

AN ECONOMIC EVALUATION OF APPRENTICESHIP TRAINING IN
WESTERN NIGERIAN SMALL-SCALE INDUSTRIES*

by

Adewale F. Mabawonku**

*This paper has been published as part of Michigan State University's Off-Farm Employment Project, which is financed by the Office of Rural Development and Development Administration, Development Support Bureau, U.S. Agency for International Development (AID/ta-CA-2).

**Lecturer, Department of Agricultural Economics, University of Ibadan, Ibadan, Nigeria.

TABLE OF CONTENTS

	<u>Page</u>
1. INTRODUCTION	1
1.1. Objectives of the Study	2
1.2. Study Outline	2
2. METHODOLOGY	3
2.2. Area of Study	3
2.3. Industry Selection	3
2.4. Sampling Procedure	5
2.5. Data Collection	6
2.5.1. Data Collection in Large-Scale Industries	8
2.5.2. Data Collection in Trade Schools	9
2.6. The Shortcomings of and the Problems Associated with Study	9
3. ⁶ THE INSTITUTIONAL SET-UP OF APPRENTICESHIP SYSTEM IN WESTERN NIGERIA	11
3.1. The Apprenticeship System	15
3.2. The Organization of Training	22
3.3. Apprentice Fees	23
3.4. Training Programs in Trade Centers	27
4. COSTS AND RETURNS TO APPRENTICESHIP TRAINING	31
4.1. Components of Costs of Apprenticeship Training	32
4.2. Cost of Training in Trade Centers	36
4.3. Estimates of Benefits	42
4.4. Estimates of Internal Rates-of>Returns	44
4.5. Rate-of-Return in Wage Employment	44
4.6. Rate-of-Return in Self-Employment	48
4.7. Adjusted Social Rates of Return	50
5. SUMMARY AND POLICY IMPLICATIONS	53
5.1. Implications for Apprenticeship Training	57
5.2. Implications for Trade Centers	59
5.3. Implications for Further Research	60
BIBLIOGRAPHY	61

LIST OF TABLES

<u>Table</u>	<u>Page</u>
2.1. Sampling Frame and Size — Number of Establishments	7
3.1. Percentage Distribution of Apprentices by Age	12
3.2. Distribution of Apprentices by Years of Education.	13
3.3. Distribution of Apprentices According to Father's Occupation	14
3.4. Job Experience of Apprentices Prior to Training	16
3.5. Distribution of Apprentices According to Length of Unemployment Prior to Training	17
3.6. Distribution of Apprentices According to Who Made the Decision for Them to be Apprenticed	20
3.7. Distribution of Apprentices by Type of Contract Signed with Proprietors	21
3.8. Relationship Between Masters and Apprentices	25
3.9. Average Apprenticeship Fees and Allowances (in Naira) by Industry and Location	26
3.10. Trade Centers in Western Nigeria: Student Population by Course	29
4.1. VMP and Opportunity Costs of Inputs Used in Apprentice Training	35
4.2.A Cost Components — Tailoring	37
4.2.B Cost Components — Furniture Craft	38
4.2.C Cost Components — Auto Repair	39
4.3. Cost Components — Trade Centers	41
4.4. Distribution of Annual Returns (N) to Proprietors by Years of Experience	43
4.5. Private and Social Internal Rates-of-Return in Wage Employment	45
4.6. Private and Social Internal Rates-of-Return for Self-Employment for Apprentice Training by Industry and Location	46
4.7. Adjusted Social Internal Rates-of-Return by Industry	51

1. INTRODUCTION

Many developing countries are undertaking concerted efforts to promote the growth of small-scale industries. Local policymakers, as well as international agencies, view both horizontal multiplication of small nonfarm industries and their vertical integration within the economic structure as key strategies to help reduce unemployment and to usher in an industrial structure consistent with the factor endowments of these countries.

The establishment of a small-scale industrial subsector requires skilled craftsmen or workers who can perform various specialized activities. Its ability to grow therefore depends on the development of institutions to train workers. In many countries in Africa, the training of small-scale industrial entrepreneurs has been approached by the establishment of trade schools, handicraft centers, and vocational institutes. At the same time, proprietors in the small-scale industries offer a training program based on the system of apprenticeship. Whereas the government-established institutions are formal, apprenticeship training in the private sector is often informal and on-the-job. Given these alternative methods of training workers for the small-scale industries, important questions which arise in the allocation of the society's resources center on what the yields are from these alternative approaches as well as the yields from the different skills or trades available in the subsector. Another question is the appropriateness of the skills being taught to the type of productive structure envisaged in the future, especially to the needs of the small-scale sector if expansion of this sector is being emphasized.

1.1. Objectives of the Study

In broad terms this study will focus on analyzing the structure, conduct, and performance of the apprenticeship system in Nigeria. Bearing in mind that the concern is the relationship between training and performance, the focus will be on such specifics as

1. a description of the apprenticeship system as an institution for skill acquisition
2. analysis of the economics of apprenticeship training, and comparative evaluation of returns for apprenticeship system and trade school training
3. recommendations of policies regarding training of small-scale industry entrepreneurs

1.2. Study Outline

In section 2, the approaches used in data collection, including the selection of area of study, the choice of industries, and the sampling of establishments and procedure used to collect the data are presented. In section 3, the institutional setup of the apprenticeship system, as well as that of the trade schools together with the economic and social environment in which small-scale entrepreneurs carry out both production and training, is detailed. Section 4 presents estimates of the costs and returns to apprenticeship and trade school training. The last section, section 5, summarizes the findings of the previous sections and contains recommendations for promoting small industries in Nigeria.

2. METHODOLOGY

2.2. The Area of Study

This study of the apprenticeship system in Western Nigeria was carried out from April to December 1976. Budgetary and logistic constraints limited the selection to three locations. The choice of locations was based on population settlements and educational facilities in Western Nigeria. The three locations selected were Oyo, Ijebu-Ode, and Aiyeye. Oyo township has a population of nearly 500,000 and contains a trade school and a number of secondary schools; it is located thirty-three miles north of Ibadan. Ijebu-Ode, population 200,000, also has a trade school, a "comprehensive" college, and no less than twelve secondary schools. While Oyo, which is an urban area, has a sizable agricultural population, the majority of the population in Ijebu-Ode is in commerce. To facilitate a comparative analysis between urban and rural areas, Aiyeye, a rural town with a population of less than 50,000, was also chosen. Both Ijebu-Ode and Aiyeye are situated forty and fifty miles, respectively, south of Ibadan.

2.3. Industry Selection

Official statistics in Nigeria generally deal with industries employing ten or more people, thus excluding thousands of other small enterprises which employ fewer than ten workers. Buchanan [1950] found that there were 2,700 establishments distributed among 14 categories in Ibadan alone in 1949. In a more comprehensive survey of industrial units in Ibadan, carried out in 1961 and 1963, Callaway [1961, 1963] counted a total number of 5,135 establishments distributed among 15 categories with a total employment of 14,500 persons. A similar work by Kilby in 1961 produced

10,728 firms employing 28,721 workers in 14 towns in Eastern Nigeria [Kilby, 1962]. Recent attempts include the work of Koll [1969], who estimated 1,427 establishments and an employment figure of 27,698 in Ibadan township, and the Industrial Research Unit of the University of Ife, which produced estimates of establishments and employment figures for 20 towns in Western Nigeria.

The industries identified by these studies range from traditional ones, such as blacksmithing, weaving, and pottery, to modern industries among which are tailoring, auto repair, carpentry, and photography. Apprenticeship in the more traditional industries is always restricted to only the members of the household and is often subject to many taboos and rituals. On the other hand, apprenticeship in the modern industries is less personalized and more often than not reflects the labor market situation and the returns to labor in the subsector. Given this situation, the choice of industries in this study was restricted to the more modern ones and was also based on the relative importance of these industries. The industries thus identified are auto repair, furniture craft or carpentry, and tailoring.

For the purpose of this study, the following definitions are adopted. "Number of establishments" means the number of manufacturing plants. "Number employed" includes all persons engaged in the production activities of the establishment whether they were paid or not. Thus it includes the proprietor, members of his family working in the plant, and paid workers such as journeymen and apprentices. Tailoring, mechanics, and furniture craft have been used to describe an array of industries producing diverse products. This no doubt has led to a lot of confusion in many studies of small industries. Tailoring described those engaged in sewing and knitting.

Furniture makers and carpenters cannot be readily distinguished in Nigeria. Both engage in the production of finished goods such as tables and chairs, and also engage in construction activities such as roofing houses and building homes. Hence this study does not distinguish between the two, but will refer to workers in this industry as furniture makers. Mechanics refers to those engaged in auto repair and, as such, excludes welders, tire repairers, and painters.

2.4. Sampling Procedure

Sampling from any population is dependent on the information about that population, the purpose of the exercise, and the funds available. In Western Nigeria as well as in other parts of the country, no accurate and up-to-date information is available about the population of small-scale industries. This makes drawing a sample impossible. Ideally, one can take a complete enumeration of the population and from this framework draw a sample. But given the funds available for this study, that, too, was impossible.

The sample frame is defined as the number of establishments in tailoring, auto repair, and furniture craft in Oyo, Aiyeye, and Ijebu-Ode engaging one or more apprentices. To get a sample that will provide a reasonable estimate for the population in each locale, the following procedure was adopted. From the University of Ife survey, a list of names and addresses of every establishment in the industries covered in the survey was compiled for Oyo and Ijebu-Ode. (The survey did not cover Aiyeye.) Each establishment on the list in each town was visited. The proprietors of the establishment were asked whether or not they had an apprentice in their establishment. They were also asked to name a minimum of five other

establishments similar to theirs in their neighborhood. These were written down and compared with the list being used. The exercise lasted about two weeks. The names of establishments not on the list were added to it, and proprietors or establishments which could not be located were deleted. By visiting the proprietors on the list to ascertain whether they had apprentices, a list of establishments with apprentices was compiled. Thus a rough but ready frame was obtained. From this frame a random sample of establishments was drawn. The number of establishments selected was based on the number in the frame and, except for tailoring, was set at between 50 to 70 percent for each industry category to give a reasonable number of observations. The resulting sample size is shown in table 2.1.

For Aiyeye area no reliable previous survey exists; hence a total enumeration of the area had to be undertaken. It was discovered that there were only two auto repair establishments, four furniture craft workers, and just sixteen tailors in Aiyeye township itself. To obtain a large enough sample size, the small neighboring towns of Odogbolu and Ikenne had to be included.

2.5. Data Collection

Collection of data in the small industries was carried out in two phases. The first phase, designed to provide information about the apprenticeship system and the participants in the training, involved the use of appropriate questionnaires to obtain detailed information from proprietors and apprentices. Each questionnaire was administered by an enumerator at one interview, and different forms were used to interview apprentices and proprietors. Apprentices were interviewed when their masters were not around in order to obtain confidential information about apprentice-proprietor relationships and especially information about fees and allowances.

TABLE 2.1
SAMPLING FRAME AND SIZE — NUMBER OF ESTABLISHMENTS

Location	Industry	Ife Directory Frame (A)	Compiled Frame (B)	Sample Covered (C)	Percentage Sampled
Ijebu-Ode	Furniture Craft	29	65	37	56.92
	Auto Repair	26	43	23	53.48
	Tailoring	437	421	28	7.13
Oyo	Furniture Craft	38	29	18	62.07
	Auto Repair	16	40	30	75.00
	Tailoring	146	173	30	17.34
Aiyeye	Tailoring	N.A.*	69	44	63.77

*N.A. - Not available

Source: Survey data

The second phase, aimed at providing information on the performance of the establishments, the contribution of apprentices to production, and the incomes of the proprietors, followed immediately after the first phase ended. Stock forms were used to collect information about each establishment's capital stock, inventories, and inputs. This was followed with flow forms to provide data on each firm's output and sales; the hours worked by proprietor, journeymen, and apprentices; and the value of inputs purchased. To collect this information, each firm was visited by enumerators twice in the month for six months to collect data on production activities covering the entire two-week period preceding the visit.

Liedholm and Chuta [1976] show that small industries are characterized by irregular, seasonal patterns of production. They show that peak production activities in carpentry and tailoring occurs between the months July and November. Auto repair, it seems, has no seasonality of production. Based on these findings, data on the input-output relations of the establishments were collected from June through November.

2.5.1. Data Collection in Large-Scale Industries. In order to obtain information as to whether apprenticeship-trained workers are hired in other sectors of the economy besides small-scale industries, as well as their earnings in these sectors, twelve large industries comprising seven auto repair and five furniture firms located in Ibadan were included in the survey. (No large-scale industries are located in the survey areas.) Discussion with the personnel managers provided the study with their personal evaluation of apprenticeship training, as well as the list of apprenticeship-trained workers in their firms. Permission was obtained to interview these workers. With the use of questionnaires, 307 workers were interviewed to

provide information on earnings, work experience, previous employment and earnings, and where they were trained. The data on earnings thus obtained were used in estimating the rates-of-return to apprenticeship training in wage employment.

2.5.2. Data Collection in Trade Schools. In order to facilitate a comparative analysis of the apprenticeship system, two trade schools in the area in which the small industry survey was carried out were included in the study. The data collected dealt with training programs, institutional arrangements, and training costs. The trade schools included were Oyo Trade Center and Ijebu-Ode Trade Center. Directives from the Oyo and Ogun State governments were obtained after several visits and communication with ministry officials. From both Ministries of Education responsible for the centers and the principal of each school, information about the number of students, salaries and number of personnel (both teaching and administrative), other items of expenditure, and the training program was collected. Information about buildings and equipment was obtained from the Technical Education Division of the Ministry of Education. Also addresses of former students were obtained from each center. Using these addresses, 500 questionnaires were mailed out to provide information on employment and income after training. To obtain information on student costs, forms were distributed to a random 20 percent of the students in the schools. Questions asked included amount of fees paid annually; and expenditures on uniform, books, and personal upkeep.

2.6. The Shortcomings of and the Problems Associated with the Study

It seems appropriate at this juncture to spell out some of the problems associated with the study and its shortcomings, especially as they

affect our findings. Data collection and interviewing began with 210 establishments (see table 2.1) in the first phase of the study. But during the third month of the study when information on each firm's input and output began to be collected, a number of proprietors refused to cooperate, especially in the Ijebu-Ode area, and these firms were dropped from the survey. However the information gathered during the first phase of the study is utilized in the study. Even for those enterprises surveyed for the entire duration of the study, incentives in one form or the other had to be provided. By interviewing the apprentices separately and when their masters were not there, it was discovered that there was no consensus between the number of hours per day that the apprentice said he spends in learning his trade and the number of hours his master said he trains him. Hence in compiling information about the apprenticeship system, reliance was placed more on the recorded observation of the researcher and the field staff and also on the information provided by the apprentices, information shown to be more reliable than that provided by the master. In other words, it was found that questionnaires were not enough; one had to observe many establishments for a number of weeks in order to get an accurate picture of the mode and pattern of training as well as the firm's activities.

3. THE INSTITUTIONAL SETUP OF APPRENTICESHIP SYSTEM IN WESTERN NIGERIA

In this section, the socio-economic characteristics of the apprentices, the institution of apprenticeship training in the small-scale industries, and the organization of training in government trade schools will be examined.

Various characteristics tend to delineate the apprentices from the rest of the population as well as from their masters. Important among these are their age, level of education, and labor-market experience prior to training. Tables 3.1 and 3.2 show a common trend among the apprentices, with over 70 percent still in their teens and about 80 percent having completed at least primary school education, and with an average age of 14 years and an average level of education of 5 years. Analysis of variance indicated a statistically significant variation in age among the locations, with apprentices in Oyo being older than those in Ijebu-Ode and Aiyeye. Compared with their masters (the proprietors), apprentices appear to be better educated in all the industries.

How much intergenerational mobility occurs in occupations or industries in Western Nigeria? In a survey of craftsmen in Ibadan, Koll [1969] observed that less than 10 percent of his respondents were engaged in trades similar to those of their parents. As presented in table 3.3, over 90 percent of apprentices in Oyo have parents whose main occupation is farming. In Ijebu-Ode, however, only about 50 percent of the apprentices have parents in agriculture. A substantial number of parents of apprentices in Ijebu-Ode were engaged in trade or commerce as compared to those of Oyo and Aiyeye apprentices. A number of explanations can be offered for these observations. First, agriculture is the dominant employer of labor in the

TABLE 3.1
PERCENTAGE DISTRIBUTION OF APPRENTICES BY AGE

Location	Industry	Age (years)				\bar{x} *	n**
		<20	20-30	31-40	>40		
		%	%	%	%		
Ijebu-Ode	Auto Repair	86.49	13.51	---	---	14.9	37
	Furniture Craft	83.33	16.67	---	---	16.8	18
	Tailoring	80.00	20.00	---	---	16.4	10
Oyo	Auto Repair	35.29	64.71	---	---	19.5	17
	Furniture Craft	57.14	35.72	7.14	---	16.3	14
	Tailoring	72.22	27.78	---	---	17.5	18
Aiyeye	Tailoring	81.25	15.63	3.12	---	18.4	32
All Locations	Auto Repair	70.37	29.63	---	---	17.2	54
	Furniture Craft	71.88	25.00	3.12	---	16.6	32
	Tailoring	78.33	20.00	1.67	---	17.4	60

* \bar{x} : mean age; ** n: number of apprentices

Source: Survey data

TABLE 3.2
DISTRIBUTION OF APPRENTICES BY YEARS OF EDUCATION

Location	Industry	Years of Formal Education			\bar{x}^*	n**
		None	1-6	7-9		
		%	%	%		
Ijebu-Ode	Auto Repair	2.70	91.90	5.40	5.7	31
	Furniture Craft	11.11	88.89	---	5.3	18
	Tailoring	10.00	90.00	---	5.1	10
Oyo	Auto Repair	29.41	70.59	---	4.2	17
	Furniture Craft	42.86	57.14	---	3.0	14
	Tailoring	---	100.00	---	6.0	18
Aiyeye	Tailoring	6.25	84.38	9.37	5.2	32
All Locations	Auto Repair	11.11	85.19	3.70	5.0	54
	Furniture Craft	25.00	75.00	---	4.2	32
	Tailoring	5.00	90.00	5.00	5.4	60

* \bar{x} : mean years of education; ** n: number of apprentices

Source: Survey data

TABLE 3.3

DISTRIBUTION OF APPRENTICES ACCORDING TO FATHER'S OCCUPATION

Father's Occupation	Oyo		Ijebu-Ode		Aiyeye		All Locations	
	No.	%	No.	%	No.	%	No.	%
Farming	45	91.84	32	49.23	22	68.75	99	67.81
Artisan	3	6.12	6	9.23	4	12.50	13	8.90
Clerical Worker	--	---	4	6.15	--	---	4	2.74
Trader	1	2.04	21	32.31	1	3.12	23	15.75
Other (Laborer, Driver, etc.)	--	---	2	3.08	5	15.63	7	4.80
	49	100.00	65	100.00	32	100.00	146	100.00

Source: Survey data

country; hence the predominant number of parents are from that sector. Second, nearly all of the occupations of the parents of the apprentices are low-income occupations. Such low-income parents are often unable to pay the high cost of education for their children and hence send them to seek their fortune in the apprenticeship system where costs of training are lower.

In many countries in Africa, young men enter the labor force at a relatively young age. In Nigeria no law exists against child labor and many youths, upon completion of their primary education, move into the cities in search of wage employment. But knowledge about the scarcity of jobs for primary school leavers seems to have changed the orientation of parents as well as their children. As shown in tables 3.4 and 3.5, nearly 90 percent of the apprentices had no previous job experiences and about 60 percent never sought wage employment, but instead moved from formal education to apprentice training. Of those who sought employment prior to training, about 29 percent remained unemployed for 1 to 12 months. The relative unattractiveness of farming as an occupation to youths is shown in table 3.4 which indicates that only 3 percent of the apprentices were ever engaged in farming.

3.1. The Apprenticeship System

In the absence of an organized labor market for apprentices, recruitment of apprentices is undertaken through informal discussions between the proprietor and his neighbors, customers, or relatives. Goodwill on the part of the proprietor not only helps in attracting patrons and hence business success, but parents or sponsors who have at one time or the other interacted with the proprietor base their judgement of his ability to train their children on such considerations. The most common practice by which

TABLE 3.4
JOB EXPERIENCE OF APPRENTICES PRIOR TO TRAINING

Job Experience	Oyo		Ijebu-Ode		Aiyeye		All Locations	
	No.	%	No.	%	No.	%	No.	%
None	42	85.71	60	92.31	29	90.63	131	89.73
Domestic Servant	2	4.08	--	---	--	---	2	1.37
Farming	4	8.16	1	1.54	--	---	5	3.42
Artisan (Apprentice)	1	2.04	1	1.54	1	3.13	3	2.05
Others (Road Hawkers)	--	---	3	4.62	2	6.25	5	3.42
	49	99.99	65	100.01	32	100.01	146	99.99

Source: Survey data

TABLE 3.5

DISTRIBUTION OF APPRENTICES ACCORDING TO LENGTH OF UNEMPLOYMENT PRIOR TO TRAINING

Months of Unemployment	Oyo		Ijebu-Ode		Aiyeye		All Locations	
	No.	%	No.	%	No.	%	No.	%
None	33	67.35	39	60.00	13	40.63	85	58.22
1-12 Months	15	30.61	15	23.08	12	37.50	42	28.77
13-24 Months	1	2.04	8	12.31	4	12.50	13	8.90
25-36 Months	--	---	3	4.62	3	9.37	6	4.11
36 Months	--	---	--	---	--	---	--	---
	49	100.00	65	100.01	32	100.00	146	100.00

Source: Survey data

apprentices are recruited is either by a parent approaching the proprietor or the proprietor discussing his needs with neighbors, patrons, or relatives.

Once recruited, an apprentice within the firm is not regarded as a worker with definite hours of work. Rather, he is seen as part of the proprietor's household and is expected to perform activities that are unrelated to his training. Callaway [1968], for example, documented complaints by apprentices that they were often made to serve as house servants to their masters' wives. It was observed during the course of this study that for many proprietors there is no separation between business and family or social interests. Rather the two are seen to be closely related. Proprietors may take time off from their duties to attend to family problems; they may also send one of their apprentices to perform duties or services in their households — duties that are unrelated to the training program. Apprentice training in most cases is viewed as not only training a child to acquire some skills, but as part of the larger process of bringing him up. One important facet of this is that the responsibility of bringing up the child is transferred from the parents or sponsors to the master. This cannot be otherwise because apprentices generally stay at their master's workshop for up to twelve hours a day, irrespective of the business.

Entry into apprenticeship has no age limit nor restrictions based on educational attainment. A youth just out of primary school may be apprenticed directly; an older farmer from a land-scarce community may migrate to an urban area to learn a trade as can a married, unemployed woman. In general, however, parents apprentice their children at a relatively young age, often when they are between fourteen to twenty years of age. Given the relatively young age of the apprentices, the decision to seek training will

have to be made either by their parents or relatives who can undertake finance the cost of training. Even when apprentices are old enough to make decisions that will affect their lives, essentially the same parameters would be considered as when parents make the decisions. Important among these parameters is the rate of return to training in different industries. While no data are available to parents on rates-of-return to alternative skills, their perception of the labor market often depends on the demand and supply of skilled labor in their location and on the relative success of people who have learned similar skills in the area. Looking at table 3.6, it is clear that for the majority of the apprentices, decisions regarding where and to whom they were to be apprenticed were made by their parents. Those who made the decision by themselves (mostly tailors in Aiyeye) were mainly married women.

Once the decision is made on the trade and master, the next step involves some form of agreement on the length of the training period, the fees to be paid, and whether a youth will leave his parents to live with his master. Sometimes a written document specifying the obligations of both parties is prepared but in many cases the agreements are unwritten. As shown in table 3.7, written agreements are more common in Oyo than Ijebu-Ode. The highest proportion of written agreements is found among apprentice tailors in Aiyeye and Ijebu-Ode. Examination of a number of written agreements revealed the following essential elements:

1. the proprietor or master agrees to train the apprentice for a specified length of time, usually between three to five years
2. the sponsor agrees to pay the apprenticeship fees in part either during the training or at the end of the training period, and to perform the "freedom ceremony"

TABLE 3.6

DISTRIBUTION OF APPRENTICES ACCORDING TO WHO MADE THE DECISION FOR THEM TO BE APPRENTICED

Decision Made By	Oyo		Ijebu-Ode		Aiyeye		All Locations	
	No.	%	No.	%	No.	%	No.	%
Self	9	18.37	5	7.69	18	56.25	32	21.92
Parents	29	59.18	57	87.69	11	34.38	97	66.44
Brother/Sister Relation	2	4.08	1	1.54	1	3.13	4	2.74
Others (Friends, etc.)	9	18.37	2	3.08	2	6.25	13	8.90
	49	100.00	65	100.00	32	100.01	146	100.00

Source: Survey data

TABLE 3.7

DISTRIBUTION OF APPRENTICES BY TYPE OF CONTRACT
SIGNED WITH PROPRIETORS

Location	Industry	Written %	Oral %	None %	n*
Ijebu-Ode	Auto Repair	18.92	32.43	48.65	37
	Furniture Craft	27.78	72.22	---	18
	Tailoring	60.00	40.00	---	10
Oyo	Auto Repair	58.82	35.29	5.89	17
	Furniture Craft	50.00	50.00	---	14
	Tailoring	44.44	33.33	22.23	18
Aiyeye	Tailoring	68.18	29.55	2.27	44
All Locations	Auto Repair	31.48	33.33	35.19	54
	Furniture Craft	37.50	62.50	---	32
	Tailoring	61.11	31.94	6.95	72

* n: number of apprentices

Source: Survey data

Signatories to the agreement usually include the master, the parents or sponsors, and a witness. Agreements are not prepared in a court of law or in front of a lawyer, as is normally the case in many European countries, and disputes over the fulfillment of obligations are settled between the parties concerned without recourse to legal or judicial authorities.

When asked what they would do should an apprentice violate the terms of the agreement, nearly all the proprietors said they would report the apprentice to his sponsor, and after repeated violations he would be dismissed. However, should an apprentice or his sponsor refuse to pay apprentice fees, the master can deny performing the freedom ceremony, in which case no certificate or evidence of training would be given to the apprentice.

3.2. The Organization of Training

The organization of training in the Nigerian apprenticeship system can be described as informal. The entire training is carried out on the job. A hierarchy of authority is established in each firm. The master delegates authority to the oldest apprentice or journeyman who then delegates part of the authority to the next apprentice and so on down the line. The length of training depends on the industry and on the age of the apprentice. Young apprentices often spend more years in training than older ones. The average length of training in Oyo, Ijebu-Ode, and Aiyeye ranges from three years in tailoring to four years in auto repair and furniture craft.

Except among tailors who keep records of measurements, no related training in the form of an organized lesson on the skill is provided. How

much learning takes place depends on the number and variety of orders the firm receives in a given time. Proprietors with large orders engage their apprentices in the production activities, and in order to speed up production, will teach them faster than the proprietors with relatively fewer orders. Apart from learning the skills of the trade, apprentices are often sent on errands to buy raw materials and equipment and are thus able to learn about purchasing and marketing in the process.

3.3. Apprentice Fees

One of the important components of the costs of apprentice training is the amount each proprietor charges per apprentice. Variations in apprentice fees between establishments in the same industry and between different industries have been documented in Nigeria and Sierra Leone [Callaway, 1968; Liedholm and Chuta, 1976]. In a survey of small industries in Nigeria, the I.L.O. team [I.L.O., 1971] reported that apprentice fees were a source of capital and income for the proprietors in the area of the survey.

In this section the relationships between apprentice fees and allowances received by apprentices will be examined. Allowances, here, refer to periodic payments in cash made to apprentices. Such allowances can be given daily or weekly and are most often for mid-day meals and less often for transportation. Do proprietors pay in the form of allowances more than they receive as training fees? On the one hand, as more and more proprietors demand more apprentices, the supply of trainee-workers to an establishment could be increased only by offering higher inducements in the form of allowances relative to apprentice fees. On the other hand, as the supply of trainees to a firm increases, the apprentice fees decrease, all other things being equal.

Before discussing the model, one aspect of the apprenticeship system that more often than not governs the amount of fee paid will be examined. In table 3.8, the distribution of apprentices according to the relationships between themselves and their masters is presented. A youth may be apprenticed to his parents, his brother, or a relative. In this case he may not have to pay apprentice fees which others are charged. In all the locations, a large proportion of the apprentices (about 80 percent) are not related to their masters. Rather they are the children of neighbors, patrons, or friends of the proprietors. Blood relations predominate in Oyo as compared with Ijebu-Ode and Aiyeye. Notwithstanding this, however, over 95 percent of the apprentices alleged that they have to pay apprentice fees in the Oyo area. In Ijebu-Ode and Aiyeye only about 65 percent reported having to pay apprentice fees.¹

In table 3.9, the averaged apprentice fees and allowances paid for the entire training period is presented by industry and by location. The apprentice fee/allowance ratios are used here to measure the degree to which proprietors offering training derive income gains from such activities. In Ijebu-Ode apprentice fees on the average constituted 20 percent of the allowances received during the training period. Furniture craft and auto repair pay a higher allowance in order to induce apprentices in Ijebu-Ode. In the Oyo area the average ratio was 1.42 with allowances lower in auto

¹It was observed that while some proprietors denied charging fees, their apprentices said in confidence that they had to pay fees at the end of their training. Moreover, disparities occurred in the amounts proprietors alleged they paid as allowances and that the apprentices said they received. In these cases we used the information provided by the apprentices rather than the proprietors.

TABLE 3.8
RELATIONSHIP BETWEEN MASTERS AND APPRENTICES

	Oyo		Ijebu-Ode		Aiyeye		All Locations	
	No. of Appren.	%	No. of Appren.	%	No. of Appren.	%	No. of Appren.	%
Not Related	37	75.52	56	86.15	23	71.88	116	79.45
Brother/Sister	6	12.24	8	12.31	5	15.63	19	13.01
Parents	--	---	--	---	--	---	--	---
Relatives (Cousin, etc.)	6	12.24	1	1.54	3	9.38	10	6.85
Others (Friends, etc.)	--	---	--	---	1	3.11	1	0.69
	49	100.00	65	100.00	32	100.00	146	100.00

Source: Survey data

TABLE 3.9
 AVERAGE APPRENTICESHIP FEES AND ALLOWANCES (IN NAIRA) BY INDUSTRY AND LOCATION

Industry	Oyo			Ijebu-Ode			Aiyeye			All Locations		
	A App. Fees (N)	B Allow. (N)	A/B	A App. Fees (N)	B Allow. (N)	A/B	A App. Fees (N)	B Allow. (N)	A/B	A App. Fees (N)	B Allow. (N)	A/B
Tailoring	39.93	38.40	1.04	22.30	63.00	0.34	14.27	25.30	0.56	25.50	42.23	0.60
Furniture Craft	21.66	19.20	1.13	9.00	92.00	0.10	---	---	---	15.53	55.60	0.28
Auto Repair	39.41	13.45	2.93	17.25	94.53	0.18	---	---	---	26.33	53.98	0.53
Mean for all Industries	33.67	23.68	1.42	16.18	83.18	0.20	14.27	25.30	0.56	23.05	50.60	0.46

N1.00 = \$1.65

Source: Survey data

repair than in other industries. The sharp difference between Oyo and other towns reflects the different labor-market situations in these areas. In Oyo, for example, there exists a pool of unemployed school leavers seeking either clerical jobs or looking for opportunities to acquire some marketable skills. Moreover there is generally a dearth of proprietors in these industries in the Oyo area when compared to other locations. In these situations, the scramble for the little available apprenticeship employment might have led proprietors (1) to taking more apprentices than they might otherwise have been able to train effectively, (2) to raising apprentice fees, and (3) to pay less in the form of allowances to their apprentices. While it is true that proprietors by engaging the apprentices in on-going production activities would derive an increase in earnings (which would increase progressively as the apprentice's skill improves), our estimates of transfer payment (allowances less apprentice fees) indicate that in two of the three towns there is a positive net gain for the apprentices rather than the proprietors.

3.4. Training Programs in Trade Centers

Before concluding this survey of apprenticeship training in the small-scale industries, training in government trade schools, an alternative institution established and run by the governments of Western Nigeria, will be examined.

Unlike apprenticeship training which has a long history in Western Nigeria, formal training of craftsmen came into being in the late fifties with the establishment of the Ijebu-Ode Trade Center in 1959. The main objective of the trade centers was to provide

facilities for trade training for male and female students, with the right aptitude for technical education which will qualify

them for direct employment in industry at craftsman's level, or enable them to establish small-scale businesses of their own in due course [Ministry of Education, 1972].

Between 1959 and 1963, five trade centers, including a women's center, were established in different locations in Western Nigeria, each center offering specialized courses in many trades (see table 3.10). Between 1962 and 1971 enrollment in the centers had increased from 854 to 1,853. Admission into the centers requires that prospective students be between fifteen and eighteen years of age and that they have a Secondary Modern School certificate, that is, that they have spent nine years in formal educational institutions. A common entrance examination is offered which determines who is to be admitted.

Training lasts for three years and a fee of ₦72 (1 ₦ [Naira] = \$1.65) is paid annually. Students are also required to buy books and work clothes, but the fees paid cover accommodation, feeding, and instruction. In light of the costs of running the institutions, the amount of money paid by the students represents an insignificant portion. Thus, like all forms of formal educational institutions in the country, the trade centers are heavily subsidized.

Training is organized along three lines, theory and language, craft practice, and "vacation employment" to provide real world experience for trainees. The theory curriculum includes General and Related Science, English Language, General and Practical Mathematics, Technical Drawing, and General Factory Regulations. These subjects as well as craft practice are taught at different levels in each of the three years on the following basis: first year — 15 hours class work and 20 hours of practicals per week; second year — 10 hours of class work and 25 hours of practicals per week; and third year — 10 hours of class work and 25 hours of practicals

TABLE 3.10

TRADE CENTERS IN WESTERN NIGERIA: STUDENT POPULATION BY COURSE
SEPTEMBER 1974

	<u>Student Population</u>	
<u>Ijebu-Ode Trade Center Courses</u>		
Furniture Craft	114	
Brick Work	120	
Painting/Decorating	97	
Carpentry/Joinery	60	
Plumbing	93	
Screen Posters/Signwriting	<u>17</u>	
		501
<u>Oshogbo Trade Center Courses</u>		
Fitter Machinist	166	
Instrument Mechanic	102	
Refrigeration and Air Conditioning	136	
Radio/Television	<u>156</u>	
		560
<u>Oyo Trade Center Courses</u>		
Agricultural Mechanic	81	
General Welding	78	
Auto Mechanic	93	
Vehicle Body Building	42	
Spray Painting	21	
Sheet Metal	<u>23</u>	
		338
<u>Owo Trade Center Courses</u>		
Electrical Installation	150	
Auto Electrician	81	
Auto Mechanic	<u>64</u>	
		295
TOTAL		<u><u>1,694</u></u>

Source: Western Nigeria Ministry of Education, Technical Education Section,
Ibadan

per week, excluding about three months of vacation. Vacation employment is provided by attaching trainees who have completed two years to industries or to government establishments.

At the end of the training the centers conduct internal examinations for the award of the Federal Craft certificates. Students are also encouraged to take external examinations such as the City and Guilds of London Institute examinations for Ordinary Craft certificates.

4. COSTS AND RETURNS TO APPRENTICESHIP TRAINING

Attempts to evaluate training programs are of recent origin with relatively little work on training programs in Africa, and with many past studies being approached from a macro viewpoint [Thias and Carnoy, 1972]. Analytically, evaluations of training programs take many forms, the most important of which are (1) descriptive evaluation [CIRF, 1966] and (2) comparison of one form of training with another based on human capital theory in which benefit-cost or the internal rates-of-return are estimated [Somers and Wood, 1969].

Benefit-cost and internal rate-of-return analyses involve the application of investment theory to training programs and are meant to provide information about the yields to investment in education. The benefits of a program come into existence over a period of time so that there is a distinct profile of benefits and costs corresponding to each program. Among the questions which an analyst faces is: Given sufficient funds, which project should be undertaken by the society? To provide an answer, the employment of an investment criterion such as benefit-cost ratios or internal rate-of-return is required. Benefit-cost analysis (or the Net Present Value Criterion) involves the use of a given interest rate to weigh the streams of benefits and costs, or the excess of benefits over costs, and reducing these to a single value at a point in time. The problem is which interest rate should be used. In internal rate-of-return analyses, the rate which equates the stream of net benefits to zero is endogenously determined. This approach assumes that the return from one point in time is reinvested the following years and so on until the end of the project's life [Mishan, 1976].

The internal rate-of-return analysis will be used in this study to evaluate the alternative training programs in Western Nigeria. The cost components will be considered first, followed by a discussion of the benefits or returns. The computed internal rates-of-return from alternative training schemes will then be presented and discussed.

4.1. Components of Costs of Apprentice Training

Apprenticeship training, as organized in Nigeria, requires that both employers and trainees share the costs of training and while the skill is specific [Becker, 1971], it still can be used elsewhere. In the apprenticeship system under consideration, wages are not paid directly to workers; rather, employers' costs often include the provision of board, food, and allowances to apprentices in addition to the costs of materials and time used up during the training program. Apprentices often pay training or apprentice fees and may provide for their own upkeep, and engage in the firm's production activities.

In rate-of-return analysis, the two types of costs used are private costs and social costs. In this study private costs are defined as the out-of-pocket costs incurred by the trainees. Under apprenticeship training, private costs (C_{p_a}) include the value of equipment, tools, and uniforms purchased by the apprentice (E), the difference between transfer payments, that is, the difference between apprentices' fees (F) and allowances received during the training (A) plus foregone earnings during the training period (O), i.e.,

$$(1) \quad C_{p_a} = E + (F - A) + O$$

A student trained in the trade schools, like his counterpart under apprentice training, incurs costs which are identified as student costs, that is, expenditure on books, uniforms and tools (E), foregone earnings (O), and fees (F). Unlike apprentices, trainees in the trade schools are paid no allowances, although some income often accrues to them during "vacation employment". Specifically, the private cost (Cp_t) of training in the trade schools can be written as:

$$(2) \quad Cp_t = E + O + F$$

The social cost of training (Cs_a), that is, the real cost of training under the apprenticeship system, is defined as the sum of the value of tools and equipment purchased by the apprentice (E), the opportunity cost of the proprietor's labor (V), plus the opportunity cost of the firm's capital equipment (K) less the value of output produced by the apprentice (Q), plus the earnings foregone by trainees (assumed to be equal to the opportunity cost of labor)(O), that is,

$$(3) \quad Cs_a = E + V + K - Q + O$$

The social cost of trade school training, Cs_t , is the sum of teaching and administrative costs (T), operating costs (Z), capital costs (K), and earnings foregone (O) by the trainees:

$$(4) \quad Cs_t = T + Z + K + O$$

In order to measure some of the components of the costs, a number of approaches were adopted. The first involves estimates of the value of marginal product (VMP) of proprietor's labor, apprentice's labor,

and capital.² To estimate the opportunity cost of the proprietor's labor and capital, the VMP was multiplied by the average number of hours worked by the proprietor in the year; the VMP of capital services was multiplied by the annual estimate of capital utilization in each industry and location. The value of output produced by the apprentice (Q) was obtained in the same way by multiplying the VMP of apprentice labor by the average annual number of hours worked by the apprentice. The estimated opportunity costs and output of proprietors and apprentices are presented in table 4.1. The opportunity cost of the proprietor's time is highest in the furniture industry, over \$1,000 per annum; and lowest in tailoring. The observed differences reflect both labor productivity and earnings in each industry. The value of output produced by the apprentice is lowest in tailoring and highest in furniture making. The value of capital services used up in training is negligible in all the industries. To estimate the foregone earnings of apprentices, the average earnings of unskilled workers in the labor force were used where the level of education

²To estimate the value of marginal products of the inputs (capital and labor) used by the firms, the following procedure was adopted. Capital was defined in terms of its rental value [Mabawonku, 1977] and labor input of the proprietors, journeymen, and apprentices expressed in man-hours. Using ordinary least squares technique, the parameters of the Cobb-Douglas function were specified as:

$$\ln Q = \alpha \ln A + B_0 \ln V + B_1 \ln L_p + B_2 \ln L_a + B_3 \ln L_j + e \quad \text{where}$$

Q is defined as value added, A the shift factor, V capital services, L_p proprietor's labor, L_a apprentices labor input, L_j journeymen's hours of labor input and e the error term.

Estimates of the marginal product of these factors were obtained from the Cobb-Douglas production function thus: $MP_i = \gamma_i (AP_i)$ where γ_i is the estimated elasticity coefficient of input i, and AP_i the average product or the output-input ratio for that particular input.

TABLE 4.1

VMP AND OPPORTUNITY COST OF INPUTS USED IN APPRENTICE TRAINING

	Proprietors			Apprentices			Capital Services		
	VMP (in ₦)	Labor Input (Hrs)	Opp. Cost	VMP (in ₦)	Labor Input (Hrs)	Opp. Cost	VMP (in ₦)	Capital Input (in ₦)	Opp. Cost
<u>Oyo</u>									
Auto Repair	0.66	248.52	164.02	0.08	577.68	46.21	0.15	26.39	3.96
Tailoring	0.57	303.96	173.26	0.04	200.88	8.04	0.10	60.39	6.04
Furniture	0.66	2232.60	1473.52	0.09	1284.60	115.61	0.35	17.01	5.95
<u>Ijebu-Ode</u>									
Auto Repair	0.38	604.56	229.70	0.03	1265.76	37.97	0.40	53.78	21.51
Tailoring	0.05	1082.16	54.11	0.04	254.28	10.17	0.18	42.82	7.51
Furniture	0.90	2109.00	1898.10	0.13	1479.96	192.39	0.16	29.55	4.73
<u>Aiyeye</u>									
Auto Repair	---	---	---	---	---	---	---	---	---
Tailoring	0.05	1110.70	55.34	0.04	453.84	18.15	1.42	38.29	54.37
Furniture	---	---	---	---	---	---	---	---	---

Source: Computed from Survey data

was similar to the average level of education of the apprentices.

In tables 4.2A, 4.2B, and 4.2C, the costs of training in the tailoring, furniture craft and auto repair industries are shown. In tailoring, foregone earnings constituted about 80 percent of the social cost of training. Both social and private costs are highest in furniture craft, followed by auto repair and lowest in tailoring. In nearly all the industries and locations, apprentice fees are paid mostly at the end of the training period and constitute about 6 percent of private costs in tailoring, and 4.5 percent in furniture craft and auto repair. Another component of the training cost is the amount spent on equipment by the apprentice. In tailoring such equipment includes a tape, scissors, and sometimes a catalog. In auto repair and furniture craft the tools purchased by the apprentices are limited to a few hand tools. In general, apprentices most often depend on the masters for the supply of tools and raw materials for training. Other cost components of apprentice training, not included in the table, include costs of freedom ceremonies, gifts from proprietors to apprentices, and the value of services rendered by the apprentice in the proprietor's household.

4.2. Cost of Training in Trade Centers

Unlike the components of training costs in small industries, the components of training costs in the trade schools are directly and easily measurable. Data on student costs were collected by the use of questionnaires. A randomly selected sampling of currently enrolled students from the first to the third year of training were interviewed. In addition, addresses obtained from the centers were used to trace former trainees and to collect information on training costs and earnings. Questions asked

TABLE 4.2 A
COST COMPONENTS — TAILORING

Cost Components (in ₦ per annum)	Year 1			Year 2			Year 3			Year 4			Total Years 1-4 Cash Flow Items		
	Aiyeye	Ijebu- Ode	Oyo	Aiyeye	Ijebu- Ode	Oyo	Aiyeye	Ijebu- Ode	Oyo	Aiyeye	Ijebu- Ode	Oyo	Aiyeye	Ijebu- Ode	Oyo
Apprentice Fees	---	---	---	---	---	---	14.27	22.20	---	---	---	39.93	14.27	22.20	39.93
Equipment, etc. bought by apprentice	3.04	---	2.84	1.08	---	---	2.69	---	6.50	---	---	---	6.81	---	9.34
Allowances Received	7.50	---	6.00	7.80	5.00	7.20	10.00	16.00	10.80	---	---	14.40	25.30	21.00	38.40
Output Produced by Apprentices	18.50	10.17	8.04	18.15	10.17	8.04	18.15	10.17	8.04	---	---	8.04	54.80	30.51	32.16
Value of Proprietor's Time	55.34	54.11	17.26	55.34	54.11	17.26	55.34	54.11	17.26	---	---	17.26	166.02	162.33	69.04
Value of Capital Services	54.37	7.71	60.40	54.37	7.71	6.04	54.37	7.71	6.04	---	---	6.04	163.11	23.13	78.52
Foregone Earnings	360.00	360.00	360.00	360.00	360.00	360.00	360.00	360.00	360.00	---	---	360.00	1080.00	1080.00	1440.00

Source: Survey Data

TABLE 4.2 B
COST COMPONENTS — Furniture Craft

Cost Components (in N per annum)	Year 1		Year 2		Year 3		Year 4		Total Year 1-4 Cash Flow Items	
	Ijebu- Ode	Oyo	Ijebu- Ode	Oyo	Ijebu- Ode	Oyo	Ijebu- Ode	Oyo	Ijebu- Ode	Oyo
Apprentice Fees	10.00	---	---	---	---	21.66	10.00	---	20.00	21.66
Equipment, etc. bought by apprentice	---	---	1.60	---	4.00	6.00	10.20	---	15.80	6.00
Allowances Received	---	1.80	30.00	1.50	30.00	1.50	32.00	---	92.00	4.80
Output Produced by Apprentice	192.39	115.61	192.39	115.61	192.39	115.61	192.39	---	769.56	346.83
Value of Proprietor's Time	1898.10	1473.53	1898.10	1473.52	1898.10	1473.53	1898.10	---	7592.40	4420.57
Value of Capital Services	4.73	5.95	4.73	5.95	4.73	5.95	4.73	---	18.92	17.85
Foregone Earnings	360.00	360.00	360.00	360.00	360.00	360.00	360.00	---	1440.00	1080.00

Source: Survey Data

TABLE 4.2 C
COST COMPONENTS — AUTO REPAIR

Cost Components (in N per annum)	Year 1		Year 2		Year 3		Year 4		Total Years 1-4 Cash Flow Items	
	Ijebu- Ode	Oyo	Ijebu- Ode	Oyo	Ijebu- Ode	Oyo	Ijebu- Ode	Oyo	Ijebu- Ode	Oyo
Apprentice Fees	---	---	---	---	---	---	17.25	39.41	17.25	39.41
Equipment, etc. bought by Apprentice	2.00	---	5.88	---	8.00	---	12.00	---	27.88	---
Allowances Received	8.23	---	24.00	3.25	27.33	3.50	43.20	4.20	102.76	10.95
Output Produced by Apprentice	37.97	46.21	37.97	46.21	37.97	45.21	37.97	46.21	151.88	184.84
Value of Proprietor's Time	229.73	164.02	229.73	164.02	229.73	164.02	229.73	164.02	918.92	656.08
Value of Capital Services	21.51	3.96	21.51	3.96	21.51	3.06	21.51	3.96	86.04	14.94
Foregone Earnings	360.00	360.00	360.00	360.00	360.00	360.00	360.00	360.00	1440.00	1440.00

Source: Survey data

dealt with fees, uniforms, books, and equipment bought by the trainees. Data on personnel costs (teaching and administrative), operating, and equipment costs were obtained from both the schools and the technical education divisions of Oyo and Ogun States' Ministries of Education. Estimates of the values of building and land were derived from data on the proposed new trade schools. To obtain the annual rental value of buildings and equipment, a discount rate of 20 percent was used. Foregone earnings (see table 4.3) were obtained in the same way as the apprenticeship cost by using the earnings of members of the labor force with similar education to that of the trainees. Comparing the two trade centers (Ijebu-Ode and Oyo), personnel and operating costs per pupil were lower in Ijebu-Ode than in Oyo.

Value of capital services was assumed to be the same in the two centers. Estimates of student costs show that trainees in Ijebu-Ode spend more per year than those in the Oyo trade schools.

Compared with costs in apprentice training, the private cost of training in the trade centers is over twice the annual private costs in apprentice training; student fees in the trade centers are about twice the highest apprentices fees, while foregone earnings of trade school trainees is about twice as high as that of apprentices, a result of difference in levels of education and in wages. Notwithstanding this however, training in trade schools is heavily subsidized by the state governments with the government being responsible for the running and upkeep of the institutions. While the government is responsible for as much as 95 percent of the cost in the trade centers, no government subsidy is received by the proprietors or trainees in small-scale industries. Rather, the proprietors generally

TABLE 4.3.
COST COMPONENTS — TRADE CENTERS

Cost Components (in ₦ per annum)	Year 1		Year 2		Year 3	
	Ijebu-Ode	Oyo	Ijebu-Ode	Oyo	Ijebu-Ode	Oyo
Teaching and Administrative	363.00	460.00	363.00	460.00	363.00	460.00
Operating	126.00	291.00	140.00	320.00	145.00	300.00
Capital (Services)	1121.47	1121.47	200.10	200.10	90.75	90.75
Student Costs (fees, etc.)	166.65	141.75	132.45	120.00	116.30	114.32
Foregone Earnings	804.00	804.00	834.00	834.00	864.00	864.00

Source: Computed from Survey data

tend to subsidize the training of their apprentices at least as far as cash transfers between the proprietors and apprentices are concerned.

4.3. Estimates of Benefits

The benefit (monetary) from training is the increase in trainee earnings occurring after the training and as a result of it. To estimate the benefits, it was assumed that all trainees would find employment either in small-scale industries as self-employed artisan workers or as wage workers³ in either the large industries or in government establishments. To estimate returns (earnings) to labor in self-employment, estimates of the opportunity costs of the firm's capital and labor inputs (other than the labor input of the proprietor), all of which were derived in table 4.1, were subtracted from the firm's value added.⁴

The computed returns to self-employed proprietors are shown in table 4.4. In all the industries, returns to proprietor increase with experience over time and then decline. From these data, earnings profiles, relating experience and income for self-employed proprietors by industry and location, were then constructed (see Mabawonkwu [1977], pp. 112-120). To obtain the differential effects of additional training on earnings,

³The wage estimates for those employed in large establishments were obtained from the results of the interviews with the 500 trade school and apprentice-trained employees who were wage employed. To obtain the differential effects of additional training, these wage estimates were reduced by the comparable unskilled wage rates.

⁴Specifically, the average returns to proprietor's labor is:
 $\bar{Q}_{ijk} = Q_{ijk} - \bar{V}_{ijk} - B_{jk}L_{ajk} - B_{jk}L_{ijk}$ and where \bar{Q}_{ijk} is the returns to proprietor in firm i , industry j and location k ; Q_{ijk} is the firm's value added, \bar{V}_{ijk} the rental value of capital services, L_{ajk} apprentices' hours of labor input, L_{ijk} journeymen's hours of labor input, and B'_{sjk} the estimated MVP from the regression equation.

TABLE 4.4
DISTRIBUTION OF ANNUAL RETURNS (N) TO PROPRIETORS BY YEARS OF EXPERIENCE

Years of Experience	Ijebu-Ode			Oyo			Aiyeye	All Locations		
	Furniture	Auto Repair	Tailoring	Furniture	Auto Repair	Tailoring	Tailoring	Furniture	Auto Repair	Tailoring
1-5	N 607.44 (8)	N 380.22 (5)	N 319.30 (13)	N 829.10 (8)	N 358.40 (14)	N 243.44 (17)	N 229.98 (15)	N 757.54 (16)	N 328.86 (19)	N 270.30 (45)
6-10	807.64 (7)	399.32 (5)	355.08 (7)	564.78 (4)	336.38 (7)	257.76 (8)	359.24 (6)	813.22 (11)	331.24 (12)	339.80 (20)
11-15	1220.04 (4)	243.88 (1)	307.76 (1)	325.43 (3)	361.02 (3)	278.26 (1)	104.48 (5)	997.86 (7)	296.12 (4)	166.48 (7)
16-20	462.88 (1)	497.72 (3)	494.66 (2)	1468.96 (2)	321.64 (5)	196.00 (3)	167.62 (1)	1212.80 (3)	348.48 (8)	300.14 (6)
21-25	1062.88 (1)	478.00 (1)	292.66 (2)	1344.60 (1)	342.48 (1)	184.28 (1)	375.88 (3)	1242.42 (2)	300.48 (1)	328.90 (6)
26-30	414.74 (2)	478.50 (3)	319.28 (3)	---	---	---	---	332.02 (2)	461.70 (3)	175.20 (3)
	N 762.44	N 409.94	N 344.79	N 906.39	N 343.98	N 231.95	N 247.44	N 892.64	N 344.48	N 263.47

Figures in parentheses are numbers of observations

Source: Computed from Survey data

however, the estimated earnings of proprietors had to be reduced by the earnings that they might have obtained as unskilled workers in the economy. To do this, the average earnings of unskilled workers with the same educational level as that of the trainees were subtracted from the estimated proprietor's earnings (Mabawonkwu [1977]).

4.4. Estimates of Internal Rates-of>Returns

The estimates of the internal rates are presented in tables 4.5 and 4.6, and are based on the computations of the costs and benefits described above. In presenting the calculations, an attempt is made to compare the two alternative training programs with respect to training in only furniture craft and auto repair since trade schools do not offer training in tailoring. An attempt is also made to consider alternative employment types, self-employment versus wage employment. Comparison between apprenticeship and trade school is, however, limited to wage employment because very few of trade school-trained workers are self-employed.⁵

4.5. Rate-of-Return in Wage Employment

The earnings in wage employment in Nigeria, unlike earnings in self-employment, do not often reflect demand and supply factors.⁶ Private industries, in response to government policies, pay administered wages

⁵Of the 500 questionnaires mailed to graduates of trade schools, for example, not a single respondent was self-employed.

⁶Attempts to adjust the earnings stream for socio-economic factors such as education and experience provided statistically insignificant coefficients.

TABLE 4.5
PRIVATE AND SOCIAL INTERNAL RATES-OF-RETURN IN WAGE EMPLOYMENT

	Apprentice Training		Trade Center Training	
	Private Internal Rate of Return %	Social Internal Rate of Return %	Private Internal Rate of Return %	Social Internal Rate of Return %
Auto Repair	59.41	23.63	68.03	23.33
Furniture Craft	62.22	32.19	76.79	24.00

Source: Computed from Survey data

TABLE 4.6

PRIVATE AND SOCIAL INTERNAL RATES-OF-RETURN FOR SELF-EMPLOYMENT
FOR APPRENTICE TRAINING, INDUSTRY, AND LOCATION

Location	Industry	Apprentice Training	
		Private Internal Rate-of-Return	Social Internal Rate-of-Return
Ijebu-Ode	Tailoring	2.00	- 0.09
	Furniture Craft	31.11	18.95
	Auto Repair	14.32	14.11
Oyo	Tailoring	7.05	- 0.13
	Furniture Craft	24.25	12.93
	Auto Repair	9.39	4.22
Aiyeye	Tailoring	4.01	- 0.12
All Locations	Tailoring	5.53	- 0.24
	Furniture Craft	29.94	16.89
	Auto Repair	11.94	9.23

Source: Computed from Survey data

which are above what is necessary to induce a worker to forego self-employment for wage employment. Equally important, however, is the fact that many large-scale industries enjoy economies of scale and are able to declare high after-tax profits despite the high wage rates. Translated into yields from training, these high wages show up as high internal rates-of-return for both types of training programs (see table 4.5.). Private rates-of-return were higher for trade center trainees than for apprentices in both auto repair and furniture industries by about 15 and 23 percent, respectively. The private rates-of-return for the two training programs were higher in furniture craft than in auto repair. For example, while the rate for apprenticeship training in auto repair (wage employment) was 59 percent, the rate for furniture craft was 62 percent — a difference of about 5 percent.

Social rates ranged from 23 percent in auto repair to 32 percent in furniture craft industry. Between the two training programs the social rates-of-return were higher for apprentice than for trade center training. In the furniture industry, the social rate for apprentice training was 32 percent compared with 24 percent for trade center training. In general the calculated internal rates-of-return (both social and private) in wage employment reflect the fact that apprentice training compares favorably with trade school programs, especially from the point of view of society's valuation, despite the lack of attention or support from the government.

Under the assumption that both apprentice- and trade school-trained workers received equal pay, the adjusted earnings of apprentice workers was used to estimate another set of internal rates-of-return for

trade-school training. The private rates for employment in auto repair and furniture industries (for trade school-trained workers) declined from 68 to 31 percent and from 76 to 49 percent, respectively. Social rates also declined, being 13 percent for auto repair and 16 percent for the furniture industry. Thus, under equal pay for similar skills, the rate-of-return (both private and social) to apprenticeship training would be nearly twice the rate to trade school training.

The private (unadjusted) rate-of-return obtained by Thias and Carnoy [1972] for those who completed 12 to 13 years of formal education in Kenya was 23.8 percent. For trade school trainees with nine years of formal education and three years of skill-related training, the adjusted private rates in Western Nigeria (in wage employment) averages about 72 percent. While earnings and cost may differ in the two countries, it seems, however, that skill-related training may be a more profitable investment than formal education up to a certain level.

4.6. Rate-of-Return in Self-Employment

If self-employment is the ultimate form of employment for apprentice-trained workers, then the rate-of-return to self-employment must not only be high enough to attract new entrants, but higher than those in alternative employment opportunities. Alternative employment opportunities are limited mostly to wage employment in the manufacturing industries and the public service. Between 1964 and 1972, Berger estimated an average rate of growth of output in Nigeria's manufacturing industries at 8.1 percent. The number of manufacturing establishments grew at a rate of 12.1 percent; employment also grew at an average of 12.6 percent while the number of workers employed per establishment only increased between 1964 and 1972 by

0.4 percent [Berger, 1975]. In other words, while earnings in wage employment might be sufficiently attractive to induce workers to seek wage employment, vacancies as well as recruitment are limited. Administered wages, and technologies that are capital intensive, both mitigate against employment opportunities in wage employment.

The private rates-of-return to self-employed apprentices are below those in wage employment (see table 4.6). The average (all locations) private rates in (self-employment) furniture and auto repair industries are 48 and 20 percent, respectively, of the private rates in wage employment for apprentice-trained workers.

Among the self-employed workers, returns also vary according to the skill and the location of business. Tailoring in all of the three locations — Ijebu-Ode, Oyo, and Aiyeye — is characterized by very low private rates-of-return and negative social rates. These findings, of course, reflect the generally lower earnings in tailoring and the proliferation of workers in the industry within the last decade [Mabawonku, 1977].

Auto repair and furniture craft, two industries that have been found [Mabawonku, 1977] to generate higher incomes, also showed higher rates in both Ijebu-Ode and Aiyeye compared with those in tailoring. For the two industries, both private and social rates to apprentices were higher among workers in Ijebu-Ode than in Oyo. Private and social rates in the furniture industry in Ijebu-Ode were about 29 percent greater than for those of similar industry in Oyo, while the social and private rates in auto repair were respectively 200 and 55 percent greater in Ijebu-Ode.

The highlights of the study so far are as follows:

1. for the two training programs, the private rates-of-return are higher in wage employment compared to self-employment

2. in wage employment, apprenticeship training compares favorably with trade school training
3. for all industries, rates-of-return are higher in areas of high income compared to areas of low income or in urban areas compared to rural areas as shown, for example, in comparing Ijebu-Ode and Aiyeye
4. private rates are low in tailoring in all locations, with social rates being negative

4.7. Adjusted Social Rates-of-Return

The previous analyses, however, are based on rather conservative estimates of some of the cost parameters; consequently, in this section, adjusted social rates-of-return are presented that reflect alternative specification of these parameters. In the first instance it is not unlikely that the estimated valuation of the proprietor's time used in this study could lead to a higher estimate of the cost of apprentice training. With the assumption that a proprietor would spend his time equally in producing commodities and offering training, the value of the opportunity cost of the proprietor's time was reduced by 50 percent. This produced a nearly 45 percent downward adjustment to the cost of training.

The use of this new cost stream produced changes in the social rates-of-return as shown in table 4.7. Differences between the social rates presented in table 4.6 earlier and the adjusted social rates in table 4.7 were, on the average, 30 percent, 55 percent, and 20 percent in tailoring, furniture craft, and auto repair, respectively. The negative social rates in tailoring became positive values ranging from 1.24 percent for Ijebu-Ode to 3.96 percent in Oyo. In wage employment, the adjusted costs also produced statistically significant improvements in the social rate-of-return to apprenticeship training. Indeed for those in wage employment, the social

TABLE 4.7
ADJUSTED SOCIAL INTERNAL RATES-OF-RETURN BY INDUSTRY

Location	Industry	Apprentice Training Social Rate-of-Return %
<u>Self-Employment</u>		
Ijebu-Ode	Tailoring	1.24
	Furniture Craft	29.44
	Auto Repair	14.88
Oyo	Tailoring	3.96
	Furniture Craft	23.45
	Auto Repair	7.30
Aiyeye	Tailoring	2.20
All Locations	Tailoring	4.25
	Furniture Craft	19.32
	Auto Repair	9.97
<u>Wage Employment</u>	Auto Repair	66.00
	Furniture Craft	75.14

Sources: Computed from Survey data

rate-of-return to apprenticeship training was approximately three times the social return to trade center training.

Attempts to adjust the costs in the trade schools for possible over and underestimation, did not produce any appreciable change in the estimated rates. In addition, attempts were made to see whether changes would occur in the estimated rates by increasing the working life and hence the "cut-off" period from thirty-five to forty years. No changes were observed for all the skills and training programs beyond some very small percentage points.

In general, the rates-of-return to both training types were high, especially in wage employment. But given the shortage of intermediate-skilled workers, earnings and hence the private rates could have been higher but for government wage policies which mitigate against the forces of supply and demand.⁷ While the estimates provide a static picture of the economy at a given point, it is not unlikely that, with a general upswing in the economy, returns to education will be higher in the future.

⁷Around August 1976, the federal government decreed a wage freeze for the private sector, thus preventing firms from bidding competitively for workers.

5. SUMMARY AND POLICY IMPLICATIONS

In previous sections, several empirical findings relating to apprenticeship training as a subset of activities of small-scale industries in Western Nigeria were presented. This section summarizes these findings and examines their policy implications.

One of the primary objectives of the study was to evaluate the returns to alternative forms of training entrepreneurs in Western Nigerian small industries. To this end, 210 establishments distributed among 4 major industries (tailoring, furniture, auto repair and blacksmithing) in 3 locations (Aiyeye, Ijebu-Ode, and Oyo) were surveyed from April to November 1976. In addition, information about costs of training in the trade schools was collected from the Oyo and Ijebu-Ode trade centers. Three hundred and seven intermediate skilled workers distributed among twelve large-scale industries in Ibadan, as well as their employers, were interviewed to provide information on employment prospects of apprentice-trained workers in sectors other than the small-scale industries.

Unlike formal recruitment procedures in the large-scale industries, recruitment of apprentices in small-scale industries was often undertaken through informal discussions between the proprietors and their neighbors, customers, or relatives. Considerable differences were observed between the socio-economic characteristics of the proprietors and their apprentices. Blacksmiths, rather than recruiting outsiders as apprentices, had their family members learning the skills. In other industries, the majority of the apprentices were not related to their masters. As could be expected, the proprietor/masters were generally older than their apprentices. The average age of the apprentices was seventeen years. Though younger than the

proprietors, apprentices appeared to be better educated than their masters, with an average level of formal education of five years. While there was evidence of intergenerational mobility in occupations, with less than 10 percent of the apprentices having parents engaged in the small-scale industries, there is an indication that many of the apprentices had parents in low paying occupations (see table 3.3). Through discussions with the apprentices, it was gathered that many could have chosen to go into formal training in high schools or government institutions had their parents had the money.

Low income and the knowledge that jobs were scarce for primary school leavers drove many youths to seek apprenticeship training. Of the 247 apprentices interviewed, nearly 90 percent never even bothered to look for wage employment but proceeded straight from elementary school into apprenticeship training. Those who sought wage employment spent an average of fifteen months before they could get such jobs as that of domestic servant.

Due to the relatively young age of the apprentices, the decision to seek training in the small-scale industries was made by their parents or relatives. The contracting of apprenticeship training generally involves the parents approaching a master craftsman. Terms of the contract involve determining the length of training, the apprenticeship fees, and whether the youth would be living with his master or coming from his home. Apprenticeship contracts could be either written or verbal. About 45 percent of the apprentices signed written agreements with their masters, while 43 percent had verbal agreements and about 13 percent had yet to enter into one form of agreement or the other. Unlike the common practice of European apprenticeship, written agreements in Western Nigeria small-scale industries generally are not notarized nor are they enforceable in a law court.

The organization of training can be described as informal. The training period, averaging three and a half years, involves serving under a master at the master's place of employment. No theoretical training of any form is provided; training is done on the job, the amount of work done being dependent on the demand for the product of the firm and the master's reputation as a craftsman. Among the establishments whose services are in constant demand, the apprentices were often exposed to many challenges and training opportunities unlike those apprenticed to masters who received fewer orders.

Training in the trade centers — a substitute institution for apprenticeship — is organized along the pattern of formal education institutions with regular class schedules, regulations and examinations. Both practical and theoretical training are provided by qualified instructors for a period of three years. Unlike their apprenticed counterpart, however, trainees in the trade schools are rarely exposed to the challenges of modern technology. This has led many employers of skilled labor to complain that training in trade centers is outdated.

The social costs of training apprentices are comprised of direct trainee costs, proprietors' costs and foregone earnings. While apprentices paid training fees ranging from ₦15 in the furniture industry to ₦28 in auto repair for the entire period of training, they received allowances averaging ₦55 in furniture craft, ₦42 in tailoring, and about ₦54 in auto repair.

Empirical evidence of the ratio of apprenticeship fees to allowances received indicated that generally proprietors in the small-scale industries were subsidizing the training of their apprentices, even when allowances were adjusted for the contribution of apprentices to the firm's earnings.

The part of the cost of training borne by the proprietors includes the opportunity cost of their time, the equipment used during the training, and the subsidy. The estimated proprietor costs ranged from 5 percent per annum in tailoring to 89 percent in the furniture industry. On the other hand, the proportion of the cost borne by the apprentice (that is, the ratio of fees, equipment purchased by the apprentice, foregone earnings, and the difference between the output produced and allowances received) was estimated at about 95 percent in tailoring to less than 12 percent in the furniture industry. In locations where there is a scarcity of apprenticeable youths (e.g., Ijebu-Ode) inducements in the form of allowances were generally higher than in areas where there is a considerable interest in apprenticeship training (e.g., Oyo). In the trade schools, student costs, consisting of fees, uniforms, books and foregone earnings, constituted about 7 percent of the estimated total cost of training — the rest being borne by the government. Observations during the course of this study showed some evidence of an underutilization of capacity in the trade schools — both in equipment and personnel. For example, it was observed at the Ijebu-Ode Trade Center that some equipment had been lying idle for years to the extent that the storekeeper had no record as to when and for what purpose the equipment was purchased. The skills of the students, especially those in their final year of training, are not utilized either in producing marketable output or services, or in instructing their juniors as is generally done in apprenticeship training.

The estimated rates-of-returns showed that the private as well as social rates-of-return were high in wage employment for the two types of training programs. However, private rates-of-return were higher for trade school trainees compared with apprentice-trained workers — a reflection of

government wage policies and the subsidies to trade schools. Social rates-of-return for apprentice-trained wage workers, on the other hand, were higher than the social rates-of-return for wage workers trained in trade schools.

The private, as well as social, rates-of-return in self-employment varied with industry and location. Private and social rates were highest in the furniture industry in the two locations, and averaged about 30 percent (private) and 17 percent (social). The lowest rates were in tailoring, the private returns being 2 percent, 7 percent, and 4 percent in Ijebu-Ode, Oyo, and Aiyeye, respectively. For all the locations, social rates-of-return in tailoring were negative. For all the industries, the private rates were higher than the social rates, an indication of the extent of subsidy being provided by the proprietors for their apprentices.

5.1. Implications for Apprenticeship Training

While apprentice training can be regarded as a by-product of the activities in small-scale industries, it is the main avenue by which entrepreneurs in small-scale industries are recruited. The findings in the study show that the system also provides other sectors of the economy with the scarce skilled workers it needs. In as much as the system can perform these functions, there is a need to incorporate the training under the apprenticeship system into the manpower policies of the country. The type of training provided by the system is devoid of any theoretical exercise; the training which an apprentice receives depends on the skills which the master himself possesses and the demand for these skills. Thus strategies which aim to upgrade the performance of the proprietors in the small-scale industries will also be beneficial to their apprentices. As an educational process, such

strategies as technical assistance and provision of extension services for small industries should not be pursued by the Ministry of Industries alone, but must also involve the National Manpower Board. A joint approach by these two bodies will lead to more effective retraining of proprietors and hence their apprentices. Unfortunately, no study exists in Nigeria as to the most effective method of retraining proprietors in small industries. It is most important, therefore, that the personnel from the National Manpower Board who are experienced in planning training programs and those from the Ministry of Industries who are directly concerned with the problems in the small-scale industries work together to provide an effective retraining program.

Presently, proprietors in auto repair and furniture craft recruit apprentices by offering inducements in the form of allowances and lower apprentice fees. In the trade schools, the government provides the subsidy. An important policy question, therefore, deals with whether such a subsidy provided by the government is necessary to induce trainees and whether such subsidies should be extended to the apprenticeship system. In the first instance, every level of formal education, from elementary school to the university, is being subsidized by the government. Informal training, such as in the apprenticeship system, has up to the moment been operated without the benefit of government subsidies either to the trainees or to the firms which offer training. But empirical evidence from this study has shown that apprenticeship training provides workers both for small-scale and large-scale industries. Moreover, proprietors who provide the training of apprentices, rather than appropriating their total investment in offering training, often provide subsidies and hence suffer a loss

of earnings. Thus, as low as income in the small-scale industries is, the proprietors appear to be transferring income to other sectors of the economy. A policy that aims at redistributing income either through grants or changes in fiscal policies that would favor the small-scale industries is advocated.

5.2. Implications for Trade Centers

According to the edict establishing the institution of trade centers in Western Nigeria, one of the goals envisaged was that trainees from the trade centers, on completing their training, would establish their own businesses. Evidence from this study shows that a substantial majority of trade-center trainees, rather than establishing their own businesses, are employed in either large-scale industries or public institutions as wage earners. This, of course, appears to be a reflection of the acute shortage of intermediate-skilled workers in the economy and of government wage policies which make returns in wage employment higher than in self-employment and thus more attractive to the trainees than the uncertainties of self-employment. Equally important, however, is the evidence gathered in the course of this study that the type and content of training provided does not equip the trainees with the type of knowledge needed to succeed in self-employment. The current curriculum in the trade schools lacks such essential courses as economics, accounting, and marketing. Nor do the trainees have out-of-school practical training. If the goal of self-employment is to be realized, it will be necessary to reorganize the present pattern and form of training. It may also be necessary to provide loans to the graduating trainees without the stringent requirements of collaterals or conditions which the students cannot meet or fulfill. This

applies to apprenticeship trainees as well. Indeed, it is recommended that efforts be directed to encourage self-employment of trade-school trainees since, if they were self-employed, they could also recruit apprentices and hence generate positive secondary effects by teaching others.

5.3. Implications for Further Research

This study is an attempt to evaluate the effectiveness of apprenticeship training in the small-scale industries. Admittedly, the data on which the study was based are modest, being limited by the resources available for the study. There is the need for a similar study to be carried out in other states or areas of the country in order to have a national perspective on the problem of apprenticeship training.

But apprenticeship training in the small-scale industries is but one avenue by which entrepreneurs as well as skilled workers are produced. Other forms of training include craft schools, industrial development centers, and training in the large-scale industries. As alternative forms of training, these schemes require detailed evaluation so that policy-makers may be aided in their choice of the most effective training program for small industries.

Apart from the choice of the form of training, there is a need for a detailed study of alternative institutional patterns for reaching the thousands of small-scale industrial entrepreneurs scattered all over the country. Among the important questions for which answers have to be sought is whether the proprietors in the small-scale industries should be organized at the local levels or on a regional basis for retraining. An experimental study on a small scale is, therefore, recommended.

BIBLIOGRAPHY

- Aluko, S. A., A. O. Oguntoye, and Y. A. O. Afonja. 1972. Small-Scale Industries: Western State of Nigeria. Ile-Ife, Nigeria: University of Ife.
- Archer, J. H. Educational Development in Nigeria, 1961-70: A Report on the Planning and Cost of Educational Development on the Basis of the Ashby Commission's Report. 1961. Lagos: Government Printer.
- Barsby, Steve L. 1972. Cost Benefit Analysis and Manpower Programs. Toronto: Lexington.
- Becker, Gary S. 1971. "Investment in Human Capital: Effects on Earnings." Readings in Labor Market Analysis. Edited by John F. Burton, Jr. et al. New York: Holt, Rinehart and Winston, pp. 159-77.
- _____. 1971. "Investment in Human Capital: Rates of Return." Readings in Labor Market Analysis. Edited by John F. Burton, Jr. et al. New York: Holt, Rinehart and Winston, pp. 178-96.
- Berger, M. 1971. Industrialization Policies in Nigeria. Nigerian Institute of Social and Economic Research, Ibadan.
- Berry, R. A. 1972. "The Relevance and Prospects of Small-Scale Industries in Colombia." Center Discussion Paper No. 42, Economic Growth Center, Yale University, New Haven, Connecticut.
- Blaug, Mark. 1967. "The Private and Social Returns on Investment in Education: Some Results for Great Britain." The Journal of Human Resources 2, 3 (Summer)
- _____. 1972. An Introduction to the Economics of Education. Hammondsworth, Middlesex, England: Penguin Books Ltd.
- Blaug, M., R. Layard, and M. Woodhall. 1969. Causes of Graduate Unemployment in India. Allen Lane: The Penguin Press.
- Borus, Michael E. 1964. "The Economic Effectiveness of Retraining the Unemployed: A Study of the Benefits and Costs of Retraining the Unemployed Based on the Experience of Workers in Connecticut." Ph.D. Dissertation, Yale University.
- Borus, Michael E., and Charles G. Buntz. 1971-72. "Problems and Issues in the Evaluation of Manpower Programs." SLIR Research Reprint Series No. 129, Michigan State University.
- Bowles, Samuel. 1969. Planning Educational Systems for Economic Growth. Cambridge, Massachusetts: Harvard University Press.

- Callaway, Archibald. 1964. "Nigeria's Indigenous Education: The Apprentice System." Odu University of Ife Journal of African Studies 1, 1 (July).
- _____. 1971. "Training Young People within Indigenous Small-Scale Enterprises: The Nigerian Example in Planning Out-of-School Education for Development." IIEP Seminar, UNESCO.
- Chakravarti, A. 1972. "Social Profitability of Training Unskilled Workers in the Public Sector in India." Oxford Economic Papers 24, 1 (March): pp. 111-23.
- Chuta, T. and C. Liedholm. 1975. "The Role of Small-Scale Industry in Employment Generation and Rural Development: Initial Research Results from Sierra Leone." African Rural Employment Paper No. 11, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan.
- Corrazzini, Arthur J. 1968. "The Decision to Invest in Vocational Education: An Analysis of Costs and Benefits." Journal of Human Resources 3 (Supplement): pp. 38-120.
- Crabtree, James S. 1967. "The Structure of Related Instruction in Wisconsin Apprenticeship Committees." In Essays on Apprenticeship. Edited by Norman F. Duffy. Madison: Center for Studies in Vocational and Technical Education, University of Wisconsin, pp. 95-133.
- Dennison, E. F. 1962. The Sources of Economic Growth in the United States and the Alternatives Before Us. Committee for Economic Development, New York.
- Doyle, Lawrence, F. 1967. "An Evaluation of Apprenticeship: Growth or Stagnation." Training and Development Journal 21, 10 (October): pp. 2-12.
- Duffy, Norman F. 1967. "A Model of Choice in Labor Markets." In Essays on Apprenticeship. Edited by Norman F. Duffy. Madison: Center for Studies in Vocational and Technical Education, University of Wisconsin, pp. 149-68.
- _____. 1967. "Apprenticeship — A Theoretical Model." In Essays on Apprenticeship. Edited by Norman F. Duffy. Madison: Center for Studies in Vocational and Technical Education, University of Wisconsin. pp. 135-39.
- _____. 1967. "Recruitment to the Skilled Trades: A Study of a Segment of a Skilled Labor Market." In Essays on Apprenticeship. Edited by Norman F. Duffy. Madison: Center for Studies in Vocational and Technical Education, University of Wisconsin, pp. 140-48.

- Farber, David, J., Jack Barbash, and A. Harvey Belitsky. 1967. Apprenticeship in the United States: Labor Market Forces and Social Policy: Discussion. Madison: Research in Apprenticeship Training, University of Wisconsin; pp. 3-30.
- Gittinger, J. Price. 1972. Economic Analysis of Agricultural Projects. The Economic Development Institute, International Bank for Reconstruction and Development. Baltimore and London: The John Hopkins University Press.
- Gounden, A. M. Nalla. 1967. "Investment in Education in India." Journal of Human Resources 2, 3 (Summer): pp 347-58.
- Gunderson, Morley. 1973. "Determinants of Individual Success in On-the-Job Training." Journal of Human Resources 8, 4 (Fall), pp. 472-84.
- Hammermesh, Daniel S. 1971. Economic Aspects of Manpower Training Programs, Theory and Policy. Toronto: Heath Lexington.
- Hardin, Einer and Michael E. Borus. 1969. Economic Benefits and Costs of Retraining Courses in Michigan. East Lansing: Michigan State University.
- Hardin, E. 1969. "Benefit-Cost Analyses of Occupational Training Programs: A Comparison of Recent Studies." In Cost-Benefit Analysis of Manpower Policies. Edited by A. A. Somers and W. D. Wood. Proceedings of a North American Conference, May 14-15.
- Hunter, John M. et al. 1974. "Economics of a Non-Formal Education." Study Team Reports, Program of Studies in Non-Formal Education, Institute for International Studies in Education, Michigan State University, East Lansing, Michigan.
- Husen, T. 1968. "Ability, Opportunity and Career." Educational Research (June).
- International Bank for Reconstruction and Development. 1973. "Cost Effectiveness of Alternative Learning Technologies in Industrial Training — A Study of In-Plant Training and Vocational Schools." Bank Staff Working Paper No. 169, International Development Association, World Bank, Washington, D.C., December.
- International Labor Organization. 1966. "European Apprenticeship, Effects of Educational, Social and Technical Development on Apprentice Training Practices in Eight Countries." International Labor Organization, Geneva, Switzerland.
- _____. 1970. Socio-Economic Conditions in the Ife, Otta and Ilaro Districts of the Western State of Nigeria. Geneva: International Labor Organization.

- Indy, Richard W. 1969. "Costs: Theoretical and Methodological Issues." In Cost-Benefit Analysis of Manpower Policies. Edited by A. A. Somers and W. D. Wood. Proceedings of a North American Conference, May 14-15.
- Kilby, Peter. 1962. The Development of Small Scale Industry in Eastern Nigeria. Lagos, Nigeria: United States Agency for International Development.
- _____. 1969. Industrialization in an Open Economy: Nigeria 1945-1966. Cambridge University Press.
- King, R. P. 1977. "An Analysis of Rural Consumption Patterns in Sierra Leone and Their Employment and Growth Effects." M.S. Thesis, Michigan State University.
- Knapp, Charles B. 1973. "A Human Capital Approach to the Burden of the Military Draft." Journal of Human Resources 7, 4 (Fall): pp. 485-96.
- Layard, P. R. G., J. D. Sargan et al. 1971. Qualified Manpower and Economic Performance: An Inter-plant Study in the Electrical Engineering Industry. London School of Economics and Political Science.
- Link, Charles R. and Edward L. Ratledge. 1975. "Social Returns to Quantity and Quality of Education: A Further Statement." The Journal of Human Resources 10, 1 (Winter): pp. 78-89.
- Lukomski, Michael. 1975. "Alternatives for the Training of Skilled Industrial Labor in Sao-Paulo, Brazil." Program of Studies in Non-Formal Education, Supplementary Series, Institute for International Studies in Education, Michigan State University, East Lansing, Michigan.
- McGauley, John S. and Paul V. Johnson. 1967. "Increasing Apprenticeship Opportunities Through Pre-Employment Training." Research in Apprenticeship Training, Proceedings of a Conference, September 8-9, 1966. Madison: Center for Studies in Vocational and Technical Education, University of Wisconsin. pp. 113-23.
- McNamara, R. 1970. Address to the Board of Governors. Copenhagen: World Bank Group, September 21.
- Mabawonku, A. F. 1971. "Rural-Urban Migration and Urban Labor Market" Unpublished Survey, International Institute of Tropical Agriculture, Ibadan, Nigeria.
- Mabawonku, A. F. 1977. "The Role of Apprenticeship Training in the Small-Scale Industrial Sub-Sector of Western Nigeria." Ph.D. Dissertation, Michigan State University.

- Magnusen, Karl O. 1967. "A Survey of Wisconsin Building Trades Joint Apprenticeship Committees." In Essays on Apprenticeship. Edited by Norman F. Duffy. Madison: Center for Studies in Vocational and Technical Education, University of Wisconsin. pp. 66-94.
- Marsden, Keith. 1969. "Towards a Synthesis of Economic Growth and Social Justice." International Labour Review, November.
- Mincer, Jacob. 1971. "On-the-Job Training: Costs, Returns and Some Implications." Readings in Labor Market Analysis. Edited by John F. Burton, Jr. et al. New York: Holt, Rinehart and Winston, p. 201.30.
- Mishan, E. J. 1973. Economics for Social Decisions: Elements of Cost-Benefit Analysis. New York: Praeger Publishers.
- Nafziger, W. E. 1972. The Market for Nigerian Entrepreneurs in South of the Sahara: Development in African Economies. Edited by S. P. Schatz. Philadelphia: Temple University Press.
- Nigeria, Federal Government of. 1972-74. Building the New Nigeria, National Development Plan, 1972-74. Lagos. Federal Government of Nigeria.
- _____. 1975-80. Guidelines for the Third National Development Plan, 1975-80. Lagos: Federal Ministry of Economic Development and Reconstruction, Federal Government of Nigeria.
- Nigerian Human Resource Development and Utilization. 1967. "Education and World Affairs." Committee on Education and Human Resource Development, Nigeria Project Task Force, a Final Report prepared for the United States Agency for International Development, Education and World Affairs, New York.
- Ribich, Thomas I. and James L. Murphy. 1975. "The Economic Returns to Increased Educational Spending." The Journal of Human Resources 10, 1 (Winter): pp. 56-77.
- Rogers, Augustus James, III. 1969. "Professional Incomes and Rates of Return to Higher Education in Brazil." Ph.D. Dissertation, Michigan State University.
- Sanders, Lester Earl. 1967. A comparison of Two Methods of Preparing Youth for Employment: Cooperative Occupational Education Versus the Preparatory Vocational-Technical School. Columbia: University of Missouri.
- Schatzl, Ludwig. 1973. Industrialization in Nigeria, A Spatial Analysis. Munchen: Weltforum Verlag.
- Scherer, F. M. 1970. Industrial Market Structure and Economic Performance. Chicago: Rand McNally and Co.

- Schmid, A. 1967. "Nonmarket Values and Efficiency of Public Investments in Water Resources," American Economic Review (May).
- _____. 1975. "Systematic Choice Among Multiple Outputs of Public Projects Without Prices." Social Indications (December).
- Schultz, Theodore W. 1972. "The Increasing Economic Value of Human Time." American Journal of Agricultural Economics (December).
- Shaffer, J. D. 1971. "Institutional Performance in Agricultural Development." Unpublished manuscript, Michigan State University, East Lansing, Michigan.
- Steel, William F. 1977. Small Scale Employment and Production in Developing Countries: Evidence from Ghana. New York: Praeger Special Studies.
- Strauss, George. 1967. "Apprenticeship: An Evaluation of the Need." Essays on Apprenticeship. Edited by Norman F. Duffy. Madison: Center for Studies in Vocational and Technical Education, University of Wisconsin. pp. 2-35.
- Stromsdorfer, E. W. 1968. "Determinants of Economic Success in Retaining the Unemployed." Journal of Human Resources 3 (Spring).
- Stromsdorfer, E. W. and G. G. Cain. 1968. "An Economic Evaluation of Government Retraining Programs in West Virginia." In Retraining the Unemployed. Madison: University of Wisconsin Press.
- Taussig, Michael K. 1968. "An Economic Analysis of Vocational Education in the New York City High Schools." Journal of Human Resources 3 (Supplement): pp. 59-87.
- Thakur, C. P. 19 . "Skill Generation and Labor Market in a Developing Economy." Faculty of Business Administration and Commerce, University of Alberta, Edmonton, Canada (Mimeo.).
- Tinbergen, Jan and H. L. Bos. 1965. "Econometric Models of Education, Some Applications." Technical Report, Education and Development, Organization for Economic Cooperation and Development, Paris.
- Weisbrod, B. A. 1969. "Benefits of Manpower Programs: Theoretical and Methodological Issues." In Cost-Benefit Analysis of Manpower Policies. Edited by A. A. Somers and W. D. Wood. Proceedings of a North American Conference, May 14-15.
- Welch, F. 1970. "Education in Productions." Journal of Political Economics 78 (January): pp. 35-59.

AFRICAN RURAL EMPLOYMENT/ECONOMY PAPERS

- *AREP No. 1 Derek Byerlee and Carl K. Eicher, "Rural Employment, Migration and Economic Development: Theoretical Issues and Empirical Evidence from Africa," 1972.
- AREP No. 2 Derek Byerlee, "Research on Migration in Africa: Past, Present and Future," 1972.
- AREP No. 3 Dunstan S.C. Spencer, "Micro-Level Farm Management and Production Economics Research Among Traditional African Farmers: Lessons from Sierra Leone," 1972.
- AREP No. 4 D.W. Norman, "Economic Analysis of Agricultural Production and Labour Utilization Among the Hausa in the North of Nigeria," 1973.
- AREP No. 5 Carl Liedholm, "Research on Employment in the Rural Nonfarm Sector in Africa," 1973.
- AREP No. 6 Gordon Gemmill and Carl K. Eicher, "A Framework for Research on the Economics of Farm Mechanization in Developing Countries," 1973.
- AREP No. 7 Francis Sulemanu Idachaba, "The Effects of Taxes and Subsidies on Land and Labour Utilization in Nigerian Agriculture," 1973.
- AREP No. 8 D.W. Norman, "Methodology and Problems of Farm Management Investigations: Experiences from Northern Nigeria," 1973.
- AREP No. 9 Derek Byerlee, "Indirect Employment and Income Distribution Effects of Agricultural Development Strategies: A Simulation Approach Applied to Nigeria," 1973.
- *AREP No. 10 Sunday M. Essang and Adewale F. Mabawonku, "Determinants and Impact of Rural-Urban Migration: A Case Study of Selected Communities in Western Nigeria," 1974.
- *AREP No. 11 Enyinna Chuta and Carl Liedholm, "The Role of Small-Scale Industry in Employment Generation and Rural Development: Initial Research Results from Sierra Leone," 1975.
- AREP No. 12 Tesfai Teclé, "The Evolution of Alternative Rural Development Strategies in Ethiopia: Implications for Employment and Income Distribution," 1975.
- AREP No. 13 Derek Byerlee, Joseph L. Tommy and Habib Fatoó, "Rural-Urban Migration in Sierra Leone: Determinants and Policy Implications," 1976.
- AREP No. 14 Carl Liedholm and Enyinna Chuta, "The Economics of Rural and Urban Small-Scale Industries in Sierra Leone," 1976.
- AREP No. 15 Dunstan S.C. Spencer, I. May-Parker and Frank S. Rose, "Employment, Efficiency and Income in the Rice Processing Industry of Sierra Leone," 1976.
- AREP No. 16 Robert P. King and Derek Byerlee, "Income Distribution, Consumption Patterns and Consumption Linkages in Rural Sierra Leone," 1977.
- AREP No. 17 Adewale F. Mabawonku, "An Economic Evaluation of Apprenticeship Training in Western Nigerian Small-Scale Industry," 1979.

*Out of print.

Single copies of the papers may be obtained free from the African Rural Economy Program, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan 48824, U.S.A.

AFRICAN RURAL EMPLOYMENT/ECONOMY WORKING PAPERS

- *WP No. 1 "African Rural Employment Study: Progress Report and Plan of Work, 1972-1976," May 1974.
- *WP No. 2 Dean Linsenmeyer, "An Economic Analysis of Maize Production in the Kasai Oriental Region of Zaire: A Research Proposal," May 1974.
- *WP No. 3 Hartwig de Haen, Derek Byerlee and Dunstan S.C. Spencer, "Preliminary Formulations of Policy Models of the Sierra Leone Economy Emphasizing the Rural Sector," November 1974.
- *WP No. 4 Enyinna Chuta and Carl Liedholm, "A Progress Report on Research on Rural Small-Scale Industry in Sierra Leone," November 1974.
- *WP No. 5 "Plan of Work for the IDR/MSU Research Program in the Ada District of Ethiopia," November 1974.
- *WP No. 6 William A. Ward, "Incorporating Employment into Agricultural Project Appraisal: A Preliminary Report," February 1975.
- +*WP No. 7 Eric F. Tollens, "Problems of Micro-Economic Data Collection on Farms in Northern Zaire," June 1975.
- *WP No. 8 "Annual Report for Period July 1, 1974 - June 30, 1975--Rural Employment in Tropical Africa: A Network Approach," 1975.
- +*WP No. 9 Carl K. Eicher, Merritt W. Sargent, Edouard K. Tapsoba and David C. Wilcock, "An Analysis of the Eastern ORD Rural Development Project in Upper Volta: Report of the M.S.U. Mission," January 1976.
- +*WP No. 10 Tom Zalla, "A Proposed Structure for the Medium-Term Credit Program in the Eastern ORD of Upper Volta," February 1976.
- *WP No. 11 Dunstan S.C. Spencer, "African Women in Agricultural Development: A Case Study in Sierra Leone," April 1976.
- *WP No. 12 Derek Byerlee, Joseph L. Tommy and Habib Fadoo, "Rural-Urban Migration in Sierra Leone: Determinants and Policy Implications," June 1976.
- *WP No. 13 Dunstan S.C. Spencer, Ibi May-Parker and Frank S. Rose, "Employment Efficiency and Incomes in the Rice Processing Industry of Sierra Leone," June 1976.
- *WP No. 14 Carl Liedholm and Enyinna Chuta, "An Economic Analysis of Small-Scale Industry in Sierra Leone," June 1976.
- *WP No. 15 Dunstan S.C. Spencer and Derek Byerlee, "Technical Change, Labor Use and Small Farmer Development: Evidence from Sierra Leone," August 1976.
- *WP No. 16 Mark D. Newman and David C. Wilcock, "Food Self-Sufficiency, Marketing and Reserves in the Sahel: A Working Bibliography," September 1976.
- +*WP No. 17 Gretchen Walsh, "Access to Sources of Information on Agricultural Development in the Sahel," December 1976.
- *WP No. 18 Dean A. Linsenmeyer, "Economic Analysis of Alternative Strategies for the Development of Sierra Leone Marine Fisheries," December 1976.
- *WP No. 19 Dunstan S.C. Spencer and Derek Byerlee, "Small Farms in West Africa: A Descriptive Analysis of Employment, Incomes and Productivity in Sierra Leone," February 1977.
- + WP No. 20 Derek Byerlee, Carl K. Eicher, Carl Liedholm and Dunstan S.C. Spencer, "Rural Employment in Tropical Africa: Summary of Findings," February 1977.
- *WP No. 21 Robert P. King, "An Analysis of Rural Consumption Patterns in Sierra Leone and Their Employment and Growth Effects," March 1977.
- +*WP No. 22 Tom Zalla, Ray B. Diamond and Mohinder S. Mudahar, "Economic and Technical Aspects of Fertilizer Production and Use in West Africa," July 1977.