Côte d'Ivoire's Vocational and Technical Education

Christiaan Grootaert

Formal vocational and technical education has been geared too
much toward jobs in the modern sector, which cannot absorb many
new workers. Informal training — chiefly apprenticeship training
— doesn't prepare trainees adequately to do account work. To
develop the unrealized potential of the informal sector, both formal
and informal training should be redirected toward the informal
sector.

Côte d'Ivoire spends more of its budget (42%) on education than any other country in the world. Part of its spending on formal vocational education and training should be redirected toward training in the informal sector.

The public costs of formal vocational and technical education (VTE) per student are four to seven times higher than the costs to individuals because of generous scholarship programs, the high cost of expatriate teaching staff, and the underuse of facilities during the current recession. Specific policy measures that would increase the social rates of return on investments in vocational training and education include:

- Reducing scholarships to VTE students.

- Replacing expensive expatriate (mostly French) teachers with Ivorians.

- Building fewer new buildings and making better use of the old ones.

- Upgrading the apprenticeship system by setting up short-term vocational and technical (especially evening) courses that complement apprenticeship training. These would include courses for the self-employed on, say, credit and marketing to help them run their own businesses.

- Promoting the employment of formal VTE graduates outside Abidjan, the magnet for most rural migrants.

This paper is a product of the Education and Employment Division, Population and Human Resources Department. Copies are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Rita Vartanian, room J6011, extension 34678.

CONTENTS

List of Tables and Figures

Acknowledgements

1. Introduction

The purpose of this paper is to present an economic assessment of Vocational and Technical Education (VTE) in the Republic of Côte d'Ivoire. A study of the VTE sector in that country is of particular interest for two reasons. First, ever since independence, investment in education has been a top priority in Côte d'Ivoire's development strategy. The sector has received a rising share of the Government's recurrent budget, exceeding 40% over the last decade – which is a higher share than in any other country in the world. The scrutiny of these expenditures is thus important, especially in an era of economic recession and adjustment, which has imposed a climate of fiscal austerity on the country.

Second, the Vocational and Technical Education sub-sector is of particular interest because it juxtaposes a formal and informal system of providing VTE. Formal VTE is given in a series of institutions that are integrated in the overall education structure. Parallel to that exists a system of individually arranged apprenticeships, mostly in small urban enterprises, where VTE is acquired in an on-the-job setting. This duality raises a question about the relative effectiveness of both systems in teaching people skills that provide them access to gainful employment, and about their relative cost-effectiveness in doing so.

The economic assessment presented in this paper therefore takes a three-pronged approach. First, the impact of VTE on earnings is studied. This analysis relies mostly on expanded Mincer-type earnings functions to

reveal the contributions to earnings made by general education, formal VTE, and apprenticeships (informal VTE). The specification will bring out the role of diplomas and certificates obtained. Second, the role of VTE in gaining access to different types of jobs is analyzed. This will be portrayed by binary choice models which, successively, will show the effects of VTE on the choice between self-employment and wage-employment, the choice between private and public sector employment, and on the choice between formal and informal sector wage employment. The explicit consideration of the employment selection process permits to test for and, if needed, to correct selection bias in the estimated earnings functions, at each stage of the analysis. Third, the cost structures of both formal and informal VTE are analyzed: out-of-pocket costs, opportunity costs, and institutional costs. In combination with the earnings analysis, this will permit to compute private and social rates of return to investment in diferent types of vocational and technical education.

The plan of the paper is as follow. In the next section, we discuss the household survey which is the main data source for the analysis. Sections 3 to 5 are devoted to a description of, respectively, the general education sector in Côte d'Ivoire, the formal system of vocational and technical education, and the system of informal apprenticeships. Section 6 outlines the Bank's involvement in the education sector in the country. The empirical analysis starts in section 7 with the presentation of results at the national level. The discussion covers the impact of VTE on earnings and on access to jobs, the private and

social costs of the VTE system, and the internal rate of return of investments in VTE. In sections 8 and 9, regional and sectoral dimensions are introduced into the analysis. Section 10 focuses on the interaction between general education and VTE. Lastly, section 11 summarizes the main findings and policy implications.

2. Data Source

The main data source for this study is the Côte d'Ivoire Living Standards Survey (CILSS), conducted between February 1985 and February 1986. The survey canvassed a nationally representative sample of 1,600 households. Information was collected on a wide array of subjects, including income, expenditures, assets, employment, and socio-economic characteristics of the household and its members. Table 1 lists the different sections of the CILSS questionnaire and their content.[1]/

The education module recorded self-reported literacy and numeracy, educational attainment of all household members aged five or above, educational expenses of household members enrolled in the last twelve months, and education of children who no longer live in the household. The education module is reproduced in Appendix 5.

CILSS interviews took place in two rounds, two weeks apart, which made possible the set-up of a system of in-field detection and correction of interviewer and measurement errors. To that effect, microprocessors were installed in Abidjan and in the regional statistical offices where the field teams were based. After the first round, the questionnaires were immediately delivered to the team's regional office. Since it was almost completely precoded, the information on the questionnaire could be entered directly on computer diskettes, thereby avoiding the conventional step of coding (which is often very slow and susceptible to error). Using a custom

---

1/ A further description of this questionnaire can be found in Grootaert (1986).

Table 1: THE CILSS QUESTIONNNAIRE

-FIRST ROUND-

Questionnaire Section	Obtained Information
* Composition of the Household	Identification of the members of the household. Demographic information. Information on the parents of the household members.
* Housing	Type of housing, tenancy status, housing expenditures. Source of water and l: ᛫ ᛫, type of fuel used, other amenities.
* Education	Literacy and educational attainment of household members 5 years and older. Schooling expenses in the last 12 months. Education of children who no longer live in the household.
* Health	Number of days of illness or injury, time lost in regular activities. Health expenditures. Utilization of health services in the last four weeks. Preventive health care and associated expenditures in the last 12 months.
* Activities	Main and secondary activities of household members 7 years or older, in the last 7 days and in the last 12 months. Type and sector of activities, time devoted to activities, income and social security benefits. Job search, search for additional work, unemployment spells. Work history. Domestic activities.
* Migration	Changes in residence of household members age 15 or above. Reasons for the migration.
* Respondents for the Second Round	Id: :ification of the household members that must be interviewed during the second round.
* Housing Characteristics	Construction materials and dimensions of the living quarter.

Table 1 (cont'd):   THE CILSS QUESTIONNAIRE

-SECOND ROUND-

Questionnaire Section	Obtained Information
* Farm and Livestock Activities	Area of land utilized, purchases and sales in the last 12 months. Harvest and disposition of the crops. Age of perennials. Farm inputs. Income and expenditures of farms and activities that transform farm products. Inventory of livestock, purchases and sales during the last 12 months. Income from the sales of animal products. Mutual aid. Farm equipment and tools. Sharecropping.
* Non-farm Self-Employment Activities	Income, expenditures, capital goods for the three main non-farm enterprises of the household.
* Expenditures and Inventory of Durable Goods	Daily expenditures in the last two weeks. Non-food expenditures in the last two weeks and the last 12 months. Inventory of durable goods. Expenditures of family support.
* Food Expenditures and Consumption of Home Produced Food	Food expenditures in the last two weeks and the last 12 months. Consumption of home produced food in the last 12 months.
* Fertility	Pertains to a woman aged 15 or more, randomly chosen during the first round. Number of children, number of pregnancies, and utilization of maternity services during the last pregnancy.
* Other Income	Income from family support, and other income not yet accounted for in previous sections.
* Credit and Savings	Loans and savings of the household.

written program, data were then subjected to a series of range and consistency checks, and a list of all possible errors and inconsistencies was printed out. During the second round, the enumerators filled out the remainder of the questionnaire and verified the answers that had been marked as potentially in error on the print-out. The completed questionnaires were then returned to the regional offices for data entry of the second round and of the corrected information pertaining to the first round. In combination with other features, such as a high ratio of supervisors to enumerators d random re-interviews of households, this system permitted to maintain a high level of quality control on the field operations. The data derived from the CILSS are therefore generally of high quality.2/

2/ More detail about the CILSS field work and the data entry system can be found in Ainsworth & Munoz (1986).

3. Education in Côte d'Ivoire

The Republic of Côte d'Ivoire is a middle-income economy, which
in the 1970s enjoyed a rapid economic growth, pushing GNP per capita to a
record $1,200 in 1981. Since then, the country has been very hard hit by
the worldwide recession, in particular by the drop in primary product
prices. By 1984, the country's GNP per capita had fallen almost 50% to
$610 (Table 2). Although the population of 10 million is still
predominantly engaged in agriculture, the country has a high degree of
urbanization. The urban population is concentrated in Abidjan, the
economic capital, which has about 1.8 million residents. The Côte
d'Ivoire's social and economic picture is therefore trichotomous: next to
differences in living and working conditions between rural and urban areas,
there is also a sharp difference between Abidjan and the other cities.
Size alone reflects this: Bouaké, the second largest city in the country,
has less than 1/5 the population of Abidjan. Consequently, the analysis in
this paper is not only done at the national level, but, to the extent that
the number of observations permit it, the regional dimension is explicitly
introduced.

Since independence in 1960, the government of Côte d'Ivoire has
put a high priority on education, and the significant resources devoted to
the sector have resulted in a rise of the primary enrollment rate from 33%
to 84% in 1985 (Table 3). Between 1960 and 1973, the government's
recurrent expenditures on education and training grew at an average annual

Table 2: MACROECONOMIC AND HUMAN RESOURCE INDICATORS

FOR CÔTE D'IVOIRE, 1984

Population	9.9 million
Average Annual Growth, 1973-1984	4.5%
Average Annual Projected Growth, 1980-2000	3.7%
GNP Per Capita (1984 dollars)	$610
Average Annual Growth, 1965-1984	0.2%
Life Expectancy at Birth	52 years
Infant Mortality Rate (per thousand)	106

Percent of Labor Force[1]/ in
       - Agriculture
       - Industry
       - Services
	
	65%
	8%
	27%

Percent of Population in Urban Areas	46%

[1]/ 1980

Source: World Bank (1986)

Table 3: GROSS ENROLLMENT RATIOS[1]/

	Abidjan	Other Cities	Rural	Total
Primary School (Ages 7-12)	104.0	100.9	70.9	83.8
Secondary School (Ages 13-18)	58.1	46.3	14.0	32.5
Secondary School + "Terminal" (Ages 13-19)	53.6	42.8	13.3	30.4
University (1-4 years) (Ages 20-23)	9.4	1.9	0.2	2.9
University (1-8 years) (Ages 20-27)	6.8	1.5	0.1	2.2

[1]/ The number of enrolled people over the total population in a given age-group x 100.

rate of 17.5%, which was faster than the growth of recurrent public revenues. As a result, the share of education in the government's recurrent budget rose from 22% to 33% - which was a higher figure than in any other country in the world (den Tuinder, 1978). This share continued to rise to 45% in 1980, and has since decreased to 42% - but it is still the highest in the world.

In urban areas, universal primary schooling has been achieved, but rural areas are lagging. The education effort has benefited, of course, mostly the young generation, and overall literacy and numeracy in the country is still quite low (Table 4). The differences between locations are notably sharp. For example, less than 1/5 of the rural population aged 5 and above knows how to write, but 61% of people in Abidjan and 44% of people in other cities do. Among other factors, the massive migration of the seventies into Abidjan has contributed to exacerbating the urban-rural gap.

Côte d'Ivoire's educational system was modelled after the French system and starts with a 6-year primary cycle. At the end, a Certificat d'Etudes Primaires Elémentaires (CEPE) is obtained. Secondary studies are broken down in a 4-year cycle, recognized with a Brevet d'Etudes Premier Cycle (BEPC), and a 3-year cycle, after which one obtains the Baccalaureate. The latter is a requirement to enter the University of Abidjan, or any of the post-secondary institutes of technical education. Table 5 shows that only a small fraction of the Ivorian population has

Table 4: LITERACY AND NUMERACY RATES (%)

	Abidjan	Other Cities	Rural	Total
Reading	64.7	51.5	23.0	37.7
Writing	60.9	44.1	18.5	32.8
Arithmetic	66.8	59.0	31.0	44.4

Table 5: DISTRIBUTION OF PEOPLE BY HIGHEST DIPLOMA OBTAINED AND SEX

	Abidjan		Other Cities		Rural	
	Female	Male	Female	Male	Female	Male
	%	%	%	%	%	%
None	71.2	52.9	80.0	62.4	96.1	87.9
CEPE	17.1	25.1	15.1	23.7	3.8	9.7
BEPC	3.1	5.9	2.6	6.1	0.1	1.5
Upper Secondary	1.3	2.9	0.4	1.5	0.0	0.3
University Degree	1.1	2.2	0.1	0.5	0.0	0.0
Technical Vocational Diploma	.8	10.5	1.7	5.2	0.0	0.5
Other	0.4	0.5	0.0	0.4	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
(Sample size)	(1,005)	(936)	(1,215)	(1,142)	(3,053)	(2,694)

completed any educational cycle.[3]/ In rural areas, 4% of women and 10% of

men have completed primary education. Less than 2% of men have completed a

higher cycle. In Abidjan, about 1/4 of men have a primary education

degree, 3% have completed secondary education, and 2.2% have a university

degree. Women hold fewer certificates and diplomas than men, and the

relative gap is largest at the upper secondary level. However, since the

gap is lower for university degrees, it suggests that relatively more women

than men who obtain a baccalaureate are also successful at obtaining a

university diploma.

Vocational and technical education (VTE) can be obtained in Côte

d'Ivoire both through formal and informal channels. The formal VTE system

is extremely complex, as it consists of many different types of public and

private institutes. The public institutes depend administratively and

budgetarily from no less than 18 different ministries.[4]/ They can be

grouped as follows (for the meaning of abbreviations, see Figure 1):

3/ This table as well as all following tables pertain to the population
    aged 5 or above.

4/ Detailed descriptions of the VTE system can be found in Guirassi (1986)
    and ONFP (1986). Two general studies of the VTE sector in Côte
    d'Ivoire are Achio (1983) and ONFP (1984).

Figure 1

IVORY COAST
STRUCTURE OF THE EDUCATION SYSTEM
COTE D'IVOIRE
STRUCTURE DU SYSTEME D'EDUCATION

- institutes dependent from the Ministries of Education[5]

  - secondary level institutes:

    - 2 technical high schools (Lycées Techniques—capacity: 2,745 students - curriculum: 3 years)

    - 7 vocational high schools (Lycées Professionnels—capacity: 3,538 students - curriculum: 3 years)

    - 8 technical colleges (CET/CET féminin - capacity: 2,331 students - curriculum: 2-3 years)

    - 15 vocational training centers (CFP - capacity: 1,606 students - curriculum: 2 years)

    - 7 miscellaneous training centers (capacity: 435 students - curriculum: 1-3 years)

  - post-secondary level institutes:

    - National Institute for Higher Technical Education (INSET - capacity: 1,464 students - curriculum: 2-5 years)[6]

  - teacher training institutes:

    - 15 primary school teacher training centers (CAFOP/ENI - capacity: 3,405 students - curriculum: 2 years)

    - Institute for Secondary School Teacher Training (ENS - capacity: 2,500 students - curriculum: 3-4 years)[6]

    - National Institute for Vocational and Technical Teacher Training (IPNETP - capacity: 300 students - curriculum: 1-5 years)[6]

5/ There are currently three Ministries of Education in Côte d'Ivoire, responsible for primary education (Ministère de l'Enseignement Pré-scolaire et Primaire), vocational and technical education (Ministère de l'Enseignement Technique et de la Formation Professionnelle), and general secondary and higher education (Ministère de l'Education Nationale).

6/ INSET, ENS and IPNETP are administratively independent institutes, but they "depend" from the Ministries of Education by receiving most of their budget from them.

- institutes dependent from other ministries: there are 39 different institutes belonging to 14 "technical" ministries (such as Public Works, Agriculture, etc.), which provide technical and vocational education at both the secondary and post-secondary levels. (For a list of these institutes, see ONFP (1986).) The capacity of these institutes is 7,274 students.

All of the institutes in the above list provide "initial" VTE, i.e., students typically enter the institutes directly after completing the prerequisite general education curriculum, without work experience. There are also a number of institutes that are geared to people currently in the work force, to allow them to refresh or upgrade their skills. This is typically short-term training, and its management and finance (through a payroll tax) lies largely outside the system of initial VTE. A description of short-term training institutes and the payroll tax is in Appendix 4.

In addition to the public VTE institutes, there exist also privately operated institutes, the majority of which offer curricula in business and secretarial skills. There are currently about 40 such institutes with a theoretical capacity of over 15,000 students. In practice, these institutes enroll far fewer students and are characterized by the poor quality of their training and low success rates (Achio, 1983).

Figure 1 presents an overview of the public system of general, vocational and technical education in Côte d'Ivoire. The lower two

rectangles in the figure are not comprehensive and only illustrate how some of the institutes dependent from technical ministries fit in with the rest of the system.

As an alternative to participating in the formal VTE system described above, an individual wishing to acquire vocational or technical skills can turn to the informal mechanism of apprenticeships. An apprenticeship arrangement can be started as early as primary school age and can last ten years or more. It typically consists of a young person working full time in a small enterprise at zero cash wage while learning a trade. Food and lodging are sometimes provided, but by no means always, and in some cases, a fee is even required from the apprentice. The exact nature of the arrangement is negotiated in each case between the owner of the enterprise, the apprentice and his/her parents. There are no specific government regulations that pertain to the apprenticeship contract, nor are there public institutes that deal with it. The training received as an apprentice is very practically oriented but usually quite limited in scope. As a result, it is widely perceived as an inferior form of VTE, relative to that acquired in the formal VTE system. The apprenticeship appeals mostly to individuals who lack the qualifications to gain access to the formal VTE system, or those who have dropped out of the system.[7]

---

[7] For a further description of the apprenticeship system, see Coulibaly (1986).

4. Formal Vocational and Technical Education

Formal VTE in Côte d'Ivoire is obtained mostly by Ivorian nationals living in cities (Table 6).8/ Less than 1% of the rural population has any VTE, while in Abidjan and other cities, 13.5% and 7% of the population, respectively, has received VTE. There is a significant number of women among urban VTE graduates, ranging from 29% in other cities to 41% in Abidjan. For the most part, the education lasted one to three years. Nevertheless, in many cases, no diploma or certificate was obtained. This can be seen by comparing Table 6 with Table 5: In Abidjan, for example, 13.5% of people have received VTE, but only 5.8% report having a VTE diploma.

VTE is undertaken most often after a few years of secondary general education: 31% of people with VTE in Abidjan have completed the first cycle of secondary education, another 21% have 1-3 years of upper secondary education (Table 7). In other cities, however, and especially in rural areas, a larger percent of people than in Abidjan start VTE right after primary school, presumably gearing themselves towards the acquisition of a lower level of skills.

The combination of formal VTE and apprenticeships is quite rare in Abidjan, but 8% to 9% of people with VTE in the rest of the country have also served as apprentices.

8/ Côte d'Ivoire has a sizeable foreign population: in Abidjan, 24% of households are non-Ivorian; in other cities, 20%; and in rural areas, 13%.

Table 6: INCIDENCE AND DURATION OF VTE

	Abidjan	Other Cities	Rural
	%	%	%
Percent of Population with VTE	13.5	7.0	0.9
(number of cases in sample)	(263)	(164)	(53)
Male	59.3	71.3	79.2
Female	40.7	28.7	20.8
	100.0	100.0	100.0
Ivorian	90.5	96.9	96.2
Non-Ivorian	9.5	3.1	3.8
	100.0	100.0	100.0
Duration (years)			
1	1.9	6.1	5.7
1	23.6	25.0	24,5
2	30.0	31.1	37.7
3	29.3	27.4	17.0
4-5	11.4	9.1	5.7
6+	3.8	1.2	9.4
	100.0	100.0	100.0
% with also apprenticeship	2.3	8.5	9.4

Table 7: HIGHEST GENERAL EDUCATION GRADE COMPLETED BY VTE GRADUATES

	Abidjan	Other Cities	Rural
	%	%	%
Primary 1-5	1.1	0.0	5.7
6	12.2	18.9	28.3
Lower Secondary 1	7.6	4.3	3.8
2	7.2	7.9	9.4
3	9.9	8.5	5.7
4	30.8	26.2	24.5
Upper Secondary 1	6.8	8.5	5.7
2	4.2	4.9	5.7
3	10.3	13.4	11.3
University 1	0.4	1.2	0.0
2	2.3	3.0	-
3	2.3	1.2	-
4	2.3	0.6	-
5+	2.6	1.2	-
Total	100.0	100.0	100.0

VTE is an important determinant of modern sector employment, as
Table 8 indicates. In Abidjan, 57% of secondary level VTE graduates are
employees for the government or for modern sector private enterprises.
This figure rises to 81% for graduates of post-secondary VTE.9/ In
contrast, 21% of the people with only general education past the primary
level hold such positions. A similar situation exists in other cities and
rural areas. The percentage of economically inactive people among VTE
graduates is also much below that among people with only general
education. Nevertheless, the unemployment rates of VTE graduates are not
low. In Abidjan, unemployment among VTE graduates is less than among
people with post-primary general education, but it is much higher than
unemployment among people with primary school or less. Private sector
employment in Abidjan has indeed been particularly hard hit by the
recession of the eighties, and this may have had a proportionally larger
impact on the employment opportunities of VTE graduates. This has induced
a number of VTE graduates to opt for own account work instead.

_____

9/ The small sample size of the CILSS clearly is a disadvantage for
disaggregated analysis at this level: there are only 33 individuals in
the sample with post-secondary VTE.

Table 8: RELATION BETWEEN WORK STATUS AND VTE

	Educational Achievement			
	Primary school or less	Post-primary general education		
		only	+secondary level VTE	+Post-secondary level VTE
	%	%	%	%
			Abidjan	
Government Employee	2.9	8.8	30.6	66.7
Private Sector Employee (Formal)	7.7	12.8	26.0	14.3
Private Sector Employee (Informal)	7.6	7.0	2.8	0.0
Unpaid Family Worker	1.5	0.9	0.0	0.0
Self-Employed	19.3	3.5	9.0	4.8
Inactive	54.7	47.6	15.8	4.8
Unemployed	6.1	19.4	15.8	9.5
	100.0	100.0	100.0	100.0
(number in sample)	(982)	(227)	(177)	(21)
			Other Cities	
Government Employee	4.0	8.3	56.2	66.7
Private Sector Employee (Formal)	2.4	7.4	17.1	16.7
Private Sector Employee (Informal)	5.4	11.1	0.0	0.0
Unpaid Family Worker	18.6	12.0	1.9	0.0
Self-Employed	30.1	7.4	7.6	16.7
Inactive	38.9	50.9	13.3	0.0
Unemployed	0.6	2.8	3.8	0.0
	100.0	100.0	100.0	100.0
(number in sample)	(1,298)	(108)	(105)	(12)
			Rural Areas	
Government Employee	0.1	3.2	53.3	-
Private Sector Employee (Formal)	0.4	5.3	0.0	-
Private Sector Employee (Informal)	0.9	3.2	0.0	-
Unpaid Family Worker	48.4	51.6	6.7	-
Self-Employed	32.5	21.0	23.3	-
Inactive	17.7	15.8	16.7	-
Unemployed	0.0	0.0	0.0	-
	100.0	100.0	100.0	-
(number in sample)	(4,502)	(95)	(30)	(-)

Note: Figures exclude people currently enrolled.

5. Informal VTE: Apprenticeships

While formal VTE graduates almost all live in cities, 38% of people with apprenticeship training live in rural areas. The incidence of women among apprentices is lower than among VTE graduates, while that of non-Ivorians is much higher (Table 9). Apprenticeships also tend to last longer than formal training: in rural areas, 28% of apprenticeships last four years or more; in other cities, 31%; and in Abidjan, 33%. In other words, the average duration of an apprenticeship increases with degree of urbanization. This is due to both pressures from demand for VTE and lack of job opportunities in Abidjan as a result of the recession. Informal VTE absorbs people who dropped out of formal VTE or never gained access. Many people migrate to Abidjan in search of schooling, so that demand for VTE is likely to exceed the access quotas to the existing facilities, and the unfulfilled demand raises the price, i.e., the duration, of the informal alternative. Many of the non-Ivorians who migrate to Côte d'Ivoire also find themselves unable to enter the formal VTE system (they often lack the prerequisite diplomas) and apprenticeships become their most attractive alternative.

Moreover, in a situation of job shortage, many trainees prefer to lengthen their apprenticeship rather than to become unemployed, at least when they receive wages in kind. Employers themselves tend to try and extend the duration of apprenticeships because the wages in kind are below the market wage of a regular worker, and certainly in the later years of apprenticeship, the trainee's marginal product is likely to exceed his compensation.

Table 9: INCIDENCE AND DURATION OF APPRENTICESHIPS

	Abidjan	Other Cities	Rural
	%	%	%
Percent of Population with Apprenticeship	13.4	11.5	5.7
(number of cases in sample)	(261)	(271)	(325)
Male	69.7	73.8	82.5
Female	30.3	26.2	17.5
	100.0	100.0	100.0
Ivorian	78.5	84.1	84.6
Non-Ivorian	21.5	15.9	15.4
	100.0	100.0	100.0
Duration (years)			
1	2.5	4.5	8.4
1	20.9	24.5	21.4
2	22.1	20.4	24.5
3	21.3	19.7	18.0
4-5	20.1	19.3	13.7
6-9	10.2	9.7	10.6
10+	2.9	1.9	3.4
Total	100.0	100.0	100.0
% with also VTE	2.3	5.2	1.5

Apprenticeships are undertaken by people with much less general education than VTE students (Table 10). In Abidjan, 40% of people who were trained as apprentices had no general education at all, and this was the case for more than half the trainees elsewhere. For those with some formal education, the main entry point into apprenticeship is after the primary curriculum.

Like VTE graduates, trainees from apprenticeships tend to channel themselves into a specific work status. In Abidjan, an apprenticeship leads primarily to wage work in the informal sector - i.e., the trainees will continue to work in a small enterprise, but for a wage (Table 11). This tendency is more distinct for apprentices with more general education. The second road that graduated apprentices take is to become self-employed. This option is more likely when little general education was received by the apprentice. Presumably, this is because relatively well educated apprentices continue to search for formal sector jobs and view their informal sector work as a temporary solution, preferable to unemployment. Apprentices with no or low education may recognize that their chances for formal sector work are small and see own account work as their best option. Also, in view of the rising primary school enrollment in Côte d'Ivoire over the past two decades, people without education are likely to be older and have had more time to save funds and establish their own enterprise. The age factor can explain also why one finds quite a few people without education or with only primary education but with apprenticeship training in the modern private sector. Ten to twenty years

Table 10: HIGHEST GENERAL EDUCATION GRADE COMPLETED BY PEOPLE

WITH APPRENTICESHIP TRAINING

		Abidjan	Other Cities	Rural
		%	%	%
None		40.2	51.7	58.5
Primary	1	1.1	1.1	2.5
	2	2.3	2.6	4.9
	3	6.5	3.7	4.0
	4	5.7	4.4	5.2
	5	6.5	8.9	4.9
	6	24.9	19.2	16.3
Lower Secondary	1	4.6	2.6	2.1
	2	3.8	2.2	0.3
	3	2.3	1.1	0.9
	4	1.5	1.5	0.3
Upper Secondary		0.4	1.1	0.0
Total		100.0	100.0	100.0

Table 11: RELATION BETWEEN WORK STATUS AND APPRENTICESHIP TRAINING

| | Educational Achievement | | | | | |
| | No Education | | Primary Education | | Post-Primary Education | |
	No Apprenti- ceship	Apprenti- ceship	No Apprenti- ceship	Apprenti- ceship	No Apprenti- ceship	Apprenti- ceship
	%	%	%	%	%	%
			Abidjan			
Government Employee	2.5	2.9	3.2	4.4	21.8	6.4
Private Sector Employee (Formal)	4.1	17.3	6.8	15.9	19.0	9.7
Private Sector Employee (Informal)	3.1	21.1	2.5	27.4	2.3	38.7
Unpaid Family Worker	1.9	2.9	1.1	0.0	0.2	3.2
Self-Employed	25.2	29.8	7.2	15.0	5.6	9.7
Inactive	60.9	18.3	69.1	25.7	33.2	19.3
Unemployed	2.3	7.7	10.1	11.5	17.8	12.9
	100.0	100.0	100.0	100.0	100.0	100.0
(number in sample)	(484)	(104)	(278)	(113)	(394)	(31)
			Other Cities			
Government Employee	1.4	5.7	10.3	5.8	36.1	13.0
Private Sector Employee (Formal)	0.6	10.7	3.4	1.9	12.9	8.7
Private Sector Employee (Informal)	1.8	9.3	4.6	28.8	3.5	21.7
Unpaid Family Worker	15.6	22.1	23.7	23.1	6.4	8.7
Self-Employed	33.4	41.4	16.4	26.0	6.4	21.7
Inactive	46.8	10.0	40.5	13.5	32.2	17.4
Unemployed	0.4	0.7	1.1	1.0	2.5	8.7
	100.0	100.0	100.0	100.0	100.0	100.0
(number in sample)	(788)	(140)	(262)	(104)	(202)	(23)
			Rural Areas			
Government Employee	0.1	0.0	0.2	0.8	17.0	0.0
Private Sector Employee (Formal)	0.2	1.0	0.5	3.3	3.6	8.3
Private Sector Employee (Informal)	0.7	2.6	1.7	0.8	1.8	0.0
Unpaid Family Worker	48.1	27.9	59.1	38.0	42.0	33.3
Self-Employed	31.7	61.0	23.7	51.2	18.7	50.0
Inactive	19.1	7.4	14.8	5.8	17.0	8.3
Unemployed	0.0	0.	0.0	0.0	0.0	0.0
	100.0	100.0	100.0	100.0	100.0	100.0
(number in sample)	(3,587)	(190)	(594)	(121)	(112)	(12)

Note: Table excludes currently enrolled people.

ago the formal VTE possibilities were much more limited in Côte d'Ivoire
than in recent years and apprenticeship training was a relatively better
way to acquire skills than it is nowadays.

In rural areas, apprenticeships lead people more to setting up
their own business, relative to people with the same general education
background but without apprenticeship training. The latter are more likely
to become unpaid family workers. The situation in other cities falls in
between that of Abidjan and rural areas.

There is a specific concentration of occupations which
apprentices select, relative to people with only general education, and
others they avoid. In Abidjan, for example, almost two-thirds of people
without education and without apprenticeship are in sales occupations,
while only 14% of apprentices without general education do sales work.
Apprentices are very well represented among metal workers, carpenters,
tailors and mechanics, with the latter two categories alone absorbing more
than one-third of the apprentices with some general education. Another
concentration occurs in the transport sector, where apprentices work as
drivers. In rural areas, the great majority of apprentices end up working
in farming occupations.

6. Bank Involvement in the Education Sector in Côte d'Ivoire[10]/

The Bank has made three education loans to the government of Côte d'Ivoire (Table 12). The First Education Project (1970) supported virtually all levels of the education system. When it was completed in 1977, it had achieved its principal objective of providing facilities for the increased output of trained manpower for industry, commerce, and agriculture. The project also contributed to general education through the construction of schools and by providing specialist services for the introduction of educational television in Côte d'Ivoire.

The Second Education Project, signed in 1975, focused on VTE by financing the construction of two teacher training centers and the upgrading and equipping of adult vocational training centers.

The Third Education Project, in 1979, was much larger than the previous loans, and included the construction of a model rural facility for VTE and community development. The bulk of the loan, however, financed the construction of four vocational high schools and four primary school teacher training centers.

The Bank's involvement in the education sector of Côte d'Ivoire has thus concentrated on formal VTE, especially on the provision of infrastructure. The Bank's role has been important. The two technical

10/ I am thankful to Omporn Regel and Rosemary Rinaldi for their contribution to this section.

Table 12: BANK EDUCATION LOANS TO CÔTE D'IVOIRE

First Education Project (1970)

Cost: $19.1 million

Loan: $11.0 million (raised to $13.2 million in 1975)

Purpose: Construction and equipment of one adult training
school, two secondary technical schools, two
post-secondary technical schools, three general
secondary schools, three primary school teacher
training centers; construction of an Instructional
Television Production Center; various technical
assistance.

Second Education Project (1975)

Cost: $8.7 million

Loan: $5.0 million

Purpose: Construction and equipment of two primary school
teacher training centers; equipment of four vocational
training centers; various technical assistance.

Third Education Project (1979)

Cost: $84.9 million

Loan: $24.0 million (+ $19.5 million co-financing loan from
                          AFDB)

Purpose: Construction and equipment of four vocational high
schools, four primary school teacher training centers,
one community development training center; various
technical assistance.

high schools, four of the seven vocational high schools and more than half of the primary school teacher training facilities were constructed with Bank financing.

In addition to the three education projects, the Bank has provided Project-Related Training (PRT) as part of its lending operations in sectors as diverse as water supply, oil exploration, and health. Table 13 lists all Bank projects in the last five fiscal years (July 1981-June 1986) with PRT components. There is a wide variety of training covered, but most projects call for some form of on-the-job training locally and training and study tours abroad.

Currently, the education sector in the Côte d'Ivoire faces several problems. The most important problem in the general education sector is the decline in enrollment rates, especially at the primary level. Enrollment growth in the first grade has fallen to 0.5% per year, while the school age population grows at 4.1% per year. Especially in rural areas, there is an increasing alienation from the school system, and consequently falling enrollment rates, because the system is perceived as not adapted to local needs.

In the VTE sub-sector, the main current problem is the imbalance between the supply capacity of the formal system and the demand for graduates. Formal VTE curricula are very much oriented towards the modern sector, and, as a result of the recession of the eighties, this sector has

- 33 -

Table 13: IBRD/IDA LENDING FOR TRAINING IN COTE D'IVOIRE

(1982-1986) (US$ Million)

Project Name	Fiscal Year	Total Project Cost	Loan/ Credit Amount	Training Component Cost	PRT Lending	% of PRT Lending	Description of PRT Component*
Oil Exploration	82	123.15	101.50	1.82	1.45	1.43	1
Technical Assistance	82	24.64	16.00	1.10	1.10	6.88	2
Urban Development II	82	104.00	51.00	0.83	0.50	0.98	3
Water Supply II	82	57.30	43.00	2.50	2.25	5.23	4
Forestry II	85	51.60	31.30	0.25	0.25	0.80	5
Highway Sector II	85	230.68	110.00	1.14	0.60	0.55	6
Palm Oil V	86	145.20	13.40	0.19	0.19	1.42	7
Indust. Development	86	49.25	30.00	0.10	0.10	0.33	8
Health I	86	29.70	22.20	1.83	1.83	8.24	9
Telecommunications II	86	116.70	24.50	0.90	0.90	3.67	10

*Description of PRT Component:

1. on-the-job training for technicians; training abroad with foreign oil companies.
2. on-the-job training of local ministerial staff (project and sector analysis); study trips and fellowships abroad.
3. training in traffic management for engineers and urban planners at National School for Public Works and abroad; driver training program; vehicle repair and maintenance training.
4. on-the-job and post-graduate training for technical staff and accountants.
5. in-service training for forestry, marketing, and accounting staff; driver training; local and foreign study tours.
6. basic training and refresher courses for selected Ministry of Public Works staff.
7. development of training programs in agriculture, crop processing, administration, finance, commercial operations, and management.
8. training of staff of the Central and participating banks in economic analysis of projects.
9. management training for hospital staff, in-service training for all levels of health staff, field training for student nurses; fellowships abroad.
10. overseas training and fellowships for staff of National Office of Telecommunications.

been unable to absorb VTE graduates. The excess supply is most obvious among graduates of curricula geared towards the tertiary sector (business, accounting, secretarial skills, etc.). Yet, at the same time there is a shortage of graduates in certain technical and scientific fields, especially at the post-secondary level (Achio, 1983). In response to rising unemployment among VTE graduates, the government has reduced admission quota to VTE institutes to levels compatible with the anticipated ability of the public sector to absorb graduates. The result is a serious underutilization of existing facilities. There is a need to adapt the curricula of many VTE institutes so that graduates are also prepared for careers in t'e informal sector, e.g., as self-employed workers, and to provide complementary programs to facilitate this transition (e.g., the provision of credit to small-scale entrepreneurs).

Since 1981, the Bank has been preparing a Fourth Education Project. The long evolution of this project is largely due to institutional reorganizations within the government.[11]/ Unlike its predecessors, this project would focus on increasing the efficient utilization of existing infrastructure, rather than adding to it. The proposed project would have four components:

(1) improving management, and planning and budgetting capacity of the ministries of education.

11/ Management of the education sector was the responsibility of 4 ministries until April 1983, when a unified Ministry of Education was created. In July 1986, the latter was abolished and 3 separate ministries were set up, responsible for primary education, technical and vocational education, and secondary and higher education.

(2) increasing efficiency and effectiveness of existing
resources through reorganization, renovation, and better
equipment of schools.

(3) upgrading the quality of math and science in secondary
educrtion.

(4) developing national capabilities for project preparation and
implementation.

7. Economic Assessment of VTE at the National Level

We begin the economic assessment of VTE in Côte d'Ivoire by presenting results of multivariate analysis at the national level. The next two sections of the paper will add regional and sectoral dimensions. We discuss first the effect of VTE on earnings (sec. 7.1) and on access to different kinds of work (sec. 7.2). Next, the structure of private and social costs associated with VTE is presented (sec. 7.3). This leads to the calculation of the internal rate of return to VTE (sec. 7.4). Lastly, we discuss briefly the earnings of the self-employed (sec. 7.5), and summarize the main findings (sec. 7.6).

7.1 Earnings Analysis

The CILSS data allow the construction of two earnings measures:

(1) W_1 = basic pre-tax cash earnings from the main job.

(2) W_2 = total pre-tax earnings from the main job = W_1 + bonus/commissions + wages-in-kind (food, housing, clothing, transport, other) from the main job.[12]

12/ Respondents to wage questions in the CILSS could report either pre-tax or post-tax income - a follow-up question identified which they had reported. Unfortunately, information on taxes paid is only available at the household level. We pro-rated these taxes to reported individual incomes and added the amount of tax to incomes reported post-tax, so as to put all earnings figures on a comparable pre-tax basis. Some editing of the earnings data was done to recode outlying values. This involved less than 1% of the cases.

The Côte d'Ivoire is characterized by a sharp earnings differential between urban and rural areas: average base earnings from the main job in Abidjan are 4 times those in rural areas, average total earnings in Abidjan are 4.5 times those in rural areas (Table 14). The differential is most pronounced for the self-employed and smallest for informal sector employees. Earnings in Abidjan are also higher than those in other cities, except for employees in the formal private sector.[13]/ Government employees command the highest salaries, except in other cities where employees in the formal private sector are at the top.

The payment of bonus/commissions and wages-in-kind is largely limited to the modern sector in urban areas. These payments make up about 20% of base wages, except for private sector employees in other cities for whom they constitute a hefty 37% of base wages. The reason for this high premium, as well as for the fact that private sector employees in other cities earn a higher base salary than their colleagues in Abidjan, is likely to be the enormous pull factor emanating from Abidjan. Without a higher remuneration and substantial bonuses and in-kind benefits, modern firms might find it very difficult to attract workers for their establishments outside Abidjan. In general, the labor market in other cities is much tighter than in Abidjan. The overall unemployment rate is only 3% as opposed to 19% in Abidjan.

13/ The distinction between the formal and informal sector was based on a series of questions in the CILSS specifically designed to elicit the degree of legal and institutional protection accorded to workers--with the absence of such protection being characteristic of the informal sector. The questions pertained to the existence of a written employment contract between worker and enterprise, the application of minimum wage laws, the existence of a union in the firm, and the receipt of various social security benefits (paid leave, paid sick leave, retirement fund, etc.).

Table 14: MONTHLY EARNINGS BY EMPLOYMENT STATUS

Employment Status	Abidjan			Other Cities			Rural Areas		
	W_1	W_2	W_2/W_1	W_1	W_2	W_2/W_1	W_1	W_2	W_2/W_1
					CFAF				
Government Employee	167,699	197,930	118.03	115,508	142,917	123.73	110,447	118,345	107.15
Private Sector Employee-Formal	111,606	133,529	119.64	141,103	193,949	137.45	70,578	78,981	111.91
Private Sector Employee-Informal	31,242	31,599	101.14	30,081	30,870	102.62	23,701	25,490	107.55
Self-Employed	96,489	96,489	100.00	51,544	51,544	100.00	26,036	26,036	100.00
All	111,009	123,418	111.18	70,946	81,120	114.34	27,497	27,720	100.81

Index

	W_1	W_2		W_1	W_2		W_1	W_2	
Government Employee	100	100	-	68.88	72.21	-	65.86	59.79	-
Private Sector Employee-Formal	100	100	-	126.43	145.25	-	63.24	59.15	-
Private Sector Employee-Informal	100	100	-	96.28	97.69	-	75.86	80.67	-
Self-Employed	100	100	-	53.42	53.42	-	26.98	26.98	-
All	100	100	-	63.91	65.73	-	24.77	22.46	-

See text for definitions of W_1 and W_2.
Index is calculated separately for each type of worker and for W_1 and W_2.

The explicit consideration of educational background reveals that Côte d'Ivoire is not only characterized by wide earnings disparities across locations but also within the same location (Table 15). In urban areas, the mean earnings of a person with post-secondary VTE is more than six times that of a person without VTE and with no more than primary general education. There appears to be a great premium to obtaining education past the primary level, although the relative contribution of secondary VTE vs. secondary general education is not directly obvious from the table. In other cities, graduates of secondary VTE earn significantly more than those with only secondary general education, but the reverse is true in Abidjan. This is again consistent with a tighter labor market in other cities. The multivariate earnings analysis below will have to bring out more clearly the contribution to earnings of each level and type of education.

One conclusion which Table 15 does bring out clearly is that acquiring VTE in an informal way, through apprenticeships, is a much less certain road to high earnings. For people with no education, an apprenticeship adds to their earning ability, but once any general education has been obtained, the role of an apprenticeship in enhancing earnings is unclear. The strongest positive effect occurs in rural areas where workers with primary education and an apprenticeship receive more than twice the earnings of those without either.

Table 15: MONTHLY EARNINGS (W$_2$) OF WORKERS, ACCORDING TO EDUCATIONAL BACKGROUND

	Abidjan		Other Cities		Rural Areas		All	
	CFAF	Index	CFAF	Index	CFAF	Index	CFAF	Index
Primary school or less, no VTE	71,943	100.0	55,870	100.0	26,122	100.0	38,756	100.0
Post-primary education, no VTE	182,488	253.7	130,228	233.1	66,080	253.0	143,161	369.4
Post-primary education + secondary level VTE	176,938	245.9	187,221	335.1	97,879	374.7	173,101	446.6
Post-primary education + post-secondary level VTE	483,781	672.4	346,690	620.5	--	--	440,162	1,135.7
No general education, no apprenticeship	62,227	100.0	42,983	100.0	21,895	100.0	29,753	100.0
No general education + apprenticeship	84,472	135.7	75,651	176.0	37,059	169.3	59,443	199.8
Primary education, no apprenticeship	72,173	116.0	64,993	151.2	37,069	169.3	51,756	173.9
Primary education + apprenticeship	64,730	104.0	47,802	111.2	49,229	224.8	53,642	180.3
Post-primary education, no apprenticeship	183,513	294.9	148,536	345.6	88,462	404.0	160,390	539.1
Post-primary education + apprenticeship	41,358	66.5	44,725	104.0	13,340	60.9	34,155	114.8

The Human Capital Model

We now turn to the multivariate estimation of the private benefits to VTE and apprenticeships. We rely on the standard human capital framework which yields the following estimating equation (Mincer, 1974):

$$lnW_i = a + bS_i + cE_i + dE_i^2 + u_i \qquad (1)$$

where, for the ith individual,

      W = wage earnings

      S = years of schooling

      E = years of work experience

      u = a random disturbance factor,

and where a, b, c, and d are the model's parameters.

This model can easily be adapted to show explicitly the contribution of other than general education. In particular, for this study, we propose the following specification:

$$lnW_i = a + bS_i + cE_i + dE_i^2 + eT_i + fA_i + u_i \qquad (2)$$

where T = years of vocational or technical education

      A = years of apprenticeship training,

and   e and f are the corresponding parameters.

With respect to years of schooling and training, equation (2) assumes that all years of schooling or all years of training contribute the

same amount to increasing earnings, and that no additional benefit is derived from obtaining diplomas or certificates. Existing evidence indicates that the returns to primary, secondary, and higher education differ in developing countries (Psacharopoulos, 1985). Also, employers often screen prospective employees and set starting salaries - or sometimes entire remuneration schedules - based on their diplomas or certificates. We therefore also estimate the equation below:

$$\ln W_i = a + \sum_j b_j S_{ij} + c E_i + d E_i^2 + \sum_k e_k T_{ik} + f A_i + \sum_j g_j D_{ij} + u_i \quad (3)$$

where j indexes the type or level of schooling and k indexes the type or level of training (no differentiation can be made within apprenticeships); D_j is a categorical variable $D_j = 1$ if the diploma for curriculum j was obtained, zero otherwise.[14]

Means and standard deviations of the variables in the earnings function are shown in Table 16. Most of the human capital variables have already been discussed in Sections 3-5 of this paper. With regards to experience, the CILSS provides two direct measures: the time worked in the

[14] An alternative to this procedure would be to estimate equation (3) minus the T and A variables for four groups of people: those with only general education, those with T, those with A, and those with both T and A. This procedure has the advantage of capturing the interaction between training and education, but it has the disadvantage of not showing the effect of the number of years of training and of any diplomas obtained. In principle, this disadvantage could be overcome by estimating earnings functions for groups defined for each year of training and by whether or not a diploma or certificate was obtained. In practice, there are insufficient observations in the CILSS data to implement this procedure.

Table 16: MEANS AND STANDARD DEVIATIONS OF EARNING FUNCTION VARIABLES

Variables	Mean	SD
$\ln(W_1)$	11.12	1.09
$\ln(W_2)$	11.27	1.14
Years of Schooling	6.97	5.45
Years of Primary Schooling	4.24	2.66
Years of Secondary Schooling	2.33	2.68
Years of Higher Schooling	0.41	1.41
Years of Work Experience - Current Occupation	9.19	7.91
Years of Work Experience - Previous Occupation	1.52	3.45
Years of Secondary VTE	0.86	1.62
Years of Post-Secondary VTE	0.08	0.43
Years of Teacher Training	0.13	0.54
Years of Apprenticeship Training	0.71	1.77
CEPE	0.22	0.42
BEPC	0.05	0.21
Secondary VTE Diploma	0.22	0.42
Post-Secondary VTE Diploma	0.04	0.19
Teacher Diploma	0.04	0.21
Other Diploma	0.07	0.25
Sex (1 = female)	0.19	0.39
Non-Ivorian	0.17	0.37
Seasonal Job	0.03	0.17
Number of Cases	500	-

current main occupation and the time worked in the previous main occupation, if any. This is greatly preferable to the customary proxy variable (age minus six minus years of schooling/training) which only measures potential experience. Moreover, in the Côte d'Ivoire, this proxy could underestimate actual experience for people without periods of unemployment or inactivity because many people combine schooling and work.[15]/

The dependent variable for the analysis is the natural logarithm of earnings. There is a debate in the earnings function literature as to what is the most appropriate time period for this variable (see for example, Blinder (1976) and the references in there). The main argument in favor of short periods (day, hour) is that this best reflects the transaction price of labor and excludes the effects of the labor-leisure choice (see for example, Griliches, 1977). On the other hand, many workers get paid over longer time-units, which for them establishes the relevant transaction price since neither supply nor demand takes place in smaller units. The CILSS questionnaire gave respondents the choice of time-unit to report earnings. More than 90% of modern sector employees reported earnings on a monthly basis, and even in the informal sector, 55% of employees did so. This is not surprising since the Government of

---

15/ In eight cases, people reported work experience on their current job to equal or exceed their age. In about 1.5% of the cases, the difference between age and experience was less than 6 years. We considered those cases to be reporting errors for experience and capped experience at age minus 6 years.

Côte d'Ivoire publishes its payscales on a monthly basis, and frequently
the private sector uses monthly terms in wage contracts. Hence, monthly
earnings constitute the relevant transaction price for wage labor in Côte
d'Ivore, since labor transactions and bargaining rarely take place in
smaller time units. Hence, the earnings analysis below uses the log of
monthly earnings as dependent variable.

The basic estimation results of equation (3) are reported in
Table 17, with $\ln(W_1)$ as dependent variable. On the average, a year of
schooling adds 13% to earnings, which is more than a year of work
experience does (Column 1). An average worker with ten years of schooling
would receive a monthly starting salary of CFA 53,370, but an unschooled
worker with ten years of experience would only earn CFA 31,729, which is
40% less. A year of primary education contributes least to raising
earnings – 7.5% per year – while a year of secondary education raises
earnings by 17.9% (Column 2). As can be expected, the effect of experience
in the previous occupation is less than that in the current one (Column
3). A year of apprenticeship contributes 4% to earnings, which is much
less than formal VTE. Within the latter, there are large differences by
level: a year of secondary VTE adds 8.5% to earnings, but a year of
teacher training adds 18.7% (Column 4).

An important issue is the role of diplomas and certificates in
hiring and remuneration decisions. The results in Column 5 suggest that
primary and lower secondary diplomas do not add significantly to earnings

Table 17: EARNINGS FUNCTION (lnW₁) - ALL EMPLOYEES

	(1)		(2)		(3)		(4)		(5)		(6)	
Intercept	9.575	(110.3)	9.679	(107.9)	9.613	(103.4)	9.585	(99.7)	9.600	(99.9)	9.852	(83.3)
Years of Schooling	.131	(20.1)	-	-	-	-	-	-	-	-	-	-
Years of Primary Schooling	-	-	.075	(4.7)	.079	(5.0)	.071	(4.4)	.037	(1.5)	.022	(0.9)
Years of Secondary Schooling	-	-	.179	(9.9)	.183	(10.1)	.158	(7.9)	.127	(5.1)	.113	(4.6)
Years of Higher Schooling	-	-	.142	(4.9)	.174	(4.6)	.157	(5.1)	.106	(2.5)	.097	(2.4)
Years of Current Job Experience	.098	(7.4)	.101	(7.6)	.099	(7.5)	.097	(7.4)	.094	(7.2)	.088	(6.9)
(Years of Current Job Experience)²	-.0019	(4.0)	-.0019	(4.1)	-.0018	(4.0)	-.0018	(3.9)	-.0017	(3.8)	-.0016	(3.6)
Years of Previous Job Experience	-	-	-	-	.041	(1.7)	.033	(1.4)	.032	(1.3)	.025	(1.0)
(Years of Previous Job Experience)²	-	-	-	-	-.0013	(0.7)	-.0008	(0.5)	-.0006	(0.4)	-.0001	(0.1)
Years of Apprenticeship	-	-	-	-	-	-	.039	(1.9)	.042	(2.1)	.027	(1.3)
Years of Secondary VTE	-	-	-	-	-	-	.085	(3.4)	.070	(2.3)	.071	(2.5)
Years of Post-Secondary VTE	-	-	-	-	-	-	.163	(1.8)	.023	(0.2)	.027	(0.2)
Years of Teacher Training	-	-	-	-	-	-	.187	(2.7)	.157	(1.7)	.167	(1.9)
CEPE	-	-	-	-	-	-	-	-	.251	(1.6)	.196	(1.3)
BEPC	-	-	-	-	-	-	-	-	.243	(1.0)	.279	(1.2)
Secondary VTE Diploma	-	-	-	-	-	-	-	-	.400	(2.1)	.325	(1.7)
Post-Secondary VTE Diploma	-	-	-	-	-	-	-	-	.970	(2.6)	.918	(2.5)
Teacher Diploma	-	-	-	-	-	-	-	-	.532	(1.8)	.547	(1.9)
Other Diploma	-	-	-	-	-	-	-	-	.727	(2.6)	.727	(2.7)
Sex (1=female)	-	-	-	-	-	-	-	-	-	-	-.135	(1.5)
Non-Ivorian	-	-	-	-	-	-	-	-	-	-	-.264	(2.7)
Seasonal Job	-	-	-	-	-	-	-	-	-	-	-.622	(3.0)
Abidjan	-	-	-	-	-	-	-	-	-	-	.091	(1.2)
Rural Areas	-	-	-	-	-	-	-	-	-	-	-.295	(2.4)
R^2	.49		.51		.52		.54		.54		.58	
$\overline{R}^2$	.49		.51		.51		.53		.53		.56	
F	162.5		103.1		75.2		51.2		33.9		29.5	

Note: Absolute t - values in parentheses.

beyond the effects of the years of schooling. The situation is different, though, for VTE and other (mostly university) diplomas: each has a premium of at least 40% attached to it. Notice, however, comparing Columns 4 and 5 of the table, that the introduction of the diploma variables in the regression reduces the coefficients of all levels of schooling and formal training (i.e., excluding apprenticeship and on-the-job training). The drop is, however, most pronounced for years of post-secondary VTE, whose coefficient in fact becomes insignificantly different from zero. Instead, a post-secondary VTE diploma has a very large earnings premium attached to it. This suggests that strong screening takes place at that level and that employers value only completed post-secondary VTE curricula. In contrast, the secondary VTE diploma has a more modest earnings premium, but the length of secondary VTE remains an important determinant of earnings.

The last regression specification (Column 6) includes a few variables that test in an elementary way for the presence of labor market imperfections. The results give weak indication that women earn less than men. Non-Ivorians earn 26.4% less than Ivorians on the average. After controlling for human capital and demographic variables, wages in Abidjan are no longer significantly above those in other cities, but wages in rural areas are systematically below those of urban areas. Moreover, holders of seasonal jobs - most prevalent in rural areas - earn 62% less than others.[16]

16/ Seasonal job is defined by the nature of the work, not by the time actually worked during the survey's reference period - although jobs for which more than 40 weeks of work were reported were always considered to be non-seasonal.

We also estimated the same set of regressions with W_2 - the total monthly wage, including bonus/commissions and income-in-kind - as dependent variable (Table 18). This raises the yields to a year of general schooling by 1-2% points. It lowers, however, the coefficients of all VTE variables, suggesting that bonuses and in-kind income are more received in jobs where the pre-requisites are general education. The observations we made when discussing the results for W_1 remain qualitatively the same for W_2, except that there is now stronger evidence of a wage gap between men and women not explained by the human capital variables in the regression. This reflects the fact that men receive more commissions, bonuses, and in-kind income than women - CFA 9,960 and 1,517, respectively, on the average.

The Role of Selection

The results in Tables 17 and 18 were obtained using OLS estimation. This assumes, among other things, that the people for whom the estimation is made, i.e., wage-earners, are a random subset of the active population. If this assumption is not true, the coefficients of the earnings function may be biased, because they reflect not only the effects of the explanatory variables on wage-earnings but also on the probability to be a wage-earner. This problem, known as selection bias, can be solved by estimating separately a binary choice equation that determines the probability to become a wage-earner. Following a method suggested by Heckman (1976, 1979), this choice equation can be estimated by probit maximum likelihood, and the results used to estimate the so-called inverse

Table 18: EARNINGS FUNCTION (lnW_2) - ALL EMPLOYEES

	(1)		(2)		(3)		(4)		(5)		(6)	
Intercept	9.644	(109.7)	9.741	(107.0)	9.665	(102.6)	9.649	(98.6)	9.659	(98.7)	9.955	(82.4)
Years of Schooling	.139	(21.1)	-	-	-	-	-	-	-	-	-	-
Years of Primary Schooling	-	-	.087	(5.3)	.091	(5.6)	.082	(5.0)	.056	(2.2)	.042	(1.6)
Years of Secondary Schooling	-	-	.183	(9.9)	.188	(10.2)	.166	(8.1)	.141	(5.6)	.126	(5.1)
Years of Higher Schooling	-	-	.150	(5.1)	.142	(4.8)	.162	(5.2)	.127	(3.0)	.123	(3.0)
Years of Current Job Experience	.103	(7.6)	.106	(7.8)	.104	(7.7)	.101	(7.6)	.099	(7.4)	.092	(7.0)
(Years of Current Job Experience)^2	-.0020	(4.2)	-.0020	(4.3)	-.0019	(4.1)	-.0019	(4.0)	-.0018	(3.9)	-.0017	(3.8)
Years of Previous Job Experience	-	-	-	-	.054	(2.2)	.046	(1.9)	.044	(1.8)	.036	(1.4)
(Years of Previous Job Experience)^2	-	-	-	-	-.0020	(1.2)	-.0016	(0.9)	-.0014	(0.8)	-.0008	(0.5)
Years of Apprenticeship	-	-	-	-	-	-	.031	(1.5)	.034	(1.6)	.018	(0.9)
Years of Secondary VTE	-	-	-	-	-	-	.083	(3.3)	.066	(2.2)	.069	(2.3)
Years of Post-Secondary VTE	-	-	-	-	-	-	.163	(1.8)	-.023	(0.2)	-.004	(0.0)
Years of Teacher Training	-	-	-	-	-	-	.129	(1.9)	.109	(1.2)	.112	(1.2)
CEPE	-	-	-	-	-	-	-	-	.192	(1.2)	.134	(0.8)
BEPC	-	-	-	-	-	-	-	-	.119	(0.5)	.150	(0.6)
Secondary VTE Diploma	-	-	-	-	-	-	-	-	.346	(1.7)	.281	(1.4)
Post-Secondary VTE Diploma	-	-	-	-	-	-	-	-	.964	(2.5)	.876	(2.3)
Teacher Diploma	-	-	-	-	-	-	-	-	.413	(1.4)	.420	(1.4)
Other Diploma	-	-	-	-	-	-	-	-	.516	(1.8)	.508	(1.8)
Sex (1=female)	-	-	-	-	-	-	-	-	-	-	-.204	(2.3)
Non-Ivorian	-	-	-	-	-	-	-	-	-	-	-.275	(2.7)
Seasonal Job	-	-	-	-	-	-	-	-	-	-	-.622	(2.9)
Abidjan	-	-	-	-	-	-	-	-	-	-	.039	(0.5)
Rural Areas	-	-	-	-	-	-	-	-	-	-	-.283	(2.3)
R^2	.52		.53		.54		.55		.56		.59	
$\overline{R}^2$	.51		.52		.53		.54		.54		.57	
F	176.2		110.6		81.2		54.2		35.8		30.7	

Note: Absolute t - values in parentheses.

Mills-ratio, lambda. Lambda captures the probability to be included in the

sample as a wage-earner, and the inclusion of lambda as a regressor in the

earnings function corrects for the non-randomness of the selection into

wage-earner status, so that consistent estimates are obtained for the

earnings function.[17]/

To check for the presence of selection bias in the CILSS sample

of wage-earners, we re-estimated the earnings equation with lambda included

(the choice equation will be discussed in section 7.2). The results in

Table 19 indicate the presence of a significant negative selection factor

into the status of wage-earner. This factor diminishes as the

specification is made more complete, which points at the role of the added

variables--diplomas and demographic variables--as elements in the

selection.

The coefficient of lambda represents the covariance between the

error terms of the choice equation and the error terms of the earnings

equation. A negative coefficient thus means that whichever unobserved

factors exist that increase the probability to become a wage-earner also

contribute to the likelihood that a person will earn a below average wage.

If we accept that people choose their status of employment in a way which

maximizes their earnings potential, then we should observe positive

selection. One interpretation of the negative selection into employee

status in Cote d'Ivoire is therefore that barriers to entry exist and/or

_____

17/ For a further theoretical discussion of this two-step estimation
     method, see Maddala (1983). An application of the technique in labor
     market analysis can be found in Grootaert (1986b).

Table 19: EARNINGS FUNCTION (lnW$_2$) - ALL EMPLOYEES - CORRECTED FOR SELECTION BIAS

	(1)		(2)		(3)	
Intercept	10.210	(74.2)	10.182	(73.2)	10.329	(52.6)
Years of Primary Schooling	.046	(2.7)	.041	(1.7)	.031	(1.2)
Years of Secondary Schooling	.143	(7.1)	.131	(5.3)	.127	(5.2)
Years of Higher Schooling	.151	(4.9)	.123	(2.9)	.130	(3.2)
Years of Current Job Experience	.085	(6.6)	.085	(6.6)	.084	(6.5)
(Years of Current Job Experience)^2	-.0015	(3.3)	-.0014	(3.3)	-.0015	(3.2)
Years of Previous Job Experience	.041	(1.7)	.038	(1.6)	.040	(1.7)
(Years of Previous Job Experience)^2	-.0012	(0.8)	-.0010	(0.6)	-.0012	(0.7)
Years of Apprenticeship	.012	(0.6)	.014	(0.7)	.014	(0.7)
Years of Secondary VTE	.063	(2.5)	.059	(2.0)	.064	(2.2)
Years of Post-Secondary VTE	.141	(1.6)	-.039	(0.3)	-.008	(0.1)
Years of Teacher Training	.099	(1.4)	.102	(1.1)	.088	(1.0)
CEPE	-	-	.051	(0.3)	.031	(0.2)
BEPC	-	-	-.019	(0.1)	-.016	(0.1)
Secondary VTE Diploma	-	-	.124	(0.6)	.115	(0.6)
Post-Secondary VTE Diploma	-	-	.713	(1.9)	.634	(1.6)
Teacher Diploma	-	-	.147	(0.5)	.148	(0.5)
Other Diploma	-	-	.286	(1.0)	.290	(1.0)
Sex (1=female)	-	-	-	-	-.079	(0.8)
Non-Ivorian	-	-	-	-	-.289	(3.0)
Seasonal Job	-	-	-	-	-.567	(2.8)
Abidjan	-	-	-	-	-.064	(0.7)
Rural Areas	-	-	-	-	-.042	(0.3)
Lambda	-.333	(5.4)	-.313	(4.9)	-.258	(2.5)
R^2	.57		.57		.59	
$\overline{R}^2$	.56		.56		.57	
F	54.16		36.20		29.71	

Note: Absolute t - values in parentheses.

that the actual selection process of employees is such that the most productive people (with productivity being reflected in earnings) are not being selected into wage-employment.

Comparing the basic OLS coefficients in Column 6 of Table 18 with the selection-corrected coefficients in Column 3 of Table 19, one notices that the differences are fairly minor as far as the human capital variables expressed in years are concerned. The significant coefficients differ by .01 or less, which in a semi-logarithmic equation means a difference of about 1% on the predicted wage. There are, however, also a few major differences. In particular, the coefficients of post-secondary VTE diploma and other diploma are much smaller when selection is taken into account. This is because these diplomas have an important role in gaining access to wage employment. Their net effect of earnings is thus much smaller than what the OLS equation had suggested.

It is also important to note what happened to the demographic valables. The "wage-gap" due to sex disappears when selection is considered, i.e., sex is an important determinant of access to wage employment, but not of wage-levels once access has been gained. The opposite is true for nationality; after selection is taken into account, the wage differential increases slightly.

The overall conclusion is that it is important in the case of Côte d'Ivoire to take selection issues into account when estimating earning functions. The net contribution of human capital variables to earnings,

especially of diplomas, cannot be obtained from OLS estimates. In the calculation of the internal rates of return below, we will therefore use the selection corrected earnings function.

Figures 2 - 5 show selected earnings/experience profiles based on the earnings equation in Table 19 (column 3). Figure 2 brings out the effects of the years of experience in a job prior to the current one. Figure 3 shows the earnings profiles of apprenticeship graduates with different levels of general education. Figure 4 brings out the effects of secondary level formal VTE on graduates with primary and lower secondary general education. Figure 5 displays the earnings profiles of post-secondary VTE and teacher training graduates with and without diploma.

7.2 Access to Wage Employment

The results of the selectivity correction procedure in the previous section make it clear that human capital is not only a determinant of earnings in Côte d'Ivoire, but also determines access to wage-employment. The probit equation that was used to derive the lambda's is shown in Table 20. The equation models the choice between own account work and work for wages, under the assumption that individuals try to maximize the returns to their education and training but taking into account both constraints and opportunties that exist as a result of their demographic

Figure 2

EFFECT OF PREVIOUS JOB EXPERIENCE

Years of current job experience

□ = no previous job experience
+ = 5 years of previous job experience
◊ = 10 years of previous job experience
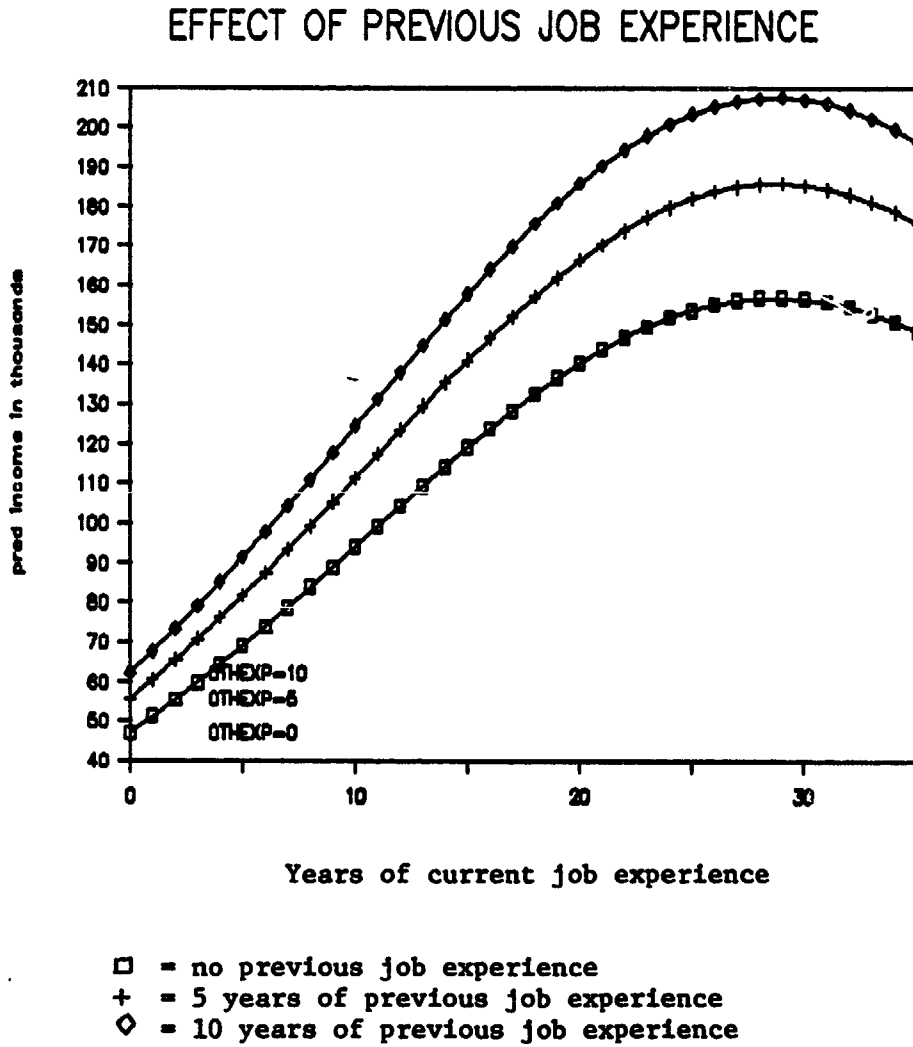
Figure 3

APPRENTICESHIPS WITH NO GEN EDUC
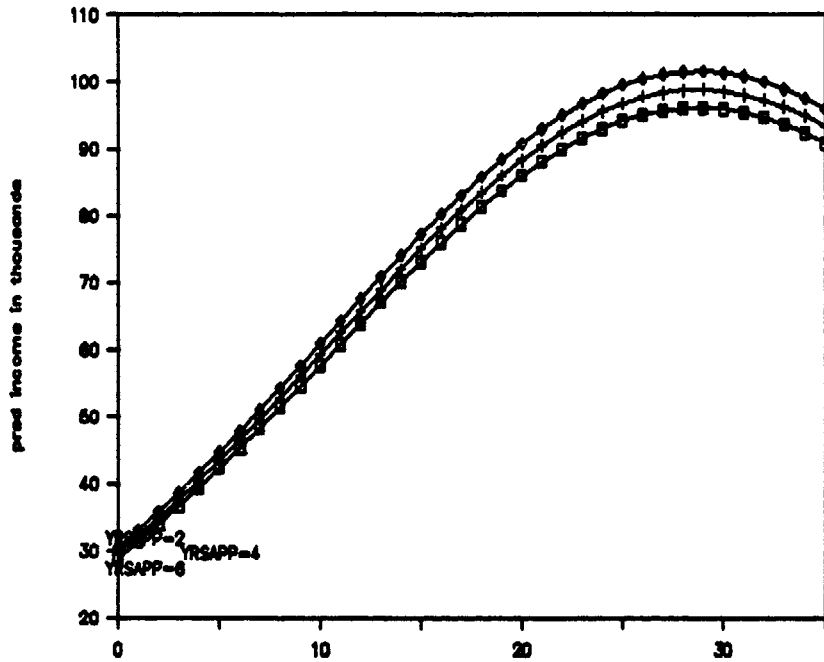
APPRENTICESHIPS WITH PRIM EDUC
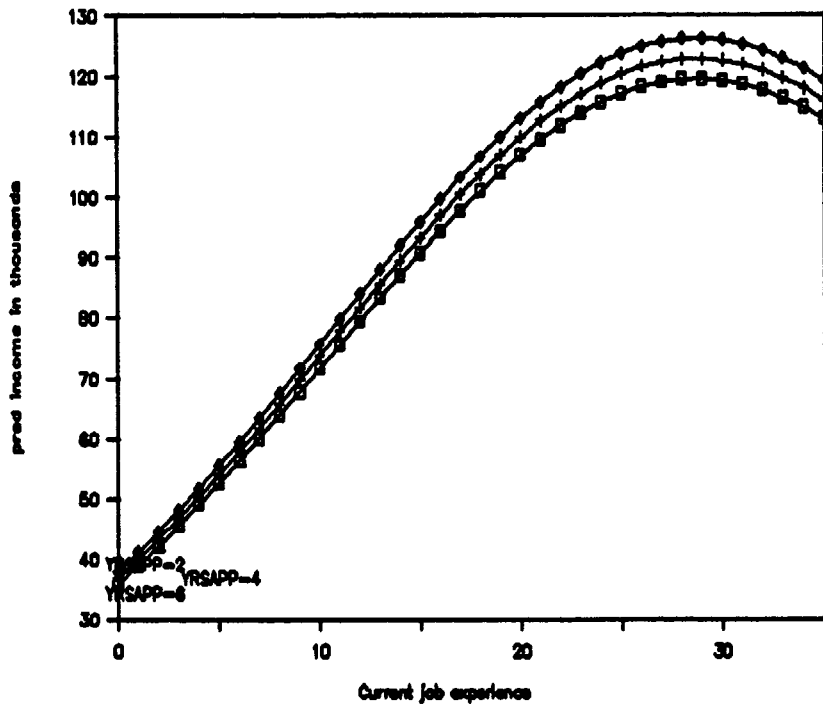
□ = 2 years of apprenticeship training
+ = 4 years of apprenticeship training
◇ = 6 years of apprenticeship training

Figure 4

SECONDARY VTE W/ PRIM EDUC
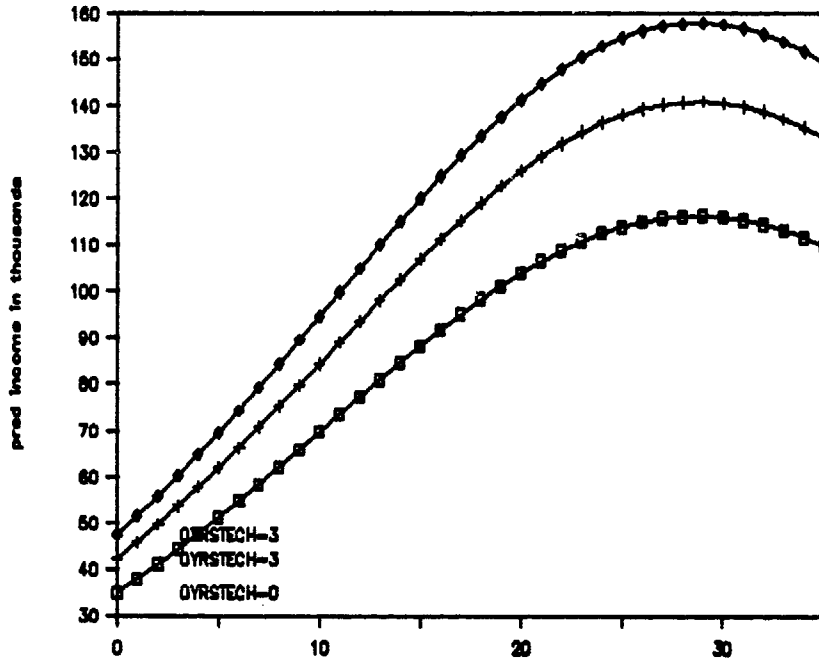
SECONDARY VTE W/ LOWER SEC EDUC
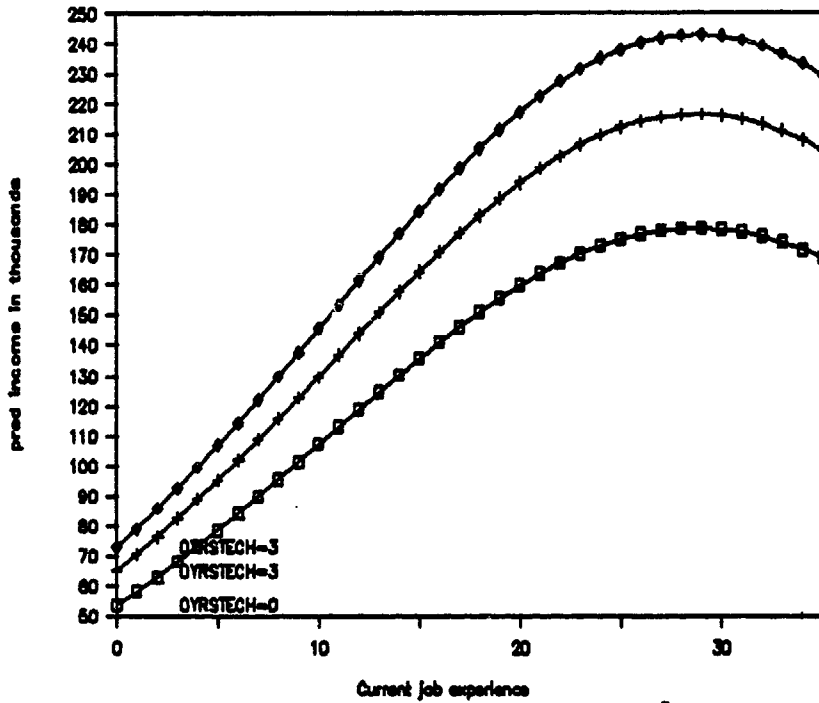
☐ = no VTE
+ = 3 years of secondary VTE
◇ = 3 years of secondary VTE + diploma

Figure 5

POST—SECONDARY VTE

HYRSTECH=3 TECHD2

HYRSTECH=3

□ 3 yrs   + 3 yrs + dipl

TEACHER TRAINING

TYRSTECH=3 TECHD1

TYRSTECH=3

TYRSTECH=1

□ 1 yr   + 3 yrs   ◇ 3 yrs + dipl
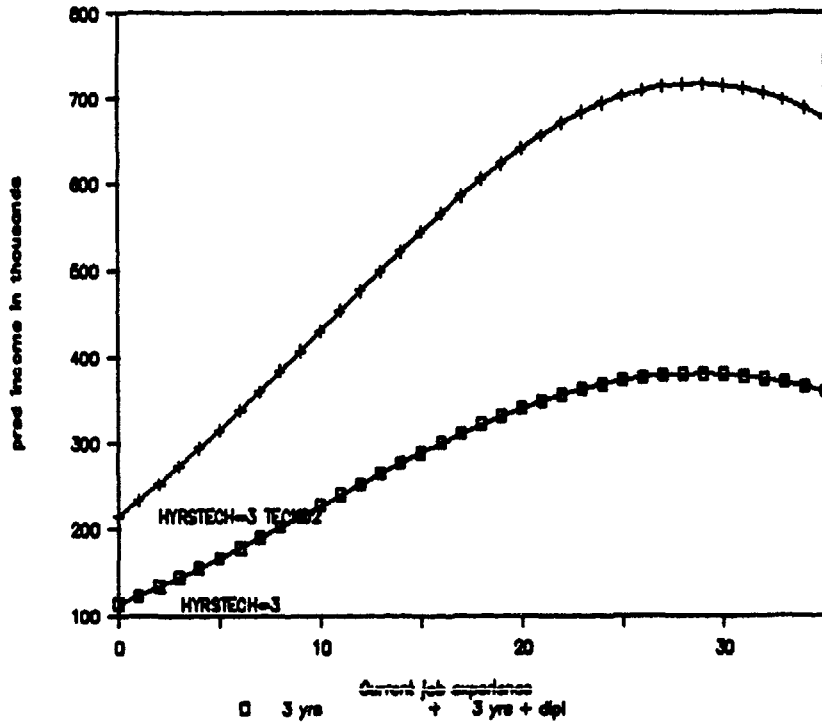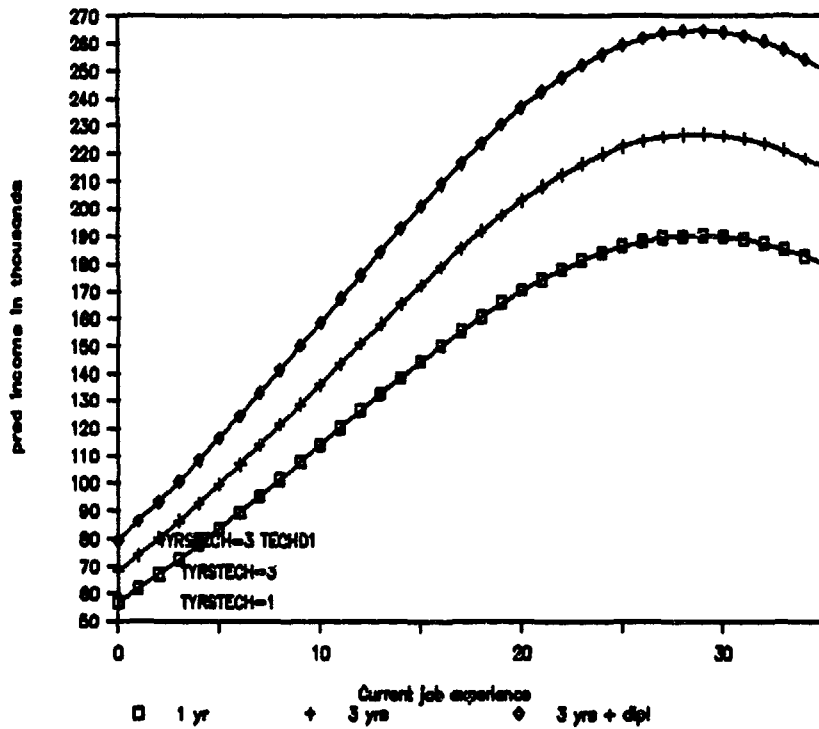
Table 20: CHOICE OF EMPLOYMENT STATUS - PROBIT RESULTS

Intercept	-2.67	(8.2)
Years of Primary Education	.028	(1.2)
Years of Secondary Education	-.048	(1.2)
Years of Higher Education	-.049	(0.5)
Years of Secondary VTE	.091	(1.7)
Years of Other VTE	.473	(2.0)
Years of Apprenticeship	-.010	(0.5)
CEPE	.669	(4.1)
BEPC	1.15	(3.5)
Secondary VTE Diploma	1.27	(4.5)
Other VTE Diploma	2.29	(3.6)
Other Diploma	1.53	(2.9)
Age	.133	(7.0)
$(Age)^2$	-.0018	(6.8)
Female Without Child 5 years	-.947	(5.5)
Female With Child 5 years	-.970	(9.5)
Non-Ivorian	.052	(0.5)
Years of Residence Since Migration	.017	(1.4)
(Years of Residence Since Migration)^2	-.0006	(1.7)
Household Enterprises	-.363	(7.4)
Abidjan	.762	(7.3)
Rural Areas	-1.37	(13.8)
Log-likelihood	-636.34	
Chi-squared	1893.6	
Significance level	0.1E-6	
Number of cases	4597	
% correct predictions	95	

Note: Coefficients pertain to the likelihood to become a wage-earner.
      Absolute asymptotic t-values are in parentheses.

characteristics (age, sex, ethnic group and migrant status), as a result of household characteristics (presence of small children, existence of household enterprises), and as a result of their location.

The results bring out sharply the role of diplomas in obtaining wage-employment. Especially a teacher or post-secondary VTE diploma enhances the likelihood to work as an employee, but all diploma variables have large and significant positive coefficients. There is thus strong evidence of credentialism in the labor market in Côte d'Ivoire. Informal VTE under the form of apprenticeships is not a relevant factor in the choice of work status.

As to demographic variables, the chances to be employee increase with age, up to age 37. The sex-variable has been split here to reflect whether or not a woman had children less than 5 years of age in her household. It is often argued that the presence of such small children is an impediment to women's participation in the labor force, and we wanted to see whether it also affected women's choice of employment status. The coefficients indicate that woman have a much lower probability to obtain wage-work than men, but the presence of infant children has only a small additional negative effect. Ethnic group is not an important determinant of employment status, but as we saw earlier non-Ivorians do have significantly lower wage-earnings than Ivorians. Both recent and long-term migrants are most likely to work for their own account. The probability to be an employee peaks after 13 years of residence.

The presence of a household enterprise obviously makes it more likely that one stays away from wage-work. Lastly, the coefficients of the location variables reflect the higher incidence of wage-work in Abidjan relative to other cities, and the lower incidence in rural areas.

7.3 The Costs of VTE

From the point of view of the student (or the household to which he/she belongs), the cost of attending a VTE program or school consists of the out-of-pocket costs for tuition, books, materials, transport to and from school, etc. as well as the opportunity cost of the wages foregone by attending. These costs are to be diminished by any scholarships and allowances received from outside the household. The private costs of VTE are thus:

out-of-pocket costs

- scholarships

+ opportunity costs

private costs

From society's point of view, one must add to private costs all institutional costs, i.e., public spending for teacher salaries, administration and operation of the school system, scholarships, and the amortization of buildings and equipment. The social costs of VTE are thus:

institutional costs

+ private costs (except tuition)

social costs

Tuition is subtracted from the private costs in this calculation because it is merely a payment by the student of part of the institutional costs, and that part of costs would otherwise be double-counted. Notice also that since private costs are net of scholarships, the latter are counted among the institutional costs.

Private Costs

Information on out-of-pocket costs is available from the CILSS for students who are currently enrolled or were enrolled in the year preceding the survey. Those costs include tuition payments, expenditures for books and other school materials, transportation to and from school, food and lodging at school, uniforms, and miscellaneous contributions. The survey also recorded the amounts of any scholarships received. Table 21 indicates that annual out-of-pocket costs are highest for post-secondary VTE. They are 26% higher than those for teacher training, which in turn are 13% above secondary VTE costs. However, scholarships received compensate 69% of these costs for post-secondary level students, 26% for teacher trainees, but only 14% for secondary level students. As a result the net out-of-pocket costs are lowest for post-secondary students - they are only about half the costs for secondary level VTE students.

Opportunity costs consist of the wages foregone as a result of attending a VTE school or program. They were calculated on the basis of the earnings equation reported in Table 19 which corrects for selection

Table 21: ANNUAL PRIVATE COSTS OF VTE (PER STUDENT) (CFAF)

	Secondary Level	Post-secondary Level	Teacher Training	Apprenticeships
Out-of-pocket Costs	163,426	232,435	184,886	—
Scholarships	22,328	161,414	48,602	—
Net out-of-pocket Costs	141,098 (23.4%)	71,021 (5.8%)	136,284 (14.8%)	—
Opportunity Costs	461,796 (76.6%)	1,155,732 (94.2%)	783,684 (85.2%)	426,240 (100.0%)
Total Private Costs	602,894 (100.0%)	1,226,753 (100.0%)	919,968 (100.0%)	426,240 (100.0%)

bias due to the fact that inclusion in the employee group is not a random event. Since the opportunity cost calculation is a prediction of what someone would have earned had he/she become a wage earner instead of going to school, the predicted opportunity wage must take into account the probability to become a wage earner. This is precisely what the selection correction accomplishes.

To calculate the opportunity wage, the education variables in the equation were set equal to the entrance requirements for a given type of VTE and the other variables to the all sample mean for the relevant age group. For example, the opportunity wage for secondary level VTE students was calculated for a person who completed six years of primary school, had obtained a CEPE, and whose personal characteristics were those of the average 13- to 19-year-old. The opportunity cost in Table 21 is the average of what such a person could have earned annually, while gaining a work experience equal to the average length of the VTE curriculum.[18]

Table 21 shows that foregone wages are a far more important cost than out-of-pocket expenses. The share of opportunity cost in total

---

[18] In some countries, VTE curricula include part-time work in enterprises as on-the-job training. If students receive a wage for such work, it has to be subtracted from the opportunity cost. In Côte d'Ivoire, most of the practical training in VTE is done in school. Only a few fields at the post-secondary level involve some in-enterprise training. Since we do not have direct data on the wages received during such training, we preferred not to make an arbitrary correction. Given the limited amount of such training relative to total class time, the correction would have been quite small at any rate.

private cost increases with the level of VTE, up to 94% in the case of post-secondary VTE. The total private cost of the latter is more than twice that of secondary VTE.

The cost figures for apprentices are approximate, because many apprentices receive room and board, the value of which should be subtracted from foregone wages. On the other hand, some apprentices have to pay a fee. Unfortunately, we have no direct data on the value of room and board, nor on the amount of the fee. Since the apprentices who pay fees are fewer than those who receive room and board, on balance the calculated opportunity cost is likely to be an overestimate. We shall return to this problem when we perform a sensitivity analysis on the cost calculations.

Institutional Costs

The calculation of institutional costs for the VTE system in Côte d'Ivoire was a fairly demanding exercise, mainly because of the complex structure of the system (see section 3) to which is added an even more complex system of budget administration. In particular, major cost components, such as the salaries and benefits of expatriate staff, the housing allowances of Ivorian staff, and certain scholarships are not managed by the Ministry of Vocational and Technical Education or by the relevant institute or school, and hence do not appear on their budgets. The calculations thus needed to rely on a variety of sources such as budget data from various ministries, institutes and schools, payroll data, direct

data on technical assistance, and data on enrollment and the number and type of teachers. The details of the institutional cost calculations are in Appendix 3 and here we present only the summary results in Table 22.

Four main categories of expenditures are distinguished. Personnel expenses include salaries and benefits of Ivorian and expatriate staff. For the latter only the part of salaries and benefits assumed by Côte d'Ivoire (71.5%) is included in the calculations. Operating expenses include spending for utilities, communications, transportation, office and school materials, maintenance, school lunch programs, etc. Purchases of equipment is included here if its estimated life span is one year or less. Scholarships include cash payments to students as well as the salaries of teachers who are on paid leave to attend courses to upgrade their qualifications. All cost figures pertain to 1987 budgets, and enrollments are those for the 1986-87 school year. The use of budgets as a data source rather than actual expenditures is necessitated because the latter are only available with a lag of several years. However, in the current climate of fiscal austerity in Côte d'Ivoire, requests for funding above originally approved budgets are rarely granted. Hence the 1987 budget should be a reliable indicator of 1987 expenditures. The amortization figures assume an economic life of 20 years for buildings and 5 years for equipment. Where applicable, the figures are based on construction and purchases that took place under the Bank's Third Education Project.

Several features of the composition of costs are noteworthy. First, a large share of personnel expenses goes to expatriate staff. At

Table 22: ANNUAL INSTITUTIONAL COSTS OF VTE ('000 CFAF)

	Secondary Level	Post-secondary Level	Teacher Training
Personnel Expenses			
- Ivorian Staff	6,319,863	1,540,040	3,044,057
- Expatriate Staff	2,794,434	i,387,725	2,641,751
Operating Expenses	4,167,548	1,933,000	1,212,460
Scholarships	150,200	694,650	2,456,205
Total	13,432,045	5,555,415	9,354,473
(Enrollment)	(7,545)	(1,250)	(3,935)
Recurrent Cost per Student	1,780.258	4,444.532	2,377.248
Amortization (per Student)	505.711	2,874.983	690.582
Total Cost per Student	2,285.969	7,319.315	3,067.830

Source: See tables in Appendix 3.

the secondary level and in teacher training institutes an expatriate staff
costs the Côte d'Ivoire up to twice as much as a local instructor.
Expatriates make up about 1/4 of the teaching staff (Table 23), but account
for 31% of personnel expenses at the secondary level and 46% in teacher
training institutes. At the post-secondary level, the cost of an Ivorian
instructor is about the same as that of an expatriate.

The Côte d'Ivoire has traditionally relied on a large foreign
presence, mostly French technical assistants, among its teaching staff and
in government service in general. Since the early eighties, however, the
country has embarked on an "Ivorianization" program which has greatly
reduced the numbers of expatriates in government and teaching positions.
As Table 23 shows, in the VTE system, technical assistants are still most
present in technical high schools, at the ENS, and at the post-secondary
level in general. Further reductions in foreign staff would lead to
significant cost savings, except at the post-secondary level.

A second feature of the institutional costs of VTE in Côte
d'Ivoire is the high level of scholarships paid at the post-secondary
level: 555,720 CFAF per year per student, which is about three times the
GNP per capita. By contrast, at the secondary level, the average annual
scholarship is only 19,907 CFAF. In teacher training institutes, the
scholarships per student are, however, even higher than in post-secondary
VTE, largely as a result of the practice of giving primary and secondary

Table 23: COMPOSITION OF TEACHING STAFF IN VTE INSTITUTES (1986-87)

| | Ivorian Staff | | Technical Assistants | | | | Total | |
| | | | Cooperation Contract | | Local Contract | | | |
	n	%	n	%	n	%	n	%
Secondary Level								
Technical High School	159	(56.6)	115	(40.9)	7	(2.5)	281	(100.0)
Vocational High School	242	(69.5)	102	(29.3)	4	(1.2)	348	(100.0)
Technical College	172	(91.0)	16	(8.5)	1	(0.5)	189	(100.0)
Vocational Training Center	149	(89.9)	16	(9.6)	1	(0.6)	166	(100.0)
Other Training Center	39	(88.6)	5	(11.4)	-	-	44	(100.0)
	761	(74.0)	254	(24.7)	13	(1.3)	1,028	(100.0)
Post-secondary Level								
INSET	146	(52.1)	124	(44.3)	10	(3.6)	280	(100.0)
IPNETP	32	(45.7)	38	(54.3)	-	-	70	(100.0)
	178	(50.9)	162	(46.3)	10	(2.8)	350	(100.0)
Teacher Training								
CAFOP/ENI	353(1)	(74.0)	100(1)	(21.0)	24(1)	(5.0)	477	(100.0)
ENS	102	(49.8)	83	(40.5)	20	(9.8)	205	(100.0)
	455	(66.7)	183	(26.8)	44	(6.5)	682	(100.0)
Adult Training Centers	122	(75.8)	33	(20.5)	6	(3.7)	161	(100.0)
Total	1,516	(68.3)	632	(28.5)	73	(3.3)	2,221	(100.0)

(1) Estimated figures.

school teachers one or two years of leave, with payment of full salary and benefits, so that they can upgrade their qualifications.[19]

Total institutional costs per student differ widely for each level of VTE. They are lowest at the secondary level: 2,285,969 CFAF per year ($7,620 at $1 = 300 CFAF). As a frame of reference, it can be pointed out that in 1984 the Côte d'Ivoire's GNP per capita was $610. Teacher training costs per student are 3,067,830 CFAF per year ($10,226) and post-secondary VTE costs are 7,319,315 CFAF ($24,398).

Apart from the two factors already mentioned - the high cost of expatriate teaching staff and the high level of scholarships - two further elements contribute to these elevated unit costs. First, almost all VTE facilities are currently underutilized. The economic recession in Côte d'Ivoire since 1982 has reduced the demand for VTE graduates. We referred earlier to the high percentage of VTE graduates among people without a job, and in response to that situation the government has reduced entrance quotas. This has drastically raised unit costs, since no matching lay-offs in teaching staff were made. For example, the annual cost per student in a vocational high school (the most expensive type of secondary institution)

19/ The amount of scholarship per student derived from institutional cost data corresponds with that derived from the CILSS for secondary level students (see Table 21). At the post-secondary level, the CILSS figures are much below those computed from institutional budgets, suggesting either underreporting of scholarships by survey respondents, or, more likely, that the CILSS sample of post-secondary VTE students was too small to be representative of the student body as a whole. For teacher training, the figures cannot be compared because teachers on paid leave would have reported their salary as such and not as a scholarship.

is 3,312,449 CFAF. If such schools were filled to capacity, the unit cost would drop to just below 2 million CFAF (at current total expenditure levels).

Second, the costs of buildings and equipment are exceptionally high at the post-secondary level. Amortization of these adds 65% to unit costs. This is a result of the transfer undertaken since 1980 of many post-secondary VTE institutions to Yamoussoukro, the Côte d'Ivoire's new capital. This required the construction of an entire new campus for INSET. This transfer process continues and will no doubt keep post-secondary VTE costs at very high levels.

7.4 Internal Rate of Return

The private and institutional cost data discussed in section 7.3 are the building blocks to calculate the cost streams of VTE. Table 24 shows the private and social costs per student per year of VTE.

The social costs are four to five times higher than the private costs in the cases of secondary VTE and teacher training. The high institutional costs of post-secondary VTE make that the social costs are almost seven times the private costs. Since there are no institutions associated with apprenticeships, social costs equal private costs. The duration of the cost stream was calculated as a weighted average (weighted

Table 24: BENEFIT AND COST STREAMS FOR VTE GRADUATES (CFAF)

	Secondary Level	Post-Secondary Level	Teacher Training	Apprenticeships
Benefits				
Starting Salary Increment	195,396	684,264	327,014	24,215
Final Salary Increment	625,011	2,110,327	1,080,977	77,455
Duration of Benefit Stream (Years)	35	37	32	35
Costs 1/				
Private Costs	602,894 (100)	1,226,753 (100)	919,968 (100)	426,240 (100)
Social Costs	2,831,395 (470)	8,450,783 (689)	3,920,142 (426)	426,240 (100)
Duration of Cost Stream (Years)	2.79	3.09	3.20	3.05

1/   Index in parenthesis.

by the number of students) of the length of the various curricula that exist within each of the distinguished levels of VTE.[20]/

The benefit streams are the streams of salary increments resulting from the received education. They were computed from the earnings equation in Table 19 in which the relevant VTE variables were set at zero to obtain the non-VTE earnings stream and then at the values corresponding to the completion of a VTE cycle to obtain the VTE earnings stream. The differences between the two streams is the benefit stream of a given type of VTE.[21]/ Table 24 shows the starting and final values of the benefit stream for each type of VTE.

The duration of the benefit stream depends on the average age of graduation and the retirement age. In Côte d'Ivoire, the latter is 55 years for all employees, except upper level staff, for whom it is 60 years. We therefore assumed the latter age to apply to graduates of post-secondary VTE.

20/ When students repeat grades, the actual average duration of a curriculum will exceed the intended duration. Since we had no data on repetition rates, we were unable to adjust the cost streams to take account of repetition.

21/ The calculation of the benefit streams in this fashion means that the benefit streams apply to VTE graduates who obtain wage employment, which is the case for the vast majority (see Table 8). Two refinements to the calculation could, however, be considered: (i) the benefit streams could be computed as a weighted average of earnings of employee graduates and earnings of self-employed graduates (see, however, the caveat in section 7.5 regarding the analysis of the earnings of the self-employed); and (ii) the benefit streams could be corrected for the probability of VTE graduates to be unemployed. This requires, however, information on the average duration of unemployment, which cannot be derived from the CILSS.

The internal rate of return (IRR) is that rate of discount which equates the present value of cost and benefit streams. It reflects the return, over the life time, of the investment in education made by the individual and by society. The IRR can be calculated by solving the following equation for r:

$$\sum_{i=1}^{j} \frac{C_i}{(1+r)^i} = \sum_{i=j+1}^{n} \frac{B_i}{(1+r)^i}$$

Where C_i = costs
B_i = benefits
i = the number of years 1,..., j,..., n with j being the number of years until graduation, and n being the number of years between retirement and the start of the curriculum in question.

The results in Table 25 reveal very high private rates of return for formal VTE but very low social rates of return. The private return from post-secondary VTE is 21%, well above returns available in Côte d'Ivoire from many other private investments. On the other hand, the social return is a mere 4%, well below the social opportunity cost of capital (usually estimated around 10%). The returns to secondary VTE and teacher training are similar: private returns are around 15% and social returns just below 4%. Apprenticeships have a mere 2.3% return.

In view of the fact that a number of assumptions were necessary to perform the cost calculations, we did a sensitivity analysis by varying the estimated cost streams by 25%, up and down. This produced a 6-7

Table 25: INTERNAL RATES OF RETURN FOR VTE

	Secondary Level	Post-Secondary Level	Teacher Training	Apprenticeships
Social Rate of Return				
Base Case	3.86%	4.37%	3.77%	2.34%
Costs + 25%	2.66%	3.18%	2.50%	1.23%
Costs - 25%	5.54%	6.04%	5.54%	3.87%
Private Rate of Return				
Base Case	15.84%	21.24%	15.15%	2.34%
Costs + 25%	13.51%	18.28%	12.89%	1.23%
Costs - 25%	19.35%	25.71%	18.51%	3.87%

percentage points range around the base case for private rates, and a 3
percentage point range around the base case for social rates. The
essential conclusion remains the same, however: investment in vocational
and technical education is very attractive from the individual's point of
view, and the calculated rates of return clearly explain why there is a
demand for VTE in Côte d'Ivoire well in excess of the governments entrance
quotas into the schools and institutes. When this is juxtaposed to a clear
excess supply of VTE graduates in the labor market--as indicated by the
large percentage of unemployment among them--it becomes obvious that there
are inflexibilities in the labor market that have prevented a downward
adjustment of wages received by VTE graduates. It appears that the
adjustment to the recession has mainly been through a reduction of the
quantity of employment, while maintaining high salary levels for those
still employed. The large presence of the public sector in wage employment
is undoubtedly a major factor in this.

In contrast to formal VTE, the returns to informal VTE, i.e., to
apprenticeships, are very low. To the extent that we may have
overestimated the opportunity cost of apprentices (see above), we are
inclined to accept the upper bound of the range as the most correct
estimate of the rate of return, but that is still a mere 4%. Since many
apprenticeship graduates find employment in the informal sector where there
are fewer wage rigidities, the low returns reflect the effects of the
recession and the competing supply of labor from formal VTE graduates
looking for jobs.

An important result is that, from society's point of view, the returns to different types and levels of VTE are essentially the same (the differences in calculated rates fall well within the margins of error of the calculations), and all are below the social opportunity cost of capital. To justify the investments in VTE thus requires the invocation of non-quantifiable benefits, such as general externalities from having a pool of vocationally and technically trained manpower available. Nevertheless, the low social rates of return and our analysis of the composition of institutional costs both point at the need to make the VTE system in Côte d'Ivoire more cost-effective. The continued substitution of expatriate teachers by Ivorians will contribute to that. The current scholarship policy should be scrutinized: in teacher and post-secondary VTE, scholarships per student are very generous and in view of the high private rates of return, such levels could easily be reduced without risk that the supply of students would dry up. For the post-secondary level, as well as for selected secondary institutes, the cost analysis revealed the large contribution to costs made by amortization of buildings and equipment. The elimination of expensive new construction, in favor of a fuller utilization, and perhaps upgrading, of existing facilities would enhance society's returns to its investment in VTE.

On a more general level, it is obvious that the labor market is not providing prospective VTE students with proper signals. A careful policy to introduce more flexibility into the market clearing mechanisms, in combination with a raising of private VTE costs, would contribute to

balancing supply of VTE graduates and demand for them.[22] Clearly, such a policy extends beyond the scope of the VTE system as such and must be coordinated with overall employment, migration, and educational policies.

7.5 Earnings Analysis for the Self-Employed

Given that wage earners are only a small fraction of the informal labor market, we have also estimated the earnings function for the self-employed, who make up the bulk of the informal sector. A special caution is needed though given that the net earnings of the self-employed reflect not only the returns to human capital but to other inputs as well. This is obvious from the R^2 in Table 26, which indicate that human capital and the included demographic and location variables explain only 15% of the variance in the net earnings of the non-farming self-employed and 31% of that of farmers' earnings. [23]

Of interest is that primary education contributes significantly to enhancing earnings of farmers. This suggests that people's perception of the irrelevance of the primary curriculum for work in rural areas (as reflected in falling enrollment rates) may not be entirely accurate, at least for farming occupations. For non-farming own account work, however, primary education does not enhance earnings. Rather, secondary education

---

[22] The raising of private costs is especially appropriate if it is determined that most of the current unemployment among VTE graduates in Côte d'Ivoire is structural. If, on the other hand, it contains a large cyclical component, care has to be exercised to avoid creating a shortage of graduates when the Ivorian economy picks up again.

[23] The diploma variables were not included because of their low incidence among the self-employed.

Table 26:   EARNINGS FUNCTION FOR THE SELF-EMPLOYED

	Farmers		Non-Farmers							
			All		Abidjan		Other Cities		Rural Areas	
Intercept	8.78	(52.5)	10.36	(55.7)	10.62	(33.3)	10.52	(34.3)	10.09	(31.4)
Years of Primary Schooling	.055	(2.3)	.014	(0.5)	.012	(0.3)	.020	(0.4)	.057	(1.0)
Years of Secondary Schooling	.069	(0.6)	.133	(1.8)	.209	(2.3)	-.004	(0.0)	.016	(0.1)
Years of Higher Schooling	-	-	.337	(1.4)	.216	(0.9)	-	-	-	-
Years of Current Job Experience	.0 8	(4.5)	.036	(2.3)	.059	(1.9)	.019	(0.7)	.079	(2.5)
(Years of Current Job Experience)^2	-.0005	(4.4)	-.0006	(1.5)	-.0015	(1.6)	.0001	(0.1)	-.0024	(2.6)
Years of Previous Job Experience	.041	(2.1)	.090	(3.8)	.062	(1.3)	.112	(2.9)	.031	(0.6)
(Years of Previous Job Experience)^2	-.0009	(1.5)	-.0024	(2.9)	-.0007	(0.3)	-.0033	(2.7)	-.0009	(0.5)
Years of Apprenticeship	-.043	(1.8)	-.036	(1.0)	-.024	(0.5)	-.096	(1.5)	.011	(0.2)
Years of VTE	.195	(1.7)	.0005	(0.0)	.019	(0.1)	-.026	(0.1)	.281	(0.4)
Sex (1=female)	-1.63	(21.5)	-.406	(2.7)	-.351	(1.4)	-.553	(2.1)	-.512	(1.9)
Non-Ivorian	.240	(2.1)	-.033	(0.3)	-.356	(1.9)	.017	(0.1)	.348	(1.4)
Abidjan	-1.17	(1.6)	.272	(2.1)	-	-	-	-	-	-
Rural Areas	-.056	(0.5)	-.132	(1.0)	-	-	-	-	-	-
R^2	.31		.15		.25		.11		.15	
F	47.4		6.9		5.0		2.6		2.2	
Number of cases	1,286		530		180		211		139	

Note: Absolute t - values in parentheses.

- 78 -

appears to be the prime determinant among the human capital variables in Abidjan, and job experience in the other locations. It is remarkable that general education has a positive effect on the earnings of the self-employed, while informal VTE does not. The latter is presumed to be very practically oriented, but it either has no significant effect on earnings, or even a negative one in the case of farmers.[24] Formal VTE, however, mostly at the secondary level, does enhance farmers' earnings considerably, but it has no effect on the earnings of non-farmers.

Work experience plays an important role for all self-employed, but it is noteworthy that the impact of experience gathered in a previous occupation is more important than years in the current job. For example, five years of farming experience increases earnings by 18%, but those farmers who also had five years of experience in another job earn 20% more. The respective figures for non-farmers are 16.5% and 39%. (This effect of previous job experience is limited, though, to urban areas.)

The findings about the role of human capital for the earnings of the self-employed should be treated with caution. A more complete analysis is needed which explicitly considers other inputs such as machinery and equipment, raw materials, land and buildings, and the use of family and hired labor. All this can be better integrated through a production function approach rather than through earnings functions (see e.g., Jamison

----

24/ This may be the result of negative selection, for example, if it is the least able farmers who take apprenticeships instead of other forms of education, or if the apprenticeship was in a non-farming trade but the graduate was unable to find work in that trade and became a farmer (or returned to farming).

and Lau, 1982). Such work is outside the scope of this paper. Also, the selection issue needs to be explicitly considered, as we did above for the employees' earnings function.

7.6 Summary of Main Findings

The private rates of return to a formal vocational and technical education are very high in Côte d'Ivoire: 15% for secondary level VTE and for teacher training, and 21% for post-secondary VTE. By contrast, the return to an apprenticeship training is below 4%. The high returns to formal VTE are the results of generous scholarships and an inefficiently functioning labor market where salaries do not respond downward to the existing excess supply of VTE graduates.

The social rates of return to vocational and technical education are around 4%, with no significant differences by type and level of VTE. These low rates, which are likely to be below the social opportunity cost of capital, are a result of high institutional costs stemming mainly from expensive school construction programs and the use of highly paid expatriate teachers, and of the current underutilization of facilities.

There is strong evidence of credentialism in the Ivorian labor market. General education diplomas and formal VTE diplomas are the most important factors to gain entrance to wage employment.

Once such access has been gained, diplomas are less important in determining earnings than years of schooling and work experience (except for post-secondary VTE, where diploma is also the main determinant of earnings). On average, a year of secondary or higher general education increases earnings by 13%, which is more than the effect from a year of work experience (8% for experience in the current job, 4% for experience in a previous job). A year of secondary VTE enhances earnings by 6.4%, a year of teacher training by 9%. The completion of a post-secondary VTE curriculum, with diploma, carries an earnings premium of 63%. Informal VTE is an inferior substitute for formal VTE as it does not promote entrance to wage employment and its effect on earnings is small.

For non-agricultural self-employed workers, general education was found to have a bigger impact on earnings than VTE. For farmers, secondary level formal VTE greatly enhances earnings.

Policy action in the VTE system should focus on the reduction of scholarships, which, in view of the high private returns to formal VTE, should not endanger a sufficient supply of students. The ongoing replacement of expatriate teachers by Ivorians will also contribute to reducing institutional costs. Construction programs especially for post-secondary facilities should be carefully scrutinized, and, in general, the focus should be on more efficient utilization of existing VTE institutes. In coordination with other economic policies, actions to make the labor market more flexible and responsive to changes in supply and demand would contribute to sending the proper economic signals to prospective VTE students, thus making the VTE system more responsive to changing labor market conditions.

8. **The Regional Dimension**

The previous section presented an economic assessment of VTE at the national level. This level is relevant because many budget, investment, and other policy decisions are made for the country as a whole. Nevertheless, the Côte d'Ivoire is a far from homogeneous country. As some of the tables earlier in this paper indicated, there are wide divergences in education and earning levels between Abidjan, the other cities, and the rural areas. In this section we therefore introduce a regional dimersion into the economic assessment of VTE.

The limitation of the CILSS data set, especially the small sample size, do, however, impose two restrictions on the regional analysis. First, only two levels of formal 'TE can be distinguished: secondary level VTE and other VTE (combining post-secondary VTE and teacher training). Second, the number of cases of wage-earners in rural areas is too small and the estimated earnings function coefficients too imprecise to serve as a basis for an internal rate of return calculation. The latter is thus only presented for Abidjan and other cities. At any rate, given the prevalence of own account work in rural areas, the estimation of the returns to education should mainly be based on the earnings of the self-employed, and, as we said in section 7.5, the study of the role of education in own account work should follow a production function approach. This is outside the scope of this paper.

8.1 Earnings Analysis

Table 27 shows the means and standard deviations of the variables used in the regional earnings functions. The estimated functions in Table 28 reveal that there are similarities as well as important differences in the structure of rewards to human capital across locations. The similarities pertain mainly to years of general education and years of work experience, while the main differences have to do with years of VTE and the role of diplomas.

The insignificance of years of primary schooling as a determinant of wage-earnings is observed in every location. The contributions from a year of secondary and higher schooling are in the 12%-15% range in all locations. In urban areas, both years of current and previous job experience are important determinants of wage-earnings. In Abidjan, a year of current job experience adds 10% to earnings, against 7% in other cities, but the earnings-experience profile peaks much sooner in Abidjan. A year of previous job experience adds 8% to earnings in Abidjan as well as in other cities.

The effect of VTE on earnings differ a great deal across locations. Secondary VTE adds 7.3% to earnings per year of education in Abidjan, but no additional premium is received for diplomas. In the other cities equation, the coefficient of years of secondary VTE is not significantly different from zero, but the corresponding diploma variable

Table 27: MEANS AND STANDARD DEVIATIONS OF REGIONAL EARNINGS FUNCTION VARIABLES

	Abidjan		Other Cities		Rural Areas	
	Mean	SD	Mean	SD	Mean	SD
ln(W$_2$)	11.40	1.04	11.33	1.10	10.41	1.35
Years of Primary Schooling	4.38	2.59	4.41	2.61	3.00	2.91
Years of Secondary Schooling	2.49	2.71	2.43	2.75	1.18	2.05
Years of Higher Schooling	0.60	1.73	0.23	0.94	0.00	0.00
Years of Work Experience - Current Occupation	9.22	7.93	9.69	8.03	7.36	7.29
Years of Work Experience - Previous Occupation	1.44	3.19	1.49	3.46	1.99	4.54
Years of Secondary VTE	1.02	1.85	0.79	1.27	0.22	1.16
Years of Other VTE	0.15	0.60	0.27	0.80	0.22	0.57
Years of Apprenticeship Training	0.79	1.85	0.67	1.73	0.41	1.49
CEPE	0.21	0.41	0.24	0.43	0.18	0.39
BEPC	0.03	0.16	0.07	0.26	0.06	0.23
Secondary VTE Diploma	0.27	0.44	0.21	0.41	0.11	0.32
Other VTE Diploma	0.06	0.24	0.11	0.31	-	-
Other Diploma	0.09	0.28	0.05	0.22	0.02	0.14
Sex (1 = female)	0.21	0.41	0.18	0.39	0.07	0.26
Non-Ivorian	0.16	0.37	0.14	0.34	0.30	0.46
Seasonal Job	0.00	0.00	0.03	0.17	0.18	0.39
Number of Cases	270	-	176	-	54	-

Table 28: EARNINGS FUNCTIONS, BY LOCATION

	Abidjan		Other Cities		Rural Areas	
Intercept	10.17	(72.2)	9.99	(28.1)	9.45	(22.0)
Years of Primary Schooling	.027	(0.9)	.005	(0.1)	.069	(0.7)
Years of Secondary Schooling	.124	(4.0)	.149	(4.0)	.156	(0.9)
Years of Higher Schooling	.129	(2.3)	.120	(1.7)		
Years of Current Job Experience	.099	(6.1)	.069	(3.2)	.153	(1.8)
(Years of Current Job Experience)^2	-.0019	(3.5)	-.0008	(1.1)	-.0054	(1.5)
Years of Previous Job Experience	.082	(2.2)	.078	(2.1)	.037	(0.4)
(Years of Previous Job Experience)^2	-.0054	(1.8)	-.0043	(1.7)	.0016	(0.3)
Years of Apprenticeship	.014	(0.6)	-.001	(0.0)	.169	(1.3)
Years of Secondary VTE	.073	(2.1)	.037	(0.5)	.025	(0.2)
Years of Other VTE	.052	(0.4)	.037	(0.4)	.463	(0.8)
CEPE	-.098	(0.5)	.573	(2.0)	.254	(0.4)
BEPC	-.324	(1.0)	.483	(1.3)	.038	(0.0)
Secondary VTE Diploma	.023	(0.1)	.736	(2.1)	-.199	(0.2)
Other VTE Diploma	.650	(1.6)	.711	(1.7)		
Other Diploma	.344	(0.9)	.666	(1.7)	-	-
Sex (1=female)	-.064	(0.6)	-.201	(1.1)	.346	(0.6)
Non-Ivorian	-.074	(0.6)	-.206	(1.2)	-.546	(1.3)
Seasonal Job	-	-	.064	(0.2)	-.923	(2.4)
Lambda	-.275	(2.3)	-.120	(0.6)	-	-
R^2	.58		.63		.59	
F	19.13		14.12		3.66	

Note: Absolute t - values in parentheses.

has a large positive coefficient. This suggests that in other cities, only completed secondary level VTE is rewarded in the labor market. For post-secondary and teacher VTE, we find that in all urban locations completed training with a diploma adds 65% to 71% to earnings. Credentialism in earnings thus appears to be stronger for VTE graduates than for graduates with only general education, and is most evident in cities other than Abidjan. The sectoral analysis in section 9 will pursue this point further.

Apprenticeships do not significantly enhance wage-earnings in urban areas, confirming that it is a generally inferior form of training which does not prepare people properly for wage work. In rural areas, however, a year of apprenticeship adds about 17% to earnings (the t-value indicates that this estimate is not very precise though), which is more than other education and work experience (with the exception of post-secondary VTE). Clearly, in rural reas, where the numbers of formal VTE graduates is small, apprenticeships offer a relatively more valuable training. They may also be more directly geared towards the (limited range of) jobs which apprenticeship graduates take up.

With respect to the demographic variables, we find that, as was the case in the countrywide equation, there is no evidence of a wage-gap between the sexes in any location, once selection into wage-employment has been taken into account. The role of ethnicity is not so clear. In the countrywide equation, a significant negative wage gap was found for

non-Ivorians. The location-specific equations suggest that this may be
mostly due to rural areas, but the estimation results are too imprecise to
be conclusive.

The earnings equations for Abidjan and other cities in Table 28
were corrected for selection bias using the procedure described in section
7.1. The earnings equation for rural areas was estimated without the
correction because the number of cases was too small to successfully
implement the procedure. The coefficients of lambda suggest that negative
selection into wage employment occurs most strongly in Abidjan. This is
consistent with the interpretation of the negative sign we offered in
section 7.1, namely that barriers to entry may exist into wage-employment.
Indeed, in Abidjan, there is a relatively stronger presence of the
government in the labor market, and access to government jobs is restricted
the most.

8.2 Access to Wage-Employment

One of the main findings of the employment status choice equation
for Côte d'Ivoire as a whole was that VTE is a major determinant of access
to wage-employment, particularly if a diploma was obtained. The regional
equations (Table 29) confirm that VTE promotes access to wage-employment in
other cities and rural areas. The results in Abidjan are not conclusive.
The role of diplomas in job access could not be studied at the regional
level because the splitting of the data did not leave sufficient cases for
precise estimation.

able 29: CHOICE OF EMPLOYMENT STATUS - PROBIT RESULTS, BY LOCATION

	Abidjan		Other Cities		Rural Areas	
Intercept	-1.117	(0.9)	-3.98	(6.8)	-3.97	(8.3)
Years of Primary Education	.038	(0.6)	.104	(2.8)	.036	(0.9)
Years of Secondary Education	-.063	(0.8)	.079	(1.4)	⎤.644	(12.8)
Years of Higher Education	.420	(1.8)	.576	(1.3)	⎦	
Years of Secondary VTE	.146	(1.1)	⎤.320	(3.8)	1.08	(21.3)
Years of Other VTE	-.397	(0.8)	⎦			
Years of Apprenticeship	-.073	(1.6)	-.011	(0.3)	-.186	(2.7)
CEPE	.261	(0.6)	.116	(0.5)	-1.57	(6.2)
BEPC	.239	(0.3)	.332	(0.8)	-	-
Secondary VTE Diploma	.019	(0.1)	- [1]/	-	-	-
Other VTE Diploma	.814	(0.6)	- [1]/	-	-	-
Other Diploma	-1.07	(1.1)	- [2]/	-	-	-
Age	.208	(3.1)	.181	(5.3)	.106	(3.7)
$(Age)^2$	-.0029	(3.4)	-.0023	(4.9)	-.0013	(3.4)
Female without Child < 5 Years	-1.28	(4.5)	-.650	(2.3)	⎤-1.07	(5.1)
Female with Child < 5 years	-1.65	(6.5)	-.866	(5.4)	⎦	
Non-Ivorian	-1.07	(5.0)	-.011	(0.1)	.835	(4.5)
Years of Residence Since Migration	-.036	(1.3)	.038	(1.7)	.065	(2.4)
$(Years\ of\ Residence\ Since\ Migration)^2$	.0012	(1.6)	-.0015	(1.9)	-.0027	(2.3)
Household Enterprises	-1.33	(9.4)	-.185	(2.9)	-.424	(3.5)
Log - likelihood	-132.84		-236.57		-306.28	
Chi - squared	376.52		343.06		-	
Significance Level	.1E-6		.1E-6		-	
% Correct Predictions	89		88		98	

Note: Coefficients pertain to the likelihood to become a wage-earner.
Absolute asymptotic t-values in parentheses.
1/ Not included for collinearity reasons.
2/ Included in BEPC.

The location-specific equations do, however, bring out strongly the role of demographic characteristics in job access. Women are much less likely to obtain wage-work than men, especially in Abidjan. The additional negative effect from the presence of small children in the household is also largest in Abidjan. Nationality is a relevant factor in Abidjan and in rural areas, but not in the same direction. In Abidjan, non-Ivorians are less likely to obtain wage jobs, no doubt because public sector jobs are typically not accessible to them. In rural areas, on the other hand, non-Ivorians are more likely to become wage-earners. Many non-Ivorians in rural areas work as farm workers because they lack the land and capital to set up their own farm or other household enterprise.

The role of migrant status is of particular interest as it indicates quite different patterns whereby migrants enter different labor markets. In Abidjan, the probability to obtain wage-employment decreases with length of residence until 15 years. This suggests two kinds of entrants into wage-jobs: recent migrants, probably young and well educated, who fairly quickly find wage-employment, and older workers who go through a lengthy period of own account work before switching to wage-work. In other cities and rural areas, the reverse situation is observed: the probability to obtain wage-work rises with years of residence, up to 12 years (for a further discussion of the link between migration and access to different types of employment in Côte d'Ivoire, see Grootaert, 1987).

8.3 Costs and Rates of Return

The locational breakdown of private costs of VTE shows major differences between Abidjan and other cities (Table 30). Not surprisingly, out-of-pocket costs are the highest in Abidjan. Opportunity costs, however, are higher in other cities, especially for post-secondary and teacher training. The reason for this is that years as well as diplomas of secondary general education and VTE have much higher returns associated with them in other cities than in Abidjan (see the regional earnings functions in Table 28). The earnings foregone as a result of proceeding with one's education past the secondary level are thus more elevated in other cities. As a result total annual private costs of post-secondary and teacher training in other cities are 2.3 times those in Abidjan. The total private costs of a year of secondary VTE and those of a year of apprenticeship, however, are in the same order of magnitude in Abidjan and other cities.

It was not possible from the available data to compute institutional costs separately for each location, and the small differences in social costs between locations in Table 31 merely reflect differences in tuition payments.

Table 31 also shows that the salary increments due to VTE are much higher in other cities than in Abidjan. This again is a result of the high coefficients estimated in the other cities earnings equation for VTE

Table 30: ANNUAL PRIVATE COSTS OF VTE (PER STUDENT), BY LOCATION (CFAF)

	Secondary Level	Post Secondary and Teacher Training	Apprenticeships
Abidjan			
Out-Of-Pocket Costs	190,149	259,902	-
Scholarships	31,308	96,432	-
Net Out-Of-Pocket Costs	158,841 (29.1%)	163,470 (25.0%)	-
Opportunity Costs	387,720 (70.9%)	491,388 (75.0%)	384,396 (100.0%)
Total Private Costs	546,561 (100.0%)	654,858 (100.0%)	384,396 (100.0%)
Other Cities			
Out-Of-Pocket Costs	103,935	80,374	-
Scholarships	5,824	55,632	-
Net Out-Of-Pocket Costs	98,112 (16.8%)	24,742 (1.6%)	-
Opportunity Costs	485,256 (83.2%)	1,495,248 (98.4%)	301,320 (100.0%)
Total Private Costs	583,368 (100.0%)	1,519,990 (100.0%)	301,320 (100.0%)

Table 31: BENEFIT AND COST STREAMS FOR VTE GRADUATES, BY LOCATION (CFAF)

	Secondary Level	Post Secondary and Teacher Training	Apprenticeships
	Abidjan		
Benefits			
Starting Salary Increment	119,929	599,784	22,799
Final Salary Increment	363,721	1,680,574	69,144
Duration of Benefit Stream (Years)	35	34.5	35
Costs 1/			
Private Costs	546,561 (100)	654,858 (100)	384,396 (100)
Social Costs	2,207,063 (404)	3,985,340 (608)	384,396 (100)
Duration of Cost Stream (Years)	2.79	3.15	3.05
	Other Cities		
Benefits			
Starting Salary Increment	926,030	3,483,595	0
Final Salary Increment	3,852,870	14,804,976	0
Duration of Benefit Stream (Years)	35	34.5	35
Costs 1/			
Private Costs	583,368 (100)	1,519,990 (100)	301,320 (100)
Social Costs	2,260,957 (388)	4,079,978 (268)	301,320 (100)
Duration of Cost Stream (Years)	2.79	3.15	3.05

1/ Index in parentheses.

diplomas (the increments are calculated assuming a person completed a given curriculum and obtained the concomitant diploma). This in turn reflects the greater tightness of the labor market in other cities and the strong tendency of VTE graduates to migrate to Abidjan. Nevertheless, we feel that some of the increments, especially the final ones, are unrealistically high. There is indeed a danger in extrapolating, especially from a small sample, beyond the range over which estimation was done. The final salary increments represent those earned by people with 35 years of experience. The sample, however, contained very few such cases. As Table 27 showed, the mean of work experience is about nine years, and only for about 5% of the observations did experience exceed 25 years. The projected salary increments may as a result have an upward bias.

The internal rates of return by location are given in Table 32. At the secondary level, the rates for Abidjan are slightly below those we calculated for Côte d'Ivoire as a whole. The rates in other cities, however, are much higher; in fact, the social internal rate of return of secondary VTE in other cities exceeds the private rate in Abidjan. Given our earlier caution regarding the projections of salary increments, we are inclined to consider the rates for other cities as upper bounds for the true internal rate of return.

The rates of return for post-secondary and teacher training are higher than those for secondary VTE in Abidjan as well as in other cities--as we also found for the country as a whole. The rates in other

Table 32: INTERNAL RATES OF RETURN FCR VTE, BY LOCATION

	Secondary Level	Post Secondary and Teacher Training	Apprenticeships
	Abidjan		
Social Rate of Return			
Base Case	3.19%	8.53%	3.00%
Costs + 25%	2.01%	6.98%	1.85%
Costs - 25%	4.83%	10.76%	4.60%
Private Rate of Return			
Base Case	13.19%	30.04%	3.00%
Costs + 25%	11.15%	26.04%	1.85%
Costs - 25%	16.19%	36.05%	4.60%
	Other Cities		
Social Rate of Return			
Base Case	18.83%	27.03%	-
Costs + 25%	16.11%	23.30%	-
Costs - 25%	22.97%	32.69%	-
Private Rate of Return			
Base Case	47.75%	51.34%	-
Costs + 25%	41.05%	44.56%	-
Costs - 25%	57.87%	61.37%	-

cities are also systematically higher than in Abidjan, but the same caution as for secondary VTE applies here.

The returns to apprenticeships in Abidjan are slightly higher than we found for the country as a whole. We did not calculate the internal rate of return for other cities because the coefficient of years of apprenticeship is equal to zero in the earnings function (see Table 28).

The regional breakdown of the internal rate of retur ' 'culation has confirmed the wide gap between private and social returns to v_a in Côte d'Ivoire. It has also revealed that returns to formal VTE are much higher in other cities than in Abidjan, to the extent that the social rate of return in other cities is well above the opportunity cost of capital. Even allowing for the earlier mentioned difficulty of extrapolating life time salary increments, the magnitude of the difference is such that the qualitative finding of higher returns in other cities appears robust.

In addition to the policy suggestions mentioned in the previous section, regarding the need to reduce institutional costs and to enhance the efficiency of the labor market, the returns to Côte d'Ivoire's investment in VTE could be enhanced if more graduates of the VTE system would obtain jobs in other cities instead of in Abidjan. Our findings support the ongoing efforts of the government of Côte d'Ivoire to stem the migration flow to Abidjan and to develop several in-land cities as secondary growth poles.

It is useful to emphasize that our results do not support moving the VTE institutions themselves to other cities. Since we were unable to differentiate institutional costs regionally, we do not know whether these costs would be less in other cities than in Abidjan. Two elements make this doubtful, however: first, VTE teachers are government employees and government payscales are not regionally differentiated (apart from a relatively minor location allowance), and, second, the main post-secondary VTE institute in Côte d'Ivoire (INSET) is located in an in-land city and as our detached cost tables (see appendix 3) show, it is a very high cost institute. Thus, our findings support incentive systems and employment promotions to provide jobs for VTE graduates in other cities, regardless of the location of institutes.

8.4 Summary of Main Findings

The role of human capital in determining access to employment, as well as the returns to investment in human capital are significantly different in different locations of Côte d'Ivoire.

Formal VTE at the secondary level is rewarded according to the years of education in Abidjan, but in other cities only completed curricula capped with a diploma have a significant and large effect on earnings. For post-secondary and teacher VTE, diplomas are the main determinant of earnings in both Abidjan and other cities. In general, credentialism in earnings appears to be stronger for VTE graduates than for graduates with only general education.

Apprenticeships have insignificant returns in urban areas, implying that they are not substitutes for formal VTE, at least as far as wage-work is concerned. In rural areas, on the other hand, apprenticeships have similar or larger effects on earnings than other types of human capital.

Both the private and social internal rates of return to VTE are systematically higher in other cities than in Abidjan. Policies to stem the tide of migration into Abidjan and promote employment creation in other cities can thus also contribute to enhancing the returns of Côte d'Ivoire's investment in VTE.

9. The Sectoral Dimension

The market for wage-labor in Côte d'Ivoire consists of three main sectors: the public sector (the government and publicly owned enterprises), the formal private sector, and the informal private sector. In this section, we address the questions whether the contribution to earnings made by human capital is different across these sectors, and how formal and informal VTE affects access to these sectors.

The earnings functions for each type of employee are shown in Table 33 and the access functions in Table 34. The assumption underlying these functions is that selection into a sector of employment is a sequential process consisting of three decisions: (1) the choice of wage employment vs. own account work; (2) given that wage employment was selected, the choice of the public vs. the private sector; and (3) if the private sector was chosen, the final decision is between the formal and the informal sector. The earnings functions have been estimated with the two-step method explained in section 7.1, and the coefficients are thus corrected for possible non-random selection at each level of the decision chain.

A first noteworthy result is that a far larger part of the variance of government wages is explained by the variables in the regression than is the case for wages in other sectors. Since all of these variables are easy "observables," it implies that private sector wages

Table 33: EARNINGS FUNCTIONS ($\ln W_2$) BY TYPE OF EMPLOYEE

	Public Sector		Private Sector		Private Formal Sector		Private Informal Sector	
Intercept	10.37	(55.1)	9.48	(46.8)	10.44	(30.9)	9.41	(27.4)
Years of Primary Schooling	.095	(2.3)	.059	(1.7)	.022	(0.6)	-.014	(0.1)
Years of Secondary Schooling	.142	(6.4)	.109	(3.0)	.074	(1.9)	.007	(0.1)
Years of Higher Schooling	.082	(2.6)	.196	(1.8)	.261	(2.8)		
Years of Current Job Experience	.047	(3.2)	.084	(4.3)	.102	(4.4)	-.049	(1.3)
(Years of Current Job Experience)^2	-.005	(0.9)	-.0018	(2.7)	-.0023	(3.1)	.0010	(1.0)
Years of Previous Job Experience	.067	(2.9)	.002	(0.0)	-.011	(0.3)	-.073	(0.7)
(Years of Previous Job Experience)^2	-.0038	(2.4)	.001	(0.6)	.0006	(0.3)	.016	(1.8)
Years of Apprenticeship	.013	(0.3)	.053	(1.8)	.039	(1.3)	.107	(2.3)
Years of Secondary VTE	-.021	(0.8)	.139	(1)	.142	(3.3)		
Years of Post-Secondary VTE	.079	(0.8)	-.480	(1.6)	.012	(0.1)	.104	(0.6)
Years of Teacher Training	.016	(0.2)	-.712	(1.4)				
CEPE	.082	(0.3)	-.153	(0.7)	-.031	(0.1)	-.056	(0.1)
BEPC	-.139	(0.4)	-.354	(0.9)	.095	(0.3)	1.08(*)	(1.0)
Secondary VTE Diploma	.082	(0.3)	-.253	(0.8)	.033	(0.1)		
Post-Secondary VTE Diploma	.100	(0.3)	.680	(1.1)	.533	(1.0)	.244	(0.3)
Teacher Diploma	.081	(0.3)	.211	(0.3)				
Other Diploma	.003	(0.0)	.025	(0.1)	.377	(0.8)	-	-
Sex (1=female)	-.444	(4.9)	-.255	(1.7)	-.116	(0.7)	-.027	(0.1)
Non-Ivorian	-.296	(0.6)	.159	(0.9)	-.361	(2.7)	-.027	(0.1)
Seasonal Job	-	-	-.617	(2.5)	-.232	(0.3)	-.119	(0.4)
Abidjan	.183	(2.0)	.279	(2.1)	-.039	(0.3)	.029	(0.1)
Rural Areas	-.099	(0.7)	-.217	(1.2)	-.139	(0.6)	-.363	(1.2)
Lambda	-.254	(1.8)	-.919	(4.4)	-.080	(0.3)	-.669	(1.7)
R^2	.70		.54		.50		.27	
F	19.68		13.35		8.57		1.48	
Number of cases	213		288		202		86	

Note: Absolute t - values in parentheses.

(*) Includes "other diploma"

- 99 -

Table 34: ACCESS FUNCTIONS (PROBIT RESULTS)

	Public Sector		Private Formal Sector	
Intercept	-5.647	(5.8)	-6.157	(6.8)
Years of Primary Schooling	-.059	(0.9)	-.039	(0.4)
Years of Secondary Schooling	-.066	(1.4)	.088	(1.2)
Years of Higher Schooling	.206	(2.1)		
Years of Secondary VTE	-.049	(0.9)		
Years of Post-Secondary VTE	.648	(2.1)	.042	(0.4)
Years of Teacher Training	1.53	(2.9)		
Years of Apprenticeship	-.121	(2.3)	-.085	(2.2)
CEPE	.865	(2.3)	.269	(0.9)
BEPC	1.44	(2.8)	.384(*)	(0.6)
Secondary VTE Diploma	1.56	(3.6)		
Post-Secondary VTE Diploma	-.176	(0.2)	.990	(1.9)
Teacher Diploma	.210	(0.3)		
Other Diploma	1.01	(1.7)	-	-
Age	.261	(4.8)	.289	(5.5)
$(Age)^2$	-.0026	(3.8)	-.0032	(4.5)
Female with Child <5 Years	.461	(2.2)	.253	(0.9)
Female without Child <5 Years	.578	(2.0)	-.380	(0.9)
Non-Ivorian	-2.37	(4.9)	-.015	(0.1)
Years of Residence Since Migration	-.006	(0.2)	.010	(0.3)
(Years of Residence Since Migration)^2	-.0005	(0.8)	.0003	(0.3)
Household Enterprises	-.233	(2.0)	-.005	(0.1)
Abidjan	-.585	(3.5)	.364	(1.8)
Rural Areas	-.510	(1.9)	-.057	(0.2)
Log - likelihood	-219.30		-157.28	
Chi - squared	360.85		237.09	
Significance Level	.1E-6		.1E-6	
% Correct Predictions	82		83	
Sample	All employees		All private Sector Employees	

Note: Absolute asymptotic t-value in parentheses.

(*) Includes "other diploma"

reflect more unobservables such as innate ability, entrepreneurshi·, etc. that are not captured in the regression. This is, of course, exactly as one would anticipate, and is most apparent in the informal sector equation. Moreover, it appears that the government rewards general education by years and not by diploma. The lack of significance of years and diploma of VTE in the earnings equation is a result of the importance of VTE in gaining access to government jobs. Seniority increases are p·⁴⁴ at a steady 5% per year, and pre-government work experience is also rewarded out at a rapidly declining rate.

An important result from the choice equation is that diplomas as well as years of schooling are determinants of the sector of employment. Especially years of higher general education, years of post-secondary VTE and years of teacher training significantly promote access to government jobs. The public sector thus absorbs the graduates of the very upper end of the education pyramid.

Demographic factors are also important determinants of access to the public sector: women are much more likely to select the public over the private sector, particularly if they have no infants in their household. However, female government workers earn on the average 44% less than their male colleagues. Both fac'ɔ·s undoubtedly reflect a differing occupational mix between men and women: the government recruits many female secretarial and other support staff who are paid less than the predominantly male higher level civil servants.

In the private sector, rewards to general education rise sharply with level of education. Work experience is rewarded at twice the government's level, but only for experience in the current job, and at a declining rate. A year of secondary VTE adds 14% to earnings. The results for post-secondary and teacher VTE are estimated imprecisely because of the small number of cases involved. Each year of apprenticeship training adds 5% to earnings in the private sector, and, moreover, such training is a significant determinant of access to the private sector.

Within the private sector, apprenticeship training makes it very likely that a person chooses work in the informal sector. The wage equations indicate that indeed the effect of apprenticeships on earnings is greatest in that sector: earnings increase 10.7% for each year of training vs. 3.1% in the formal sector. Formal VTE, on the other hand, predisposes a graduate to the formal sector where his/her training has the higher pay-off. In fact, the access function shows that, together with age, the type of VTE received is the most important variable which filters people into the formal or informal sector. This finding must be added to our earlier observation that the type of VTE is an important determinant of access to wage employment as such.

A final item worth noting is the signs of the coefficients of lambda in the various earnings regressions. They reveal negative selection into the public sector and positive selection into the private sector,

especially the informal labor market.[25]/ This means that the private

sector is successful in attracting those individuals with "unobserved"

characteristics (ability, motivation, initiative, etc.) which tend to lead

to high productivity and earnings. It is remarkable that the informal

sector appears most successful at this, but it reflects perhaps well on the

fact that this sector operates with the fewest rigidities and can respond

most easily to supply and demand factors.

Integrating the Regional and Sectoral Dimensions

The general conclusion of the previous sub-section is that the

role of general education and VTE in determining earnings and access to

employment differs by type of employment considered. Since section 8 had

demonstrated the importance of the regional dimension as well, ideally, one

would want to integrate the two dimensions. Unfortunately, the combination

of three locations and three types of employment yields cells for which the

CILSS provides only a small number of observations, and estimates of access

and earnings equations become increasingly imprecise. Moreover, it becomes

necessary to aggregate all types of formal VTE into one category. We

therefore limit ourselves to presenting OLS estimates of the earnings

equations for some of the combinations. The conclusions have, of course, a

more tentative nature.

25/ Since the public/private sector choice equation in Table 34 was
estimated with the private sector as base category ("zero"), the
lambda's calculated for the private sector observations are negative.
Hence the negative coefficient of lambda in the private sector
earnings function indicates positive selection into that sector.
Similarly, the formal/informal sector choice equation used the
informal sector as base category, so the negative coefficient of
lambda in the informal sector earnings function indicates positive
selection.

The earnings equations in Table 35 suggest that even within the public sector, human capital is not necessarily equally rewarded in different locations. For example, in Abidjan a year of higher schooling carries a 50% larger premium than in other cities. We expect, however, that some of the differences merely reflect the different make-up of the pool of applicants for government jobs in Abidjan and other cities, corresponding to different levels of jobs available.

Our earlier results for the private sector had indicated a reward structure mainly based on years of education and work experience. We now find that this is the case only in Abidjan. An other cities, diplomas and work experience are the main determinants of earnings. One reason for this might be the greater shortage of skilled staff in other cities, especially those with a completed curriculum, due to the pull of Abidjan. We already noted earlier (Table 14) that monthly earnings in the formal private sector are higher in other cities than in Abidjan. The difference can be considered an anti-migration premium, and the coefficients of the diploma variables reflect this.

The last set of earnings equations we show are those for the private formal sectors in Abidjan and other cities (Table 36). The number of observations in the informal sector was too small to permit a breakdown by location. In general, within each location, the coefficients parallel those for the private sector as a whole. We note, for example, that premiums paid to diploma holders in other cities is a formal sector phenomenon.

Table 35: EARNINGS FUNCTIONS ($\ln W_2$) FOR GOVERNMENT AND PRIVATE SECTOR EMPLOYEES, BY LOCATION

	Abidjan				Other Cities			
	Government		Private Sector		Government		Private Sector	
Intercept	10.730	(49.7)	9.886	(53.2)	9.676	(46.7)	9.800	(29.5)
Years of Primary Schooling	.170	(2.3)	.015	(0.4)	.085	(0.9)	-.024	(0.3)
Years of Secondary Schooling	.165	(4.8)	.113	(2.5)	.180	(6.1)	.043	(0.4)
Years of Higher Schooling	.126	(2.6)	.356	(3.2)	.085	(1.5)	.101	(0.7)
Years of Current Job Experience	.0068	(0.3)	.141	(6.2)	.074	(3.6)	.079	(1.9)
(Years of Current Job Experience)^2	.0007	(0.8)	-.0031	(4.2)	-.0008	(1.3)	-.0022	(1.4)
Years of Previous Job Experience	.047	(1.0)	.097	(1.7)	.109	(3.0)	.229	(1.5)
(Years of Previous Job Experience)^2	-.0042	(1.1)	-.0074	(1.6)	-.0054	(2.5)	-.025	(1.6)
Years of Apprenticeship	-.007	(0.1)	.023	(0.8)	.030	(0.6)	-.001	(0.1)
Years of VTE	-.014	(0.4)	.124	(2.5)	.006	(0.1)	.061	(0.5)
CEPE	-.804	(1.7)	-.014	(0.1)	.427	(0.8)	.582	(1.2)
BEPC	-.128	(2.4)	-.152	(0.3)	.139	(0.2)	1.199	(1.7)
VTE Diploma	-.478	(1.0)	.029	(0.1)	.295	(0.5)	2.119	(2.8)
Other Diploma	-.928	(1.8)	-.066	(0.1)	.078	(0.1)	2.364	(2.7)
Sex (1=female)	-.431	(3.9)	-.0038	(0.1)	-.315	(2.5)	-.179	(0.5)
Non-Ivorian	–	–	-.202	(1.3)	-.571	(1.2)	.019	(0.1)
Seasonal Job	–	–	–	–	–	–	.175	(0.3)
R^2	.73		.49		.71		.65	
F	15.8		9.9		13.8		6.8	
n	98		172		100		76	

Note: Absolute t – values in parentheses.

Table 36:   EARNINGS FUNCTIONS ($\ln W_2$) FOR PRIVATE FORMAL SECTOR EMPLOYEES

BY LOCATION

	Abidjan Formal		Other Cities Formal	
Intercept	10.137	(45.4)	10.645	(23.2)
Years of Primary Schooling	.030	(0.7)	-.151	(1.4)
Years of Secondary Schooling	.092	(2.3)	-.016	(0.1)
Years of Higher Schooling	.395	(4.2)	.187	(1.1)
Years of Current Job Experience	.142	(6.0)	.049	(0.8)
(Years of Current Job Experience)^2	-.0034	(4.3)	-.0023	(0.9)
Years of Previous Job Experience	.042	(0.8)	.124	(0.7)
(Years of Previous Job Experience)^2	-.0043	(1.0)	-.017	(0.9)
Years of Apprenticeship	.055	(1.5)	.004	(0.1)
Years of VTE	.125	(2.9)	.169	(1.1)
CEPE	-.143	(0.6)	.917	(1.3)
BEPC	.322	(0.6)	1.717	(2.0)
VTE Diploma	-.176	(0.6)	2.349	(2.5)
Other Diploma	-.272	(0.6)	2.623	(2.7)
Sex (1=female)	-.022	(0.1)	-.501	(1.1)
Non-Ivorian	-.302	(1.9)	.171	(0.5)
R^2	.52		.68	
F	8.5		4.6	
n	135		49	

Absolute t - values in parentheses.

Summary of Main Findings

Human capital variables are important determinants of the type of wage employment people select. The reward structure to human capital also differs by type of employment as well as by location within each type.

Entrance to a public sector job in Côte d'Ivoire is promoted by obtaining diplomas, from general as well as vocational and technical curricula, but also by years of education, especially at the upper end of the education pyramid (higher general education, post-secondary and teacher VTE). Once the job is obtained, the earnings level is set according to the number of years of general schooling and work experience.

In the private sector, rewards to general education rise sharply with level of education. Work experience is rewarded higher than in government service. The type of VTE received is a major determinant of selection between the formal and informal private sector. Apprenticeship graduates tend to obtain work in the informal sector where each year of their training adds 10.7% to earnings. Graduates from secondary level formal VTE channel themselves into formal sector jobs, where each year of VTE adds 14% to their earnings. This suggests again that formal and informal VTE are not substitutes but prepare people for different careers and carry different rewards in terms of earnings.

The determinants of earnings within the formal private sector differ sharply between Abidjan and other cities. In other cities, steep

premiums are being paid to graduates with diplomas, in order to prevent them from migrating to Abidjan.

The estimated earnings equations explain much better the variance of wages in the public than in the private sector. This suggests the importance in the latter of unobserved factors such as ability and motivation which contribute to productivity and earnings. We found evidence of positive selection into the private sector, i.e., the private sector is successful in attracting those individuals who would score high on these unobserved factors.

10. Interaction Among Human Capital Variables

The specification of the earnings function we used throughout this paper brought out separately the effects of general education and VTE on earnings, by type and level of education, and by whether or not a diploma was obtained. It did not, however, bring out any interaction between these variables, e.g., whether the impact of VTE on earnings depended upon what was t' ` highest general education diploma obtained.

To capture such interactions, we initially experimented with introducing interaction variables into the earnings equation, such as between years of VTE and general education diplomas. These variables did not turn out to be significant. It is likely that the small sample size of our data base did not yield suffficient variation within each of the interacted cells.

Another way to capture interaction among human capital variables is to split the sampie by level of general education and to see whether the coefficients of experience, VTE, etc. differ across categories. To implement this procedure, we divided the sample into three groups: the first split was at four years of general education, because it has been argued that this constitutes a threshold below which education should not be expected to have significant effects. The second split was done after 10 years of education, which corresponds with completion of the lower secondary curriculum.

The results in Table 37 show that the impact of work experience and VTE on earnings do indeed depend upon the highest level of general education attained. The earnings/experience profile becomes much steeper and also more curved as the level of general education increases. For example, 3 years of experience in the current job adds 15% to the earnings of a person with 0-4 years of education, but adds 34% for a person with 5-10 years of education, and 35% for a person with more than 10 years of education. For the latter category, work experience in a previous job also adds significantly to earnings. However, for the well educated worker, the profile flattens out more quickly and reaches a peak after 20 years, against 26 to 27 years for less educated workers.[26]

An apprenticeship adds most to earnings for workers with low general education. Well educated workers with apprenticeship training actually earn significantly less than those without such training. As one attains more education, it becomes indeed progressively less "normal" to switch into an apprenticeship, and those individuals who do so are likely to be dropouts or graduates who were unable to find a job. There is thus a negative selection effect in the combination of an apprenticeship with high levels of general education.

The interaction between formal VTE and general education is not so clear. The effect of secondary VTE on earnings seems greatest for people with 5-10 years of general education, i.e., those individuals who

---

[26] The positive relation between level of education and the returns to work experience has been observed for many countries. For a further discussion of this phenomenon, see Knight and Sabot (1983).

Table 37: EARNINGS FUNCTION BY YEARS OF GENERAL EDUCATION

	General Education							
	0-4 years		5-10 years		> 10 years		> 6 years	
Intercept	9.98	(42.6)	10.10	(60.8)	10.05	(14.6)	9.32	(20.3)
Years of Primary Schooling	.028	(0.3)	–	–	–	–	–	–
Years of Secondary Schooling	–	–	.133	(4.1)	.211	(2.2)	.150	(5.1)
Years of Higher Schooling	–	–	–	–	.143	(3.7)	.151	(4.2)
Years of Current Job Experience	.054	(2.1)	.121	(7.3)	.128	(3.3)	.110	(5.8)
(Years of Current Job Experience)^2	-.0010	(1.2)	-.0023	(4.0)	-.0031	(1.7)	-.0022	(3.1)
Years of Previous Job Experience	.024	(0.5)	.040	(0.9)	.242	(3.2)	.098	(2.1)
(Years of Previous Job Experience)^2	-.0002	(0.1)	-.0002	(0.1)	-.020	(2.9)	-.0053	(1.4)
Years of Apprenticeship	.047	(1.2)	.006	(0.2)	-.673	(2.1)	-.253	(3.3)
Years of Secondary VTE	–	–	.082	(2.7)	.002	(0.1)	.054	(2.0)
Years of Post-Secondary VTE	–	–	–	–	.155	(1.3)	.031	(0.3)
Years of Teacher Training	–	–	.060	(0.5)	.090	(0.8)	.077	(1.0)
CEPE	–	–	.102	(0.7)	–	–	.975	(2.1)
BEPC	–	–	.073	(0.3)	-.212	(0.5)	.819	(1.7)
Secondary VTE Diploma	–	–	.212	(1.2)	-.024	(0.1)	1.10	(2.4)
Post-Secondary VTE Diploma	–	–	–	–	-.059	(0.1)	1.42	(2.6)
Teacher Diploma	–	–	.192	(0.6)	-.052	(0.1)	1.13	(2.3)
Other Diploma	–	–	.500	(1.4)	-.150	(0.3)	1.06	(2.2)
Sex (1=female)	-.118	(0.5)	-.303	(2.9)	-.053	(0.3)	-.171	(1.7)
Non-Ivorian	-.335	(2.1)	-.247	(1.5)	.337	(1.1)	.178	(1.0)
Seasonal Job	-.446	(1.4)	-.807	(2.3)	–	–	-.130	(0.2)
Abidjan	.431	(2.4)	-.076	(0.8)	-.166	(1.2)	-.154	(1.7)
Rural Areas	-.273	(1.1)	-.100	(0.6)	-.051	(1.6)	-.141	(0.8)
R^2	.25		.55		.55		.59	
F	4.31		14.80		5.9		16.0	
n	151		238		111		258	

Note: Absolute t – values in parentheses.

entered secondary VTE at the usual point in the curriculum. The effect of
post-secondary VTE can of course only be observed for people in the
category with more than 10 years of general education. Teacher training
can be started with more or less than 10 years of general education, but no
significant coefficients were obtained.

We also split the sample after 6 years of general education
(completed primary cycle). This permits to compare the effects of the
general secondary cycle with the vocational and technical secondary cycle.
A year of general secondary education adds 15% to earnings; there is also
an 82% premium if a BEPC was obtained. A year of secondary VTE contributes
only 5% to earnings, but the premium for a diploma is 110%.

It is also interesting to look at the coefficients of the
demographic and location variables. The earnings gap between men and women
is largest in the 5-10 years of general education group. The earnings gap,
according to nationality disappears with rising education, and even turns
positive for non-Ivorians at the upper secondary level and above. There is
a selection effect at work here: migrants or children of migrants from
outside the Côte d'Ivoire who succeed in obtaining a high level of
education must undoubtedly display above average amounts of motivation and
persistence. Lastly, earnings of lowly educated workers in Abidjan are 43%
above those in other cities, which in turn are significantly above those in
rural areas. This easily explains the continued migration into Abidjan
from elsewhere in the country. For workers with more than primary

education, however, wages in Abidjan are below those in other cities. This is consistent with our earlier observation of higher earnings in the formal private sector in other cities relative to Abidjan.

The results of the comparison in Table 37 should be treated with caution. Splitting the sample according to level of education raises the question of what determines access to different levels of education. Clearly, the progression to higher levels of education is not a random event. This brings about the possibility of selection bias in OLS estimated earning functions. The two-step methodology we used earlier in this paper to incorporate the selection into different kinds of employment can also be applied to the selection into types or levels of education. The first step then becomes the estimation of a probit model with the determinants of access to education as regressors. The key empirical problem, however, is to obtain a proper set of such regressors. Relevant variables are personal ability (motivation, intelligence, etc.), scholastic achievement, migration and school attendance history, and parental background (education, occupation, wealth, income) at the time the education choices are made. It is obvious that such variables are not readily available in survey data. The consideration of schooling selection is therefore empirically less tractable that than of employment selection.[27] The CILSS data did not contain sufficient information to permit us to explicitly consider selection into schooling types in this paper.

---

[27] For a further discussion of selection into types of schooling, see, for example, Appendix 3 in Jimenez and Kugler (1986).

11. Summary of Main Findings and Policy Issues

There exist in Côte d'Ivoire two systems of acquiring vocational and technical education. In the formal system, students follow a variety of secondary and post-secondary level curricula in institutes which are integrated in the overall educational structure. The informal system consists of apprenticeships, whereby young adults work full time in a small enterprise at zero cash wages while learning a trade. The training is very practically oriented but usually quite limited in scope. Relative to formal VTE, the apprenticeship appeals more to people with little or no general education and to migrants. Also, people who dropped out of the formal VTE system or those who graduated but were unable to find a job become apprentices. In urban areas, one finds about the same percentage of people with formal VTE as with apprenticeship training. In rural areas, however, the apprenticeship system dominates.

The type of VTE a person acquires is a major determinant of access to different kinds of employment as well as of earnings. Apprenticeship graduates are found more frequently among the self-employed, and when they work as wage-earners, they more frequently do so in the informal sector. The latter choice is fully justified as each year of their training adds 11% to their earnings in that sector, against only 4% in the formal sector.

Graduates from the formal VTE system on the other hand are more likely to obtain jobs as employees in the modern sector. There is evidence of credentialism in the recruitment process in the modern sector in Côte d'Ivoire, as diplomas (from VTE as well as general education) enhance the likelihood to obtain wage employment far more than the years of education. Entrance to government jobs is, however, also determined by the number of years of education. Especially, people with many years of education at the upper end of the education pyramid (higher general education, post-secondary and teacher VTE) are more likely to work in the public sector.

Once a wage job has been obtained, however, diplomas are less important in determining earnings than years of schooling and work experience (except for post-secondary VTE, where diploma is also the main determinant of earnings). On average, a year of secondary or higher general education increases earnings by 13%, which is more than the effect from a year of work experience (8% for experience in the current job, 4% for experience in a previous job). A year of secondary VTE enhances earnings by 6.4%, a year of teacher training by 9%. The completion of a post-secondary VTE curriculum, with diploma, carries an earnings premium of 63%.

The reward structure to human capital differs by type of employment as well as by location within each type. In the private sector, rewards to general education rise sharply with level of education, which is

not the case in the public sector. Work experience is rewarded higher in the private sector than in government service. In cities other than Abidjan, steep premiums are being paid to graduates with diplomas in order to induce them not to migrate to Abidjan. This practice is, however, limited to the formal private sector. The latter sector in other cities is in fact the only place where diplomas are important determinants of remuneration. Elsewhere, credentialism is evident in access, but not in remuneration.

The earnings equations we estimated explain much better the variance of wages in the public than in the private sector. This suggests the importance in the latter of unobserved factors such as ability and motivation which contribute to productivity and earnings. We found evidence of positive selection into the private sector, i.e., the private sector is successful in attracting those individuals who would score high on these unobserved factors.

Among the self-employed, primary education contributes significantly to enhancing earnings of farmers. For non-farming self-employed, secondary general education appears to be the prime determinant of earnings among the human capital variables in Abidjan, and job experience in other locations. Apprenticeships have no significant impact on the earnings of the self-employed. Formal VTE, however, mostly at the secondary level, does enhance farmers' earnings considerably, but it has no effect on the earnings of other self-employed.

The private costs of attending VTE in Côte d'Ivoire are fairly modest, mainly as a result of generous scholarship programs. The latter, in combination with expensive school construction programs and the (albeit diminishing) reliance on highly paid expatriate teachers, has, however, resulted in very high institutional costs. As a result, social costs of VTE are four to seven times higher than private costs.

The large scholarships received by VTE students as well as the high contribution of VTE to earnings imply that the private rates of return to vocational and technical education are very high in Côte d'Ivoire: 15% for secondary level VTE and for teacher training, and 21% for post-secondary VTE. It is not surprising that such high returns induce many students to try and gain access to formal VTE institutes. The recent economic recession in Côte d'Ivoire has, however, caused an oversupply of such graduates, and joblessness among them is high. The government has therefore cut the access quota to vocational and technical schools, resulting in a serious underutilization of facilities. Together with the high level of total institutional costs, this has reduced the social rates of return to VTE to around 4%, with no significant differences by level and type of VTE. This is well below the social opportunity cost of capital (usually estimated at about 10%).

The fact that high private returns to VTE have persisted in spite of the joblessness among graduates points at an inflexibility in the Ivorian labor market in adjusting to the economic recession. It appears that most of the adjustment has come through a reduction of employment, while the wages of those who kept a job were maintained at high levels.

The situation calls for several policy actions. The private rates of return to VTE are higher than those obtainable from many alternative investments. Hence, there is scope to reduce scholarships for VTE students without endangering a sufficient supply of students. This would at the same time raise the social returns to VTE. The ongoing replacement of expatriate teachers by Ivorians will also contribute to reducing institutional costs. Construction programs especially for post-secondary facilities should be carefully scrutinized, and, in general, the focus should be on more efficient utilization of existing VTE institutes. In coordination with other economic policies, actions to make the labor market more flexible and responsive to changes in supply and demand would contribute to sending the proper economic signals to prospective VTE students, thus making the VTE system more responsive to changing labor market conditions.

The role of the apprenticeship as an informal way to acquire VTE can be upgraded. At the moment, formal and informal VTE are not substitutes since they prepare for different careers. An apprenticeship prepares best for wage work in the informal sector, and there its returns are comparable to those obtained in the formal sector from formal VTE. The excess capacity of the formal VTE institutes could be used, for example, to set up short-term vocational and technical courses which teach skills complementary to those typically acquired in an apprenticeship. Such courses would not have the general education entrance requirements of the formal curricula and should mainly be given at night to be compatible with apprentices' work schedule. This would provide a training of which the level is in-between the currently existing formal and informal systems.

Formal as well as informal VTE prepare poorly for own account work. This could be remedied by including modules in the curricula that deal directly with setting up a business, credit, marketing and other issues relevant to work for own account. These topics could also be dealt with in the suggested evening courses for apprentices.

Formal VTE in Côte d'Ivoire has been too much geared towards employment in the modern sector, whilst informal VTE does not suitably prepare trainees for own account work. Both types of VTE therefore fail to contribute as much as they could to the informal sector which, in view of the limited labor absorption capacity of the modern sector, must be a major focus for employment creation. The number of VTE graduates turning to own account work is slowly increasing, but the income and employment generation potential of the informal sector is yet to be fully realized. A redirection of both formal and informal VTE in Côte d'Ivoire could make a major contribution to that effect.

REFERENCES

Achio, Francoise. Les Politiques, la Planification et l'Administration de l'Enseignement Technique et Professionnel en Côte d'Ivoire, Abidjan 1983.

Ainsworth, Martha and Juan Munoz. The Côte d'Ivoire Living Standards Survey - Design and Implementation, Living Standards Measurement Study Working Paper No. 26, The World Bank, Washington D.C., 1986.

Blinder, Alan. On Dogmatism in Human Capital Theory, Journal of Human Resources, Vol. XI (1), 1976.

Coulibaly, Aly. L' Apprentissage Traditional, sa Contribution à la Qualification des Travailleurs des Secteurs Informel et Moderne, Cahiers Formation Emploi, No. 2, 1986.

den Tuinder, B. Ivory Coast - The Challenge of Success. Johns Hopkins University Press, Baltimore, 1978.

FNR (Fonds National de Régulation), Exercise 1983-84 - Statistiques, Abidjan, Mai 1985.

Griliches, Z. Estimating the Returns to Schooling: Some Econometric Problems, Econometrica, Vol. 45 (1), 1977.

Grootaert, Christiaan. Measuring and Analyzing Levels of Living in Developing Countries: an Annotated Questionnaire, Living Standards Measurement Study Working Paper, No. 24, the World Bank, Washington D.C., 1986a.

Grootaert, Christiaan. The Position of Migrants in the Urban Informal Labor Markets in Côte d'Ivoire, mimeo, Development Research Department, The World Bank, Washington D.C., 1987.

Grootaert, Christiaan. The Role of Employment and Earnings in Analyzing Levels of Living - A General Methodology with Applications to Malaysia and Thailand, Living Standards Measurement Study Working Paper, No. 27, The World Bank, Washington D.C., 1986b.

Guirassi, Ibrahima. La Formation en Côte d'Ivoire, Cahiers Formation Emploi, No. 2, 1986.

Heckman, James. The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and a Simple Estimator for Such Models. Annals of Economic and Social Measurement, Vol. 5(4), 1976.

Heckman, James. Sample Selection Bias as a Specification Error. Econometrica, Vol. 47(1), 1979.

Jamison, Dean and Lawrence Lau. Farmer Education and Farmer Efficiency, Johns Hopkins University Press, Baltimore, 1982.

Jimenez, Emmanuel and Bernardo Kugler, with Robin Horn. An Economic
Evaluation of a National Job Training System: Colombia's SENA,
Education and Training Department Discussion Paper No. 24, The World
Bank, Washington D.C., 1986.

Knight, J.B. and R.H. Sabot. Why the Returns to Experience Increase with
Education, mimeo, Development Research Department, The World Bank,
Washington D.C., 1983

Maddala, G.S. Limited Dependent and Qualitative Variables in
Econometrics. Cambridge University Press, Cambridge, 1983.

Mincer, Jacob. Schooling, Experience and Earnings, New York, National
Bureau of Economic Research, 1974.

ONFP. (Office National de Formation Professionnelle). Bilan de l'
Enseignement Technique et de la Formation Professionelle, Abidjan,
1984.

ONFP. Les Besoins Prioritaires de la Formation Professionnelle Continue en
Côte d'Ivoire, Abidjan, 1985.

ONFP. Répertoire des Moyens de Formation en Republique de Côte d'Ivoire,
Abidjan, 1986.

Psacharopoulos, George. Returns to Education: A Further International
Update and Implications, Journal of Human Resources, Vol. XX(4), 1985.

Vandergaag, J. and W. Vijverberg. Wage Determinants in Côte d'Ivoire.
Living Standards Measurement Study Working Paper, No. 33, The World
Bank, Washington D.C., 1987

World Bank. World Development Report 1986, Oxford University Press, New
York, 1986.

APPENDIX 1: **Some Specification Issues Regarding the Earnings Function**

Ability and Other Unobserved Variables

The argument is often made that the coefficients of the
schooling, training, and experience variables in an earnings function
overestimate the effects on earnings of these factors because the
regressions typically do not control for ability, motivation, and other
such "unmeasurable" variables. Work by psychologists and education
specialists has indicated that the home environment where a child grows up
can affect his/her performance in school. The home environment in turn is
to some degree determined by the education of the parents, which thus
becomes a (second degree) proxy for some of the aforementioned
unmeasurables. To check for such effects, we added the years of schooling
of the father and mother to the earnings function. The results in Table
A1.1 lead to the conclusion that parental education has no significant
effect on earnings. (We also tried highest diploma obtained by the
parents, but no significant coefficients were obtained either.)

Since it has been argued that parents' characteristics may
influence boys and girls differently, we also split the sample of employees
by sex, but a significant effect is observed for neither sex.
Incidentally, we may note from Table A1.1 that the coefficients of the
human capital variables differ vastly by sex, not an uncommon finding.

TABLE A1.1: EARNINGS FUNCTION (lnW_2) WITH PARENTAL EDUCATION VARIABLES

	All		Male		Female	
Intercept	9.952	(80.8)	9.833	(67.7)	9.980	(47.8)
Years of Primary Schooling	.039	(1.5)	.059	(2.0)	-.097	(1.4)
Years of Secondary Schooling	.130	(5.3)	.121	(4.2)	.182	(3.8)
Years of Higher Schooling	.158	(4.2)	.176	(4.2)	.059	(0.6)
Years of Current Job Experience	.096	(7.1)	.106	(6.9)	.055	(1.7)
(Years of Current Job Experience)^2	-.0018	(3.9)	-.0020	(3.9)	-.0008	(0.7)
Years of Previous Job Experience	.040	(1.6)	.038	(1.4)	.143	(0.8)
(Years of Previous Job Experience)^2	-.0011	(0.6)	-.0009	(0.5)	-.0085	(0.6)
Years of Apprenticeship	.020	(0.9)	.022	(1.0)	.105	(0.9)
Years of VTE	.063	(2.2)	.077	(2.3)	.030	(0.6)
CEPE	.125	(0.8)	.118	(0.7)	.548	(1.3)
BEPC	.120	(0.5)	.014	(0.1)	.671	(1.3)
VTE Diploma	.339	(1.7)	.281	(1.2)	.979	(2.1)
Other Diploma	.324	(1.2)	.282	(0.9)	.990	(1.3)
Sex (1=female)	-.270	(2.8)	-	-	-	-
Non-Ivorian	-.292	(2.9)	-.279	(2.4)	.058	(0.2)
Seasonal Job	-.640	(3.0)	-.590	(2.5)	-1.593	(2.4)
Abidjan	.006	(0.1)	-.014	(0.1)	.098	(0.6)
Rural	-.268	(2.1)	-.282	(2.0)	.340	(0.7)
Father's Years of Schooling	.019	(1.4)	.026	(1.5)	.020	(0.8)
Mother's Years of Schooling	-.0002	(0.1)	.001	(0.1)	-.026	(0.6)
R^2	.58		.58		.70	
F	31.9		26.8		8.2	
n	484		396		88	

Note: Absolute t - values in parentheses.

Where significant, the coefficients of all schooling variables (except secondary) and experience are greater for men. The diploma variables on the other hand have systematically larger coefficients for women. It is, however, beyond the scope of this paper to investigate further sex differences in the returns to human capital.

Cognitive Skills

The CILSS recorded self-reported literacy and numeracy for respondents above the age of 4. It is of interest to know whether these skills have an effect on earnings independent of the years of schooling. To that effect, we split the people in the sample with no diploma into those who could read, write, and do simple arithmetic and others. The results indicated no significant effect from these skills that could be separated from the years of primary schooling during which the skills are acquired. (There is no need to introduce these skills at a higher level, since everyone in the sample with at least a CEPE reported being literate and numerate.)

Hours Worked

In the main text of the paper, we argued for the use of monthly earnings as dependent variable in the earnings functions (rather than hourly wage) because a month is the most relevant time period for supply, demand, and remuneration of wage labor in Côte d' Ivoire. Nevertheless,

the question can be raised whether an earnings function should control for actual labor supply during the reference period. Our view is that it should not because the earnings function should estimate the contribution of human capital to earnings, as reflected in the transaction agreement that was reached between suppliers and buyers of labor services. In Côte d'Ivoire, this agreement typically sets a monthly wage.

Nevertheless, the issue is in part empirical, and we re-estimated the earnings functions for government and private sector employees with ln (monthly hours) added to the specification. The coefficient of this variable is likely to be between 0 and 1. Unit elasticity would imply that the wage rate and monthly earnings models are equivalent. A value between 0 and 1 indicates a declining return to additional hours of work. Zero elasticity means that remuneration is invariant with respect to hours, i.e., that the chosen time period is the relevant one for supply and demand of labor. The coefficient for ln (hours) for government employees was not significantly different from zero (.072, t=.9), while the one for private sector employees was .266 (t=2.4). In other words, the Ivorian government pays by the month and whatever variance in hours worked by employees exists has no effect on earnings. It is perhaps surprising that in the private sector the same practice dominates and increasing labor supply has sharply diminishing returns. These results confirm the appropriateness of using monthly earnings as transaction price for labor. Moreover, R^2 as well as the human capital coefficients were not significantly affected by the inclusion of the hours variable. Therefore, on both a priori and empirical grounds, the hours variable was not included in the regressions in the main text of the paper.

APPENDIX 2:   Comparison with Other Estimates

In a recent paper, Vandergaag and Vijverberg (1987 - hereafter
VV) also estimate earnings equations based on the CILSS data. The
comparison of their major results with ours in Table A2.1 shows differences
in the magnitude and/or significance of almost all estimated coefficients.
VV's conclusions hence differ both quantitatively and qualitatively from
ours, and it seems worthwhile to investigate where the differences come
from and which findings present the proper empirical basis for policy
applications.

The differences are due to at least four factors:

(1)   Different dependent variable: VV use ln (hourly wage),
      while we use ln (monthly wage) for reasons explained in
      section 7 of this paper. Moreover, in this particular data
      set, our experience indicates that the hours and days worked
      daca are of questionable quality (for example, the
      transformation from monthly to hourly wages "creates"
      outliers). More important, the "days" question asked about
      actual days worked in the reference week while the "hours"
      questions asked for typical hours. In our opinion, one
      should not mix actual and typical time use information to
      explain actual earnings.

Table A2.1: COMPARISON BETWEEN VV ESTIMATES AND THIS PAPER

	All Employees [1]		Government Employees [2]		Private Sector Employees [2]	
	VV	This Paper	VV	This Paper	VV	This Paper
Years of Primary Schooling	ns	.042	ns	.095	ns	.059
Years of Lower Secondary Schooling	.088	.126	.205	.142	ns	.109
Years of Higher Secondary Schooling	ns		ns		ns	
Years of Higher Schooling	.208	.123	.205	.082	.300	.196
Years of Secondary VTE		.069		ns		.139
Years of Post-Secondary VTE	.072	ns	ns	ns	.098	ns
Years of Teacher Training		ns		ns		ns
Years of Apprenticeship	ns	ns	.067	ns	ns	.053
Years of Current Job Experience	.107	.092	.087	.047	.116	.084
(Years of Current Job Experience)^2	-.0019	-.0017	ns	ns	-.023	-.0018
CEPE	.494	ns	.801	ns	.395	ns
BEPC	.594	ns	.424	ns	.617	ns
Secondary VTE Diploma		ns		ns		ns
Post-Secondary VTE Diploma	ns	.876	ns	ns	ns	ns
Teacher Diploma		ns		ns		ns
Other Diploma	.536	.508	.621	ns	ns	ns
Female	ns	-.204	ns	-.444	ns	-.255
Non-Ivorian	ns	-.275	-	ns	.285	ns

ns = Not significant at .10 level.
1/   OLS estimates.
2/   Selection corrected estimates.

(2) Different treatment of outliers: VV omitted a number of
cases with low hourly wages. We have not omitted any cases,
but recoded outliers - usually with the largest non-outlying
value - after checking for inconsistency with expenditure
data.

(3) Different specification of the earnings equation: Two
explanatory variables in the VV regressions appear
questionable. First, a cognitive skills variable is
included which "is zero if the individual cannot write or
read or do arithmetic, and increases with 1 for each of the
skills acquired." (p.9) The underlying assumption of equal
productivity effect of each of these skills appears most
implausible. Moreover, such a variable is likely to
introduce collinearity as it has no variance for individuals
with a CEPE or above (i.e., the vast majority of employees),
who all reported possessing all three skills. Second, VV
have proxied total work experience by age minus schooling
minus 5. As we explained in the paper, this is
inappropriate in the Côte d'Ivoire context. It is
preferable to rely on the two direct measures of work
experience available in the CILSS (of which VV use only
one). Lastly, VV's earnings equations do not control for
location. Our findings indicate that this is an important
omission.

(4) Different specification of the sector choice equation: VV's
choice equation has very few explanatory variables: age,
sex, diplomas, the cognitive skills variable, and years of
schooling (not distinguished by level). The results of our
probit equation (Table 34) clearly indicate that this is an
incomplete specification. VV's finding of insignificance of
years of schooling is reversed once level and type of
schooling are distinguished. Indeed, it is one of our main
findings that type and level of schooling are major
determinants of choice of type of employment. Also, the
regional dimension was again not considered in VV's model.
One indication of the completeness of the specification is
that VV's probit equation predicts only 71% of the
observations correctly, against 82% for our specification.

To have an idea of the effects of (1) and (2) we reestimated the
"all employees" equation with hourly wage as dependent variable, and with
the original unrecoded data. The results in Table A2.2 show that the
recoding had only small effects on the estimated coefficients, but did
significantly improve the fit of the equation. The only important change
in individual coefficients was a reduction of the coefficient for years of
higher education from .20 to .16 (this was due to the recoding of a few
very extreme outliers - 25 to 50 times larger than the next highest value -
in commissions and in-kind-income reported by university graduates).

Table A2.2: ALL EMPLOYEES EARNINGS FUNCTION

WITH DIFFERENT DEPENDENT VARIABLE

	$\ln W_2$		$\ln (W_2 \text{ per hour})$		$\ln (\text{raw data } W_2)$	
Intercept	9.967	(82.8)	4.650	(34.8)	9.986	(73.8)
Years of Primary Schooling	.042	(1.6)	.026	(0.9)	.049	(1.7)
Years of Secondary Schooling	.141	(6.0)	.163	(6.2)	.133	(5.0)
Years of Higher Schooling	.160	(4.4)	.189	(4.7)	.203	(4.9)
Years of Current Job Experience	.091	(7.0)	.094	(6.4)	.096	(6.6)
$(\text{Years of Current Job Experience})^2$	-.0017	(3.7)	-.0017	(3.3)	-.0019	(3.6)
Years of Previous Job Experience	.040	(1.6)	.032	(1.2)	.044	(1.6)
$(\text{Years of Previous Job Experience})^2$	-.0011	(0.7)	-.0008	(0.4)	-.0015	(0.8)
Years of Apprenticeship	.019	(0.9)	.018	(0.8)	.031	(1.3)
Years of VTE	.061	(2.2)	.066	(2.1)	.058	(1.9)
CEPE	.122	(0.8)	.231	(1.3)	.086	(0.5)
BEPC	.087	(0.4)	.143	(0.5)	.027	(0.1)
VTE Diploma	.309	(1.6)	.389	(1.8)	.285	(1.3)
Other Diploma	.275	(1.1)	.611	(2.2)	.067	(0.2)
Sex (1=female)	-.213	(2.4)	-.105	(1.0)	-.227	(2.2)
Non-Ivorian	-.284	(2.8)	-.326	(2.9)	-.322	(2.9)
Seasonal Job	-.634	(3.0)	-.520	(2.2)	-.684	(2.9)
Abidjan	.014	(0.2)	-.003	(0.1)	-.026	(0.3)
Rural Areas	-.276	(2.2)	-.045	(0.3)	-.225	(1.8)
R^2	.58		.57		.52	
F	37.3		35.8		29.5	

The change of dependent variable to an hourly basis, however, had major effects on the coefficients and their significance. It reduced the estimated coefficient and t-value of primary education and increased that of other levels of education. It also increased coefficients and significance of all diploma variables. Clearly, two of VV's conclusions, viz. the sharp progression of returns to education with level of education and the importance of diplomas for earnings, critically depend upon their choice of hourly wage as dependent variable. Using monthly wage data, this paper has shown that the increase of the effect of education on earnings with level of education is much milder and that diplomas generally do not affect earnings, except in the formal private sector in other cities.

APPENDIX 3: <u>Institutional Costs: Detailed Tables</u>

The cost analysis in the main text considers three levels of VTE: secondary, post-secondary, and teacher training. In this appendix, we show the institutional cost calculations at a more disaggregated level. We also explain the data sources and the assumptions that were necessary to complete the calculations.

For the <u>secondary level</u>, Table A3.1 shows the cost calculations for 5 types of institutions:

- technical high school (Lycée Technique)

- vocational high school (Lycée Professionnel)

- technical college (College d'Enseignement Technique)

- vocational training center (Centre de Formation Professionnelle)

- other training center (Centre de Formation Artisanale, Centre de Formation Professionnelle Specialisé)

The main data sources were the 1987 budgets of the Ministry of Vocational and Technical Education and the National Office of Vocational Training (ONFP).[1]/ While these budget data break down temporary staff salaries and operating expenses (except utilities and communications) by type of institution, only a global figure is available for permanent staff

_____

[1]/ The use of budget figures as data source instead of actual expenditure figures is necessitated because the latter are only available with a lag of several years. However, in the fiscal austerity climate currently present in Cote d'Ivoire, actual expenditures are likely to fall within a couple of percentage points of budgets.

TABLE A3.1: INSTITUTIONAL COSTS FOR SECONDARY LEVEL VTE INSTITUTIONS

	All 1/	Technical High School	Vocational High School	Technical College	Vocational Training Center	Other Training Center
Personnel Expenses			'000 CFAF			
– Permanent Ivorian Staff						
– Salaries	5,616,000	785,898	1,192,463	781,581	712,275	169,093
– Housing Allowance	436,957	94,308	143,096	93,789	85,473	20,291
– Temporary Staff	266,906	18,330	72,380	26,000	48,520	14,680
– Technical Assistants						
– Cooperation Contract	2,710,769	1,227,317	1,088,577	170,757	170,757	53,362
– Local Contract	83,665	45,050	25,743	6,436	6,436	–
Subtotal	9,114,297	2,170,903	2,522,259	1,078,563	1,023,461	257,426
Operating Expenses	4,167,548	397,257	699,936	322,309	446,763	124,876
Scholarships	150,200	45,150	39,874	34,002	24,506	6,669
Total Recurrent Costs	13,432,045	2,613,310	3,262,069	1,434,874	1,494,730	388,971
(Enrollment)	(7,545)	(2,268)	(2,003)	(1,708)	(1,231)	(335)
Recurrent Cost per Student	1,780.258	1,152.253	1,628.592	840,090	1,214.241	1,161.107
Amortization of Buildings and Equipment (per Student)	505.711	87.009	1,683.857	25.316	148.709	57.281
Total Cost per Student	2,285.969	1,239.262	3,312.449	865.406	1,362.950	1,218.388

1/ Includes costs of schools plus central administration costs of Ministry of Vocational and Technical Education and the National Office of Vocational Training (ONFP)

salaries, expenses for utilities and communications, and scholarships.
The salaries for individual types of institutions were therefore calculated
on the basis of the number of teachers (see Table 23 in the main text).
Utilities and communication expenses and scholarships were allocated on the
basis of the number of students. As a result, the figures for each type of
institution may have a wider margin of error than the figures for the
entire secondary VTE system.

The budget data on salaries also do not include the important
housing allowances. These vary from teacher to teacher, but an inspection
of actual payroll data showed that they were on average 12% of base
salaries and this figure was used in the calculations.

Salaries of expatriate technical assistants are also excluded
from published budget data. They were therefore estimated on the basis of
the number of expatriate teachers in each type of institution. For regular
"cooperation contracts" we used published French civil servant salary
levels, to which an expatriate premium and a housing allowance were added.
This yielded an average annual figure of 14,926,320 CFAF, of which Côte d'
Ivoire pays 71.5%, i.e. 10,672,319 CFAF. Some technical assistants are
directly hired by the Côte d'Ivoire government (so-called "local
contracts"), and are paid according to a special salary scale. Our figures
are based on the midpoint of that scale, to which also a housing allowance
was added. An average local contract cost 6,435,672 CFAF per year.

For vocational high schools, amortization was calculated from cost figures of the Third Education Project, assuming an economic life of twenty years for buildings and five years for equipment. For other institutions, we used amortization figures calculated by ONFP.

No cost calculations were made for adult training centers, because the available data base was much weaker than for the other institutions. Moreover, courses offered by these centers range from a few days to several months. Thus, a calculation of costs per student is really meaningless, and instead costs should be calculated per student-day (or even per student-hour, since many courses are only held for a few hours per day). Data on the total number of student-days or student-hours are, however, not available (see also Appendix 4).

The post-secondary level cost data are those for the National Institute of Higher Technical Education (INSET), which offers curricula in many different fields. INSET is an independent institute with its own budget, from which were derived the figures in Table A3.2. The calculation of housing allowances and technical assistant salaries used the same assumptions and sources as for the secondary level. Scholarship figures are only known for INSET and IPNETP combined, and they were allocated on the basis of number of students. Amortization figures are those of ONFP.

For teacher training, three types of institutions were distinguished: training centers for primary school teachers (CAFOP/ENI),

TABLE A3.2: INSTITUTIONAL COSTS: INSET

Personnel Expenses		'000 CFAF
- Permanent Ivorian Staff		
- Salaries		1,317,000
- Housing Allowance		158,040
- Temporary Staff		65,000
- Technical Assistants		
- Cooperation Contracts		1,323,368
- Local Contracts		64,357
	Subtotal	2,927,765
Operating Expenses		1,933,000
Scholarships		694,650
Total Recurrent Costs		5,555,415
Enrollment : 1250		
Recurrent Cost per Student		4,444.332
Amortization of Buildings and Equipment (per Student)		2,874.983
Total Cost per Student		7,319.315

the Higher Institute for Teachers Training (ENS), and the National

Instutute for the Training of Technical and Vocational Teachers (IPNETP)

(Table A3.3). The CAFOP/ENI figures come from the budget of the Ministry

of Primary Education. Since we were unable to obtain the number of

technical assistants in these institutes, we assumed the same proportion of

expatriates in the teaching staff as for the entire secondary VTE system.

Amortization data come from the Third Education Project. The ENS

and IPNETP are independent institutes and the figures are derived from

their respective budgets. Housing allowances were added to salary figures

and expatriates' salaries were based on the actual number of expatriate

teachers. Amortization figures are based on ONFP calculations.

Table A3.3: INSTITUTIONAL COSTS OF TEACHER TRAINING INSTITUTES

	CAFOP/ENI	ENS	IPNETP
	----------'000 CFAF----------		
Personnel Expenses			
— Permanent Ivorian Staff			
— Salaries	1,390,524	790,000	341,000
— Housing Allowance	156,863	94,800	40,920
— Temporary Staff	157,050	19,500	43,400
— Technical Assistants			
— Cooperative Contracts)	1,221,688	885,802	405,548
— Local Contracts)		128,713	
Subtotal	2,936,125	1,918,815	830,868
Operating Expenses	731,510	311,200	169,750
Scholarships			
— Regular Students	94,200	1,563,700	147,350
— Teachers on Leave	—	650,955	—
Total Recurrent Costs	3,761,835	4,444,670	1,147,968
(Enrollment)	(1,570)	(2,100)	(265)
Recurrent Cost per Student	2,396.073	2,116.509	4,331.955
Amortization of Buildings and Equipment (per Student)	765.695	677.283	350.955
Total Cost per Student	3,161.768	2,793.792	4,682.910

APPENDIX 4: **Short-Term Training in Côte d'Ivoire**

Short-term training (defined as less than one year in duration)
is only available as part of Côte d'Ivoire's continued training system
("formation professionnelle continue" (FPC)), i.e., for people currently
part of the work force. In the basic training system ("formation
professionnelle initiale"), the minimum course duration is one year, and
the majority of curricula are two to three years. Short-term training is
available in the following ways:

(1)   in the centers operated by the Institut National de

Perfectionnement Permanent (INPP) (capacity: about 2,000

students). The INPP regroups 11 different centers, offering

training in many subjects ranging from mechanics,

construction, printing, etc. to adult literacy and

management;

(2)   in the Ateliers d'Applications et de Production (AAP), which

provide further training to traditional craftsmen and to

graduates of Centres de Formation Professionnelle, mostly in

the areas of carpentry, construction, and mechanics

(capacity: 870 students);

(3)   on the campus of INSET and the University of Abidjan, at the

post-secondary level; and

(4)   in enterprise training centers, in private training centers

such as Centre Ivoirien de Gestion des Entreprises (CIGE),

and in centers operated by public enterprises such as

SODECI, SOTRA, etc. (capacity: about 4,000 students).

In principle, the FPC system is financed by a payroll tax,
currently 1.2%, which must be paid by all registered enterprises.[1]/   The
tax, which in 1985-86 yielded 3.8 billion CFAF, is administered by the
Fonds National de Regulation (FNR). The first half of the tax (the
so-called "0,6") can be used by enterprises for training of their choice.
Upon presentation of invoices, they are reimbursed by FNR. For the second
half (called the "plus 0,6"), training must be pre-approved by FNR. This
part of the tax serves as a subsidy to small enterprises whose training
costs exceed 1.2% of their payrolls, and as a transfer from the modern
sector to the small-scale urban sector, as well as to rural areas (e.g., to
finance training programs in the context of rural development). The
results of the FNR operations show that such transfer indeed takes place,
although middle size enterprises (100-200 workers) receive a larger share
of their training expenses from FNR than smaller ones, both as
reimbursements and subsidies (see FNR, 1985).

1/   There is another payroll tax of 0.5%, which goes to the budget of ONFP,
as a contribution to financing basic training.

In 1985-86, about 1,100 million CFAF were reimbursed for training under the "0,6" and 637 million CFAF were granted as training subsidies under "plus 0,6." In addition, 862 million CFAF were spent on sectoral and general training actions. Notice that the latter actions take place at the initiative of the FNR, while the former two types of training take place at the initiative of the enterprise.

It is virtually impossible to calculate the unit cost of short-term training in Côte d'Ivoire, because of the large number of institutions and the wide range of types of training involved. Moreover, given that the duration of the courses ranges from a few days to a few months, cost figures per student are really meaningless and costs should be calculated on a per-student-day or per-student-hour basis. The FNR, which would be in the best position to perform such a calculation, does not, however, maintain the necessary data base. Yet, some idea of cost-per-day can be obtained from the pay scales used by FNR to approve training requests. Trainer compensation ranges from 57,000 to 182,000 CFAF per day. A back-of-the-envelope calculation made by INPP staff, based on the budget of some actual training programs, put the average cost-per-day around 100,000 CFAF. Assuming 200 teaching days per year, such a cost exceeds that of basic vocational and technical education (calculated at 2,085,051 CFAF per year per student in section 7 of this paper) for class sizes of less than ten students, which are the norm for most short-term training courses.

SECTION 3.   PART A (END)

	18							19	20	21	22	23
	How much has your household spent during the past 12 months on ...(NAME'S)...education for... IF NOTHING WAS SPENT, WRITE ZERO.							Did (NAME): have a schol- arship during the past 12 months?	What was the value of the scholarship for the past 12 months?	Has any other person, who is not a member of your house- hold, paid any other school expenses for ...(NAME)?	How far (in Km): E'll... school from here?	How long does it take (NAME) to go to school from here?
	A. Contributions to parents associations?	B. Uniforms and sports clothes?	C. Books and school supplies?	D. Transportation to school?	E. Cafeteria, board and lodging?	F. Tuition and registration fees?	G. Other? (Clubs, etc.)					TIME ONE WAY
								YES...1 NO...2 (6-21)		YES...1 NO....2		NEXT PERSON
	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT		AMOUNT		KM	HRS MIN
01												
02												
03												
04												
05												
06												
07												
08												
09												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

3A2

SECTION 5. PART B. EDUCATION OF CHILDREN RESIDING ELSEWHERE

1. Does any member of your household have children under 30 years of age not living here in this household?

YES.....1
NO......2 (> SECTION 4)

FOR EACH CHILD LISTED IN QUESTION 2, ASK QUESTIONS 4-11.

	2 What are their names? LIST ALL THE CHILDREN WHO DO NOT LIVE IN THIS HOUSEHOLD. COMPLETE THE LIST BEFORE GOING TO 4-10.	3 Sex? F...1	4 How old is (NAME)? YEAR	5	6	7	8	9	10	11
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

CHILD

(> SECTION 4)

3B

	Title	Author	Date	Contact
WPS1	Imports Under a Foreign Exchange Constraint	Cristian Moran	March 1988	C. Hambidge 61539
WPS2	Issues in Adjustment Lending	Vinod Thomas	March 1988	C. Hambidge 61539
WPS3	CGE Models for the Analysis of Trade Policy in Developing Countries	Jaime de Melo	March 1988	C. Hambidge 61539
WPS4	Inflationary Rigidities and Stabilization Policies	Miguel A. Kiguel Nissan Liviatan	April 1988	M. Kiguel 61761
WPS5	Comparisons of Real Output in Manufacturing	Angus Maddison Bart van Ark	April 1988	E. Zamora 33706
WPS6	Farm-Nonfarm Linkages in Rural Sub-Saharan Africa	Steven Haggblade Peter B. Hazell James Brown	April 1988	C. Spooner 37570
WPS7	Institutional Analysis of Credit Cooperatives	Avishay Braverman J. Luis Guasch	April 1988	C. Spooner 37570
WPS8	Prospects for Equitable Growth in Rural Sub-Saharan Africa	Steven Haggblade Peter B. Hazell	April 1988	C. Spooner 37570
WPS9	Can We Return to Rapid Growth?	Andrea Boltho	June 1988	J. Israel 31285
WPS10	Optimal Export Taxes for Exporters of Perennial Crops	Mudassar Imran Ron Duncan	June 1988	A. Kitson-Walters 33712
WPS11	The Selection and Use of Pesticides in Bank Financed Public Health Projects	Bernhard Liese Norman Gratz	June 1988	C. Knorr 33611
WPS12	Teacher-NonTeacher Pay Differences in Cote d'Ivoire	Andre Komenan Christiaan Grootaert	June 1988	R. Vartanian 34678

Title	Author	Date	Contact
WPS13 Objectives and Methods of a World Health Survey	Trudy Harpham Ian Timaeus	June 1988	A. Menciano 33612
WPS14 The Optimal Currency Composition of External Debt	Stijn Claessens	June 1988	S. Bertelsmeier 33768
WPS15 Stimulating Agricultural Growth and Rural Development in Sub-Saharan Africa	Vijay S. Vyas Dennis Casley	June 1988	H. Vallanasco 37591
WPS16 Antidumping Laws and Developing Countries	Patrick Messerlin	June 1988	S. Torrijos 33709
WPS17 Economic Development and the Debt Crisis	Stanley Fischer	June 1988	C. Papik 33396
WPS18 China's Vocationa: and Technical Training	Harold Noah John Middleton	June 1988	W. Ketema 33651
WPS19 Cote d'Ivoire's Vocational and Technical Education	Christiaan Grootaert	June 1988	R. Vartanian 34678
WPS20 Imports and Growth in Africa	Ramon Lopez Vinod Thomas	June 1988	61679
WPS21 Effects of European VERs on Japanese Autos	Jaime de Melo Patrick Messerlin	June 1988	S. Fallon 61680
WPS22 Methodological Problems in Cross-Country Analyses of Economic Growth	Jean-Paul Azam Sylviane Guillaumont	June 1988	E. Zamora 33706
WPS23 Cost-Effective Integration of Immunization and Basic Health Services in Developing Countries: The Problem of Joint Costs	A. Mead Over, Jr.		
WPS24 Review of World Bank Investments in Vocational Education and Training for Industry	John Middleton Terri Demsky		