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RISK AND FIRM GROWTH  
The Dilemma of Nairobi's Small-scale  
Manufacturers

by

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## RISK AND FIRM GROWTH

### The Dilemma of Nairobi's Small-scale Manufacturers

#### ABSTRACT

In Nairobi, where the economic and social consequences of business failure are high, entrepreneurs' risk-management strategies work separately and together to discourage firm growth. Many manage risk through flexibility. By working in rent-free quarters, using family labour and little capital, they minimize fixed costs and increase opportunities for additional income. Business owners also avoid risk by manufacturing standard products for a known market. Successful entrepreneurs diversify their income and assets rather than expanding one enterprise. Finally, most prefer to preserve land and other assets unencumbered by debt. These rational responses to a risky business environment inhibit formation of a dynamic manufacturing sector. Policymakers, NGOs, and the private sector can help by creating broad policies and targeting specific programmes to remove or reduce risk.

INTRODUCTION<sup>1</sup>

In Nairobi, as in cities throughout Africa, Asia, and Latin America, small-scale manufacturers use simple tools and technology. Most produce basic goods for local people; a few make specialty items for the tourist and export markets. Some are *jua kali* artisans while others work in market stalls or small workshops.<sup>2</sup> The firms are very small: few will ever have more than six workers.<sup>3</sup> Many businesses, including some of the smallest, generate a reasonable income and provide short-term solutions to problems of unemployment nationally. But without more medium-sized firms, Kenya will have difficulty meeting its long-term goals of employment creation, efficient production, and technological development.

Firms can begin in the medium range, or move into it from above or below. This article focuses on growth from small to medium. More precisely it explores the impact of risk on the growth of Nairobi's small manufacturers. The article has four parts. Part 1 summarises the theoretical arguments for increasing the proportion of medium-size firms. Part 2 reviews factors known to inhibit firm growth, exploring in detail the effects of risk. Part 3 presents evidence that entrepreneurs' risk management strategies prevent the growth of micro-manufacturers into small and medium enterprises. Finally, Part 4 draws conclusions from the findings. Before taking up the substantive discussion, a word on size is in order.

Both measurement and classification into size categories are problematic. Size is measured in different ways. A gauge combining employment, capital, and output is theoretically best, but the

unavailability or unreliability of capital and output figures frequently require use of categories based on employment alone. Worker skill is also an issue. Many studies of small enterprise exclude firms composed of professionals or technically skilled workers. Kenya's urban labour force survey, for example, uses a combination of owner qualifications and an income ceiling to eliminate self-employed professionals from its study of informal enterprises (Ritter and Robicheau 1988). The discussion of small and medium enterprises is further complicated by the different meanings attached to "small" and "large" in industrialised and developing countries. Even for developing countries, size categories vary from one place and one researcher to another.<sup>4</sup>

Without minimising the theoretical importance of considerations of capital, output, owner qualifications, or regional differences in definitions, I believe that in the present study a case can be made for grouping businesses according to employment only. Within specific branches of manufacturing, employment size is strongly related to both capital size and output levels (Little, Mazumdar, and Page 1987, p. 129-30). Grouping on the basis of numbers of workers, therefore, can be a reasonable proxy for a more complex size measure. Limiting the study to certain branches of manufacturing also automatically eliminates the professional firm. Finally, the study deals mainly with Kenya. International comparisons are most appropriately made with other developing countries. Using an employment size criterion facilitates comparison with other small-enterprise studies, most of which use a similar measure. My empirical analysis uses four categories: *very small* businesses have six or fewer workers, *small* enterprises have 7-10 workers, *medium-size* firms have 11-50 workers, and *large enterprises* have over 50 workers. The theoretical discussion follows the same classification as far as possible. Both recognise that many factors -- including the sometimes imprecise definition of a "regular

worker" -- makes class assignment difficult. Category differences are noted as necessary.

#### 1. THE ARGUMENT FOR MORE SMALL- AND MEDIUM-SIZE ENTERPRISES

Firm size in itself has little economic consequence. Its importance lies in its relationship to development and, in particular, to the goals of industrialisation. Studies indicate that firms of different sizes contribute differently to absorption of unskilled labour, efficient resource use, and development of technological capacity. A manufacturing sector with a mix of firm sizes improves prospects for stable, equitable growth.

#### Distribution of Firm Sizes

In the simplified world of textbook economic theory all firms in an industry are the same size. The theory assumes that an unlimited number of firms have access to the same production technology. If this technology exhibits decreasing returns to scale beyond some point, all firms should be the same size.<sup>6</sup> In fact, in both industrialised and developing countries, firms of various sizes coexist even within an industry. Industry size distributions tend to be highly skewed, with a few large firms and many small ones.

Industrial size distributions in developed and developing countries differ in one important respect. Developing country industry often lacks medium-sized firms. Staley and Morse (1965, p. 22) long ago observed that foreign investment and capital-intensive technologies allow some factories to start large, while the scarcity of local capital ensures that most new indigenous firms will be small. Early industrialisation, therefore, is characterised by a "hollow" or "excluded" middle in the size structure.

They predicted that, as the most successful small firms grow, the hollow would fill in and the distribution of employment across firm sizes come to resemble that of industrialised countries.

Yet in many countries, even after twenty, thirty, or more years of building an industrial sector, the "missing middle" remains.<sup>1</sup> The availability of significant amounts of merchant capital, direct investment by the state, and the allocation of public funds for indigenisation measures have allowed the formation of large manufacturing firms in Africa (Swainson 1980, Kennedy 1988). At the other end of the spectrum are the thousands of businesses that begin with minimal capital and remain very small. The middle range remains virtually empty.

Although data in Table 1 are not strictly comparable because they come from different years and, in some cases, use slightly different size categories, they illustrate this "hollow" for several developing countries' industrial structures. For example, nearly half of Kenya's 1969 manufacturing employment was in enterprises with fewer than five workers, 41 percent was in large-scale, and a mere ten percent fell in the small-medium category. A recent survey of the garment industry in Nairobi suggests that the distribution of employment has changed little in 20 years.

Looking at firms rather than employment gives a somewhat different picture. Rather than a "missing middle," the typical industry distribution of firms in both industrialised and developing countries has a pronounced rightward skew with a few large firms and many small ones. In Nairobi's garment industry, for example, 94 percent of the firms are very small, 4.6 percent small and medium, and 1.4 percent large. Although the skew is less pronounced in industrialised countries, the smallest firms still predominate. Birch (1987) reports that 83.4 percent of U.S. firms have 0-19

employees, 9.9 percent have from 20 to 99, and only 6.6 percent have 100 or more. It is important to note, however, that apparently small variations in the shape of the distribution of firms sizes can translate into significant differences in total employment. A hypothetical distribution of Nairobi's 2,200 garment firms that had only 83 percent in the very small category, 16 percent small and medium, and 1 percent large would employ 65 percent more workers.



Table 1: Distribution of Manufacturing Employment among Cottage Shop, Small and Medium Industry, and Large Industry: Selected Economies and Years (percent)

Economy	Year	Cottage Shop (1-4 workers)	Small-medium Industry (5-49 workers)	Large Industry (100+ workers)
United States	1967	1	22	77
Japan	1975	19 <sup>a</sup>	37 <sup>b</sup>	44
Colombia	1973	49	16 <sup>f</sup>	35 <sup>g</sup>
Korea	1975	36	17	47
Turkey	1977	50	14 <sup>f</sup>	36 <sup>g</sup>
Philippines	1975	66 <sup>e</sup>	8 <sup>b</sup>	26
Nigeria	1972	59 <sup>a</sup>	15 <sup>d</sup>	26
Kenya	1969	49	10	41
Kenya (garment industry, Nairobi only)	1989	42 <sup>c</sup>	11 <sup>d</sup>	47 <sup>e</sup>

Source: Data for United States, Japan, Korea, Philippines, and Kenya (1969) are as compiled from a variety of sources by Cortes, Berry, and Ishaq (1987, Table 1-1). Nigerian data are from Page (1979, p. 2). Data for Turkey and Colombia come from Anderson (1982, p. 916). Data for Kenyan garment industry (1989) are from my own census.

## NOTES:

- <sup>a</sup> Establishments with 1-9 workers.
- <sup>b</sup> Establishments with 10-99 workers.
- <sup>c</sup> Establishments with 1-6 workers.
- <sup>d</sup> Establishments with 7-50 workers.
- <sup>e</sup> Establishments with more than 50 workers.
- <sup>f</sup> Establishments with 5-49 workers.
- <sup>g</sup> Establishments with 50 or more workers.

#### Firm Size and Development Goals

Increasing the proportion of medium enterprises not only boosts total employment, it also provides more jobs suitable for the unskilled labourers developing countries have in abundance and improves prospects

for efficiency and technological development.

#### *Employment Creation*

Because few developing countries can absorb their rapidly growing populations into agriculture, they must look to industry for employment opportunities. Industry is often defined as covering four divisions of the United Nations International Standard Industrial Classification: mining, manufacturing, construction, and public utilities. This study, however, gives most attention to manufacturing and often uses the term "industry" to mean "manufacturing" or "manufacturing sector."

Industry's employment creation capability rests on two key variables: labour intensity and worker skill requirements. Both vary with firm size, though not in the direct linear relationship small enterprise advocates often assume. Small industry is widely believed to be more labour intensive than large. Furthermore, it is assumed that small firms use mainly unskilled labour. If both are true, then investment in small firms should produce more jobs for unskilled workers than investment in large firms.

This analysis, while broadly accurate, ignores two important facts. First, the relationship between firm size and labour intensity is not uniformly decreasing. Second, the smallest firms often require workers to have more skills than slightly larger firms. Little (1987) reports that when industry data are disaggregated, smaller firms are less likely to show as more labour intensive than large. The greater the disaggregation, the less frequently were smaller enterprises found to be more labour intensive (Little, Mazumdar, and Page 1987, p. 125). Furthermore, even without disaggregation, the smallest size group (fewer than 10 workers) was not the most labour intensive. Little (1987, p.

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212), reporting on studies of three industries, notes that the proportion of unskilled workers tends to rise as firms move into the medium range (around 25 workers). Thus medium size industry -- not microenterprise -- seems best able to provide jobs for unskilled workers.

### *Efficiency*

The second argument for more medium-size firms is their efficient use of resources. Enterprises with fewer than ten workers rarely have high capital productivity or technical efficiency. Studies of Korean and Indian industries show that very small firms are not the most productive users of capital (Little 1987, p. 209). Colombian data comparing total factor productivity as measured by benefit-cost ratios found medium-size firms more productive than small ones (Cortes, Berry, and Ishaq 1987, p. 134). My study of Nairobi's garment manufacturers found that workers in small and medium firms are significantly more productive than those in very small units (See Table 2). Value added per worker was 57 percent higher in the small (7-10 worker) firm than in a 4-6 person firm, and 102 percent higher than in a 2-3 person firm.

Table 2: Nairobi Garment Manufacturers: Value-added per worker, by size of firm

Firm size	Value-added per worker per year (K.shs)
1 person	21,528
2-3 person	17,151
4-6 person	22,169
7-10 person	34,698
11-50 person	35,621
over 50 persons	34,724

Significance of F-statistic for difference in means is .0013.

The greater efficiency of small and medium enterprises is especially important in labour-abundant, capital-scarce economies like Kenya's.

#### *Technological Development*

The technological improvement that occurs in the process of growth from very small to small and medium enterprise seems especially beneficial to the developing country since it represents the fruit of local learning. Firms that remain very small can contribute little to the development of technology in the industry. They almost always use the simplest technology available and, even if they have innovative ideas, may lack the capital to develop them for use elsewhere. Slightly larger firms, on the other hand, tend to adopt more sophisticated processes (Cortés, Berry, and Ishaq 1987, p. 202).

Thus, theory and the experience of other developing countries suggest that firms should be encouraged to grow beyond microenterprise toward the

medium range to enable the manufacturing sector to provide more jobs for those with few skills, improve its use of scarce resources, and open the way for technological development. Although a thorough testing of these arguments on Kenyan manufacturing data is beyond the scope of this paper, preliminary indications are that Kenyan industry is similar enough to that of other developing countries to make a case for increasing the proportion of small and medium enterprises. Why, then, do most businesses remain very small? The answer to this question lies in examining both the incentives and the barriers to growth.

## 2. GROWTH OR STAGNATION

Firms grow because those directing them value expansion and can seize opportunities and overcome obstacles to creating a larger enterprise. Firms stagnate when growth brings little reward or when barriers seem insurmountable. If growth will benefit the economy, then policymakers must ease the way or -- to use a favourite phrase from Kenya's current Development Plan -- "create an enabling environment" for firm growth (Kenya 1988). Effective policies must be grounded on an understanding of the economic and non-economic factors promoting and discouraging small-firm expansion.

### Economic Benefits of Growth

Economic rewards, though not the only reason for firm growth, are powerful incentives. The promise of scale, size, or growth economies impels entrepreneurs to expand output and/or to move into new product lines.

*Scale Economies*

Economies of scale are an obvious economic incentive to firm growth. In some industries, increasing returns to scale promise greater output without proportionate cost increases. The range of efficient firm sizes depends on the exact shape of an industry's production function. The horizontal function characteristic of average costs that are nearly independent of size allows a wide range of sizes, whereas a strongly U-shaped average cost curve produces a narrower range. A monotonically and strongly decreasing curve provides the strongest incentive to growth. Empirical results from India suggest that in developing economies, constant returns to scale are as common as the classic U-shaped average cost curve (Little, Mazumdar, and Page 1987, pp. 173-80). Thus in many industries, lack of scale economies could leave business owners indifferent to growth. If other growth incentives are weak or missing, and barriers are formidable, firms will remain small.

Even when scale economies exist, their effect on firm growth is unclear. One problem is that, even within the same industry firms may use different technologies. A typical pattern, especially where labour is relatively expensive, is for small firms to use labour-intensive technologies, while larger firms replace labour with capital. Sometimes the larger, capital-intensive firms can produce a given level of output at a lower marginal cost than smaller labour-intensive firms, but smaller firms' greater flexibility in meeting changes in supply or demand markets may give them lower average costs. It is impossible in such industries to identify a single optimal firm size from the point of view of technology alone (Mills 1984, Brock and Evans 1989). A further problem lies in the difficulty of measuring scale economies resulting from differences in product mix among firms of various sizes. In metal work, for example, the smallest firms

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often concentrate on making simple stoves and cooking utensils from scrap metal while larger ones manufacture iron gates, doors, and windows using new materials and more advanced technology. Larger firms' higher profits may be due as much to the market for their more sophisticated products as to lower per unit output costs.

### *Economies of Size and Economies of Growth*

Discussion of the production function and economies of scale focus on the manufacture of a single product or a narrow range of products. Yet larger firms producing many items have advantages even when product-specific scale economies are weak or non-existent (Penrose 1959, p. 89; Scherer 1980, p. 93; Storper and Walker 1989, pp. 130-31). Larger firms can afford to have machinery in reserve, thus avoiding costly production delays. The workforce in a larger firm can become more proficient at their tasks. Larger firms can afford specialised administrative and financial personnel who can devote themselves to increasing efficiency. Thus a larger firm can sometimes produce more cheaply than a smaller one, simply because it is large. Small firms, seeing these economies of size, are encouraged to grow.

Penrose (1959, pp. 100-102) identified another incentive to growth in the growth process itself. She observed that under some circumstances a particular firm may be able to exploit a profitable opportunity better than any other firm, larger or smaller. The unused knowledge and productive services existing within that firm -- what Penrose calls "economies of growth" -- encourage expansion. Such economies are transitory, disappearing once the business established the new activities and integrates them into the operations.

### Market Size

Average industry plant sizes in developed countries are uniformly higher. In part this is due to a higher ratio of wage costs to capital costs than in developing countries (Cortes, Berry, and Ishaq 1987, pp. 20-21). More important is the size of the market, reflecting higher national income and better transportation and communication networks. In industries where economies of scale exist, establishments can be expected to grow as the market expands, growth of local demand or by entry into foreign markets through exporting.

Developing country markets are often small because of small total populations and, more importantly, the small proportion of the population able to afford anything beyond basic necessities. A small market constrains firm growth. In the short run, governments can help to expand the market by improving infrastructure to enable firms to reach a larger segment of the domestic market, or by offering incentives to export production. The best long-run measures are, of course, those that increase demand by boosting incomes.

Some entrepreneurs respond to a small market by diversifying into unrelated activities. Thus, the owner of the village butchery may buy a bus or begin renting rooms. Even when the market for fresh meat is too small to permit expansion of the butchery, the business interests of the creative entrepreneur need not be limited.

### The Risky Business Environment

The size of a firm at any given moment is the result of continuous conscious and unconscious decisions. Economies of scale and growth are important, especially when expansion is being actively considered. Yet other factors may be equally crucial in the day-to-day operations that



ultimately determine firm size. This paper emphasizes the particular role of one of these -- the risky business environment -- in deterring growth. The paper's central thesis is that business owners' responses to risk and uncertainty inhibit growth of their firms. The thesis raises several conceptual and empirical questions. What are risk and uncertainty? How do most people respond to risk? How do business owners' risk management strategies prevent their firms from growing?

Risk and uncertainty are common words with technical meanings. In modern decision theory, uncertainty is a state of mind in which the individual perceives alternative outcomes to a particular action (Roumasset 1979, p. 4). Knight's ([1921] 1985) classic treatise distinguished "risks," for which the probabilities of the outcomes can be estimated, from "uncertainty," which deals with situations that do not permit quantitative determination of probability. Yet if we assume that experienced business owners can make subjective probability estimates for most events likely to affect their businesses, the distinction becomes practically unimportant. I will, therefore, use the terms "risk" and "uncertainty" interchangeably.

Small-scale manufacturers face two main types of risk. The first, which Lipton (1979, p. 352) calls "background risk," is the ever present possibility of widespread economic or political collapse or personal misfortune. The second type relates directly to the business and includes production and market risks. Because in less developed countries risks are relatively large, incomes low, and risk-spreading options few, attitudes to risk can be important determinants of decision-making (Moscardi and de Janvry 1977, Newberry and Stiglitz 1981, p. 105).

#### *Responses to Risk*

Individuals may embrace risk or shun it. Most are somewhat risk-

averse, preferring riskless or low-risk situations. Risk aversion actually covers several distinct attitudes with different resulting behaviours (Lipton 1979). One form is fluctuation aversion, in which an individual prefers a lower certain return to a variable one with a higher expected value.<sup>1</sup> A second type of risk aversion is the safety-first approach in which risk is the probability that returns will fall below some "disaster level" (Roumasset 1979, pp. 95-100). Day (1979) delineates a third theoretical model which he calls "cautious suboptimising." The model has three central ingredients: safety, danger, and experience. The individual perceives a safety zone of familiar patterns and activities, and danger in the unknown. Feelings of danger may arise from the background or business risks already described, or more generally from lack of information and understanding of the environment. In this model, decision-makers prefer to choose from options in the safety zone. When no feasible choices lie in the safety zone, they move out, but only to the option closest to the safety-zone boundary. Unlike fluctuation aversion or a safety-first approach, the model provides for feedback. Experience may enlarge or reduce an individual's safety zone, and, at the same time, the individual's choices influence the environment.

Much more research is needed to identify the risk model that best describes small business behaviour. Even if we concede that owners of small businesses in developing countries, like small farmers, are probably moderate to intermediate risk averters, we cannot easily pinpoint their primary motivation (Roumasset 1979, Binswanger and Sillers 1983). A "safety-first" notion of risk aversion, with business owners' risk management strategies centring on insuring some predetermined minimum income, seems plausible. Yet Day's (1979) cautious suboptimising allows for more complex motivations and may come closer to describing actual business

behaviour. If so, business owners establish their safety zones in terms of enterprise size, location, and product mix and then operate as far as possible within its boundaries.

Whatever form risk aversion takes, the strategies for minimising the negative consequences of risk are the same. Risk averse business owners can spread the risk, avoid it, or seek compensation. Risk spreading, corresponding to Knight's ([1921] 1985, pp. 239-47) notions of grouping and diffusion, involves dispersing potential losses among many. Sharing losses through insurance is an obvious and common form of risk spreading. Another is diversification. It is important here to note that although diversification is an important risk management strategy, not every move to diversify is motivated by risk. The village butcher cited earlier diversified in response to market size rather than risk.

Avoidance is the second method of dealing with uncertainty. Business owners avoid risk by choosing predictable activities over more speculative ones or by adopting structures and methods of operation that allow them to minimise unavoidable losses. One risk-avoiding strategy is to produce goods or services yielding a stable income; another is to specialise in areas for which the enterprise has substantial reserves of expertise (Penrose 1959, p. 140). Since a major source of risk is the unknown future, businesses also avoid risk by amassing information that will improve their predictive ability. Another risk avoidance strategy is flexibility (McCormick 1988, 1991). The flexible business is ready to move in whatever direction will increase profits or minimise losses.

When risks cannot be shared or avoided, rational people expect compensation. The standard explanation of interest rate differences relates the additional return to the increased risks involved in speculative investments. For businesses, the "principle of increasing risk" states that

as a firm expands its investment, the risk of a given chance of loss becomes more serious with each increment of investment (Penrose 1959, p. 57; Kalecki 1937). The business owner who continues to invest under such circumstances will expect higher returns for the additional risk.

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Under uncertain conditions firms tend to operate at suboptimal sizes (Lipton 1979, pp. 347-48). Entrepreneurs may either adopt conservative financial policies and restrict expansion, or plan their expansion to minimise risk (Penrose 1959, pp. 61-64). In the first case, the effect of risk on growth is direct and obvious. The indirect effects of the second are no less real. Business owners, baulking at further risk, look for safe ways to expand their interests. Possibilities include diversifying activities, protecting themselves by backward or forward integration, or adopting short-run flexible programmes easily modified when conditions change. All of these will be explored in detail for the Nairobi case.

### 3. RISK AND SMALL-SCALE ENTERPRISE

Small-scale entrepreneurs in Nairobi are probably no more risk-averse than most people, but their particularly uncertain environment forces them to weigh risk heavily in their decision making. Small manufacturers face serious background and business risks. The stakes are high. Failure can impoverish an entrepreneur's entire family. The owner of a small enterprise has few of the benefits and safeguards available in industrialised countries or even those accorded permanent employees of government and large private organisations in Kenya. Kenya has neither unemployment nor welfare programmes, and public housing is almost non-existent. Children with unpaid fees or "contributions" must usually withdraw from school.

Charges for medical care at government hospitals and dispensaries are low, but patients frequently must purchase the simplest medicines. Because jobs are few, those who fail in business have little hope of falling back on wage employment to replace lost income or assets. Some have, in fact, fallen back on small enterprise because they were unable to find formal employment. To survive, people in small business must rely on themselves and whatever support they can muster from family and friends.

Two separate surveys, one of small-scale manufacturing in Nairobi's Eastlands and the other of garment producers throughout the city, suggest that risk and uncertainty are key in keeping firms small.<sup>8</sup> The first survey, conducted in early 1986, covered all small-scale manufacturers operating in the Eastlands of Nairobi (McCormick 1988, 1991). Of 2,866 firms with ten or fewer workers, 39% made garments or other textile products, 16% were in carpentry, 23% in metalwork, and 22% in miscellaneous manufacturing activities. Very small firms predominated: 60% were single-person enterprises; 98% had six or fewer workers. Most entrepreneurs (77%) were male, though 45% of the textile businesses were owned by women. Businesses surveyed ranged from informal, *jua kali* enterprises to small workshops and factories. To capture their heterogeneity, I ranked each firm along a formality continuum with seven dimensions: business site, size, relationship to civil authority, technology, skill level of workers, management, and relationship to other enterprises (McCormick 1987).<sup>9</sup> The second survey, covering garment manufacturers of all sizes located anywhere in Nairobi, took place in 1989-90. Again most firms were very small. Nearly three-quarters (73%) of the owners of small and very small businesses are women. For convenience, in the pages that follow, the small manufacturers surveyed in 1986 are called "Eastlands small manufacturers," and the clothing manufacturers studied in 1989-90 identified as "Nairobi garment

producers."

The data from both surveys suggest that small businesses stay small because their owners' risk management strategies directly or indirectly restrict growth. The link between risk and size emerges in four distinct patterns of entrepreneurial behaviour: (1) the small-and-flexible business, (2) the "safe" product line, (3) diversified holdings, and (4) unused collateral. We will discuss each phenomenon separately, recognising nonetheless that business owners frequently use several strategies simultaneously. First, however, we will examine the economic incentives to growth.

#### Economic Incentives to Growth

Although difficult to specify precisely, economic incentives appear to exist for the major industry groups represented by Nairobi's small-scale producers. The clearest incentives are scale economies and increasing market size.

Scale economies are not strong, but appear sufficient to encourage growth into the medium size range. Clothing has no unambiguous economies of scale. Traditional sewing and other machinery is relatively cheap. Production of fashion garments requires constant adaptation and, therefore, short production runs. Yet Nairobi's small producers also make standard garments that change little from month to month or year to year: men's shirts and trousers, boys' shorts, school uniforms, workers' uniforms and coveralls. Such items would appear to offer economies of scale. Informal conversations with several clothing producers indicated that the purchase of a buttonholer or bartacker or other special-purpose machine was economically justified once the firm reached ten workers. They also said that such machines allowed them to improve both efficiency and product

quality. Many business owners also spoke of the discounts available for bulk purchases of fabric.

#### The Small-and-Flexible Firm

Risk and uncertainty shape the operations of many of Nairobi's small manufacturers, giving rise to what I call the "small-and-flexible" model of enterprise. Two common risk management strategies combine to form the model. By staying small, businesses avoid the risk of major loss. At the same time, their flexible structure allows them to shift quickly in the face of a changing environment.

#### *Managing Risk Through Flexibility*

Flexibility figured in the earliest studies of small enterprise and has recently become the cornerstone of a new paradigm of industrialisation. Informal-sector research has long noted the ability of individual participants to adapt to changing circumstances. Hart's (1973) central thesis, for example, was that urban migrants' informal occupations are a response to lack of sufficiently remunerative work. Small firms also adapt, using various strategies: low-paid or unpaid labour (Bernard 1980; Charnes 1980; Banerjee 1982; Berry 1985), free or inexpensive work-places (Nihan 1980; Ndua and Ng'ethe 1984; Noormohamed 1985), low capital intensity (Schmitz 1982), subcontracts (Roberts 1978; Abadie 1982; Peattie 1982; Schmitz 1982), and family participation in the business (Child and Kempe 1973; Zarenda 1980; House 1981; Mathias 1983; Lipton 1984). Their specific tactics -- growing out of particular historical, social, and economic circumstances -- are less important than their overall strategy. Small businesses survive an uncertain environment by being highly flexible.

The recent recognition of the value of flexibility in developed-

country industry has spawned a new paradigm: flexible specialisation. Revolving around a landmark treatise by Piore and Sabel (1984), the theory contrasts the mass production model with flexible specialisation. Piore and Sabel (1984) argue that the key to prosperity lies in moving away from rigid mass production of standardised goods towards a more innovative and flexible system of multipurpose machines operated by skilled workers able to respond to continuous change. Flexible specialisation links firms of various sizes through networks and subcontracting. The flexible specialisation paradigm has three important implications for small-scale industry. The model first emphasises that, even in advanced countries, competitiveness requires the capacity to adapt to disruptive circumstances. Second, by overcoming the view that equates industrial progress with mass production, the model offers a positive place for small-scale production in the industrialisation process.<sup>10</sup> Finally, it highlights an often missed distinction between flexibility of individual firms and the collective efficiency of a group of firms (Schmitz 1989).

With this theoretical backdrop, we can return to the hypothesis that the flexibility of small manufacturing firms in Nairobi enables them to survive and succeed. Using the Eastlands small manufacturing data, I operationalised flexibility in terms of commonly observed behaviour, then examined the relationship of flexibility to profitability.<sup>11</sup> Three flexibility tactics predominated: working in rent-free quarters, following a family organisational pattern, and minimising capital investment.<sup>12</sup> Business owners appear to reduce risk by lowering fixed costs and increasing opportunities for additional income.

About a quarter (23 percent) of the Eastlands small manufacturers pay no rent. Most are located on City Council land long used by certain artisanal groups. Other *jua kali* operators set up shop along a road or in



any vacant space. All trade the benefits of free space for the costs of sudden harassment or eviction.

Family organisation contributes to flexibility mostly by reducing wage costs and allowing business owners to diversify by taking other work. Drawing on Lipton's (1984) notion of the family mode of production, I defined a family firm as either a single-person business or a larger firm with family involvement. Non-family firms are businesses of more than one person in which the owner is not related to any other worker. Businesses using family members as workers either pay no wage, or combine a small cash wage with free room and board. Familial organisation enhances flexibility by allowing the owner to leave the business to fulfil other obligations. Eastlands small manufacturers, like the motor mechanics Berry (1985, pp 153-154) observed in Nigeria, spend much time away from their businesses. Raw materials must be purchased, contacts with customers made, and, in some cases, the farm at home managed. If one's brother, sister, or spouse remains to operate the business, such absences seem less likely to have undesired consequences. Single-person firms can also ride out season or cyclical ups and downs more easily than larger businesses. When business is slow, owner-operators can take other employment. At peak seasons they can increase their workforce by hiring casual labourers or getting help from family members.

The third component of the flexibility variable is the level of capital. Firms with simple tools and equipment can easily shift locations. Very simple technology holds down fixed costs by avoiding expenses of maintenance, protection, and the opportunity costs of invested funds. Firms with little physical capital can also alter their product mix to meet changing demand or input availability. For example, Elizabeth Adiyó, one of the few female metal workers among the Eastlands manufacturers, is both

trader and manufacturer.<sup>13</sup> She buys empty metal drums from factories in Nairobi's Industrial Area. Some she resells to traders or other metal workers who convert them into *jikos* (small charcoal stoves), cooking pots, and basins; others she fashions into tubs by cutting the drums into two, painting them, and adding handles. When demand for tubs is high, as it is in drought when animals require feeding, Mrs. Adoyo is primarily a manufacturer. At other times, she mostly trades. Because she has little capital, she is able to shift her activities without leaving expensive equipment idle. For her, having less capital brings greater flexibility.

The composite flexibility variable -- the total scores for rent-free site, family mode of production, and low capitalisation -- shows that profitable firms have higher flexibility scores than unprofitable ones (see Table 3).<sup>14</sup> Profitable firms in the less formal range of the formality continuum had a mean score of 2.1, against 1.7 for unprofitable firms. Although more formal firms were generally less flexible, the relationship between profitability and flexibility remains. Profitable firms in this range had a mean flexibility score of 1.3; unprofitable firms averaged 0.8. Thus for both groups of firms, greater flexibility is associated with profitability.<sup>15</sup>

Profitable firms are also smaller than unprofitable ones. A size measure combining employment and capital equipment averaged 5.4 for profitable businesses and 7.2 for unprofitable ones.<sup>16</sup> Profitable businesses were significantly smaller, on average, even within subgroupings of less or more formal businesses.

Table 3: Eastlands Small Manufacturers: Summaries of Size and Flexibility by Profitability and Formality

Group	Variable				Cases n
	Size		Flexibility		
	Mean	Std Dev	Mean	Std Dev	
Profitable	5.4	3.2	1.7	.89	164
Less formal	3.9	2.7	2.1	.83	83
More formal	6.9	3.0	1.3	.74	81
Not profitable	7.2	2.4	1.3	.93	84
Less formal	5.8	2.1	1.7	.89	41
More formal	8.5	1.9	0.8	.74	42
TOTAL	6.0	3.1	1.6	.93	248

- Notes: 1. Significance of the F-statistic for difference in means is .0001 for size and .0004 for flexibility.  
2. Weighting results in fractional cases, and the rounded numbers of cases do not always add to the total.

#### *The Small-and-Flexible Model*

The emerging "small-and-flexible model" was tested for both data sets. I first compared the actual classification of Eastlands manufacturing firms into profitable and unprofitable to discriminant-analysis classification with size, flexibility, and business age as discriminating variables. The third discriminating variable, the business age, was added because the high incidence of unprofitability among newer firms made age relevant for predicting a firm's category.<sup>17</sup> Recognising that the size-flexibility relationship might differ for more and less formal firms, I generated separate discriminant functions for upper and lower halves of the formality continuum.

The discriminant analysis supported the small-and-flexible model as a

good description of the behaviour of small manufacturers in the Eastlands. The two discriminant functions correctly classified 80 percent of the firms (see Table 4).<sup>19</sup> With two groups one might expect to classify 50 percent of the cases correctly by chance alone. The higher values of both the canonical correlation and tau statistics suggest that the small-and-flexible model predicts profitability better for less formal than for more formal firms.<sup>20</sup>

Table 4: Eastlands Small Manufacturers: Classification of Firms by Profitability

	Profitability Test		--- Classification ---			Tau
	Satisfied	Not Satisfied	Incorrect	Correct	%	
Less Formal	83	41	17	108	86.3	.742
More Formal	81	42	33	91	73.7	.468
TOTAL	164	84	50	198	80.0	.605

Note: Weighting results in fractional cases, and the rounded numbers of cases do not always add to the total.

In the Nairobi garment producers' survey, financial information gathered in multiple interviews allowed firms to be categorised as unprofitable, marginally profitable, and very profitable.<sup>20</sup> The small-and-flexible model was tested by comparing two groups -- unprofitable and very profitable firms -- against the groups produced by a discriminant model using the same three variables. The results support the explanatory value of the model and underscore the importance of the size-flexibility relationship. Even though garment firms are less likely than metal workers or carpenters to score high in flexibility, the basic relationship was confirmed: very profitable firms tend to be both smaller and more flexible than unprofitable firms.<sup>21</sup> The discriminant analysis' overall correct

classification of 71 percent is somewhat lower than that achieved for the general case.

Table 5: Nairobi Garment Producers: Group Means for Unprofitable and Very Profitable Firms

Group	Firms (n)	Variables		
		FLEX	AGECAT	SIZE
Unprofitable	26	.52752	2.13542	9.28846
Very profitable	44	.70243	1.50321	9.02764

The model points to a dilemma facing business owners and policymakers. To grow, a business must accumulate capital, increasing fixed costs and often introducing more advanced technology. Yet risk of loss is least for highly flexible businesses. The fact that small, flexible firms are most likely to succeed has serious implications, not only for the business owners themselves, but also for Kenya's economic development.

#### "Safe" Products

Observers in Nairobi and elsewhere have remarked on the tendency of small businesses to make identical products. While some attribute this to technological weakness, lack of imagination, or insufficient market information, it may rather be another form of risk avoidance. Knight ([1921] 1985, p. 240) long ago suggested that entrepreneurs deal with uncertainty by directing their activities along lines involving minimal uncertainty. Making products with an assured market is one such a strategy.

Thus, Eastlands metal workers produce cooking utensils, charcoal

stoves, metal boxes, small hardware, metal furniture, metal door and window frames, and iron gates. Carpenters mostly make basic wood furniture: tables, chairs, beds, stools, and wood-framed sofa sets. Tailors fashion standard men's, women's and children's clothing. Nairobians use all these products daily. Product designs are generally conservative and, according to King and Abuodha (1991), 90 percent are aimed at the large low-priced market.

Few businesses venture into unknown areas. A metal worker, interviewed in 1986, is probably typical. John Omollo's Madini Metal Works, located in Eastleigh, just across from the Mathare Valley slum area, regularly produces iron window and door frames, gates, beds, and metal framed sofa sets. At certain times of the year it also makes school desks and seats. A Nairobi-based development organisation has been encouraging metal workers to manufacture wheel chairs. Although Mr. Omollo had the design and felt certain he could make one, he would not start production without a firm order, citing the high cost of materials and his unfamiliarity with the market as reasons for his reluctance.

#### Risk, Return, and Diversification

Closer study of Nairobi's garment industry supports the connection between risk and firm size and highlights a third risk management strategy: demanding a risk premium. The data in Table 6 suggest that lack of compensation for increasing risk may also keep small firms small. Total net income rises with enterprise size, but other profitability measures show no such uniform improvement for larger businesses. The largest size category appears to belie the size-income relationship, but their figures may reflect the tendency of some of the largest -- and perhaps most profitable -- businesses to understate their revenues rather than genuinely

lower net incomes. For the first five size categories, the trend is clear. Turning, however, from absolute to relative profits, the picture changes. Again leaving aside the largest size category, the rate of profit shows no significant difference among the five groups. The rate of return on capital drops through the first four categories, and only improves for the medium and large firms. At the same time, larger businesses require more resources. Working and fixed capital requirements increase steadily with size of the business.

Table 6: Nairobi Garment Producers: Selected Capital and Profit Indicators (mean values)

Firm size	Firms (n)	Mean Amounts				Profit Rate (%)	Return on Capital (%)
		Annual Net Income (K.shs)	Working Capital (K.shs)	Equipment (K.shs)			
1-person	91	46,752	3,750	10,880	43.2	335	
2-3 persons	111	85,591	13,485	18,092	37.0	269	
4-6 persons	50	185,846	33,437	49,330	24.5	243	
7-10 persons	8	552,659	127,318	167,518	29.3	182	
11-50 persons	4	7,345,332	142,357	374,075	41.7	390	
50+ persons	1	1,854,215	538,500	7,183,673	3.8	1710	
overall	268	244,296	27,305	128,739	36.1	324	
F-statistic	n.a.	7.33	24.83	15.05	1.45	1.24	
significance of F	n.a.	.0001	.0001	.0001	.2054	.0675	

Note: See Appendix for exact variable definitions.

These figures suggest that a business with five or six employees has little incentive to grow larger. Growth will require additional investment in equipment and working capital at the same or lower rates of return. In a relatively safe business environment, entrepreneurs might continue to invest at a constant rate of return. But, as we have already seen, Nairobi's business environment is risky, making rational investors require higher returns. For the entrepreneur with enough capital to enter the clothing industry with a large business, the returns appear attractive. But

for the small business returns at the next size level offer little inducement to expand. More attractive is the prospect of beginning a second small business with a similar rate of return on capital and the added benefit of spreading the risks. Another business -- or even a house or rural land -- offer economic security in the event of failure of the first business. They are also a potential source of collateral for business borrowing, though, as we will see, they are rarely used as such.

#### Unused Collateral

Many studies point to lack of capital as a constraint to small business growth. Yet the problem may not be what it first appears to be. Nearly half (48.2 percent) of the Eastlands small manufacturers expressed a need for low interest loans for working capital, and nearly a third (31.6 percent) want loans for purchase of equipment (see Table 7). Observers frequently blame rigidities in the Kenyan banking system for the inability of small enterprise to borrow (Centre Project 1989, p. 50; Kabwegyere 1977, pp. 65-66; Kenya 1992). In particular they cite the requirement of physical collateral as a major stumbling block. Yet many owners of small businesses own land or other assets that would be acceptable collateral. Ng'ethe and Wahome (1987, p. 162) attributed the reluctance of rural entrepreneurs to use land to secure business loans to their risky circumstances. The Eastlands manufacturers and Nairobi garment producers seem similarly reluctant. Among the Nairobi garment producers, for example, nearly half (47.3 percent) own land, but two-thirds of these have never attempted to use their land as collateral for a business loan."



Table 7: Stated Needs of Eastlands Small Manufacturers

Need	--- Firms Stating Need ---	
	Number <sup>a</sup>	%
Low interest loans for working capital	121	48.2
Better places to work	132	53.4 <sup>b</sup>
Assistance in getting raw materials	91	36.7
Loans or grants for purchase of better equipment	78	31.6
Assistance in getting products to export market	49	19.8
Technical assistance to help make better products	41	16.4
Freedom to work without harassment	19	7.8

## Notes:

<sup>a</sup>Total number of responses exceeds the number of cases because business owners gave more than one reply.

<sup>b</sup>Firms differ significantly on this response, depending on present type of worksite. The value of the eta statistic in the cross-tabulation of this question with the workplace variable is .33554.

## 4. CONCLUSIONS

What, then, can we conclude about why small firms stay small? One set of answers lies in their risk-management strategies. First, small manufacturing firms stay small because smaller, more flexible businesses are more likely to be profitable than larger ones. Second, their preference for "safe" products with a known and fairly certain market leads to intense competition that limits profits and growth potential. Third, the absence of a risk premium in industry rates of return on capital encourages

diversification rather than business expansion. Finally, business owners' reluctance to collateralise their assets for business borrowing limits the capital available for expansion.

The factors affecting firm growth are not entirely independent of one another. In particular risk appears related to one of the forces most often cited as blocking the growth of particular firms: lack of managerial skill. Observers have sometimes attributed the plethora of very small firms to a peculiarly African entrepreneurial style that manages closely, eschews delegation, and fails to build an organisational structure appropriate to a large business (Marris and Somerset 1971, pp. 123-24). While accurate in some respects, this observation is misleading. The performance of Nairobi's small manufacturers suggests that many are, in fact, quite good managers. The business environment, however, encourages entrepreneurs to channel their time and energy into activities directly or indirectly related to risk aversion. Time given to travel between Nairobi and a rural home provides a clear example of the managerial costs of risk aversion. The spouses of 45 percent of married Eastlands small manufacturers live in the rural areas. Although visiting pattern depend on individual preferences and the distance of the home from Nairobi, responses indicate that half the entrepreneurs visit home more than once per month. A less risky environment should permit business owners to maintain their families in Nairobi, freeing them of this travel burden, and giving them additional time to manage their businesses. A second example, based on theory rather than empirical results, also illustrates the effects of risk averting activities. Good managers must spend significant amounts of time in formal or informal planning. In a risky environment, much of the planning necessarily takes the form of risk management: establishing safety zones, weighing and choosing alternative courses of action, and reexamining the

environment. What would happen if the risks were lessened? Would these same managers direct their attention more towards business expansion? We do not know, of course, but it seems reasonable to believe that they might.

It is tempting, at this point, to develop policy recommendations aimed specifically at offsetting the negative effects of entrepreneurs' risk aversion. To do so would be shortsighted. Risk, while clearly important, is not the only barrier to firm growth. Entrepreneurship, access to scarce resources, the competitive market, the costs of growth, distortions created by government policy and regulations, historical and cultural factors, and simple luck may be equally important deterrents to growth. Focusing on risk while ignoring other growth constraints may only aggravate the situation. Useful policy must be based on the most complete information possible. Careful questioning of business owners, especially those with businesses at the borders of small and medium enterprises, can further clarify the issues and set the stage for the evaluation of existing policy and the development of new policies supporting business expansion. In the meantime, government would do well to concentrate on implementing current supportive policies with consistency and fairness.<sup>13</sup>

## NOTES

1. Many people made this research possible. The 1986 field research in Kenya was funded by a grant under the Fulbright Programme. The American Association of University Women supported the initial analysis and writing with an American Dissertation Fellowship, and The Johns Hopkins University supplied additional fellowship assistance. The Joint Committee on African Studies of the American Council of Learned Societies and the Social Science Research Council, with funds from the National Endowment for the Humanities and the Ford Foundation, supported the 1989 field work. The Ford Foundation's Nairobi office provided a grant for related library research. Many individuals offered advice, criticism, and moral support. I am especially grateful to M.S. Mukras, Kabiru Kinyanjui, Njuguna Ng'ethe, Michael Schatzberg, Gerrishon Ikiara, William House, and Patrick Alila.
2. The Swahili words *jua kali*, meaning "harsh sun," are used in Kenya for businesses located out of doors. The term is also becoming a popular way of describing any activity that is unregulated, informal, or substandard. Thus a government employee may refer to private work on which no taxes are paid as "my *jua kali*."
3. In developing countries the vast majority of establishments are independent enterprises. We can, therefore, safely use the terms "firm," "establishment," "business" and "enterprise" interchangeably.
4. While it is impossible to review all the categorisations of firm size found in the literature, a few examples will illustrate the problem. A classic study by Staley and Morse (1965) divide developing country manufacturing firms into three size categories: "very small" with 1-9 employees, "small" with 11-99 employees, and "large" with 100 or more employees. Two data sets -- the Kenya Government Statistics (Kenya 1988, 1990) and the set of studies by Chuta and Liedholm (1985) -- use only two categories: "large" and "small." Happily, they also agree on the firms to include in each: "small" consists of firms with fewer than 50 employees; those with 50 or more are "large". The World Bank studies use 100 workers as the cutoff for "large" and consider those with 50 to 99 employees to be "medium," and with fewer than 50 workers, "small." Within the "small" category they sometimes subdivide, using "very small" to indicate any firm with fewer than ten workers, and "cottage shops" or "household industries" to describe those with fewer than five workers (Page 1979, Anderson 1982, Little, Mazumdar, and Page 1987; Little 1987; Cortes, Berry, and Ishaq 1987). The fact that some count "employees" and others "workers" further complicates comparisons.

5. The theoretical size is determined by the minimum point on the industry's long-run average cost schedule.
6. The term "missing middle," although clearly traceable to Stailey and Morse, has more recently been popularised by the World Bank's (1989) study, *Sub-Saharan Africa: From Crisis to Sustainable Growth*. Some, like Marsden (1990), deny its existence. The Kenya government (Kenya 1992, p. 4) recognises that, even compared to other developing countries, Kenya has few manufacturing firms employing 10-50 persons. Obviously differences in measures of size, groupings into categories of small, medium, and large, as well as in countries selected for study will produce different results.
7. Lipton (1979, p. 346) defines risk aversion as the psychological predisposition to avoid fair bets and fluctuation aversion as the psychological disposition to avoid unsteady outcomes. The concept of fluctuation aversion underlies the economic modelling of the risk averse individual as one with a concave utility function. See Newberry and Stiglitz (1981, pp. 69-76) for a good summary of the utility approach.
8. The research was conducted in two distinct segments: the first in early 1986; the second, from January 1989 through December 1990. Each part involved a sample survey of business owners.

The 1986 survey began with a census to locate all firms in Nairobi's Eastlands engaged in any type of manufacturing, and having ten or fewer workers. From the 2,866 firms counted, a stratified random sample of 248 firm was selected (see below).

Stratified Random Sample, 1986 Survey

Group	Sample		Population	
	Number of Firms	Total Number of Firms	Total Number of Firms	% in Sample
one-person firms	80	1,706		4.69
2-3 person firms	82	911		10.11
4-6 person firms	81	292		21.23
7+ person firms	25	57		42.10
<b>TOTAL SAMPLE</b>	<b>248</b>	<b>2,866</b>		<b>8.65</b>

Interviews were conducted in the language most comfortable to the respondent, but all answers were recorded in English.

The 1989-90 research dealt with clothing manufacturers of all sizes. The methodology was similar to that used earlier with two exceptions: the geographic boundaries were extended to include all of Nairobi, and a series of short follow-up interviews was administered over a period of 15 months after the initial interviews.

The sampling methodology added categories for medium and large businesses to the four size categories used in 1986. The sample and population are listed below. A Kiswahili version of the questionnaire ensured that interviews in English and Swahili would be identical. After the initial lengthy interview, each firm was revisited up to three times over 15 months to update information on equipment acquisitions and retirements, current production, financial information, and operating problems.

## Stratified Random Sample, 1989-90 Survey

Group	Sample	Population	
	Number of Firms	Total Number of Firms	% in Sample
one-person firms	61	747	8.17
2-3 person firms	101	909	11.11
4-6 person firms	56	413	13.23
7-10 person firms	21	68	30.88
11-50 person firms	14	32	43.75
over 50 persons	15	30	50.00
TOTAL SAMPLE	268	2,200	12.18

9. Some studies of very small enterprises identify two groups of firms: the typical "informal" business characterised by low earnings, low skills, strong competition, and ease of entry; and slightly larger small businesses with a positive surplus and a capacity to accumulate capital (Steal 1977, Nihan 1980, House 1981, Fields 1990). I prefer to conceptualise the differences as forming a continuum from least to most formal (McCormick 1987). See McCormick (1988, pp. 115-135, 288-304) for a detailed presentation of the rationale and the construction of scales for each dimension of formality.
10. Penrose's (1959) previous identification of the "interstices" of manufacturing as the domain of small enterprise is a forerunner to this notion.
11. It was impossible to estimate annual profits or losses for the Eastlands small manufacturers. Over half (55 percent) of the respondents keep no written records. The use of a cross-sectional survey also limited the usefulness of financial data. Finally, although the survey asked only about income from product sales, some businesses had other income, such

as training fees or charges for repairs. Lacking a reliable net income figure, I constructed a dichotomous variable based on the satisfaction of at least one of two conditions: the longevity of the business, and the profit or loss calculated for the survey month. Together, the two measures formed the profitability test. A business was considered profitable if its net income for the survey month was non-negative or if the business had been the primary support of its owner for at least four years. The rationale for the components of the profitability test, including the four-year cutoff, are discussed in detail in McCormick 1988, pp. 202-28 and 359-80. By this test, 164 of the 248 firms (147 operated by men and 17, by women) were profitable.

12. Although subcontracting and manipulating the apprenticeship system may also increase flexibility, they were not among the main risk-management strategies for the Eastlands small manufacturers.
13. All of the respondents mentioned by name are real people. The information is taken from survey questionnaires, follow-up interviews, and, in some cases, informal conversations. The names used are pseudonyms; locations are approximate.
14. Flexibility (FLEX) was defined by assigning one point to each of the three component variables:
  - (1) Security of access to workspace (1 = workspace just used; 0 = all other responses),
  - (2) Family mode of production (1 = single-person firm or larger firm employing family labour; 0 = all other), and
  - (3) Capital per worker (1 = depreciated value of physical capital less than K.shs. 2,000; 0 = higher capital).
15. Though not surprising, this result is not mathematically obvious since formality and flexibility are mutually independent.
16. The SIZE variable combines measures of workforce and capital sizes. Each was measured on a ten-point scale, giving a composite variable with a theoretical range of 0 to 20. The actual range is 0.29 to 16.99, with a mean of 6.00 and median of 6.16.

Workforce size was based on a definition of the full-time-equivalent workforce variable,  $WKRS = FTW + .8PTW + .5T + .66C$ , where FTW is the number of full time workers, PTW is the number of part-time workers, T is the number of trainees, and C the average number of casual labourers. The range of WKRS is from 1 to 34.22, with a mean of 2.8 and a median of 2.0. The variable was then rescaled by dividing each value by 3.422.

Capital size was based on the depreciated value of capital equipment, using a ten-year life, and straight-line depreciation. Observed values ranged from 0 through K.shs. 72,240, with more than half the businesses having capital worth less than K.shs. 600. Because of the highly skewed distribution, the capital size was defined to be twice

the log of the depreciated value of equipment except that where capital had zero value, zero was used in place of the meaningless log (0).

A more complete discussion of the rationale for the construction of these variables can be found in McCormick 1988.

17. The businesses were divided into three age categories: less than four years old, four to ten years, and over ten years. The first category's upper limit was set at four years because of high failure rates in the first three years of business (Itao 1980, Hull 1986). For a more complete discussion of the issue of firm longevity, see McCormick (1988, pp. 218 ff).
18. The canonical correlations of the functions were .6529 and .4876 respectively, indicating that they are fairly successful in separating the cases into two groups.
19. *Tau* is a proportional reduction in error statistic that compared the discriminant function's classification errors with the errors that would result from random assignment of cases. For example, the *tau* of .605 shown in Table 4 indicates that classification based on the discriminating variables made 60.5% fewer errors than would be expected if cases were randomly assigned to a category.
20. The variable PROFIT was set equal to 0 for businesses at least one year old with income insufficient to cover owners' salaries and either low rates of profit and capital accumulation, or negative net income. At the other end of the spectrum, businesses with profits equal to at least three times the owners' salaries and profit rates of 30 percent or more were coded 2. For all other businesses, PROFIT was set equal to 1.
21. The standardised canonical discriminant function coefficients were as follows:

FLEX	-.40117
AGECAT	.92573
SIZE	.04786

The canonical correlation coefficient was .3811. Chi squared at 3 degrees of freedom was 10.473 for a significance of .0149. The tau statistic of .4 indicates that classification using the discriminant function results in 40% fewer errors than would have occurred by random assignment into two groups.
22. Although 47.3% of the Eastlands manufacturers own land, only 27.7% currently have a title deed. Probably only those who can prove ownership with a title deed can obtain bank credit. Even so, only half of those with collateral have applied for loans.
23. See especially Chapter Two, "Improving the Enabling Environment," in the recent sessional paper (Kenya 1992).



Appendix

VARIABLE DEFINITIONS

Flexibility	Index based on the three ways Nairobi small manufacturers most often maintain flexibility, with one point assigned for each practice: workspace "just used"; single-person firm or larger firm employing family labour; low capital per worker (depreciated value less than K.sh 2,000 in 1986, less than K.sh 2,560 in 1989).
Business Age	The number of years since the business began. A related variable, age category, grouped businesses as less than four years old, four to ten years old, and over ten years old.
Size	A composite index giving equal weight to employment size and the depreciated value of capital equipment.
Profit/ Profitability	<p>For Eastlands manufacturers (1986), profit or profitability is defined as a dichotomous variable taking the value of one if either of the following were satisfied: the business had been the owner's only source of support for four years or more, or calculated net income (including depreciation and owners' salaries) was positive.</p> <p>For Nairobi garment producers (1989-90), a variable categorizing firms into three groups on the basis of annual net income and rate of growth. Firms were unprofitable, moderately profitable, and very profitable.</p>
Net Income	The difference between estimated annual total firm revenues and total expenses, excluding owners' salaries and depreciation on equipment.
Rate of Profit	Net income divided by total firm revenues.
Total Equipment	Undepreciated total value of machinery and equipment.
Rate of Return on Capital	Annual net income divided by total capital.

McCormick, *Risk and Firm Growth*, DP 291

Total Capital	The sum of total equipment, working capital, and inventories.
Working Capital	Cash in the bank or on hand at the time of the initial interview.
Initial Capital	The value of cash, materials, and equipment in hand when the business began.
Workers	A measure of full-time equivalent workers, including regular workers plus fractions of casual labourers and trainees.
Revenues per Worker	Sales revenues divided by the number of workers.
Value Added per Worker	The sum of labour costs, other expenses, and estimated owners' salaries divided by the number of workers.

McCormick, *Risk and Firm Growth*, pp. 291

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