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AN ECONOMIC ANALYSIS OF SMALL-SCALE INDUSTRY IN SIERRA LEONE

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FORWARD

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PREFACE

This paper has been developed as part of a three year study of rural employment problems in Africa financed under a U.S. Agency for International Development Contract (AID/csd 3625) with Michigan State University. The research in Sierra Leone was carried out under a Memorandum of Agreement between Michigan State University and the Department of Agricultural Economics and Extension, Njala University College, University of Sierra Leone and was financed under the terms of Contract AID/csd 3625. The Njala University College research program was also supported by grants from the Rockefeller Foundation and the Population Council. The research in Sierra Leone was under the direction of Dr. Dunstan S.C. Spencer.

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INTRODUCTION

The major objectives of this paper are to provide a descriptive profile of small scale industries in Sierra Leone and to analyze the major determinants of the demand for and supply of output and employment generated by these industries.[1] The problem setting will be discussed first, followed by an examination of the major empirical and analytical issues relating to small scale industries. The section will conclude with a brief review of the procedures used to collect the required data. The second section sets forth the empirical results so as to provide a comprehensive, descriptive profile of small scale industries in Sierra Leone. In the third section, the analysis of the major factors determining the output and employment generated by these industries will be presented. A final section will summarize the findings and examine the policy implications.

Problem setting

Rapid industrialization has long been regarded by development economists as an attractive and effective strategy for transforming developing economies and maximizing their rates of economic growth. This rationale motivated many developing countries in the early 1950s to launch industrialization drives based generally on strategies designed to promote large-scale, urban-based, capital-intensive industrial projects. In recent years, however, it has become apparent that these strategies and policies have generally produced disappointing results. In a number of developing countires, not only

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[1] The results of this study contribute to meeting the objectives of AID Research Contract AID/csd 3625 by providing insights into the "demand for labor in off-farm activities," one of the specific objectives of the project.

has the overall rate of growth of the economy been low, but employment in the industrial sector has failed to keep pace with population growth and, in some cases, even declined in absolute terms.[1] The poor employment performance has been the cause of particular concern, because employment generation has recently become for many countries an independent policy goal as important as economic growth.[2]

In view of these disappointing results and the heightened interest in employment generation, many developing countries have become increasingly aware of and interested in assessing the role that small scale establishments might play in their industrialization strategies. If one hypothesizes, for example, that small scale industrial establishments are more labor-intensive, more widely-dispersed, generate more output per unit of capital, and produce a higher "economic" profit than their large scale counterparts, then strong economic justification would exist for expanding small scale firms.

Unfortunately, there have been few empirical or analytical studies of small scale industries, and thus it has previously been very difficult to assess the role that small scale firms might play in any development strategy. As Morawetz [1974, p. 525] commented in his recent review of the industrialization literature "remarkably little is known about its composition and characteristics."

Sierra Leone's experience with industrialization has not been unlike that of other developing countries. After Independence in 1961, Sierra

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[1] See Morawetz [1974] and Frank [1968] for excellent reviews of the evidence.

[2] The emphasis of employment growth reflects the heightened concern for equity, the high unemployment rates and the high rates of migration. See Morawetz [1974].

Leone followed an import substitution strategy in which policies were designed to encourage the expansion of large-scale, urban-based, foreign-owned firms. The results of this policy, however, proved to be disappointing. The manufacturing sector grew at a real annual rate of only 2.8 percent from 1965/66 until 1971/72, while during the same period, the number of individuals employed in "large scale" manufacturing firms actually declined at a compound annual rate of 3.5 percent.[1] Moreover, by 1971 unemployment in urban areas had grown to almost 14 percent [Byerlee, Tommy, Fatoo, 1976]. Consequently, a new industrial strategy was set forth in the 1974 National Development Plan [Government of Sierra Leone, 1974], in which priority was now to be given to agro-based, labor intensive industries.

Although small scale industries, particularly those located in rural areas, were now envisaged to play an important role in Sierra Leone's development effort, the policies and programs to foster small scale rural industry were not specified. Instead, the National Plan stressed that "an immediate task relating to the (small scale industry) subsector is to conduct an economic survey to assemble data on its size, composition, structure of inputs and outputs, development problems, and potential. The survey is essential for evolving a detailed development programme" [Government of Sierra Leone, 1974, p. 185]. By providing a descriptive, empirical profile of the small scale industry in Sierra Leone, the present study will thus fill a clearly articulated need of the Government of Sierra Leone.

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[1] See Chuta and Liedholm [1975] for more details. "Large scale" in these figures reflects the Ministry of Labor's definition and includes those firms employing six or more workers.

Major Empirical Issues

Although a wide array of data will be presented in this descriptive profile, the most important empirical questions should be set forth. First, are small scale more labor-intensive (i.e. higher labor-capital ratio) than large scale industries? The answer to this question will guide those formulating employment policies in Sierra Leone. Second, given the output objective and the apparent relative scarcity of capital, do small firms use less capital than large firms to produce a given volume of output? Indeed, if the smaller firms generate more output and labor per unit of capital than their large scale counterparts, then small scale establishments maximize both output and employment, and the much discussed conflict or trade-off between output and employment disappears.[1] Third, do small scale industries generate a positive "economic" profit when all factors are valued in terms of their opportunity cost? The answer to this question will not only reveal the underlying economic strength of this sector, but also will permit one to ascertain if there is any relationship between factor intensity and the level of "economic" profits. Finally, are there significant seasonal and locational variations in small scale industrial activity? The answer to this question will indicate the extent to which time and space must be incorporated into small scale industrial surveys and policies.

Major Analytical Issues

In addition to providing this descriptive, empirical profile, the other major objective of this study was to analyze the major determinants

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[1] See Morawetz [1974] for an excellent discussion of the employment-output trade-off. The World Employment Conference of the ILO [1976] has recently stressed the need for choosing employment given such a trade-off.

of the demand for and supply of output and employment in small scale industry in Sierra Leone. Since the analytical framework has been outlined in two previous papers [Liedholm, 1973], [Chuta and Liedholm, 1975], only the key analytical issues will be highlighted.

One of the key analytical issues centers on the nature of the demand for small scale industry. Hymer and Resnick [1969], in their seminal article on an agrarian economy with nonagricultural activities, argue that the only source of demand for rural small scale industries is farm income. Moreover, they contend that these industrial products are "inferior" goods and thus the demand for and production of these goods will decline as farm incomes increase Thus, one important component of the Sierra Leone study will be to estimate the sign and magnitude of the income elasticity of demand for locally produced, small scale industrial commodities and services.

In addition, it will be important to verify whether sources of demand other than those related to income are of any significance. Specifically, the magnitude of the demand for small scale intermediate goods stemming from forward linkages to agriculture or large scale industry must be determined as well as the demand originating from foreign sources. If these sources of demand prove to be important, the Hymer-Resnick model should be modified accordingly.

On the supply of the analysis, one of the key issues is whether significant process or technical choices do exist within the major small scale industries. If such choices are found to exist, then changes in factor prices could have an important impact on the processes chosen in each industry. To shed light on this issue, neoclassical production analyses as well as an examination of individual production processes will need to be

undertaken. Another important supply issue centers on whether or not significant scale economies exist within the industrial sector, a question that the results of the production function analysis may help answer. A final supply issue of importance is whether or not entrepreneurship plays a significant role in determining the economic profitability of these small scale firms. To accomplish this task, a regression analysis will be employed to attempt to identify those entrepreneurial characteristics that appear to be related to profits.

Sources of Data

Since the details of the data gathering process have been presented in an earlier report [Chuta and Liedholm, 1975], only the most salient features will be briefly outlined in this paper. A two phase survey procedure was used to obtain the required small scale industry data. In phase 1, which began in March, 1974, a census of Sierra Leone's small scale industry sector was undertaken to enable an estimate to be made of the underlying population of small scale industrial establishments in the country. Phase 2, which was undertaken from August, 1974 until July, 1975, was designed to generate more detailed economic data from a selected sample of industrial establishments over a one year period. The results of the phase 1 survey were used to assemble the frame from which the sample of firms could be chosen. Two-thirds of the 270 firms selected in those localities with 2000 or more inhabitants were chosen on a random basis to ensure that a reasonable approximation of the underlying population would be obtained.[1] The remaining

[1] The 96 establishments selected from the 24 village enumeration areas were all selected randomly.

one-third were chosen in a purposive fashion to ensure that a complete spectrum of production techniques could be obtained.

One major survey difficulty, however, centered on the transitory nature of some of the small scale industrial firms. Approximately 20 percent of the initial firms selected for inclusion in phase 2 dropped out during the survey period.[1] The problem was partially solved by replacing the dropouts with new firms.

Three major types of data were collected during phase 2 of the survey. Firstly, stock data were obtained at the beginning and end of the survey period for buildings, tools, equipment and furniture, material input and output, and material input purchased were recorded twice-weekly. Finally, output and material input purchased were recorded twice-weekly. Finally, more detailed information with respect to entrepreneurship and the apprenticeship system were obtained during a single interview. The descriptive profile generated by these data will now be examined.

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[1] Forty percent of those firms that dropped out did so because of what they called "bad business," which was usually attributed to such factors as lack of demand or capital.

DESCRIPTIVE PROFILE OF SMALL SCALE INDUSTRY IN SIERRA LEONE

The descriptive profile of small scale industry in Sierra Leone will be presented in this section. Since the descriptive results of phase 1 of the study have been set forth in a previous paper [Chuta and Liedholm, 1975], they will not be extensively detailed in this paper. It should be kept in mind, however, that 47,000 small scale industrial establishments were estimated to exist in Sierra Leone in 1974 and that they employed approximately 87,000 individuals.

In this section, the relative magnitude of the small scale industrial sector will be examined first, followed by a discussion of the output and value added generated by the individual industries. The seasonality of these activities will then be traced, followed by a discussion of the capital, labor, and entrepreneurial inputs. The section will conclude with an examination of the important economic ratios for these firms.

Relative Magnitude of the Small Scale Industry Sector

The data collected during phase 2 of the study make it now possible to assess more precisely the relative magnitude of small scale industry in Sierra Leone. Although various measures could be used for this purpose, "value added" is the most universally utilized indicator of a sector's relative contribution to the overall economy. Value added may be defined as the difference between a firm's gross outputs (measured in terms of the sales prices) and the sum of material and service inputs, or alternatively as the sum of the total value of wages and salaries, depreciation, interest, rent, and profits. In the present study, the annual value added of the

small scale industrial establishments have been estimated from the output and cost data collected from those particular firms that were randomly selected for twice-weekly enumeration. The mean value added for each of those firms in the small scale industrial category in each locality group was calculated and then blown up according to the number of establishments in each area.[1] The resulting estimate for small scale industry as well as the various estimates for small and large scale industry prepared by the Government of Sierra Leone are summarized in Table 1.

Table 1 reveals that small industry in 1974/75 accounted for approximately Le 13 million[2] or 2.9 percent of Sierra Leone's Gross Domestic Product. What is particularly striking about this estimate is that it is very close to the value added estimate prepared by the Central Statistics Office for the National Accounts, an estimate which was not based on an extensive survey and which was admittedly "very rough" [Government of Sierra Leone, 1973, p. 31].

When the value added for small scale industry is compared with the latest estimate of the value added of large scale industry (Le 17.4 million or 3.9 percent of Sierra Leone's Gross Domestic Product in 1974/75), the the small scale establishments are revealed to contribute Le 13.0 million or approximately 43 percent of the entire industrial sector's value added. Although the value added of small scale (43%) is much lower than the percentage employed in small scale (i.e. 95 percent) relative to large scale industry [see Chuta-Liedholm, 1975, p. 14], the results of the study indicate

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[1] The definitional details and the breakdown of the individual mean value added are described in detail below.

[2] 1 Le (Leone) = $1.10 U.S. during the survey period.

Table 1. Sierra Leone: Estimate of Value Added of Large and Small-Scale Industry

	Government Estimate		Authors' Estimate	
	1970/71	% GDP	1974/75	% GDP
	(Leones Million)			
Small-Scale Industry	11.1	2.9	13.0	2.9
Large-Scale Industry	8.5	2.3	17.4[a/]	3.9
Total Industry	19.6	5.2	30.4	6.8
Gross Domestic Product	375.3		450.4	

Source: 1970/71 data from Government of Sierra Leone [1973].

Notes: [a/] The large scale industry value added figure for 1974/75 was obtained by subtracting all indirect taxes from the large-scale industry value added estimate presented in the Second Annual Plan [Government of Sierra Leone, 1975, Chapter X].

that small scale establishments are indeed a significant component of Sierra Leone's industrial sector.

Relative Importance of Small Scale Industrial Categories

Additional insights into the nature of Sierra Leone's small scale industrial sector can be obtained from an examination of the relative importance of its individual industries. For this purpose, the total value added has been calculated for the major industrial categories by location, the results of which are presented in Table 2.

One of the most salient findings presented in the table is the relative importance of tailoring, which accounted for over 36 percent of the value added by small scale industrial establishments in Sierra Leone. Blacksmithing, which accounted for 12 percent of the sector's value added, and carpentry, which accounted for 9 percent, were the next two most important categories, but both followed tailoring by a large margin. The relative importance of each activity, however, did vary by location. Tailoring, for example, was relatively most dominant in Freetown, while blacksmithing was relatively more important in the villages.

Indeed, these results reflect the importance of including location in the analysis of industry and provide support for distinguishing between "rural" and "urban" industries. Although any division between rural and urban is arbitrary, 20,000 inhabitants has been adopted as the dividing line in this study [see Chuta-Liedholm, 1973, p. 16]. Thus, Freetown, Koidu, Kenema, Bo, and Makeni, localities that are all now estimated to possess populations in excess of 20,000 inhabitants [see Spencer, May-Parker and Rose, 1976], have been classified as urban, while all other localities have been classified as rural. Using this classification scheme, 75 percent of the

Table 2. Sierra Leone: Value Added by Small-Scale Industrial Categories by Location, 1974/75

Industrial	Villages Less Than 2,000	Localities 2,000-20,000	Localities 20,000-100,000 (Bo, Koidu, Kenema, Makeni)	Localities Over 100,000 (Freetown)	Total	%
	(Leones Million)					
Tailoring	2,618,000	534,000	571,000	982,000	4,705,000	36
Blacksmithing	1,458,000	77,000	11,000	9,000	1,555,000	12
Carpentry	330,000	558,000	219,000	122,000	1,229,000	10
Baking	a/	259,000	175,000	264,000	698,000	5
Gara Dyeing	a/	345,000	165,000	30,000	540,000	4
Other	3,062,000	480,000	257,000	477,000	4,276,000	33
Total	7,468,000 (57%)	2,253,000 (17%)	1,398,000 (11%)	1,884,000 (15%)	13,033,000	100

Source: Data collected during phase 2 of the small-scale industry component of the African Rural Employment Project, Njala University College.

Note: a/ Included with "other" industries.

value added of small scale industries in Sierra Leone is generated in the rural areas.[1] These results reflect the importance of including rural enterprises in studies of the industrial sector of Sierra Leone.

With these more aggregative relationships now established, it is important to examine in depth the economic parameters of the individual small-scale industrial firms in Sierra Leone. To ensure that a reasonable approximation of the underlying population is provided, annual mean values of the input and output parameters have been constructed from the randomly selected firms for which data were available for the entire twelve month period.[2] Complete twelve months data were currently available for only 111 of the original 276 randomly selected firms, and thus for some industries the number of observations proved to be somewhat low.[3] Preliminary analyses, however, revealed that the mean value of the parameters did not vary significantly between those firms with complete data and those firms with incomplete data; this fact should consequently be kept in mind when interpreting the results presented in this section.

Annual Output and Value Added

The details of the annual mean output and value added figures for the major categories of small-scale industries in Sierra Leone are summarized in Table 3 by location. Before proceding to discuss the findings, however,

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[1] Computed from Table 2.

[2] Some of the data presented in this section relating to the characteristics of apprentices and entrepreneurs, however, refer to both randomly and purposively sampled firms. These are noted in the respective tables.

[3] In a few localities, for example, several months of data could not be collected due to difficulties with the enumerators. In the enumeration areas, there were difficulties in identifying some of the nonfarm households.

Table 3. Sierra Leone: Annual Mean Output and Value Added by Major Small-Scale Industrial Categories and Size of Localities, 1974/75

(Leones)

Industrial Category	Variable	Localities				
		Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Those Above 2,000
Tailors	Gross output	213.3	604.3	1,149.7	1,657.7	997.4
	Material and service input	11.0	173.6	278.6	454.1	258.6
	Value added	202.6	430.6	871.0	1,203.6	738.8
	n a/	8	23	29	7	59
Gara	Gross output	--	--	3,484.5	--	3,484.5
	Material and service input	--	--	1,917.5	--	1,917.5
	Value added	--	--	1,567.0	--	1,567.0
	n	--	--	2	--	2
Carpentry	Gross output	78.0	3,511.0	2,187.3	--	2,452.0
	Material and service input	7.1	2,241.0	473.0	--	827.2
	Value added	70.0	1,270.0	1,713.5	--	1,624.8
	n	6	1	4	--	5
Blacksmiths	Gross output	245.5	1,361.3	706.0	1,008.0	1,084.0
	Material and service input	6.3	219.6	307.0	705.0	329.6
	Value added	237.9	1,141.7	399.0	303.0	754.0
	n	10	3	2	1	6
Baking	Gross output	--	--	5,015.5	--	5,015.0
	Material and service input	--	--	2,727.5	--	2,727.0
	Value added	--	--	2,288.0	--	2,288.0
	n	--	--	2	--	3
Goldsmiths	Gross output	--	600.0	1,591.5	767.0	958.5
	Material and service input	--	271.0	320.0	150.0	267.2
	Value added	--	329.3	1,271.5	617.0	691.3
	n	--	3	2	1	6
Watch repair	Gross output	--	--	1,249.5	185.0	894.7
	Material and service input	--	--	259.5	41.0	186.7
	Value added	--	--	990.0	144.0	708.0
	n	--	--	2	1	3
Radio repair	Gross output	--	--	1,071.0	--	1,071.0
	Material and service input	--	--	193.5	--	193.5
	Value added	--	--	877.0	--	877.0
	n	--	--	2	--	2
Shoe repair	Gross output	--	508.0	1,547.0	--	1,027.5
	Material and service input	--	63.0	495.0	--	279.0
	Value added	--	445.0	1,052.0	--	7,485.0
	n	--	1	1	--	2

Source: Data were collected during phase 2 of the small-scale industry and farm level components of the African Rural Employment Project, Njala University College.

Notes: a/ n = number of observations; randomly selected firms only.

the definitions used in this study must be specified. The gross output value of each sample firm, for example, was obtained by specifying that all the output, including that produced for inventory, barter, or gifts, should be valued at the sales price at the firm.[1] The material and services input value for each firm, on the other hand, reflects the purchased value of all raw materials, lubricants, fuels (including electricity), water, indirect taxes and telephone services consumed by the sampled firm during the year. The value added for each firm is simply the resulting difference between the value of gross output and the value of material and service inputs.

The data presented in Table 3 reveal that there were important variations in the mean output and value added generated by the various categories of small scale industries in Sierra Leone. In those localities with 2,000 or more inhabitants, for example, the mean annual value added for bakeries (Le 2,288), carpenters (Le 1,625), and gara dyeing (Le 1,567) were over twice that of tailors (Le 739) and blacksmiths (Le 754). The output variations were of a similar magnitude.

Indeed, the most striking result demonstrated in Table 3 was that the mean annual value added in several industries appeared to vary importantly with location. The mean annual value added of tailors, for example, varied from Le 203 in the rural villages to Le 1,204 in Freetown; carpentry and blacksmiths exhibited similar wide variations in this parameter. Analysis of variance procedures applied to these data revealed that the locational variation in the tailoring value added figures were significant at the one percent level. Due primarily to the small number of observations, however,

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[1] Equivalent to ex-factory price.

the locational variations in the other industries' mean value added figures were not statistically significant.

The final result of interest that can be derived from Table 3 was the variation in the relative importance of purchased inputs by the various small-scale industry categories. The relative amounts of purchased inputs were highest in gara dyeing, where large quantities of cloth were purchased; and bakeries, where flour was a major purchased input. The purchased inputs for tailoring were relatively small because tailors worked primarily on fabric brought to them by their customers. In summary, the data presented in Table 3 reveal that there are important differences in the annual value added, outputs, and purchased inputs by industrial category and location.

Seasonal Variations in Output

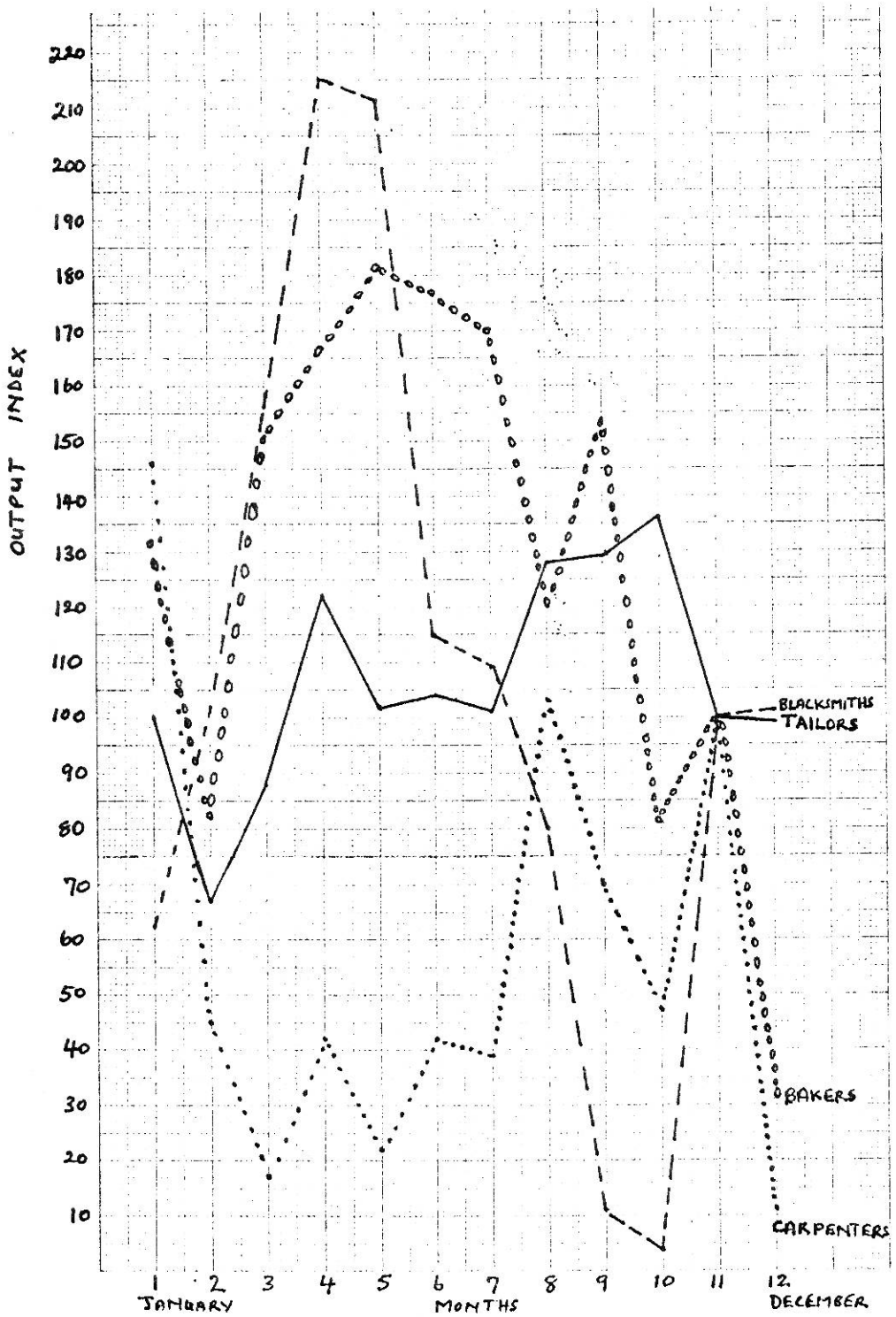
The annual value added and output data, however, mask important variations in the level of activity over the year. Indeed, one of the key reasons that data were gathered for one year in the present study was to permit these seasonal variations to be more precisely quantified.

The mean monthly variation in output of the major small-scale industry groups are portrayed in figure 1. The graph reveals that all the major industrial groups were subject to large monthly fluctuations in the level of activity. Indeed, for all the major industries, the mean output in the peak month was at least twice the mean output in the lowest month. The blacksmithing industry exhibited the largest variation in output over the year, while tailoring exhibited the least.

The seasonal pattern of output, however, is not the same for all the major industrial groups. Tailoring, the most important of the small-scale

Figure 1. Sierra Leone: Index of Monthly Output of Major Small-Scale Industries, 1974/75

(November = 100)[a/]



Source: Survey data.

Note: [a/] The indexes for tailors and carpenters reflect the mean output value for all localities while the indexes for blacksmiths and bakers are limited to those localities with 20,000-100,000 inhabitants.

industries, for example, is most active during the last quarter of the year, the period when the major harvesting activities are occurring. The seasonal peak for tailoring may be traceable not only to the several important religious festivals and holidays that occurred during this period, but also to the fact that the farmers, who are the major customers for tailoring products in the more rural localities, earn much of their cash income at this time. The blacksmithing and baking industries, on the other hand, attain their peak levels of activity in the second quarter of the year. The seasonal peak for bread may be due to the fact that rice, which is a partial substitute for bread, may be less available and relatively more costly during this period. The main explanation for the seasonal peak for blacksmithing activity is that the farmers, who are the major demanders of blacksmithing services,[1] engage in land clearing during the second quarter and thus require large quantities of blacksmiths' products and services at that time. In summary these results thus reflect the importance of incorporating seasonal variation into any analysis of small-scale industry and point to the potential dangers of surveys limited to one month. With the output parameters specified, it is not necessary to examine in more detail the corresponding production inputs, labor, and capital.

Capital Input

The problems associated with the measurement and analysis of the capital input are myriad and are still subject to much controversy and

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[1] See below, page 62 for a discussion of the nature of blacksmithing demand and the kinds of products and services supplied.

debate.[1] In the following section, the data sources and method of analysis chosen will be described, followed by a discussion of the composition and sources of this capital.

For purposes of analysis, capital has been divided into three major categories: working capital, equipment, and buildings. Working capital, is defined to include only the value of the inventories of material inputs and finished outputs held by the enterprise.[2] These stocks have been evaluated on the basis of the inventory levels at the beginning of the survey year. Equipment, is composed of the tools, machines, and furniture that is being utilized by the establishment. These assets have been initially valued at their original purchase price on the basis of information supplied by the entrepreneur. The final capital category is buildings and reflects the value of both the building and land that is being utilized by the establishment.

If only the value of those capital assets purchased by the enterprise are included in the analysis, however, the capital figures will be understated to the extent that firms rent their buildings and equipment. The data, in fact, reveal that the vast majority, 70 percent, of small scale industrial establishments in Sierra Leone rent their premises. Moreover, approximately 36 percent of the tailors in the survey rented their sewing machines.[3] Thus, if the use of capital by small scale industries

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[1] See, for example, the exchange related to the Cambridge controversy [Harcourt, 1972].

[2] This definition is somewhat more restrictive than definitions that include cash and net receivables. For small scale establishments, however, net receivables are minimal and cash data are difficult to obtain.

[3] Computed from survey data.

is to be measured completely, it is imperative that the rental value of buildings and equipment be combined with the capital stock data.

The combination of the stock and rental capital values, however, raises the important theoretical and empirical issue of what is the correct specification of the capital input. Ideally, the capital services rather than the capital stock figure should be used in the analysis of the cost and production relationships of firms. In most studies, however, the capital stock is used as a proxy for capital services flows, but this stock measure is valid only under the restrictive assumption that the capital stock components are of the same durability and vintage.[1] Thus, in the present study, all the capital stock variables have been converted into capital services flows using the capital recovery formula:

$$R = \frac{rV}{1 - (1+r)^{-n}}$$

where R is the constant annual capital service flow, V is the original (undepreciated) market value of the asset, r is the discount rate and n is the life expectancy of the capital. This formula generates an annual capital service flow from the capital stock data that is equivalent to the rental charge or "user cost" of capital and reflects both depreciation and the opportunity cost of the capital.

If the capital recovery factor is to be used in the analysis, however, two additional parameters are required: (1) the life expectancy of the capital stock (n), and (2) the discount rate reflecting the opportunity cost of capital (r). Fortunately, data were collected on both the age and the expected remaining lives of the equipment and buildings used by the

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[1] See Yotopoulos [1967] for a good review of this issue.

small scale industry establishments. To eliminate the distortions arising from incorrect or inconsistent responses supplied by individual establishments, however, the mean expected life for each component of the capital stock was calculated and used in the analysis.[1] Not unexpectedly, the mean expected life for each component varied widely, ranging from two years for non-metal tools used by tailors to thirty-five years for the blacksmith's anvils. These results thus reflected the importance of adjusting the capital data for life expectancy.

The determination of the appropriate discount rate to use in the analysis, on the other hand, involves a somewhat more subjective exercise. Ideally, one would want to use the rate of discount that reflects the opportunity cost of capital in Sierra Leone, but this rate is rather elusive. The capital market appears to be highly "fragmented"[2] with artificially low interest rates existing in the commercial banking sector and unduly high interest rates existing in the informal credit markets. The maximum discount rate charged by the commercial banks is, for example, 12 percent [Bank of Sierra Leone, 1975] while rates in the informal rural credit markets generally exceed 40 percent.[3]

In view of these considerations, it has been assumed initially that a discount rate of 20 provides a reasonable approximation of the opportunity

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[1] A similar procedure was used to calculate the mean expected life of those buildings owned by the establishments.

[2] See McKinnon [1973] for a detailed discussion of "fragmented" capital market.

[3] Linsenmeyer [1976], for example, reports that fishermen obtained loans for fixed capital at a rate, adjusted for default risk of 43 percent. See also Bank of Sierra Leone [1969] for noninstitutional credit rates in agriculture.

cost of capital in Sierra Leone.[1] This particular discount rate is, if anything, somewhat low and thus will give the benefit of the doubt to the more capital-intensive firms.

Armed with the 20 percent discount rate, the expected life of the various capital assets and the capital recovery factor, all the capital stock variables were converted to capital service flows. In addition, the 20 percent discount rate was used to convert the working capital figure into a number reflecting the opportunity cost of the funds tied up in such assets. With these assumptions and qualifications in mind, it is now appropriate to examine the capital input data.

The details of the annual mean capital services used by the major categories of small scale industries are summarized in Table 4. The table reveals that there are wide variations in the mean annual capital services inputs. In those localities with 2,000 or more inhabitants, for example, gara dyeing using only Le 18 of capital services annually while blacksmiths employ an average of Le 342 of these inputs. The annual capital services used by tailors, the largest group, falls between these extremes and amounts to an average of Le 135 per year.

The composition of these capital services also varies by industrial category. In those localities of 2,000 or more inhabitants, for example, the building rent ranges from a high of Le 186 per year (54 percent of total capital services) in blacksmithing, to a low of zero in gara dyeing, where all production is done outdoors. Working capital services, on the other hand, range from a high of Le 57 per year (34 percent of total capital

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[1] For a more extensive discussion of the discount rate and credit markets, see below, page 102.

Table 4. Sierra Leone: Annual Mean Capital Services Input by Major Small-Scale Industrial Categories and Size of Localities, 1974/75

(Leone)

Industrial Category	Variable	Localities				
		Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Those Above 2,000
Tailors[a/]	Building services	12.0	20.8	60.3	186.7	59.9
	Equipment services	26.4	38.8	60.9	104.5	57.3
	Working capital services	--	2.6	33.1	3.4	17.7
	Total capital services input	38.4	62.2	154.3	294.7	134.9
Gara	Building services	--	--	--	--	--
	Equipment services	--	--	6.0	--	6.0
	Working capital services	--	--	12.0	--	12.0
	Total capital services input	--	--	18.0	--	18.0
Carpentry	Building services	12.0	120.0	63.0	--	74.0
	Equipment services	25.0	48.0	30.0	--	33.6
	Working capital services	--	0	72.0	--	57.0
	Total capital services input	37.0	168.0	165.0	--	164.6
Blacksmiths	Building services	12.0	48.0	366.0	240.0	186.0
	Equipment services	26.4	88.0	168.0	288.0	148.0
	Working capital services	--	8.0	8.0	24.0	8.0
	Total capital services input	38.4	144.0	534.0	552.0	342.0
Baking	Building services	--	--	84.0	--	84.0
	Equipment services	--	--	18.0	--	18.0
	Working capital services	--	--	12.0	--	12.0
	Total capital services input	--	--	114.0	--	114.0
Goldsmiths	Building services	--	20.0	60.0	120.0	50.0
	Equipment services	--	4.0	18.0	84.0	22.0
	Working capital services	--	0	42.0	0	14.0
	Total capital services input	--	24.0	120.0	204.0	86.0
Watch repair	Building services	--	--	24.0	--	16.0
	Equipment services	--	--	60.0	--	40.0
	Working capital services	--	--	--	--	--
	Total capital services input	--	--	84.0	--	56.0
Radio repair	Building services	--	--	60.0	--	60.0
	Equipment services	--	--	36.0	--	36.0
	Working capital services	--	--	18.0	--	18.0
	Total capital services input	--	--	171.0	--	171.0
Shoe repair	Building services	--	12.0	48.0	--	30.0
	Equipment services	--	0	12.0	--	6.0
	Working capital services	--	0	24.0	--	12.0
	Total capital services input	--	12.0	84.0	--	48.0

Source: Survey data.

Note: [a/] The number of observations is the same as in table 3.

services) for carpenters to a low of Le 8 in blacksmithing, where virtually no inventories of material or output are retained.

Finally, the results in Table 4 indicate that there are important variations in the mean annual capital services related to location in Sierra Leone. In tailoring, for example, the annual capital services ranged from Le 38.4 in the rural villages to Le 295 in urban Freetown. Carpentry and blacksmithing also exhibited similar wide variations by location. Analysis of variance procedures applied to the data for these three industries, the only ones with sufficiently large number of observations, revealed that the locational variations were significant at the 5 percent level.

The composition of the capital services also vary by location. More specifically, the building rental component is relatively much more important in urban than in rural locations, reflecting the relative premium on space in urban locations. In tailoring, for example, the building rent accounts for 63 percent of the capital services in urban Freetown, but only 31 percent in the rural villages. Thus, location would appear to influence both the amount and composition of the capital services input and thus reinforces the importance of specifying location in any analyses of small scale industry.

The capital service input data, however, do not reveal the nature of the initial capital stock requirements at the time these firms were established and thus do not shed light on a potential barrier to entry into small-scale industry. To analyze this aspect, initial capital stock data were obtained from the entrepreneurs during the detailed entrepreneur interviews. The initial capital stock figures relating to the randomly selected

enterprises are presented in Table 5, in which the data are arranged by industrial category and location.

The data reveal that the initial capital stock requirements for the major small-scale industry categories were quite modest. In all the major industries, the mean initial investment required was less than Le 100. Indeed, gara dyers could enter with only Le 31 of initial capital and tailors needed but Le 56. These results it should be noted are similar to the $75 initial capital requirements reported for rural industries in Kenya [Child, 1973]. A particularly striking result presented in Table 5, however, is the indication that initial capital stock requirements do not necessarily decline as one moves to smaller, more rural localities. The mean initial capital stock requirement for tailors in the rural village, for example, is Le 68, while in urban Freetown it is only Le 50. One partial explanation for this phenomenon with respect to tailors is that a sewing machine rental market has developed in many urban areas and thus urban tailors do not have to purchase their sewing machines in order to enter the industry; the sewing machine rental market has not yet entered the rural localities, however, and rural tailors, of necessity, must purchase their machines.

The sources of these initial capital funds are presented in Table 6, where the data are arranged by size of locality. The table reveals that personal savings from agriculture, trade or business provided the majority (60 percent) of the funds needed to establish small-scale industries in Sierra Leone, followed by gifts and family loans.[1] The paucity of funds obtained from either the government or the commercial banking system provides

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[1] Similar proportions are reported by Child [1973] for Kenya and Harris [1970] for Nigeria.

Table 5. Sierra Leone: Average Initial Capital Stock Requirements at Time of Establishment by Major Industrial Categories and Size of Locality, 1974/75

(Leones)

Industrial Category a/	Localities				
	Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Localities
Tailors	68	45	62	50	56
Gara dyeing	--	--	31	--	31
Carpenters	24	44	82	--	47
Blacksmiths	26	44	215	b/	55
Baking	--	--	90	--	90
Others	22	72	65	152	63

Source: Survey data.

Notes: a/ The number of observations is the same as in table 3, except for the noninclusion of the blacksmith in Freetown due to lack of data.

b/ Data unavailable from firm.

Table 6. Sierra Leone: Sources of Initial Capital of Small-Scale Industrial Firms at the Time of Establishment

Sources	Localities				
	Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Localities
Savings from agriculture	38.2%	19.4%	7.9%	--	20.3%
Savings from trade or business	26.5%	38.9%	50.0%	20.0%	38.1%
Other savings	--	2.8%	2.6%	--	1.8%
Loans from commercial banks	--	--	2.6%	--	.9%
Loans from friends or family	2.9%	5.6%	--	40.0%	4.4%
Gifts	5.9%	13.9%	21.1%	40.0%	15.1%
Loans from money lenders	2.9%	--	--	--	.9%
Other	23.5%	19.4%	15.0%	--	18.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
n a/	34	35	38	5	112

Source: Data collected from entrepreneural questionnaire administered during phase 2 of the small-scale industry component of the African Rural Employment Project, Njala University College.

Note: a/ n = number of observations.

a further indication of the rather fragmented and underdeveloped nature of the institutional capital market in Sierra Leone for small scale industry.

The existence of some variation in the source of initial capital by location is also revealed in this table. In the villages, for example, personal savings from agriculture provided the largest source of initial capital, while in the larger urban localities, personal savings from trade or business and gifts were the predominent sources of these funds.

The capital for the expansion of these establishments, on the other hand, was generated from none of these sources. As Table 7 reveals, almost 90 percent of the funds used for expansion were simply reinvested profits, reflecting perhaps both the high rates of return to these particular activities and the fragmented nature of the capital market.[1] One of the most striking results presented in Table 7 is the revelation that none of the establishments enumerated in the sample had obtained expansion funds from either the commercial banking system or the government. These results as well as those presented earlier relating to the initial sources of funds reflect the relatively nascent state of the capital market and the corresponding and important role played by small-scale enterprises in generating and providing a vehicle for investing personal savings in Sierra Leone.

Finally, it was important to ascertain if the capital stocks of the small-scale industries were fully utilized.[2] Consequently, although they are difficult to quantify and subject to error, excess capacity measures

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[1] See above, page 21, for a further discussion of this point.

[2] See Winston [1974] for a good discussion of the capacity utilization issues. Excess capacity can be both planned and unplanned and caused by both demand and supply factors.

Table 7. Sierra Leone: Sources of Expansion Funds for Small-Scale Industrial Establishments, 1974/75

Sources	Localities				
	Less Than 2,000	2,000-20,000	20,000-100,000	Above 100,000	All Localities
Reinvested profits	76.5%	87.5%	95.5%	100.0%	88.5%
Loans from commercial banks	--	--	--	--	--
Loans from cooperatives	5.9%	12.5%	--	--	3.9%
Loans from money lenders	11.8%	--	--	--	3.9%
Other	5.9%	--	4.5%	--	3.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
n a/	17	8	22	5	

Source: Data obtained from the entrepreneurial questionnaire administered during phase 2 of the small-scale industry component of the African Rural Employment Project, Njala University College.

Note: a/ n = number of observations; based on returns from only those firms that expanded.

were computed for the major industries by location, the results of which are summarized in Table 8. The measure was obtained by asking the proprietors to state how many additional hours they would operate their firms with the existing buildings and equipment if there were no demand or materials constraints. The additional hours worked were then expressed as a percent of the sum of the existing and additional hours worked by the firm to produce the resulting excess capacity measure. Except for the baking industry, where the more "modern" firm normally operated two shifts,[1] the measure reflects the single-shift excess capacity of these firms.

An examination of Table 8 reveals that a substantial amount of excess capital capacity existed in all the major small-scale industries. The excess capacity varied by major industry, however, ranging from a high of 41 percent in the blacksmithing industry to only 25 percent in gara dyeing. Even more striking, however, was the indication that the amount of excess capacity varied by location. In tailoring, for example, there was 45 percent excess capacity in the villages but only 24 percent in Freetown. The highest amount of excess capacity was found to exist in rural areas in the other major industries as well. These results thus indicated that, particularly in the rural areas, the existing capital stocks of small-scale industries in Sierra Leone were generally not fully utilized.

Labor Input

With capital input data having been discussed, it is not important to examine in detail the labor input. The data sources and procedures used will be discussed first, followed by a discussion of the composition of

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[1]For a description of "modern" bakeries, see below, p. 81.

Table 8. Sierra Leone: Excess Capacity[a/] by Major Small-Scale Industry by Location, 1974/75

Industrial Category	Localities				
	Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Localities
Tailors	45%	34%	29%	24%	33%
n b/	14	24	3	8	
Gara	--	15%	31%	18%	25%
n	--	1	3	1	
Carpentry	45%	33%	25%	22%	34%
n	9	9	8	3	
Blacksmiths	43%	47%	30%	--	41%
n	8	4	3	--	
Baking	--	41%	32%	30%	34%
n	--	6	7	6	
Others	38%	44%	27%	43%	36%
n	9	16	19	5	
Weighted grand mean					35%

Source: Survey data.

Notes: [a/] For definition of excess capacity measures, see text.

[b/] n = number of cases: includes both randomly and purposively sampled firms.

the labor input by labor type, industry, and location. The section will conclude with a discussion of the characteristics of the two most important labor components, apprentices and the proprietors.

Since data on the stock or number of workers for each enterprise had been collected during phase 1 of the study (see Chuta and Liedholm [1975]), the primary objective during phase 2 was to obtain data on the flow of labor services. These data were obtained from the labor input questionnaire that was administered twice weekly to firms over a period of one year. The objective was to measure labor services in terms of the number of hours actually worked in production by each category of workers; consequently, the labor services variable did not include the hours of individuals when they were simply waiting for work. This method of measuring labor services was chosen because it not only produces the most suitable input for production function analysis, but also would provide an indication of an establishment's excess capacity. Finally, it should be noted that, unlike the farm level component of the Sierra Leone project, female and child labor inputs have been expressed in terms of actual, not male equivalent hours.[1]

The details of the mean annual labor hours used by the major categories of small-scale industries in the various localities of Sierra Leone are summarized in Table 9. An examination of this table reveals that, as with the capital services input, there are quite wide variations in the mean number of labor hours by the major industrial category. In those localities in excess of 2,000, for example, the mean annual number of tailoring hours worked was only 1,572 hours, while in carpentry the mean annual number of hours worked was 6,457.

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[1] It should be noted that female and child hours were minimal except in gara dyeing, where female labor was important.

Table 9. Sierra Leone: Annual Mean Labor Hours by Small-Scale Industrial Category, Labor Type and Locality

(Number of Hours)

Industrial Category	Variable a/	Localities				
		Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Localities
Tailors	Proprietor labor	474.0	869.0	840.6	1,398.4	917.9
	Male family labor	0	.6	.5	0	.5
	Female family labor	0	2.3	.1	0	.9
	Child family labor	0	0	0	0	0
	Apprentices	0	323.5	534.0	1,928.9	617.8
	Hired labor	0	18.3	52.3	15.0	36.0
	Total	474.0	1,211.3	1,431.2	3.342.3	1,572.3
Gara	Proprietor labor	0	--	1,000.5	--	1,000.5
	Male family labor	0	--	194.5	--	194.5
	Female family labor	0	--	412.5	--	412.5
	Child family labor	0	--	15.5	--	15.5
	Apprentices	0	--	0	--	0
	Hired labor	0	--	381.5	--	381.5
	Total	0	--	2,004.5	--	2,004.5
Carpentry	Proprietor labor	308	3,132.0	919.5	--	1,362.0
	Male family labor	--	0	0	--	0
	Female family labor	--	0	0	--	0
	Child family labor	--	0	0	--	0
	Apprentices	--	15,541.0	2,292.5	--	4,942.2
	Hired labor	--	0	191.3	--	153.0
	Total	308	18,673.0	3,403.3	--	6,457.2
Blacksmiths	Proprietor labor	745	1,123.0	496.0	446.0	801.0
	Male family labor	--	0	0	0	0
	Female family labor	--	0	0	0	0
	Child family labor	--	0	0	0	0
	Apprentices	--	1,691.7	631.5	775.0	1,185.5
	Hired labor	--	200.7	669.0	--	323.3
	Total	745	3,015.3	1.796.5	1,221.0	2,310.0
Baking	Proprietor labor	--	--	277.5	--	277.5
	Male family labor	--	--	754.0	--	754.0
	Female family labor	--	--	0	--	0
	Child family labor	--	--	0	--	0
	Apprentices	--	--	0	--	0
	Hired labor	--	--	3,139.5	--	3,139.5
	Total	--	--	4,171.0	--	4,171.0
Goldsmiths	Proprietor labor	--	700.0	988.5	1,486.0	927.0
	Male family labor	--	0	53.0	0	17.7
	Female family labor	--	--	0	0	0
	Child family labor	--	486.0	0	0	243.0
	Apprentices	--	395.7	550.0	812.0	517.0
	Hired labor	--	0	0	0	0
	Total	--	1,614.0	1,591.0	2,298.0	1,720.7
Watch repair	Proprietor labor	--	--	687.0	171.0	515.0
	Male family labor	--	--	0	0	0
	Female family labor	--	--	0	0	0
	Child family labor	--	--	0	0	0
	Apprentices	--	--	19.0	0	12.0
	Hired labor	--	--	10.0	0	7.0
	Total	--	--	715.0	171.0	534.0

Table 9 - Continued
Sierra Leone: Annual Mean Labor Hours by Small-Scale Industrial Category, Labor Type and Locality

(Number of Hours)

Industrial Category	Variable a/	Localities				
		Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Localities
Radio repair	Proprietor labor	--	--	549.0	--	549.0
	Male family labor	--	--	0	--	0
	Female family labor	--	--	0	--	0
	Child family labor	--	--	0	--	0
	Apprentices	--	--	154.0	--	154.0
	Hired labor	--	--	0	11.0	0
	Total	--	--	703.0	--	703.0
Shoe repair	Proprietor labor	--	1,593.0	1,192.0	--	1,393.0
	Male family labor	--	0	0	--	0
	Female family labor	--	0	0	--	0
	Child family labor	--	0	0	--	0
	Apprentices	--	14.0	0	--	7.0
	Hired labor	--	0	0	--	0
	Total	--	1,607.0	1,192.0	--	1,400.0

urce: Survey data.

·e: a/ Number of observations is the same as table 3.

The composition of this labor input also varied by industrial category. This result is apparent from Table 9, where the total hours of labor input by industry has been subdivided into the following categories: (1) proprietors' labor, (2) family labor (male, female, child), (3) apprentices, and (4) hired labor.

The mean annual number of hours actually worked by apprentices varies widely by industrial category. In those localities with 2,000 or more inhabitants, for example, the mean yearly apprenticeship hours worked varies from a high of 4,942 in carpentry (76 percent of total carpentry industry hours) to zero in gara dyeing.[1] In tailoring, the mean annual number of hours worked by apprentices was 617, a number that represented 39 percent of the total tailoring hours.

The hired labor variables exhibits similar wide variation by industrial category. In those localities with 2,000 or more inhabitants, the mean annual hours of hired workers in tailoring is only 35 (2 percent of the total) while in baking the number increases to a mean yearly total of 3,346 (62 percent of the total).

The relative importance of the family labor input also varies widely by industry. Indeed, in the major industrial categories, family labor is important only in gara dyeing and is negligible in the other industrial categories.

Moreover, these data reveal that the role of women in the major small-scale industrial categories included in the survey is rather small.

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[1] It should be noted, however, that in the larger, more purposive sample, a few gara dyers actually used apprentices in production, but their utilization was very minimal.

Women appear to be engaged actively in only the gara dyeing industry, where women family members contribute 16 percent of the industry's total mean annual labor hours. It should be further mentioned that virtually all the proprietors in the gara industry are also women, thus making the women's role in this industry quite substantial. In all the other major small-scale industries, however, the labor hour contribution of women either as family workers, proprietors or apprentices is small. Additional analyses must be undertaken on these data, however, before more detailed results and conclusions can be specified.

Finally, the data in Table 9 reveal that the mean number of hours worked by the proprietor in the five major small-scale industries in those localities in excess of 2,000 is approximately 1,000 and ranges from a low of 800 to a high of 1,300 hours. The proprietors of small-scale industry thus appear to work about the same number of hours as farm proprietors. [See Spencer and Byerlee, 1976.]

Both the composition and overall magnitude of the labor services input also varied somewhat depending on the size and location of settlements in Sierra Leone. In tailoring, for example, the total mean annual labor hours ranged from 474 in the rural villages to 1,398 in urban Freetown. There were also variations in carpentry and blacksmithing labor hours by location, but, in these two industries, the mean annual labor hours were largest in those localities with from 2,000 to 20,000 inhabitants. Finally, the data in Table 9 reveal that the proprietor's labor services tend to be relatively more important in the smaller, more rural localities, while the apprentices' labor services tend to become more important as one moves to

the larger, urban localities. Thus, once again location has an important bearing on the various small-scale industry parameters being examined.

With these general statistics in mind, it is now important to examine in more detail the characteristics of the two most important labor components, apprentices and proprietors. The apprentices will be examined first, followed by a discussion of the proprietors.

The apprenticeship system provides the primary vehicle for training the labor for small-scale industry. It is a system in which a young person serves a proprietor or master for a given period of time in order to learn a trade or craft. The duration of the apprenticeship varies from industry to industry as Table 10 reveals. A gara dyeing apprentice, for example, serves for only about a year and one-half while a blacksmith's apprentice serves for an average of five years. The duration of the tailoring apprentice falls between these extremes and averages three and one-half years. It should be further noted that the duration of the apprenticeship does not vary importantly with location; indeed, analysis of variance procedure indicated that locational variations in the duration of apprenticeship were not statistically significant at even the 50 percent level.

A large number of the apprentices are required to pay the proprietors or masters a learning fee for the training they receive during this period. Indeed, as Table 11 reveals, 53 percent of the small-scale industrial establishments charged a fee for the training given, with the percentage of firms requiring the fee in the major industrial categories ranging from a low of 17 percent in baking to 100 percent in gara dyeing.

Whether or not a learning fee was required, however, depended importantly on the location of the enterprise. In those rural localities with less than

Table 10. Sierra Leone: Duration of Apprenticeship and Learning Fees by Small-Scale Industrial Category and Location

Industry	Duration of Apprenticeship (Years)					Learning Fee (Years)				
	Localities					Localities				
	Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Localities	Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Localities
Tailors	3.2	3.4	4.0	3.6	3.6	28.5	24.7	28.6	--	27.1
n a/	10	32	30	7	79	11	18	18	--	47
Gara	--	1.0	2.0	1.0	1.7	--	11.3	19.7	--	15.5
n	--	1	4	1	6	--	3	3	--	6
Carpenters	4.3	4.0	5.4	5.7	4.8	24.0	45.6	42.0	--	37.5
n	4	7	8	3	22	7	9	5	--	21
Blacksmiths	5	4.6	5.3	--	4.9	25.0	42.3	--	--	31.9
n	10	8	4	--	22	6	4	--	--	10
Baking	--	3.8	1.0	1.0	2.0	--	13.0	20.0	--	15.3
n	--	4	2	5	11	--	2	1	--	3
Others	6.0	3.2	2.9	2.3	3.1	12.7	24.1	33.4	20.0	24.5
n	2	13	18	4	37	3	12	5	1	21

Source: Survey data.

Note: a/ n = number of observations; based on all randomly and purposively selected firms that responded to those questions.

Table 11. Sierra Leone: Percentage of Small-Scale Industry Proprietors Charging a Learning Fee to Apprentices

Industry	Localities				
	Less Than 2,000	2,000-20,000	20,000-100,000	100,000+	All Localities
Tailors	79%	58%	56%	0%	54%
n a/	10	33	34	8	85
Gara	--	100%	100%	100%	100%
n	--	3	3	1	7
Carpenters	70%	69%	75%	33%	68%
n	10	13	8	3	34
Blacksmiths	88%	50%	0%	--	55%
n	8	8	4	--	20
Baking	--	25%	25%	0%	17%
n	--	8	4	6	18
Others	43%	81%	26%	20%	46%
n	7	16	19	5	47
Weighted grand mean					53%

Source: Survey data.

Note: a/ n = number of observations; based on all randomly and purposively selected firms that responded to this question.

2,000 inhabitants, for example, approximately 73 percent of the firms required a learning fee, while in Freetown only 13 percent of the firms required such a fee. This variation may be traceable to a differing underlying pattern of demand for and supply of apprentices. Since apprenticeship training is a basic requirement for entry into many small-scale industries, the relative entry cost relating to training appears to be higher in rural areas than in the urban areas.[1]

To ascertain the dimensions of the learning fee as a potential entry barrier, it is also necessary to examine the magnitude of the learning fee. As Table 10 reveals the learning fees in the rural villages are rather similar for the major industrial groups, amounting to approximately Le 25 for the duration of the apprenticeship. In the large localities, the learning fee charged by those firms requiring it appears to increase somewhat for all industrial categories except tailoring. Analyses of variance procedures applied to these data, however, revealed that none of these locational variations in the learning fee were statistically significant. Thus, given the predominance of the learning fee in rural areas, the learning fee does appear to fall more heavily on the rural than on the urban apprentices.

Finally, the vast majority of the small-scale industry proprietors received their own training from the apprenticeship system. Indeed, the survey data reveal that 90 percent of the proprietors sampled had previously served as apprentices.[2] The other characteristics of the proprietors must now be examined in more detail.

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[1] It should be noted that in urban areas, the proprietor also generally provides room and board for their apprentices.

[2] Computed from data collected from the entrepreneurial questionnaires.

The average age of the small-scale industry proprietor in Sierra Leone, for example, is 40 years. The industrial proprietors thus tended to be younger than the farming household head, whose average age was 49 [Spencer, 1973]. As Table 12 reveals, however, the proprietor's age varies by industry. Tailors, for example, tend to be relatively young (34 years mean) while blacksmiths tend to be relatively older (47 years mean). One might hypothesize that industries with the lowest entry barriers and more dynamic growth potential would have the younger entrepreneurs. One of the most striking results that is apparent from Table 12, however, is the variation in the industrial proprietor's age by location. In particular, urban proprietor's are shown to possess substantially lower mean ages than their rural counterparts. The mean age of tailors in rural villages, for example, is 39 while in urban Freetown the mean proprietor's age declines to 30, a variation significant at the 10 percent level. Indeed, the mean age for all small-scale industry proprietors in the rural sample was 45 years, a figure that was only slightly lower than the 49 year average age of farming household heads.

There are a range of other socio-economic characteristics that might shed direct light on the proprietor's ability to operate the firm. The occupation of the proprietor's father, for example, could provide an indication not only of the intergenerational occupational mobility, but also the psychological attitude of the proprietor towards operating the firm.[1]

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[1] See Harris [1971] for an excellent discussion of the influence of social and psychological factors on entrepreneurial performance. For example, attitudes towards risk and modes of interpersonal relationships within an organization can be shaped by these social and psychological variables.

Table 12. Sierra Leone: Small-Scale Industrial Proprietors' Entrepreneurial Characteristics

Industry	Age of Proprietor (Years)					Age of Business (Years)				
	Localities					Localities				
	Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Localities	Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Localities
Tailors	38.6	36.8	32.2	30.0	34.7	14.4	11.3	12.3	7.3	11.8
n a/	12	35	34	8	89	14	35	33	8	90
Gara	--	37.3	45.3	40.0	41.6	--	16.7	19.0	13.0	17.2
n	--	3	4	1	8	--	3	3	1	7
Carpenters	50.3	37.2	33.8	44.0	41.1	14.9	11.5	10.5	18.0	12.8
n	10	11	8	3	32	10	13	8	3	34
Blacksmiths	46.5	49.8	43.3	--	47.1	14.0	19.7	14.0	--	16.0
n	9	8	4	--	21	9	7	4	--	20
Baking	--	40.3	47.5	49.3	45.6	--	7.8	6.4	6.9	7.1
n	--	7	6	7	20	--	8	7	7	22
Other	47.5	45.9	34.5	42.8	41.3	19.3	17.4	10.8	12.4	14.6
n	8	16	19	5	48	8	16	19	5	48
Weighted grand mean					40.0					12.6

Source: Survey data.

Note: a/ n = number of observations; based on all randomly and purposively selected firms that responded to this question.

In view of Sierra Leone's pervasive agricultural base, it is perhaps not surprising that the primary occupation of the vast majority of the fathers of the industrial proprietor's was farming. Indeed, as revealed in Table 13, approximately two-thirds of the proprietors had fathers whose primary occupation was farming. The two-thirds figure for Sierra Leone is higher, however, than that reported for Nigerian proprietors in the surveys of both Callaway [1967] and Harris [1971].[1] One might hypothesize that the different results were traceable, at least in part, to the absence of rural proprietors from the Nigerian surveys. An examination of Table 13, for example, does reflect some tendency for the percentage of farmers to increase as one moves to the smaller rural localities. Various Chi-squared tests, however, indicated that except for bakeries, these locational differences were not statistically significant at even the 10 percent level.

Another potentially important characteristic of the proprietor is the level of formal education. One might hypothesize that formal education contributes to managerial, organizational and technical skills of the proprietor. The extent of the formal education of proprietors is provided by Table 14 in which the percentage of proprietors with any formal education are arranged by industry and location.

The most striking result revealed by the table is the low percentage of proprietors with any formal education. Indeed, for all localities, 77 percent of the proprietors possessed no formal education at all, a high percentage even by African standards. In Callaway's sample of proprietors

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[1]Callaway found that 48 percent of the proprietors' fathers in Ibadan were farmers while Harris reported that 25 percent of his proprietors' fathers were farmers.

Table 13. Sierra Leone: Percentage of Small-Scale Industrial Proprietors' Fathers Who Were Farmers by Industrial Category and Location

Industry	Localities				
	Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Localities
Tailors	86%	71%	61%	100%	72%
n a/	14	31	33	6	84
Gara	--	100%	33%	100%	71%
n	--	3	3	1	7
Carpenters	80%	83%	57%	33%	72%
n	10	12	7	3	32
Blacksmiths	75%	38%	25%	--	50%
n	8	8	4	--	20
Bakers	--	75%	80%	0%	50%
n	--	8	5	7	20
Others	25%	53%	39%	100%	48%
n	8	17	18	5	48
Weighted grand mean					63%

Source: Survey data.

Note: a/ n = number of observations; based on all randomly and purposively selected firms that responded to this question.

Table 14. Sierra Leone: Percentage of Small-Scale Industrial Proprietors with Formal Education by Industry and Location

Industry	Localities				
	Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Localities
Tailoring	21%	15%	35%	25%	24%
n a/	14	34	34	8	90
Gara	--	0%	25%	0%	13%
n	--	3	4	1	8
Carpenters	10%	25%	38%	33%	24%
n	10	12	8	3	33
Blacksmiths	0%	0%	25%	--	5%
n	10	8	4	--	22
Baking	--	10%	29%	71%	33%
n	--	10	7	7	24
Other	0%	12%	53%	20%	26%
n	9	17	19	5	50
Weighted grand mean					23%

Source: Survey data.

Notes: a/ n = number of observations; based on all randomly and purposively selected firms that responded to this question.

in Ibadan, for example, only 24 percent had no formal education while Harris reported that among his Nigerian proprietors only 13 percent possessed no formal education. There also, however, appeared to be some variation in the level of formal education by industry and location, but, except for baking, none of these variations were statistically significant.[1] Clearly, as noted previously, nonformal education apparently provided the major source of training for small-scale industrial proprietors.

Another potential indicator of the ability of the proprietor to operate the firm is whether or not the firm keeps records or business accounts. As the data in Table 15 indicate, only 17 percent of the firms kept even a very rudimentary set of business accounts or records. The extent to which these business practices were utilized did appear to vary somewhat by industry and location, with the practice more prevalent, for example, in the larger urban locations and in the baking industry. On the basis of Chi-squared tests, however, the variation was found to be statistically significant only for bakers and tailors.[2]

Finally, the number of years that proprietors' establishments have been operating should also provide an indication of his or her ability to run the firm. The data on the number of years since the proprietors' businesses were established are summarized in Table 12, where they are arranged by location and industry. The mean number of years that these small-scale establishments have been operating in Sierra Leone is approximately thirteen years. The age of firms appeared to vary by location and

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[1] On the basis of Chi-squared tests at the 10 percent significance level.

[2] At the 5 percent significance level.

Table 15. Sierra Leone: Percentage of Small-Scale Industrial Proprietors Who Keep Records

Industry	Localities				
	Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Localities
Tailoring	0%	3%	21%	0%	9%
n a/	14	33	34	8	89
Gara	--	67%	50%	0%	50%
n	--	3	4	1	8
Carpenters	10%	15%	38%	33%	21%
n	10	13	8	3	34
Blacksmiths	0%	0%	25%	--	5%
n	9	8	4	--	21
Baking	--	0%	57%	86%	46%
n	--	8	7	7	22
Others	0%	6%	32%	20%	16%
n	9	17	19	5	50
Weighted grand mean					17%

Source: Survey data.

Note: a/ n = number of observations; based on all randomly and purposively selected firms that responded to this question.

industry, with the urban tailoring and baking establishments, for example, tending to be younger than their counterparts elsewhere. However, analysis of variance procedures applied to these data indicated that these age variations by location and industry were not statistically significant.[1]

Several of the socio-economic characteristics of the proprietor that have been examined, however, do vary importantly by establishment, and many of the characteristics have been hypothesized to influence the performance of the firms. These hypothesized relationships will be tested and reported upon later, once the requisite performance variables have been constructed.

The Economic Ratios: Output-Capital, Output-Labor and Labor-Capital

Having now described the various inputs and outputs for the various small-scale industrial establishments in Sierra Leone, it is now possible to examine, in a preliminary way, various crude economic ratios that relate to the relative efficiency with which these firms combine their capital and labor inputs. Specifically, the output-capital, output-labor and, labor-capital ratios, will be calculated and compared by industry and location.

These particular economic ratios can provide several useful insights into the productive process. Firstly, they provide one measure of the factor intensity of production in the various industries.[2] Secondly, they indicate the relative productivities of the factors of production.[3]

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[1] At the 10 percent level.

[2] See Morawetz [1974] for a good review of the relevant issues surrounding this use of the ratio.

[3] See, for example, Steele [1976], who uses the ratios for this purpose in Ghana.

Finally, they provide a clue as to the amount of output and employment generated per unit of the scarce capital input.[1]

The ratios have been calculated by using the input and output data mentioned previously. In particular, it should be recalled that the two inputs, labor and capital, have been measured in terms of the flow of services rather than stocks. Additionally, the output term, following Morawetz [1974], is measured using the value added rather than the gross output values of the firms surveyed. Finally, it should be recalled that the ratios described in this section related only to those generated from the randomly selected small-scale industrial establishments.[2]

The three economic ratios calculated for small-scale industries are presented in Table 16. The output-capital ratio results will be discussed first, followed by the output-labor and labor-capital ratios.

The output-capital ratio provides a useful measure of not only average capital productivity, but also an indication of the capital intensity of production. Moreover, if one assumes that capital is the only scarce factor of production, maximum output is obtained when the output-capital ratio is maximized.[3] Given the relative paucity of capital in Sierra Leone, a high output-capital ratio would thus provide a good indication that an industry was using this scarce resource effectively.

The output-capital data summarized in Table 16 reveal that there are extensive variations in these ratios by industry. In those localities

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[1] See Child [1973].

[2] The ratios for random and purposive firms by process are presented below in Table 22.

[3] For the restrictions on this result, see Morowetz [1974].

Table 16. Sierra Leone: Output-Capital, Output-Labor, Capital-Labour Ratios for Small-Scale Industry by Industry and by Location, 1974/75 a/

Industrial	Variable a/	Localities				
		Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Those Above 2,000
Tailors	Output - Capital ratio b/	5.3	6.9	5.6	4.1	5.5
	Output - labor ratio	.4	.4	.6	.4	.5
	Labor - capital ratio	13.3	17.3	9.3	10.3	11.1
Gara	Output - capital ratio	--	--	87.0	--	87.0
	Output - labor ratio	--	--	.8	--	.8
	Labor - capital ratio	--	--	108.0	--	108.0
Carpentry	Output - capital ratio	1.9	2.4	10.4	--	8.8
	Output - labor ratio	.23	.1	.5	--	.4
	Labor - capital ratio	8.3	24.0	20.8	--	21.0
Blacksmiths	Output - capital ratio	6.3	7.9	.7	.5	2.2
	Output - labor ratio	.3	.4	.2	.2	.3
	Labor - capital ratio	21.0	19.8	3.5	2.7	7.3
Baking	Output - capital ratio	--	--	20.0	--	20.0
	Output - labor ratio	--	--	.5	--	.5
	Labor - capital ratio	--	--	40.0	--	40.0

Source: Survey data.

Notes: a/ Number of observations is the same as table 3.

b/ Output is measured in terms of value added.

with 2,000 or more inhabitants, for example, the output-capital ratios range from a high of 87 in the gara dyeing industry to a low of 2.2 in the blacksmithing industry. The baking industry ratio is on the upper end of this range, while those for tailoring and carpentry fall towards the lower end. Analysis of variance applied to these data indicated that these variations in the output-capital ratio by industry were significant at the 1 percent level.

On the other hand, there do not appear to be any symmetrical patterns in the relationship between the output-capital ratios and location. The output-capital ratio appears, for example, to increase by location size in carpentry, decline by location size in blacksmithing, and reach a maximum in the intermediate location sizes in tailoring. One might hypothesize that these variations indicate that locational factors affect these industries differentially. However, analysis of variance indicated that none of these variations in the output-capital ratio by location were significant at even the 50 percent level.

The output-labor ratios, on the other hand, do not exhibit the same amount of variation between industries as do the output-capital ratios. In all those localities with 2,000 or more inhabitants, for example, the difference between the industries with the highest and lowest output-labor ratio is less than three times, whereas the corresponding difference between the industries with the highest and lowest output-capital ratios is over thirty times.

In addition, one might hypothesize that the industries with the highest output-capital ratios would be more likely to possess the lowest output-labor ratios, since these industries might be expected to have less capital

resources with which to support labor. The results presented in Table 16 however, indicate that the output-labor ratio is highest for gara, the industry also with the highest output-capital ratio, and is lowest for blacksmithing, the industry with the lowest output-capital ratio. Thus, the average productivity of both capital and labor in small-scale industry in Sierra Leone appear to move in the same, rather than in opposite directions.

The labor-capital ratio provides another useful indication of the degree of labor-intensity of production, and, more specifically, an indication of the amount of employment generated per unit of capital. Given the relative capital scarcity and relative labor abundance in Sierra Leone, firms and industries with higher labor-capital ratios would generally appear, at least on a crude level, to be making the most effective use of the factors of production.

The labor-capital data in Table 16 show that this ratio varies widely from industry to industry. In those localities with 2,000 or more inhabitants, for example, the labor-capital ratio ranges from a high of 108 hours of labor generated per unit of capital service in gara dyeing to a low of only 7 hours of labor generated per unit of capital services in the blacksmithing industry. The ratio for the baking industry is situated on the upper portion of this range, while those for tailoring and carpentry are closer to the labor-capital ratio of blacksmithing. Analysis of variance procedures confirm that these variations in the labor-capital ratios are statistically significant at the 1 percent level.

An examination of these data also suggests that the labor-capital ratio may vary by location. Indeed, the labor-capital ratio appears to

reach its maximum value in those localities with 2,000 to 20,000 inhabitants and its lowest value in urban Freetown. Moreover, in the rural villages, blacksmithing now possesses the highest labor-capital ratio while carpentry possesses the lowest. Analysis of variance procedures applied to these data reveal that the locational variation in the labor-capital ratios are statistically significant for tailoring and blacksmithing at the 10 percent level. Thus, at least for these two industries, location must be considered when analyzing the labor-capital ratios.

These data also shed some light on the issue of the potential conflict between output and employment. Such a conflict could supposedly arise, for example, if an industry with a relatively high labor-capital ratio (i.e., a relatively labor intensive industry) also possessed a relatively low output-capital ratio.[1] However, if the relative magnitude of an industry's labor-capital and output-capital ratios are of the same order, then the potential conflict disappears and output and employment are jointly maximized.

If one compares the output-capital and labor-capital ratios summarized in Table 16, it is apparent that there is no conflict between employment and output for small-scale industry in Sierra Leone. The industry with the highest output-capital ratio, gara dyeing, also possesses the highest labor-capital ratio, while the industry with the lowest output-capital ratio, blacksmithing, also possesses the lowest labor-capital ratio. Indeed, if one ranks the major small-scale industries in Sierra Leone in terms of both their output-capital and labor-capital ratios, the two rank orderings turn out to be exactly the same. Thus, at least at the industry

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[1] See Morawitz [1974] for a recent discussion of the employment-output tradeoff.

level, gara dyeing and baking, for example, produce not only the highest average output, but also generate the largest amount of employment per unit of capital, the apparent scarce factor of production. A more definitive assessment of the relative efficiency with which resources are allocated in Sierra Leone, however, must await an analysis of the marginal relationships, a topic which will be examined below.

It would also be of interest to ascertain how some of these small-scale industry economic ratios compared both with the comparable economic ratios for large-scale industry in Sierra Leone and elsewhere in Africa. Since the economic ratios in other African countries are almost universally expressed in terms of the stock of both labor and capital rather than in terms of service flows, the Sierra Leone small-scale industry data, of necessity, had to be converted into stock terms. This task was accomplished by substituting the number of individuals working for the labor hour figure and using the reciprocal of the capital recovery factor to convert the capital service flows into capital stock equivalents. Moreover, factor intensity in these other studies is usually measured in terms of the capital-labor rather than the labor-capital ratios; thus the Sierra Leone data have been adjusted accordingly.

When compared with the large-scale firms in Sierra Leone, the small-scale industrial firms were found to be more labor intensive and also more productive with respect to capital. The capital stock per worker for the entire random sample of small-scale industrial firms in Sierra Leone, for example, amounted to Le 140 per worker (or $154) while the

comparable figure for the large industrial firms in Sierra Leone was Le 6,645 per worker ($7,310).[1] Thus, by this measure, the small-scale firms are almost fifty times more labor intensive than the large firms in Sierra Leone. Moreover, when the output (i.e., value added)-capital stock ratios are compared, the small-scale industries were found to possess higher output-capital ratios than their large-scale counterparts. The output-capital ratios for the sample of small-scale firms was 1.2 while the comparable ratio for the large-scale firms was no higher than 0.8.[2] These results thus indicate that small-scale industry makes more productive use, on the average, of the scarce factor of capital than do the larger firms. Moreover, since small-scale industry is also found to be more labor-intensive than large-scale industry, the output and employment trade-off dissolves. Small-scale industries in Sierra Leone are shown to generate not only more employment, but also more output per unit of scarce capital than do their large-scale counterparts.[3] Moreover, when the small-scale industry results in Sierra Leone are compared with the results of studies elsewhere, the relative labor-intensity of Sierra Leone's industrial establishments is even more apparent. In Steel's [1976] recent study of small-scale industry in Ghana, for example, those

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[1]The large-scale industry coefficient was computed from the primary data supplied by the large firms to the Economic Planning Unit. The capital figure used is the total undepreciated value of fixed assets and does not include working capital; thus the capital labor ratio for large scale industry is somewhat understated.

[2]The large-scale industry ratio was calculated from primary data supplied by firms for 1974 to the Economic Planning Unit. The output-capital ratio is overstated to the extent that working capital is excluded from the capital stock measure.

[3]See Morawitz [1974] for a review of the ratios reported elsewhere.

firms employing no wage workers were estimated to possess capital-labor ratios of $500 per worker, while those firms employing 1 to 9 wage workers were estimated to possess a capital-labor ratio of $1,500 per worker. In addition, Frank Child [1973] in a recent study of a sample of rural industries in Kenya reports that the mean capital-labor ratio for all the firms examined was $795. Thus, small-scale industries in Sierra Leone, where the capital-labor ratio is $168, would appear to be even more labor intensive than those small-scale industries that have been examined elsewhere in Africa. One might hypothesize that the Sierra Leone results are traceable, at least in part, to the large number of relatively small, rural firms included in the survey, establishments that were not included in these other studies. Nevertheless, the high labor intensity of Sierra Leone's small-scale industrial firms is of major importance to policy makers and to international lending organizations and is deserving of more detailed consideration.[1] With the descriptive profile of Sierra Leone's small-scale industrial sector having now been set forth, it is now possible to undertake a more detailed economic analysis of this sector.

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[1]The average project funded by the World Bank's Development Finance Corporation, which is the Bank's major mechanism for assisting medium-scale enterprises, is $10,000 per worker [World Bank, 1976].

ANALYSIS OF DETERMINANTS OF DEMAND FOR AND SUPPLY OF SMALL SCALE INDUSTRY OUTPUT AND EMPLOYMENT IN SIERRA LEONE

In this section, the major determinants of the demand for and supply of output and employment generated by the small scale industrial sector in Sierra Leone will be analyzed. The major factors influencing the demand for the goods and services of this sector will be analyzed first. The supply factors influencing small scale industry will then be examined, with particular emphasis being given to the various specifications of the underlying production function relationships. Since the full spectrum of production choices and firm types needs to be examined, both randomly and purposively selected firms will be included in the analyses undertaken in this section. The returns to the proprietor and the "economic" profitability of the major small scale industries can then be estimated and analyzed. The section will conclude with an examination of those entrepreneurial characteristics that appear to be associated with the economic profitability of these establishments.

Demand

Demand plays an important role in the determination of the economic viability of small-scale industries. Several scholars have argued that the demand for the products of small-scale industries is severely limited and indeed have concluded that, at least in the rural areas, the demand for these products will decline absolutely as the level of rural incomes increase.[1] It is thus imperative that the various components of the demand for the products of small-scale industry in Sierra Leone should be analyzed.

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[1] See, for example, the classic article on "Z" goods by Hymer and Resnick [1969].

There are three major sources of demand for the products of small-scale industry in Sierra Leone. The primary source is that demand generated from the incomes of rural and urban consumers. A second source of demand arises from the backward and forward production linkages with the agricultural and large-scale industrial sectors. The final important source of demand for the products of small-scale industry is that provided by the foreign or import sector. Each of these demand sources will now be examined.

The crucial parameter required for analyzing the linkage between rural and urban incomes and the quantity of small-scale industry products demanded is the income elasticity of demand. Indeed, both the magnitude and sign of the income elasticity demand coefficient for small-scale industrial products play an important role in the debate over the future viability of these activities. Hymer and Resnick [1969], for example, argue forcefully that in the rural areas the products of local small-scale industries (Z goods) are "inferior" goods and thus that the demand for and production of these goods will decline as rural incomes rise. Yet, the two authors do not present any empirical evidence to support their view. An earlier study by Leurquin [1960], however, indicated that the income elasticities for durable goods produced in rural Rwanda-Urundi were positive and thus that these goods were not "inferior." In view of these conflicting contentions and the meager amount of empirical evidence, it is clear that a study of the income elasticities for locally produced goods is of central importance.

Fortunately, a rural consumption component [Byerlee and King, 1976] of the overall Sierra Leone project has undertaken the required rural

household income and expenditure surveys to permit these required income elasticities to be estimated. Specifically, the survey was designed to obtain a detailed breakdown of household expenditures on individual non-food items by origin of production. Thus, it was possible to distinguish between those commodities produced by small-scale industry and those produced by large-scale firms or imported from abroad.

Although ultimately a wide range of functional forms and dependent variables are to be used in estimating the relevant elasticities, the preliminary results were available relating to one functional form and dependent variable specification. Specifically, the following double log form of the expenditure relationship was estimated:

$$\ln C_i = \ln A + b_1 \ln E + b_2 \ln S$$

where C_i is the value of each specific commodity purchased, E is the value of total cash expenditures, and S is the household size. In this formulation, the parameter b_1 provides an indication of the cash expenditure elasticity of demand for the rural households in Sierra Leone.

The initial cash expenditure elasticities for the major commodities produced by small-scale industry in Sierra Leone are summarized in Table 17. The striking result is the extremely high expenditure elasticity coefficient for the products of small-scale industry. For the products of <u>all</u> small-scale industry, for example, the elasticity coefficient was 1.60, thus indicating that, at least in the rural areas, these goods were clearly not "inferior."[1] There were, however, some important variations by

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[1]The coefficient was statistically significantly higher than zero at the 1 percent level. A coefficient of 1.60 indicates that if incomes increase by ten percent then the demand for small scale industry products would increase by sixteen percent.

Table 17. Sierra Leone: Cash Expenditures Elasticities of Demand by Rural Households for Major Small Industry Products, 1974/75

Industry	Cash Expenditure Elasticity
1. Local tailoring products	+1.22 (.22)[a/]
2. Local gara dyeing products	+1.41 (.32)
3. Local blacksmithing products (not including farm inputs)	+0.16 (.27)
4. Local carpentry products	+1.90 (.31)
5. Local baking products	+1.55 (.31)
6. All local small-scale industry products	+1.60 (.17)

Source: Data collected by rural consumption component of African Rural Employment Project [Byerlee and King, 1976].

Note: [a/] Standard errors are in parentheses.

industrial category. The coefficient for those blacksmithing products not used as farm inputs, for example, was very low and not statistically different than zero. The elasticity coefficients for the other major small-scale industries were surprisingly high. The elasticity coefficients for these other major industries were all greater than one and ranged from 1.90 for carpentry to 1.22 for tailoring.[1] These results thus challenge the rather widely held contention that the products of small-scale industry in rural areas are all "inferior" commodities. Indeed, they indicate that, except for blacksmithing, the demand for these products should be expected to increase strongly as rural incomes increase. Thus, rather than being viewed as an overriding constraint, the demand induced from rising incomes should be viewed as a positive force for the growth of small-scale industry in Sierra Leone.

The demand for small-scale industries stemming from the backward and forward linkages with the agricultural and large-scale industrial sectors, on the other hand, must be obtained from the relevant input-output coefficient of the various sectors of the Sierra Leone economy. The required input and output data relating to the agricultural sector have been obtained from the farm level component of the project [see Spencer and Byerlee, 1976], while the data relating to the large-scale industry were obtained from unpublished surveys conducted by the Central Planning Unit.

An examination of the relevant data, however, reveals that the backward and forward linkages of the small-scale industrial sector are not yet very extensive. The linkages with the large-scale sector, for example, are

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[1] These elasticity coefficients are all at least one standard deviation greater than one.

limited solely to the backward linkage from the small scale bakers to the large-scale flour mill.[1] There are few forward linkages yet established from the small to the large scale sector and thus the large-scale sector provides few sources of intermediate demand for the products of the small-scale industrial sector.[2]

The linkages of the small-scale industrial sector with agricultural sectors, however, are more extensive than those with the large-scale industrial sector. The backward linkage from rice milling to rice production, for example, is very strong in Sierra Leone as has been outlined in a recent study [Spencer, May-Parker, and Rose, 1976]. Palm and cocoa processing activities are also of minor importance, although these have not been subjected to examination in the Sierra Leone study.

The forward linkage from small-scale industry to the agriculture sector in Sierra Leone, on the other hand, is limited primarily to blacksmithing. Indeed, the vast majority of the products of the blacksmith are destined for use as a farm input. As Table 2 reveals, for example, over 93 percent of the blacksmithing value added is generated in villages. Moreover, approximately 28 percent of the blacksmithing output in these localities with 2,000 or more inhabitants is destined for the villages.[3] Finally, a preliminary analysis of the data from the localities with from

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[1] Indeed, except for illegal imports of flour from Guinea or Liberia, all the flour used by the small-scale firms comes from the large-scale mill in Freetown.

[2] Some carpentry products are used by large-scale industrial firms.

[3] Computed from sales data collected as part of the small-scale industrial survey.

2,000 to 20,000 inhabitants indicates that approximately 90 percent of the blacksmith's output in these localities is some form of a farming input. The primary blacksmithing activities for which the agricultural sector provides an intermediate demand are farm tools, such as matchets, hoes, knives, and axes, and the repair of farm tools and equipment. According to the initial results of the farm level study [Spencer and Byerlee, 1976], for example, the average Sierra Leone farm household in 1974/75 purchased four cutlasses, four hoes, four knives, 1 ax, and Le .25 of repair services per year.[1] Of these agricultural inputs, only matchets were imported in any quantity and these imports represented less than 10 percent of the total quantity of matchets consumed.[2] Thus, the agricultural sector provided an important source of intermediate demand for the products of the blacksmithing sector.

The final source of demand for the products of the small-scale industrial sector is the export or foreign market. Huddle and Ho [1972], for example, have argued that the international demand for traditional goods produced by small-scale industries is quite high. Indeed, their study indicated that the income elasticity of demand in high income countries for a broad group of culturally oriented products was greater than one.

An examination of the data generated by the small-scale industry survey reveals that there is indeed an important international demand for the products of one Sierra Leone small-scale industry, gara dyeing. A preliminary examination of the destination of sales data of gara dyeing firms revealed

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[1] Computed from input data collected as part of the farm level study.

[2] In 1973, for example, only 129,000 matchets were imported, while total domestic production was estimated at approximately 1.4 million.

that approximately 18 percent of the production of that industry was exported. Thus, failure to include the export market in an analysis of the demand for the products of small-scale industry can result in a serious understatement of the existing and potential market size.

The analysis of the three major sources of demand for the products of small-scale industry has thus indicated that the existing and potential market is clearly much stronger than Hymer and Resnick [1969] and others have contended. Thus, one should not necessarily presume that the demand for and production of these industries in Sierra Leone has or will necessarily decline.

Indeed, evidence relating to the past growth of small-scale industry in Sierra Leone reinforces the conclusion derived from the demand analysis. Since time-series data on small-scale industry in Sierra Leone are nonexistent, information on the growth of industry was obtained by asking the proprietors in each locality whether or not the number of firms in their particular industry and the output of their particular firm had increased, decreased, or remained constant over the last five years.

The responses of the proprietors with respect to these questions are summarized in Table 18. The table reveals that the majority of proprietors felt that both the output and the number of firms in all industries except blacksmithing had increased over the past five years. There were substantial variations, however, in the estimated growth by industrial category. For example, 100 percent of the gara dyers believed that the number of gara firms had increased, while only 26 percent of the blacksmiths felt that the number of blacksmithing firms in their locality had increased. A similar, though less pronounced, variation by industry was

Table 18. Sierra Leone: Proprietors' Estimates of Change in the Number of Firms and the Output of the Firms in the Past Five Years by Industry and Location, 1974/75

Industry Categories	Output					Number of Firms				
	Localities					Localities				
	Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Localities	Less Than 2,000	2,000-20,000	20,000-100,000	Over 100,000	All Localities
Tailoring										
Increased	58%	58%	59%	100%	62%	42%	71%	63%	100%	65%
Decreased	25%	38%	28%	--	28%	17%	29%	38%	--	28%
Same	17%	4%	13%	--	10%	42%	--	--	--	7%
n[a/]	12	24	32	7	75	12	21	32	7	72
Gara										
Increased	--	50%	67%	100%	67%	--	100%	100%	100%	100%
Decreased	--	50%	33%	--	33%	--	--	--	--	--
Same	--	--	--	--	--	--	--	--	--	--
n	--	2	3	1	6	--	3	3	1	7
Carpentry										
Increased	43%	25%	63%	100%	55%	30%	33%	75%	100%	48%
Decreased	43%	25%	13%	--	23%	20%	33%	25%	--	24%
Same	14%	50%	25%	--	23%	50%	33%	--	--	27%
n	7	4	8	3	22	10	9	8	2	29
Blacksmith										
Increased	44%	57%	50%	--	50%	25%	14%	50%	--	26%
Decreased	33%	43%	25%	--	35%	38%	57%	25%	--	42%
Same	22%	--	25%	--	15%	38%	29%	25%	--	32%
n	9	7	4	--	20	8	7	4	--	19
Bakery										
Increased	--	100%	50%	75%	71%	--	17%	33%	100%	50%
Decreased	--	--	33%	25%	21%	--	67%	33%	--	36%
Same	--	--	17%	--	7%	--	17%	33%	--	14%
n	--	4	6	4	14	--	6	3	5	14

Note: [a/] n = number of observations; includes both randomly and purposively selected firms that responded to these questions.

obtained with respect to the output growth of the firms.[1] These results thus provide some evidence that the small-scale gara, tailoring, baking, and carpentry industries have grown in Sierra Leone over the last five years, while blacksmithing may have stagnated somewhat during this period. These findings thus reinforce those derived from the previous demand analysis.

The data also indicate, however, that the growth of small-scale industries varied by location. Indeed, almost 90 percent of the proprietors in urban Freetown felt that the number of firms in that locality had increased, while in the rural enumeration areas only about 31 percent believed that the number of firms had increased in the past five years.[2] When asked about the output growth of their firms in the past five years, approximately 80 percent of the Freetown proprietors believed their outputs had increased, while only 50 percent of the proprietors in the rural enumeration areas felt this way.[3] Thus, the small-scale industries would appear to be growing more rapidly in the larger urban areas and relatively less rapidly in the smaller rural villages. Nevertheless, the evidence indicates that even the small-scale industries of the rural villages have generally been growing. This would indicate that the small-scale industry sector in Sierra Leone has generally been increasing and thus provides support for the conclusions that the demand for the products of all the major small-scale industries, except perhaps blacksmithing, has been increasing.

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[1] These variations by industry were statistically significant at the 1 percent level on the basis of Chi-square tests.

[2] Approximately 42 percent of the proprietors in the enumeration areas felt that there had been no change in the number of firms.

[3] These variations by location were statistically significant at the 5 percent level on the basis of Chi-square tests.

Before leaving the analysis of demand, it would also be of interest to examine the locational pattern of the demand for the major commodities produced by the small-scale industries in Sierra Leone. Some initial information relating to this issue are available from the destination of sales data collected in conjunction with the small-scale industry study. An examination of these data indicates that the demand for products of the tailoring and baking industries are very localized with very little of the product flowing to other localities. For example, 98 percent of the bread and 97 percent of the tailoring outputs remain in the locality where production occurred. The market for the outputs of gara dyers, blacksmiths, and carpenters, on the other hand, are more widespread. These data indicate, for example, that 37 percent of the gara cloth, 32 percent of the blacksmiths' output, and 15 percent of the carpenters' output flow outside the locality where the commodities were produced. It would appear that the various small-scale industries exhibit differing locational patterns of demand. It must be stressed, however, that these results are tentative and that more careful analysis is required.

Supply

With the demand components having now been considered, it is now necessary to examine the major factors influencing the supply of small-scale industrial commodities. Specifically, various production functions for the small-scale industry will be examined and estimated, followed by an analysis of the returns to the proprietor and the economic profits earned by the various small-scale industry groups. An analysis of the factors influencing the supply of entrepreneurship concludes this section.

Neoclassical Production Functions

The neoclassical formulations of the production function can yield many insights into the factors determining the supply of small-scale industry products. Specifically, empirical estimates of these production functions can be used to determine the returns to scale, the marginal productivities of the production inputs and the elasticity of input substitution. Thus, the relevant input and output data for the major small-scale industries in Sierra Leone have been fitted to two of the most commonly estimated neoclassical production functions, the Cobb-Douglas and the Constant Elasticity of Substitution (C.E.S.) production functions.

The Cobb-Douglas function is the neoclassical production function that is most commonly estimated empirically. The function takes the general form $Y = AL^{\alpha} K^{\beta}$, where A is a constant, Y is output or value added, L is labor services, and K is capital services. Although this particular form of the production function has no more claim to depicting the underlying production relationships than other functions, it does have some important properties that make it a useful choice. The estimated parameters of the function, α and β, are the elasticities of output with respect to labor and capital; moreover, the sum of the coefficients indicates the degree of the "returns to scale." By utilizing a Cobb-Douglas function, however, one is also making the implicit assumption that the elasticity of factor substitution is equal to one. If one is to shed additional light on the factor substitution issue and thus on the degree to which relative factor prices influence factor choice, the more general Constant Elasticity of Substitution function must also be estimated.[1]

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[1]The elasticity of factor substitution provides a measure of the rate of change in the marginal rate of substitution of factors in the production of a commodity. Technically, the elasticity of substitution

$$\frac{K/L\, d(L/K)}{\partial L/\partial K\; d(\partial K/\partial L)}.$$

The value of the parameters of the Cobb-Douglas function were obtained by using ordinary least squares techniques to estimate the following stochastic formulation of the function:

$$\ln Y = \ln A + \alpha \ln L + \beta \ln K + \varepsilon_1$$

The data used in the analysis were obtained from both the randomly and purposively selected firms for which twelve months of data existed. The output measure used was the yearly value added for each firm[1] while the labor input was measured in terms of the yearly number of man-hours actually worked in production. Finally, capital was measured in terms of the annual flow of capital services or the yearly "user cost" of capital. Thus, all variables were measured in flow terms for each individual firm and should consequently provide a more accurate representation of production than the usual studies that use stock data from an aggregation of firms.

The results of the Cobb-Douglas production function analyses for the major small-scale industrial categories are summarized in Table 19. Except for the carpentry industry, it would appear that the Cobb-Douglas function has provided a reasonably good fit to the underlying data relating to the individual small-scale industries in Sierra Leone. The adjusted $\bar{R}^2$ values (except for carpentry) are reasonably high for a cross-section study and the coefficients are generally statistically significant.[2]

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[1] By using value added, it is implicitly assumed that there are no economies of scale in the use of the purchased inputs.

[2] The various specification error tests, such as those for omitted variables, simultaneous equation problems, heteroscedasticity and non-normality, have not yet been undertaken. See Ramsey and Zarembka [1971].

Table 19. Sierra Leone: Values of the Cobb-Douglas Production Functions for Major Small-Scale Industries, 1974/75

Industry	Number of Firms[a/]	Constant Term	Labor Coefficient α	Capital Coefficient β	Sum of Coefficients	$\bar{R}^2$
Tailoring	65	0.13	0.62 (.17)[b/]	0.37 (.13)	0.99	.54
Gara dyeing	7	1.69	0.66 (.25)	0.13 (.13)	0.79	.61
Carpentry	14	5.00	0.25 (.26)	0.15 (.18)	0.40	.23
Blacksmithing	12	0.30	0.89 (.16)	0.01 (.008)	0.90	.78
Baking	13	-.90	0.75 (.20)	0.29 (.09)	1.04	.87

Source: Data collected from small-scale industry survey.

Notes: [a/] Includes randomly and purposively selected firms in those localities with 2,000 or more inhabitants.

[b/] Standard errors in parentheses.

One important result evident from the analysis was the indication that labor coefficients were consistently higher than the capital coefficients in each industry. Thus, at least for the 1974/75 period, a 1 percent increase in labor was accompanied by a larger percentage increase in output than was a corresponding 1 percent increase in capital. In the tailoring industry, for example, a 10 percent increase in labor would have been accompanied by a 6.2 percent increase in output, while a 10 percent increase in capital would have been associated with only a 3.7 percent increase in output.

The results of the analysis also indicate that there is no empirical evidence of the existence of any increasing return to scale in the industrial categories examined. Only in the bakery industry did the sum of coefficients even slightly exceed one and, in this case, an analysis of variance test indicated that sum of the coefficients was not statistically different than one.[1] The tailoring and blacksmithing industry have appeared to possess constant returns to scale during this period. There was some initial indication, however, that gara dyeing was subject to decreasing returns to scale, but the sum of the coefficients was not statistically different from unity.[2]

The labor measure employed in the analysis, however, is composed of several rather heterogeneous labor types, each of which has differing employment characteristics. Thus, some further disaggregation of this measure may improve the specifications of the production function as well

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[1]Based on the test suggested by Titner [1952] where the residual sums of squares of the constrained (sum of coefficients equals one) regression are compared with the residual sum of squares of the unconstrained regression.

[2]The carpentry coefficients were not statistically significant.

as provide some additonal insights into the labor component of the relationship. Specifically the labor input into the production function might usefully be subdivided into the following three groups: (1) hired laborers, who are generally paid a monthly wage; (2) apprentices, who are both receiving training and are producing commodities, but who are generally not receiving any monetary compensation; and (3) proprietors and family members, all of whom generally do not receive a formal wage.

A Cobb-Douglas production function with these three labor groups explicitly specified was thus estimated using ordinary least squares techniques. The stochastic form of the estimated function was:

$$\ln Y = \ln A + \alpha_\rho \ln L_\rho + \alpha_A \ln L_A + \alpha_H \ln L_H + \beta \ln K + \varepsilon_1,$$

where L_ρ is the yearly hours of proprietors (including family) labor in production, L_A is the yearly hours of apprentices in production, L_H is the yearly hours of hired workers in production, and α_ρ, α_A, and α_H are the estimated elasticity coefficients with respect to output for the three labor categories. The other terms and the data used are the same as those used in the previous Cobb-Douglas estimate.

The results of the Cobb-Douglas production function with the additional labor groups are presented in Table 20. When compared with the previous estimate of the Cobb-Douglas function, this formulation did not generally provide a significantly improved representation of the underlying data. Nevertheless, it did yield some useful additional insights into the labor components of the production function. The estimated coefficients (α) for the three labor groups, for example, did appear to vary importantly by industry and by labor group. In particular, the estimated proprietor's elasticity coefficients (α_ρ) were significantly higher than those for

apprentices (α_A) and hired workers (α_H), at least in thos industries with statistically significant coefficients.

Insights into the allocative efficiency of small-scale industry and crude estimates of the opportunity cost of the labor groups can be obtained if the marginal productivities of these labor groups are determined. These marginal products can easily be calculated from a Cobb-Douglas production function since:

$$MP_I = \alpha_I(AP_I)$$

where α_I is the estimated elasticity coefficient for any particular input that is obtained from the Cobb-Douglas function and AP_I is the average product or the output-input ratio for that particular input. Thus, the mean average products for each labor group were calculated for each industry category (see table 20) and used to compute the marginal productivites for each labor group.

The estimated marginal productivities for each labor group by major industrial category are presented in table 20. An examination of the table reveals that the marginal product varied both by major industry and by labor group. The marginal productivity of proprietors, for example, was higher est in gara and baking and lowest in blacksmithing and tailoring. Yet, the marginal productivity of proprietors in all industries were higher than those of apprentices. It is important to note, however, that the marginal productivity of apprentices was clearly above zero for several industries, and ranged from Le .05 to Le .08 per hour worked in production. Thus, in an economic analysis of small-scale industry, it may be inappropriate to value apprenticeship labor at a zero price.[1] Indeed, in the

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[1] It would be important, however, to separate the training component and assess it individually.

absence of more detailed information, these marginal productivity estimates for both proprietors and apprentices could provide a useful approximate estimate of the opportunity cost of these inputs.

Moreover, an initial indication of the allocative efficiency of small-scale industries can be obtained by comparing the marginal productivity of hired labor with the wage rate for hired workers.[1] The only statistically significant coefficient for hired labor, however, is found in the tailoring industry. The marginal productivity for hired workers in tailoring is Le .47 per hour actually worked and the mean number of hours actually worked per month is 70,[2] yielding a marginal product per month of Le 33. This figure is remarkably close to the actual mean monthly wage rate for hired tailoring workers of Le 32[3] and thus suggest that a reasonably high degree of allocative efficiency exists in the small-scale industry sector in Sierra Leone. A subsequent study, however, will examine the labor market and allocative efficiency issues in greater detail.

The Cobb-Douglas formulations of the production function, however, do not shed much light on the factor substitution issue, because as previously noted, one of its properties is that the elasticity of substitution (σ) is always equal to one. Thus, the more general Constant Elasticity of Substitution (C.E.S.) production function has also been

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[1]The marginal product is, in reality, the value of the marginal product since output has already been valued and expressed in terms of price. For calculating the variance of MP estimates, see Carter and Hartley [1958].

[2]Based on survey data.

[3]Based on preliminary evaluation of wage rate data. Byerlee, Tommy, and Fatoo [1976] report that the mean monthly wage rate for uneducated urban workers in small-scale industries is Le 30.

fitted to these same basic data.[1] A key property of this functional form of the production function is that the elasticity of substitution parameter can range from 0 to infinity, and thus it can reflect the potential differing extent to which capital and labor can be substituted for one another in production. The elasticities of substitution of the Cobb-Douglas function, where $\sigma = 1$, and the Leontief fixed inputs coefficient function, where $\sigma = 0$, are special cases of this more general formulation.

Although several versions of the C.E.S. production function exist, the generalized function of Drhymes and Kurz [1964] has been used in the present study. In this version, the function is defined as follows:[2]

$$Y = A\ [\partial_1 L^{\rho} + \partial_2 L^{\rho}]^{V/\rho}$$

where Y deonotes output (value added), K capital services, L, labor services, A is the neutral efficiency parameter, ∂_1 and ∂_2 are the distributive parameters, ρ is the substitution parameter, and V is the returns to scale parameter. It can be shown that ρ specifies the elasticity of substitution, since $\sigma = 1/1-\rho$; thus if $\rho = 0$, the elasticity of substitution is equal to one, while if $\rho = \infty$, the elasticity is approximately equal to 0.

Although the C.E.S. production function is usually estimated indirectly, the function in this study was estimated directly using a non-linear maximum likelihood regression approach.[3] The stochastic formulation

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[1] The basic article on this particular function is Arrow, et al. [1961].

[2] Note that ρ is used in this paper is the negative of substitution parameter defined by Arrow, et al. [1961]. The analysis is made somewhat more elegant by this substitution.

[3] See, for example, Ramsey and Zarembka [1971] for a discussion of this technique. The neutral efficiency parameter has been dropped from the analysis.

of the estimated model was:

$$\ln Y = V/\rho \left[\ln \left(\partial_1 L^{\rho} + \partial_2 K^{\rho}\right) + \varepsilon_1\right.$$

The value added, capital service and labor service data employed to estimate this function were the same as those used in the Cobb-Douglas formulation.

The maximum likelihood regression results for the major small-scale industrial groups are summzarized in table 21. When compared with the Cobb-Douglas results, the C.E.S. function did not appear to have yielded a superior representation of the data. The carpentry parameters continue to be insignificant and, except for gara dyeing, the $\bar{R}^2$ and coefficient standard errors were not measurably better for the C.E.S. than for the Cobb-Douglas function.

The C.E.S. formulation, however, has provided some interesting insights into the nature of the production relationships. Firstly, none of the substitution parameters were significantly different from zero; consequently, the elasticity of substitution was not significantly different from one and the Cobb-Douglas functional form can be accepted as appropriately describing the data. Moreover, none of the returns to scale parameters, V, were significantly different from one, thus indicating once again the apparent lack of economies of large-scale production in these particular Sierra Leone industries. Finally, except for baking, the estimated labor and capital coefficients in the two production functions were quite similar. The results derived from the C.E.S. production function not only support those derived from the Cobb-Douglas, but also provide evidence of the appropriateness of the Cobb-Douglas function itself.

Nevertheless, even the Cobb-Douglas function possesses some properties that may not accurately depict the production relationships of

Table 21. Value of the C.E.S. Production Functions for Major Small-Scale Industries, 1974/75

Industrial Category a/	Labor δ_1	Capital δ_2	Scale V	Substitution ρ	$\bar{R}^2$
Tailoring	.58 (.49) b/	.43 (.36)	.95 (.12)	.01 (.10)	.52
Gara dyeing	.69 (.45)	.16 (.07)	1.40 (.84)	.08 (.30)	.91
Carpentry	.60 (11.30)	.53 (14.00)	.50 (.25)	.02 (.50)	.30
Blacksmithing	.90 (.44)	.03 (.18)	.89 (.23)	.26 (.44)	.75
Bakery	.27 (.31)	.48 (.44)	1.14 (.18)	.47 (.53)	.87
All industries	.58 (.20)	.43 (.33)	1.02 (.36)	.21 (.36)	.78

Source: Data collected from small-scale industry survey

Notes: a/ The number of observations is the same as in table 18.

b/ Standard errors in parentheses.

small-scale industry. Specifically, the assumption of the Cobb-Douglas function that the underlying production isoquants are smooth and continuous may strain credulity, particularly if one believes that there are few, if any, production choices available to small-scale industry. Thus, it is important to examine specifically the production process alternative within each industry

Alternative Production Processes

A process, according to Dorfman [1953], "...is a specific method for performing an economic task." It is assumed in this formulation that each process uses the input factors in fixed proportion, and thus factors can be substituted for one another only if one process can be substituted for another. If, as in a fixed coefficient Leontief production function, only one process is assumed to exist in an industry, there is no process or factor substitution possible. On the other hand, if an infinite number of processes is assumed to exist, as in the neoclassical formulations of production, continuous process and factor substitution is possible. To the extent that the actual number of processes utilized by any small-scale industry falls between these extremes, the linear programming analyses can provide useful, additional insights into the nature of the production relationships. The processes or techniques of production utilized by the major small-scale industries in Sierra Leone must thus be examined to ascertain the degree of process choice currently available.

An investigation of the processes being utilized in the major small-scale industrial groups in Sierra Leone reveals that more than one, though not an infinite number of processes can be delineated within

each industry. To provide a sharp focus on the issue of process choice, however, only the two major processes within each industrial group will be discussed at this stage of the presentation. For simplicity, the processes will be classified into two groups, "traditional" or "modern", although the terms do not necessarily accurately portray the technique used. An analysis employing the full array of processes in a complete linear programming model of small-scale industry will be discussed in a subsequent paper.

In the tailoring industry, the major process distinction arises between those more "traditional" proprietors that engage in only ordinary sewing and tailoring, producing such products as common shirts and dresses, and those more "modern" proprietors that also engage in embroidery work. Although both groups use sewing machines, those tailors that embroider require a much more sophisticated and more expensive type of machine than those who engage in ordinary tailoring work. It should also be noted that even within each of these major categories there are further process subdividions relating primarily to the kind of sewing machine used.[1]

In the gara industry, on the other hand, the main process distinction centers on the type of dyes used. The majority of establishments use imported, synthetic dyes in the manufacturing of the gara cloth. There are still, however, a few, more "traditional" establishments that continue to use the native indigo dye in the manufacturing process. It should also be noted that there are further process differences related to the type of cloth used for dyeing.

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[1] In the linear programming model of the industry fourteen different processes have been delineated within the tailoring industry.

The major process distinction within the carpentry industry centers on the type of tools and equipment used. The great majority of more "traditional" proprietors use only simple hand tools such as hammers and saws. There are, however, a few more "modern" firms that employ rather sophisticated machines such as electric saws, sanders, and planes.

Within the blacksmithing industry, the process distinction also centers on the type of equipment used. The vast majority of blacksmiths use the more "traditional" tools and equipment such as small, hand-operated bellows and small hammers. On the other hand, there are some more "modern" blacksmith firms, however, that use electric forges and drilling machines as well as welding equipment.

Finally, within the baking industry the main distinction between processes centers importantly on the type of oven used. There are, for example, a large number of the more "traditional" bakeries that bake bread in large mud ovens. At the other extreme, there are several more "modern" bakers who produce bread in large electric ovens and who also use automatic mixers, kneeders and rollers. It should be noted, however, that in between the two extremes, is one baker using an intermediate form of technology in which an iron, wood-fired oven is employed.[1]

With the two major process options within each industry having been delineated, it is next of importance to ascertain whether, in fact, the factor proportions for each of these major processes differed from one another. To accomplish this task, it was thus necessary to compute the mean value of the three economic ratios (output-capital, output-labor and labor-capital) that reflect the factor proportions for these processes.

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[1]This is a used machine that was imported from England.

The mean value of the output-capital, output-labor, and labor-capital ratios of the two major process options for the major small-scale industry categories of Sierra Leone are presented in table 22. The output variable has been measured in terms of value added, the labor services variables is measured in the annual number of man-hours, and the capital services variable is measured in terms of the annual value of user or rental cost of the capital services.

An examination of the results presented in table 22 reveal that the factor combinations do generally appear to vary depending on type of process utilized. Indeed, analysis of variance procedures applied to these data indicated that, except for gara dyeing, the mean value of the economic ratios that reflected these differences in factor combinations were statistically different from one another at the 5 percent significance level.

An important result of the analysis was the indication that the more "traditionally" oriented processes were more labor-intensive than the more "modern" processes. For example, except for gara, the mean value of labor generated per unit of capital was consistently higher in each industry for the more "traditional" process. The differences in the factor intensity between processes in carpentry, blacksmithing and baking were particularly large.

The most striking result stemming from table 22, however, is the indication that the output generated per unit of the scarce factor, capital, is also highest for the more "traditional" processes within each industry. Indeed, the average productivity of capital in the more "traditional" processes within the blacksmithing, carpentry and baking industries was at least ten times that of the more "modern" processes.

Table 22. Sierra Leone: Mean Values of the Output-Capital, Output-Labor, and Labor-Capital Ratios by Process for Major Small-Scale Industry Categories, 1974/75

Industrial Categories[a/]	Output - Capital	Output - Labor	Labor - Capital
Tailors			
"Traditional"	7.7	.46	16.7
"Modern"	5.5	.55	10.1
Gara Dyers			
"Traditional"	63.8	.88	72.5
"Modern"	66.7	.84	80.0
Carpenters			
"Traditional"	29.3	.61	48.0
"Modern"	3.0	.97	3.1
Blacksmiths			
"Traditional"	7.0	.35	20.0
"Modern"	.5	.25	2.1
Baking			
"Traditional"	29.9	.44	68.0
"Modern"	3.2	1.33	2.4

Source: Survey data.

Note: [a/] Includes both randomly and purposively sampled firms in those localities with 2,000 or more inhabitants.

Since those processes that were more productive of capital were also more labor-intensive, there would appear to be no conflict between employment and output in the choice of processes within these industries. In summary, this study has revealed that, except for gara dyeing, there are significant process options within each industry that must be incorporated in any analysis of production of small-scale industry in Sierra Leone.

Returns to Proprietor and "Economic" Profit Rate

With the production relationships and basic processes specified, it is now possible to examine the return to the small-scale industrial proprietors and the economic profit rate within the various small-scale industries. The return to the proprietor parameter is important because it provides not only a measure of the real income earned by the proprietor, but also, to the extent that the proprietor is a scarce factor of production, an indication of the relative economic viability of the various industries and processes. The economic profit rate provides an additional measure of the relative economic viability of the various small-scale industries in Sierra Leone.

Before proceeding to examine the returns to the proprietor and the economic profit rate, it will first be necessary to specify more precisely how these measures were obtained. Since one of the primary objectives of the study was to examine the conomic viability of small-scale industries, measures of the economic rather than the financial returns were required. Consequently, it was important that all inputs be valued at their opportunity rather than the actual costs. Thus, the returns to the proprietor measure for each firm was obtained by subtracting from the firm's value added figure, the opportunity cost of its

annual capital services and its annual nonfamily labor services. The capital services figure was obtained from table 4 where the annual user or rental cost of capital had been estimated at a discount rate of 20 percent, the assumed opportunity cost of capital in Sierra Leone.[1] The estimate of the opportunity cost of the proprietor and family labor was obtained by combining the assumed opportunity costs of hired and apprentice labor. The opportunity cost of the hired labor was assumed to be equal to the actual money wage paid, since the earlier production function analysis had indicated that the marginal product and the wage rate of hired labor were quite similar. The production function analysis, on the other hand, indicated that the marginal product of apprentices was higher than the nominal remuneration they received; thus, in this study, the apprentices' labor was valued in terms of the estimated value of their marginal product in each industry.[2]

The "economic" profit rate measure, on the other hand, was designed to provide an indication of the return generated by the industrial firm when all inputs, including the proprietor's input, had been valued at their opportunity cost. On this basis, the "marginal", yet viable firm would thus generate zero returns or a zero economic profit, while a firm generating a positive return would be earning a pure surplus or positive "economic" profits.[3] The "economic" profit figure for each firm was ob-

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[1] See above for a discussion of the opportunity cost of capital.

[2] Thus, based on the previous marginal productivity analysis, tailoring apprentices were valued at Le .08 per hour worked, blacksmithing apprentices at Le .05 per hour worked, and gara, carpentry and baking apprentices at Le .08 per hour (assumed to be the same as tailors in absence of a good estimate).

[3] The economic profit must be kept distinct from the accountant's concept of profit which usually includes opportunity cost of return on capital and proprietor's labor.

tained by subtracting from the returns to the proprietor, the opportunity cost of the proprietor's labor. For lack of a better indicator of this parameter, the opportunity cost of the proprietor's labor was measured in terms of the approximate value of the proprietor's marginal product in each industry.[1] Finally, for comparative purposes, the "economic" profits figures have been expressed in rate terms as a percentage of the total value of firm's capital stock.

The returns to the proprietor are summarized in table 23. The table reveals the wide variation in the returns to the proprietor both by process and by industry. The returns, for example, vary from a high of Le 9,491 per year for "modern" bakers to a low of Le 576 per year for "modern" blacksmiths. At the major industry level, bakers generate the highest proprietor's return, while tailors and blacksmiths generate the lowest return.

One of the most striking results presented in the table, however, is the indication that the proprietor's return varies markedly between processes in the same industry. Indeed, analysis of variance procedures applied to these data revealed that, except for dyeing, these variations were statistically significant.[2] The more "modern" technique in each industry, it should be noted, did not necessarily yield the highest return to the proprietor. Although in tailoring and baking the more "modern" techniques produced the highest returns, in carpentry and black-

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[1]Thus, based on previous marginal productivity analysis, tailoring proprietors were valued at Le .35 per hour, gara proprietors at Le .84 per hour, carpenters at Le .35 per hour (assumed to be the same as tailors in absence of a good estimate), blacksmiths at Le .30 per hour and bakers at Le .54 per hour.

[2]At the 10 percent significance level.

Table 23. Sierra Leone: Annual Mean Return to Proprietor and Economic Profit Rate by Major Process and by Major Small-Scale Industry Category

Industrial Categories[a/]	Annual Returns to Proprietors	Economic Profit as a Percent of Total Capital Stock
	(Leones)	(Percent)
Tailoring		
"Traditional"	376	19
"Modern"	984	38
Gara		
"Traditional"	1,444	241
"Modern"	1,567	299
Carpenters		
"Traditional"	3,145	283
"Modern"	1,972	11
Blacksmiths		
"Traditional"	1,206	40
"Modern"	-567	-18
Baking		
"Traditional"	4,391	198
"Modern"	9,491	30

Source: Survey data.

Note: [a/] Includes both randomly and purposively sampled firms in these ocalities with 2,000 or more inhabitants.

smiths the highest returns accrued to those proprietors using the more "traditional" technique.

The returns to the proprietor, however, also varied by location. This fact is demonstrated in table 24 where the returns to those proprietors using the more "traditional" processes are arranged by locality size. The mean proprietor returns are generally highest in the intermediate size localities and lowest in the villages. For example, the tailoring proprietors engaging in ordinary sewing in those localities with from 20,000 to 100,000 inhabitants generate an annual return of Le 465, while those tailoring proprietors in the villages generate only Le 164 per year. The relatively low return to the proprietor in the villages is undoubtedly due to the fact that they also engage in farming activity. Unfortunately, it has not yet been possible to ascertain the extent of the proprietor's farming activity and the income that it generated; this interaction, however, will be the subject of a subsequent study.

The returns to the proprietor for firms in localities with 2,000 or more inhabitants, however, do shed some light on the relative income position of the proprietors. The mean annual return to the proprietor from the randomly selected firms, for example, was Le 672. The unskilled urban worker receiving the minimum wage earned approximately Le 250 per year, while the upland rice farm proprietor received a mean annual income in 1971/72 of only Le 146.25 [Spencer, 1975]. The mean return of proprietor engaged in even the least remunerative of the small-scale industries was thus higher than that earned by individuals in these two groups. The determination of the exact relative income position of the small-

Table 24. Sierra Leone: Annual Returns to Proprietor by Major Industry and Locality for "Traditional" Processes Only

(Leones Per Year)

Industrial Category a/	Locality			
	Villages Less Than 2,000	2,000-20,000	20,000-100,000	More Than 100,000
Tailoring	164	316	465	365
Gara dyeing	--	568	1,634	1,682
Carpentry	33	4,284	2,534	1,144
Blacksmithing	199	779	2,059	--
Baking	--	1,657	6,725	--

Source: Survey data.

Note: a/ Includes all randomly and purposively selected "traditional" firms; for definition of term "traditional," see text.

scale industry proprietors must await more complete supporting data.[1]

An examination of "economic profit" rates of the small-scale industries can provide additional insights into the economic viability of these activities. The estimated "economic" profit for these firms, expressed as a percentage of their capital stock, have consequently been estimated and summarized in table 23, where the data have been aggregated by major process and major industry. The most striking result is that, with the exception of "modern" blacksmithing, all the "modern" blacksmithing, all the processes and industries generated a positive "economic" profit; thus, if the assumptions underlying the analysis have been correctly specified, all the major types of small industrial activities, except "modern" blacksmithing, must be considered economically viable.

The "economic" profit rate varied widely, however, both by process and industry. Baking, gara dyeing and carpentry, for example, generated the highest rates of economic profit, exceeding 100 percent in several instances, while tailoring and blacksmithing generated economic profit rates that were significantly lower.[2] Moreover, except for gara dyeing, the "economic" profit rates differed significantly by major processes within each industry.[3] It was the more traditional, rather than the more"modern "modern" processes that generally produced the significantly higher "economic" profit rates in these major industries. Indeed, only in the

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[1]Byerlee, Tommy and Fatoo [1976]report that those migrants who are self-employed earn an income almost one-third higher than that of the average migrant.

[2]Analyses of variance indicated these were different statistically at the 1 percent level.

[3]5 percent level.

tailoring industry, did the more "modern" process, embroidery, generate an economic profit rate exceeding that generated by the more traditional process. Even the traditional tailors, however, earned a positive "economic" rate of profit. The analysis thus indicates that the traditional processes used by small-scale industries in Sierra Leone are economically viable at the present time.

Finally, it would be of interest to ascertain if the economic profit rates were related to the underlying factor intensities of these processes utilized. Indeed, assuming that labor is relatively abundant and capital is relatively scarce, one would hypothesize that the more labor-intensive processes would generate the highest rate of economic profit. If one comparies the labor capital ratios presented in table 22 with the economci profit rates in table 23, one discovers that in almost every instance, the more labor-intensive process generated the highest economic profit rate.[1] The only apparent exception occurred in the tailoring industry, where the more capital-intensive processes (embroidery) appeared to generate a higher economic profit rate than the more labor-intensive process. On closer examination, however, this anomaly proved to be illusory. Within the embroidery group, there is a further important process subdivision between relatively capital-intensive and labor-intensive embroiderers. If these two groups are separated, the relatively labor-intensive embroiderers are discovered to generate high rates of economic profit, while the relatively capital-intensive embroiderers are found to generate relatively low rates of economic profit, rates that

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[1] Indeed, the simple correlation coefficient relating the economic profit rate to the labor-capital ratio was +.50 and was significant at the .1 percent level.

are even lower than those generated by the "traditional" tailors. Thus, the "economic" profit rate of the various small-scale industrial activities in Sierra Leone was seen to be importantly related to the relative labor intensity of the industrial processes utilized.

The conventional factor-intensity measure, however, provides only a partial clue as to the relative economic profitability of various small-scale industrial firms. It does not fully capture, for example, the role played by another potentially scarce resource, the proprietor or enetrepreneur. Thus, it will be necessary to ascertain whether certain entrepreneurial characteristics can be delineated that may have some influence on the economic profit rate of small-scale industrial firms in Sierra Leone.

The Role of the Entrepreneur

Entrepreneurship is a difficult concept to capture and specify quantitatively. Although a large number of definitions of entrepreneurship abound, however, a common theme in all the definitions is that the entrepreneur is a key decision maker.[1] The larger the supply of such decision makers, other things equal, the better will a country's other scarce resources be combined for productive purpose and consequently the larger will be its output. The supply of effective entrepreneurial talent, however, is limited and not all firms are equally successful.

Thus, it is of importance to identify those characteristics of the entrepreneur that may influence his or her performance and to ascertain which entrepreneurial characteristics, if any, are statistically associated with successful or economically profitable firms. Such an analysis

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[1] See Kilby [1965] and Harris [1971].

would provide not only an indication of the potential constraints to an expansion of the supply of entrepreneurs, but also provide insights into how policies might be formulated for overcoming these constraints and for expanding the quantity of effective entrepreneurial services in small-scale industry in Sierra Leone.

There are several entrepreneurial characteristics that can be hypothesized to have an important effect on the economic performance of small-scale firms. Firstly, one might hypothesize that the entrepreneur's acquisition of some formal education would be expected to have a positive effect on the profits of a firm. As noted earlier, the education would be assumed to enhance the entrepreneur's managerial, organizational and technical skills and consequently influenced his or her ability to operate the firm. A second hypothesis would be that entrepreneurs with greater experience or greater numbers of years operating that firm would be expected to earn higher economic profits than those with fewer years experience. The argument is similar to that used for formal education. A third hypothesis would be that those entrepreneurs keeping records or business accounts should be expected to earn higher economic profits than those who do not. The underlying assumption is that record-keeping should enhance the managerial ability of the entrepreneur and thus affect the firm's economic profits. A fourth hypothesis is that entrepreneurs with a larger amount of initial capital would earn higher economic profits than those with smaller amounts of such capital. The underlying logic for the hypothesis is that given the imperfect capital market, one might expect a considerable advantage to accrue to the enterpreneur with access to a large amount of initial capital, which would enable the entrepreneur to start on a larger scale and better exploit the market opportunities

present. A fifth and related hypotheses is that entrepreneurs expanding with only internally generated funds would have lower economic profits than those entrepreneurs expanding with the benefit of the outside capital market. The argument is similar to that relating to the entrepreneur's initial capital. A final hypothesis is that entrepreneurs whose fathers were not farmers would have higher economic profits than those entrepreneurs whose fathers were farmers. The logic underlying this hypothesis is that the father's occupation provides an indication of entrepreneur's social and psychological attitude towards industrial activity. It is correspondingly assumed that entrepreneurs will be more favorably disposed toward industrial pursuits and be more successful if their father had been engaged in industrial or related activities rather than in farming.

These six hypotheses must now be investigated empirically. If one assumes that these characteristics are independent of one another and influence economic profits, the dependent variable, in an additive manner, these hypotheses can be investigated together by statistically estimating a single equation of the following form:[1]

$$\pi = a + b_1 Ed + b_2 Exp. + b_3 Bk + b_4 I.C. + b_5 R.P. + b_6 F.O. + \varepsilon_1$$

where π is the return to the entrepreneur, a is a constant, Ed is a dummy variable which is equal to one if the entrepreneur possesses any formal education, Exp. is the age of the business, Bk is a dummy variable which is equal to one if the entrepreneur keeps even rudimentary books or accounts, I.C. is the amount of initial capital of the firm at the time

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[1]This procedure was suggested by Harris [1971].

it was established, R.P. is a dummy variable which is equal to one if the firm used only reinvested profits to finance its expansion and zero if it obtained funds outside the firm, and F.O. is a dummy variable which is equal to one if the entrepreneur's father was not a farmer. Although the linear form of the equation had no more claim to validity than any other, it did provide a useful and convenient point from which to begin the analysis.

The result of the regression analysis of the equation, based on a sample of those seventy small-scale industrial firms that possessed the required profit and entrepreneurial characteristics data, was as follows:

$$\pi = \underset{(1,240)}{-1,057.0} - \underset{(467)}{593.9Ed} + \underset{(23.5)}{56.7Exp} + \underset{(866.4)}{3,156.9Bk} + \underset{(.65)}{.37I.C.}$$

$$+ \underset{(542.0)}{1,147.7R.P.} - \underset{(559.1)}{554.3F.O.} \qquad \bar{R}^2 = .59$$

Sig. $p < .01$

For a cross-section analysis, the results indicate that the equation has provided a reasonably good estimate of the underlying entrepreneurial characteristics that affect the economic returns to the entrepreneur. The individual characteristics must now be examined in turn.

The relationship between formal education and entrepreneurial success is surprisingly weak. Although only significant at the 20 percent level, the educational coefficient is negative, hinting perhaps that formal education and entrepreneurial performance may be inversely related. Similar results have been reported by Kilby [1965] for the Nigerian bread industry and Harris [1971] for a cross-section of Nigerian industries. There are, however, various explanations for this weak relationship between entrepreneurial success and formal education. Nonformal

education is not only a substitute for formal education, but may, in some cases, provide a more superior form of training for the entreprenur. In addition, as Kilby [1965] has noted the more formally educated entrepreneurs may undertake several different business activities and thus their effectiveness in any one may be diminished. Finally, as Harris [1971] points out, formal education and basic ability may be inversely correlated in small-scale industry. This would occur if the good students with formal education were generally offered permanent jobs in government and large-scale industry, "...leaving only the bottom of the class to enter entrepreneurial careers, while the bright and energetic individuals without formal education turn to business as the best available alternative" [Harris, 1971].

The years of experience of the entrepreneur, on the other hand, do appear to have an important bearing on entrepreneurial success. The years in business coefficient is positive and significant at the 5 percent level. The "education" gained while operating the firm would thus appear to be a more important determinant of entrepreneurial success than the education gained in a more formal setting.

Entrepreneurs that keep even some rudimentary form of records or accounts also appear to be more successful than their counterparts who do not. The record keeping coefficient is not only positive but significant at the 1 percent level. This result indicates that technical training on how to keep and use financial records as a tool of management may be one effective method of assisting and increasing the economic viability of small-scale industrial enterprises in Sierra Leone.

The results of the analysis also reveal that those firms with access to larger amounts of initial capital were not necessarily any more successful

than those commencing business with smaller amounts. Although the initial capital coefficient was positive, it was not significant at even the 30 percent level. Thus, gaining initial access to capital may not necessarily be an unduly serious constraint for small-scale industry. The generally low initial capital requirements, simple technology and the general lack of economics of large-scale production[1] involved in small-scale industry make it possible for a firm to enter on a rather small scale and compete quite successfully with the larger firms.

Moreover, the lack of access to external sources of capital for expansion also does not appear to have had an adverse effect on the economic profitability of the firms in the sample. The reinvested profits coefficient was positive and significant at the 5 percent level, indicating that the entrepreneurs that expanded by using reinvested profits were generally even more successful than those entrepreneurs with access to external sources of capital. Although these results are certainly not conclusive,[2] they do cast some doubt on the contention that the lack of capital is the principal barrier to the success of small-scale industry in Sierra Leone.

The final result of the entrepreneurial analysis reveals that there was no apparent relationship between the occupation of the entrepreneur's father and the profitability of the establishment. The coefficient measuring the dummy variable for the nonfarming occupation of the father was negative and not statistically significant at the 30 percent level.

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[1] See above, page 71.

[2] Indeed, the causation may be reversed, since more profitable firms have more funds to reinvest. A statistical association has been established but not necessarily a causation.

Thus, the family background, at least in formulation used in this study, did not seem to have a major impact of the economic profitability of small-scale industrial establishments in Sierra Leone.

This initial formulation of the relationship between the entrepreneurial characteristics and the economic profitability of these firms has made it possible to isolate those entrepreneurial characteristics that seem to be associated with a high level of economic profits. Specifically, years of experience and the keeping of records are two characteristics that appear to be positively associated with economic profits. On the other hand, formal education, father's occupation, initial capital level and access to the capital market do not seem to be strongly associated with the level of economic profits and thus may not be serious barriers to an expansion of entrepreneurship. These results, however, are dependent on the correctness of the underlying formulation of the analysis, and further analysis, particularly on a more disaggregated basis by locality and industry, are required before more definitive statements can be made. They do provide some initial guide to the kinds of policies that might be applied to encourage an expansion in both the supply of entrepreneurs and small-scale industries.

SUMMARY AND POLICY IMPLICATIONS

The salient results of this study of small-scale industry in Sierra Leone can now be summarized. The most important empirical contributions will be highlighted first, followed by a review of the key analytical contributions. The section will conclude with a discussion of the policy implications that stem from these empirical and analytical findings.

The empirical evidence has revealed that small-scale industries dominate Sierra Leone's industrial sector. Specifically, small-scale industries account for 95 percent of the employment and 43 percent of the value added of the entire industrial sector. Moreover, 75 percent of the value added is generated in rural rather than in urban localities. Moreover, there are large fluctuations in the level of activity over the year, although the seasonal patterns differ from industry to industry.

The small-scale industries in Sierra Leone are found to make extensive use of the relatively abundant factor, labor, and are parsimonious in their use of the relatively scarce factor, capital. The labor-capital ratio for small-scale industry is not only substantially higher than that for large-scale industry in Sierra Leone, but it also appears to be higher than the ratio estimated for small-scale industries elsewhere in Africa. Moreover, the small-scale firms also possess higher output-capital ratios than their large-scale counterparts. The small-scale industries thus generate both a higher output and a larger amount of employment per unit of capital than do the larger establishments. Moreover, within the small-scale sector itself, if one ranks the major industries in terms of both their output-capital and labor-capital ratios, the two rank orderings also are the same. Gara dyeing and baking possess the highest ratios, while blacksmithing possess the lowest.

All the major small-scale industrial categories in Sierra Leone are found to generate a positive "economic profit," and thus all must be considered economically viable. The most labor-intensive (i.e., highest labor-capital) industries such as gara dyeing and baking generate the highest "economic profit" while the least labor intensive, blacksmithing, generate the smallest "economic" profit.

Finally, the study reveals that many of the economic characteristics of small-scale industry vary by location. The industries in the smallest villages, for example, are generally smaller, more labor-intensive, and possess more excess capacity than do their counterparts in Freetown. Thus, locational factors must be incorporated in any analysis of small-scale industry.

In addition to providing empirical insights into the nature of small-scale industry, the study also sheds light on some important analytical issues relating to small-scale industry. The analysis of demand elasticities, for example, reveals that, counter to a key premise of the Hymer and Resnick model [1969], the rural income elasticity of demand for most small-scale industry products is strongly positive and thus clearly indicates that these goods are not "inferior".[1] In addition, the important forward linkages shown exist from the blacksmithing industry to agriculture also points to the need to incorporate the demand for intermediate goods in any analysis of small-scale industry demand in general and in the Hymer-Resnick model in particular. Finally, the empirical evidence of a strong export demand for gara dyeing products demonstrates

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[1] The benefits of an "integrated research program" are clearly demonstrated in the example, since the demand elasticities were generated by the research on consumption (see Byerlee and King [1976]).

the important role played by foreign demand as well. Indeed, when all these demand elements are combined, the study demonstrates that there is little support for the contention that the demand for and ultimately the supply of rural small-scale industry products has or in the near future will necessarily decline in Sierra Leone.

On the supply side, the analysis reveals that process choices do exist within the major small-scale industrial categories in Sierra Leone. Indeed, both the neoclassical analysis and the examination of alternative production processes indicate that both process and factor substitution are possible within each industry. The more "traditional" processes are generally more labor-intensive and generate more "economic" profit than do the more "modern" processes within each industry. Finally, there is no empirical evidence of increasing returns to scale existing in these industries.

These empirical and analytical results should prove to be of value to those charged with formulating policies with respect to this sector. The overall policy implications will be examined first, followed by a brief review of those portions of the study that provide insights into the efficacy of the major policies influencing small-scale industries.

The key, overall policy implication stemming from the study is the evidence that small-scale industry can contribute to meeting both the employment and output objectives of Sierra Leone. The study has revealed that these industries generate not only more output, but also more employment per unit of capital than do the large-scale industries; thus Sierra Leone does not have to sacrifice output to generate employment when small-scale industries are expanded. The underlying economic strength of small-scale industries is reinforced by the evidence that all the major

small-scale industries generate an "economic" profit when all factors are valued at their appropriate opportunity cost. Within the small-scale sector itself, gara dyeing and baking are the two industries generating the highest "economic" profit and this deserving of particular attention.

In view of the strong economic justification for the small-scale industries, it is important to examine briefly the specific policies designed to influence small-scale industry. One of the most commonly articulated and utilized methods of directly affecting small-scale industries is through the provision of capital or more specifically credit. It is thus of importance to ascertain the need for such a policy measure and the form it might most effectively take. The findings of this research reveal that self-financing has been of overwhelming importance in this sector. Personal and family savings, for example, accounted for approximately 80 percent of the funds used to establish small-scale industries in Sierra Leone, while almost 90 percent of the funds used for expansion were reinvested profits.[1] The crucial question is whether the overwhelming use of self-financing reflects an underlying capital shortage and a corresponding need for improved access to credit through the formal financial system. The small-scale entrepreneurs themselves will generally argue that the shortage of capital and credit is one of the primary constraints they face. Indeed, approximately two-thirds of the entrepreneurs interviewed in the Sierra Leone small-scale industry study felt that the shortage of capital or credit was the "greatest difficulty encountered in their business".[1] It is of importance to ascertain whether

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[1] See above, page 28.

[2] Based on the survey data.

the perceived difficulty was real or whether it was simply an easy response to give the interviewer.

There is, for example, some force to the contention that capital and credit may not be a crucial constraint for small-scale industry. The initial capital requirements for the kinds of small-scale industries examined in Sierra Leone, for example, are relatively modest, generally less than Le 100. Moreover, the results of the analysis of entrepreneurial characteristics, indicated that firms with access to only small amounts of initial capital were as successful in generating economic profits as those with larger amounts of initial capital.[1] In addition, the same analysis also revealed that those firms that expanded with only reinvested profits were apparently more successful in generating high levels of economic profits than those that had access to outside funds. Finally, there is evidence that relatively substantial amounts of excess capacity exist in all of the major small-scale industries examined in Sierra Leone.[2] These findings, while not conclusive, provide some support for the contention that capital may not necessarily be the overriding constraint facing small-scale industry.

These considerations, however, do not necessarily obviate the need for policies designed to improve the small-scale industry's access to the formal credit market. The capital market in Sierra Leone, as in most other African countries, is highly "fragmented" with artificially low rates existing on credit from the commercial sources and unduly high rates existing on that credit available from sources in the noncommercial sector.

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[1] See above, page 95.

[2] See above, page 28.

Since the commercial banks charge a maximum interest rate of only 12 percent for their most risky loans, it is not surprising that they have limited their lending almost exclusively to their traditional customers in the trading sector and have made very few loans to manufacturing establishments.[1] There are, however, virtually no formal institutional mechanisms outside the commercial banking system for making credit available to small-scale firms, particularly those located in rural areas.[2] It would thus appear to be important to develop improved institutional mechanisms to increase the access to and the availability of credit for small-scale industries.

There is considerable force to the contention, however, that this credit to small-scale industries should be provided at higher rates of interest than are currently being charged by the commercial banking system. The present study, for example, has revealed not only that small-scale industries generate a high rate of "economic" profit but also that "process choices" exist within the major small-scale industries. Thus, an unduly low or subsidized rate of interest may result in more capital intensive processes and industries being established than would be the case with interest rates that reflected more closely the opportunity cost of capital in Sierra Leone.

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[1] In 1971/72, for example, the trading sector received 78 percent of the loans from commercial banks while manufacturing received only 5 percent [Bank of Sierra Leone, 1973].

[2] The Credit Guarantee Scheme, under which the Bank of Sierra Leone guarantees loans made by commercial banks and the National Development Bank to small private sector establishments, was launched in 1974. Once again, however, the vast majority of loans guaranteed (80 percent in 1974) were for trading activities, not manufacturing. See Chuta/Liedholm [1975] for more details of the scheme.

The results of this study also provide some insights into the efficacy of policies designed to improve the technical and managerial skills within the small-scale industry sector of Sierra Leone. The apprenticeship system serves as the primary vehicle for providing technical training in small-scale industry; indeed, 90 percent of the proprietors had previously served as apprentices . None of the proprietors had received formal vocational training[1] and only one-quarter had received any formal education. The regression analysis revealed, however, that there was no correlation between the economic profitability of the firm and the level of formal education. Unfortunately, no information exists about the relative cost and benefits of alternative methods of providing technical training.[2] In view of the importance and ubiquity of the apprenticeship system, some attention should perhaps be paid to programs designed to upgrade and expand the existing apprenticeship system. In addition there is some evidence to indicate that policies designed to provide managerial training may be of some value. The small-scale industry study has revealed, for example, that only 17 percent of the proprietors keep a rudimentary set of books or accounts. Moreover, the regression analysis has indicated that a high positive correlation existed between those firms that keep books and the level of "economic" profits. Thus, policies designed to improve both technical and mangerial skills may be of importance. The exact specifications of these as well as other policies, however, will require more detailed studies of the

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[1] Indeed, only about 2 percent of the secondary school students are enrolled in a formal technical or vocation training institute.

[2] A thesis currently being undertaken in Nigeria by Mabawonku is attempting to quantify the costs and benefits of alternative methods of small-scale industry training.

individual small-scale industries themselves.

There are also numerous policies that have an indirect impact on small-scale industries. Fiscal,[3] monetary, and wage policies, for example, or policies designed primarily to affect agriculture, large-scale industries, and the infrastructure will also have an influence, often unintended, on small-scale industrial firms. These indirect policy effects, however, can only be properly evaluated and assessed in an integrated analysis that explicitly incorporates the intersectoral interactions.[2] When this integrated analysis as well as the more detailed examination of the individual policy requirements of each small-scale industry category have been completed, more specific and detailed policy prescriptions can be specified.

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[1]The import duties, for example, on the capital and intermediate inputs required by small-scale industry are the same as many semi-luxury imports, such as toys, and higher than many of the inputs required by the large-scale firms.

[2]See Spencer and Byerlee [forthcoming].

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