



Living Standards  
Measurement Study  
Working Paper No. 29

**LSM - 29**  
MAY 1988

## **The Distribution of Welfare in Côte d'Ivoire in 1985**

**Paul Glewwe**

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(List continues on the inside back cover)

## **The Distribution of Welfare in Côte d'Ivoire in 1985**

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LSMS Working Paper  
Number 29

# **The Distribution of Welfare in Côte d'Ivoire in 1985**

Paul Glewwe

The World Bank  
Washington, D.C., U.S.A.

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Washington, D.C. 20433, U.S.A.

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First printing May 1988

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Paul Glewwe was an economist in the Welfare and Human Resources Division of the World Bank's Population and Human Resources Department when this paper was written.

#### **Library of Congress Cataloging-in-Publication Data**

Glewwe, Paul, 1958-

The distribution of welfare in Côte d'Ivoire in 1985 / Paul Glewwe.

p. cm. -- (LSMS working paper, ISSN 0253-4517 ; no. 29)

Bibliography: p.

ISBN 0-8213-1053-4

1. Cost and standard of living--Ivory Coast. 2. Consumption (Economics)--Ivory Coast. 3. Households--Ivory Coast. I. Title. II. Series.

HD7067.G55 1988

339.2'09666'8--dc19

88-14073

### ABSTRACT

This paper examines the distribution of welfare in Côte d'Ivoire (Ivory Coast) in 1985 as measured by per capita consumption expenditures. The data employed are from the 1985 Côte d'Ivoire Living Standards Survey. While it is meant to be primarily descriptive in nature, possible explanations of particular patterns in the distribution of welfare are offered at several points. The major findings are: 1. The urban population in Côte d'Ivoire is substantially better off than the rural population, and the poor in Côte d'Ivoire are overwhelmingly found in agricultural pursuits in rural areas. 2. There is a strong association between education and welfare, which highlights the importance of educational policies, particularly those affecting the school attendance of children. 3. Household composition, more specifically the proportion of household members who are children or who are employed, does not explain why some households are poor - poor households have a larger proportion of working members and a lower proportion of children than do other households.

**ACKNOWLEDGMENT**

This report is based on The Côte d'Ivoire Living Standards Survey, which was conducted in 1985 by the World Bank's Living Standards Unit and the Direction de la Statistique, Ministère de l'Economie et des Finances of the Republic of Côte d'Ivoire.

I would like to thank the entire staff from the Bureau of Statistics, with special thanks to Méité Nediembo, Director of Statistics; Bakary Daho, Project Director; Idrissa Quattara, Deputy Project Director; Roch Sopri, Assistant Deputy Project Director; and Kouakou Chia Blé, Computer Programming Specialist. Finally I am indebted to Carmen Martinez for typing several drafts of this paper.

**Table of Contents**

	<b>Page</b>
I. Introduction.....	1
II. Consumption Data as an Indicator of Welfare.....	3
III. The Distribution of Consumption in Côte d'Ivoire.....	8
A. The Distribution of Consumption Expenditures by Population Deciles.....	8
B. Characteristics of Households by Per Capita Expenditure Groups.....	10
C. School Attendance, Housing and Ownership of Durables.....	19
IV. Inequality in Cote d'Ivoire.....	27
A. Historical Comparison with Other Countries.....	27
B. Regional Inequality Decomposition.....	28
C. Decomposition by Nationality and Ethnic Groups.....	30
D. Decomposition by Educational Attainment.....	33
V. Characteristics of the Poor in Côte d'Ivoire.....	36
A. Poverty in Côte d'Ivoire - A National Profile.....	36
B. Poverty in Urban Côte d'Ivoire.....	45
C. Poverty in Rural Côte d'Ivoire.....	53
VII. Conclusion.....	62
REFERENCES.....	65
Appendix A: The Côte d'Ivoire Living Standards Survey.....	67
Appendix B: Food Consumption as a Welfare Measure.....	75
Appendix C: Measurement of Inequality.....	78

**Tables**

	Page
Table 1: Welfare Indicators of Côte d'Ivoire and Sri Lanka.....	7
Table 2: Distribution of Total Consumption by Welfare Deciles.....	9
Table 3: Characteristics of Households by Quintiles.....	11
Table 4: Characteristics of Households by Regions.....	13
Table 5: Sex of Head of Households Within Regions, by Quintiles.....	16
Table 6: School Attendance by Welfare Quintiles.....	21
Table 7: Housing Characteristics in Côte d'Ivoire.....	23
Table 8: Ownership of Durables by Quintiles and Regions.....	25
Table 9: Gini Coefficients on Per Capita Income.....	28
Table 10: Per Capita Expenditure Inequality-Decomposed by Region.....	30
Table 11: Per Capita Expenditure Inequality-Decomposed by Nationality.....	31
Table 12: Per Capita Expenditure Inequality-Decomposed by Ethnic Groups.....	32
Table 13: Per Capita Expenditure Inequality-Decomposed by Education of Head.....	34
Table 14: Household Size and Per Capita Consumption of the Poor.....	37
Table 15: Sex of Household Head Among the Poor.....	38
Table 16: Distribution of the Poor by Regions.....	38
Table 17: Distribution of the Poor by Ethnic Group.....	39
Table 18: Distribution of the Poor by Employer and Occupation.....	40
Table 19: Distribution of the Poor by Educational Level.....	41
Table 20: Illness, School Attendance and Housing of the Poor.....	43
Table 21: Composition of Household Members Among the Poor.....	44

Table 22:	Household Size and Per Capita Consumption of the Urban Poor.....	46
Table 23:	Sex of Household Head Among the Urban Poor.....	47
Table 24:	Nationality and Ethnic Group Among the Urban Poor.....	47
Table 25:	Distribution of the Urban Poor by Employer and Occupation....	49
Table 26:	Education and Poverty in Urban Areas.....	50
Table 27:	Housing Characteristics of the Urban Poor.....	51
Table 28:	Household Composition Among the Urban Poor.....	52
Table 29:	Household Size per Capita Consumption of the Rural Poor.....	54
Table 30:	Sex of Household Head Among the Rural Poor.....	55
Table 31:	Nationality and Ethnic Group Among the Rural Poor.....	56
Table 32:	Distribution of the Rural Poor by Employer and Occupation....	57
Table 33:	Education and Poverty in Rural Areas.....	58
Table 34:	Housing Characteristics of the Rural Poor.....	59
Table 35:	Household Composition Among the Rural Poor.....	60
Table A.1:	Regional Price Indices in Côte d'Ivoire, 1985.....	71
Table A.2:	Welfare Deciles According to Different Welfare Measures.....	72
Table A.3:	Composition of Total Consumption in Côte d'Ivoire, 1985.....	74
Table B.1:	Distribution of Food Consumption by Food Consumption Deciles.....	76

## I. Introduction

The distribution of the benefits of economic growth in developing countries is a subject which has received much attention since at least the early 1970's. It is generally accepted that the success of any economic policy is in part measured by the extent to which it promotes equity. However, the information necessary to measure the impact of recent policies on the distribution of goods and services is often lacking in the developing world. This is particularly the case in sub-Saharan Africa, which contains many of the poorest countries and which has suffered severe setbacks since the 1960's.

This paper examines the distribution of welfare in The Republic of Côte d'Ivoire (Ivory Coast) in 1985. Although Côte d'Ivoire is not typical of African countries in that its economy has grown substantially since its independence in 1960, its success recommends its policies to other African countries and in this sense an analysis of the distribution of welfare under these policies is relevant to the future of all African countries that wish to emulate its prosperity. In addition, several characteristics of Côte d'Ivoire, such as a large agro-export industry, a substantial variation in agroclimatic zones within the country, and a mixture of different ethnic and religious groups, are common to many sub-Saharan African countries. Given the high quality of data from Côte d'Ivoire and the dearth of data from other African countries, an examination of the distribution of welfare in Côte d'Ivoire is a first step towards investigating the distribution of welfare in sub-Saharan Africa. It also has implications for the debate on growth vs. equity among development economists (see Bhagwati, 1985, and Chenery, 1974).

The distribution of welfare in Côte d'Ivoire is also of interest in its own right given recent developments in the Ivorian economy. After 20 years of rapid economic growth (see den Tuinder, 1978), total GDP began to decline in 1980. By 1985, private consumption expenditures per capita had fallen 26.0% relative to 1980. Although preliminary data point to future recovery, the distributional aspects of these recent developments have never been analyzed. An examination of the distribution of welfare in 1985 is important for understanding the welfare effects of Côte d'Ivoire's recent economic decline.

The organization of this paper is as follows: Section II discusses the theoretical basis of consumption expenditures as a measure of welfare. The next section presents a detailed description of the distribution of consumption expenditures in Côte d'Ivoire. The fourth section analyzes the distribution of welfare using summary measures of inequality, and the fifth section provides a profile of the poor in Côte d'Ivoire. A final section concludes the paper.

## II. Consumption Data as an Indicator of Welfare

Most empirical work on the distribution of welfare is done using either expenditure or income data recorded in household surveys. This is intuitively appealing but it is important to review the theoretical framework which allows one to draw the link between the distribution of income or expenditures and the distribution of welfare. This is found in the branch of economic theory known as welfare economics.

The starting point of applied welfare economics is a social welfare function which takes the Bergson-Samuelson form (i.e. social welfare is a function of the utility levels of individuals). It is further assumed that individuals possess the same utility function. If one examines households rather than individuals it is assumed the households possess the same utility function, which has among its arguments the compositional characteristics of the household (e.g. number and ages of household members). Because individual utility functions are observationally equivalent under any monotonic transformation, it is necessary to find a method of labeling indifference curves which: 1) allows one to distinguish between individuals at different levels of utility given observable data; 2) does not imply any particular cardinalization of the common individual utility function. This can be done using "money-metric" utility, which is the amount of money required (given a set of prices and the assumption of utility maximization) to attain a specified level of utility.

The use of money-metric utility to compare different utility curves assumes that total consumption, as opposed to total income, represents the

welfare levels of individuals.<sup>1/</sup> Using consumption rather than income data is also supported by the argument that the former is a better indicator of life-cycle welfare than the latter because income may fluctuate over short periods of time while consumption is allocated more evenly ("smoothed") over time. Furthermore, consumption data are likely to be more reliable than income data because the former are less sensitive information from the perspective of the survey respondents. Finally, consumption data are preferable because it is difficult to measure the income of self-employed workers.

Once the choice has been made to compare the welfare of households by comparing their total consumption expenditures,<sup>2/</sup> new issues arise which must be addressed. Specifically, some have argued that food expenditure data are better for measurement of welfare than total expenditure data (Anand and Harris, 1985). Several reasons can be offered: 1) Consumption of food is less susceptible to economies of scale within households than consumption of nonfood items; 2) Construction of price indices is easier for food expenditures; 3) Imputation of use values to durable goods and owner-occupied housing is not necessary if one examines only food expenditure data; and 4) Food expenditure data are thought to be more accurate than those on

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<sup>1/</sup> This would not be the case if savings (i.e. income minus consumption) is an argument in the utility function. In this paper the standard practice of considering savings to be delayed consumption, so that it does not enter into the utility function as a separate argument, will be followed.

<sup>2/</sup> In the remainder of this paper the terms "expenditures" and "consumption" are used interchangeably. For goods which are purchased intermittently (i.e. durable goods and housing), consumption and expenditures are not simultaneous. The expenditure variable used here "spreads out" such expenditures so that they do represent actual consumption (see Appendix A). Also, consumption of home-grown food and other inkind income is given monetary value so that expenditures include consumption of these items.

non-food expenditures. This paper will examine total expenditures rather than food expenditures. The reasoning for this choice is given in Appendix B, but the general argument is that use of food expenditures to rank households implies that better off households have the same food shares (percentage of expenditures spent on food) as poor households, which is difficult to accept. However, the arguments raised in the previous paragraph must be answered. The steps taken to deal with these problems are discussed in Appendix A, with the exception of the first argument, which will now be considered.

It has often been asserted that additional household members, particularly children, are less "costly", in the sense of requiring additional expenditures to maintain the welfare levels of original household members, relative to the initial cost of attaining that level of welfare by a household composed of a single person or a childless couple. This assertion is supported by both common experience and economic reasoning. Clothing and other items can be handed down from older to younger children, durable goods such as radios and refrigerators can be enjoyed by additional household members at no extra cost, and even in the case of food, children consume less food than adults. Indeed, empirical work has consistently shown that the welfare of larger households (given a fixed level of household expenditures) is not strictly inversely related to household size (van der Gaag, 1982). The method of adjusting for this phenomenon is the estimation of "adult equivalent scales", which measure the "cost" of additional household members in terms of fractions of adults (cf. Deaton and Muellbauer, 1980, Ch. 8).

A rigorous construction of adult equivalent scales for Côte d'Ivoire in 1985 is no small task and lies beyond the scope of this paper. However,

one can reasonably assume that adult equivalent scales lie between zero and unity, i.e. that an additional member will present increased costs to other household members but not to the point where household welfare is measured by per capita expenditure. In this paper children will be given smaller weight than adults; in terms of adult equivalents children less than seven years old will have a weight of 0.2, children between the ages of seven and twelve will have a weight of 0.3, and children between the ages of thirteen and seventeen will receive weights of 0.5. These weights are consistent with those estimated for Sri Lanka and Indonesia by Deaton and Muellbauer (1986). The sum of these weights for each household is used to divide household expenditures to arrive at a measure of household welfare. For lack of data on the intra-household distribution of goods and services, it is assumed that each individual has the same level of welfare as the household as a whole. All comparisons will be made between individuals (not households) after their welfare level has been assigned.

Before examining the data in Côte d'Ivoire, it should be pointed out that welfare measurement using consumption data may not cover all aspects of one's idea of what welfare is. Welfare rankings based on adjusted per capita expenditures omit some important but difficult to measure components of welfare, particularly the health status of individuals. In a given country the health of individuals may be roughly comparable, but comparison between different countries may not be possible without strong disclaimers. This point can be illustrated by comparing two very different countries - Côte d'Ivoire and Sri Lanka.

Table 1 presents some figures relevant for welfare comparisons from Côte d'Ivoire and Sri Lanka. They are given here for illustrative purposes

only. The figures show that Sri Lanka does relatively well in non-consumption measures of welfare, such as life expectancy, infant mortality and the adult literacy rate, while Côte d'Ivoire has a substantially higher GNP per capita, which is clearly a consumption-based measure. There is no clear method to make welfare judgments across these two countries and no attempt will be made here. However, it should be borne in mind that the welfare comparisons in Côte d'Ivoire made in this paper are essentially based on consumption measures of welfare and thus ignore aspects of living standards which are much more difficult to measure.

**Table 1: Welfare Indicators of Côte d'Ivoire and Sri Lanka**

Welfare Measure	Côte d'Ivoire	Sri Lanka
GNP per Capita (1984)	\$610	\$360
Life Expectancy (1984)	52	70
Infant Mortality Rate (1984)	106	37
Adult Literacy Rate (1980)	35%	85%

Source: World Bank (1983, 1986).

This completes the discussion of the framework used in this paper for examining the distribution of welfare in Côte d'Ivoire. Appendix A describes the data in detail and shows how they are modified to correct for the problems discussed above. The following section examines the distribution of welfare (as measured by consumption) in Côte d'Ivoire.

### III. The Distribution of Consumption in Côte d'Ivoire

This section provides descriptive data on the distribution of welfare in Côte d'Ivoire as measured by total consumption expenditures. The first subsection examines the shares of total consumption going to population deciles ranked according to their welfare levels. The second subsection provides information on the characteristics of households by consumption quintiles and by different regions in Côte d'Ivoire. The third subsection examines school attendance, housing and ownership of durable goods, by welfare levels.

#### A. The Distribution of Consumption Expenditures by Population Deciles

This subsection examines the distribution of total consumption by population deciles, where Decile 1 contains the poorest 10% of the population (as measured by adjusted per capita consumption expenditures - see Appendix A for details), Decile 2 contains the next poorest 10%, etc., and Decile 10 contains the "wealthiest" 10% of the population. Table 2 gives data on per capita consumption expenditures for all ten population deciles as given by household expenditures divided by household size (unadjusted) and also by household consumption divided by adult equivalents (adjusted). Of course, weighting children as fractions of adults leads to higher means for the latter as compared with the former, but there is little difference in the distribution of welfare using either method. The data in Table 2 indicate that the use of per capita total consumption expenditures as a welfare indicator results in broad rankings consistent with Engel's law - as the welfare of individuals rises the percentage of total consumption devoted to food declines. They also reveal the degree of inequality - the poorest 40% of the population receive 14-15% of total consumption while the wealthiest 20% receive 49-51%.

**Table 2: Distribution of Total Consumption  
by Welfare Deciles**

Decile	Mean Per Capita Annual Expenditures (CFAF x 1000)		% of Total Expenditures in Côte d'Ivoire		Food Share (%) of Total Expenditures within each Decile	
	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted
1	69.5	42.5	1.98	1.96	0.711	0.709
2	114.5	68.9	3.26	3.18	0.660	0.680
3	154.0	93.1	4.39	4.30	0.659	0.635
4	189.0	113.2	5.39	5.23	0.622	0.624
5	227.0	135.5	6.47	6.26	0.596	0.609
6	271.4	163.0	7.73	7.53	0.591	0.595
7	334.3	199.5	9.53	9.21	0.569	0.550
8	415.4	255.6	11.84	11.80	0.499	0.506
9	556.9	344.8	15.87	15.93	0.478	0.488
10	1177.0	749.3	33.55	34.60	0.352	0.348
All Côte d'Ivoire	350.9	216.5	100.00	100.0	0.489	0.487

A comparison of the data in Table 2 with comparable data from other countries would provide information on differences in the distribution of welfare between Côte d'Ivoire and other countries. Unfortunately, comparable data are almost non-existent. However, data on income inequality are available and will be discussed in Section IV.

## B. Characteristics of Households by Per Capita Expenditure Groups

The previous subsection gives some information on the distribution of welfare in Côte d'Ivoire but it reveals almost nothing about the welfare levels of different population groups. In this subsection the welfare levels of different groups within the Ivorian population will be compared. Table 3 presents tabulations which divide the total population into five welfare groups (quintiles). The first quintile contains the poorest 20% of the population as defined by adjusted (i.e. smaller weights for children) per capita expenditures, the second contains the next poorest 20%, etc., and the fifth contains the wealthiest 20% of the Ivorian population. Each quintile is then characterized by the proportion of people who belong to different population groups within that quintile. The groupings within quintiles are: 1) Region in which the household resides; 2) Sex of the head of household; 3) Nationality of the head of household; 4) Ethnic group (tribe) of the household; 5) Type of employer of the head of household; 6) Occupation of the head of household; and 7) Highest grade completed by the head of household. In addition, mean per capita consumption expenditures (both adjusted and not adjusted by adult equivalent scales) are given for each group. Table 4 provides the breakdowns of these groupings according to regions, which is useful in interpreting the data in Table 3.

The composition of quintiles according to regions reveals that Abidjan (the colonial capital and largest city) is home to relatively well off households. Other urban areas are also relatively wealthy. The poorest region is the Savannah, followed by the densely populated East Forest, region. The West Forest region, which has relatively recent settlements and is less heavily populated than the East Forest, contains households that are

Table 3: Characteristics of Households by Quintiles

Characteristic	All Côte d'Ivoire	Breakdown within Quintiles					Mean Expend. per Capita (CFAF x 1000 per year)	
		Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Adjusted	Unadjusted
<u>Region</u>								
Abidjan	18.8	3.3	5.2	13.4	29.2	42.8	633.8	402.3
Other Urban	22.4	7.0	18.1	28.2	27.1	31.8	412.7	253.3
West Forest	15.2	8.8	19.6	21.9	14.9	11.0	296.0	182.2
East Forest	24.7	35.2	35.4	22.5	19.9	10.6	246.2	146.5
Savannah	18.9	45.7	21.8	14.1	9.0	3.9	177.7	107.7
<u>Sex of Head</u>								
Male	90.0	93.7	90.1	89.0	88.2	89.1	347.7	212.7
Female	10.0	6.3	9.9	11.0	11.8	10.9	379.5	250.9
<u>Nationality</u>								
Ivorian	85.7	89.3	84.6	85.4	82.4	86.9	350.6	216.5
Burkino	6.2	5.6	7.2	7.8	6.8	3.7	287.8	177.6
Mali	4.0	2.5	5.5	2.9	6.0	3.1	359.3	203.5
Guinea	1.9	2.1	1.8	2.3	2.0	1.2	297.2	180.9
Ghana	0.2	0.0	0.4	0.2	0.4	0.2	423.7	374.8
Other African	1.8	0.5	0.2	1.3	2.4	4.5	582.6	374.3
Other	0.1	0.0	0.3	0.0	0.0	0.4	770.6	543.9
<u>Ethnic Group</u>								
Akan	38.1	37.6	42.6	34.7	35.0	40.9	354.6	217.2
Krou	13.9	7.9	11.6	20.3	16.9	12.8	367.5	228.5
Mande (North)	13.0	17.8	12.1	9.0	14.4	11.4	338.5	208.6
Mande (South)	11.2	6.2	11.3	13.8	9.9	14.6	388.9	244.2
Voltaic	9.5	21.0	6.5	8.8	5.6	5.7	244.7	153.0
Non-Ivorian	14.1	9.2	15.4	13.4	18.2	14.1	378.8	231.5
Other	0.3	0.3	0.5	0.0	0.0	0.5	290.9	213.4

Table 3: Characteristics of Households by Quintiles  
(Continued)

Characteristic	All Côte d'Ivoire	Breakdown with Quintiles					Mean Expend. per Capita (CFAF x 1000 per year)	
		Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Adjusted	Unadjusted
<u>Employer of Head</u>								
None	1.1	0.2	0.3	1.0	1.5	2.6	516.6	362.9
Government	11.4	1.1	3.0	9.0	13.6	30.3	665.0	409.8
Parastatal	1.3	0.0	0.0	1.0	1.9	3.4	550.3	346.8
Private	12.5	2.2	5.5	15.6	14.5	24.6	511.5	318.5
Self-employed	73.8	96.6	91.2	73.4	68.6	39.2	269.5	165.1
<u>Occupation of Head</u>								
None	0.9	0.2	0.3	0.5	1.5	2.2	553.4	391.8
Agricultural	60.3	90.1	81.1	60.8	46.2	23.3	232.4	142.1
Sales/Services	20.5	6.0	12.0	23.4	32.7	28.2	430.0	263.0
Constr./Mfg.	4.7	2.0	3.3	6.8	5.7	5.9	385.6	237.7
White Collar	11.7	0.5	3.0	7.5	11.9	35.8	773.8	485.4
Other	1.9	1.3	0.2	1.2	2.1	4.9	467.9	284.6
<u>Highest Grade Complete by Head</u>								
None	65.3	86.2	80.7	67.9	58.9	32.9	254.7	156.8
Elem. (1-7)	18.5	12.8	17.0	21.0	24.5	17.2	329.5	203.5
Middle (8-11)	9.7	0.9	2.3	8.2	13.2	24.1	590.8	350.8
HS (12-14)	4.0	0.0	0.0	2.3	3.1	14.8	828.4	526.4
University	2.4	0.2	0.0	0.5	0.4	11.1	1348.9	872.5

- Note: 1. All figures are in terms of the percentage of the population living in households with the relevant characteristics.
2. If the head of the household was not employed, characteristics are taken from the household member who earned the highest income (money and in-kind) from a paid occupation. (Self-employment is a paid occupation if some of the product is sold).

Table 4: Characteristics of Households by Regions

Characteristic	All Côte d'Ivoire	Breakdown by Regions				
		Abidjan	Other Urban	West Forest	East Forest	Savannah
<u>Sex of Head</u>						
Male	90.0	82.0	87.3	95.2	91.5	95.2
Female	10.0	18.0	12.7	4.8	8.6	4.8
<u>Nationality</u>						
Ivorian	85.7	77.2	84.5	81.0	86.9	98.1
Burkino	6.2	6.7	5.7	7.6	9.9	0.4
Mali	4.0	9.2	4.1	5.0	2.1	0.4
Guinea	1.9	2.4	1.6	4.9	0.4	1.2
Ghana	0.2	0.2	0.8	0.0	0.1	0.0
Other Africa	1.8	4.2	3.3	1.1	0.4	0.0
Other	0.3	0.1	0.0	0.4	0.3	0.0
<u>Ethnic Group</u>						
Akan	38.1	31.0	38.2	1.8	68.0	35.4
Krou	13.9	10.9	12.7	45.3	8.5	0.0
Mande (North)	13.0	14.8	16.5	7.5	3.5	23.7
Mande (South)	11.2	10.9	5.6	26.7	6.8	11.4
Votaic	9.5	7.9	11.3	0.7	0.6	27.9
Non-Ivorian	14.1	24.5	15.3	18.1	12.0	1.7
Other	0.3	0.0	0.4	0.0	0.7	0.0
<u>Employer of Head</u>						
None	1.1	2.4	1.2	0.8	0.5	0.8
Government	11.4	22.4	26.9	0.5	3.4	1.3
Parastatal	1.3	4.2	1.6	0.0	0.3	0.2
Private	12.5	39.0	15.9	2.8	2.9	2.3
Self-Employment	73.8	32.0	54.4	96.0	92.9	95.5

**Table 4: Characteristics of Households by Regions  
(Continued)**

Characteristic	All Côte d'Ivoire	Breakdown by Regions				
		Abidjan	Other Urban	West Forest	East Forest	Savannah
<u>Occupation of Head</u>						
None	0.9	2.4	0.9	0.8	0.5	0.2
Agricultural	60.3	1.7	31.4	87.1	88.5	94.3
Sales/Services	20.5	45.4	39.5	8.4	5.1	2.9
Constr./Mfg.	4.7	13.2	6.5	1.1	2.1	0.7
White Col./Mgr.	11.7	35.2	17.5	0.6	3.4	1.5
Other	1.9	2.2	4.3	2.1	0.3	0.5
<u>Highest Grade Completed by Head</u>						
None	65.3	36.5	51.0	70.5	75.5	93.5
Elem. (1-7)	18.5	21.8	21.8	24.9	20.0	4.2
Middle (8-11)	9.7	23.7	14.8	4.6	3.4	2.3
H. Sch.(12-14)	4.0	10.1	8.2	0.0	1.1	0.1
University	2.4	8.0	4.2	0.0	0.0	0.0
<u>Per Capita Expenditures (CFAFxl000)</u>						
Adjusted	350.9	633.8	412.7	296.0	246.2	177.7
Unadjusted	216.5	402.3	253.3	182.2	146.5	107.7

- Note: 1. All figures are in terms of the percentage of the population living in households with the relevant characteristics.
2. If the head of the household was not employed, characteristics are taken from the household member who earned the highest income (money and in-kind) from a paid occupation. (Self-employment is a paid occupation if some of the product is sold).

mostly in the middle quintiles. Of course, one should not infer that movement from rural to urban areas will result in a poor person becoming rich. As will be seen below, the educational level of the head of household is strongly correlated with welfare levels, so that high levels of welfare in urban areas reflect their relatively well educated residents.

Perhaps the most surprising information in Table 3 is that households headed by women have higher welfare levels than those headed by men. This is in contrast with many other developed and developing countries, where female-headed households are most often poorer than those headed by males. Part of the explanation of the situation in Côte d'Ivoire lies in the fact that female-headed households are disproportionately found in Abidjan and other urban areas and are relatively rare in the rural areas. If one examines quintiles within urban and rural areas female-headed households are slightly poorer than average in urban areas but not necessarily so in rural areas, particularly the East Forest region. This information is given in Table 5. In any case, it seems that female-headed households are not significantly worse off than those headed by males in Côte d'Ivoire.

Differences in quintile composition by nationality show few patterns. Ivoirians, who comprise 85.7% of the surveyed population, <sup>1/</sup> are fairly evenly spread over all welfare levels. Citizens of Burkino Faso, Mali and Guinea are over-represented in the lower quintiles while Ghanaians and other Africans (who are predominantly found in urban areas - see Table 4) are

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<sup>1/</sup> There is some evidence that the non-Ivorian population is under-sampled in the CILSS.

**Table 5: Sex of Head of Household Within Regions, by Quintiles**

Region	Sex of Head	Entire Region	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Mean Exp. Per Capita (CFAFx1000 per year)	
								Adjusted	Unadjusted
Urban	Male	80.8	71.7	79.3	82.8	86.5	81.3	658.3	412.5
	Female	19.2	19.2	20.7	17.2	13.5	18.7	522.6	355.7
Other Urban	Male	86.2	86.0	80.8	86.6	87.5	88.2	419.7	255.1
	Female	13.8	14.0	19.2	13.4	12.5	11.8	364.5	240.9
West Forest	Male	93.7	90.9	95.2	91.7	98.0	92.5	296.0	181.2
	Female	6.3	9.1	4.8	8.3	2.0	7.6	291.0	201.6
East Forest	Male	90.3	93.9	98.5	87.0	90.8	83.7	241.5	143.4
	Female	9.7	6.2	1.5	13.0	9.2	16.3	296.9	179.0
Savannah	Male	92.7	90.2	90.9	91.5	94.0	96.1	178.8	108.2
	Female	7.3	9.8	10.0	8.5	6.0	4.0	156.1	97.5

better off than the typical Ivorian. Yet Ghanaians and other Africans amount to only 2% of the total population of Côte d'Ivoire.

The distribution of welfare by ethnic groups reveals that most tribal groups have roughly the same distribution within quintiles, except that Voltaic households clearly have lower welfare levels on average. Much of this is due to the fact that Voltaics are found predominantly in the Savannah area (see Table 4), which is the poorest region of the Côte d'Ivoire. Given that the Savannah area has low levels of educational attainment (Table 4) it is possible that the low living standards of Voltaics are in part a result of low educational levels. The correlation between schooling and welfare is discussed below.

As in many other developing countries, working for the government or for a large private firm is strongly correlated with welfare levels. Individuals living in households in which the head works for the government are most often found in quintiles three, four and five. The same is true to the lesser extent of those living in households where the head works for parastatal firms (government-owned corporations) or for private firms. On the other hand, households headed by self-employed workers (most of whom are farmers) are predominant in the lower quintiles. One can see in Table 4 that the type of employer is strongly correlated with different regions - government, parastatal and private sector jobs are common in urban areas while the self-employed compose nearly the entire rural labor force. An interesting observation from Table 3 is that individuals living in households where the head (and all other family members - see note 2 of Table 3) was not working have higher welfare levels than most Ivorian households. It seems that unemployment is more common among the well to do than among the poorer

households in Côte d'Ivoire. Of course, some of these households may be entirely composed of retired persons living on pensions or other sources of transfer income.

Welfare differences by the occupation of the head of household also display patterns commonly found in developing countries. Households with low levels of welfare are predominantly in agricultural pursuits, while households in which the head works in construction and manufacturing or sales and services have higher welfare levels, and those in white collar or management occupations have the highest of all. One can see from Table 4 that these patterns are related by region - rural areas are predominantly agricultural while urban areas have many households in which the head was in sales and services, construction and manufacturing, or a white collar or management occupation.

The last grouping is potentially the most informative, since education is virtually always found to have strong explanatory power in the earnings of workers and the Ivory Coast is no exception (van der Gaag and Vijverberg, 1986). Eighty-six percent of the poorest 20% of the population lived in households where the head had no education at all, while only 1.1% of these poor households had a head with a middle school, high school or university education. In contrast, only 32.9% of the wealthiest 20% of the population lived in "no education" households, which compares to a figure of 50.0 percent for households where the head had a middle school or higher education. One can see in Table 4 that households with better educated heads are found in urban areas, particularly Abidjan, while less educated heads predominate in rural areas, particularly the Savannah.

The extent to which education brings about (though strict causality is not demonstrated in this paper) differences in the welfare of households is to some extent underestimated by the figures given, since the educational levels of household members other than the head are not accounted for in the figures in Table 3. In many households the head may be an older family member who is no longer the main contributor to household income, and thus his or her educational level may not be the most relevant one for judging the effect of the education of household members on levels of welfare.

In any case, there is little doubt that education is strongly correlated with (and almost certainly a major determinant of) the welfare levels of households in Côte d'Ivoire. This correlation between education and welfare has important implications for policy, particularly in terms of the distributional impact. The World Bank (1986) reports that 40% of Ivorian children of primary school age have no access to any form of education, while at the same time large amounts of funds are spent on the few students in higher education. A reorientation of government policies toward a more equitable educational system would seem to be in order if the benefits of economic growth are to be more evenly distributed.

### C. School Attendance, Housing and Ownership of Durables

The information collected in the Côte d'Ivoire Living Standards Survey allows for some interesting observations to be made on the decisions households make, particularly the differences seen among households at different levels of welfare. In this section differences in school attendance, housing and ownership of durables by welfare quintiles will be examined.

One of the most important questions concerning the nature of poverty in any country is whether the poor constitute the same group of people over long periods of time or whether there is a large amount of entry in and exit from the ranks of the poor over the years. An important aspect of this is whether children who come from poor families are likely to be poor when they become adults and have their own families. Given the strong positive correlation found between education and levels of welfare in the previous section, the relationship between welfare levels and school attendance of children deserves serious attention. This data is given in Table 6.

Before discussing the data in Table 6 it is useful to make three observations. First, school attendance can be thought of as an interaction of supply and demand. In other words low school attendance is in part due to a family decisions based on the opportunity cost of schooling (demand for schooling) and in part on the availability and quality of school facilities (supply of schooling). Neither side should be neglected when analyzing patterns in school attendance. Second, the school attendance figures given in Table 6 are artificially low because children who were on summer vacation were not counted as attending school. Third, there is evidence in Côte d'Ivoire and other African countries that children begin school at a relatively late age (thus lowering the figure for ages 6-10) and often repeat grades (thus raising the figure for ages 11-15).

In Côte d'Ivoire as a whole school attendance rises as one moves from poorer to wealthier households for both age groups. Yet to some extent this may be an artifact of differences in welfare levels among regions. In fact, within regions the relationship between welfare levels and school attendance is weak, showing no clear monotonic pattern. Even though it is almost always the case that the poorest quintile has lower school attendance than average,

**Table 6: School Attendance by Welfare Quintiles**

	Entire Region	Quintiles				
		1	2	3	4	5
<u>All Côte d'Ivoire</u>						
Ages 6-10	50.5	32.9	45.2	51.6	57.2	64.0
Ages 11-15	49.6	32.4	43.8	53.5	55.1	58.1
<u>Abidjan</u>						
Ages 6-10	54.0	40.0	42.5	60.3	63.8	64.2
Ages 11-15	49.3	35.0	51.2	51.5	48.9	56.8
<u>Other Urban</u>						
Ages 6-10	63.0	38.5	61.7	68.9	73.2	66.0
Ages 11-15	59.4	54.4	61.2	58.6	63.0	58.7
<u>West Forest</u>						
Ages 6-10	49.7	54.4	50.7	50.8	43.7	49.4
Ages 11-15	46.9	36.0	39.7	59.2	44.2	59.1
<u>East Forest</u>						
Ages 6-10	55.5	33.6	55.7	59.8	59.8	65.0
Ages 11-15	54.8	38.1	53.3	60.0	57.0	67.4
<u>Savannah</u>						
Ages 6-10	26.2	13.9	21.1	32.9	33.0	28.4
Ages 11-15	25.3	21.1	25.0	27.1	14.9	38.0

**Note:** Within each of the five sectors quintiles are defined with respect to those sectors (e.g. poorest 20% of all Abidjan residents, not the poorest 20% of all Ivorians who also happen to live in Abidjan).

while that of the wealthiest quintile is higher than average, the absolute differences are not dramatically large. <sup>1/</sup> Differences in school attendance are much more apparent between regions, particularly the low school attendance in the Savannah. It is also curious that the Other Urban and East Forest regions have higher school attendance than does Abidjan.

Given that school attendance is lowest in the Savannah, that the poorest people in Côte d'Ivoire are found in that region, and the findings in the previous subsection that education is strongly correlated with household welfare, the outlook for the welfare of Ivoirians in the Savannah region is not good. One cannot determine with certainty whether low school attendance is primarily due to some opportunity cost of schooling or the lack of good school facilities without an extended discussion beyond the scope of this paper. Yet the fact that 40% of primary school children do not have access to facilities and the low correlation between welfare levels and school attendance within regions suggest that the problems is a lack of good facilities. As pointed out above, this has direct policy implications for the Ivorian educational system.

Housing conditions are important measures of welfare themselves, and they also have indirect implications for welfare, particularly in the area of health. Table 7 gives information on sources of drinking water, sources of lighting and the type of toilet used by welfare quintiles and by regions.

In Côte d'Ivoire as a whole, there are a variety of sources of drinking water, some of which are clearly preferred by wealthier households,

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<sup>1/</sup> It is possible that wealthier households send some children away to school, so that those remaining at home underestimate the fraction attending school. But this is most likely to occur among older children.

Table 7: Housing Characteristics in Côte d'Ivoire

	All Côte d'Ivoire	Quintiles				
		1	2	3	4	5
<u>Source of Drinking Water</u>						
Indoor Faucet	14.1	1.6	1.3	7.8	15.3	44.5
Outdoor Faucet	10.2	0.8	6.0	12.1	14.5	17.6
Water Vendor	10.4	3.2	8.1	10.8	18.6	11.4
Pump Well	27.7	52.2	34.7	29.3	13.5	8.8
Other Well	26.3	26.9	32.8	29.1	30.1	12.8
Rain, Lake, River	10.8	15.0	16.8	10.4	7.5	4.3
Other	0.5	0.4	0.4	0.5	0.6	0.7
<u>Source of Lighting</u>						
Electric	41.6	13.2	21.3	43.0	55.8	74.8
Gas	0.2	0.3	0.0	0.2	0.4	0.0
Candles/Oil Lamps	58.2	86.5	78.7	56.8	43.9	25.2
<u>Type of Toilet</u>						
Flush	22.0	3.4	4.2	17.6	27.9	57.0
Pit	41.8	40.4	45.8	43.2	48.6	30.8
None	36.3	56.2	50.1	39.2	23.5	12.2
	All Côte d'Ivoire	Abidjan	Other Urban	West Forest	East Forest	Savannah
<u>Source of Drinking Water</u>						
Indoor Faucet	14.1	46.9	21.7	0.0	1.2	0.6
Outdoor Faucet	10.2	8.6	27.6	0.0	8.7	1.3
Water Vendor	10.4	43.9	8.3	0.0	1.3	0.0
Pump Well	27.7	0.0	2.3	37.4	43.4	57.1
Other Well	26.3	0.7	38.6	48.6	28.6	16.4
Rain, Lake, River	10.8	0.0	0.8	14.0	15.5	24.7
Other	0.5	0.0	0.7	0.0	1.4	0.0
<u>Source of Lighting</u>						
Electric	41.6	84.8	78.7	0.9	20.9	14.6
Gas	0.2	0.2	0.2	0.0	0.3	0.2
Candles/Oil Lamps	58.2	15.0	21.1	99.1	78.8	85.2
<u>Type of Toilet</u>						
Flush	22.0	81.4	26.9	0.0	1.7	1.5
Pit	41.8	15.7	66.6	46.7	53.0	19.5
None	36.3	2.9	6.6	53.3	45.3	79.1

such as indoor and outdoor faucets, and others which predominate among poorer households, such as well water and water from natural sources. In Abidjan indoor faucets and water vendors are the most common water sources, while outdoor faucets and (non-pump) wells are common in other urban areas. Residents of rural areas get most of their water from wells and natural sources. In many cases households may have little choice regarding their water supply, so that the patterns by quintiles may to a large extent reflect the region in which the household resides.

The two main sources of lighting, electricity and candles or oil lamps, are clearly inversely related by welfare levels - wealthier households use the former while poorer households use the latter. The breakdown by regions is quite dramatic - urban areas overwhelmingly depend on electric lighting while rural areas are dependent on candles and oil lamps. As with water, the type of lighting may often be out of the household's control.

Finally, the type of toilet in the household displays expected patterns. Poorer households have a pit toilet or no toilet at all, while wealthier households often have flush toilets. Flush toilets are predominant in Abidjan, while pit toilets are the most common in other urban areas and either pit toilet or no toilets at all are typical of rural areas.

A better understanding of choices made by households is given in data on the ownership of durables. Ownership patterns over different welfare levels can be used to identify goods as necessities or luxuries, and to a certain extent may reveal pairs of goods to be complements or substitutes. A full analysis of expenditure patterns is beyond the scope of this paper, but a rough idea is given by the data in Table 8.

Most of the durable goods in Table 8 are luxuries in the sense that wealthier households are more likely to possess them (of course this does not account for the fraction of outlay spent on a particular good). The sole exception is bicycles, which are found among the poorer households because they are most often found in rural areas, where the poorer households reside. One is to some extent surprised by the wide distribution of relatively expensive goods such as refrigerators, televisions, tape players

**Table 8: Ownership of Durables by Quintiles and Regions**

	All Côte d'Ivoire	Quintiles				
		1	2	3	4	5
Sewing Machine	28.3	13.2	23.1	27.2	38.1	40.2
Refrigerator	27.1	5.9	9.8	19.8	38.9	61.1
Fan	26.1	5.5	10.0	23.2	38.6	53.1
Radio	26.8	19.1	28.7	23.1	28.3	34.6
Tape Player	52.2	38.1	42.9	53.6	54.7	71.6
Television	34.5	9.3	15.4	29.9	59.2	68.7
Bicycle	36.3	55.7	49.1	31.2	25.3	20.4
Automobile	12.0	2.1	3.1	4.0	13.5	37.2
	All Côte d'Ivoire	Abidjan	Other Urban	West Forest	East Forest	Savannah
Sewing Machine	28.3	40.5	44.6	12.4	29.8	7.8
Refrigerator	27.1	58.5	51.2	1.9	16.6	1.2
Fan	26.1	51.9	55.9	0.7	12.6	3.0
Radio	26.8	34.1	30.3	20.7	32.8	12.4
Tape Player	52.2	59.5	65.7	48.7	46.7	38.7
Television	34.5	74.8	61.7	9.9	15.7	6.6
Bicycle	36.3	4.6	24.0	28.2	48.5	73.3
Automobile	12.0	26.2	18.0	3.6	9.6	0.5

**Note:** All figures are the percentage of the total population living in households possessing the durable good.

and automobiles. In particular, tape players are much more common than radios, which are presumably less expensive. Even the poorest 20% of the population have purchased a substantial number of tape players, which seem to be quite popular even in the Savannah region.

#### IV. Inequality in Côte d'Ivoire

In this section inequality will be analyzed using summary measures of expenditure inequality. A few points should be emphasized at the outset. First, a measure of expenditure inequality is a single number which describes the spread of an entire distribution of income or expenditures, thus it is only a first approximation to describing the nature of inequality. Second, because income data are not deemed to be appropriate for measuring welfare, inequality can only be decomposed by groups and not by income sources (see Appendix C). Third, the actual expenditure levels used are adjusted by household composition by counting children as fractions of adults, so that all the analysis in this section is based on adjusted per capita consumption expenditures.

##### A. Historical Comparison with Other Countries

Before examining the distribution of adjusted per capita expenditures in detail it is useful to compare the level of inequality in Côte d'Ivoire relative to that of other developing countries. Data in Table 9 are taken from a variety of sources. The figures are not always comparable but they do convey an approximate notion of how Côte d'Ivoire compares with other countries. The Gini coefficient is perhaps the most commonly used measure of inequality. It varies from 0 (complete equality) to 1 (complete inequality) and is further described in Appendix C.

The data in Table 9 suggest that Côte d'Ivoire had a relatively equitable distribution of income in 1959 compared to other African countries and an "average" level of equity relative to non-African countries. This is

Table 9: Gini Coefficients on Per Capita Income

African Countries	Gini Coefficients	Non-African Countries	Gini Coefficients
Chad (1958)	0.3687	Costa Rica (1971)	0.4757
Côte d'Ivoire (1959)	0.4556	Dominican Republic (1969)	0.4550
Dahomey (1959)	0.4675	El Salvador (1969)	0.4653
Gabon (1960)	0.6899	Honduras (1967-68)	0.5658
Madagascar (1960)	0.5618	India (1964-65)	0.3957
Senegal (1960)	0.5874	Malaysia (1970)	0.5045
South Africa (1965)	0.5813	Peru (1961)	0.6664
Tanzania (1967)	0.5282	South Korea (1970)	0.4065
Tunisia (1961)	0.5094		

Source: Jain (1975).

consistent with other observers perceptions of Côte d'Ivoire (e.g., den Tuinder, 1978). However, these figures must be approached with caution because: 1. They are based on income rather than expenditure data; 2. They are from different years; 3. They do not have identical concepts of income. Despite these caveats, they are of some use in putting the following analysis into perspective.

#### B. Regional Inequality Decompositions

Measurement of expenditure inequality will be done using four commonly used inequality measures, the Gini coefficient, the Theil entropy measure (T), an alternative entropy measure proposed by Theil (L), and the log variance of income (LV). The definitions of these measures and the justification for their use are given in Appendix C. For present purposes, it is relevant that the last three measures are group-decomposable. The advantage of using group-decomposable inequality measures is that they can be

used to divide overall inequality into inequality within different groups and inequality among those groups. For example, one can determine the proportion of overall inequality in Côte d'Ivoire due to differences in average (adjusted) per capita expenditures among the five regions (Abidjan, Other Urban, West Forest, East Forest, and Savannah). This allows one to determine the potential effect on overall inequality of policies aimed at reducing differences among these regions. If the between-group component is small (say, less than 5%) policies whose sole objective is to reduce differences in welfare among these groups will have only a small effect on the overall distribution of welfare and thus may offer little to recommend from the equity perspective. On the other hand, relatively large between-group contributions (say 20% or higher) reveal possibilities for promoting greater equity in Côte d'Ivoire. In this section, groupings will be done according to regions, ethnic groups, nationality and the education of the head of household.

Table 10 gives the decomposition of inequality in Côte d'Ivoire when it is divided into five regions. Gini coefficients are given for purposes of comparison only since that inequality measure is not group decomposable.

Although the different inequality measures do not always give the same rank to different regions, they do display broad agreement in many ways. First, inequality in Côte d'Ivoire as a whole is greater than it is in any given region, which implies a substantial between-group contribution to overall inequality. Second, inequality is always highest in Abidjan, which is not surprising given its concentration of the wealthiest households in Côte d'Ivoire. Third, inequality is lowest in the West Forest region. This region has been recently "developed" and settled, so that differences in incomes that arise over time may not have been fully played out.

**Table 10: Per Capita Expenditure Inequality-Decomposed by Region**

Region	% of Total Population	Mean Adjusted Exp. (CFAF x 1000 yr.)	Gini	Theil T	Theil L	Log Variance
Abidjan	18.8	633.8	0.4109	0.3108	0.2809	0.5035
Other Urban	22.4	412.7	0.3601	0.2297	0.2135	0.3997
West Forest	15.2	296.0	0.3172	0.1773	0.1703	0.3327
East Forest	24.7	246.2	0.3752	0.2625	0.2366	0.4341
Savannah	18.9	177.7	0.3800	0.2515	0.2424	0.4683
Côte d'Ivoire	100.0	350.9	0.4350	0.3530	0.3254	0.6079
Between-Group Contribution (%)				0.0948 26.9%	0.0946 29.1%	0.1775 29.2%

The most important finding in Table 10 is that the between-group component is relatively large. This implies that policies aimed at equalizing mean incomes (and thus expenditures) among these different regions have significant potential to reduce overall inequality in Côte d'Ivoire. However, the form such policies may take is as yet unclear. This issue will be discussed below.

### C. Decomposition by Nationality and Ethnic Groups

Côte d'Ivoire has a substantial population of expatriates from neighboring countries, other African countries, and Non-African countries (particularly France). Recent policies have adopted "Ivorianization," the replacement of foreign workers by Ivorians, as worthy goal. One can divide these foreign workers into two categories (see den Tuinder, 1978), highly skilled workers (primarily non-African) whose skills are rarely found among Ivorians, and low-skilled workers (Africans from neighboring countries) who

accept low-paid jobs which many Ivorians do not want. The 1985 CILSS does not include French and other non-African expatriates in its sample but does include all Africans living in Côte d'Ivoire. One can check to see whether the existence of other Africans has any impact on the distribution of welfare among the entire population, Ivorian and non-Ivorian. Table 11 presents inequality decompositions by nationality. Note that 85% of the population is Ivorian which already implies a low between-group contribution to overall inequality since most of the population lies within this group.

**Table 11: Per Capita Expenditure Inequality - Decomposed by Nationality**

Nationality	% of Total Population	Mean Adjusted Exp. (CFAFx1000 yr.)	Theil T	Theil L	Log Variance
Ivorian	85.7	350.6	0.3640	0.3361	0.6289
Burkino	6.2	287.8	0.2297	0.2154	0.4099
Mali	4.0	359.3	0.2825	0.2488	0.4335
Guinea	1.9	297.2	0.2316	0.2176	0.4107
Ghana	0.2	423.7	0.2893	0.2480	0.3908
Other	1.9	596.7	0.2478	0.2326	0.4447
Côte d'Ivoire	100.0	350.9	0.3530	0.3254	0.6079
Between-Group Cont. (%)			0.0053 1.5%	0.0047 1.4%	0.0087 1.4%

It is clear from Table 11 that nationwide figures are very similar to those given for Ivorians only - mean adjusted per capita expenditure is virtually identical and inequality measures are quite similar. Of the non-Ivorian groups, immigrants from Burkino Faso, Mali and Guinea are (on average) poorer than Ivorians while those from Ghana and other African countries are

wealthier. These differences reflect the fact that the latter are predominantly found in urban areas while the former are more common in rural areas (see Table 4). In summary, one finds that differences in nationality contribute very little to overall inequality.

One characteristic of Côte d'Ivoire which is common to most sub-Saharan African countries is that there are several distinct ethnic (or tribal) groups. Rivalries between these groups is common problem in Africa, and at times one ethnic group may be able to secure for itself a privileged position which is reflected by its level of economic welfare. Table 12 decomposes overall inequality in Côte d'Ivoire into its between- and within-group components when the population is divided along ethnic lines.

**Table 12: Per Capita Expenditure Inequality -  
Decomposed by Ethnic Groups**

Ethnic Group	% of Population	Mean Adjusted Exp. (CFAF x 1000 yr.)	Theil T	Theil L	Log Variance
Akan	38.2	354.6	0.3740	0.3353	0.6070
Krou	13.9	367.5	0.3069	0.2530	0.4291
Mande (North)	13.0	338.5	0.3879	0.3701	0.7045
Mande (South)	11.2	388.9	0.2745	0.2612	0.4949
Voltaic	9.5	244.7	0.4147	0.3979	0.7537
Non-Ivorian	14.1	377.2	0.3119	0.2820	0.5074
Côte d'Ivoire	100.0	350.9	0.3531	0.3253	0.6077
Between-Group Contribution (%)			0.0062 1.8%	0.0068 2.1%	0.0258 4.2%

Note: Four households could not be identified by ethnic group and were dropped from the sample, which explains why figures for Côte d'Ivoire differ slightly with those in previous tables.

As discussed in the previous section, the Akan group is primarily found in the southeastern quarter of Côte d'Ivoire (and thus predominates in the East Forest region), the Krou group is found in the Southwest (the West Forest region). The Mandé groups are found in the Northwest areas, while the Voltaic group is found in the North and Northeast regions. Non-Ivorian groups are found throughout Côte d'Ivoire and are primarily composed of the non-Ivorian nationalities given in Table 11.

The overall impression from Table 12 is that differences in per capita mean expenditures among the different ethnic groups do not account for a substantial amount of overall inequality. The between-group contribution is less than 5% for all three inequality measures. Except for the Voltaic group, whose low level of welfare is not surprising given its location in the northern Savannah areas of Côte d'Ivoire, differences in mean adjusted per capita expenditures are very small among these groups.

#### D. Decomposition by Educational Attainment

Measuring the between-group contribution to overall inequality is most useful when the division of the total population into different groups has an underlying causal significance. In other words, dividing the population according to an underlying "exogenous" variable gives a first approximation to the contribution of that variable to overall inequality. In developing countries, perhaps the most important determinant of income (and hence expenditures) is educational level. Given the differences in welfare in Table 3 in the previous section, one could expect this to also be the case in Côte d'Ivoire. Table 13 gives inequality decompositions where households are grouped according to the educational level of the head of the household (or of the main earner if the head is not employed).

**Table 13: Per Capita Expenditure Inequality—Decomposed  
by Education of Head**

Education of Head	% of Pop- ulation	Mean Adjusted Exp. (CFAF x 1000 yr.)	Theil T	Theil L	Log Variance
None	65.3	254.7	0.2328	0.2318	0.4683
Primary (1-7)	18.5	329.5	0.1937	0.1961	0.3979
Middle (8-11)	9.7	590.8	0.2333	0.2153	0.3965
High School (12-14)	4.0	828.4	0.2030	0.1916	0.3599
University	2.4	1348.9	0.2289	0.2389	0.5060
Côte d'Ivoire	100.0	350.9	0.3528	0.3252	0.6077
Between Group Cont. (%)			0.1299 36.8%	0.1031 31.7%	0.1629 26.8%

Note: One household was dropped because no data were available on schooling attainment of its head. This has a small effect on the Côte d'Ivoire figures.

The figures in Table 13 clearly demonstrate the important role played by education in determining the distribution of welfare in Côte d'Ivoire. Depending on the inequality measure used, differences in the educational attainment of the household head account for one-fourth to one-third of overall expenditure inequality. In fact, these figures may understate the contribution of education for two reasons. First, the educational levels of other household members are not considered, so that their contribution to differences in overall welfare is not taken into account. Second, as explained in Appendix C, the log-variance measure of inequality is not sensitive to Pigou-Dalton transfers at high income levels. This implies that it may understate the between-group contribution if one group (in this case those with a university education) has a very high mean expenditure level. Thus the 26.8% figure is probably misleadingly low. These results reinforce

the argument made in Section III that a reorientation of the educational system in Côte d'Ivoire to provide better access to primary education could have a large effect on reducing inequality in the long run.

To summarize this section, group decomposable measures of inequality have been used to characterize the distribution of welfare in Côte d'Ivoire. Substantial differences exist between the welfare levels among the five regions in Côte d'Ivoire, accounting for about 27-29% of overall inequality. In contrast, differences in nationality and ethnic group welfare levels are very small relative to differences within those groups. Finally, the proportion of overall inequality due to differences in welfare levels by education groups is quite high, which underscores the role played by education in determining the welfare levels of Ivorian households.

## V. Characteristics of the Poor in Côte d'Ivoire

Another method of describing the distribution of welfare in Côte d'Ivoire or any other country is to focus on the population that falls below a given poverty line. The conditions faced by the poorest people in any country is presumably of particular importance to policymakers and others concerned with social welfare. The standard definition of poverty is to choose a "poverty line", some level of expenditure (or income) which is assumed to be the minimum amount required for a "decent" standard of living, and classify all those whose expenditures fall below this poverty line as being in poverty. Once the poor have been classified, their characteristics can be ascertained, which is very important for choosing policies aimed at reducing poverty. This section will present the characteristics of the poor in Côte d'Ivoire, as a whole, and also within urban and rural areas.

### A. Poverty in Côte d'Ivoire - A National Profile

Selection of a poverty line involves an element of arbitrary choice. It is best to try different poverty lines and then see whether they give a similar characterization of the poor. It is also convenient to choose a poverty line which classifies a certain percentage of the population as poor, so that one always knows the number of people under consideration. For these reasons two poverty lines have been chosen which allow us to examine the poorest 10% and poorest 30% of the population. The former group can be considered to be in extreme poverty while the latter group is defined by a more generous poverty criterion. In terms of adjusted per capita consumption expenditures, the extreme poverty group is defined as the population living in households in which adjusted per capita expenditures are below 95,681 CFAF per

year. The larger poverty group has a corresponding poverty line of 170,766 CFAF per year. In the remainder of this subsection both poverty groups will be described in detail.

**Table 14: Household Size and Per Capita Consumption of the Poor**

	Poorest 10%	Poorest 30%	All Ivoirians
Household Size	14.5	13.1	12.3
Adjusted Household Size	9.1	8.0	7.4
Food Consumption	32.2	47.1	105.5
Adjusted Food Consumption	49.8	75.5	171.7
Total Consumption	45.0	70.0	216.5
Adjusted Total Consumption	69.9	112.7	350.9

Notes: 1. Figures are per capita averages, not per household averages.  
 2. Consumption is measured in CFAFx1000 per year.

Table 14 provides basic information on household size and per capita consumption for both poverty groups. Figures are also included for the population as whole. One can see that a typical poor person lives in a larger household than an average Ivorian, but the differences are not unusually large. In terms of per capita consumption expenditures, both adjusted and unadjusted by family composition, the poorest 30% have less than half of the food expenditures and only a third of the total expenditures of an average Ivorian. For the poorest 10% the corresponding fractions are less than one third and one fifth. Thus, both definitions of poverty represent populations whose consumption levels are much smaller than that of the typical Ivorian.

In Section III it was noted that female-headed households do not seem to be at a significantly lower level of welfare than those headed by a male. This is also the case with both poverty groups, as seen in Table 15. In fact, male-headed households are more common among the poor than among the overall population.

**Table 15: Sex of Household Head Among the Poor**

Sex	Poorest 10%	Poorest 30%	All Ivorians
Male	93.5	93.8	90.0
Female	6.5	6.2	10.0

This is in part due to the disproportionate number of female-headed households in urban areas, as pointed out in Section III. The fact that the poor are most often found in rural areas is seen in Table 16, which gives the distribution of the poor by the five regions in Côte d'Ivoire.

**Table 16: Distribution of the Poor by Regions**

Region	Poorest 10%	Poorest 30%	All Ivorians
Abidjan	2.0	3.5	18.8
Other Urban	2.0	10.8	22.4
West Forest	8.1	11.2	15.2
East Forest	31.1	34.4	24.7
Savannah	56.8	40.1	18.9

The distribution of the poor is quite uneven across the five regions. Poverty, particularly extreme poverty (poorest 10%) is relatively rare in urban areas. In the rural areas poverty is not evenly distributed but is found primarily in the East Forest and Savannah regions. In contrast, the West Forest region does relatively well. The majority of the extremely poor is located in the Savannah, which is consistent with the findings in Section III. In the next two subsections poverty will be analyzed within urban and rural areas, respectively.

One may also be interested in the nationalities and ethnic groups which predominate among the poor. Eighty-eight percent of the poorest 30 percent and ninety-one percent of the poorest 10% were citizens of Côte d'Ivoire, which is not very different from the nationwide figure of eighty-six percent. The distribution of the various ethnic groups among the poor is given in Table 17. These figures reflect those given in Table 16 in that the groups in the Savannah area (Northern Mande and Voltaic) are more likely to be poor than those found in other parts of the country. This relationship is stronger when examining the poorest 10% of the population.

**Table 17: Distribution of the Poor by Ethnic Group**

Ethnic Group	Poorest 10%	Poorest 30%	All Ivorians
Akan	34.0	38.4	38.1
Krou	5.2	9.9	13.9
Mande (North)	22.3	15.4	13.0
Mande (South)	4.8	7.6	11.2
Voltaic	26.5	16.8	9.5
Other	0.7	0.2	0.3
Non-Ivorian	6.5	11.6	14.1

Perhaps the most useful information for policy analysis is the incidence of poverty among different types of workers. Table 18 gives the information in two forms, first classifying heads of households according to their employer and then by their occupation. As one would expect given the findings in Section III, the poor are almost always self-employed and they work primarily in agriculture. Thus raises in wages paid to government and parastatal workers will have virtually no effect on poverty and neither will legislation regarding minimum wages to be paid by private employers. It is clear that policies to reduce poverty must be aimed at self-employed workers in agriculture, particularly in the East Forest and Savannah regions. Raising agricultural incomes in Côte d'Ivoire is necessary to make significant reductions in poverty.

**Table 18: Distribution of the Poor by Employer and Occupation**

	Poorest 10%	Poorest 30%	All Ivorians
<u>Employer</u>			
None	0.3	0.1	1.1
Government	1.0	1.6	11.4
Parastatal	0.0	0.0	1.3
Private	1.0	3.2	12.5
Self-Employed	97.7	95.1	73.8
<u>Occupation</u>			
None	0.3	0.1	0.9
Agricultural	92.3	87.5	60.3
Sales/Services	5.1	7.8	20.5
Industrial	0.8	2.3	4.7
White Collar/ Management	0.0	1.5	11.7
Other	1.6	0.9	1.9

**Note:** Employer and Occupation refer to that of the head of household, or to that of the main earner if the head does not work.

The characteristic of Ivorians that has perhaps the strongest causal relationship to poverty is the educational levels of workers, as discussed above. Table 19 gives the distribution of education among the poor in Côte d'Ivoire. These figures demonstrate the importance of education in Côte d'Ivoire. Virtually all of the poor have little or no education, which implies that a moderate or high level of education is almost certain to remove one from the ranks of the poor. Of course, changes in the distribution of education come very slowly even when policies are working well, but in the long run the benefits of education, particularly at the lower levels, are difficult to overemphasize.

The importance of schooling leads one to ask whether children in poor families are less likely to attend school. The answer is found in Table 20, which gives information on school attendance, self-reported illness and housing conditions among the poor in Côte d'Ivoire. School attendance of children among the poorest 30% of the population is clearly lower than it is for all Ivorians. This is particularly true for the poorest 10%, whose children attend school at a much lower rate than even the poorest 30%. Of course, much of this reflects regional differences. School attendance of the poor with urban and rural regions will be discussed below.

**Table 19: Distribution of the Poor by Educational Level**

Educational Level	Poorest 10%	Poorest 30%	All Ivorians
None	88.6	84.6	65.3
Primary (1-7)	11.1	13.9	18.5
Middle (8-11)	0.0	1.4	9.7
High School (12-14)	0.0	0.0	4.0
University	0.3	0.1	2.4

**Note:** Education level is that of the head of household.

Another noteworthy phenomena is that schooling appears to be delayed for the poorest 10% since school attendance is substantially higher for those aged 11-15 than for those aged 6-10.

Table 20 also contains data on self-reported illness and housing characteristics. It is rather paradoxical that poor people are healthier than wealthier people, especially when one examines their toilet facilities and sources of drinking water. What is probably happening is that poor people have a less restrictive definition of good health than wealthier people, so that they consider certain health problems as "normal" while a wealthier person may classify them as illnesses. Thus the data on illness is of little use since people at different welfare levels have different conceptions of health and illness.

The information on housing given in Table 20 is similar to that given in Section III. Poor people have less access to electric lighting and so depend on candles and lamps. Toilet facilities are commonly nonexistent, or at best are pit latrines. Finally, drinking water comes from wells or natural sources and almost never from faucets or water vendors. The implications of these toilet and drinking water facilities on health of the poor are probably negative since they may promote the spread of infectious diseases. However, little more can be said without a detailed analysis.

Poverty is often thought to be associated with the composition of poor households. Large numbers of children and small numbers of working household members may provide at least a partial explanation of why particular households are poor. However, the data given in Table 21 do not support this hypothesis. Poor households have fewer children and more working members (as

Table 20: Illness, School Attendance and Housing of the Poor

Region	Poorest 10%	Poorest 30%	All Ivorians
<u>School Attendance</u>			
Ages 6-10	23.0	36.1	50.5
Ages 11-15	30.0	37.2	49.6
<u>Illness</u>			
% People Sick	25.6	28.4	30.8
Days ill (%)	11.9	11.9	12.3
Days inactive (%)	7.3	7.4	7.3
<u>Source of Drinking Water</u>			
Indoor Faucet	1.1	1.4	14.1
Outdoor Faucet	0.0	1.6	10.2
Water Vendor	0.9	4.0	10.4
Pump Well	65.0	47.5	27.7
Other Well	21.1	28.9	26.3
Lakes, River, Rainwater	12.0	16.4	10.8
Other	0.0	0.3	0.5
<u>Source of Lighting</u>			
Electric	9.8	14.4	41.6
Gas	0.0	0.2	0.2
Candles/Lamps	90.2	85.4	58.2
<u>Type of Toilet</u>			
Flush Toilet	2.0	3.2	22.0
Pit Latrine	32.6	40.8	41.8
None	65.4	56.0	36.3

Table 21: Composition of Household Members Among the Poor

Household Member	Poorest 10%	Poorest 30%	All Ivorians
Children 0-6 yrs.	22.8	24.3	24.2
Children 7-12 yrs.	16.7	17.5	18.1
Children 13-17 yrs.	10.7	11.3	12.3
Workers	57.5	53.7	43.2

Note: Some workers may also be children, so the categories do not necessarily sum to 100%.

a percentage of total members) than the typical Ivorian household.<sup>1/</sup> This implies that it is not the lack of work activities per se or the large number of dependents that cause households to be poor but the income from the occupations that poor people have. This could be due to the low income per time unit of work or to the seasonal or part-time nature of the work (or both). Investigation of employment opportunities among the poor, who are primarily found in agriculture, is clearly needed, but is beyond the scope of this paper.

To summarize the most important findings of this subsection, the poor are predominantly found in rural areas, particularly the East Forest and Savannah regions. They are almost always self-employed and are primarily in agricultural occupations. They have a very low level of education, and unfortunately school attendance among the poor is rather low. Although they come from somewhat larger households, the percentage of household members who are children is actually lower than average, and the percent of working

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<sup>1/</sup> Workers are any household members who, in either the last week or the last year, worked: 1. For an employer, 2. On a plot of land, or 3. In a family-owned business.

household members is substantially higher than that of a typical Ivorian household.

#### B. Poverty in Urban Côte d'Ivoire

The description of poverty in the previous subsection does not account for differences between poverty in urban areas and that found in rural areas. For example, it is doubtful that the urban poor are workers in agriculture. This subsection will examine poverty in Abidjan and other urban areas, while the next subsection will do the same for rural areas in Côte d'Ivoire.

As pointed out above, the poor are much less numerous in urban areas than in rural areas given a poverty line for Côte d'Ivoire as a whole (see Table 16). Yet poverty has a relative aspect, so that one could classify the urban poor as the poorest 10% or 30% of urban residents. Of course, this implies a higher poverty line as measured by adjusted consumption expenditures. In this subsection the urban poor will be divided into the poor in Abidjan and the poor in other urban areas. The poverty lines in Abidjan for the poorest 10% and poorest 30% are 213,482 CFA and 349,859 CFAF, respectively. The analogous poverty lines in other urban areas are 157,393 CFA and 239,741 CFAF.

Table 22 presents basic information on household size and per capita consumption for the urban poor in Côte d'Ivoire. It also includes average figures for both Abidjan and other urban areas. As with Côte d'Ivoire as a whole, household size is slightly larger for the urban poor relative to urban residents in general, but the differences are small. For both Abidjan and other urban areas, the food consumption of the poorest 30% is about half of

**Table 22: Household Size and Per Capita Consumption of the Urban Poor**

	Abidjan			Other Urban		
	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All
Household Size						
Actual	10.8	10.3	10.2	14.1	13.4	12.5
Adjusted	7.5	6.6	6.4	8.9	8.3	7.4
Food Consumption						
Actual	50.4	69.8	136.7	34.7	52.3	101.8
Adjusted	71.8	108.1	215.4	55.7	83.7	167.2
Total Consumption						
Actual	110.5	154.4	402.3	76.3	107.7	253.3
Adjusted	157.4	237.6	633.8	121.4	172.9	412.7

Note: 1. Figures are per capita averages.  
2. Consumption is measured in CFAFxl000 per year.

what it is for an average urban resident. The corresponding fraction for the poorest 10% is slightly above one third. In terms of total consumption expenditures, the spending level of the poorest 30% is about 40% of the average level, while the figure for the poorest 10% is about 25-30%.

Table 23 investigates whether female headed households are more common among the urban poor. In Abidjan, households headed by women are more likely to be found among the poor, but the differences are not very large. In other urban areas the poorest 30% are slightly more likely to live in households headed by women but the poorest 10% are less likely. This suggests that living in a household headed by a woman entails a small disadvantage in Abidjan but makes little difference in other urban areas.

**Table 23: Sex of Household Head Among the Urban Poor**

	Abidjan			Other Urban		
	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All
Male	76.4	78.6	82.0	91.5	85.1	87.3
Female	23.6	21.4	18.0	8.5	14.9	12.7

Do the urban poor belong to different nationalities or ethnic groups relative to the overall urban population? The answers to these questions are given in Table 24. As far as nationality is concerned, the poorer people in urban areas, particularly Abidjan, are more likely to be non-Ivorian than the

**Table 24: Nationality and Ethnic Group Among the Urban Poor**

	Abidjan			Other Urban		
	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All
<u>Nationality</u>						
Ivorian	60.6	68.2	77.2	70.5	74.8	84.5
Burkino	10.8	11.5	6.7	8.5	11.7	5.7
Mali	20.9	14.5	9.2	13.9	8.5	4.1
Guinea	5.0	3.6	2.4	5.4	1.8	1.6
Other	2.7	2.2	4.5	1.7	3.2	4.1
<u>Ethnic Group</u>						
Akan	20.1	24.8	31.0	33.2	37.3	38.2
Krou	3.9	16.9	10.9	2.4	7.4	12.7
Mande (North)	27.0	15.8	14.8	17.3	15.3	16.5
Mande (South)	0.0	1.8	10.9	5.1	2.4	5.6
Voltaic	9.7	12.5	7.9	17.0	12.6	11.3
Other	0.0	0.0	0.0	0.0	0.0	0.4
Non-Ivorian	39.4	28.3	24.5	25.1	25.1	15.3

urban population as a whole. This coincides with the observation that many low-paying jobs often go to African immigrants (den Tuinder, 1978). Of course this is not surprising since Côte d'Ivoire's success relative to its neighbors attracts immigrants from those countries who are quite willing to accept jobs that pay low wages by Ivorian standards.

A similar phenomenon takes place among the ethnic groups in Abidjan. The Northern Mandes and Voltaics came from the relatively poor Savannah region and thus tend to be found among the poor in urban areas. However, there is little difference among the poor and the general population in other urban areas, except that the Krou ethnic group is under-represented among the poor.

The previous subsection highlighted the fact that most poor people in Côte d'Ivoire (given a national poverty line) are farmers in rural areas. Of those who are relatively poor in the urban areas, what jobs do they take and whom do they work for? This information is given in Table 25. In Abidjan those who are relatively poor or more likely to live in households where the head is self-employed, usually in a sales or services occupation. This is consistent with the view that workers with little education and few skills (some of whom may be migrants) have difficulty finding formal employment and thus turn to self-employment. Another interpretation is that self-employment is more lucrative for such people and so they choose that rather than work at low wages for someone else. In addition to sales and services, the poor in Abidjan are also more likely to live in households in which the head is an industrial worker, and less likely to live in households where the head is in a white collar job and/or works for the government.

**Table 25: Distribution of the Urban Poor by Employer and Occupation**

	Abidjan			Other Urban		
	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All
<b><u>Employer</u></b>						
None	5.0	2.8	2.4	0.0	0.0	1.2
Government	11.6	12.7	22.4	8.5	10.5	26.9
Parastatal	0.0	0.7	4.2	0.0	0.0	1.6
Private	19.7	42.2	39.0	15.3	14.9	15.9
Self-Employed	63.7	41.5	32.0	76.3	74.6	54.4
<b><u>Occupation</u></b>						
None	5.0	2.8	2.4	0.0	0.0	0.9
Agricultural	1.2	2.8	1.7	53.2	54.7	31.4
Sales/Services	59.1	54.9	45.4	23.4	25.1	39.5
Industrial	23.9	20.4	13.2	9.8	7.0	6.5
White collar	5.4	14.1	35.2	13.6	11.9	17.5
Other	5.4	4.9	2.2	0.0	1.4	4.3

In other urban areas, self-employment is even more important among the poor due to the fact that many people work in agriculture even though they are classified as living in urban areas. As one would suspect, given the findings in Côte d'Ivoire as a whole, poor people in other urban areas are more likely to be found in agriculture relative to the general population in other urban areas. Also, government employment of the head of household is negatively correlated with poverty. Yet in contrast with Abidjan, sales and services occupation are less common among the poor in these areas.

Table 26 gives the distribution of the urban poor by the educational level of the head of household, and also gives rates of school attendance. In Abidjan the poor live in households where the head has a much lower educational level relative to all households in Abidjan. This is also the

case for other urban areas, yet in those areas the differences are not as large, and there is little difference between the figures for the poorest 10% and the poorest 30%. School attendance declines dramatically for those households in the poorest 10% of the population in Abidjan, but this is not the case in other urban areas, where school attendance does not decline substantially for the poorest. There may be some kind of "underclass" in Abidjan in the sense that the children of the poor do not obtain much education, but this cannot be determined until further research is done.

**Table 26: Education and Poverty in Urban Areas**

	Abidjan			Other Urban		
	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All
<u>Education of Head</u>						
None	69.1	62.0	36.8	76.6	76.5	49.9
Primary (1-7)	25.9	24.5	19.8	17.0	16.3	19.8
Middle (8-11)	1.9	9.3	21.9	6.4	5.1	15.3
High School (12-14)	1.5	3.7	11.1	0.0	1.5	9.6
University	1.5	0.5	10.5	0.0	0.7	5.4
<u>School Attendance</u>						
Ages 6-10	23.5	44.0	54.0	45.0	50.4	63.0
Ages 11-15	21.9	43.3	49.3	57.1	54.0	59.4

In the previous subsection, certain household amenities were less common among the poor, but much of that may have been due to differences between urban and rural areas. Table 27 gives information on sources of drinking water and lighting, and type of toilet. In Abidjan the main source of water for the poor is water vendors. Little is known about either the

vendors or their water. Electric lighting is still the most common source of lighting for the poorest in Abidjan, though candles and/or lamps are nearly as common. Finally, flush toilets are still predominate even among the poor. All of this demonstrates that Abidjan is relatively modern and "westernized" compared to other large cities in Africa.

In other urban areas the most common source of water is a (non-pump) well, though faucets and water vendors are also important. About half of the poorer population have electric lighting while the other half use candles or lamps. Latrines are the most common toilet among the poor and the population in general in other urban areas of Côte d'Ivoire.

Table 27: Housing Characteristics of the Urban Poor

	Abidjan			Other Urban		
	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All
<u>Source of drinking Water</u>						
Indoor faucet	12.7	20.0	46.9	13.9	9.0	21.7
Outdoor faucet	3.5	6.4	8.6	12.5	14.5	27.6
Water vendor	79.9	72.3	43.9	12.2	16.0	8.3
Pump well	0.0	0.0	0.0	0.0	3.7	2.3
Other well	3.9	1.4	0.7	56.3	54.2	38.6
Lakes, Rivers, Rainwater	0.0	0.0	0.0	5.1	2.7	0.8
Other	0.0	0.0	0.0	0.0	0.0	0.7
<u>Source of Lighting</u>						
Electric	62.5	72.0	84.8	41.4	56.9	78.7
Gas	0.0	0.7	0.2	0.0	0.7	0.2
Candles/lamps	37.5	27.3	15.0	58.6	42.5	21.1
<u>Type of Toilet</u>						
Flush toilet	61.4	71.7	81.4	15.9	10.7	26.9
Latrine	30.1	25.3	15.7	68.5	73.1	66.6
None	8.5	3.0	2.9	15.6	16.2	6.6

The previous subsection made the point that the poor in Côte d'Ivoire belong to households that have relatively few children and more workers than the typical household. Is this the case in both urban and rural areas? Table 28 provides the relevant information for Abidjan and other urban areas.

The same patterns that were found in Côte d'Ivoire as a whole are also found in urban areas - poor households have a larger proportion of working household members and a smaller proportion of children. However, it is important to note that the proportion working is much smaller in urban areas, especially Abidjan, than in Côte d'Ivoire as a whole. This is probably due to the relatively small degree of self-employment in urban areas. Self-employed heads of household, particularly farmers, have other family

Table 28: Household Composition Among the Urban Poor

	Abidjan			Other Urban		
	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All
Children 0-6 yrs.	18.1	21.8	21.3	22.4	22.6	22.7
Children 7-12 yrs.	13.5	15.8	17.4	19.0	17.0	18.1
Children 13-17 yrs.	12.4	11.6	13.4	12.5	15.4	16.3
Workers	27.0	24.0	24.8	40.0	40.3	32.6

members working with them, which would raise the percentage of workers among family members. Since self-employment is much less lucrative than formal employment, it is not surprising that this percentage is negatively correlated with welfare levels. It simply indicates that incomes from self-employment, even with other household members providing labor, are very small.

To summarize, the poor in urban areas of Côte d'Ivoire have substantially lower welfare levels relative to other urban residents, but many would not be considered poor if compared to the Ivorian population as a whole. Many of the urban poor are non-Ivorian, particularly the poorest 10%. A disproportionate number of the poor are self-employed, with sales and services being the most common occupation in Abidjan and agricultural occupations predominant in other urban areas. As one would expect, the education level of the heads of poor urban households are much lower than those of urban residents in general. While school attendance in other urban areas is not lower among the poor, the poorest 10% in Abidjan have substantially lower school attendance. Household amenities such as electric lighting and flush toilets are common even among the poorest in Abidjan, though less so in other urban areas. Finally, poor urban households have a lower proportion of children and a higher proportion of working members (which probably reflects self-employment) than typical urban households.

### C. Poverty in Rural Côte d'Ivoire

In the previous subsection the poor in urban Côte d'Ivoire were defined in terms of the poorest 10% and the poorest 30% of the urban population. This subsection examines the poorest 10% and 30% of the rural population. Specifically, the three rural regions (West Forest, East Forest, and Savannah) are all examined using this definition of poverty within each region. Thus we examine the poorest 30% in the West Forest, then the poorest 30% in the East Forest, etc., and similarly for the poorest 10%, so that all three rural regions have different poverty lines. The poverty lines for the poorest 10% and 30% in the West Forest region are 120,674 CFAF and 198,168

CFAF, respectively. The corresponding poverty lines for the East Forest region are 86,946 CFAF and 139,312 CFAF, and those for the Savannah are 59,509 and 95,681. It is important to recognize that the poorest 10% (30%) in the East Forest are significantly poorer than the poorest 10% (30%) in the West Forest, and the analogous groups in the Savannah are the poorest of all.

Table 29 provides some useful data on household size and per capita consumption for the rural poor in Côte d'Ivoire. Two points should be emphasized. First, the poorest 30% and 10% of the population in rural areas are much poorer than the analogous population in urban areas (cf. Table 22). Second, within rural areas there is a definite ranking, with the West Forest doing relatively well (even better than in other urban areas in terms of food consumption) while the Savannah region is the poorest of all.

Table 29: Household Size per Capita Consumption of the Rural Poor

	West Forest			East Forest			Savannah		
	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All
<u>Household Size</u>									
Actual	12.8	11.2	10.8	16.4	15.1	15.2	16.9	15.1	11.6
Adjusted	8.0	6.9	6.6	9.4	8.9	8.8	10.7	9.6	7.1
<u>Food Consumption</u>									
Actual	36.2	60.7	125.5	25.8	40.0	89.4	21.4	34.5	83.6
Adjusted	56.5	96.9	204.1	43.5	65.6	148.9	31.9	52.7	137.6
<u>Total Consumption</u>									
Actual	56.8	86.9	182.2	39.9	60.2	146.5	29.5	44.5	107.7
Adjusted	89.8	139.2	296.0	67.3	98.8	246.2	44.3	68.1	177.7

Note: 1. Figures are per capita averages.  
2. Consumption is measured in CFAFx1000 per year.

The proportion of poor who live in households headed by women is given in Table 30 for each of the three rural regions. There are no distinct patterns in general. Poor households in rural areas are as likely to be headed by women as other households. Only the Savannah area shows a pattern, with poor households being slightly less likely to be headed by women than non-poor households. Thus poverty shows little relation to the sex of the head of household.

Table 30: Sex of Household Head among the Rural Poor

	West Forest			East Forest			Savannah		
	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All
Male	95.5	95.5	95.2	88.0	94.2	91.4	97.7	96.8	95.2
Female	4.5	4.5	4.8	12.0	5.8	8.6	2.4	3.2	4.8

It was seen in the previous subsection that the poor in urban areas are more likely to be non-Ivorian than typical urban residents. This suggests that migrants from Côte d'Ivoire's poorer neighbors take low-paying urban jobs, but do they also take low-paying rural jobs? The relevant information is given in Table 31, which classifies the poor in rural areas by nationality and ethnic group.

In rural areas there is no overall trend, but there are small differences among the three rural regions. In the West Forest region Ivorians are more likely to be poor than non-Ivorians, while in the East Forest the trend is slightly in the opposite direction. In the Savannah almost everyone is Ivorian so almost no nationality differences arise. In terms of ethnic group, there are few discernible patterns. Perhaps the most important finding

is that in the Savannah, which is the poorest region in Côte d'Ivoire, the Voltaic group is substantially over-represented among the poor. The reasons for this should be examined in future research.

Table 31: Nationality and Ethnic Group Among the Rural Poor

	West Forest			East Forest			Savannah		
	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All
<b>Nationality</b>									
Ivorian	90.6	86.6	81.0	84.7	86.7	86.9	100.0	98.4	98.1
Burkino	2.5	5.0	7.6	15.3	12.7	9.9	0.0	0.0	0.4
Mali	2.0	0.7	5.0	0.0	0.6	2.1	0.0	0.5	0.4
Guinea	5.0	6.3	4.9	0.0	0.0	0.4	0.0	1.1	1.2
Other	0.0	1.3	1.5	0.0	0.0	0.7	0.0	0.0	0.0
<b>Ethnic Group</b>									
Akan	0.0	0.0	1.8	67.8	69.2	68.0	11.0	21.3	35.4
Krou	60.2	46.7	45.3	2.2	7.1	8.5	0.0	0.0	0.0
Mande (North)	4.0	3.7	7.5	7.4	6.3	3.5	27.3	32.5	23.7
Mande (South)	24.4	35.6	26.7	4.6	4.8	6.8	2.4	1.9	11.4
Voltaic	4.0	1.3	0.7	0.0	1.3	0.6	60.4	43.4	27.9
Other	0.0	0.0	0.0	2.8	0.9	0.7	0.0	0.0	0.0
Non-Ivorian	7.5	12.7	18.1	15.3	10.5	12.0	0.0	0.9	1.7

Working in the formal sector (either for the government or a private employer) was shown to be more lucrative than self-employment, but since most of these jobs are in urban areas it may not be relevant to characterizing rural poverty. Table 32 presents statistics on the poor based on employers and occupational categories. It is quite clear that nearly everyone in rural areas lives in a household where the head is self-employed. The few who live in families where the head works for the government or not at all are never

found among the poor. Agricultural occupations are most common for heads of households in rural areas, though sales and service occupations also exist. There is little occupational difference among poor and nonpoor households.

In Section III it was seen that most educated people reside in urban areas. Yet it is still important to quantify the educational composition of the poor in rural Côte d'Ivoire, and it is also useful to examine school attendance for children in rural areas. This can be seen in Table 33. Most people in rural areas live in households where the head had no education at all. In the East Forest and Savannah areas, though not in the West Forest, this is even more likely for poorer people. School attendance patterns are

Table 32: Distribution of the Rural Poor by Employer and Occupation

	West Forest			East Forest			Savannah		
	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All
<b>Employer</b>									
None	0.0	0.0	0.8	0.0	0.0	0.5	0.0	0.0	0.8
Government	0.0	0.0	0.5	0.0	0.0	3.4	0.0	0.0	1.3
Parastatal	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.2
Private	7.0	4.0	2.8	0.0	1.6	2.9	0.0	0.4	2.3
Self-Employed	93.0	96.0	96.0	100.0	98.4	92.9	100.0	99.6	95.5
<b>Occupation</b>									
None	0.0	0.0	0.8	0.0	0.0	0.5	0.0	0.0	0.2
Agricultural	83.6	91.3	87.1	89.9	93.3	88.5	96.5	97.8	94.3
Sales/Services	9.5	6.3	8.4	10.1	4.2	5.1	2.0	1.3	2.9
Industrial	0.0	0.0	1.1	0.0	2.5	2.1	0.0	0.0	0.7
White Collar	0.0	0.0	0.6	0.0	0.0	3.4	0.0	0.0	1.5
Other	7.0	2.3	2.1	0.0	0.0	0.3	1.6	0.9	0.5

rather ambiguous. In the East Forest and Savannah poorer children aged 6-10 are less likely to attend school, but the opposite is true in the West Forest. In both East and West Forest poorer children aged 11-15 are less likely to attend school, yet this is not the case in the Savannah. As before these figures need to be treated with caution because poorer families may simply send children to school at a later age - this could explain the pattern found in the Savannah. It is also relevant to recall that 40% of Ivorian children of primary school age have no access to any kind of educational facilities, and it is almost certain that nearly all of them are found in rural areas.

Table 33: Education and Poverty in Rural Areas

	West Forest			East Forest			Savannah		
	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All
<u>Education of Head</u>									
None	63.2	63.8	70.5	84.7	80.8	75.5	97.6	94.6	93.5
Primary (1-7)	30.9	29.4	24.9	15.3	19.2	20.0	2.4	5.4	4.2
Middle (8-11)	6.0	6.8	4.6	0.0	0.0	3.4	0.0	0.0	2.3
High School (12-14)	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.1
University	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<u>School Attendance</u>									
Ages 6-10	62.5	54.4	49.7	31.3	41.8	55.5	15.0	12.7	26.2
Ages 11-15	34.8	41.0	46.9	36.5	44.9	54.8	21.9	24.4	25.3

Housing is quite different in rural areas relative to urban areas. Differences among rich and poor households can be seen in Table 34. Since almost all water in rural areas comes from wells or natural sources, there is

little variation between rich and poor, and what variation does exist is difficult to interpret. When electric lighting is available, which is the case in the East Forest and Savannah regions, it is less common among the poor, who instead rely on candles and lamps. Finally, poorer people are less likely to use latrines (the alternative being no toilet at all) in the

Table 34: Housing Characteristics of the Rural Poor

	West Forest			East Forest			Savannah		
	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All
<u>Source of Drinking Water</u>									
Indoor faucet	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.6
Outdoor faucet	0.0	0.0	0.0	0.0	1.0	8.7	0.0	0.0	1.3
Water vendor	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0
Pump well	34.8	37.4	37.4	73.3	57.1	43.4	77.3	67.6	57.1
Other well	58.7	47.1	48.6	15.6	22.9	28.6	14.5	18.9	16.4
Lakes, rivers, rain	6.5	15.5	14.0	11.0	18.0	15.5	8.2	13.5	24.7
Other	0.0	0.0	0.0	0.0	1.0	1.4	0.0	0.0	0.0
<u>Source of Lighting</u>									
Electric	0.0	0.0	0.9	11.0	10.6	20.9	0.0	8.6	14.6
Gas	0.0	0.0	0.0	0.0	0.8	0.3	0.0	0.0	0.2
Candles/lamps	100.0	100.0	99.1	89.0	88.6	78.8	100.0	91.4	85.2
<u>Type of Toilet</u>									
Flush	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	1.5
Latrine	61.7	59.1	46.7	65.3	60.1	53.0	2.8	13.4	19.5
None	38.3	40.9	53.3	34.7	39.9	45.3	97.3	86.6	79.1

Savannah, but the opposite is the case in the East and West Forest. Overall, the data in Table 34 show little systematic variation in these housing characteristics.

Finally one can examine household composition in rural Côte d'Ivoire. This is presented in Table 35. The same trends found in urban areas and in Côte d'Ivoire as a whole also hold in rural areas. Specifically, poorer households have a larger proportion of working members and a slightly smaller proportion of children than typical rural households in Côte d'Ivoire.

Table 35: Household Composition Among the Rural Poor

	West Forest			East Forest			Savannah		
	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All	Poorest 10%	Poorest 30%	All
Children: 0-6 yrs	21.9	23.2	25.2	24.8	25.2	25.7	19.2	23.1	26.2
7-12 yrs	18.4	17.9	18.3	18.4	17.7	19.4	18.0	15.9	16.9
13-17 yrs	9.5	11.4	9.5	13.8	12.6	12.0	10.6	9.5	9.2
Workers	51.7	51.3	49.7	56.1	55.0	52.1	61.2	60.1	57.3

To summarize, the poor in rural Côte d'Ivoire are in many ways typical of other rural residents. There is little difference in terms of the sex of the head of household and nationality. There is one important characteristic regarding ethnicity, which is that the poorest people in the poorest region, the Savannah, are disproportionately members of the Voltaic ethnic group. This needs more investigation.

Self-employment in agricultural, and to some extent in sales and services, is the predominant occupational arrangement among both the poor and the population in general in rural areas. When ranked by the education level of the head of household, poor people tend to live in "less educated" households in the East Forest and Savannah areas, but this is not the case in

the West Forest region. School attendance of children is most often lower among the poor but this is not always the case. Housing characteristics seem to vary by only a small amount in rural Côte d'Ivoire. Finally, one again finds that poor households have more workers and fewer children than wealthier households, which again suggests that poverty is primarily a matter of low earnings among those who work.

## VII. Conclusion

The ability to make appropriate policy decisions in the areas of economic development is heavily dependent on one's knowledge of social and economic characteristics of the country in question. In particular, policies aimed at raising social welfare and reducing inequalities in the distribution of welfare cannot be articulated clearly until the characteristics of households at different welfare levels are known. This paper has provided a characterization of the distribution of welfare in Côte d'Ivoire in 1985. It provides useful information not only for policy choices in that country, but hopefully for other sub-Saharan african countries as well. The following findings are the most important for purposes of policy formulation.

First, welfare levels are clearly higher in urban areas, particularly Abidjan, than in rural areas. Of the three rural areas, the West Forest has a higher level of welfare than the East Forest, while the northern Savannah areas have the lowest levels of welfare. That urban areas are better off than rural areas is no surprise, as this pattern is found in virtually every country in the world. Of course, this does not imply that a rural resident will be better off by moving to an urban area, since characteristics of rural residents differ from those of urban dwellers. Urban dwellers have higher levels of education and are more likely to be working for the government or a private employer, and those characteristics are strongly associated with high welfare levels.

Second, differences in nationality and ethnic group (tribe) were not very important in determining welfare levels, and contributed little to overall inequality in Côte d'Ivoire. In most cases the welfare of different ethnic groups corresponded highly with those of the regions in which they

predominate. In particular, the Voltaic group, which is the poorest, predominates in the northern Savannah region. A related finding is that the sex of the head of household has little to do with welfare levels, particularly in rural areas.

Third, given the strong association between education and welfare levels, it is important that school attendance among the poor is rather low. Much of this variation is due to the fact that school attendance in the Savannah, where the poor are most often found, is lower than in any other region of Côte d'Ivoire. Yet school attendance is low in other regions as well and 40% of primary school age children have no access to educational facilities. Clearly, policies are needed to raise school attendance throughout Côte d'Ivoire.

Fourth, the poorest households in Côte d'Ivoire are overwhelmingly in agricultural pursuits, where they are self-employed cultivators. Any policy aimed at equalizing the distribution of welfare and reducing poverty should include efforts to raise agricultural productivity in general and among these workers in particular. Given past achievements, there is a precedent for raising productivity in agriculture in the future. Yet this must take place not only in the forest regions but most importantly in the Savannah area as well.

Finally, household composition, in the sense of many dependents and few workers, does not explain why certain households are poor. In fact, the poorest households have a lower proportion of children and a higher proportion of workers than wealthy households. Thus the productivity of workers in agricultural pursuits is the key variable from the viewpoint of making policy

choices. An analysis of agricultural productivity would be most useful in formulating specific policy recommendations.

This paper is primarily exploratory in nature, and thus raises many more questions than it answers. Yet, it constitutes an important first step by providing descriptive information about welfare levels in Côte d'Ivoire and providing initial direction on appropriate policies for consideration. The data available from the Côte d'Ivoire Living Standards Survey can be used to conduct thorough analyses of the questions asked but not answered in this paper. Two questions in particular ought to receive immediate attention:

1. What determines the school attendance of children and the availability of school facilities in rural areas?
2. What are the principal determinants of the incomes of agricultural households?

The data now available remain to be exploited for answering these and many other questions concerning the distribution of welfare in Côte d'Ivoire.

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Appendix A: The Côte d'Ivoire Living Standards Survey

The Côte d'Ivoire Living Standards Survey (CILSS) is a random sample of 1600 households interviewed from mid-February, 1985, to mid-February, 1986.

1/ The data collected include information on food and nonfood expenditures, agricultural production and consumption of food produced, income from different sources, health and educational status of household members, employment and other productive activities, migration, housing conditions, and a variety of other subjects. The survey is thoroughly described in Ainsworth and Muñoz (1986). The data pertinent to measurement of consumption are discussed in this appendix.

Data collected in the CILSS which are relevant for the measurement of consumption include: 1) Daily expenses on regularly purchased nonfood items (such as fuel, cigarettes and personal health items) and food consumed outside the household within the last two weeks; 2/ 2) Expenditures on clothing, household goods and maintenance, medicines and other irregular expenditures within both the last year and the last two weeks; 3) Remittances sent from the household to persons not residing in the household in the past year; 4) Food expenditures in the last year and the last two weeks; 5) Possession of durable goods, including present value and cost when purchased; 6) Value of food produced and consumed by the household. Finally, data were collected on rents paid by households who were renters, which is useful in estimating imputed rents for owner-occupied housing.

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1/ Due to some missing information, 31 households have been dropped from the original 1600.

2/ Specifically, between the time the first and second interviews were conducted, which is generally two weeks.

Of the four types of explicit expenditure listed above (i.e. those numbered one through four) it is assumed that remittances are pure transfers which do not raise the welfare of the household members sending the transfers. Thus remittance expenditures are not included as part of household consumption expenditures. The other three expenditure categories clearly raise the welfare of households and the annual data are summed to give annual expenditure in the past year. <sup>1/</sup> However, the use value of durable goods and the value of owner-occupied housing must also be calculated to get an accurate measure of consumption.

The enjoyment of housing and durable goods does not take place at the time they are built or purchased, but instead extends over a long period of time (usually several years) during which they are used. Thus the welfare received from such goods must be based on estimated rental values of owning the good. For housing, the best approach is to estimate hedonic rent equations (i.e. to predict the rental value of housing based on the characteristics of the dwelling) for those households which are renters. Thus imputed rents can be calculated for households which own their dwellings based on the characteristics of those dwellings. This has been done for the Abidjan area and for other urban areas in Côte d'Ivoire by Kozel (1986). After using appropriate methods to correct for sample selection bias, rents were estimated for renters as a function of household characteristics such as floor area, type of dwelling, source of water and source of lighting. Imputed rents were

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<sup>1/</sup> The first type of expenditure listed in the preceding paragraph is annualized based on expenditure in the past two weeks.

than calculated for home owners, again after adjusting for sample selection bias. <sup>1/</sup>

Unfortunately, there is almost no rental market in the rural areas of Côte d'Ivoire, which prevents one from estimating imputed rents in rural areas. This forces one to impose imputed rents in rural areas. Based on the twenty-four households which report rents in rural areas, it is assumed that each rural household has an imputed rent of 3.3% of total expenditures. This may result in a small reduction in the estimate of overall variability in total consumption, but since the amount imputed is only 3.3% it is unlikely to significantly affect the results.

For durable goods, the rental value can be estimated based on depreciation in the real value of those goods over time. The effective rental price of a durable good is its depreciation in value over the year in question (which can be calculated from the data on estimated present value and on cost when purchased) and the opportunity cost of owning the good in terms of forgone investment earnings. It is assumed that the foregone opportunity cost is 10% in real terms. This estimate may be rather high, but since the use value of durable goods only accounts for 4.0% of total consumption there is little cause for concern.

Estimates of imputed rents and of the use-value of durables were added to the three categories of explicit expenditures (excluding remittances)

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<sup>1/</sup> Not all variability in rents was captured in the hedonic rent equation since the  $R^2$  statistic was 0.646 in Abidjan and 0.776 in other urban areas. Thus predicted rents for home owners do not reflect all the variability in this component of total consumption. Since rents (imputed or actual) account for only 10-15% of total consumption and the  $R^2$  statistics were rather high, this does not seem to be a serious problem.

described above. The value of food produced and consumed in the household was then added to arrive at the value of total household consumption. A minor adjustment was made to exclude the purchase of durables and maintenance expenditure on housing and durables. The latter should be reflected in the value of housing and durable goods and thus are accounted for in estimates of imputed rent and the use value of durables. The food expenditure variable used in this paper is simply the sum of food expenditures, the value of food produced and consumed within the household, and the cost of food eaten outside the household.

An additional difficulty in comparing expenditures across different households is that prices may vary over different regions of the country and over different agricultural seasons. Since almost all expenditures are based on purchases within the past year, seasonal price variations should not significantly affect comparability across households. Regional differences, however, are important, and two price indices, one for food and one for total expenditures, have been calculated for five separate regional groups: the Abidjan area, other urban areas, the West Forest region, the East Forest region, and the Savannah area in the North. The food price index is based on prices from 17 items which account for over 70% of total food expenditures (including items produced and consumed at home). The nonfood price index presented difficulties due to the small number of items for which prices were available, and more seriously, the lack of comparability between items priced in Abidjan and those priced in the rest of Côte d'Ivoire.

Because it is thought that price differences in nonfood items are primarily due to differences in transportation costs, it seemed advisable to use an item or set of items which is both relatively non-perishable and found

throughout the country. The only item which meets these criteria is tomato paste, which is sold in small cans. Thus the price of these cans of tomato paste are used to represent the price of nonfood items. Because there are no comparable data on the price of tomato paste in Abidjan it is assumed that it is the same as the price prevailing in other urban areas. The 1979 Ivorian budget survey found that tomato paste was slightly (7%) cheaper in other urban areas relative to Abidjan. The use of this item as an indicator of nonfood prices has some intuitive appeal - its price is lowest in urban areas and highest in the sparsely populated Savannah region in the North. Table A.1 presents the regional price indices used in this paper.

Table A.1: Regional Price Indices in Côte d'Ivoire, 1985

	Food Price Index	Non-Food Price Index	Total Price Index
All Côte d'Ivoire	100.0	100.0	100.0
Abidjan	127.5	97.7	112.8
Other Urban	98.1	97.7	97.8
West Forest	84.3	100.8	92.3
East Forest	90.9	98.5	94.7
Savannah	83.3	108.9	96.0

At this point one should check to see whether these regional price indices and other adjustments to the welfare measure have a large impact on the overall distribution of welfare in Côte d'Ivoire. This is done in Table A.2, which demonstrates the impact of different definitions of or refinements

to the measure of welfare. Column 1 gives shares of total welfare going to each 10% of the population (from poorest to wealthiest) as given by per capita total consumption after adjusting for regional price differences and household composition (i.e. smaller weights for children). This, of course, is the welfare measure used in this paper.

Column 2 gives decile shares of total welfare going to each 10% of households. This can be misleading since households vary in number of members. In particular, small households are more likely to be classified as poor simply because they are small, while large households are more likely to be classified as rich because they are large. This has a tendency to exaggerate inequality by adding an erroneous source of variation, which is evident in column 2 of Table A.2.

If no regional price indices are used the distribution of per capita consumption (after adjustment for household composition) is that given in column 3. As was seen in the text, the Savannah is the poorest region, while Abidjan is the wealthiest. Some of this difference (in nominal terms) is due to higher prices in Abidjan and lower prices in the Savannah. If no adjustment is made for this, then inequality may be exaggerated. This is seen to be the case for Côte d'Ivoire since money-metric welfare is less evenly distributed in column 3 than in column 1.

What if no adjustments are made to account for the fact that additional household members, particularly children, are less costly due to certain economies of scale? If poorer families have more children, than inequality may be exaggerated. There is some evidence for this in Table A.2 but the impact is mild. In any case, this adjustment does not have a large influence and so does not artificially "create" some of the results in the text.

**Table A.2: Welfare Deciles According to Different Welfare Measures**

Decile	Adjusted per Capita Consumption	By Households	No Price Adjustment	No Composition Adjustment	Food Consumption Per Capita
1	1.98	1.57	1.84	1.96	2.44
2	3.26	2.85	2.99	3.18	4.02
3	4.39	3.93	4.06	4.30	5.17
4	5.39	4.99	4.91	5.23	6.21
5	6.47	6.12	5.98	6.26	7.33
6	7.73	7.56	7.27	7.53	8.55
7	9.53	9.25	8.97	9.21	10.12
8	11.84	11.92	11.70	11.80	12.11
9	15.87	16.88	15.99	15.93	15.59
10	33.55	34.94	36.28	34.60	28.46

Finally, one can compare food consumption with total consumption. The former is more equitably distributed than the latter, which is not surprising given that wealthier households are likely to spend proportionately less on food than poor households. As a welfare measure in itself, food consumption has some intuitive appeal. However, for reasons given in Appendix B, it is not used in this paper.

Finally, it is useful to give some summary data on consumption in Côte d'Ivoire. Table A.3 gives the breakdown of total consumption by various categories. In Côte d'Ivoire as a whole, slightly less than half of total consumption (including imputed rent and the value of durable services) is food consumption. Of nonfood consumption, rents (imputed or real) and durable services play a relatively minor role. When one examines consumption patterns by different areas of Côte d'Ivoire, one finds that the fraction of total expenditures devoted to food consumption is generally smaller in wealthier regions than in poorer regions.

Table A.3: Composition of Total Consumption in Côte d'Ivoire, 1985

	All Côte d'Ivoire	Abidjan	Other Urban	West Forest	East Forest	Savannah
Food purchased	31,9%	33,9%	33,5%	29,9%	28,0%	28,2%
Food produced	11,8	0,1	4,0	27,6	27,5	37,1
Food eaten away from home	3,7	4,4	2,9	5,4	3,1	2,0
Rents	8,7	10,5	13,6	3,3	3,3	3,3
Water/Elec. Utilities	5,7	8,3	8,5	0,0	1,4	1,4
Durable services	3,8	4,7	4,6	1,7	2,9	2,0
Other nonfood	34,4	38,1	33,1	32,2	33,8	26,0
Total food	47,5	38,4	40,3	62,9	58,6	67,4
Total nonfood	52,6	61,6	59,7	37,2	41,5	32,7
Total value CFAFx1000 per capita per year	216,5	402,3	253,3	182,2	146,5	107,7

Note: Figures have not been adjusted by regional price indices or household composition.

Appendix B: Food Consumption as a Welfare Measure

As pointed out in Section II, one could use either total expenditures or food expenditures to determine the welfare levels of households. Both methods have advantages and disadvantages, but it would be useful to find a method of comparing the rankings to judge the relative merits of both methods. One possible standard is Engel's law, which states that total expenditures increase, the proportion of total expenditures spent on food declines. The argument here is that the expenditure elasticity of food consumption is less than one because food is considered to be a "necessity" rather than a "luxury." Engel's law has received a large amount of empirical support in both developed and developing countries. Thomas (1986) has done a careful examination of the accuracy of Engel's law using a large number of data sets and finds that it holds in general, though perhaps not for the poorest people in some countries. Since total expenditures, ceterus paribus, should be monotonically related to welfare, this implies that the proportion of total expenditures allocated to food should decline as welfare rises. Given this reasoning, an accurate welfare ranking ought to show a decline in the fraction of total expenditures spent on food as one moves from people at low welfare levels to people at higher levels. Table B.1 gives the relevant figures for households ranked by per capita food expenditures.

As can be easily seen, food shares do not decline as welfare levels rise when welfare is based on per capita food consumption (either adjusted or unadjusted). This indicates that such a welfare measure should not be used for Côte d'Ivoire. In contrast, food shares do decline as welfare increases when total expenditure is used as a welfare ranking, as seen in Table 2 in the text.

**Table B.1: Distribution of Food Consumption by Food Consumption Deciles**

Decile	Mean Per Capita Food Expenditures (CFAF x 1000 per year)		% of Food Expenditures in Côte d'Ivoire		Food Share (%) within each Decile	
	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted
1	41.9	25.5	2.44	2.41	0.471	0.478
2	69.0	41.4	4.02	3.93	0.472	0.483
3	88.8	53.5	5.17	5.08	0.508	0.504
4	106.7	63.9	6.21	6.06	0.512	0.501
5	125.8	75.2	7.33	7.13	0.456	0.465
6	146.9	88.9	8.55	8.43	0.463	0.475
7	173.8	104.7	10.12	9.93	0.483	0.471
8	207.9	124.8	12.11	11.83	0.494	0.500
9	267.8	167.5	15.59	15.89	0.500	0.513
10	488.8	309.1	28.46	29.32	0.497	0.480
All Côte d'Ivoire	171.7	105.5	100.00	100.00	0.489	0.487

It is not hard to imagine why welfare ranking based on per capita food expenditures may be misleading. Leaving aside the difficulties encountered with differences in household composition, suppose one has a set of individuals among whom total expenditures are unequally distributed. Under the assumption that Engel's law holds, one would expect relatively wealthy individuals to spend, on average, a smaller percentage of total outlay on food, even though random fluctuations in food expenditures may lead to

variations among individual people. An accurate measure of total expenditure is an unambiguous indicator of welfare rankings with which to compare individuals, but if food expenditures are relatively inelastic with respect to total outlay (i.e. the expenditure elasticity is greater than zero but less than one) and are susceptible to random shocks, then a negative shock to food expenditures for a given individual will mistakenly lead one to classify him as having a lower level of welfare than is indicated by total expenditures. In addition such a negative shock will reduce the individual's food share (food expenditures as a fraction of total expenditures). By an analogous argument, a positive shock results in (mistakenly) raising an individual's welfare ranking while simultaneously raising his food share. Given a sufficiently large random term in the determination of food expenditures one can obtain welfare rankings based on food shares which do not conform to Engel's law even though it is assumed to hold on average. This hypothesis is consistent with the data in Table 2 in the text and Table B.1, and if true it implies that per capita total expenditure is a better indicator of welfare than per capita food expenditure.

Appendix C: Measurement of Inequality

Given a measure of welfare of individuals, an aggregate statistic which records the level of inequality among these individuals can be selected. Perhaps the best strategy is to specify characteristics which one would like an inequality measure to have and then use all proposed measures which satisfy those criteria. There are four characteristics <sup>1/</sup> which are highly desirable: 1. Mean Independence - inequality is unaffected by equiproportionate changes in everyone's income; 2. Population-Size Independence - the same distribution of income over a larger or smaller population does not affect measured inequality; 3. Symmetry - exchanging income levels among different people does not affect inequality; and 4. Pigou-Dalton Transfer Sensitivity - a transfer of income from a wealthy person to a poor person reduces measured inequality. Virtually all proposed inequality measures are population-size independent and symmetric and most are mean-independent (though variance is not) and sensitive to Pigou-Dalton transfers (though variance of the logarithm of income is not for high incomes). For detailed discussions of measurement of inequality see Sen (1973), Shorrocks (1980, 1982, 1984) and the references cited by both authors.

Many suggested measures are eliminated by the following characteristics which are desirable, but not necessary, for a measure of inequality: 5. Decomposability - total inequality can be additively broken down by population groups or income sources; 6. Statistical Testability - one can test whether differences in inequality over time or between groups are

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<sup>1/</sup> Although these properties are described in terms of income, their essential nature is unchanged when expenditure data (adjusted or unadjusted) are used to measure the distribution of welfare.

statistically significant. It turns out that decomposability by income sources (where total inequality is assumed to be a covariance-weighted sum of measured inequality from each income source) is, given generally acceptable axioms, independent of the measure of inequality chosen (Shorrocks, 1982), so that income source decomposability does not reduce one's choice of inequality measures as long as they meet the first four criteria. However, group decomposability (where total inequality is the weighted sum of inequality measured within each group plus inequality between the mean incomes of the different groups) limits one to the two entropy measures proposed by Theil (Shorrocks, 1980, 1984). The variance of the logarithm of income is also group decomposable but unfortunately it does not satisfy Pigou-Dalton transfer sensitivity for large incomes. Yet one may want to use this measure because, given the assumption that expenditures follow a lognormal distribution, one can test whether the difference in inequality between two different distributions is statistically significant. Future work on inequality measurement should focus on whether other inequality measures, particularly the two Theil measures, are amenable to statistical tests.

Confining the analysis to the distribution of expenditure, and not income, means that income source decompositions cannot be used. This puts more weight on judicious use of group-decomposable measures of inequality for interpreting overall levels of inequality. Given the above discussion on the ability of inequality measures to meet particular axioms, we will use the three group-decomposable measures. The Gini coefficient will also be calculated for comparability with inequality studies of other countries. The three group decomposable measures are defined as follows:

$$1) \text{ Theil (T)} = \sum_{i=1}^N \frac{Y_i}{Y} \ln \left\{ \frac{Y_i N}{Y} \right\} = \sum_j \left\{ \frac{Y_j}{Y} \right\} T_j + \sum_j \left\{ \frac{Y_j}{Y} \right\} \ln \left\{ \frac{Y_j/Y}{N_j/N} \right\}$$

$$2) \text{ Theil (L)} = \sum_{i=1}^N \frac{1}{N} \ln \left\{ \frac{Y}{Y_i N} \right\} = \sum_j \left\{ \frac{N_j}{N} \right\} L_j + \sum_j \frac{N_j}{N} \ln \left( \frac{N_j/N}{Y_j/Y} \right)$$

$$3) \text{ Log Variance (LV)} = \sum_{i=1}^N \left[ \ln (Y_i) - \overline{\ln Y} \right]^2 = \sum_j \left\{ \frac{N_j}{N} \right\} LV_j + \sum_j \frac{N_j}{N} \left[ \overline{\ln Y_j} - \overline{\ln Y} \right]^2$$

where  $Y$  = total income of the population,  $Y_i$  = income of individual  $i$ ,  $Y_j$  = total income of group  $j$ ,  $N_j$  = number of people in group  $j$ ,  $N$  = total population,  $\overline{\ln Y}$  = mean of  $\ln (Y_i)$  over the entire population, and  $\overline{\ln Y_j}$  = mean of  $\ln (Y_i)$  over the population in group  $j$ . The terms to the right of the inequality sign in each formula depict the decomposable properties of the respective measures - the first term is a weighted average of the inequality found within each group (henceforth referred to as the within-group component) and the second term is the level of inequality that would prevail if each individual had the mean income (or mean of the log income in the case of the LV measure) of his or her respective group (the between-group component).

The Gini coefficient can be graphically depicted as the area lying above the Lorenz curve divided by the entire area in the Lorenz diagram. Its mathematical formula is:

$$\text{Gini (G)} = \frac{1}{2NY} \sum_{i_1} \sum_{i_2} |Y_{i_1} - Y_{i_2}|$$

where  $i_1$  and  $i_2$  simply correspond to the respective summation signs.

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## **The World Bank**

### **Headquarters**

1818 H Street, N.W.  
Washington, D.C. 20433, U.S.A.

Telephone: (202) 477-1234

Telex: WUI 64145 WORLDBANK  
RCA 248423 WORLDBK

Cable Address: INTBAFRAD  
WASHINGTONDC

### **European Office**

66, avenue d'Iéna  
75116 Paris, France

Telephone: (1) 47.23.54.21

Telex: 842-620628

### **Tokyo Office**

Kokusai Building  
1-1 Marunouchi 3-chôme  
Chiyoda-ku, Tokyo 100, Japan

Telephone: (03) 214-5001

Telex: 781-26838

