased by the omission of firms that have disappeared. Both Evans and McPherson (1992) recognized this potential for bias and tested for it using the "Heckit" method devised by Heckman (1976). In turn, both found that selectivity bias was not significant in the regression equation and need not be corrected for. Based on these findings, no attempt is made here to correct for selectivity bias.

Second, in expectation of nonlinearity and nonadditivity in the variables, Evans transformed the linear equation into a log-log equation. Finally, Evans corrected his equation for heteroskedasticity using a weighted least squares method. However, he found that there was little difference in the goodness of fit resulting from that correction.

Given these results, a linear equation is first used to estimate Equation 3.1. Secondly, following Evan's approach, the equation is re-estimated in log-log form. Finally, based on the discovery of heteroskedasticity[15], the log-log equation is re-estimated using a weighted least

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[15] The equation was tested for heteroskedasticity using a White Test (see Kmenta, 1986). Both size and age variables were included in the test. The Chi-square statistic was 473.22, which is greater than $\chi^2_{df=3,.01}=11.345$. Therefore, the null hypothesis of a homoskedastic disturbance was rejected.

squares procedure. Weights are calculated for groups of enterprises based on age, given Goldfeld-Quant test results that show a heteroskedastic relationship between the residuals and age. Weights are calculated as one over the square root of the average variance of the residuals for each group of observations, where observations are grouped by age of enterprise as: (1) one-year-old enterprises, (2) two- or three-year old enterprises, (3) four- to eight-year old enterprises, and (4) all enterprises over eight years old. The first category comprises roughly 40 percent of the sample, while each subsequent category contains 20 percent of the sample.[16] While this weighting scheme is expected to reduce the level of heteroskedasticity associated with age, it does not necessarily result in a homoskedastic variance, given a potentially heteroskedastic relationship between the residuals and firm size.

The results of all three equations are presented in Table 3.1. The discussion that follows is based on the results of both the log-log equation and the weighted least squares equation.

3.4.2.2 Dependent Variable

The dependent variable "growth" is measured in terms of the absolute number of workers added by the enterprise since start, then annualized by dividing by the number of years the enterprise has been in operation. All enterprises less than one year old are assigned an age of one for this calculation.

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[16] The standard deviation of residuals and resultant weights for each group are: (1) SD=.3940, Weight=2.54; (2) SD=.2009, Weight=4.98; (3) SD=.2847, Weight=3.51; and (4) SD=.0422, Weight=23.70.

$$(3.2)\ \text{Growth} = \frac{(\#\ \text{Workers Currently} - \#\ \text{Workers at Start})}{\text{Enterprise Age}}$$

As discussed in Chapter II, this measure of absolute growth is deemed superior to measures of growth rates given the large number of firms that begin as one-worker concerns. Since growth is measured in absolute terms rather than as a growth rate, the variable should be interpreted as the number of workers added to the business annually.

For the log-log form of Equation 3.1, the growth variable follows the specification used by Evans (1987) due to problems inherent in taking the logarithm of a variable for which many observations equal zero:

$$(3.3)\ \text{Growth} = \frac{\ln(\#\ \text{Workers Currently}) - \ln(\#\ \text{Workers at Start})}{\text{Enterprise Age}}$$

3.4.2.3 Independent Variables

The independent variables used to test Equation 3.1 include both continuous and dichotomous variables. Here is a brief description of the set of operational variables for each of the above elements in the model.

Starting Size:	Number of workers actively engaged in the enterprise at start, including the proprietor.
Age:	The number of years an enterprise has been in operation.
Sector:	15 dummy variables representing the two-digit international standard industrial classification (ISIC) of the enterprise. Omitted category: retail trade.

Degree of Urbanization:	3 dummy variables representing the degree of urbanization where the enterprise is located. Omitted category: rural areas.
Location:	5 dummy variables representing the type of location of the enterprise. Omitted category: home-based enterprises.
Proprietor's Gender:	Dummy variable coded as "1" for women-owned enterprises, and "0" otherwise. The "0" category includes both men-owned and group-owned enterprises.
Proprietor's Managerial & Technical Skills:	8 dummy variables representing the immediate previous occupation of the proprietor. Omitted category: previously unemployed.
Proprietor's Marketing Skills:	3 dummy variables representing different markets targetted by the enterprise. Omitted category: majority of sales made directly to final consumers.
Workers' Technical Skills:	2 dummy variables representing the form of training received by the best-trained worker. Omitted category: best-trained worker has no training.

Table 3.1 provides the results of the regression model for all three functional form specifications. For each variable, the coefficient, T-statistic, and significance level of the T-statistic are provided. In addition, the adjusted R^2 and F statistics are presented for each equation. A discussion of the results follows in Section 3.5.

Table 3.1
Regression Results: Net Growth of National Sample

VARIABLE	Functional Form		
	Linear	Log-Log	Log-Log with WLS Correction
CONTINUOUS VARIABLES			
Firm Age	-.020 (-7.735) [.000]	-.075 (-17.367) [.000]	-.062 (-22.604) [.000]
Firm Starting Size	-.161 (-17.922) [.000]	-.177 (-16.744) [.000]	-.089 (-14.038) [.000]
SECTOR (2-digit ISIC Code)			
Food/Beverage Manufacturing	.071 (.944) [.345]	.029 (1.408) [.159]	.014 (1.018) [.309]
Textile Manufacturing	.115 (1.335) [.182]	.053 (2.285) [.022]	.018 (1.235) [.217]
Wood Manufacturing	.409 (4.543) [.000]	.123 (5.075) [.000]	.045 (3.268) [.001]
Mineral Manufacturing	.263 (1.195) [.232]	.102 (1.719) [.086]	.037 (1.213) [.225]
Metal Manufacturing	.707 (6.707) [.000]	.129 (4.536) [.000]	.052 (3.306) [.001]
Miscellaneous manufacturing	-.017 (-.081) [.936]	-.057 (-1.018) [.309]	-.007 (-.216) [.829]
Construction	.584 (3.040) [.002]	.055 (1.107) [.286]	.055 (2.127) [.033]
Wholesale Trade	.146 (1.059) [.290]	.035 (.942) [.346]	.026 (1.191) [.234]
Retail Trade -- Omitted	*	*	*
Hotels/Restaurants/Bars	.457 (5.227) [.000]	.121 (5.086) [.000]	.048 (3.015) [.003]
Transport Services	.075 (.405) [.686]	.059 (1.176) [.240]	.046 (1.283) [.200]
Business Services	-.209 (-.665) [.506]	-.038 (-.447) [.655]	-.006 (-.163) [.870]
Personal Services	.011 (.141) [.888]	.010 (.448) [.654]	-.007 (-.478) [.632]

Table 3.1 (cont'd).

VARIABLE	Functional Form		
	Linear	Log-Log	Log-Log with WLS Correction
Repair Services	-.117 (-1.265) [.206]	-.071 (-2.831) [.005]	-.043 (-3.019) [.003]
LOCATION			
Commercial/Industrial Areas	.148 (2.204) [.027]	.042 (2.303) [.021]	.031 (2.656) [.008]
Roadside/Rural Trading Centers	.050 (.705) [.481]	.041 (2.161) [.031]	.028 (2.236) [.025]
Traditional Markets	-.076 (-1.370) [.171]	-.019 (-1.265) [.206]	4.4E-04 (.044) [.965]
Home-based -- Omitted	*	*	*
Non-fixed Location	-.240 (-1.955) [.051]	-.083 (-2.503) [.012]	-.032 (-1.506) [.132]
Other Locations	.941 (1.840) [.066]	.043 (.325) [.745]	-.014 (-.241) [.810]
DEGREE OF URBANIZATION WHERE ENTERPRISE IS LOCATED			
Rural Areas (population under 2000) -- Omitted	*	*	*
Small Towns (population 2000-10,000)	-.078 (-1.326) [.185]	-.041 (-2.591) [.010]	-.018 (-1.790) [.074]
Large Towns (population over 10,000) except Nairobi/Mombasa	.009 (.161) [.872]	-.017 (-1.113) [.266]	-.009 (-.935) [.350]
Nairobi and Mombasa	-.108 (-1.388) [.165]	-.016 (-.788) [.431]	-.008 (-.583) [.560]
GENDER OF PROPRIETOR			
Female Proprietor	-.213 (-5.418) [.000]	-.084 (-7.764) [.000]	-.045 (-6.306) [.000]
Non-female Proprietor -- Omitted	*	*	*
MAIN CLIENT OF ENTERPRISE			
Final Consumers -- Omitted	*	*	*
Other Businesses for Distribution	.112 (1.269) [.204]	.015 (.639) [.523]	.015 (1.004) [.315]

Table 3.1 (cont'd).

VARIABLE	Functional Form		
	Linear	Log-Log	Log-Log with WLS Correction
Other Businesses for Production	.743 (4.754) [.000]	.061 (1.455) [.146]	.011 (.522) [.602]
Other Client	-.250 (-1.357) [.175]	-.093 (-1.888) [.059]	-.029 (-1.029) [.304]
PROPRIETOR'S PREVIOUS OCCUPATION AND CHARACTERISTICS			
Previously unemployed -- Omitted	*	*	*
Previously in agriculture	.035 (.659) [.510]	.010 (.665) [.506]	.003 (.332) [.740]
Previously in business	.125 (2.322) [.020]	.046 (3.136) [.002]	.020 (2.095) [.036]
Previously in formal sector employment	.126 (1.942) [.052]	.019 (1.117) [.264]	.004 (.378) [.706]
Previously in informal sector employment	.001 (.010) [.992]	.007 (.388) [.698]	-3.3E-04 (-.027) [.978]
Previously in civil service	-.090 (-1.097) [.273]	-.017 (-.767) [.443]	-.013 (-.886) [.376]
Previously in school	-.032 (-.411) [.681]	-.016 (-.769) [.442]	-.007 (-.536) [.592]
Previously in apprenticeship	-.108 (-.964) [.335]	-.012 (-.390) [.698]	-.010 (-.574) [.566]
Previously in other activity	.030 (.265) [.791]	.020 (.653) [.514]	.001 (.058) [.954]
TRAINING OF BEST-TRAINED WORKER			
No training -- Omitted	*	*	*
Apprenticeship Training	-.057 (-1.065) [.287]	.015 (1.051) [.293]	.011 (1.258) [.209]
Vocational/Technical Training	.202 (3.009) [.003]	.060 (3.314) [.001]	.047 (4.088) [.000]
Other Training	.104 (1.259) [.208]	.033 (1.494) [.135]	.013 (.971) [.332]
Constant	.628 (8.013) [.000]	.271 (12.829) [.000]	.218 (14.969) [.000]

Table 3.1 (cont'd).

VARIABLE	Functional Form		
	Linear	Log-Log	Log-Log with WLS Correction
Sample Size	4060	4059	4059
Adjusted R^2 Statistic	.119	.149	.161
ANOVA F Statistic	15.381 [.000]	19.644 [.000]	21.544 [.000]

3.5 Results of the Analysis

Overall, the results show that many of the variables predicted by the formal and informal models above are significant, with signs that are generally consistent with theory and previous empirical work. For all three equations, the ANOVA F-statistic is significant at the .000 level, therefore the hypothesis that jointly the coefficients are insignificant can be rejected. Overall, the sign and significance level of most coefficients remain similar across all three equations. Moving from a linear model to a log-log equation also improves fit, where the adjusted R^2 statistic rises from .119 to .149.[17]

For the dichotomous variables, each vector was tested for significance using an F-test (Kmenta, 1986), with a null hypothesis that jointly the coefficients of the vector of dummy variables equal zero. These tests were performed for both the log-log and the weighted least squares equation. The results of these tests are presented in Table 3.2 and will be referred to in the discussion below.[18]

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[17] The adjusted R^2 statistic for the weighted least squared equation is not strictly comparable to that of the log-log equation.

[18] The F-test results for the unweighted and weighted log-log equations are quite similar, yielding identical results at the .01 significance level. If a .05 significance level is used, the null hypothesis regarding choice of exchange relations is rejected for both equations. For degree of urbanization, the null hypothesis is rejected at the .05 level for the unweighted log-log equation only.

Table 3.2
Significance of Dummy Variable Vectors by Equation

Dummy Classification	Unweighted Log-Log Equation			Weighted Log-Log Equation		
	F statistic	Test $F_{(01)}$ Value	Is H_o accepted or rejected?	F statistic	Test $F_{(01)}$ Value	Is H_o accepted or rejected?
Sector	6.86	2.18	Rejected	4.09	2.18	Rejected
Location of Enterprise	9.92	3.02	Rejected	6.88	3.02	Rejected
Degree of Urbanization	2.80	3.78	Accepted	1.22	3.78	Accepted
Choice in Exchange Relations	3.55	3.78	Accepted	2.60	3.78	Accepted
Entrepreneur's Previous Occupation	8.20	2.51	Rejected	6.65	2.51	Rejected
Worker Skill Level	34.63	3.78	Rejected	32.35	3.78	Rejected

First looking at the continuous variables, the results in Table 3.1 indicate a strong negative relationship between growth and both starting size and age. Looking at the WLS coefficients, it appears that, on average, businesses grow less in each successive year of operation and less for each additional worker in the business.[19] These results fit the predictions of Jovanovic's model, and are consistent with empirical work from other countries.

In terms of sector, the F-tests show that sector does indeed influence growth. The specific sectoral coefficients must be compared to the omitted category: retail trade. From the WLS equation, it appears that enterprises in five sectors grow significantly more than in retail trade, namely wood manufacturing, metal manufacturing, construction, hotel and restaurant services, and transport services. Only one activity appears to grow significantly less than retail trade activities: repair activities.

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[19] Due to the functional form of the equation, interpretation of the coefficients for continuous variables is difficult, and depends on the starting size and age of the enterprise. Appendix C provides sample calculations of the size-growth effects for a range of values.

less than retail trade activities: repair activities.

It is also helpful to look within manufacturing to identify those sectors that have had the greatest net growth. To order the six manufacturing sectors in terms of growth while holding other factors constant, the regression model was re-estimated six times, each time omitting a different manufacturing category. The ranking, ordered from fastest to slowest growth, is: (1) metal fabrication, (2) wood production and processing, (3) non-metallic mineral processing, (4) textile and wearing apparel production, (5) food and beverage processing, and (6) miscellaneous manufacturing. Two of these sectors, wood products and textile products, will be the focus of Chapter IV.

The elements of the less formal models also appear to be important to explaining the extent of growth, including business location, proprietor gender and background, and workers' skill levels. Each of these are examined in turn.

First, choice of business location by the entrepreneur affects growth, as shown by the significant F-statistics for enterprise location in Table 3.2. Those enterprises locating in more central or more visible locations such as (1) commercial areas or (2) along roadsides or in rural or neighborhood trading centers show markedly stronger growth than those based within the home (the omitted category). Those without a fixed business locations show less growth than home-based enterprises.

While choice of location is important, the F-tests suggest that growth does not vary by the locality's level of urbanization, contrary to the results of the Zimbabwe study. While the signs for all three coefficients are negative, suggesting that growth is less in towns and cities than in rural areas, only for small towns is the relationship statistically significant. For

these locations, negative agglomeration externalities outweigh the positive.

As shown in Table 3.1, gender is also an important determinant of growth, where women-run businesses grow significantly less than other businesses. While this may strengthen Downing's hypothesis that women pursue different goals while in business, it may also reflect some form of discrimination in the marketplace against women entrepreneurs or a lower level of skills embodied in female proprietors. In all cases the negative relationship is statistically significant at the .001 level.

Looking at the human capital of both the entrepreneur and workers, several findings are of interest. First, while the F-statistics for the dichotomous variables on exchange relationships are insignificant at the .01 level, they are significant at the .05 level. This suggests that decisions regarding clientele may have an effect on enterprise growth. Specifically, the positive signs found in all equations for enterprises using forward linkages suggest that enterprises participating in more complex production or distribution chains may have greater opportunities to grow than those selling directly to final consumers.

Second, the previous occupation of the proprietor, from which the current skills of the proprietor to some extent emerge, does appear to affect the ability of the enterprise to grow, as shown by the significant F-statistics in Table 3.2. Entrepreneurs who have previously undertaken business grow more than businesses headed by the previously unemployed (the omitted category). If one accepts that those with previous business experience have greater managerial skills than the previously unemployed, then this result lends credibility to Kilby's argument that management skills are a key constraint to growth (Kilby, 1972). Alternatively, individuals with previous business experience may be better at

performing all requisite entrepreneurial functions.

Finally, the results suggest that growth of enterprises is related to the skill level of workers. In particular, those businesses with workers trained formally at vocational or technical schools show markedly higher growth than those with untrained workers. This finding lends credence to the hypothesis that proprietors are able to hire workers to relieve their own technical shortcomings, thereby relieving that form of entrepreneurial bottleneck. It is also possible that the level of workers' training may serve as a proxy for other variables not be captured in the equation. For example, ability to hire skilled workers may be a function of the proprietor's access to information or managerial skills, or of the current size of the enterprise.[20]

In conclusion, it appears that, controlling for other variables, growth does diminish with enterprise size and age, and varies by sector. In addition, the location and human capital characteristics of the enterprise have significant effects on the ability of enterprises to add workers, and should not be ignored in future attempts to identify determinants of enterprise growth, particularly for developing country settings.

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[20] Of all the variables contained in Equation 3.1, skill level of workers is the most likely to be endogenously related to growth. To illustrate, an reverse argument for causality may be made, where enterprises have expanded in order to add skilled workers, rather than expanding due to the presence of skilled workers. Unfortunately, the direction of causality cannot be determined without information on the relative timing of growth and the arrival of skilled workers.

CHAPTER IV:

THE EXTENT OF GROWTH FOR TWO ACTIVITIES

4.1 Introduction

As seen in Chapter III, the sector in which the enterprise operates is one determinant of enterprise growth. This should elicit little surprise, since each type of activity faces a unique set of production and marketing conditions which invariably affect its long-term evolution. It can therefore be argued that examining the characteristics facing particular activities can go a long way to explain why businesses in some industries show more propensity towards growth than others.

In Chapter III, broad sectoral definitions were used in the search for determinants of growth.[21] This rough categorization served to highlight general trends rather than to explain the unique dynamics of particular industries. Moreover, the analysis missed those dynamics that appear at the intra-industry level, once product differentiation and market fragmentation appear. These intra-industry distinctions may help to explain why, even within an industry, certain businesses have different patterns of growth and development than others.

Thus, in order to better capture dynamics between and within industries, it is

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[21] This categorization was based on two-digit ISIC codes. While this permits comparability between the Chapter III results and those presented in McPherson's Zimbabwe work, it is likely that the activity-specific patterns appear at the four-digit ISIC level or even at levels of greater disaggregation.

necessary to look more closely at specific activities. This chapter examines two activities -- furniture-making and shoe-making -- to identify both industry and intra-industry characteristics that may shed light on why certain industries show more growth than others and why some firms in an industry grow while others fall behind.

4.2 Field Methods and Data

The analyses in this chapter and Chapter V are based on detailed studies of two activities in a slum settlement in greater Nairobi, Kenya, called Kibera. The Kibera studies were undertaken over an eight-month period in 1990-1991. The studies were limited to two activities to allow a level of depth that would not otherwise have been possible. Selection of activities for study was based on the number of enterprises in each activity[22] and an observed level of heterogeneity and dynamism within the activities. Given their dominance in the microenterprise community and the possibility of production for non-Kibera markets, furniture-making and shoe-making were chosen for study.[23]

At the time of the studies, Kibera was home to an estimated 250,000 individuals. Of the fourteen neighborhoods within Kibera, three are "middle-income" estates with permanent housing and utilities. The remaining 11 neighborhoods are densely settled low-income areas with little infrastructure and a large percentage of adults either unemployed or working as

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[22] A count of enterprises per activity was provided by the complete census of all business activities in Kibera carried out in late 1990 by Kenya Rural Enterprise Programme (Parker and Aleke Dondo, 1991). A critical population of at least 100 enterprises was deemed necessary to provide the basis for random selection of a sample of 40 enterprises, allowing for missing or uncooperative enterprises.

[23] The count of enterprises in these two activities was: furniture-making, n=249; shoe-making, n=204 (Parker and Aleke Dondo, 1991).

casual laborers. Thus, the vast majority of the Kibera population has a need to undertake income-earning activities, but little per capita disposable income for purchasing goods other than food, fuel and clothing. Focusing the research on Kibera may thus have an added advantage of providing insights of the potential for microenterprise employment creation in such dense, low-income urban settings.

The analysis presented in this chapter is based on information collected in three studies. The starting point for the field work was two rapid appraisal studies of the chosen activities, carried out using a subsector framework (see Boomgard, et.al., 1991). In the subsector approach, producers are examined in light of the entire system of economic activities that transforms raw materials into finished products and places them in the hands of final consumers. In addition to including different stages of production, subsector analysis illuminates the role of traders, retailers, and transporters, policies and institutions, and any other actors that set the rules or involve themselves in the actual transformations of the subsector.

It would be inappropriate to claim that the rapid appraisal studies were complete subsector studies. Instead, they focused more on the effects of the economic system on a particular group of participants in the system. In that sense, the rapid appraisals were extended industry studies. Still, the framework provided important insights into the choices facing furniture-makers and shoe-makers in terms of input sourcing, production, and marketing methods, as will be discussed below.

Second, in the absence of current or sufficiently disaggregated data on demand, a small sample demand survey was undertaken. This survey was used to identify purchasing

patterns of the Kibera population for the products and services of the activities in question.

Third, after the rapid appraisal study identified key areas for inquiry, intensive retrospective interviews were conducted with 40 randomly selected businesses in each activity, which provided detailed enterprise-level data on many of the key characteristics.[24] This retrospective study provided the data for the statistical work presented in this chapter, and will be discussed again in Chapter V.

Furniture-making and shoe-making are examined separately below in Sections 4.3 and 4.4. Section 4.5 tests for the determinants of enterprise growth for the two activities, incorporating several elements identified by the subsector assessments. Finally, Section 4.6 examines the results of this analysis, setting forth hypotheses to explain anomalies between the different activities.

4.3 A Description of Furniture-making

According to the 1991 census of Kibera businesses, furniture-making comprises 15 percent of all manufacturing enterprises in Kibera. Furniture-makers show more dynamism than manufacturing in general, where 52 percent of furniture-makers have added workers, compared to 39 percent in manufacturing as a whole. Consequently, the average furniture-making enterprise has 2.4 workers, slightly higher than the 2.2 workers per enterprise seen in manufacturing as a whole.

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[24] The frame for this random sample was the entire population of Kibera-based enterprises in the selected activities, as enumerated in the census of Kibera businesses.

4.3.1 Demand for Furniture

Demand for Kibera-made furniture comes largely from the Kibera population itself. Given the income level of the population and furniture's nature as a durable good, purchases are highly seasonal, typically made in months when school fees are not due, and then only at the beginning of the month following pay day. The Kibera low-income consumer purchases basic items such as beds, stools, and small tables, made of low-cost woods such as pine or cyprus. The much smaller middle income population, on the other hand, tend to buy larger, higher-quality and higher-priced items, the bulk of which are purchased outside of Kibera. These customers may shop locally for their basic items, but demand a higher quality of inputs (typically camphor wood), more finishing work (such as lathe work or carving), and a higher overall level of workmanship (particularly in joining, sanding, and varnishing) than is demanded by low-income consumers. However, as these basic but higher-quality items are produced along Kibera's roadside, lower-income customers are beginning to notice, admire and order higher-quality work, albeit more modest pieces in smaller quantities.

4.3.2 Structure of Furniture-making

As noted above, a subsector is made up of a series of functions during which the product is transformed or moved forward in some way. There are four such functions in Kibera furniture-making: (1) input supply, (2) furniture part shaping and cutting, (3) furniture assembly and finishing, and (4) furniture retail. These functions are briefly outlined below.

Function 1: Input supply

Wood mills are located nationwide, and serve an extensive market in greater Nairobi such as the large lumber market in Gikomba.[25] Some mills of soft woods, such as pine and cyprus, transport their products to the Nairobi market, including stops in Kibera to supply wood retailers. Furniture makers that use soft woods can either purchase wood from the mill by the truck load (an option available only to the largest producers) or buy from the local retailers. Higher quality woods, such as Meru oak or camphor, are typically sold by the mills to wholesalers in Gikomba, then purchased either by the piece or the bundle by Kibera wood retailers or producers.

Other inputs such as nails, hinges, and varnish are carried by both large shops in Gikomba and several smaller suppliers around Kibera. Prices are slightly higher in Kibera, however the producers save bus fare, can buy in smaller quantities and may receive short-term credit by shopping locally. Finally, tools and equipment are typically purchased in Gikomba, where there is a thriving metalworking industry.

Function 2: Furniture part shaping

Shaping of furniture parts is part of the production of all but the most rudimentary furniture. Two basic machines are used: rolling lathe machines and band saws. This function is carried out either within Kibera or in Gikomba. If the wood to be shaped is purchased in

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[25] Gikomba is a large market area within Nairobi proper. It is the hub of the furniture industry, where tools and supplies are readily available at the best prices. Furniture-making services are also available in Gikomba, from lumber cutting and shaping, to upholstering, to transport. Gikomba will also be considered in the shoe-making study, where it is again a major source of supplies and services. It is accessible by bus from Kibera.

Gikomba, furniture makers have the wood shaped while there, then bring it back ready for assembly. Kibera's shaping businesses are concentrated in the major market areas of Makina and Line Saba where electricity is more accessible. Very few of Kibera's furniture-makers undertake this function. Instead, there are a small number of specialized machinists operating in Kibera's major markets which provide these services.[26]

Function 3: Furniture assembly and finishing

Furniture assembly and finishing is the central activity of the subsector, involving 249 businesses in Kibera. This stage of production can be broken down into five tasks: cutting wood to lengths, joining, sanding, upholstering, and finishing. Cutting to length can be done either by the wood retailer, the machinist who undertakes the subsequent shaping, or by the furniture-maker himself. The other tasks are undertaken by the furniture-maker after shaping is completed, using hand tools for joining, sanding, upholstering, and finishing.

Function 4: Furniture retail

Furniture retail is undertaken in two ways. First, the vast majority of Kibera producers retail their own furniture at the workshop, and customers are responsible for transporting their purchases from the shop. A few businesses produce furniture for city-based retailers. These producers transport their finished products to the retailer, either by bus or by hiring a pick-up truck.

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[26] While not included in the retrospective survey, these specialized machinists were interviewed in the subsector rapid appraisal studies.

4.3.3 Categorizing Furniture-makers

Kibera's furniture makers are not a homogeneous group, either in terms of how they organize production or in terms of which markets they serve. Several key distinctions are important, including capital use, level of vertical integration in production, location of the enterprise, quality of products made, and whether they produce for a non-Kibera market.

4.3.3.1 Capital use

Producers differ in the amount of both fixed and working capital used. In addition to working space, fixed capital is embodied in tools and machinery. While all enterprises have a similar set of hand tools (albeit in different amounts depending on the number of workers), investment in motorized machinery is undertaken by only a few enterprises. Indeed, only three of the 39 furniture-makers interviewed in the retrospective survey have machines on site. The rest subcontract out machine work, typically to specialized machinists who do not engage in furniture assembly.[27]

Why are less than ten percent of furniture-makers mechanized? Cost of machinery does not seem to be the major constraint. For example, rolling lathe machines, manufactured in the informal sector from scrap metal, sold for Kenya Shillings 7,000 in 1991, much less than the more common sewing machine used in shoemaking. Instead, two other constraints appear to be more binding. First, such machines require special skills.[28] Even more

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[27] While important participants in the subsector, specialized machinists are not included in the furniture-maker sample. In large part, this omission is due to their small number (n=6), which would preclude capturing sufficient numbers in a random sample.

[28] Many of the machinists interviewed were missing fingers, testimony to the difficulty in becoming a skillful machinist.

importantly, however, the machines require electricity, which is non-existent in many of Kibera's neighborhoods. Several furniture-makers reported having the means to buy a machine, but were waiting until electricity lines were extended to their neighborhoods. Two other producers reported owning machines, but not being able to operate them due to lack of electricity.

Working capital is also an issue for furniture-makers. Wood is expensive, and if production is for display, working capital can remain tied up in inventories. Some producers, typically those with machines, are likely to buy wood by the truckload, thus using markedly more working capital than those that buy by the piece. Furniture-makers are evenly divided in whether they are producing for order or inventory. Those with the best reputations typically receive sufficient orders to keep their workshops fully occupied, and thus are less likely to tie up working capital in inventories. Newcomers and those without a distinguished reputation are more likely to produce for display, and therefore are likely to tie up their capital in inventories for longer periods of time.

4.3.3.2 Level of vertical integration

Related to capital use is the number of functions undertaken within a single furniture-making enterprise. The first group, which includes less than ten percent of furniture makers, is fully integrated into all production activities, including cutting and shaping. These producers are highly capitalized: they own power tools and buy wood wholesale from the mills. Producers in this channel have several distinct advantages over those in the other channel. First, by dealing directly with supply wholesalers, they avoid paying retailers' mark-

ups on supplies. Second, by performing all production work within the business, they retain control over the timing and quality of production. If machines are not kept fully occupied by in-house production, the machinists undertake work for other furniture-makers, thereby adding a subcontracting function to the enterprise. However, by undertaking all functions within the business, greater managerial skill is required.

The less-integrated group of producers includes the vast majority of Kibera producers. None have power tools, so they subcontract shaping of wood to businesses that have machines. Nearly all of these businesses buy wood at the retail rather than the wholesale level, typically from Kibera wood retailers. When asked what plans they had for expansion, many entrepreneurs in this group reported that they were saving in order to buy machines or purchase wood in bulk.

Differences appear between these channels in a number of areas. Most striking is the size difference. Fully integrated businesses have an average of 11 workers, while less integrated businesses have on average only four workers. Moreover, fully integrated businesses tend to produce higher quality furniture from hardwoods and are more likely to market some of their goods outside of Kibera than less integrated businesses. In part, these differences may stem from the entrepreneur's experience in furniture-making. Indeed, entrepreneurs in fully integrated businesses brought an average of 12 years of experience to their current business, while those in less integrated businesses brought, on average, less than seven years of experience. In addition, entrepreneurs in more integrated businesses are, perhaps by requirement, better financial managers.

4.3.3.3 Location of the enterprise

Locationally, the Kibera furniture industry can be broken into two segments as well. First, just over half of all Kibera furniture makers are located in one of the three neighborhoods with a regular marketplace -- Makina, Line Saba and Lindi. While only one-fourth of all furniture-makers are actually located within the perimeters of a marketplace, another quarter are located nearby and are thereby visible to market-goers. Each marketplace has some access to electricity. And each has all the functions of the subsector represented: input supply, machine shops, furniture assemblers and finishers, and a good customer base.

The other half of furniture makers are located in the other neighborhoods of Kibera. While population is still dense in any of these areas, businesses cannot depend on the attraction of a large market to bring in customers. Visibility is an issue of locating near the best-travelled footpaths.

Recalling the discussion on agglomeration externalities from Chapter III, it is clear that the group of furniture-makers located in and around markets have the greatest agglomeration externalities, both in access to inputs and services and in access to customers.

4.3.3.4 Markets served

The third way to categorize furniture-makers is by the types of markets they serve. Markets can be identified in two ways: first, by the type and quality of products produced, and second, in terms of whether the business is producing for the Kibera market or for the larger Nairobi market. To some extent, these two measures are co-linear, where those producing higher quality products also tend to service the non-Kibera market. Due to this

co-linearity, only one of these measures is included in the subsequent empirical work. However, it is useful to distinguish between the two marketing issues in order to clarify production options.

In terms of type and quality of product, the bulk of basic furniture items are made of pine or cyprus, both soft woods. Workmanship in terms of joining, sanding, and varnishing is rough. In addition, these pieces involve little value added in the form of machine work or upholstery. The overwhelming majority of these items are purchased by customers from Kibera.

As mentioned above, there is a small and possibly growing number of producers of better quality furniture in Kibera. These items are typically made from hard woods (usually camphor), involve some machine work, and show a higher level of overall workmanship. Even basic items made with better woods and more skill yield a higher return for the producer. While the market within Kibera for such furniture is small, the market for such goods in greater Nairobi is much larger. However, competition from large and small competitors from across Nairobi make penetrating the non-Kibera market difficult. Nor do Kibera producers who have succeeded in producing for city-based retailers necessarily decide to continue such contracts. In fact, due to the pressures of the marketplace, terms of payment for such work have declined to the point where some Kibera-based furniture-makers have willingly given up such contracts.[29]

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[29] Such contracts typically involve a large up-front capital outlay to purchase wood, followed by a 60-90 day delay in payment after the shipment is delivered.

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4.3.4 Group Action by Furniture-makers

The above discussion focuses solely on producers as independent actors in the furniture subsector. The research also provided a limited view into the existence of group action on the part of producers. Overall, it appears that group action is very limited, both in terms of procurement of inputs and marketing output. Even in terms of subcontract work, the linkages between enterprises tends to be of a competitive nature. For example, if a furniture-maker takes his chair to a neighboring business for lathe work, the neighbor tends to put that order last in the queu behind all in-house jobs.

Despite the lack of cooperative action, the fieldwork identified the need for group-based interventions, such as the opening of non-Kibera market outlets that could offer the same package of services to customers as the large-scale shops, in particular the popular "buy now, pay later" installment plans. Such action would require large amounts of capital, which is beyond the ability of single producers.

In general, the Kibera environment mitigates against group action of the types seen elsewhere. Kibera residents have a very low level of trust for their neighbors, in part due to the short-term nature of many residents' stay and the lack of family and ethnic ties around which to build trust.

4.3.5 Conclusions on Furniture-making

The above discussion on capital use, level of integration, location of the enterprise, and type of market served captures many of the production decisions facing Kibera's furniture-makers. Greater vertical integration, which has cost and return advantages, depends

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on a regular clientele and a scale of operation that many enterprises cannot maintain in terms of capital requirements and sheer ability to manage. Location of the enterprise affects the level of demand available to enterprises as well as supply-side access to goods and services required for production. Finally, technical skills of proprietors and workers, as well as decisions on types of inputs to use in production, delineate enterprises' ability to enter the higher-quality markets.

4.4 A Description of Shoe-making

Shoemaking firms comprise 12 percent of all manufacturing activities in Kibera. On average, businesses have 1.9 workers, slightly below the average size of manufacturing concerns of 2.2 workers. Since inception, only 32 percent of shoemaking enterprises have added workers, below the manufacturing average of 39 percent of enterprises. Hence, they are a less dynamic group of enterprises than the furniture-making firms examined above.

4.4.1 Demand for shoes

As in the furniture case, Kibera's higher-income consumers tend to purchase their shoes outside of Kibera. Thus, the majority of customers for Kibera's shoes come from the lower-income population. However, in the face of poor economic conditions and falling per capita incomes, Kibera's low-income consumers are turning away from more durable but higher-cost shoes made of leather to lower-cost alternatives made of plastic and canvas. As Kibera-based cobblers are specialized in the production of leather shoes, this points to an overall drop in demand for Kibera-made shoes, while sales of the large-scale mechanized

producers of canvas and plastic shoes have increased. This shift toward mass-produced shoes has been particularly noticeable for women's and children's shoes, while men still tend to buy leather shoes and repair them more frequently. Thus, demand for shoemaking services in Kibera has two basic components: (1) the production of men's leather shoes, and (2) shoe repair.

Demand for these products and services show seasonal patterns. New shoes are purchased primarily around holidays and following the rainy season. Within a month, purchases occur around the middle of the month following pay advances and at the beginning of the month following payday. Between these peak buying periods, demand is strongest for shoe repair services, as consumers attempt to make their current shoes last until their next purchase.

4.4.2 Structure of Shoe-making

There are four central functions that comprise the shoemaking subsector: (1) input supply, (2) production of shoes, (3) retail of shoes, and (4) shoe repair. These functions are briefly outlined below.

Function 1: Input supply

The following materials are found in a typical pair of leather shoes: shoe leather, insole leather, soles, thread, eyes, and glue. Repair work requires the same materials, but in smaller quantities. Prices for inputs vary both by where they are purchased and by quantity. Except for leather, most materials are available within Kibera from several suppliers. While they have

all the necessary items, these shops usually have a poorer selection and higher prices than similar shops in Gikomba or in Nairobi center. However, if shoemakers can find the supplies they want and are only buying small amounts, it is cheaper to buy in Kibera and save the transportation costs of going to town. If buying large quantities, shops in town are more likely to give bulk discounts, providing an additional incentive to take the time to travel into town and to pay transport costs.

Some input suppliers offer credit to regular and trustworthy customers. Credit is easier to establish at the higher-priced Kibera suppliers. However, credit is usually limited to one to five days, a deadline which is difficult to meet if producing for inventory. Therefore, most producers prefer to buy with cash from the lowest cost supplier.

Function 2: Shoe production

Shoe production can be broken into three main steps: cutting pieces from flat leather, stitching the pieces together to make an "upper", then attaching the upper to the sole by gluing and stitching. Shoemakers vary in the number of these steps they undertake, depending on levels of mechanization and skill as discussed below.

Function 3: Retail of shoes

While a small minority of enterprises sell their shoes to city-based retailers who sell to the final consumer, the vast majority of cobblers retail their shoes themselves. In the past, the typical method of retail was to display sample shoes from which orders were taken. Increasingly, however, customers purchase finished shoes from displays, which requires

cobblers to produce for inventory.

Function 4: Repair of shoes

The final function, shoe repair, takes place after the final consumer owns the shoes. All types of shoes can be repaired, including canvas and plastic shoes. However, the bulk of the repair business is for leather shoes, which are often repaired multiple times. Repairs may be as small as patching a hole, or as large as replacing a sole. Returns on small repairs are virtually zero, and are perhaps undertaken as a means of encouraging loyal customers to return, while larger repairs are more remunerative for cobblers.

4.4.3 Categorizing producers

As in the case of furniture-making, four key distinctions appear in shoemaking which explain much of the heterogeneity between producers: capital use, the level of vertical integration, the location of the enterprise, and the market served by the enterprise. These topics are explored below.

4.4.3.1 Capital use

In shoemaking, fixed capital is typically in the form of a sewing machine and the sets of shoe forms for new shoe production. Sewing machines are non-electric treadle machines equipped with a special head and needle that stitches leather. In 1991, new machines cost Ksh. 15,000, while used machines cost Ksh. 10,000, 43 percent more than the rolling lathe machine used in furniture-making. Despite the higher price and lower enterprise returns,

however, fully 28 percent of shoemakers have machines. While skill requirements for stitching may still be sizeable, independence from electricity appears to account for the greater spread of mechanization.

The second form of fixed capital, the mbao, or shoe forms, are critical to the shaping of new shoes. While data are not available on the number of shoe forms each business owns, many of those businesses specializing in repair work plan to move into new shoe production once they can purchase mbao. Each pair of forms cost between Ksh. 200-800, with wide quality differences. A complete set of sizes might include up to 24 pairs of forms, one each for men, women, and children. In addition to the mbao, hand tools (typically made from scrap metal) are used by all businesses.

Finally, businesses must invest to some extent in materials. Low-cost scrap materials are often used in shoe repair, and can be purchased by weight. For new shoemaking, flat leather is sold by piece, typically large enough for five to six pairs of shoes. Such an investment in materials is difficult for the smallest producers, who have the option of buying ready-made uppers by the pair rather than purchasing flat leather. While more expensive on a per-pair basis, it requires less bulky investments in materials. Exacerbating working capital requirements is the increasing trend of consumers to buy shoes from displays rather than by order. Production for displays requires cobblers to produce in higher quantities with more differentiation in terms of sizes and styles, and all at greater risk.

4.4.3.2 Level of vertical integration

Closely tied to the level of capital used in the business is the number of number of tasks undertaken within a business. The most vertically integrated producers are those with sewing machines, who buy flat leather, cut and stitch it themselves, then attach the upper to the sole. An intermediate approach is to buy and cut flat leather, subcontract out the stitching, then attach the completed upper to the sole. Finally, the least integrated method is to buy ready-made uppers from a supplier, then attach the ready-made upper to the sole. While the cobbler must still have an mbao for shaping the shoe, this option requires fewer skills in cutting leather and stitching, and has lower working capital requirements.

Overall, one quarter of producers (those with sewing machines) are fully integrated, and do all steps of shoemaking within their business. Another 48 percent buy flat leather but, in the absence of sewing machines, subcontract out stitching. The remaining 27 percent buy ready-made uppers and undertake only the assemble step of production. Those who use ready-made uppers spend more on materials and less on labor per pair of shoes, thus this method is the exception in Kibera, where capital is scarce.

While all shoemakers interviewed have the ability to make new shoes, fully 43 percent report that they specialize in shoe repair. Two distinctions appear between those undertaking primarily repair and those more involved in new shoe making. First, repair enterprises are markedly smaller than those undertaking new shoe production. The average shoe repair enterprise has one worker, while the business making new shoes has an average of three to four workers. Secondly, sales and profits are lower for repair businesses and appear to be falling over time.

In addition to the fixed and working capital constraints discussed above, two other reasons are given for specializing in repair. First, producers point to a demand shortage, where one cannot count on sufficient customers to ensure that new shoes will sell quickly. Therefore, moving to new shoe production may result in a large percentage of the business's capital being tied up in inventories for an unacceptably long period of time. Secondly, repair work is seen as the "bread and butter" of the shoe business, avoiding the annual and monthly seasonality of the new shoe market, so one can make a more steady living by concentrating on repairs. Overall, then it appears that shoe repair work involves lower risks than new shoe making, both due to lower capital investments and to lower seasonality.

Clearly, the different channels and sub-channels in part reflect different levels of mechanization, where those with the most minimal tools are confined to repair work, and those without sewing machines must decide whether to buy flat leather and subcontract stitching or buy ready-made uppers. But as the discussion above illustrates, these choices also reflect attitudes about risk and general market conditions.

4.4.3.3 Location of the enterprise

Shoemaking activities in Kibera can be categorized by location of the enterprise as well. There are two distinct types of locations in which cobblers are found. First, there are two marketplaces with heavy concentrations of shoemakers: Makina and Line Saba. Roughly 36 percent of all shoemaking and repair businesses can be found in these two areas. Over three-quarters (78 percent) of businesses in these neighborhoods concentrate on making new shoes, while only 22 percent focus on repairs. Roughly half of all businesses with sewing

machines are located in these neighborhoods as well.

Those businesses located outside of the two market areas have quite different characteristics. The majority (59 percent) of businesses concentrate on repair work. Those that do make new shoes produce lower-quality and lower-priced shoes than are found in the markets. In general, these businesses rely on local residents for business, where demand is strongest for repairs. In higher-income areas such as Olympic and Ayany, the local residents use their neighborhood shoemaker solely for shoe repairs, then purchase new shoes in Nairobi center.

As in the furniture case, it appears that businesses in the marketplaces face what was referred to in Chapter III as agglomeration externalities. Again, there are likely to be supply-side externalities of service and supply availability as well as increased competition. On the demand side, the markets are expected to have a larger clientele, due to their visibility and accessibility.

4.4.3.4 Markets served

Over 80 percent of shoe-makers produce exclusively for the Kibera market. While data are sparse, producers report that the number of shoemakers producing for the Kibera market is increasing, while overall demand for new shoes appears to be stagnant and increasingly seasonal as per capita incomes fall and people shift to cheaper substitutes. Ideally, Kibera's shoemakers would search out new markets for their products. However, only 18 percent of shoemakers have entered non-Kibera markets, either in Nairobi or up-country. As was the case in furniture-making, entering larger markets in greater Nairobi

involves low returns in a highly competitive market and poor bargaining power at the level of the individual producer. Shoemakers report that competition for Nairobi markets has bid returns down to near zero, while the risks of such markets have increased. Terms of most contracts allow Nairobi-based retailers to reject entire orders if pairs are not identical in color, styling, and uniformity of stitching. Thus, material requirements as well as skill requirements increase for such markets.

A slight variation within the Kibera market appears by quality of product. Overall, though consumers know about quality differences, only a very small percentage are willing to pay more for a longer lasting shoe. The vast majority prefer to buy cheaper shoes and replace the soles, rather than spend twice the amount for a higher-quality shoe.

4.4.4 Group Action Among Shoe-makers

As in furniture-making, there is little group action among shoe-makers, undoubtedly for many of the same reasons mentioned above. There are a few limited cases where those making new shoes have lent a pair of mbao to someone involved primarily in repairs. However, the borrowers are quick to point out the limits of such arrangements. There were no cases where shoemakers banded together to share transport costs, to purchase inputs in bulk, to buy communal mbao, or to jointly produce for large outside orders.

Indeed, there appears to be a role for an institution to identify and operationalize areas for common action. Creative funding would be required, in order to stock up on inputs and to cover the risks of production for risky markets. One can think of many tasks for a cooperative body: making mbao available for rental for a fee, bulk material purchase, and

short-term credit for inventory development, among others.

4.4.5 Conclusions on Shoe-making

As in furniture-making, an examination of the enterprise's level of capitalization, vertical integration, location, and markets served illuminates the opportunities and risks facing the enterprise. Overall, shoemaking shows very high levels of competition, both in Kibera and non-Kibera markets, with increasing demands for skills and working capital to compete in either market. Complete vertical integration in all stages of production is more common in shoemaking, where mechanization is independent from access to electricity. However, vertical integration still requires more skills, more fixed capital, and more reliable customers than less integrated methods of production.

4.5 Re-examining the Extent of Enterprise Growth

The above discussion suggests that in the Kibera context and within the chosen activities, the analysis presented in Chapter III can be refined to include the enterprise's level of vertical integration, and to more carefully define product characteristics, markets, and enterprise location. Therefore, Equation 3.1 is modified and re-estimated below for the two activities under examination, as shown in Equation 4.1.[30]

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[30] One business was omitted as an outlier from the shoe sample, reducing the number of shoemaking enterprises to 39. This business was omitted due to its abnormally high growth: it had added 30 workers in a three year period.

(4.1) $GROWTH_j = \alpha + \beta_i STARTING\ SIZE_{ij} + \gamma_i AGE_{ij} + \delta_i SECTOR_{ij} + \lambda_i LOCATION_{ij} + \phi_i PROPRIETOR\ SKILLS_{ij} + \psi_i LEVEL\ OF\ VERTICAL\ INTEGRATION_{ij} + \theta_i MARKET\ SERVICED_{ij} + \epsilon_{ij}$

Two new variables appear in Equation 4.1: level of vertical integration and product quality.[31] In addition, three variables which were included in Equation 3.1 are omitted in Equation 4.1: gender, degree of urbanization, and worker skills, two of which were statistically significant in the analysis in Chapter III.[32] Finally, new operational variables have been assigned to several of the variables in Equation 3.1, based on the data available from the retrospective survey. The precise operational variables for Equation 4.1 are described below:

Starting Size:	Number of workers actively engaged in the enterprise at start, including the proprietor.
Age:	The number of years an enterprise has been in operation.
Type of Activity:	Dummy variable, in pooled equation only. Omitted category: shoemaking.
Location:	Dummy variable for whether the enterprise is in a neighborhood with a large marketplace. Omitted category: enterprise is not in neighborhood with a large

[31] Different proxies for product quality are used in the two activities. In furniture-making, quality is determined by type of wood used, where pieces from hardwoods are considered higher-quality, while those made from softwoods are considered lower-quality. In shoemaking, price of the shoe serves as a proxy for shoe quality, where those shoes selling at above average prices are considered higher quality, and those selling below average are considered lower quality.

[32] First, since all entrepreneurs in these subsectors are male, gender is omitted from the equation. Second, because all businesses operate in a dense urban setting, degree of urbanization is omitted. Lastly, a proxy for worker skills is not available in the data set for the two activities.

	marketplace.
	Dummy variable for whether the enterprise operates from within the household. Omitted category: enterprise is not within the household.
Mangerial Skills:	Dummy variable for whether the proprietor keeps written records of sales and costs. Omitted category: proprietor does not keep written records.
Technical Skills:	Number of years the proprietor has been actively engaged in this line of work, whether as apprentice, worker, or proprietor.
Benefits of non-Kibera Markets:	Dummy variable for whether the enterprise actively supplies non-Kibera markets, regardless of extent. Omitted category: enterprise does not serve Kibera markets.
Level of Vertical Integration:	Dummy variable for whether an enterprise undertakes all production tasks within the business or subcontracts some tasks out. Omitted category: enterprise is not fully integrated.
Product Quality:	Dummy variable for level of product quality. Omitted category: enterprise produces items of lower quality.

Using the same dependent variable set out in Equation 3.3, Equation 4.1 was estimated using a log-log functional form. A White test revealed heteroskedasticity related to business age and size. To improve the efficiency of estimates, a weighted least squares procedure similar to the one employed in Chapter III was used for the data set, dividing the sample into four groups according to age of enterprise.[33] Weights were calculated as one over the square root of the average variance of the residuals for that group of enterprises.[34]

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[33] Group 1 comprises 19 enterprises, all one or two years old; Group 2 includes 23 enterprises from three to five years old; Group 3 includes 17 enterprises from six to eight years old; and Group 4 includes 19 enterprises nine years old or older.

[34] The variance of the residual and resultant weight for each group is as follows. Group 1: variance=.09715, weight=3.208; Group 2: variance=.02587, weight=6.219; Group 3: variance=.00856, weight=10.808; Group 4: variance=.00106, weight=30.715.

The results of the log-log equation with weighted least squares correction are presented below, both for the pooled sample and separately by type of activity.

Table 4.1
Regression Results: Net Growth of Two Activities

Variable	Log-Log Equation with WLS Correction		
	Pooled Equation	Furniture Only	Shoes Only
CONTINUOUS VARIABLES			
Firm Starting Size	-.114 (-4.517) [.000]	-.086 (-2.178) [.040]	-.179 (-5.290) [.000]
Firm Age	-.106 (-4.452) [.000]	-.197 (-4.810) [.000]	-.065 (-2.255) [.033]
Number of Years Proprietor has Been in Occupation	-.012 (-.714) [.478]	-.029 (-.902) [.377]	-.030 (-1.646) [.112]
DUMMY VARIABLES			
Type of Activity	.123 (3.381) [.001]	n/a	n/a
Proximity to Marketplace	-.026 (-.863) [.392]	.004 (.075) [.941]	-.069 (-1.856) [.075]
Business operates from the Home	-.037 (-.874) [.386]	-.014 (-.175) [.862]	-.046 (-.968) [.342]
Proprietor Keeps Written Business Records	.063 (1.934) [.058]	.119 (2.033) [.054]	.010 (.284) [.779]
Firm Serves Non-Kibera Market	.003 (-.075) [.940]	-.032 (-.446) [.660]	-.067 (-1.227) [.231]
Firm is fully integrated vertically	.067 (1.801) [.077]	.205 (2.100) [.047]	.064 (1.793) [.085]
Firm makes higher-quality products	.011 (.359) [.721]	-.039 (-.804) [.430]	.017 (.532) [.599]
Constant	.262 (4.096) [.001]	.537 (4.752) [.000]	.257 (3.924) [.001]

Table 4.1 (cont'd).

Variable	Log-Log Equation with WLS Correction		
Sample Size	68	32	36
Adjusted R-Square Statistic	.411	.494	.498
ANOVA F Statistic	5.678 [.000]	4.362 [.003]	4.865 [.001]

4.6 Results of the Analysis

Of note, all three equations have greater explanatory power than the equivalent equation in Chapter III, as shown by adjusted R^2 statistics of above .40 for all equations. This suggests that relationships between business characteristics and firm growth are more closely captured by increasing disaggregation by type of activity. It is interesting to note that fit has improved despite the omission of several variables found to be significant in Chapter III. The extent to which this improvement can be traced to the addition of new variables identified by the subsector studies will be seen below.

Second, there are three key results in Table 4.1 that are consistent with those found in Chapter III. First, the relationship between starting size and growth is negative and significant, though the size of the coefficient varies by type of activity.

Second, the relationship between business age and growth is significant and negative, and again the size of the coefficient varies by type of activity. In general, it appears that shoemaking enterprises show a stronger size response than do furniture-making enterprises, while furniture-making businesses show a stronger age response.

Third, as in Chapter III, it appears that different activities grow differing amounts.

In this sample, furniture-making grows markedly more than does shoe-making, the omitted category. The overall trend for shoemaking concerns to grow less than furniture-making businesses may in part point to different economies of size in the two activities. There is less need for specialization of workers by task in shoemaking. In addition, with shrinking demand for Kibera shoes, it may be the most appropriate response for shoemakers to operate at the lowest possible efficient size as a risk-avoidance method.

Locational issues also affect amounts of growth. As in Chapter III, businesses located within the home grow less than those located outside of the home, however the relationship is not statistically significant at the .20 level. From the size of the coefficients it appears that shoemakers show a larger negative response to being located within the home than do furniture-makers, reflecting the importance of visibility to compete successfully in shoemaking. However, shoemakers also show a negative growth response for enterprises located near major Kibera markets, suggesting that these locations are highly competitive. Thus, to grow, it appears that shoemakers must find a suitable location which is visible but away from the bulk of competitors.

Proprietor managerial skills, operationalized as the maintenance of written records, also play a role in growth, particularly for furniture-making establishments. In furniture-making, proprietors keeping books show more growth than those that do not keep books. In shoemaking, while the relationship is positive, the coefficient suggests only a one percent higher growth for those keeping financial records. This dichotomy may reflect the size differences in the two activities, where larger furniture-makers may have greater need for written records to stay informed about business health. It may also reflect the greater

seasonality in furniture-making, where money management is critical in order to remain in operation during periods of low demand.

Level of vertical integration is also strongly related to amount of growth, where fully integrated producers in both activities show higher growth than non-integrated producers. This points to the complementary role of capital and labor in these enterprises, where all fully integrated producers have at least one piece of machinery. It may also indicate that by vertically integrating, producers lower production risks related to quality and timing that often appear when subcontracting parts of the production process, thereby allowing the business to increase production without increasing its exposure to supply-side risk.[35]

Two other findings of interest bear mention. While not statistically significant, both furniture-making and shoemaking show a negative relationship between entering the non-Kibera market and growth. This suggests that risks in these markets are indeed higher than the rewards, and that the decision of producers to not serve such markets under existing arrangements may be rational. Second, the results show that businesses making higher-quality products do not show more growth than those producing low-quality products. Indeed, the coefficient in furniture-making is negative, suggesting that those using hardwoods are growing less than those using lower-quality softwoods. In shoemaking as well, those making lower quality shoes appear to be growing slightly more than those making longer-lasting shoes, as would be expected from the general demand trend toward cheaper shoes noted in

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[35] It is also possible that level of vertical integration is endogenous to the business growth equation. Specifically, businesses may increase level of integration and number of workers simultaneously as part of a single expansion plan. In such cases, it would be incorrect to ascribe causality of the growth in the workforce to vertical integration. In order to untangle causality, time-series information is required that identifies whether vertical integration preceded, accompanied, or followed expansions in the workforce.

Section 4.4.1. In both activities, this points to the declining purchasing power of the poor Kenyan consumer.

In conclusion, disaggregating further by type of activity has served to clarify the role of activity-specific variables, such as choice of location and quality of inputs in attracting customers, and of vertical integration or bookkeeping on the production side. In the end, while these results all suggest that different supply and demand characteristics influence growth in each activity, the relationships predicted by theory -- age, size, and sector -- hold when examining specific activities as they did in Chapter III.

CHAPTER V:

THE PROCESS OF ENTERPRISE GROWTH

In Chapters III and IV, the analysis focused on the extent of business expansion. Net growth over time was used as the variable to be explained for two reasons. First, examination of net change factors out year-to-year variations in size that can obscure the medium-term expansion patterns of the enterprise. Second, the data on number of workers used in Chapter III were available for two time periods only -- the time of the surveys and the time at which the enterprise started -- which limited the use of the data to an examination of net enterprise expansion only.

However, use of net growth as presented in the previous chapters has two potentially significant weaknesses. First, measuring size in only two periods and averaging across the number of years an enterprise has been in operation implies that the business has traveled a linear path of growth. This may be a heroic assumption, as entrepreneurs learn, succeed, fail, and respond to numerous outside shocks. Indeed, by examining long-term (net) responses of demand for labor to the various regressors may mask true short- and medium-term labor demand effects. As a result, unless current conditions have been fixed since the enterprise started, coefficients for net labor response over the longer-term can be expected to be unreliable estimators of short- or medium-term responses.

Second, in both Chapters III and IV, total net growth was regressed on current

enterprise characteristics. This practice was based on lack of information about the enterprise preceding growth, as well as on the expectation that conditions in the enterprise have not changed over time. However, this convention raises questions of endogeneity and the direction of causality between growth and these characteristics. While the analysis in Chapters III and IV still has predictive power, there are logical reasons to look for data sets which provide information on the conditions facing the enterprise before growth occurs. Such data sets would provide stronger arguments for causality, and possibly better predictive models for assessing current enterprises' ability to grow in the future.

There is merit, then in analyzing the process of enterprise growth by looking at time series data that illuminate period-by-period conditions in an enterprise and the absolute changes in the workforce that accompany these conditions. Specifically, such data would provide an opportunity to examine several questions:

- Which pre-existing conditions lead to greater employment creation? Conversely, which conditions lead to reductions in employment?
- Is the process of workforce expansion linear over time, or does it follow a different pattern?
- To what extent can business growth be sustained from period to period?

This chapter will deal with each of these questions.

5.1 Introduction

Economic theory predicts that demand for labor is derived from consumers' demands for final goods and services and from production conditions such as factor prices and types of technology available. As these demand and supply patterns shift in response to changes in industry structure, technology, and consumer tastes and income, the amount of labor businesses require will also vary. Proprietors, attempting to maximize profits, will respond to marginal changes in product demand and factor prices by adding workers in certain time periods and reducing their workforce in others. These business-level responses to such forces are unlikely to be instantaneous, but rather will occur in the short-to-medium term, given the time requirements of information dissemination, labor search or downsizing, and retooling.

In addition to the relationships outlined in neoclassical theory, labor demand may be dramatically and suddenly affected by unexpected shocks to the business. Hamermesh (1993) points to the need to incorporate analysis of shocks into empirical work on labor demand in addition to the marginal changes predicted in the neoclassical model. Indeed, shocks may constitute an important determinant in the demand for labor, and given their sudden nature, may account for short-term changes in labor demand that are not directly linked to changing industry or macroeconomic conditions. Examples of such shocks in the Kibera case include business demolition, theft, or a serious illness of the proprietor.

Finally, as discussed in earlier chapters, the amount of labor hired by a given business depends on the entrepreneur, his goals and abilities. From a time-series perspective, the bundle of skills embodied in a proprietor will evolve over time, as he gains experience, takes on new tasks, and acquires new skills.

The goal of this chapter is to examine which of these elements lead to an increase or decrease in the number of workers in any given time period. Section 5.2 discusses the data used for the analysis, while Section 5.3 examines the analytical method chosen for the analysis. Sections 5.4 and 5.5 present the equation and the results of the analysis. Section 5.6 looks more closely at the determinants of growth for different subsets of the sample. Section 5.7 takes a closer look at the influence of age and size on growth. Finally, Section 5.8 presents concluding comments on the chapter.

5.2 The Data

In 1991, extensive retrospective business histories were recorded for 40 shoemaking and 39 furniture-making concerns. Each proprietor provided a detailed history of his enterprise from start through the current period. In addition to listing all individuals who worked in the enterprise, their length of tenure and the nature of their employment, each respondent provided a chronology of types of products produced, types and sources of inputs, types of markets served, production techniques, managerial systems, and problems encountered. Special attention was given to highlighting years in which changes were made in any of these areas. In addition, the respondents provided extensive information about their own backgrounds.

Few if any of the proprietors kept written records of any kind, therefore all questions were answered from memory. As a result, no information was requested on past product prices, wages, or value of sales. In addition, given the low level of borrowing or mechanization, no attempt was made to capture data on the cost of capital. As a result, many

of the elements of a formal labor demand model were not captured in these interviews. However, the detailed firm history provides a time-series perspective on when the workforce expanded or contracted and to what extent, and what changes in the enterprise coincide with or precede changes in the workforce.

On the basis of this time-specific information, the retrospective surveys were transformed into a time series data set for a cross-section of 79 firms. Given the different ages of the firms at the time of the interviews, information exists for multiple age cohorts, each with a fixed number of observations corresponding to longevity in 1991. Complete age-specific data are available only for the oldest cohort. Table 5.1 shows the number of businesses with observations for a given age.[36] For each additional year, data are available for a smaller number of firms. Sample size only becomes a serious constraint after year ten, when sample size falls below fifteen observations. Therefore, to ensure a reasonable sample size for each age period, the analysis in this chapter is restricted to firm histories for the first through the tenth year in operation only. By truncating the analysis at age 10, total sample size is reduced from 479 to 437.[37]

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[36] Since each year of each business provides one observation for the analysis, sample size is determined by adding the number of observations vertically. Thus, for all businesses, total possible sample size is 479.

[37] The analysis in Chapter IV omitted one shoemaking concern which had a markedly atypical growth history. For consistency, the same firm is removed from the analysis in this chapter. As the outlier was only two years old at the time of the survey, the omission has the effect of removing two observations, bringing the truncated sample from 439 to 437.

Table 5.1
Number of Enterprises with Observations for a Given Age

Age of Enterprise	# Enterprises at least this age in Shoemaking	# Enterprises at least this age in Furniture-making	# Enterprises at least this age in Total Sample
1	40	39	79
2	39	38	77
3	30	30	60
4	27	27	54
5	21	22	43
6	16	19	35
7	16	15	31
8	13	13	26
9	10	9	19
10	6	9	15
11	6	7	13
12	6	5	11
13	4	3	7
14	3	2	5
15	2	2	4
TOTAL	239	240	479

As discussed by Peters (1988), data from retrospective surveys differ from those collected through traditional panel survey methods, which influence how their results should be interpreted.[38] There are two particular strengths that retrospective data have over traditional panel data sets. First, since information is collected on all enterprises since inception, growth can be examined for an age cohort. For example, all enterprises can be examined for their experience in the first, second, or subsequent year. Second, retrospective data ensure that all key events of interest in the enterprise's history will be captured, since all experiences to date are recorded. This has the additional benefit of allowing multiple events to be included in the analysis. In traditional panel surveys, on the other hand, respondents are typically asked about current conditions or changes in conditions since the last interview. Even if they are all of the same age cohort, events prior to the period in question are typically ignored, thus a view of the entire life cycle is foregone. In addition, multiple events are often missed, which hinders a view of how early events may affect the nature of subsequent events.

Despite these reasons for using retrospective data, such data sets also have several drawbacks. The first, cited by Peters (1988) and Mason and Fienberg (1985), is memory decay, where more distant events are subject to greater recall error. Other common problems are telescoping of events, which alters the time periods in which events are reported, and selective reporting, particularly of troubling experiences.

Whether collected through a traditional panel survey or with retrospective interviews, however, the data provide a time series both of the dependent variable and of explanatory

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[38] The traditional method of conducting a panel survey is to repeatedly survey the same group of respondents in multiple time periods, thereby constructing a time series and cross-sectional data set.

variables of interest. It is then possible to regress the dependent variable on exogenous variables and pre-existing endogenous variables for a given time period, removing the problems of endogeneity referred to above.

5.3 Analytical Method

In analyzing the panel data set, a choice was made between two techniques. The first option was to examine the effect of exogenous and pre-existing endogenous variables on the absolute amount of business growth in a given period. Such an equation would be estimated with ordinary or generalized least squares techniques, where the dependent variable would be the absolute amount of change in each period. For pooled time series and cross-sectional data, one appropriate method is the ANCOVA (Analysis of Covariance) model summarized by Dielman (1989), which is discussed in greater detail below.

The second option was to estimate the likelihood of enterprise expansion or contraction in a given time period, given a set of conditions. In this model, the dependent variable would be an ordered multinomial dichotomous variable and the equation would be estimated using a multinomial ordered logit method.

In choosing between the two models, the data were examined to see which analytical methods could be supported. Of greatest concern were the sample size and the frequency distribution of the dependent variable. Examining only changes in non-apprentice labor, 78 percent of all annual observations showed no change in business size, while 9 percent showed contractions and 13 percent expansions. Following the guidance of Maddala (1992), logit analysis was ruled out due to the imbalance of observations in the three categories.

Alternatively, the multinomial ordered logit would require a sample size well above the 437 available.[39] As a result, the analysis presented below uses the ANCOVA method.

5.3.1 The ANCOVA method

ANCOVA models were designed for the analysis of pooled cross-sectional and time-series data to improve upon the classical pooling of observations across individuals and time periods. Rather than treating all observations as independent, vectors of dummy variables are added to the analysis to indicate each time period and individual (or group of individuals). Dielman (1989) writes:

> The use of the dummy variables is an attempt to adjust for the missing independent variables which produce the individual and time effects. The equality of the slope coefficients from one cross section to another is accepted, but it is assumed that the intercepts differ. (p. 50)

The ANCOVA method was proposed by Kuh (1959) following his observation that parameter estimates for panel data aggregated over time differed markedly from those for the same data aggregated over individuals. Thus, an improved method would separate shorter-run time effects from longer-run individual effects. In addition, by removing the individual and time effects from the error term, parameter estimates would become more efficient.

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[39] According to Maddala (1992, pp.330-331), to estimate a logit model, one must either have a very large data set or sample disproportionately to have enough observations fall into the different categories. It is not acceptable to get around these difficulties by weighting observations in the logit estimation procedure.

5.3.1.1 Identifying time-related effects

Developing the ANCOVA model required identifying an appropriate vector of time-related dummy variables that would capture the time-varying nature of growth. Three possible vectors were identified and tested in turn. The first vector categorized businesses by year of start, testing for growth variation between different birth cohorts of businesses. As discussed by Ryder (1985), cohorts capture generational characteristics in the broadest sense, suggesting that proprietors entering business in the same time period will bring similar perspectives and experiences, which will affect how they undertake business. Rather than using a year-by-year classification of birth cohorts which assumes that generations last but one year, the sample was broken into four birth cohorts: those enterprises started before 1982, those started between 1982 and 1984, those started between 1985 and 1988, and those started after 1988. The breaks between cohorts were identified as those years in which macroeconomic transitions occurred, where those starting business prior to 1982 or between 1985 and 1988 would be operating in more optimistic business environments, while those starting between 1982 and 1984 would face less hopeful conditions. The omitted category, those starting in 1989 or 1990, represents businesses starting in a period of greater uncertainty, with new economic and political upheaval.

The second time-related vector categorized observations by year of operation, capturing period effects. In fact, a period variable rolls together the effect of the myriad economic, social, and political forces affecting all businesses in a given year, such as level of competition in the industry, consumer demand, inflation, political stability, and the innumerable other characteristics influencing the business environment in a given period. The

tested vector included one dummy variable for each year from 1981 onward, and a single dummy for all years prior to 1981. The omitted variable is for the most recent year: 1991.

Finally, the third time-related vector captured age of enterprise. This vector tests whether there is a common pattern of growth that depends on enterprise age, as predicted by the results of Chapters III and IV. One dummy variable is added for each year of operation except year one, which is excluded.

In total, the tested vectors represent all three of the time-related effects of age, period, and cohort included in APC (or age-period-cohort) models now common in the social sciences.[40] To examine the relevance of the three vectors, the basic equation was estimated including each of the vectors in turn, then F-tests were performed to examine the explanatory power of each vector. The results of the tests are presented in Table 5.2 below, where the null hypothesis states that the vectors have no effect on amount of growth.

Table 5.2
Significance of Time-Related Dummy Variable Vectors by Category

Vector Classification	F-Statistic	Test $F_{(.01)}$ Value	Is H_0 accepted or rejected?
Birth cohort	2.48 (df=3,421)	3.78	Accepted
Year of operation	0.61 (df=11, 414)	2.32	Accepted
Age of Enterprise	1.43 (df=9, 415)	2.41	Accepted

[40] See, for example, Mason and Fienberg (1985), who explore the specification and implementation of APC models.

In each of the three cases, the null hypothesis is accepted, indicating that none of the three vectors significantly improve the fit of the equation. Indeed, the inclusion of the vector for year of operation actually worsens the fit of the equation, as evidenced by the F-statistic of less than one. Even before the complete analysis, then, it appears that year of enterprise birth, year of operation, and age of business have little effect on the amount of growth experienced in a one-year period.

5.3.1.2 Identifying individual effects

For the individual effects, a vector of 78 individual effect dummy variables placed too great a demand on degrees of freedom, thus was not used in the analysis.[41] Instead, a three-variable group effect vector of ethnic background was used in the hopes that it would capture differences in training individuals may have received regarding entrepreneurship. Like the time-related vectors, it too was insignificant when tested with an F-test and was subsequently removed from the analysis. As an alternative, a set of individual characteristics was added to the analysis as continuous and dichotomous independent variables on the individual's level of formal education and experience. However, it is recognized that the truly unique characteristics of each individual entrepreneur, such as risk aversion or business purpose, remain captured in the error term along with other missing variables in the analysis.

Given the lack of significance of time effects, and the inability to include a complete vector of individual effect dummies, the ANCOVA model collapses to a classical pooling

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[41] While the "errors component model", a generalized least squares differencing method, remedies this problem, it requires a longer time series than is available here (Dielman, 1989).

model. This assumes that the intercept for each time period and individual is not unique, but *is* common across all time periods and individuals once other independent and lagged dependent variables are held constant.[42]

5.4 Description of the Equation

Much as in Chapters III and IV, the analysis below attempts to relate absolute amount of growth to a set of independent variables. Using a panel data approach allows the inclusion of two types of data that were not available in previous chapters. First, the panel data allow the inclusion of lagged endogenous variables. Second, the data provide an opportunity to include time-varying independent variables, such as per capita income of consumers or the proprietor's ever-increasing level of experience.

5.4.1 The dependent variable

Since the ANCOVA and the classical pooling models use a continuous dependent variable, in the analysis below the dependent variable is the absolute change in the number of non-apprentice workers in the business in a calendar year. Apprentices are omitted from the analysis because they represent temporary changes, as most stay only for an agreed-on training period.[43]

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[42] Dielman points out that if intercepts do, in fact, differ between individual units, which leads to biased estimates in the pooled model, this may be an acceptable cost in order to reduce the individual estimator variances.

[43] This omission was made despite the fact that apprentices constitute roughly half of all worker intakes and outflows in a business. Over time, the number of apprentices in a given business remains roughly constant, but on a period-by-period basis they introduce a great deal of variation in business size.

5.4.2 The independent and lagged dependent variables

In the analysis below, the regressors can be categorized in the following six groups: macroeconomic, community, and industry conditions, business characteristics, entrepreneur characteristics, and external shocks. Each of these categories is examined in turn below, including a description of the chosen operational variables.

a. Macroeconomic conditions.

One parameter accorded great influence in demand theory is income elasticity of demand, where changes in consumer income levels affect the demand for a given good or service. For normal goods, income elasticity of demand is positive, where as incomes rise more of those goods are demanded. For inferior goods, increases in income may lead to a reduction in demand, as consumers shift to more desirable alternatives. In addition, the income effect may be stronger for one set of products than for the other. Demand for basic necessities, such as food and clothing, is unlikely to drop as much in response to a decline in income as would demand for luxury goods. For the two activities examined here, shoe-making businesses, which produce a basic consumable, are expected to show a smaller response to income changes than furniture-making enterprises, which make products considered to be luxury items by very poor Kibera consumers.

In the analysis below, the macroeconomic income effect is operationalized as the annual real change in national per capita gross domestic product. The data series is developed from data published by the UNDP (1992). The signs of the relationships are expected to be positive, as both sets of products are considered normal goods.

b. Community conditions.

Community-level, or Kibera-specific, variables capture local conditions of both supply and demand. The first community variable examines agglomeration externalities, as discussed in Chapter IV, where those operating in Kibera's market areas are expected to face both a larger market and stiffer competition than those in more remote neighborhoods. While this variable was found to be insignificant in Chapter IV, it is useful to include it again when analyzing panel data.

Second, the conditions in Kibera as a whole have changed over time. Population and population density have increased, but so have levels of competition in the two activities of interest. New services have appeared in Kibera, such as electricity, which in turn brought services relying on electrical machinery. Based on the reports of the 79 respondents, 1989 appears to have been a pivotal year in Kibera. That is the year in which producers report a dramatic increase in the number of competitors. It is also the year in which electricity lines were extended into Kibera, though only into a few neighborhoods.

In the analysis below, two operational variables are included for community characteristics of Kibera. First, a dummy variable is included for business location. Enterprises in neighborhoods with a major market are coded as "1", while those in other neighborhoods are coded as "0". Second, a dummy variable is included that captures the key year of 1989. All years prior to 1989 are coded as "0", while 1989 and later years are coded as "1".

c. Industry conditions.

As in the analysis of earlier chapters, it is expected that conditions in an industry affect individual business's ability to grow over time. Industry conditions of influence may include types, sources, and costs of inputs, levels of competition, types of markets serviced, and demand for products. Indeed, the questionnaires provided a wealth of information about conditions in each activity. However, given the desire to use common variables for analysis of a pooled sample as well as the need to conserve degrees of freedom, a single dummy variable is added to the equation for type of activity. Furniture-making enterprises are coded as "1" and shoemaking enterprises as "0". Should the coefficient for the dummy variable be significant, however, it will prove impossible to identify the specific industry characteristics that lead to the observed growth effect.

d. Business characteristics.

Amount of labor used is but one of many characteristics of an enterprise, all of which interact and evolve over time. Thus, the challenge in examining the effect of business characteristics on employment is to remove the endogeneity between changes in labor and other changes occurring in the enterprise. This can be accomplished by using only pre-existing business conditions in the analysis of demand for labor.[44] Given the time series

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[44] In addition, several business characteristics used in Chapter IV are omitted in this analysis due to the difficulty in determining the direction of causality, even with the use of lagged variables. For example, changes in marketing and management techniques are omitted because changes in these variables may be responses to labor changes in previous periods, rather than the cause of future labor decisions. For example, several proprietors reported that they stopped keeping written records after downsizing their workforce, since the proprietor then had personal recollection of all purchases and sales and no longer considered books worth the time required. In such a case, causality is clearly the reverse of what is being

nature of the survey, it is possible to regress growth in a given year on the conditions of the business in previous periods. For the equation below, a one-year lag effect is used to solve the endogeneity problem.[45] This practice assumes that the lag effect takes place within a one-year period. Depending on the variable of interest, such a lag may be either too short or too long. Practicality, however, dictates use of the one-period lag, since it both helps solves the endogeneity problem and leaves sample size intact.[46]

Three business characteristics are included in the equation: age of business, size of business, and level of mechanization. Chapters III and IV both identified strong negative relationships between age and net growth and business size and net growth. However, given that the analysis was cross-sectional, it was impossible to chart the path of the age and size effects over time. By including these variables in panel data analysis, it is hoped that more can be learned about the path of growth as age and business size change.

In terms of age, the vector of dummy variables was found to be insignificant, as reported in Section 5.3.1.1 above. However, given the significant age-growth relationship found in Chapters III and IV, it is important to include age in this analysis as well, but without using the degrees of freedom required for the vector of dummy variables. Instead, this

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tested here.

[45] The first year of business operation is counted from January 1 of the first full calendar year of business operation. Thus, the lagged variables for observations on the first year are those conditions in the business during the partial birth year. This technique has the salutary effect of allowing a one-period lag structure without reducing sample size, since all enterprises have a birth year not included in the analysis.

[46] Use of a more extended lag structure drastically reduces sample size. A two-period lag structure results in the omission of all year-one observations, while a three-period lag results in the omission of both year-one and year-two observations.

analysis uses a continuous variable reporting the age of the enterprise for the year of observation, comparable to the age variables included in Chapters III and IV. Because age of the business does not change regardless of amount of growth in any given period, it is an exogenous variable.

Enterprise size is operationalized as the total number of non-apprentice workers in the previous period. One can hypothesize that given managerial, market, or capital constraints, the larger the enterprise in any one period, the less likely it is to add workers in the subsequent period. If true, this would result in the negative relationship shown in Chapter IV, but would be a more powerful finding in that it ties change in a given period to the size in the immediately preceding period rather than to size at business start.

Enterprise size is also closely related to the variable measuring change in the number of workers in the previous period. Indeed, the two variables are statistically correlated at the .001 level, therefore size may serve as a reasonable instrumental variable for the amount of change for the same period.[47] As a proxy, the size variable will test whether proprietors continue on an expansion or contraction path over two periods (as manifested by a positive sign on the coefficient), or whether changes in one period are halted or even reversed in the subsequent period (as manifested by a negative sign on the coefficient).

The last enterprise-level variable of interest concerns changes in the firm's level of mechanization. There are three possible labor demand responses to an increase in mechanization: (1) demand for labor may not change, but existing workers may become more productive, (2) demand for labor may fall as machines replace workers, or (3) additional

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[47] It is necessary to use a proxy for change in workers because the variable cannot be calculated for year one observations.

workers may be hired, either to bring in required machine operating skills or to raise production to a level that utilizes the machinery at full capacity. The sign of the relationship between changes in mechanization and subsequent labor demand will determine which of these scenarios is most applicable for each type of activity. In the equation below, mechanization is operationalized through a dummy variable for whether a business added a machine in the previous period.[48] For shoe-making, the purchase of a sewing machine is considered "mechanizing", while for furniture-making, businesses can mechanize by adding either a rolling lathe, a circular saw, or a band saw.

e. Entrepreneur characteristics.

The interest and ability of an entrepreneur to bring on new workers depends on a complex set of skills and preferences of the entrepreneur. Two key characteristics expected to play a role in this process are level of education and amount of previous experience, and are included in the equation below.

As opposed to the cross-sectional analysis, in the time-series equation level of experience is no longer a fixed variable. Instead, it varies over time as the proprietor builds experience. Specifically, for each year in business the proprietor increases his years of experience by one. In early versions of the equation below, a continuous variable of years of experience was used. However, the coefficient for this variable displayed a great deal of instability. This suggested that the relationship between growth and experience may not be

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[48] In the case of mechanization, a one-period lag may be too long, as new workers may be hired at the same time as machines are installed. Nevertheless, to avoid endogeneity, the lagged relationship is used.

linear, and could be better captured by identifying critical levels of experience, or turning points, in the relationship. To test for these turning points, dummy variables were created for each level of experience, then the equation was estimated with each dummy variable separately.[49] The results showed that the bend in the experience curve falls at seven years for proprietors in both types of activity, where those with seven or more years of experience have markedly higher growth than those with less than seven years of experience. Rather than a continuous variable, this dummy variable is included in the final equation below. All observations where the proprietor has seven or more years of experience are coded as "1", while other observations are coded as "0".

Examination of the continuous variable for years of formal schooling shows a similar pattern. While the sign of the coefficient on education is always positive, the significance level differs by sample subgroup, suggesting that the minimum education level necessary for growth differs among subsets of the population. As a result of this finding, a two-variable dummy vector was substituted for the continuous variable. While the omitted category is "some primary education", one dummy variable is coded "1" for all those who completed primary school without going on to secondary school, and "0" otherwise. The second variable is coded "1" for all entrepreneurs who went on to complete some secondary schooling and "0" otherwise. It is likely that the coefficients of these variables will capture two effects. One is the direct effect of the additional schooling from finishing primary or going on to secondary school. However, if one accepts that certain traits in an individual lead them to persevere in school, then those that complete primary school or go on to secondary

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[49] This technique estimates experience as a "spline function", where the linearity assumption is dropped. See, for a discussion on the use of spline functions, Kennedy (1986).

school may have a different set of underlying capabilities than those who do not complete their primary education. If so, then the coefficients will also capture the underlying traits that lead some people to pursue more formal education.

f. External shocks.

Following Hamermesh's (1993) advice to include the effects of external shocks in the analysis of labor demand, the questionnaires were reviewed for sudden events common to several respondents. Three such events appeared:

- Theft of tools, materials, or finished products.
- Demolition of the enterprise, either by government bulldozers or by fire.
- Sudden illness or death of the proprietor or a family member.

Response to these shocks is reported to be instantaneous in all cases. After a theft, the business shuts down until capital can be raised to replace the stolen tools or goods. After demolition, the business closes until new premises can be found and any lost tools replaced. Illness or death of a family member typically results in an immediate but temporary closure of the business as well as the withdrawal of capital for payments of personal expenses. In the few cases where proprietors took loans for their business, they were inevitably recovering from one such shock, hoping to rebuild inventories and thus reestablish a customer base.

In the equation below, one dummy variable is included for each of the shocks mentioned above, where a "1" indicates that the shock occurred in that time period, and a "0"

indicates that it did not. Due to the immediate effect of the shock on the business, shocks are included for the same time period as the growth under analysis. This should not introduce concern about endogeneity, however, due to the unexpected nature of the events.

5.4.3 The Equation

The final equation, then, includes all of the variables discussed above, and can be written as:

$$(5.1)\ GROWTH_{it} = \alpha + \beta CONSUMER\ INCOME_t + \gamma COMMUNITY\ CONDITIONS_t + \phi TYPE\ OF\ ACTIVITY_i + \delta BUSINESS\ SIZE_{i,t-1} + \pi BUSINESS\ AGE_{it} + \theta MECHANIZATION_{i,t-1} + \zeta PROPRIETOR\ EDUCATION_i + \lambda PROPRIETOR\ EXPERIENCE_{it} + \psi EXTERNAL\ SHOCKS_{it} + \epsilon_{it}$$

Table 5.3 provides the results of the equation for the pooled sample and for each activity separately.

Table 5.3
Regression Results: Panel Data Set by Activity

Variables	Sample		
	Shoemaking	Furniture-making	Pooled Sample
MACROECONOMIC CONDITIONS			
Change in per capita GDP	.005 (.945) [.346]	.013 (1.008) [.315]	.011 (1.528) [.127]
COMMUNITY CONDITIONS			
Marketplace location (Neighborhood with major market=1)	-.008 (-.136) [.892]	-.000 (-.001) [.999]	.029 (.383) [.702]
Post-1988	-.068 (-1.111) [.268]	.258 (1.613) [.108]	.101 (1.266) [.206]
INDUSTRY CONDITIONS			
Type of activity (Furniture=1)	--	--	.215 (2.453) [.015]
BUSINESS CHARACTERISTICS			
Number of workers in last period	-.154 (-3.666) [.000]	-.135 (-3.480) [.001]	-.119 (-4.740) [.000]
Age of business	-.013 (-.871) [.385]	-.045 (-1.424) [.156]	-.035 (-2.012) [.045]
Change in level of mechanization	.431 (2.963) [.003]	.418 (.837) [.404]	.383 (1.730) [.084]
ENTREPRENEUR CHARACTERISTICS			
Did not complete primary school -- Omitted	--	--	--

Table 5.3 (cont'd).

Variables	Sample		
	Shoemaking	Furniture-making	Pooled Sample
Completed primary school	-.082 (-1.290) [.200]	.256 (1.551) [.123]	.094 (1.097) [.273]
Completed some secondary school	.070 (.713) [.477]	.560 (2.100) [.037]	.358 (2.734) [.007]
At least seven years of experience	.145 (1.937) [.054]	.262 (1.419) [.158]	.214 (2.186) [.029]
EXTERNAL SHOCKS			
Theft	-1.010 (-4.834) [.000]	-1.361 (-2.753) [.006]	-1.151 (-4.339) [.000]
Demolition	-.176 (-1.063) [.289]	-.764 (-1.348) [.179]	-.436 (-1.736) [.083]
Death/illness	-.203 (-1.368) [.173]	-.798 (-1.824) [.070]	-.467 (-2.211) [.028]
Adjusted R^2	.201	.097	.110
F-statistic	5.569 [.000]	2.948 [.001]	5.147 [.000]

5.5 Results of the Basic Equation

The first finding of note is the poor fit of the equation, as evidenced by low adjusted R^2 statistics for all three equations. Indeed, this equation captures only ten to 20 percent of the variation in the dependent variable, compared to roughly 50 percent of the variation captured in the cross-sectional analysis in Chapter IV. Since both chapters analyze the growth of the same firms, this may suggest that much of the yearly variation in labor use is "noise", or short-term changes in size that do not identify a longer-term growth pattern. It is also expected that much of the unaccounted for variation in annual growth is due to omitted variables. Some of the known omitted variables include innate entrepreneurial ability, taste for risk, and desire for growth; wage rates; the availability of acceptable and trustworthy workers; and product prices relative to costs of production.

Increases in per capita income do not show a statistically significant effect on business growth, however the coefficient on change in per capita GDP is positive in all cases. As predicted, the coefficient for shoemaking is smaller than for furniture-making, though the difference is negligible.

The growth response to the community variables is similarly weak. Businesses located near major markets do not grow significantly more than those far from markets, nor do they grow significantly less. Similarly, the pooled sample does not show 1989 to be a watershed year, as implied by the respondents. However, the results in the non-pooled samples suggest an activity-specific response to the changes that took place in 1989. Furniture-making, an industry depends more heavily on the electricity that arrived in Kibera in 1989, shows greater growth taking place in 1989 and after. Shoemaking, which has no such dependence on

electrical machinery, exhibits less growth from 1989 onward as competition increases, however the relationship is not statistically significant.

As in Chapter IV, type of activity remains a significant determinant of growth. The coefficient in the pooled equation reveals that, on average, furniture-making enterprises add .2 workers more per year than do shoe-making enterprises, or one more worker over a five-year period. In addition, the non-pooled equations reveal that businesses in the two activities show dissimilar growth effects from different levels of education, experience, and mechanization, as discussed below.

The results show that the size of the enterprise in the previous period is significantly and negatively related to growth, confirming the findings of Chapter IV. This suggests that businesses that are larger in one period grow less in the subsequent period, while smaller enterprises grow more in subsequent periods. Because size is also a proxy for amount of change in the previous period, this finding also suggests that if entrepreneurs add workers in one period, they are unlikely to continue on a growth path in the subsequent period. Conversely, if a business loses workers in one year, it is unlikely that additional workers will be lost in the following year. These issues will be re-examined in more detail in Section 5.7.

From the results of the pooled sample, it appears that growth is negatively related to business age, confirming the finding of Chapter IV. While still negative, the statistical relationship is insignificant for either furniture- or shoe-making separately. This suggests that there is not a common response to age, and that the life cycle pattern of growth may vary by population subgroup. This topic is discussed at greater length in Section 5.7 below.

The data also point to a growth response subsequent to the purchase of new

machinery. The relationship is positive in all equations, suggesting that machinery is not labor displacing. However, it is only statistically significant in shoemaking, suggesting that new workers are required in shoemaking to bring the increasingly mechanized business up to an efficient output level. In furniture-making enterprises, which typically start out larger, there may be less need to increase the number of workers following machinery purchase, leading to the positive but insignificant result.

And what effect do entrepreneurial characteristics have on growth? First looking at education, the pooled sample shows that whether proprietors have some and all primary schooling has only a small impact on growth. However, those entrepreneurs who have gone beyond primary school show much higher levels of growth, adding .36 workers more each year than those that did not complete primary school. The "education benefit", however, appears to be activity-specific. Shoemaking enterprises show insignificant growth resulting from increased education. On the other hand, furniture-making enterprises show a strong response to education. While there is a small positive response to finishing primary school (on the order of .25 workers more per year), there is a dramatic growth response to going on to secondary school, where such businesses add an additional worker every two years over the growth shown by the group that did not complete primary school. Again, it is possible that level of education captures an underlying set of abilities or personality traits that both propel a person further in school and into growth strategies in business. However, were this true, one would expect such a trend to appear for entrepreneurs in both activities. Instead, the results suggest that the educational curriculum has indeed passed on skills that are useful to proprietors, particularly those in furniture-making.

As expected, experience also has a positive effect on growth. The relationship is statistically significant both in the pooled sample and in shoemaking. In furniture-making, while significant at the .16 level only, experience also shows a definite positive effect on growth. Thus, while shoemakers may rely more heavily on skills developed through experience to achieve business growth, furniture-makers may show the benefit of a mix of education and experience to grow. Their overall greater reliance on skills acquired through schooling may reflect the greater need for capital management in furniture-making (due to the high cost of inputs and greater demand seasonality) that requires greater numeracy or organizational skills than in shoe-making.

Finally, the data point to the powerful effect of outside shocks on business growth. All three shocks produced strong, negative effects on the size of the workforce, which generally held for both activities. In a cursory look at the raw data, it appears that these shocks account for roughly 35 percent of the cases of business downsizing, so these results are hardly surprising.

In comparing the different categories of variables, it appears that business growth or contraction depends less on the macroeconomic or community conditions, and more on industry, business, and entrepreneurial characteristics or external shocks. However, the lack of response to age in general, and to education in shoemaking also raises questions of the fit of these variables in an analysis of year-to-year variations in business size. This lack of fit, also evidenced by the low adjusted R^2 statistic, suggest that there is a great deal of variation in number of workers which is captured in the year-to-year measurements despite its transitory nature. The evidence provided by the size coefficient strengthens this hypothesis,

with proof of a negative and highly significant relationship between previous size and current growth. This topic will be explored in greater detail in Section 5.7.

The initial disaggregation of the pooled sample by activity reveals that different groups of enterprises may have dissimilar responses to the variables included in the analysis. To explore the growth experience of different subsets of the sample, the next section further disaggregates the analysis presented above by two sample subsets.

5.6 Extensions of the Basic Equation

This section first re-estimates Equation 5.1 for proprietors with different levels of education. Whatever the direct effect of education on growth, it may be that additional education has beneficial effects in terms of ability to respond to changes in other independent variables as well. The equation is then re-estimated for businesses starting at different sizes, to ascertain if given characteristics have dissimilar effects on the growth of firms that start small or large.

5.6.1 Disaggregating by Education Level

To examine the effect of education on growth, Equation 5.1 was re-estimated for three groups as identified by the proprietor's level of education: (1) some primary education only, (2) full primary education but no secondary education, and (3) some secondary education.[50] The results of the analysis are presented in Table 5.4.

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[50] No proprietors in the survey had gone beyond secondary school.

Table 5.4
Regression Results: Panel data by level of education

Variables	Level of Education		
	Some Primary	Completed Primary	Some Secondary
COMMUNITY/MACRO ECONOMY			
Change in per capita GDP	.021 (1.615) [.109]	.012 (1.439) [.152]	-.006 (-.200) [.842]
COMMUNITY CONDITIONS			
Marketplace location	-.164 (-1.142) [.255]	-.025 (-.266) [.790]	-.116 (-.434) [.666]
Post-1988	.087 (.573) [.568]	-.051 (-.524) [.601]	.327 (1.295) [.201]
INDUSTRY CONDITIONS			
Type of activity (Furniture=1)	.210 (1.381) [.170]	.334 (2.983) [.003]	-.108 (-.339) [.736]
BUSINESS CHARACTERISTICS			
Age of business	-.008 (-.272) [.786]	-.031 (-1.449) [.149]	-.121 (-1.791) [.079]
Number of workers in last period	-.380 (-6.018) [.000]	-.161 (-4.067) [.000]	-.023 (.495) [.623]
Change in level of mechanization	.464 (1.178) [.241]	.062 (.233) [.816]	.916 (1.336) [.187]
ENTREPRENEUR CHARACTERISTICS (EDUCATION EXCLUDED)			
At least seven years of experience	.164 (.873) [.384]	.212 (1.761) [.080]	.659 (2.392) [.020]

Variables	Level of Education		
	Some Primary	Completed Primary	Some Secondary
EXTERNAL SHOCKS			
Theft, demolition, or death/illness	-.745 (-2.377) [.019]	-.561 (-3.575) [.000]	-.656 (-2.356) [.022]
Adjusted R^2	.23	.131	.102
Sample Size	148	227	62

Of note, adjusted R^2 falls as level of education rises, suggesting that the "missing factors", including entrepreneurial capacity, are more important determinants of growth for the more educated group of proprietors. Thus, it appears likely that individuals with higher entrepreneurial talent have self-selected into secondary school.

Second, the more educated the proprietor, the less he is buffeted by the conditions in the larger economy or the industry. While those with primary education appear to do better in years where per capita GDP is rising, those with some secondary education are not affected by changes in per capita GDP, growing regardless of the general economic environment. Likewise, those with some secondary education are likely to add workers regardless of sector, while the less educated are more able to add workers in furniture only.

The disaggregation by level of education also makes more sense of the ambiguous age results seen in Table 5.3. It now appears that the general pattern of firm growth in early years holds for the more educated proprietors, but disappears for those that have not completed primary school, where there is no relationship between age and growth. Perhaps this reflects a greater ability of more educated proprietors to attempt expansions in early years, while less

educated proprietors either do not know how or want to expand at that point in time.

Table 5.4 also sheds new light on the relationship between size and growth. While the relationship between size last period and growth this period is negative for all education levels, those with only primary education show a strong negative relationship, suggesting a greater amount of oscillation in those businesses' size from year to year. Thus, it appears that there is greater volatility in growth of firms with less educated proprietors, while those run by proprietors with secondary education show a smoother path of growth.

The experience variable also provides an interesting result. While the earlier results suggested that education and experience may be substitutes for each other, these results suggest that they are mutually reinforcing. Those with partial primary education are less able to use their experience to generate growth than those that have at least completed primary school. Again, if the group that has completed more schooling is more motivated or more attentive in general, this result is not surprising, as these individuals would also be the most able to apply lessons learned through previous experience.

Overall, then, analyzing the sample by education level points out the increased vulnerability of firms and volatility of growth for those enterprises run by proprietors with less education. Those with more education, on the other hand, appear better able to overcome macroeconomic cycles and industry conditions, harness their experience, attempt growth in earlier periods, and chart a more stable path of growth over time.

5.6.2 Disaggregating by Starting Size

A recurrent theme of the thesis thus far has been the relationship between firm size and growth. Two unanswered questions arise when examining the effect of size on growth:

- Does the negative relationship between size and growth hold for enterprises of all size categories, or does it reflect the inability of one-worker firms to decline?
- Can the negative relationship between age and growth be traced to the dominance of one-worker firms in the sample, or does it hold for enterprises of all sizes?

In the case of both size and age, the negative relationship observed thus far may be the result of simple mathematics: one-worker firms cannot decline in size and remain in the sample, at least not until they have expanded. However, older and bigger enterprises can decline, hence the negative size-growth and age-growth relationships.

To examine these two questions, the sample is again disaggregated, this time by starting size, and Equation 5.1 estimated for each group. Since only enterprises starting with one worker cannot decline in size until after they expand, this group of enterprises is analyzed separately, comprising 45 percent of the total sample. Firms starting with two or three workers make up another 32 percent of the sample. They are still very small, but can decline in size. All other firms (those starting with over three workers) are analyzed as the third stratum, comprising 23 percent of the sample. Results of the analysis are presented in Table 5.5.

Table 5.5
Regression Results: Panel data by starting size

Variables	Number of Workers at Start		
	1	2-3	4 or more
COMMUNITY/MACRO ECONOMY			
Change in per capita GDP	.015 (2.184) [.030]	.014 (.819) [.414]	-.002 (-.131) .896
COMMUNITY CONDITIONS			
Marketplace location	-.116 (-1.487) [.139]	-.055 (-.296) [.767]	.239 (1.248) [.215]
Post-1988	-.011 (-.145) [.885]	-.077 (-.415) [.679]	.353 (1.437) [.154]
INDUSTRY CONDITIONS			
Type of activity (Furniture=1)	.179 (2.059) [.041]	.331 (1.615) [.109]	.277 (.975) [.332]
BUSINESS CHARACTERISTICS			
Age of business	-.035 (-1.986) [.049]	-.044 (-1.060) [.291]	.004 (.105) [.916]
Number of workers in last period	-.159 (-2.996) [.003]	-.075 (-1.628) [.106]	-.277 (-4.807) [.000]
Change in level of mechanization	.385 (1.958) [.052]	.166 (.304) [.762]	.366 (.686) [.495]

Table 5.5 (cont'd).

Variables	Number of Workers at Start		
	1	2-3	4 or more
ENTREPRENEUR CHARACTERISTICS			
Did not complete primary school -- Omitted	--	--	--
Completed primary school	-.045 (-.561) [.576]	.196 (.941) [.348]	.622 (2.827) [.006]
Completed some secondary school	-.059 (.466) [.642]	.336 (1.024) [.308]	1.213 (3.329) [.001]
At least seven years of experience	.175 (1.854) [.065]	.304 (1.352) [.179]	.057 (.220) [.826]
EXTERNAL SHOCKS			
Theft, demolition, or death/illness	-.545 (-4.217) [.000]	-.487 (-1.828) [.070]	-1.346 (-3.821) [.000]
Adjusted R^2	.179	.005	.263
Sample Size	197	138	102

Before examining the specific coefficients, it is important to acknowledge the conspicuously low adjusted R^2 statistic for the 138 observations from firms starting with two or three workers. The lack of fit of this equation means that little information on determinants of growth is gained by examining these observations.[51] Therefore the comments below refer only to one-worker and four-plus worker firms.

One of the most important findings is the significant, negative relationship between size and growth for enterprises of both size categories. Even the smallest firms, those starting with one worker, tend to stop growing or downsize after increasing in size.

The results on the effects of business age also require special note. One-worker firms, as predicted, show a negative and significant relationship between age and growth. Again, this may simply reflect the simple mathematics that growth must precede contraction or else the enterprises would exit the sample due to closure. For larger firms, those with four or more workers, the relationship between age and growth disappears entirely, exhibiting both a sign change and no statistical significance. Thus, the case that there is a negative and statistically significant relationship between age and growth cannot be made for either size category.

Before proceeding, however, one-person firms require further discussion. If one-worker firms do not ever actually decline in size, then the negative relationship indicates that more growth occurs in early periods than in later periods. Such an interpretation is supported by the literature. Recalling the results reported in Liedholm and Mead (1987) that one-person

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[51] It is unclear what causes the low adjusted R^2 statistic. The most extreme outlier in the analysis does not fall in this group. It can be hypothesized that this size of enterprise may be less stable than those starting either smaller or larger.

firms are the least efficient of all enterprise size categories, one-person firms may face pressure to add workers early in order to reach a more efficient size of two or more workers. Further evidence of the need to add workers early appears in McPherson's work (1992), which reports that enterprises that grow by even one worker in their early years are less likely to fail than those that do not add workers. This result was based on a data set where the bulk of firms had but one worker.

Table 5.5 reveals three aspects of business growth that do not depend on size at start. The first is type of activity. Regardless of size at start, enterprises grow more in any given year if involved in furniture-making, however this relationship is weakest for the largest enterprises. Second, all enterprises show a positive response to mechanization. While statistically significant for one-worker enterprises only, the actual number of workers hired after adding machinery is similar for one-worker and four or more worker firms. The level of significance for one-worker firms may indicate that for these enterprises, growth after mechanization may be a necessity in order to use the new machinery to full capacity. Finally, the results consistently point to the negative impact of shocks on growth. Larger businesses lose more workers than one-worker firms, due to the fact that they have more workers to lose.

Having noted these three cases of consistent results, however, it appears that enterprise size at start has a marked influence on many of the other variables' effect on growth. For example, larger enterprises are more able to grow despite changes in the larger economy or local community. The larger the enterprise is at start, the less the effect of changing per capita GDP on growth. On the other hand, those starting as one-person

activities tend to expand more when per capita incomes are rising and less when incomes are falling.

Similarly, larger enterprises are better able to take advantage of community services. Only the larger enterprises (those starting with four or more workers) grow more if located near major markets, while smaller enterprises, particularly one-worker enterprises, are less likely to grow in such locations. This finding implies that one-person enterprises are less able to compete with larger enterprises in such visible settings. Likewise, enterprises that start larger show more growth after 1988 than do smaller enterprises. This finding also suggests that larger enterprises are better able to grow in a increasingly competitive environment, and may be better able to take advantage of new services as they arrive.

Finally, the growth response to education and experience of the proprietor varies by initial enterprise size. Those proprietors who start a business with four or more workers are highly dependent on their formal education, both primary and secondary, to achieve growth. Those starting with one worker, on the other hand, do not appear to benefit from formal schooling, showing a negative relationship between additional education and growth. As in the disaggregation by activity, this finding may point to the need for greater problem-solving and numeracy skills in enterprises that start larger, skills that may be better learned through schooling than through work experience. Amount of experience, on the other hand, appears to be more important to those starting as one-worker firms.

In conclusion, there are multiple levels at which starting size affects growth. Overall, the smaller the enterprise at start, the more it is influenced by macroeconomic conditions and the less capable it is of taking advantage of community conditions. While enterprises that

start small grow more as they expand their experience base, those that start with four or more workers grow more if they have a stronger educational background, and show little response to increasing levels of experience. This points to the need for different types of skills to grow up from a very small enterprise than from a larger enterprise. Finally, all groups show a strong negative relationship between previous size and growth, suggesting that growth is not a linear process, but contains periods of stagnation or decline, regardless of size at start.

5.7 A Closer Look at the Influence of Age and Size on Growth

As in previous work on business growth, two variables have recurrently emerged as key determinants of business growth in this thesis: enterprise age and enterprise size. This section draws together the findings on these topics, then uses simple but revealing descriptive data to examine some of the outstanding questions.

5.7.1 Enterprise Age and Growth

In Chapter III, the results of the national analysis of net growth unambiguously pointed to a negative relationship between enterprise age and growth. In Chapter IV and again in this chapter, the pooled samples have also demonstrated a negative relationship between age and growth. Using panel data and disaggregating by subgroups of the sample, however, the age-growth relationship disappears. Instead, age only appears to be an important determinant of growth for those enterprises that start with one worker or those enterprises with a more educated proprietor. Once discarding the relationship for one-worker firms as a mathematical truism, the negative relationship is based on slim evidence

indeed. Hence, it appears that the relationship between growth and age is something other than a linear, downward-sloping function.

To examine the shape of the function, average number of workers added per year was calculated for the pooled sample and each sample subgroup, then averaged across years to provide a mean number of workers added over time. The first plot, Figure 5.1, shows the shape of the pooled sample relationship. Looking only at endpoints, one can draw a downward-sloping line between the positive growth in year one and the negative growth in year ten. However, between those two years, amount of growth varies dramatically, dropping to negative values in years two and five, and establishing an all-time high in year six. One is hard pressed to find an appropriate functional form to capture this pattern.

Once disaggregating by type of activity, as shown in Figure 5.2, other patterns emerge. Shoemaking shows little change at all over the period, with a slightly positive relationship in the first seven years and a negative trend thereafter. The furniture-making plot is similar to the pooled sample, but with increased volatility. Growth hits its all time high in year eight after five turning points in the function, again eluding any attempt to fit a function.

Likewise, examining different sizes of enterprise reveals vastly different growth-age relationships for each subset, as shown in Figures 5.3 to 5.5. While the smallest enterprises start their life cycle by upsizing, the largest start by downsizing, and those in the middle show little change in any kind until year eight. As in the previous graphs, the only similarity between the subsamples is the downsizing that occurs after year eight.

Overall, when examined on a year-by-year basis, the expected negative relationship between age and growth disappears. This explains both the insignificant age dummy variable

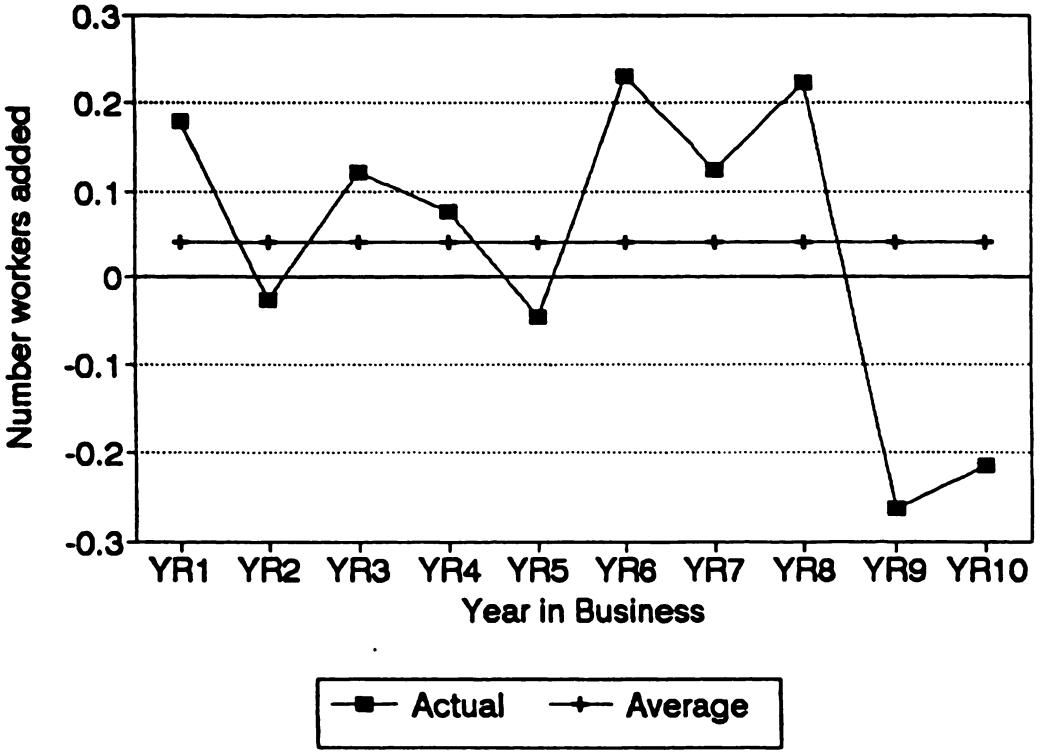

Figure 5.1: Workers Added Per Firm Per Year: Actual v. Average

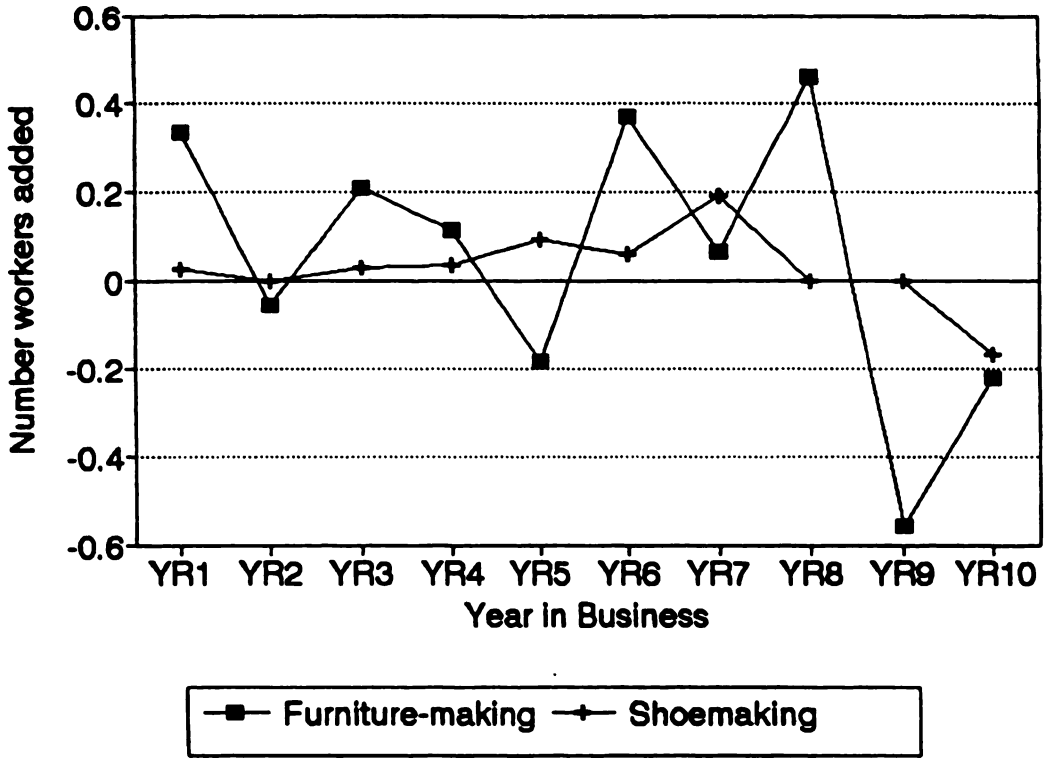

Figure 5.2: Workers Added per Firm per Year By Activity

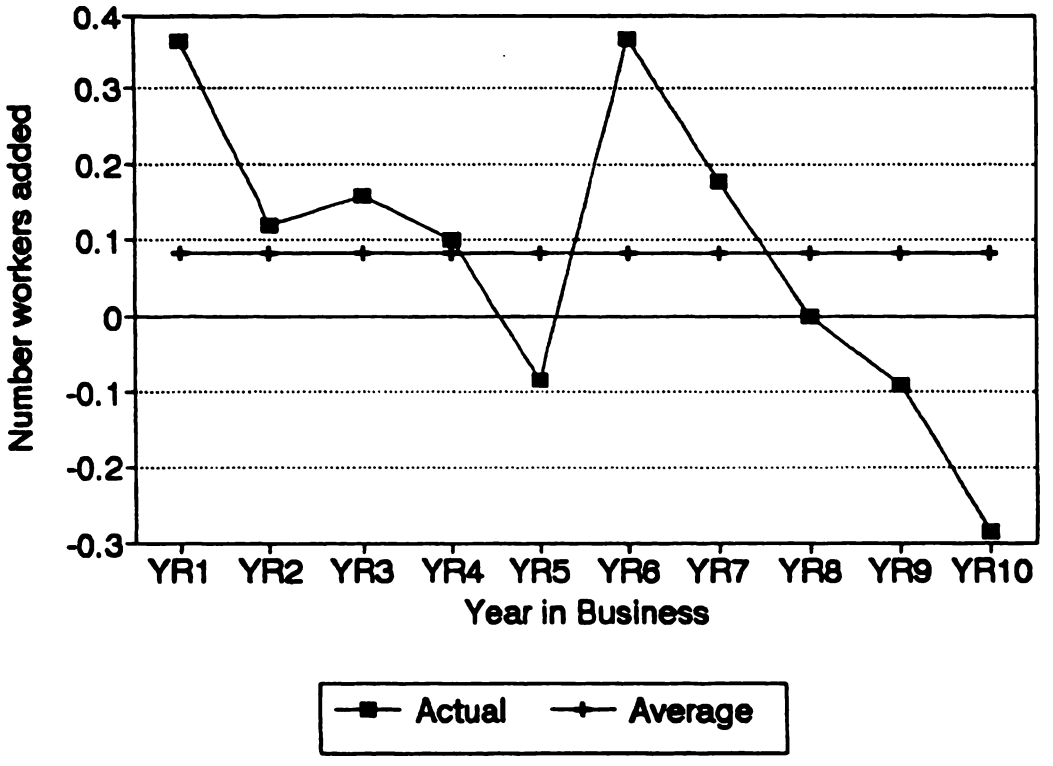

Figure 5.3: Workers Added per Firm per Year; Starting Size: 1 Worker

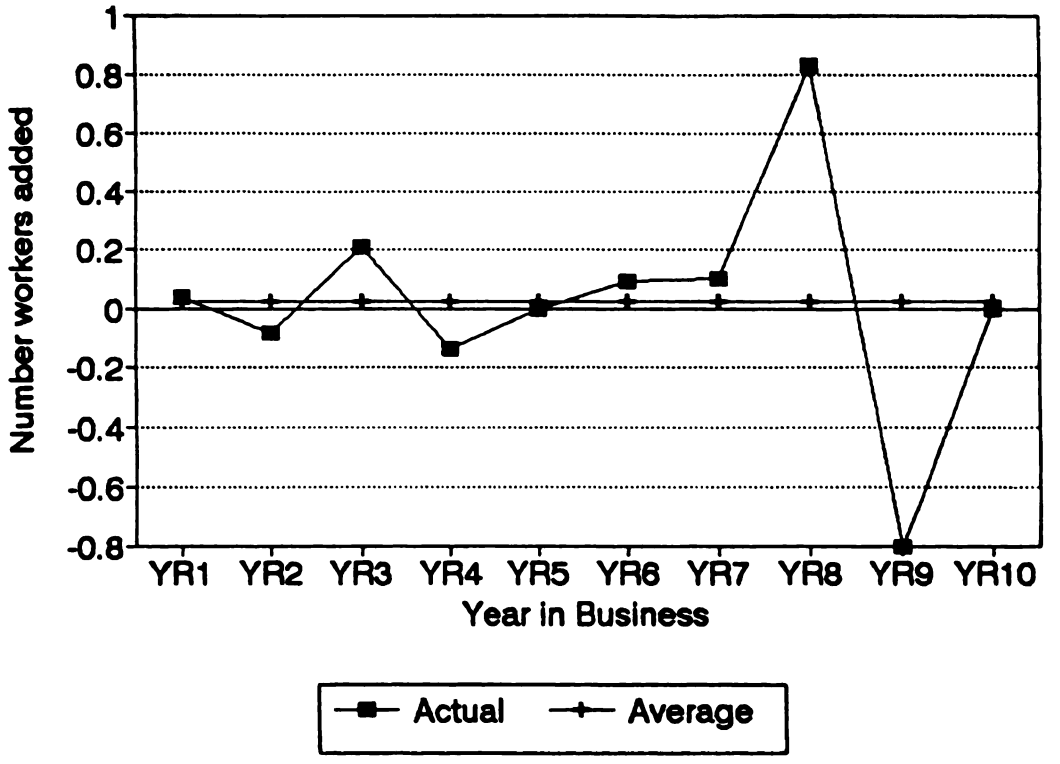

Figure 5.4: Workers Added per Firm per Year: Starting Size: 2-3 Workers

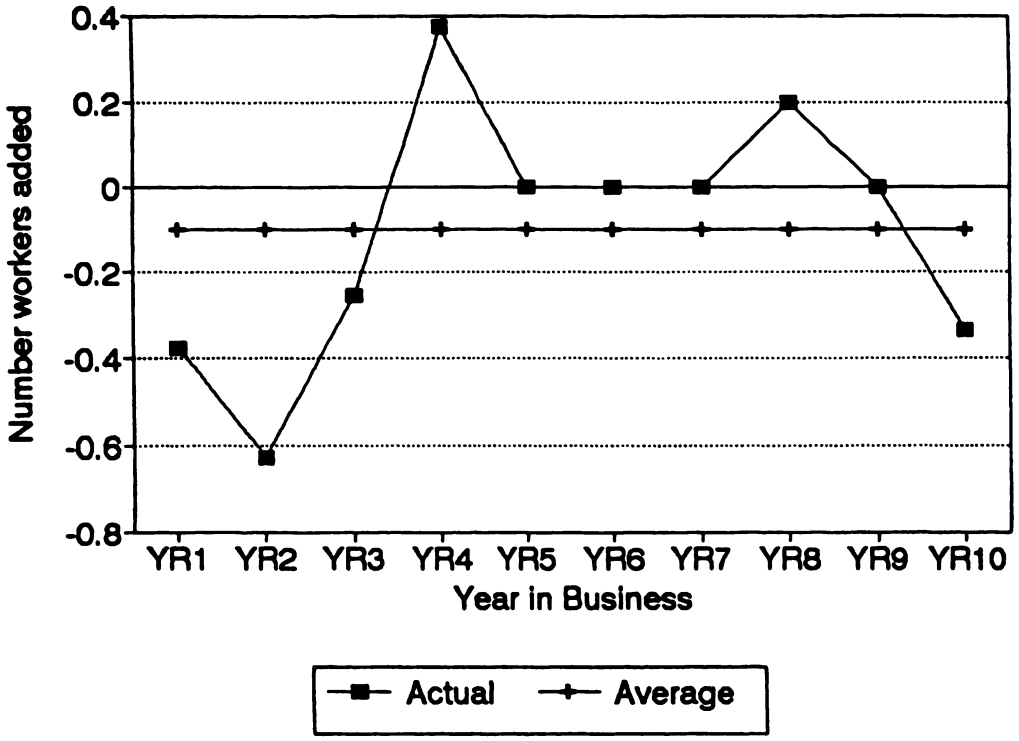

Figure 5.5: Workers Added per Firm per Year; Starting Size: 4 or more Workers

vector in the original ANCOVA model, as well as the insignificant coefficients for age in the different equations, and suggests that conclusions about the age-growth relationship should be made with great caution.

5.7.2 Enterprise Size and Growth

Almost without exception, the analyses presented to this point reveal a significant, negative relationship between enterprise size and growth.[52] There are two possible interpretations for this negative relationship. First, there may be an upper bound to size, where once enterprises reach that number of workers, growth slows, stops, or reverses. This interpretation implies that there is a limit to the size a business can attain, given constraints of managerial ability, space, or capital. The second interpretation is that businesses do not continue on a growth trajectory over two periods, either halting or reversing the process started in previous periods. This interpretation says something about the process of growth, suggesting that it is not linear, but full of stops, starts, and possibly reversals. However, it is likely that the true explanation for the negative relationship between size and growth is some combination of these interpretations. Below, the data are examined for insights on the importance of these different forces.

First in terms of absolute size, the negative size-growth relationship is less due to slower growth in larger enterprises than to actual reversals in size for those enterprises. Smaller enterprises, on the other hand, are more likely to stagnate rather than reversing in size. In net terms, enterprises with fewer than four workers in any one period are likely to

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[52] The only exception is for the subsample of proprietors who have completed some secondary schooling, for whom the relationship is negative but weak.

show positive (albeit small) growth in the subsequent period, while enterprises with four or more workers actually lose workers in the subsequent period. Thus, it appears that larger businesses do not simply grow less than smaller businesses, but in fact contract more.[53]

And what of the second interpretation? The data show that there are few cases where change in one period is followed by a change in the same direction in the subsequent period. Of 79 noted cases of growth or decline in one period, in only nine (11 percent) of the cases did change continue in the same direction in the next period. Of the remaining 89 percent, how many showed a reversal in the following period, and how many no change? In fact, for 29 percent, the growth or decline was followed by an actual reversal, but these reversals were much more common following declines. For the remaining 60 percent of the cases, growth or decline was followed by a period of no change. Thus, it appears that there is a general period of regrouping after either growth or decline, manifested by a period of no change. A plot of the relationship between change in the number of workers in one period and the resulting change in the number of workers in the next period is provided in Figure 5.6.

The plot shows the downward sloping relationship between change in one period and change in the next. However, from the graph it is now clear that the negative relationship is less due to the inability to sustain growth and more due to the ability to replace workers lost in the previous period. Indeed, additions of two workers in the first period resulted in only minor declines in size in the succeeding period. On the other hand, the loss of two workers

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[53] On average, enterprises with one worker in one period add .2 workers in the next period, while enterprises with two to three workers in one period add .04 workers the next period. On the other hand, enterprises with four or more workers in one period show a net decline in size in the subsequent period on the order of -.21 workers. Due to the much discussed difficulty in interpreting growth of one-worker firms, a comparison of two-to-three worker firms with four or more worker firms can produce the results reported here.

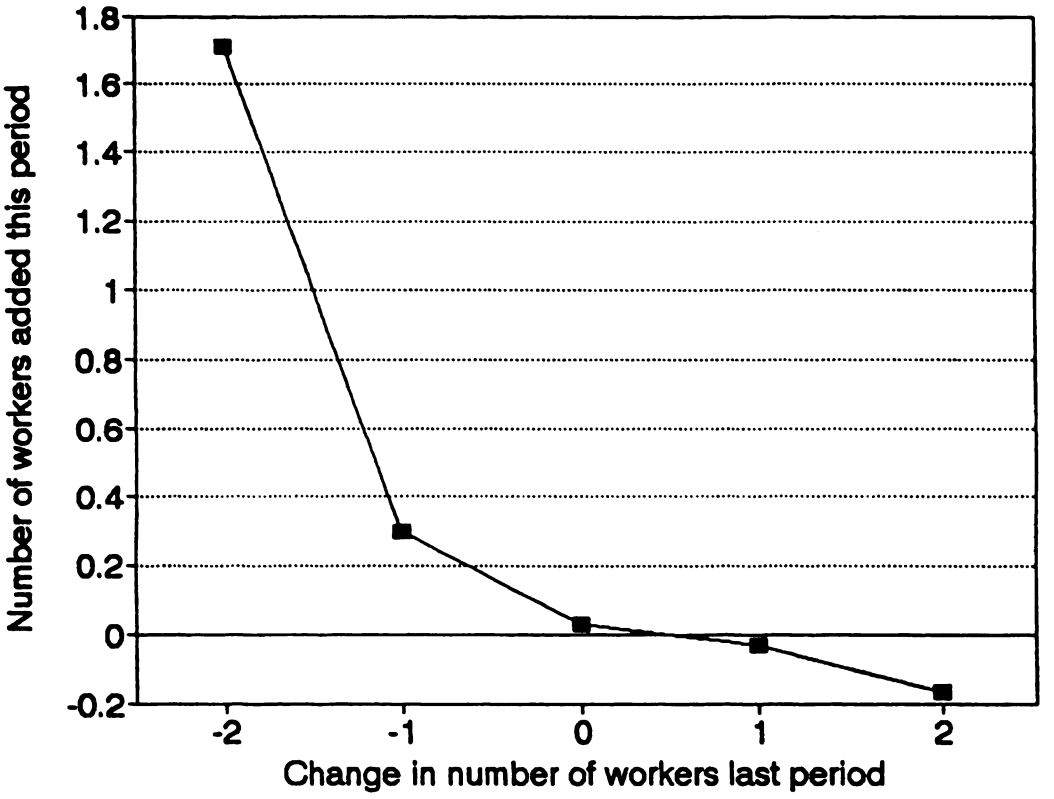

Figure 5.6: Growth Response to Last-Period Change

in one period resulted in the replacement of nearly the same number of workers in the subsequent period. This is an auspicious finding, which suggests that the labor expansion pattern is much more stable than one would have assumed from the significant, negative relationship between size and growth found in the regression analysis. Indeed, while there may be some inability to maintain growth from one period to the next, the process of change is still likely to result in net growth of the enterprise. In effect, the growing enterprise appears to be moving "two steps forward, one step back", rather than "one step forward, two steps back".

Another finding regarding the size-growth relationship also bears mentioning. As shown in Figure 5.7, the variance of growth in any period is greater for those enterprises that have had larger changes in the previous period. It appears, then, that a large change in one period is a risky endeavor, resulting in a wider array of growth responses in the subsequent period. Smaller growth, such as adding or subtracting a single worker, results in a much smaller variance in growth in the subsequent period. In short, smaller increments of growth are more likely to be sustained than larger increments.

The eight-year growth process for four firms is plotted in Figure 5.8 to illustrate these findings. These four firms were the only enterprises that grew from one to three or more workers over an eight-year period. Hence, they provide examples of the patterns by which businesses add multiple workers over a multi-year period. Firms #1 and #2 grow early and in one-worker increments, additions which are sustained over multiple periods. Firm #3, on the other hand, adds three workers in a single period, then loses two after one year. A second growth period adds four workers, one of which is lost in the next period. While this process

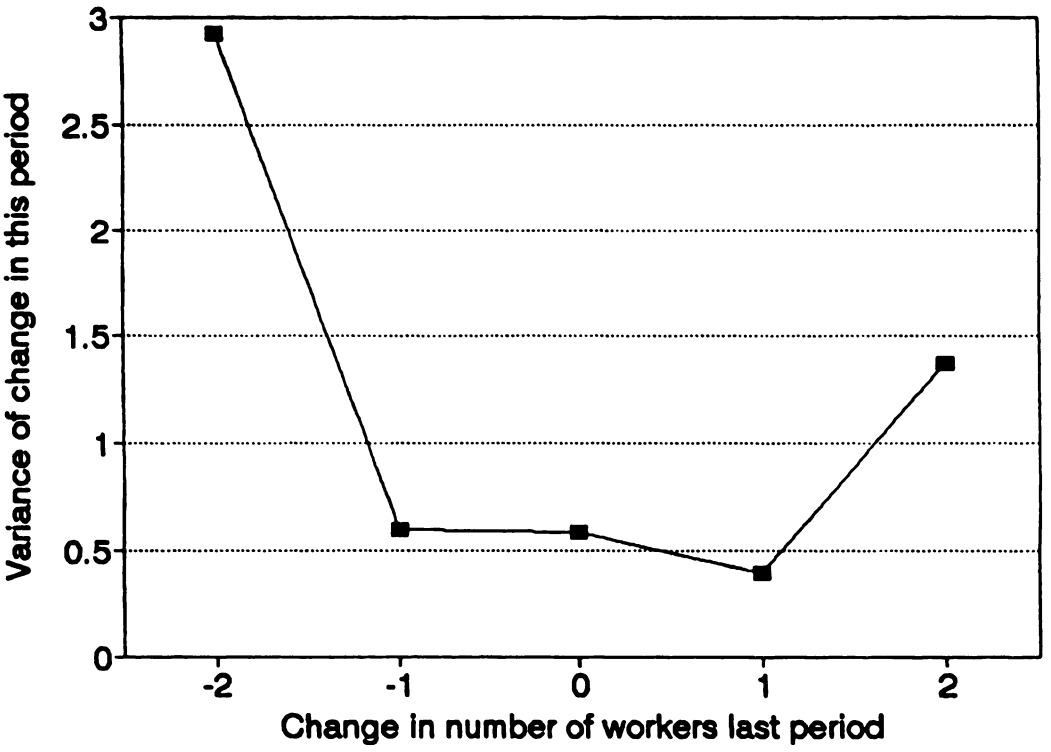

Figure 5.7: Variance in Growth Response to Last-Period Change

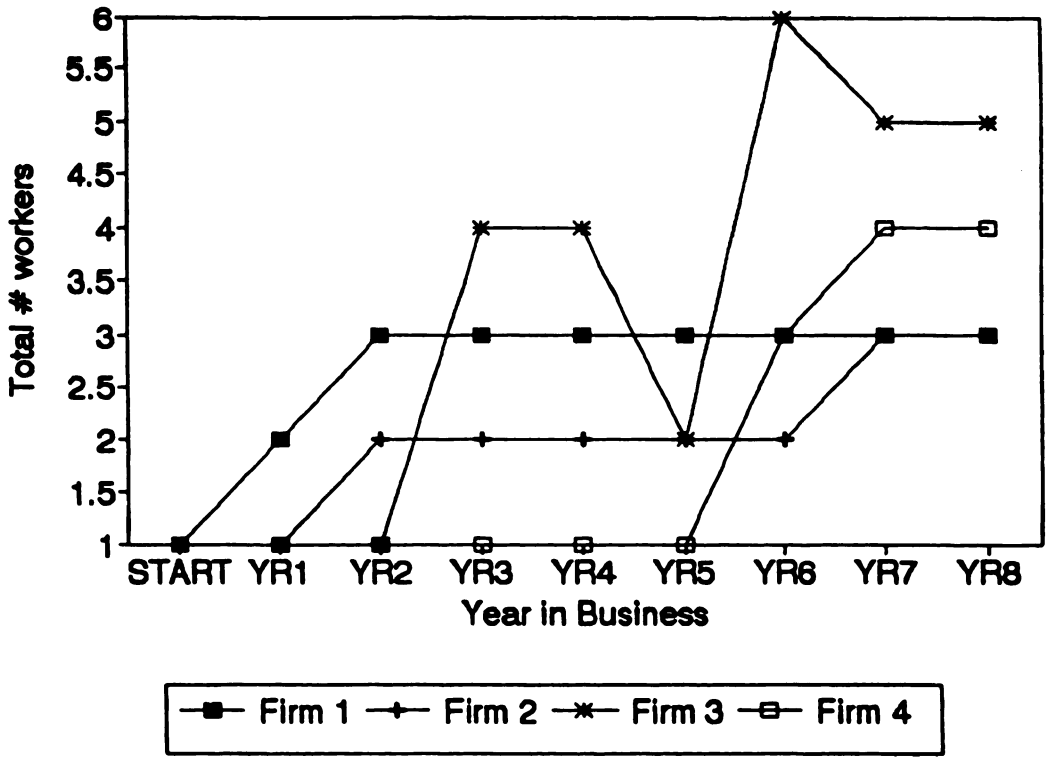

Figure 5.8: Process of Growth: 8-Year History: Firms Growing from 1 to Over 2 Workers

may, in the final analysis, result in greater net growth, it leads to a process of growth that is much more volatile than for those businesses adding one worker at a time. Only Firm #4 adds multiple workers in a single period and sustains growth. However, this enterprise waits until the fifth year in business to attempt such a jump.

5.8 Conclusions

This section reviews the findings of the above sections. It examines each of the variables included in Equation 5.1 in turn, constructing the sum of our knowledge on its effect on growth.

5.8.1 Macroeconomic Conditions

Prior to this analysis, it was difficult to measure the effect of changes in the broader economy on microenterprise growth. In addition, it was impossible to measure the effect of macroeconomic change on individual enterprises, or compare it with the effect of other variables. To do this, micro-level time-series data was required, or panel data.

Analyzing the panel data, the pooled sample reveals that existing businesses do not decline in periods of per capita income growth. Indeed, an increase in national per capita income may have a small beneficial effect on enterprise growth for the microenterprise population at large. In addition, the positive effect of per capita income is greater for two subsets of the population: those enterprises run by less educated proprietors and those starting with only one worker. In effect, these groups of enterprises benefit from a generally "rising tide".

5.8.2 Community Conditions

As in Chapter IV, the panel data show no general effect, either positive or negative, of agglomeration externalities, increased competition, or the arrival of new services on growth. However, these results vary by sample subgroups, where larger enterprises and those run by more educated proprietors are better positioned to expand in times of increased competition and better services. Larger enterprises also have a competitive advantage in more visible market areas, while one-worker enterprises do less well in these areas than in more remote neighborhoods.

Second, enterprises dependent on electrical machine services show a higher rate of growth when that service is available nearby. Not only does local electricity lead to lower transport costs to procure machine services, it also allows more time to be devoted to production activities and more options in terms of integration into other stages of production.

5.8.3 Industry conditions

Amount of growth varies by type of activity, where furniture-making grows more than shoemaking in general and for nearly all sample subgroups. There is one exception: proprietors with some secondary education are able to overcome this industry bias, expanding shoemaking enterprises more than furniture-making enterprises.

5.8.4 Business Age

While discussed at length above, two findings deserve repeat mention. First, the relationship between age and growth is less clear than had previously been reported in work

based on cross-sectional data. Second, there is clearly a downturn in growth that occurs after year eight, which may signal an end of the typical business's dynamic life cycle.

5.8.5 Business Size

As discussed above, the results show a consistently negative and significant relationship between size and growth, suggesting variation in size over time. Only those enterprises run by more educated proprietors appear to travel a smoother path of growth.

The more detailed analysis reveals a more complex picture. The first finding of note concerns worker replacement. While downturns in enterprise size may be common, they appear to be short-term in nature. The data suggest that workers lost in a given period are generally replaced by the end of the next period.

Second, there is some inability to sustain growth from one year to the next, particularly for larger firms and for firms undertaking larger amounts of growth in a single period. This suggests that there may be a lack of managerial skills that either limits total enterprise size or limits the amount of growth that can be achieved in a given time period. In any case, the process of growth does not appear to be linear, but is punctuated by reversals and, for most firms, muted by periods of dormancy.

5.8.6 Mechanization

For the sample in general and for all subsamples, the findings show that in no case does increased mechanization displace workers. However, the positive growth effect of increased mechanization is only statistically significant for one set of enterprises: those

starting with only one worker. For these smallest enterprises, there is either a need to increase output to use machines to capacity, or a need to add workers with machine skills. Thus, the "growth effect" of mechanization can only be taken as a likely outcome for the smallest enterprises.

5.8.7 Proprietor's Level of Education

Overall, the results suggest that education matters in microenterprise growth. In general, a complete primary education leads to slightly more growth than only a partial primary education. Proprietors with some secondary education, on the other hand, show much higher growth levels than those with partial primary education. However, this pattern varies by sample subgroup. Formal education is more important in larger firms, particularly those that start with four or more workers, while one-worker firms show no response to additional education.

Level of education also affects growth indirectly by changing the response to other conditions facing the enterprise. Those with more formal schooling are less affected by changes in per capita income or by industry conditions. They are also likely to add workers earlier and follow a smoother growth path than their less educated counterparts.

5.8.8 Proprietor's Level of Experience

Level of experience also affects growth. The data point to a seven-year experience threshold, indicating that prior to participating in their current activity for seven years (either as worker or business proprietor), entrepreneurs do not have the experience base that leads

to growth. After seven or more years of experience, however, the entrepreneur reaps a "growth dividend".

While positive in all cases, experience is less useful to those that have the least education. These individuals may be less able to capture the lessons of their experience and translate them into a successful growth strategy. Overall, then, the results suggest that for proprietors with education, experience acts as a complement. For those without education, however, experience acts as a substitute.

5.8.9 External Shocks to the Business

Finally, without exception the results show that shocks can rock a business, leading to large and significant drops in the number of workers. This finding illuminates the remarkable level of risk facing entrepreneurs in Kibera. These risks take the form of poor security, harassment, natural catastrophe and illness, all of which are out of the proprietor's control. Undoubtedly, these shocks have such an important impact due to the lack of a capital cushion, where proprietors do not have sufficient capital to buy tools, rebuild, or pay medical expenses while keeping the business operating at the same level of employment and output.

5.8.10 Final Comments

These findings will be integrated with the results of Chapters III and IV in the next chapter. It is hoped that comparing results from the data sets will reveal common patterns, as well any gains from shifting to a time-series perspective when analyzing business growth.

CHAPTER VI: CONCLUSIONS

In drawing together lessons from the analyses presented in the preceding chapters, findings can be grouped into four areas that bear special attention:

i) Findings on patterns of enterprise growth.

ii) Findings on determinants of enterprise growth.

iii) Policy implications of these findings.

iv) Usefulness of moving from cross-sectional to time-series data on business growth.

The chapter begins by synthesizing new findings on patterns of growth, as revealed by time-series data on Kibera enterprises. Section 6.2 then explores the determinants of growth, in the process illuminating similarities and differences that appear between growth nationally and in Kibera. Section 6.3 presents policy implications of the findings. Section 6.4 turns from the empirical results to an examination of the value of moving from a cross-sectional analysis of net growth to analysis of the pattern of growth over time. Finally, Section 6.5 offers a concluding comment.

6.1 Patterns of Enterprise Growth

This thesis presents the first examination of the process by which enterprises add or subtract workers over time. This unique perspective is made possible by the retrospective firm-level surveys, which provided a time-series picture of the path traveled by individual firms.

Several key findings emerge on the patterns by which enterprises evolve over time. First, by taking a time-series approach, the relationship between business age and growth disappears for all but one-worker firms. In fact, for firms that start with multiple workers, the first years may actually be a time of contraction. The negative relationship found in cross-sectional analysis of net growth appears to reflect two patterns: (1) the dominance of one-worker firms, which necessarily must expand before they contract, and (2) the ever-present downsizing that takes place after year eight in operation.

These age-related findings suggest that there is a learning process for managing a multiple-worker enterprise. The downsizing of larger enterprises in early periods suggests that entrepreneurs do not necessarily enter business with an ability to choose the right number of workers or manage them properly. Larger businesses may overestimate the appropriate size. Businesses that start with only one worker, on the other hand, often discover that they need to add workers. This learning process may be similar to that proposed by Jovanovic's "learning theory". However, as will be discussed below, the findings suggest that the process of learning itself should be included as a determinant of firm growth.

The data also provide new information about the expansion path traveled by enterprises. While enterprises do not follow a single pattern, a few key findings emerge.

First, it is useful to recall that only 38 percent of Kenyan enterprises add any workers over time, thus for the majority of enterprises, the experience is one of no change. However, even those enterprises that show no net change may have experienced periods of growth or decline, the combined effect of which is zero.

The Kibera data provide some insight on this issue. Of the 49 Kibera firms showing no net change in number of workers, one-third (14 enterprises) experienced at least one period of increase and decrease in the number of workers in the enterprise. Of these 14 enterprises, eleven attempted a business expansion, but could not maintain the new enterprise size, while the other five experienced a temporary reduction in their workforce. Thus, eleven enterprises, or 14 percent of the total Kibera sample, tried but failed to expand their workforce, while another fifty percent of enterprises showed no period of positive growth.

Second, just over one-third of the firms showing net growth also suffered set-backs during the growth process. But while net growers added multiple workers in 44 percent of the cases of annual growth, in only 22 percent of reversals did they lose more than one worker. Moreover, for growing enterprises, periods of upsizing outnumered downsizing more than four to one. Hence, growers generally follow an upward size trajectory punctuated with small, periodic reversals. Which enterprises are more likely to face reversals? The results of Chapter V point out that larger changes in size are more difficult to sustain than those taking place in one-worker increments. This finding suggests that enterprises growing gradually are less likely to reverse growth in the subsequent period than those attempting larger changes in size.

For completeness, enterprises showing a net loss of workers should be examined for

patterns as well. Over time, these enterprises show the opposite trend to growing firms, where periods of downsizing outnumber those of upsizing more than four to one. Businesses tend to downsize gradually, typically in increments of one.

Thus, there are two types of changes in enterprise size: (1) net changes in enterprise size over time, resulting in positive, negative, or zero growth; and (2) the short-term changes in enterprise size that lie behind measures of net growth. Practitioners interested in maximizing microenterprise labor absorption can benefit by identifying characteristics and conditions that lead to greater labor absorption, both in the short- and long-term, in order that such conditions can be fostered. In addition, it is equally useful to identify causes of enterprise contraction, in order that such conditions can be minimized.

6.2 Determinants of Enterprise Growth

What determines the amount of growth or decline businesses experience? The analyses in Chapters III, IV, and V all examine characteristics related to enterprise growth. Chapters III and IV examined net business growth, looking for causes of size changes over the medium- to long-term. Chapter V, on the other hand, focuses on year-to-year changes in enterprise size, thereby searching for short-term determinants of growth. The longer time frame in the earlier chapters provides an opportunity to identify trends that may be otherwise obscured by year-to-year variations in size. Conversely, the shorter time frame of the analysis in Chapter V provides an opportunity to capture short-term influences on size as well as time-varying influences. In combination, the two time perspectives should provide a good picture of short-, medium-, and long-term determinants of enterprise growth.

The analyses provide several similar results. First, it is clear that some industries or economic sectors have a higher potential for employment generation than others. The the textile industry, which includes shoemaking concerns, grows more slowly than wood-based industries such as furniture-making, as shown by the national sample in Chapter III. This finding is confirmed in the Kibera industry studies in Chapters IV and V, where furniture-making is found to grow more than shoemaking in net terms, as well as in terms of absolute annual change. Reasons for differences in growth between activities are not adequately identified by the analysis. Such issues would better be resolved by micro-level analysis of scale economies and broader market characteristics, as well as empirical estimates of changes in level of demand for different industries.

Second, as discussed at length in previous chapters, the analyses point to the negative relationship between enterprise size and growth, both in net and annual terms. These results signify that, for Kenya's micro and small enterprise population, more jobs are generated by the growth of the smallest enterprises, both in the short and long run.

Choice of location also influences the extent of growth. In the analysis of net growth nationally, those enterprises located in commercial areas or along well-traveled roads are found to grow more than those operating from within the home, while those located in traditional marketplaces do not grow faster than those based at home. This result is confirmed in the Kibera case, where enterprises in or near Kibera's traditional markets do not show more growth than other enterprises, either in net or annual terms. In general, then, despite their proximity to the greater Nairobi market, Kibera's enterprises all fall into the slower-growth location categories. This suggests that, despite being more accessible by road

than other neighborhoods, Kibera's marketplaces are not attracting non-Kibera customers, and therefore do not provide the benefits of "visibility" ascribed to roadside or commerial area locations. Finally, these results suggest that Kibera may be a "mature" rather than a growing market, despite its proximity to a large and growing metropolitan area.

Proprietors' experience and skills also influence amount of growth, both in net and annual terms. Nationally, those coming from a business background are the only group of proprietors that show growth significantly higher than the previously unemployed. This suggests that experience in entrepreneurship and business management is more critical in job creation than is technical expertise derived from working for others. In Kibera, the combined level of experience, both as an entrepreneur and a worker, appears to provide an mix of skills that leads to growth. Specifically, the analysis reveals an experience threshhold, where proprietors with seven or more years of relevant experience (as proprietors or workers in the same industry) add more workers per year than those with less than seven years of experience. This finding provides further evidence that there is a critical learning process undergone by entrepreneurs.

Numeracy skills of the entrepreneur also contribute to growth. In net terms, Kibera entrepreneurs who keep books grow more than those that do not. Looking at year-by-year changes, those with greater schooling show higher growth, a trend which is particularly apparent for entrepreneurs who have completed some secondary schooling. In sum, the analysis consistently points to the importance of human capital to business growth, whether in the form of business experience, technical experience, managerial skills, or formal education.

In all chapters, the results on the relationship between markets and growth show ambiguity. In the national sample, net growth is slightly higher for enterprises that do not sell their products directly to final consumers. However, the reverse is true in Kibera, where those selling to distributors in the greater Nairobi market show slightly lower growth than those selling directly to final consumers. Returning to the national sample, the data show that enterprises in urban areas typically show the greatest growth if using distributional channels, so why does this pattern not hold for Kibera? First, the Kibera market may have higher demand than the greater Nairobi market, so that those selling within Kibera are actually better off than those selling to non-Kibera customers. Equally likely, however, the non-Kibera market for furniture and shoes may be so competitive that profits in such markets are driven to zero, or so risky that the net effect of participation is negative.

The time-series analyses in Chapter V provided an opportunity to examine the effects of changing macroeconomic and community conditions on growth, data which could not be incorporated in the cross-sectional analyses in Chapters III and IV. While in general, businesses do not show a marked growth response to these variables, certain businesses appear to be more vulnerable to these forces than others. In particular, smaller enterprises and those run by less educated proprietors are more dependent on rising per capita incomes to prosper. These enterprises also appear to be less able to compete with other enterprises, both growing less if located near marketplaces and in years of greater competition. Hence, education and size both appear to provide a competitive advantage.

Finally, the panel data reveal the influence of outside shocks on the enterprise workforce. While intuition would lead one to similar conclusions, the data point to the

frequency of such occurrences as well as the magnitude of the effects, leading to the unavoidable conclusion that environmental risks have a serious impact on microenterprise employment creation.

6.3 Programmatic Implications of the Findings

What do these findings mean for practitioners endeavoring to expand employment in microenterprises? While it is important to recall that the Kibera studies included a small number of firms in only two activities, several implications emerge which bear consideration in programming.

First, as development agencies simultaneously pursue macroeconomic reform and microenterprise development agendas, it is important to point out that a growing economy does not hurt the ability of microenterprises to expand. In fact, increasing per capita income has a positive effect on growth, although it does not appear to be a major factor. Likewise, infrastructural improvements may lead to growth in the sector, as in the case of improved access to electricity for furniture-makers. These are auspicious findings, suggesting that improving the level of development in the country as a whole also enhances the position of those in the microenterprise sector. Furthermore, such findings discredit the notion that microenterprises absorb labor only in times of economic hardship.

Firm-level findings also have important programmatic implications. First, given the size-growth relationship, it is impractical to expect larger firms in the sector to provide the bulk of new jobs. It is important to point out that the Kenyan case differs dramatically from the experience in other countries, where larger businesses do not show the downsizing trend

seen in Kenya. This suggests that there are constraints specific to the Kenyan case that lead to the downsizing of larger, more visible enterprises. Such constraints may be related to political, social, or economic conditions in the country. Future research aimed at identifying these constraints would allow practitioners to assess their ability to remove these constraints and thereby foster greater expansion from micro into small or medium enterprises. In addition, the complexity of the issues suggest that moving micro enterprises up the size scale will require multi-faceted interventions that go far beyond credit provision.

The results also suggest that marketing interventions should be undertaken with great care, with an understanding of the dynamics of market niches within an activity. This was illustrated by the negative growth response from improving product quality in either shoe- or furniture-making at a time when consumers were more concerned with cost. Detailed subsector studies can be particularly useful in identifying both growing markets and methods of moving micro-entrepreneurs into those niches.

The results point to the potential impact of human capital development programs on the microenterprise sector, identifying growth responses to both vocational training and formal education. However, it appears that different sizes of enterprise have different human capital needs. Larger firms are more likely to expand further if they have greater schooling and numeracy skills. Teaching such skills to the smallest enterprises, on the other hand, may have little effect on employment generation.

In all cases, greater practical experience in business leads to growth. Traditionally, it has proven difficult to provide experience through programming. However, creative institutional linkages may lead to opportunities for internships, on-the-job training,

apprenticeship programs, or other experience-enhancing programs. In the meantime, this finding can help to identify businesses that have a greater chance of expansion. For example, entrepreneurs with previous experience in their chosen field or in another business may be more likely to translate financing into additional jobs. Credit for individuals with other backgrounds, such as the previously unemployed, new school leavers, or retrenched civil servants, should not be expected to lead to the same level of employment creation.

Finally, given that risk is a major problem for entrepreneurs, there may be value in developing a disaster loan fund. Indeed, some groups of Kenyan entrepreneurs have already created saving societies explicitly to provide a source of funding in times of financial crisis.[54] Such credit programs could provide emergency funding in times of catastrophe, as in the case of business demolition or theft, but would only be feasible in cases where moral hazard is not a concern.

In sum, the results begin to illuminate the roles of different types of assistance in employment generation. Credit, for example, may best be provided to the smallest enterprises that have not reached their managerial limits or to entrepreneurs in a crisis situation. On the other hand, human capital enhancement programs may have the greatest influence on larger businesses, opening the door for further expansion by increasing managerial capacity.

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[54] As reported by Parker (1994), three percent of Kenyan entrepreneurs belong to a savings group whose primary purpose is to provide cash to members in times of crisis that would otherwise be withdrawn from the individual's business.

6.4 Methodological Issues

Finally, it is useful to step back from the content of the results and re-examine the methods used in the analysis. Did the transition from cross-sectional analysis to a time-series perspective provide new insights on enterprise growth?

Perhaps most importantly, the panel data set provided an opportunity to test for the role of time-varying factors, such as changing macroeconomic and community conditions or evolving experience of the entrepreneur. These additions not only provided new insights on the effects of these variables on growth, but they removed the analytical barrier between analyzing business growth and the dynamics of a changing environment. In so doing, they enhance the predictive power of the equation. As more is understood about the interaction between the macroeconomy and the microenterprise sector, for example, better estimates can be made of the effects of macroeconomic reform on the microenterprise sector.

Moving from analysis of net growth to one of absolute yearly change also improves the ability to understand the magnitude of short-term variability and to identify short-term influences on growth, such as the impact of mechanization, shocks, or a change in size in the previous period on growth. By moving to a shorter time horizon, the analysis is reduced to estimating the growth response of the enterprise to real, discrete events. Again, this improves the predictive power of the equation.

Finally, the time-series approach in Chapter V takes steps to resolve the endogeneity dilemma from earlier chapters by regressing growth on pre-growth conditions. Thus, important findings of the analysis of net growth which are confirmed by the analysis in Chapter V can be protected from charges of endogeneity.

6.5 Concluding Comments

It is hoped that future reseach using a time-series approach will be able to go beyond the analysis of employment generation contained here, capturing financial data as well as information on workers. Such an addition would allow the analysis to predict not only where employment creation will take place, but how proprietors improve their level of income, and thereby their household welfare.

The steps taken in this dissertation to link growth to characteristics of the subsector were strictly preliminary. Future work in this area would benefit from more closely linking the process of growth to an understanding of specific subsectors. Areas that would provide critical insights include the characteristics of input and final product markets, returns to various activities or stages of production, level of demand, technological options and resulting economies of scale, among others.

Finally, the results above point to the need to better understand the informal labor market, the role of apprentices in both human capital development and as laborers, and the importance of non-economic factors in making labor decisions.

APPENDIX A

1993 KENYA BASELINE SURVEY INSTRUMENTS

BASIC QUESTIONNAIRE (Kenya, 1993)

Date completed: ____________

Date proofed: ____________

Date entered: ____________

Date verified: ____________

District: ____________ (__)

Stratum: ____________ (__)

Cluster #: ____________

Page #: ____________

Enumerator: ____________ (__)

Supervisor: ____________ (__)

Site with no activity: ____________

____________ (__)

Site closed: ____________

____________ (__)

Proprietor #	Enterprise #	Unique proprietor ID	Unique enterprise ID	Type of enterprise	Enterprise code	Ownership structure (a)	Location type (b)	Structure type (c)	On-site utilities (d)	# of months per year	REGULAR WORKERS NOW: # Working proprietors	REGULAR WORKERS NOW: # Unpaid family workers	REGULAR WORKERS NOW: # Paid workers (salary & piece rate)	REGULAR WORKERS NOW: # Apprentices	REGULAR WORKERS NOW: Total # of workers	REGULAR WORKERS NOW, of Total: # Females	REGULAR WORKERS NOW, of Total: # Children (under 14)	Technical skill level of the most trained worker (e)	Year started this business	# of workers at start (including proprietor, etc.)	Approx. start-up capital (f)	Who do you sell to? (g)	Where do inputs come from? (h)	Kinds of business assistance received (i)	Rights to business premise/space (j)	Share of HH income from all business activities (k)	Activity prior to this business (l)	Proprietor's Name, Nickname, Enterprise Name, Physical Address, CBS#	Closed Enterprise? (0=no, 1=yes) If YES, go to Closed Business Questionnaire	Enumerator: Did you fill in SQ? (0=no, 1=yes)

Seasonal businesses other times of year? If YES, start over...

Codes:

a/ 1. Male only 2. Female only 3. Partnership 4. Family 5. Cooperative/group 6. Corporate 7. Other

b/ 1. Home/homestead 2. Traditional market 3. Neighborhood/rural trading center 4. Commercial district 5. Industrial area 6. Roadside, not in trading area 7. Mobile 8. Other

c/ 1. Permanent structure 2. Temporary structure 3. Roof only 4. No structure 5. Vehicle 6. Other

d/ 1. Electricity and water on-site 2. Electricity only on-site 3. Water only on-site 4. No utilities on-site 5. Not applicable

e/ 1. No technically trained people 2. Apprentice 3. Youth polytechnic 4. Technical training institute 5. Harambee Institute of technology 6. National polytechnic 7. University 8. Other

f/ 1. 0 - 10,000 Ksh 2. 10,001 - 25,000 Ksh 3. 25,001 - 50,000 Ksh 4. 50,001 - 100,000 Ksh 5. Over 100,000 Ksh 6. Inherited business 7. Not applicable

g/ 1. Local individuals 2. Local hawkers/vendors/traders 3. Domestic manufacturing enterprise 4. Domestic commercial enterprises 5. Domestic service enterprise 6. Export agent 7. Exports directly 8. Other

h/ 1. Makes/collects own inputs 2. Buys imported inputs/stock 3. Buys domestic inputs/stock 4. Buys domestic and imported inputs/stocks 5. Does not use inputs/customers provides inputs 6. Don't know 7. Other

i/ 1. None 2. Informal credit/savings 3. Formal credit 4. Management training 5. Trade-based assistance 6. Business contacts 7. Marketing assistance 8. General-informal support 9. Multiple 10. Other

j/ 1. Hold title deed 2. Written lease/rental agreement 3. Informal agreement 4. Squatter 5. Other 6. Not applicable

k/ 1. Provides all of household income. 2. Provides more than half of income. 3. Provides about half of the income 4. Provides less than half of the income 5. Not applicable

l/ 1. Had another business 2. Unemployed 3. Employed in jua kali business 4. Employed in formal sector business 5. Government employee 6. Worked in agriculture 7. Just left school 8. Just left apprenticeship 9. Other

CLOSED ENTERPRISE QUESTIONNAIRE (Kenya, 1993)

Date completed:__________ District:__________(__)

Stratum:__________(__) Enumerator:__________(__)

Date prooted:__________ Cluster #:__________ Supervisor:__________(__)

Date entered:__________ Page #:__________

Date verified:__________

Proprietor #	Closed enterprise #	Unique proprietor ID	Unique closed enterprise ID	Type of closed enterprise	Closed enterprise code	Ownership structure (a)	Location type (b)	Year enterprise started	# of workers at start (including proprietors, unpaid family, paid, apprentices)	Year enterprise closed	# of workers at close (including proprietors, unpaid family, paid, apprentices)	Highest # of workers (including proprietors, unpaid family, paid, apprentices)	Who did you sell to? (c)	Where did your inputs come from? (d)	Reason enterprise closed	Closure code (e)	What happened to tools/stock? (f)	What are you doing now?	Current activity code (g)	Proprietor's Name, Nickname, Enterprise Name, Physical Address, CBS#	Enumerator: Did you fill in BQ? (0=no, 1=yes)

Codes:

a/ 1. Male only 2. Female only 3. Partnership 4. Family 5. Cooperative/group 6. Corporate 7. Other

b/ 1. Home/homestead 2. Traditional market 3. Neighborhood/rural trading center 4. Commercial district 5. Industrial area 6. Roadside, not in trading area 7. Mobile 8. Other

c/ 1. Local individuals 2. Local hawkers/vendors/traders 3. Domestic manufacturing enterprise 4. Domestic commercial enterprises 5. Domestic service enterprise 6. Export agent 7. Exported directly 8. Other

d/ 1. Made/collected own inputs 2. Bought imported inputs/stock 3. Bought domestic inputs/stock 4. Bought domestic and imported inputs/stocks 5. Did not use inputs/customer provided inputs 6. Don't know 7. Other

e/ 1. Too few customers 2. Too many competitors 3. Shortage of operating funds 4. Shortage of stock or raw materials 5. Other business reason 6. Legal troubles/Government interference 7. Personal reasons 8. Got a job 9. Started another business 10. Other

f/ 1. Sold with business 2. Gave to family/friends 3. Used to start new business 4. Liquidated 5. Other 6. Not applicable 7. Don't know

g/ 1. Run another business 2. Work for someone else 3. Nothing 4. Other

SUPPLEMENTARY QUESTIONNAIRE (KENYA, 1993)

TO BE FILLED AT END OF INTERVIEW:

Date:_____ Proprietor Name:_____ Enumerator:_____

Cluster #:_____ Proprietor # (from BQ):_____ Supervisor:_____

Enterprise # (from BQ):_____

1. What are some of the biggest problems your business has faced over the last year? [ENUMERATOR: If person says CREDIT, ask what problem credit would solve]

   1st problem:_____

   2nd problem:_____

   3rd problem:_____

2. Have you experienced ...( )... over the last year? [ENUMERATOR: tick for each]

a.	Eviction or demolition	Yes( )	No( )	NA( )
b.	Request for cash payments	Yes( )	No( )	NA( )
c.	Requirement to get a license	Yes( )	No( )	NA( )
d.	Limitation on where you can sell	Yes( )	No( )	NA( )
e.	Limitations on where you can produce	Yes( )	No( )	NA( )
f.	Requirement to pay minimum wage	Yes( )	No( )	NA( )
g.	Other form of government involvement [list]_____	Yes( )	No( )	NA( )

3. Is there anything that has made business easier over the last year?

   1._____

   2._____

   3._____

4a. How do you compare yourself to your competitors in terms of customers? (Who gets most customers?)

   _____

   b. Why do you think so?_____

5. What skills would you like to acquire to enhance your business?

   _____

6. If you were to expand or improve this business, what steps would you take?

_____

_____

7a. If you could choose between expanding this business or starting another business, which would you choose? [ENUMERATOR: tick one]

Expand this business..... ( )
Start new business..... ( )
Other_____ ( )

b. Why do you say so?_____

8a. Do you belong to any business support group or informal business network? Yes( ) No( )

b. [IF YES] What is the nature of the group? _____

_____

c. [IF YES] How has this group helped your business?_____

_____

d. [IF YES] What else could this group do to assist your business?

_____

9. For what reasons did you decide to pursue <u>this</u> kind of business rather than some other business activity?

_____

10a. OTHER ON-SITE OR SEASONAL BUSINESSES CURRENTLY? Yes( ) No( )

[IF YES: return to Basic Questionnaire]

b. [IF NO] ANY CLOSED BUSINESSES? Yes( ) No( )

[IF YES: go to Closed Enterprise Questionnaire]
[IF NO] Many thanks for your time.

TO BE FILLED AT HEAD OFFICE: _____

Unique Enterprise #:::::::::::: Post-code date:::::::::::::: Data entry date::::::::::::::

APPENDIX B

1991 KIBERA RETROSPECTIVE SURVEY INSTRUMENTS

APPENDIX B

1991 KIBERA RETROSPECTIVE SURVEY INSTRUMENTS

FURNITURE SECTOR QUESTIONNAIRE:

* *

Respondent's Name: _____

Gender: _____

Enterprise Name: _____

Enterprise Location: _____

Enterprise ID: _____

* *

Interview Date: _____

Interviewer: _____

Guide/Translator: _____

Time Start/Finish: _____ / _____

* *

INTRO: I WOULD LIKE TO ASK A FEW QUESTIONS ABOUT YOU AND YOUR BACKGROUND, THEN ASK YOU MORE ABOUT YOUR FURNITURE-MAKING BUSINESS.

A. PERSONAL/FAMILY INFORMATION

1. In what year were you born? 19___

2. What is your home district?_____ Location?_____

3. Do you live in Kibera? (1) Yes (2) No _____ [IF NO] Where?_____

4. Have you had any education? (1) Yes (2) No _____

   [IF YES] What types of education (formal and technical) have you had?

None			[ ]
Some Primary			[ ]
Completed Primary			[ ]
Some Secondary			[ ]
Completed Secondary			[ ]
Completed A-levels			[ ]
Technical school:	Type:_____	Length:_____	[ ]
	Type:_____	Length:_____	[ ]
University			[ ]
Other (specify:_____)			[ ]

5. [IF NONE OR PRIMARY IN (4)]

   a. Can you read Kiswahili or English? No_____ Swah_____ Eng _____

   b. Can you do arithmetic? No_____ Add/Sub_____ Mult/Div_____

6. Tell me about your apprenticeship and work experience, starting from the first position you held up until the time you started this business.

From /To	Position (proprietor/worker/apprentice)	Type of Business	Firm Type (formal/informal)

7. At the time you started your furniture-making business, did you have any other jobs or business activities? (1) Yes (2) No _____

[IF YES, LIST HERE] .

Type of Activity	Your position

8. Apart from furniture-making, are you now involved in any other jobs or business activities? (1) Yes (2) No _____

[IF YES, LIST HERE]

Type of Activity	Your position

9. What made you decide to go into business for yourself? _____
_____

10. Do you have or know of any job or business opportunity that might make you decide to close your furniture-making business?_____
_____

11. Have any other members of your family ever been in business? (1)Yes (2)No ____

[IF YES] Who,... (and have you assisted in the business in any way?)

Family member	Type of Business	Location	Your role?

BUSINESS START-UP:

12. Before you opened your business, did you try making furniture for sale?
(1) Yes (2) No _____

[**IF YES**, ASK ALL OF THE FOLLOWING QUESTIONS.
IF NO, GO ON TO QUESTION 13.]

a. When did you start doing this? Year/month:_____

b. About how many hours a week did you spend on this activity?_____

c. To whom did you sell this furniture? _____

d. Did anyone work with you during that time? (1) Yes (2) No _____

		(Put #)	Start date
[IF YES] On what basis?	Volunteer	_____	_____
	Piece work	_____	_____
	Permanent	_____	_____
	Trainee	_____	_____

e. What did you learn during this period that was helpful to you when you opened your business?

_____

_____

_____

f. What steps did you take to turn this activity into a full business?

_____

_____

_____

B. BUSINESS INFORMATION

13. In what year did **you** begin in this carpentry business? 19____

14. How did you acquire this carpentry business?

Founded it	[ ]
Bought it	[ ]
Took it over from parent or other family	[ ]
Other_____	[ ]

15. [IF DID NOT FOUND] When was the business first established? 19_____

16. How many people (including yourself) worked in the business . . .

	When started. . .	Now. . .
Proprietors		
Unpaid family		
Paid regular workers		
Paid casual workers		
Apprentices		
QUICK TOTAL		

SO, IN TOTAL, _____ PEOPLE WERE WORKING IN THE BUSINESS WHEN YOU FIRST STARTED IN 19__, AND ____ PEOPLE ARE WORKING IN THE BUSINESS NOW. [start chart below]

17. Think back to when you first opened with ____ people. . .

Who was the first person you either added or lost after opening. . . (who, when, why). . . second person. . . third person. . . etc. . . .

Worker type	Added/Lost	Year	Reason

18. What products do you make most frequently? (etc...)

Item	Weekly sales NOW*		Price Range NOW (hi/lo)	Average Returns NOW (hi/lo)	Weekly sales AT START*		
	good	bad			good	bad	avg
Beds							
Stools							
Coffee tables							
Chairs							
Cupboards							
Sofa sets							
Wardrobes							
Other:							

* Weekly sales in number of items, not value.

19. Have you tried producing other items that you are no longer making?
(1) Yes (2) No _____

[IF YES] What products, when, and why discontinued?

Other products	Started	Finished	Why discontinued?

20. Have you changed the style or characteristics of any of your products since you began making them? (1) Yes (2) No _____

[IF YES] What products have you changed, and how (and when and why)?

Item	Type of change	When?	Why change took place

21. [ASK IF STARTED BUSINESS BEFORE 1990]

In what year did you do the most business? 19____

Why do you think that business was at its best then?_____
_____

22. [ASK IF STARTED BUSINESS BEFORE 1990]

In what year did you do the least business? 19____

Why do you think that business was low at that time?_____
_____

Did you do anything specific to bring business back up?_____
_____

[ASK IF BUSINESS HAS EVER HAD WORKERS] Did you have to lay off workers during the period of poor business? (1) Yes (2) No _____

[IF YES] Did you lay them off permanently ____ or temporarily?_____

23. [ASK IF STARTED BUSINESS BEFORE 1990]

Are there certain times of the year when business is especially . . .

. . . good? (1) Yes (2) No _____ [IF YES] When?_____
. . . bad? (1) Yes (2) No _____ [IF YES] When?_____

24. Are there certain times of the month when business is especially . . .

. . . good? (1) Yes (2) No _____ [IF YES] When?_____
. . . bad? (1) Yes (2) No _____ [IF YES] When?_____

BUSINESS CLOSURE:

25. Have you had any periods when you have closed your business, then reopened after some time? (1) Yes (2) No _____

[IF YES] When, for how long, and why?

When?	Duration	Reason for Closure

[IF YES] What happened to the following while the business was closed?

Premises: _____

Workers (number at close=___): _____

Materials: _____

Finished Products: _____

Tools: _____

[IF YES] What steps did you take to re-open the business?_____
_____

[IF YES] What difficulties did you face in re-opening the business?_____
_____

[IF YES] How many people did you take on when you re-opened, and after who much time? _____

MARKETING CHANNELS:

26. To whom did you sell your furniture when you first started in the business (and now); and how important a market was (is) each? (Use ranking of markets in columns A and B, 1=most important, 2=next most important, etc.)

Marketing Channel	(A) At start	(B) Now	Developed/Stopped when, why, and how?
Kibera individuals			
Non-Kibera individuals			
City-based retailers			
Institutional buyers			
Other			

27. Did you make more products for display or for orders . . .

	. . .when started?	. . . now?
More for display	_____	_____
More for orders	_____	_____

[IF ANSWER CHANGED] Why did you change? _____

_____

INPUT PROCUREMENT:

28. What kind of wood did you use the most of . . .

When you started?_____ Now?_____

[IF ANSWER CHANGED] Why did you change? _____

_____

29a. Where did you purchase your wood when you first started in the business, and why there?

(Wood Type 1=_____):_____

(Wood Type 2=_____):_____

29b. Did you have special arrangements with your suppliers, such as:

	(1)	(2)
Bulk discounts	_____	_____
Credit	_____	_____
Free transport	_____	_____
Other_____	_____	_____

29c. Where do you currently purchase your wood, and why there?

(Wood Type 1=_____):_____
(Wood Type 2=_____):_____

29d. Do you currently have any special arrangements with your suppliers, such as:

	(1)	(2)
Bulk discounts	_____	_____
Credit	_____	_____
Free transport	_____	_____
Other_____	_____	_____

30. [IF ANSWERS TO 29a AND 29c ARE DIFFERENT] When and why did you change wood suppliers?
19___, _____

31a. Do you have any motor-driven machines? (1) Yes (2) No _____

[IF YES] What types of machinery do you have? And when was it purchased?

Type	Purchase date

[IF NO] Where do you go for your machine work (cutting, lathe work, etc.), and why there?

_____

31b. Have you gone to other machinists in the past? (1) Yes (2) No _____

[IF YES] Where?_____

[IF YES] When and why did you change? 19__, _____

LOCATION:

32. Where was your business located when it was first started?_____

Where is your business currently located?_____

[IF BUSINESS HAS MOVED] When and why did you move?_____

_____

MANAGERIAL CHANGES:

33. Have you changed any of the following aspects of your business?

Category of change	Nature of change	When?	Why?
Added space to workshop			
Changed workshop layout			
Changed pricing method			
Changed worker specialization			

34. In terms of bookkeeping and records, which of the following activities did you carry out in your business when it first started (and now)?

	Start	Now	When changed	Changed HOW and WHY?
Keep records of sales	Y/N	Y/N		
Keep records of costs	Y/N	Y/N		
Keep records of what customers owe you	Y/N	Y/N		
Set aside money for buying wood/tools	Y/N	Y/N		
Keep separate business and personal records	Y/N	Y/.N		
Have a business bank account	Y/N	Y/N		
Have a business licence	Y/N	Y/N		

BUSINESS CONSTRAINTS:

35: [ASK IF PERSON IN BUSINESS SINCE 1990] What is the biggest problem that has faced your business in the past year?

_____

What is the second biggest problem that has faced your business in the past year?

_____

Other current problems of note? _____

36. [ASK IF STARTED BUSINESS BEFORE 1990] What was the biggest problem that faced your business when it first opened?

_____

What was the second biggest problem that faced your business when it first opened?

_____

37. [ASK IF STARTED BUSINESS BEFORE 1990] Other than at the start or now, have you faced any particular difficulties?

_____

38. Have you ever had any problems with the authorities, such as:

Problem	When/how frequently?	With what effects?
Laws about workers		
Payment of taxes		
Licensing rules		
Security payments		
Party membership		
Demolitions		
Other:		

ASSISTANCE:

39. Has this business ever gotten any of the following types of assistance:

Type of assistance	Yes/No	When?	From whom?	Found useful?
Credit				
Marketing assistance				
Training				
Other:				

FUTURE PLANS:

40. Do you have plans to make any changes in this business in the near future?

(1) Yes (2) No _____

[IF YES] What kind of changes?

Type of Change	How to go about making the change	Expected Benefits

-- THANK YOU FOR YOUR ASSISTANCE AND PATIENCE--

<END OF FURNITURE-MAKING QUESTIONNAIRE>

SHOE SECTOR QUESTIONNAIRE:

* *

Respondent's Name: _____

Gender: _____

Enterprise Name: _____

Enterprise Location: _____

Enterprise ID: _____

Primarily Production or Service: _____

* *

Interview Date: _____

Interviewer: _____

Guide/Translator: _____

Time Start/Finish: _____ / _____

* *

INTRO: I WOULD LIKE TO ASK A FEW QUESTIONS ABOUT YOU AND YOUR BACKGROUND, THEN ASK YOU MORE ABOUT YOUR SHOE-MAKING BUSINESS.

A. PERSONAL/FAMILY INFORMATION

1. In what year were you born? 19___

2. What is your home district?_____ Location?_____

3. Do you live in Kibera? (1) Yes (2) No _____ [IF NO] Where?_____

4. Have you had any education? (1) Yes (2) No _____

   [IF YES] What types of education (formal and technical) have you had?

None			[ ]
Some Primary			[ ]
Completed Primary			[ ]
Some Secondary			[ ]
Completed Secondary			[ ]
Completed A-levels			[ ]
Technical school:	Type:_____	Length:_____	[ ]
	Type:_____	Length:_____	[ ]
University			[ ]
Other (specify:_____)			[ ]

5. Tell me about your apprenticeship and work experience, starting from the first position you held up until the time you started this business.

From /To	Position (proprietor/worker/apprentice)	Type of Business	Firm Type (formal/informal)

6. When did you first open this shoe-making business? 19___; Month: _____

7. At the time you started this shoe-making business, did you have any other jobs or business activities? (1) Yes (2) No _____

[IF YES, LIST HERE]

Type of Activity	Time spent per:

8. Apart from shoe-making, are you now involved in any other jobs or business activities? (1) Yes (2) No _____

[IF YES, LIST HERE]

Type of Activity	Time spent per:

9. What made you decide to go into business for yourself? _____
_____

10. Do you have or know of any job or business opportunity that might make you decide to close your furniture-making business?_____
_____

11. Have any other members of your family ever been in business? (1)Yes (2)No ____

[IF YES] Who,... (and have you assisted in the business in any way?)

Family member	Type of Business	Location	Your role?

BUSINESS START-UP:

12. Before you opened your business, did you try making shoes for sale or repairing shoes for money? (1) Yes (2) No _____

[**IF YES**, ASK ALL OF THE FOLLOWING QUESTIONS.
IF NO, GO ON TO QUESTION 13.]

a. When did you start doing this? Year/month:_____

b. About how many hours a week did you spend on this activity?_____

c. Who were your customers? _____

d. Did anyone work with you during that time? (1) Yes (2) No _____

		(Put #)	Start date
[IF YES] On what basis?	Volunteer	_____	_____
	Piece work	_____	_____
	Permanent	_____	_____
	Trainee	_____	_____

e. What did you learn during this period that was helpful to you when you opened your business?

_____

_____

_____

f. What steps did you take to turn this activity into a full business?

_____

_____

_____

EMPLOYMENT:

13. How many people (including yourself) worked in the business . . .

	When you first started. . .	Now. . .
Proprietors		
Unpaid family		
Paid regular workers		
Paid casual workers		
Apprentices		
QUICK TOTAL		

SO, IN TOTAL, _____ PEOPLE WERE WORKING IN THE BUSINESS WHEN YOU FIRST STARTED IN 19___, AND ____ PEOPLE ARE WORKING IN THE BUSINESS NOW. [start chart below]

14. Think back to when you first opened with ____ people. . .

Who was the first person you either added or lost after opening. . . (who, when, why). . . second person. . . third person. . . etc. . . .

Worker type	Added/Lost	Year	Reason

15. Did you spend more time making shoes or doing repair work . . .

	. . . when started?	. . . now?
More new shoes	_____	_____
More new shoes	_____	_____

16. What types of shoes do you sell OR services do you provide most frequently? (etc...)

Item	Weekly sales NOW*		Price Range NOW (hi/lo)	Average Returns NOW (hi/lo)	Weekly sales AT START*		
	good	bad			good	bad	avg
ON ORDER:							
DISPLAY:							
SERVICES (put number of customers per week)							
Large repairs							
Small repairs							
Other:							

* Weekly sales in number of items or number of customers, not value.

17. [ASK IF MAKES NEW SHOES] Would you say that you make more shoes for display or on orders . . .

	. . . now?	. . . at start?
More for display	_____	_____
More for orders	_____	_____

[IF ANSWER CHANGED] When and why did you change? 19___;

---

18. Have you tried making other types of shoes or providing other services that you are no longer involved in? (1) Yes (2) No _____

[IF YES] What types of shoes/services? (and when and why discontinued?)

Shoes/services	Started	Finished	Why discontinued?

19. Have you changed the way you make any type of shoe or do repairs since you started in this business? (1) Yes (2) No _____

[IF YES] What have you changed, and how (and when and why)?

Item	Type of change	When?	Why change took place

20. [ASK IF STARTED BUSINESS BEFORE 1990]

In what year did you do the <u>most</u> business? 19____

Why do you think that business was at its best then?_____

_____

21. [ASK IF STARTED BUSINESS BEFORE 1990]

In what year did you do the least business? 19____

Why do you think that business was low at that time?_____

_____

Did you do anything specific to bring business back up?_____

_____

[ASK IF BUSINESS HAS EVER HAD WORKERS] Did you have to lay off workers during the period of poor business? (1) Yes (2) No _____

SEASONALITY OF SALES:

22. [ASK IF STARTED BUSINESS BEFORE 1990]

Are there certain times of the year when business is especially . . .

. . . good? (1) Yes (2) No _____ [IF YES] When?_____
. . . bad? (1) Yes (2) No _____ [IF YES] When?_____

Are there certain times of the month when business is especially . . .

. . . good? (1) Yes (2) No _____ [IF YES] When?_____
. . . bad? (1) Yes (2) No _____ [IF YES] When?_____

23. [IF BAD TIMES EXIST] What strategies do you have for brining in business in slow times of the month or year?

_____

_____

_____

BUSINESS CLOSURE:

24. Have you had any periods when you have closed your business, then reopened after some time? (1) Yes (2) No _____

[IF YES] When, for how long, and why?

When?	Duration	Reason for Closure

[IF YES] What happened to the following while the business was closed?

Premises: _____

Workers (number at close=___): _____

Materials: _____

Finished Products: _____

Tools: _____

[IF YES] What steps did you take to re-open the business?_____

_____

[IF YES] What problems (if any) did you face in re-opening the business?_____

_____

MARKETING CHANNELS:

25. [ASK IF MAKES NEW SHOES]

To whom did you sell new shoes when you first started in the business (and now); and how important a market was (is) each? (Use ranking of markets in columns A and B, 1=most important, 2=next most important, etc.)

Marketing Channel	(A) At start	(B) Now	Developed/Stopped when, why, and how?
Kibera individuals			
Non-Kibera individuals			
City-based shoe retailers			
Institutional buyers			
Other			

SPECIALIZATION AND INPUT PROCUREMENT:

26. [ASK IF MAKES NEW SHOES]

Did you make more of your shoes from ready-make uppers or from flat leather . . .

	. . . when started?	. . . now?
From uppers	_____	_____
From flat leather	_____	_____

[IF ANSWER CHANGES] When and why did you change? 19_____;

_____

27. [ASK IF MAKES ANY SHOES FROM FLAT LEATHER]

Do you cut the leather yourself or send it out? (1) Self (2) Out _____

Same since start? (1) Yes (2) No ____; [IF NO] When changed? 19___

Do you stitch the leather yourself or send it out? (1) Self (2) Out _____

Same since start? (1) Yes (2) No ____; [IF NO] When changed? 19___

[ASK IF STITCHES FOR SELF] Do you have a sewing machine?
(1) Yes (2) No ____

[IF YES] When did you buy it? 19_____

[ASK IF SENDS OUT FOR STITCHING] Where do you go for stitching uppers?

_____

Who actually does the stitching there? Self _____ Machine operator _____

Have you gone elsewhere for stitching in the past? (1) Yes (2) No _____

[IF YES] Where?_____

[IF YES]When and why did you change? 19___; _____

28. When you first started in the business, where did you go for the following supplies? . . . And now?. . . . What are the reasons for your choice? [IF CHANGED, ask when and why]

Type of material	Major source at start	Major source currently	When?	Reason for choice/ Why changed?
Leather				
Uppers				
Soles				
Misc. (glue, thread, eyes, etc.)				
Other:				

LOCATION:

32. Where was your business located when it was first started?_____

Where is your business currently located?_____

[IF BUSINESS HAS MOVED] When and why did you move?_____

MANAGERIAL CHANGES:

30. Have you changed any of the following aspects of your business?

Category of change	Nature of change	When?	Why?
Added space to workshop			
Changed workshop layout			
Changed pricing method			
Changed ways in which workers are organized or specialized			

34. In terms of bookkeeping and records, which of the following activities did you carry out in your business when it first started (and now)?

	Start	Now	When changed	Changed HOW and WHY?
Keep records of sales	Y/N	Y/N		
Keep records of costs	Y/N	Y/N		
Keep records of what customers owe you	Y/N	Y/N		
Set aside money for buying leather/tools	Y/N	Y/N		
Keep separate business and personal records	Y/N	Y/.N		
Have a business bank account	Y/N	Y/N		
Have a business licence	Y/N	Y/N		

BUSINESS CONSTRAINTS:

32: [ASK IF PERSON IN BUSINESS SINCE 1990] What is the biggest problem that has faced your business in the past year?

_____

What is the second biggest problem that has faced your business in the past year?

_____

Other current problems of note? _____

33. [ASK IF STARTED BUSINESS BEFORE 1990] What was the biggest problem that faced your business when it first opened?

_____

What was the second biggest problem that faced your business when it first opened?

_____

Other start-up problems of note? _____

34. [ASK IF STARTED BUSINESS BEFORE 1990] Other than at the start or now, have you faced any particular difficulties?

_____

35. Have you ever had any problems with the authorities, such as:

Problem	When/how frequently?	With what effects?
Laws about workers		
Payment of taxes		
Licensing rules		
Security payments		
Party membership		
Demolitions		
Other:		

ASSISTANCE:

36. Has this business ever gotten any of the following types of assistance:

Type of assistance	Yes/No	When?	From whom?	Found useful?
Credit				
Marketing assistance				
Training				
Other:				

FUTURE PLANS:

37. Do you have plans to make any changes in this business in the near future?

(1) Yes (2) No _____

[IF YES] What kind of changes?

Type of Change	How to go about making the change	Expected Benefits

-- THANK YOU FOR YOUR ASSISTANCE AND PATIENCE--

<END OF SHOEMAKING QUESTIONNAIRE>

APPENDIX C

CALCULATIONS OF THE STARTING SIZE EFFECTS ON GROWTH

APPENDIX C

CALCULATIONS OF THE STARTING SIZE EFFECTS ON GROWTH

As mentioned in Chapter III, the coefficients for the continuous variables reported in Table 3.1 cannot be interpreted simply as a linear relationship between firm starting size and growth. This is due to the specification of the dependent variable, where growth was defined as:

$$(3.3)\quad \text{Growth} = \frac{\ln(\#\text{ Workers Currently}) - \ln(\#\text{ Workers at Start})}{\text{Enterprise Age}}$$

Indeed, while the coefficient from the log-log WLS equation for starting size is -.089, the actual effect of starting size on growth varies depending on the age of the business (given the presence of age in the denominator) and on the number of workers added. In total, three findings appear when calculating the effects of starting size on growth according to the formula above:

- For a given starting size, the older a business is, the smaller the effect of starting size on growth.
- For a given starting size, the more workers the firm adds (that is, the larger the current size of the firm), the larger the effects on growth.
- The larger the number of workers at start, the smaller the values and lower the range of values for the coefficient on starting size becomes.

To illustrate these findings, two tabular examples are provided below. Table C.1 shows the calculations of Equation 3.3 for enterprises starting with only one worker: purely self-employment activities. Because the smallest enterprises show the highest range of values and the largest effect of starting size on growth, this table gives an idea of the possible extremes for the sample.

Table C.1
Effect of Additional Workers at Start on Growth;
Starting Size: One-worker firms

	Age of Enterprise		
# Workers Added	1	3	5
1	-.062	-.021	-.012
3	-.123	-.041	-.025
5	-.159	-.053	-.032

Of note is the range of values, from -1.2% to -15.9%. Indeed, the range is sufficiently broad to include values that might be considered "small", as well as those that are quite substantial. To interpret this table, it appears that, for those businesses starting with one worker that add three workers and are five years old, growth slowed by 2.5% due to the addition of each supplementary worker. If five workers are added over five years, growth slows by 3.2% for each new worker the firm hires.

Now it is interesting to take a group of firms that represent larger enterprises: those with five workers at start. Table C.2 below shows the range of values for the coefficient on starting size.

Table C.2
Effect of Additional Workers at Start on Growth;
Starting Size: Five-worker firms

	Age of Enterprise		
# Workers Added	1	3	5
1	-.016	-.005	-.003
3	-.042	-.014	-.008
5	-.062	-.021	-.012

In this case, the range has narrowed considerably, with the coefficient value falling between -0.3% and -6.2%. Overall, these values are smaller than those for enterprise starting with one worker. All of this points to the relative nature of the coefficients in this model, and encourages the reader to interpret with care.

LIST OF REFERENCES

LIST OF REFERENCES

Allen, Bruce T. Managerial Economics. New York: Harper and Row, Publishers, 1988.

Allison, Paul. "Event History Analysis: Regression for Longitudinal Data," Quantitiative Applications in the Social Sciences Series No. 46. Newbury Park, CA: Sage Publications, 1984.

Boomgard, James J., Stephen P. Daves, Steven J. Haggblade and Donald C. Mead. "A Subsector Approach to Small Enterprise Promotion and Research," GEMINI Working Paper No. 10. Bethesda, MD: Development Alternatives, Inc., 1991.

Brock, William A. and David S. Evans. The Economics of Small Businesses: Their Role and Regulation in the U.S. Economy, A CERA Research Study. New York: Holmes and Meier, 1986.

Cely, Patricia. "Microempresas y Pequenas Empresas De Mujeres en la Republica Dominicana: Resultados de une Encuesta Nacional," Santa Domingo, Dominican Republic: FondoMicro, June 1993.

Chuta, Enyinna and Carl Liedholm. Employment and Growth in Small-Scale Industry. New York: St. Martin's Press, 1985.

Cortes, Mariluz, Albert Berry and Ashfaq Ishaq. Success in Small and Medium-Scale Enterprises: The Evidence from Colombia, A World Bank Research Publication. New York: Oxford University Press, 1987.

Dielman, Terry E. Pooled Cross-Sectional and Time Series Data Analysis, New York: Marcel Dekker, Inc., 1989.

Downing, Jeanne. "Gender and the Growth and Dynamics of Microenterprises," GEMINI Working Paper No.5. Bethesda, MD: Development Alternatives, Inc., 1990.

_____ and Lisa Daniels. "The Growth and Dynamics of Women Entrepreneurs in Southern Africa," GEMINI Technical Report No. 47. Bethesda, MD: Development Alternatives, Inc., August 1992.

Dunne, Timothy, Mark J. Roberts and Larry Samuelson. "TheGrowth and Failure of U.S. Manufacturing Plants," Quarterly Journal of Economics, Vol. 104, No. 4, 1989.

Eckstein, Zvi and Kenneth I. Wolpin. "The Specification and Estimation of Dynamic Stochastic Discrete Choice Models: A Survey," The Journal of Human Resources, Vol. XXIV, No. 4, pp. 562-598, 1989.

Ericson, Richard and Ariel Pakes. "An Alternative Theory of Firm and Industry Dynamics", mimeo, September 1989.

Evans, David S. "The Relationship Betwen Firm Growth, Size, and Age: Estimates for 100 Manufacturing Industries," The Empirical Renaissance in Industrial Economics, Bresnahan, Timothy and Richard Schmalensee, eds. New York: Basil Blackwell, 1987.

_____. "Tests of Alternative Theories of Firm Growth," Economic Research Report #86-36, C.V. Starr Center for Applied Economics. New York: New York University, December 1986.

Gupta, S.K. "Gender Differentiation and Adjustments: Agenda for the 1995 Beijing World Conference on Women," paper prepared for UNIFEM, New York, March 1994.

Hall, Bronwyn H. "The Relationship Between Firm Size and Firm Growth in the US Manufacturing Sector," The Empirical Renaissance in Industrial Economics, Bresnahan, Timothy and Richard Schmalensee, eds., New York: Basil Blackwell, 1987.

Hamermesh, Daniel S. Labor Demand, Princeton, NJ: Princeton University Press, 1993.

Heckman, James. "The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and a Simple Estimator for Such Models," Annals of Economic and Social Measurement, 5, 1976.

Hsiao, Cheng. Analysis of Panel Data, Econometric Society Monographs No. 11, New York: Cambridge University Press, 1986.

International Labour Organization. "Employment, Incomes and Equality: A Strategy for Increasing Productive Employment in Kenya," Geneva, 1972.

Jovanovic, Boyan. "Selection and Evolution of Industry," Econometrica, Vol. 50, No. 3, pp. 649-670, May, 1982.

Kennedy, Peter. A Guide to Econometrics, Second Edition,Cambridge, MA: MIT Press, 1986.

Kilby, Peter. "Hunting the Huffalump", in Entrepreneurship and Economic Development, Peter Kilby, ed., New York: The Free Press, 1971.

Kmenta, Jan. Elements of Econometrics, Second Edition, New York: McMillan Publishing Company, 1986.

Kuh, E. "The validity of cross-sectionally estimated behavior equations in time series applications," Econometrica, 27, pp. 197-214, 1959.

Liedholm, Carl and Donald Mead. "Small Scale Industries in Developing Countries: Empirical Evidence and Policy Implications," MSU International Development Paper No. 9. East Lansing, MI: Department of Agricultural Economics, Michigan State University, 1987.

Little, Ian M.D., Dipak Mazumdar and John M. Page, Jr. Small Manufacturing Enterprises: A Comparative Analysis of India and Other Economies, A World Bank Research Publication. New York: Oxford University Press, 1987.

Lucas, Robert E. Jr. "On the Size Distribution of Business Firms," Bell Journal of Economics, Vol. 9, No. 2, pp. 508-523, 1978.

Manski, Charles F. "Anatomy of the Selection Problem," The Journal of Human Resources, Vol. XXIV, No. 3, pp. 343-360, 1989.

Mason, William and Steven Fienberg. Cohort Analysis in Social Reserach: Beyond the Identification Problem. New York: Springer-Verlag, 1985.

McPherson, Michael A. Growth and Survival of Small Southern African Firms, Ph.D. Dissertation, Michigan State University, 1992.

_____. "Growth of Small Enterprises in Southern Africa," Journal of Development Economics, forthcoming.

_____ and Joan C. Parker. "A Manual for Conducting Baseline Surveys of Micro- and Small-Scale Enterprises." Bethesda, MD: Development Alternatives, Inc., February 1993.

Mead, Donald C. "The Contribution of Small Enterprises to Employment Growth in Southern Africa," World Development, forthcoming.

Parker, Joan C. "Micro- and Small-Scale Enterprises in Kenya: Results of the 1993 National Baseline Survey," GEMINI Technical Report No. 75. Bethesda, MD: Development Alternatives, Inc., March 1994.

_____. "Why Workers Come and Go: An analysis of labor supply and demand patterns in Kenyan microenterprises," mimeo, 1991.

_____ and C. Aleke Dondo. "Kenya: Kibera's Small Enterprise Sector -- Baseline Survey Report," GEMINI Working Paper No. 17. Bethesda, MD: Development Alternatives, Inc., April 1991.

Peters, H. Elizabeth. "Retrospective versus panel data in analyzing life cycle events," Journal of Human Resources, Vol. 23, No. 4, Fall 1988, pp. 488-513.

Phillips, Bruce D. and Bruce A. Kirchhoff. "Analysis of New Firm Survival and Growth", paper presented at Babson Entrepreneurship Research Converence, Calgary, Canada, May 1988.

Ryder, Norman B. "The Cohort as a Concept in the Study of Social Change," Chapter 2, Cohort Analysis in Social Research, William M. Mason and Stephen E. Feinberg, eds., New York: Springer-Verlag, 1985.

Simon, Herbert A. and Charles P. Bonini. "The Size Distribution of Business Firms," American Economic Review, Vol. 48, No. 4, pp. 607-617, 1958.

United Nations Development Programme. African Development Indicators, Washington, DC: International Bank for Reconstruction and Development, 1992.

USAID/Kenya. "Estimates of Employment Provision by Sector", Mimeo, extracted and updated from 1992 Annual Performance Indicator report, 1993.

Vijvergberg, Wim P. M. "Profits from self-employment," LSMS Working Paper No. 43. Washington, DC: World Bank, April 1988.

World Bank. Kenya: Re-investing in Stabilization and Growth through Public Sector Adjustment, A World Bank Country Study, Washington, DC: International Bank for Reconstruction and Development, 1992.

_____. Sub-Saharan Africa: From Crisis to Sustainable Growth, A Long-term Perspective Study, Washington, DC: International Bank for Reconstruction and Development, 1989.

_____. World Development Report 1993: Investing in Health, New York, NY: Oxford University Press, 1993.