

What has happened to the urban population in Côte d'Ivoire since the eighties?

An analysis of monetary poverty and deprivation over 15 years of household data

*Michael GRIMM*

*Charlotte GUENARD*

*Sandrine MESPLE-SOMPS*

## **RESUME**

L'objet de ce travail est d'étudier l'évolution de la pauvreté urbaine en Côte d'Ivoire depuis les années 1980. On s'attache à rendre compte de plusieurs dimensions de la pauvreté, à vérifier, par des techniques de la dominance, la robustesse des tendances observées et à estimer de manière économétrique les déterminants des différentes formes de pauvreté. On montre que la pauvreté de conditions d'existence peut adopter une dynamique différente de celle de la pauvreté monétaire. Sans équivoque, la pauvreté monétaire, après avoir véritablement explosé entre 1985 et 1993, a sensiblement augmenté dans les centres urbains ivoiriens malgré le retour de la croissance. Une approche examinant les conditions d'existence et les capacités des ménages montre, sur la période de croissance, une tendance inverse.

## **ABSTRACT**

This article investigates the evolution of urban poverty in its various dimensions in Côte d'Ivoire since the eighties. The robustness of the results is checked using dominance criteria. An econometric analysis of the determinants of poverty complements the analysis. The study shows that the dynamic of poverty in terms of existence conditions can significantly differ from that of monetary poverty. As was the case in the eighties, monetary poverty increased strongly in the nineties in spite of a return to sustained growth following the devaluation of the CFA Franc. Poverty in terms of existence conditions raised less before the adjustment and even decreased afterwards.

**Key words** : urban poverty, deprivation, adjustment, West Africa, Côte d'Ivoire

**JEL Codes**: I31, I32, O12, O55

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## INTRODUCTION

Côte d'Ivoire has experienced widely varying phases of economic growth over the last few decades, which explains why, after being considered a middle income country during the 1970s, it was subsequently reclassified as a highly indebted and poor country (HIPC) (Berthélemy & Bourguignon, 1996). Following decolonization, and the boom in coffee and cocoa prices which gave rise to sustained economic growth as well as large investments in public and social infrastructure, Côte d'Ivoire witnessed a long period of per capita GDP decline from 1978 to 1993. The turnaround in coffee and cocoa prices and inefficient policies of public spending financed by an onerous external indebtedness, precipitated the country into a serious economic crisis. Throughout the 1980s, the country attempted to reestablish external and internal equilibriums mainly through real stabilization plans. This period was also one during which several structural reforms were initiated (e.g. privatization, liberalization of the economy, and customs reforms). Starting in 1994, following the devaluation of the CFA Franc, record productions of cash crops, massive supplies of international aid, and an acceleration of reforms encouraged the return of growth. However, as recent events show, this growth has remained fragile (Cogneau & Mesplé-Somps, 2001). The Ivorian economy is still highly dependent on world raw material prices and indicators of social development are still at an insufficient level (World Bank, 2000a).

For several years, Ivorian authorities have principally been preoccupied with questions of growth and structural reforms and have considered problems of inequality and poverty as secondary. In fact, it is the debate on the effects of the devaluation and the distribution of benefits of the new growth which has brought the analysis of poverty to the fore.<sup>1</sup> More particularly, it appears that poverty is no longer considered as being "only" a rural phenomenon, but also more and more an urban problem. Indeed, during the last years, the progression of poverty in urban areas has been more rapid than in the countryside. Grootaert (1994) for example found for the period 1985 to 1988 a multiplication of poverty by four in Abidjan and by two in other Ivorian cities, whereas poverty on the national level increased only by a factor of 1.5. Jones & Ye (1997) stated that in the beginning of the 1990s, urban poverty increased faster than rural poverty and did not diminish in the year after the devaluation (see also World Bank, 1997). Other studies of a more analytical flavor, using computable general equilibrium models to evaluate the short and medium impact of the devaluation of the CFA Franc in Côte d'Ivoire (e.g. Bourguignon, de Melo & Suwa-Eisenmann, 1995; Calipel & Guillaumont Jeanneney, 1996; Cogneau & Collange 1998), predicted a reduction in unemployment by almost 2 points in urban Côte d'Ivoire, but a strong regression of urban real incomes. They also found, a strong regional redistribution in favor of the rural sector.

In this study, we analyze the evolution of poverty in urban areas in Côte d'Ivoire between 1985 and 1998. Until now, a study over such a long time has never been done. Existing studies concentrate either on the 1980s (Gleewe, 1991; Grootaert, 1993; Kakwani, 1993; Grootaert, 1994; Grootaert, 1995; Grootaert & Kanbur, 1995; Grootaert, Kanbur & Oh, 1995; Grootaert, 1996; Grootaert, 1997) or on the beginning of the 1990s (Jones & Ye, 1997; World Bank 1997). We first examine poverty using a monetary approach, where the standard of living of households is measured by the level of consumption expenditures, which are less subject to inter-year variations and are more easily measurable than income, notably with respect to non-salaried households (Deaton & Zaidi, 1999).

However, we cannot be satisfied with a strictly financial approach to poverty, insofar as monetary resources are only one possible way to achieve a certain level of well-being. Conversely, a household with an income of more than 2 US\$ per day per capita can have for example no access to safe water or female education. Thus, indicators other than the level of consumption expenditures can also measure well-being. It is now recognized that poverty is a complex and multi-dimensional phenomenon. The definition of poverty includes notions of risk, vulnerability, shortages of capacities, lack of possibilities of expression (*voicelessness*) and access to power (*disempowerment*) (Sen, 1985, 1993; World Bank, 2000b).

We thus subsequently examine the evolution of the subsistence conditions of urban Ivorian households. Then we address the contrast between this approach and the monetary approach. Analyses done for developed or developing countries show that they can support very distinct realities<sup>2</sup>. The realization that poverty can take on multiple facets thus reflects the problem of targeting the most disadvantaged populations and of choosing the adequate poverty reducing policy instruments.

The investigation is carried out on the basis of absolute poverty lines. Furthermore, beyond an examination of FGT indicators (Foster, Greer & Thorbecke, 1984), the sensitivity of poverty to changes in the choice of the poverty line and the demographic composition of households is tested using stochastic and sequential dominance criteria (Atkinson & Bourguignon, 1987; Deaton, 1997; Ravallion, 1998; Chambaz & Maurin, 1998; Duclos & Makdissi, 2000).

This analysis uses data from five household surveys conducted between 1985 and 1998, carried out by the *Institut National de la Statistique* of Côte d'Ivoire (INS) with the support of the World Bank and other international organizations: (i) The Living Standard Measurement Surveys (LSMS) of 1985 and 1988 (each has a sample size of 1600 households), (ii) the *Enquête Prioritaire* (EP) of 1992/93 (9600 households), (iii) the *Enquêtes de Niveau de Vie* (ENV) of 1995 (1200 households) and 1998 (4200 households). All surveys are representative on the national level.

In the following section monetary poverty is analyzed, while in the third section subsistence conditions are examined. The correspondence between the two approaches is raised in the fourth section, which also offers an analysis of the determinants of the two forms of poverty. The fifth section concludes.

## **1. A MONETARY ANALYSIS OF LIVING STANDARDS**

### **1.1. FGT poverty indicators**

The line of "extreme" poverty is defined as 1 US\$ per capita per day and that of "simple" poverty as 2 US\$ per capita per day in 1985 purchasing power parity.<sup>3</sup> This choice may seem arbitrary, but it has the advantage of allowing international poverty comparisons. Furthermore, the information collected in the available surveys does not permit the definition of a nutritional or broad nutritional line. The FGT poverty indicators are calculated on the basis of per capita expenditures.

(Please insert Table 1 about here)

The different indicators of monetary poverty show an unambiguous progression in absolute poverty in urban areas between 1985 and 1995 (Table 1). Extreme poverty started to appear in Abidjan in 1993 with a rate of 0.9% of households concerned, which then increased to 4.6% in 1995. However, the incidence of poverty at 2 US\$ shows that simple poverty surged in 1988 (4.3% of poor households) and progressed rapidly until 1995 (15.2% of poor households in 1993 and 29.3% in 1995). In other cities, the incidence of extreme poverty was already around 3.4% of households in 1985, and then grew to approximately 16% in 1993 and to 14.5% in 1995. The rate of poverty at 2 US\$ was also already high in 1985 at 12.3% and rose strongly from 1988 (25.4%) before exploding in the mid 1990s. In 1995, 52.4% of urban households living outside Abidjan had expenditures of less than 2 US\$ per capita per day. The depth of poverty, which reflects the mean deviation of the expenditures of the poor relative to the poverty line, reveals that the increase in the incidence of poverty was accompanied by erosion in the average situation. Similarly, the indicator of the severity of poverty, which is a combination of the poverty rate, the mean degree of poverty and a measure of inequality between the poor, continued to grow until 1995. With the start of

economic recovery in 1995, a year characterized by the highest rates of poverty, the incidence of extreme and simple poverty began to fall in Abidjan as well as in other cities. The levels respectively dropped to 5.9% and 31.1% in 1998 using the 2 US\$ poverty line. In Abidjan the incidence of extreme poverty fell from 4.6% to 1.2%, while in other cities it dropped from 29.3% to 10.0%. The weight of poor households living in Abidjan with respect to the total share of poor urban households thus fell from 41% in 1995 to 28% in 1998. However, in contrast to what happened in other cities, the 1998 poverty rate in Abidjan did not decline below its 1993 level.

Even if an exact evaluation of the impact of the devaluation of the CFA Franc on poverty remains difficult, we can at least state that between 1995 and 1998 average real per capita expenditures of households living in Abidjan rose by 4.6% and that poverty dropped by 10.5 points (2 US\$). This suggests that the growth process was a non-negligible poverty reduction lever. However, as the confidence intervals in Table 1 show, it is important to mention that poverty trends in urban areas in Côte d'Ivoire are fragile. Indeed, except for the surveys of 1993 and 1998, the samples are rather small and thus all the results suffer from weak precision. Dominance analysis (of first and second order), using Kolmogorov tests seems necessary to check the robustness of measured trends in the change in poverty over time as well as across regions. The significance tests of differences in regional variations in expenditure levels were first undertaken, to verify whether at least one variation above the critical threshold exists for the whole distribution. We also ensured that for a large spectrum of poverty lines (from 0 to 4 times the 2 US\$ line, covering more than 80% of the distribution each time) the curves do not cross and that observed variations are significant. These tests allow us to confirm that the incidence of poverty was always higher in other urban centers than in Abidjan whatever the chosen year.

The dominance analyses of the trends show that the increase in poverty, for urban areas as a whole, is unambiguous between 1985 and 1995 since the stated trends are confirmed up to the line of 4 to 5 US\$ per capita per day (see Table A1, Appendix). After 1995 the changes diverge noticeably between Abidjan and the other urban centers. With respect to the fall in the FGT poverty indicators between 1995 and 1998 in Abidjan, the dominance analysis confirms that poverty did not decline below the 1993 level. Conversely, in secondary urban centers, poverty indicators dropped significantly between 1993 and 1998, at least for all poverty lines below 4 US\$. All these results have been reconfirmed by sequential dominance tests (results not presented here, see Bour & Pasquier, 2000), which allow for equivalence scale effects and thus control for the demographic composition of households. Whereas the monetary situation of urban households outside of Abidjan improved between 1993 and 1998, whatever the household-type considered, the opposite was true in Abidjan. In total, it appears that poverty in urban areas in Côte d'Ivoire decreased between 1993 and 1998.

## **1.2. Inequality and expenditure distributions**

Average consumption expenditure trends confirm the severe worsening of poverty in urban areas. Whereas in 1985 the average level of per capita expenditures in Abidjan was the double of the national average (urban and rural), in 1995 it was only one and a half times higher. At the same time, the average level of consumption expenditures in other urban areas was close to the national average. This severe drop hit all budget items, in Abidjan as well as in other urban centers. Whereas urban households outside Abidjan benefited quickly from the economic recovery after the devaluation, households in Abidjan benefited only after 1996. The small increases in expenditure levels of urban households, however, did not allow a return to expenditure levels of the mid 1980s: more precisely, average expenditure in urban Côte d'Ivoire fell, on average, by 5% per year, corresponding to a drop of 50% over 13 years.

(Please insert Table 2 about here)

Analysis of inequality in expenditure levels reveals that in Abidjan the Gini coefficient increased from 0.34 to 0.37 between 1985 and 1993, reached 0.44 in 1995, and finally dropped to 0.38 in 1998 (see Table 2). Examination of the Lorenz curves, as well as significance tests of the variations between the curves, confirms none of these trends. In contrast, in other cities, the Gini index fell from 0.38 in 1985 to 0.36 in 1998, with a strong drop observed between 1985 and 1988. Examination of the Lorenz curves two by two allows us to confirm only the falling trend between 1985 and 1988, and the increasing trend between 1988 and 1993. Other trends are not significant particularly the fall in inequality between 1985 and 1998 is not robust. Finally, for urban areas as a whole, only the increase of the Gini coefficient between 1988 and 1993 is significant.

(Please insert Figure 1 about here)

In order to examine the distribution in more detail an analysis of Kernel expenditures curves was carried out, allowing identification of the distribution segments where expenditures changed the most. Over the entire period (1985-1998), the shifting of the curves shows that the drop in standards of living affected middle class households as much as households in the poorest class (see Figure 1). Even in Abidjan, all classes of households suffered from the crisis between 1993 and 1995. The resumption of growth between 1995 and 1998 translated, above all, into an improvement for the middle and highest expenditure quartiles, while the situation of the poorest only improved marginally. This confirms the erosion of monetary living conditions between 1993 and 1998. In contrast, households in secondary urban centers seem to have been less exposed to the large negative shock of the devaluation: the curves did not significantly move between 1993 and 1995. At the same time, the recovery between 1995 and 1998 was beneficial to the overall distribution in secondary cities (the Kernel curve shifted slightly to the right), allowing the above-noted significant drop in the incidence of poverty.

### **1.3. Comparison with macroeconomic trends**

The severe drop in expenditure levels in the 1980s and in the first half of the 1990s is partly corroborated by the changes in average income levels.<sup>4</sup> The survey data show that between 1985 and 1995 average real monthly wages of civil servants fell by 44% in Abidjan, and by 56% in other urban centers. Average real monthly wages of private sector wage earners fell by 52% in Abidjan and by 64% in urban centers.<sup>5</sup>

These results show to what extent the reestablishment of equilibrium in public finances, as well as the external account, affected the living standard of the most favored classes (that is, civil servants and wage earners in the modern sector). At the beginning of the 1980s, the middle and upper class housing subsidy was stopped and payments to civil servants blocked. From 1985, out-of-school hiring by the civil service was cut by half. At the same time, scholarships for higher and secondary education were reduced and a policy of voluntary retirements established. The price of public services, such as electricity, water or public transportation rose by 25% while the price of food in urban areas increased. The minimum wage was not indexed to inflation<sup>6</sup>, and, finally, a new labor code was implemented easing hiring and firing procedures. Simultaneously, private firms suffered from public payment arrears, a general drop in the level of absorption and losses in competitiveness.

The recovery, starting in 1994, was due mainly to a favorable evolution of international export crop prices, record coffee and cocoa productions, a return of aid and new private capital attracted by the privatization process. The latter explains the increase in private investment reported in the national accounts (IMF, 2000). Even if some of the recovery components are linked to growth in the modern sector, the general situation of urban consumers improved only modestly. The monetary approach reveals a strong increasing poverty trend in urban areas between 1985 and 1995, then a weak declining poverty trend after 1995, which did not, however, allow a significant drop in urban

poverty. Given the extent of the erosion in the level of monetary living conditions for a non-negligible part of the urban Ivorian population, we next examine whether this trend is also reflected by the evolution of what is generally called "non-monetary poverty indicators" or "subsistence condition indicators".

## **2. ANALYSIS OF SUBSISTENCE CONDITIONS**

### **2.1. Construction of subsistence condition scores**

The household surveys allowed us to construct different sub-indicators of living conditions with which we associated various scores. These indicators are objective and structural elements, which refer to the conception of poverty as a shortage in capacities or vulnerability. Nevertheless, though some are dependent on the level of income. For each component the maximum score corresponds to a high level of deprivation, whereas a score of zero means an absence of any deficiencies (see Table A2, Appendix). Scores are then aggregated to a synthetic composite measure of deprivation.<sup>7</sup> The different components are: (i) *indicators of material existence conditions* of households based on characteristics of their housing and their means of access to diverse commodities (e.g. water, electricity, toilets, type of fuel) consisting of objective elements that are less subject to economic fluctuations than levels of expenditures; (ii) *an indicator of the level of human capital* computed as the ratio of the number of years of education effectively completed by household members to the maximum number of years of education possible, given the age of each member; (iii) *an indicator of vulnerability* which accounts for the number of durable goods (e.g. bicycles, radios, televisions) that each household possesses; this translates both, the possibilities of each of producing a permanent income (in the case where the durable goods are productive) and the possibility of coping with temporary financial difficulties through the sale of these goods. Note that this indicator is relatively dependent on the level of income. The aggregation makes sense if each item follows the same logic as that of the global composite indicator. We note a relative constancy, in time and space (for Abidjan and other cities), of the relation between the different components.<sup>8</sup> We note also that the degree of correspondence between subsistence condition elements, the indicator of the human capital and the composite index is quite high. Thus poor subsistence conditions are associated with low levels of education, whatever the year considered. The presence of any form of poverty increases the empirical probability of the occurrence of other forms of poverty.

Several possibilities for aggregating the elements can be considered. Either we add the different components without specifying weights, following the example of Lollivier & Verger (1997), or we derive a weight for each variable using principle component analysis. Both methods were undertaken. They led to almost the same results: i.e. the correlation coefficient between the two indicators exceeds 0.9. For the sake of simplicity, we chose to present only the results of the aggregation without weights.

### **2.2. The evolution of subsistence conditions**

Before proceeding with the examination of the composite indicator and its evolution, it is worthwhile to examine the evolution of its different elements (see Table A3, Appendix). The households of other cities suffered from greater deprivation than those living in Abidjan. Following a period of worsening living conditions, we observe in 1998, for all urban areas together, a net improvement in the use of lighting and cooking materials. Furthermore, there is a reduction in the quantity of durable goods possessed by households. The continuation of this drop during 1998 can

be explained by both the currency devaluation, which increased the cost of these mostly imported goods and by the continuing unfavorable financial situation of urban households.

At the end of the 1990s education levels were still very low. More than one third of the adult population of Abidjan had never attended school. However, in Abidjan, the education of children has greatly and regularly improved over the last fifteen years, with 70% of children from six to 15 years having attended school in 1998, versus only 50% in 1985. On the other hand, in other cities of Côte d'Ivoire this trend was weaker and the average educational level in 1985 and 1998 has not improved much. Following the shortage in public investment, disequilibria arose between the economic capital and the rest of the country with respect to the quantity and quality of educational infrastructure. In addition, a certain number of households declared that they withdrew their children from school due to a drop in their incomes.

(Please insert Figure 2 about here)

The evolution of the cumulative distributions of the deprivation scores (see Figure 2) shows that 1988 was the best year for Abidjan and 1985 for the other cities.<sup>9</sup> In Abidjan, living conditions improved between 1985 and 1988; after this, the situation of households strictly deteriorated until 1993. Finally, from 1993 to 1998, the situation improved and allowed households to attain living conditions similar to those in 1985. A sequential dominance analysis confirms these results. With the exception of the most needy household group, for which the differences in the distributions are not significant, it appears that the weight of poverty in terms of subsistence conditions clearly declined in Abidjan between 1993 and 1998. In other urban centers, households suffered from deterioration in their living conditions until 1993. As in Abidjan, the resumption of growth between 1993 and 1998 brought a significant improvement in living conditions, but only sufficient enough, to regain 1988 levels. The sequential dominance analysis also confirms this trend.

The changes in subsistence conditions are much less varied than those of monetary poverty. This, however, is inherent in the indicator itself, which is necessarily less volatile than consumption expenditures. Furthermore, this does not mean that households have "decent" living conditions, since from the 1980s, a third of households in Abidjan and more than half of those living in the rest of the urban zones could be considered as being poor in terms of subsistence conditions.

The period between 1993 and 1998 is characterized by a clear improvement in the subsistence conditions of urban Ivorian households. This contradicts the conclusions drawn from the monetary analysis, at least with respect to households in the economic capital since they suffered from an increase in the rate of monetary poverty. However, nothing ensures that these are the same households. This divergence, however, confirms the multidimensional character of poverty. One could further argue that the most deprived households, whose incomes rose, preferred to spend their surplus income on improvement of their subsistence conditions rather than on their current consumption. This would be coherent with the increase in the activity in the construction sector (IMF, 2000). Finally, this improvement in subsistence conditions might show that the recovery translated, to a certain extent, into an increase in public infrastructure investment, favorable to the subsistence conditions of urban households (e.g.. electricity and water supply). Indeed, the percentage of households connected to the electricity network, to running water and using gas for cooking rose considerably, which would be coherent with this latter hypothesis.

### **3. DO THE TWO FORMS OF POVERTY DESCRIBE THE SAME PHENOMENA?**

In order to determine whether the two dimensions of poverty support the same reality, we examine the extent to which they are correlated and whether they apply to the same sub-populations. Econometric analyses concerning their determinants are then undertaken.

### 3.1. Correspondence between monetary poverty and subsistence conditions

Table 3 presents Cramer's V statistic of correspondence (the boundaries of this statistic are zero and one; zero indicating no correspondence and one perfect correspondence) between the score of subsistence conditions, consumption level quintiles and being poor or not at 2 US\$ per capita per day. The correspondence between the two dimensions of poverty is relatively weak. However, it is higher in other cities than in Abidjan. Furthermore, it is difficult to make out any trend in the change in these coefficients over time.

(Please insert Table 3 about here)

To confirm this first remark, we should examine what proportion of the population suffers from both forms of poverty. For that purpose, we define the poverty line of relative subsistence conditions such that the proportion of the population suffering from insufficient subsistence conditions is equal to the proportion of people faced with insufficient consumption expenditures (Table A4 in the Appendix presents the poverty rates as well as the corresponding subsistence condition score levels).

(Please insert Table 4 about here)

The proportion of households suffering from both forms of poverty was rather weak, with less than 10% in Abidjan and 33% in other cities (see Table 4). In other words, only a little more than half of the households in secondary Ivorian cities that suffered from subsistence condition deficiencies were also monetarily poor, whereas in the capital the proportion was even below 50%. Furthermore, while the percentage of households suffering from deficiencies in subsistence conditions and monetarily poor increased in Abidjan over the period under study, this rate fell between 1993 and 1998 in other cities. Compared to Abidjan, the monetary situation may have improved in other cities for some of the households defined as poor in terms of subsistence conditions. If we follow the proportion of households defined as monetarily poor and suffering from insufficient subsistence conditions, we cannot state any trend between 1993 and 1998. Accordingly subsistence conditions may not have improved for the monetarily poor. All these observations show that the two poverty approaches are not entirely exclusive.

### 3.2. Analysis of the determinants of the monetary standard of living

In order to identify the characteristics of households associated with a more or less favorable monetary standard of living, a semi-logarithmic function of per capita household expenditures was estimated. The model used is of the following form:

$$\log y_i = \mathbf{b}x_i + \mathbf{e}_i, \quad (1)$$

Where  $\log y_i$  is the logarithm of real per capita expenditures corrected for regional and temporal variations in prices,  $x_i$  is a vector of the characteristics of the household  $i$  and its members,  $\mathbf{b}$  is the vector of parameters to be estimated and  $\mathbf{e}_i$  is a normally distributed error term.<sup>10</sup> The vector  $x$  essentially contains variables characterizing the human capital of the household and its members (education of the head and his/her spouse, socio-economic status<sup>11</sup>) and variables describing the composition of the household (number of children, number of adults, number of elderly persons, and type of household). Whereas the first group of variables gives an indication of the productivity of the household,<sup>12</sup> the second group reflects its needs. A third group of variables concerns usual control variables such as citizenship, gender of the household head, as well as migrant status.<sup>13</sup> The latter variables take into account potential sources of segmentation and discrimination in the labor market. Table A5 in the Appendix presents some descriptive statistics of the explanatory variables

used. The purpose of these estimations is twofold. First, the results can be related to the evolution of monetary poverty presented above. Second, to the extent that the analysis of the determinants of subsistence conditions use the same explanatory variables, the estimations allow us to examine whether the two dimensions of poverty depend on the various household characteristics in the same way.

In what follows, we implicitly assume that variables such as the composition of the household and the occupational choice of its head are exogenous. This assumption is satisfactory if we are interested in determinants of the standard of living at a given moment and not over the life cycle as a whole. Furthermore, it is important to note that our analysis does not claim to identify the causal relationships between the standard of living and the different explanatory variables, but rather to bring out the most important correlations between per capita expenditures and the socio-economic and demographic households characteristics.

(Please insert Table 5 about here)

Table 5 presents the results obtained for the years 1985, 1988, 1993, 1998 and for a pooled sample containing the households of the four surveys together. It is noteworthy that the number of observations is very different from one year to another and that this clearly has a non-negligible influence on the standard errors of the estimated coefficients. In general the explanatory power of the model seems to be satisfactory with a  $R^2$  between 48% and 56%. However, the unexplained part of the variance of the logarithm of expenditures increases from 1985 to 1998, indicating that the unobserved characteristics have an increasing influence.

Households in Abidjan – about half of the surveyed households – had clearly higher per capita consumption than households in other Ivorian cities. The difference was particularly high in 1992/93 with consumption 67.7% higher in Abidjan relative to the other cities. Households headed by a woman, which were 11% of households in 1985 and 19% in 1998, seem on average to be richer than households headed by a man. This result has also been found by Grootaert *et al.* (1995) and Grootaert (1997) who analyzed the Ivorian household data of the 1980s. Surprisingly, the age of the household head did not appear to be an important determinant for the household's standard of living. However, many of the effects linked to life cycle are already captured by household composition variables. The citizenship of the household head decisively influenced the level of expenditures. Ivorian households had, on average, a per capita consumption of 33% to 17.2% above that of non-Ivorian African households, which represented between 24% and 33% of the urban population.<sup>14</sup> The human capital of the household head and his/her spouse comes out as a key variable for the standard of living (a result also highlighted by Grootaert *et al.* (1995) and Grootaert (1997)). Households headed by a person having a primary level of education had, on average, per capita expenditures of 19.7% to 31.2% above those of households headed by a person who was never enrolled in school. Having a secondary or higher education level had an even higher impact, increasing per capita expenditures from 56.6% to 80.2%. The effects of the education of the spouse went in the same direction but were on average slightly weaker. Wald tests (not presented here) confirmed the reduction in the benefits associated with secondary education between 1985 and 1988 and its increase between 1988 and 1993 as well as the increase in the benefits associated with primary education between 1993 and 1998. Of all socioeconomic groups, civil servants and public sector wage-earners had the lowest risk of falling into poverty. If single parent families (4% of households in the pooled sample) had on average a standard of living below that of nuclear or enlarged families (84% of households), polygamous families (12% of households) had on average slightly higher expenditures. The effects linked to the demographic composition of households were significant and stable for all years considered. Each additional child of zero to five years old reduced per capita expenditures, all things being equal. The positive sign of the quadratic term, however, means that this negative effect weakened with a growing number of children. In 1998, for instance, per capita expenditures diminished by 16.2% if the number of children aged zero to five

years rose from one to two. If this number increased from two to three children, per capita expenditures only decreased by 7.4%. The negative effect was lower for children from six to fourteen years, but remained significant. The effect of the number of adults was also negative. However, it should be noted that the impact of an additional adult is ambiguous: on one hand, an extra adult increases the potential productive capacity of the household, but on the other hand, he/she increases its needs. Another typical phenomenon in the African family environment is the fact that relatively rich households often welcome members of related families who are less well off, which then may reduce the standard of living of the welcoming household. Moreover, we observe that the coefficients of household composition were on average greater in 1998 than in 1985, indicating that the composition of the household itself was a greater correlate of the standard of living (the robustness was verified using Wald tests). The period dummies show the evolution of per capita average expenditures between 1985 and 1998 quite well. A household with constant socio-demographic characteristics saw, on average, a per capita decline in expenditures of 133% between 1985 and 1998, of 47% between 1988 and 1998, and of 3.6% between 1993 and 1998.

In order to quantify the isolated explanatory power of some variables, their *partial R<sup>2</sup>* values were calculated. We note, for example, that 34.1% to 49.4% of the variation in per capita expenditures not explained by the model - omitting the variables related to the composition of the household - are explained if the latter group of variables is added to the model. The education of the household head explains, for all years, between 7.3% and 11.5% of the variance, which remains unexplained by a model where the education of the household head is excluded.

### 3.3. Analysis of the determinants of subsistence conditions

In order to analyze the association between the subsistence condition scores and the socio-economic household characteristics, an ordered probit model of the following form was estimated:

$$y_i^* = \mathbf{b}x_i + \mathbf{e}_i, \quad (2)$$

Where  $\mathbf{b}$  is the same vector of explanatory variables as for the analysis of determinants of the monetary standard of living. The dependent variable  $y^*$  is not observed. We only observe:

$$\begin{aligned} y = 0 & \quad \text{if} \quad y^* \leq 0, \\ y = 1 & \quad \text{if} \quad 0 < y^* \leq \mu_1, \\ y = 2 & \quad \text{if} \quad \mu_1 < y^* \leq \mu_2, \\ & \dots \\ y = 16 & \quad \text{if} \quad \mu_{15} < y^*. \end{aligned}$$

The  $\mu$ 's are unknown parameters, which are jointly estimated with the vector  $\mathbf{b}$  (Greene, 1997). Once again, the results obtained are above all descriptive and specify, all things being equal, the association between the socio-demographic characteristics of a household and its members and the probability of attaining a given subsistence condition score.

Given the non-linearity of the ordered probit model, the estimated coefficients  $\mathbf{b}$  (see Table 6) are not easy to interpret. To facilitate the analysis, the probabilities are predicted for three levels of subsistence conditions from the pooled model by varying one variable each time while maintaining the others at their means. The probabilities for some of these are presented below. The thresholds of the scores used for evaluating weak deficiencies (score 3), poverty (score 8) and extreme poverty

situations (score 11), naturally arise from a partially subjective choice. Nevertheless, several tests show that results for alternative threshold levels are very close to the results presented here, they are thus sufficiently robust for the chosen threshold.

(Please insert Table 6 about here)

Poverty measured by living conditions was strongly related to the household's location, whatever the year considered: being located in Abidjan increased the probability of having a weak score and thus living in acceptable conditions. The gender of the household head also significantly influenced the deprivation score. In line with the preceding monetary approach, households where the head was a man were more likely to live in poor conditions than those headed by a woman. Another important factor was the citizenship of the household head. The differential due to citizenship intensified when the poverty score was high; that is, non-Ivorian Africans had a clearly higher probability of living in poor conditions than Ivorians (probability of 9.1% versus 6.8% respectively for a score of 11 which corresponds, according to our definition, to extreme poverty, Table 7).

(Please insert Table 7 about here)

On the other hand, the age of the household head as well as migrant status did not have a significant influence on subsistence poverty. A high education level of the household head significantly reduced the probability of being poor in terms of subsistence conditions (see Table 8). The influence of the education level of the spouse went in the same direction, but had, however, a lower impact on the subsistence condition score. The positive effect of the education of the household head and his/her spouse on the probability of having more favorable subsistence conditions intensified the higher the level of instruction obtained.

(Please insert Table 8 about here)

The evolution of the predicted probabilities, from year to year, shows a break in 1993 with respect to the effects of education. Until 1993, a household head with a primary level of education saw his/her probability of having good living conditions diminishing from 14.7% in 1985 to 6.5% in 1993 using a score of 3. After 1993, a recovery seemed to take place, but the probability did not reach its 1985 level. Similarly, the probability of having very poor living conditions (score 11) increased until 1993, then started to drop, but not to a level below that of 1985. The same evolution can be seen for household heads having a secondary or higher education.

(Please insert Table 9 about here)

Household heads working as independents, having an agricultural or non-agricultural activity and who represented 42% of households in the pooled sample, had a higher vulnerability to subsistence poverty than all other professional categories. Their probability of being extremely poor was 8.8%. If the household head was a private sector wage earner this probability was only 6.6% (see Table 9). Thus even if the household head was unemployed or inactive his/her situation appeared better than that of a self-employed. However, it is clear that the household head is not necessarily the main income earner of the household. Households where the head worked in the public sector appeared to be the best protected from subsistence poverty with a probability of only 3.7% of being extremely poor in the pooled model. Although civil servants and other public sector wage earners remained better protected from subsistence poverty than all other professional categories, the probability that they fell into a state of poverty (score 8) increased from 10.8% in 1985 to 15.2% in 1993, then dropped back to a level of 12.9% in 1998 (predicted probabilities year by year not presented in the table). Private sector – formal and informal – wage earners represented 57.5% of the poor in terms of subsistence conditions in Abidjan in 1985 (19.4% in other cities) and 41.4% in 1998 (28% in other cities). This poverty incidence was clearly above the average over the entire

period, especially outside Abidjan. Their probability of being extremely poor however diminished over the period from 12% in 1985 to 4.1% in 1998.

The type of household had only a weak and rarely significant effect on the poverty scores. Also, subsistence conditions do not seem to be highly linked to the composition of the household. Among the selected variables, only the presence of young children influenced subsistence poverty in a significant way in all years, although this variable had only a weak influence on the probability of living in good conditions (score 3). The presence of an increasing number of children in the household intensified the probability of being poor or extremely poor in terms of subsistence conditions. The presence of an increasing number of adults in the household - a significant variable in the pooled model – tended to diminish the risk of living in poor (score 8) and unacceptable (score 11) conditions. Finally, the fact that a household sheltered more elderly persons increased the risk of being extremely poor, but had little effect on the other poverty scores.

### **3.4. Summary of the econometric analysis of the determinants of the monetary standard of living and deprivation**

The econometric analyses show that the two forms of poverty can be relatively well described by the same set of explanatory variables. The education of the household head is identified as one of the key variables of the standard of living of households. The results also confirm earlier observations that the socio-economic status of the household head is an important welfare determinant. For example, for equal levels of endowments, households whose head worked in the public sector had higher welfare levels than households working in other sectors. The degree and the risk of poverty seem also lower for Ivorian households located in Abidjan. Households headed by a man are poorer than those headed by a woman. On the other hand, the influence of the composition of the household seems to be less relevant concerning the explanation of subsistence poverty relative to monetary poverty. However, using the two approaches reveals that common features characterize poor households. In addition, the change over time of the relative effects of several variables are very similar for the two poverty dimensions. However, our econometric models leave a large part of heterogeneity unobserved, which means that even if the most disadvantaged households belong to the same population sub-groups, they are not very easy to identify using a single approach. This should be taken into account when targeting poverty reducing policies.

## **CONCLUSION**

We have analyzed the evolution of poverty in Côte d'Ivoire since 1985 by taking into account several dimensions of poverty, checking the robustness of the observed trends using dominance tests and econometrically estimating the determinants of the different forms of poverty. While the multidimensional character of poverty in developing and developed countries has already been shown through statistical analysis, this study shows that poverty measured by subsistence conditions can have a different dynamic than monetary poverty. This distinct evolution can clearly be explained by the more inert nature of subsistence condition poverty, since it integrates the elements of household capacities that fluctuate less than current levels of expenditures. But this is also due to the fact that our subsistence condition indicator takes into account the supply and accessibility of public services, which are not strictly linked to the financial conditions of households or their individual characteristics.

We have shown that monetary poverty truly soared between 1985 and 1993, then fell in secondary Ivorian urban centers but continued to increase in Abidjan. The confrontation of this analysis with an approach examining subsistence conditions and household capacities has revealed a somewhat

different trend. First, the magnitude of the increase in poverty in terms of subsistence conditions between 1985 and 1993 was much smaller. Second, 1998 marked a significant positive evolution, the living conditions of urban households improved (both in Abidjan and in other cities), without however, reaching levels better than those observed in the 1980s. The fact that the growth was due more to investment than consumption may partly explain this divergent evolution. Even if some recovery responsible factors were linked to an increase in modern sector activities, the general situation of urban consumers only slightly improved.

Nevertheless, several structural facts common to the two approaches have been underlined. Households headed by a man are less rich and live in poorer conditions than those headed by a woman. Although less educated persons were the most vulnerable, each educational level (primary, secondary or superior) was, at the end of the 1990s, linked to a higher risk of poverty than before – thus even well educated individuals suffered a non-negligible incidence of poverty in 1998. Without a doubt, the real stabilization measures undertaken during the 1980s and in the mid-1990s, as well as the increase in prices following the devaluation, directly affected urban civil servants and employees of the modern private sector. Between 1985 and 1998, real public salaries were cut in half (minimum wages followed this downward trend). The incidence of poverty for wage workers increased by a factor of 10 between 1985 and 1998 in Abidjan, and by five in the other Ivorian urban centers. All categories of households experienced a decline in their purchasing power. However, public wage earners remained most protected from poverty.

Despite the macroeconomic success of the stabilization program, public financial resources remain very limited with respect to redistribution and growth enhancing policies. Indeed, they are still largely conditioned by the evolution of the prices of raw materials on the one hand, and by the weak development of the tax system, which does not react sufficiently to growth, on the other hand. Furthermore, although certain household capacity indicators such as the level of education experienced long term positive trends, they provided an insufficient leverage for growth. Indeed, their levels are still too low and they are not a guarantee of acceptable living conditions and sufficient income, even if they are an important determinant of them. If growth is a necessary condition for the improvement of populations' standards of living, it is obvious that it is insufficient for the eradication of poverty. Hysteric phenomena may explain that despite the recovery of economic growth, a large part of the population still lives in a preoccupying situation in terms of poverty. In addition, the actual economic and political situation in Côte d'Ivoire does not seem favorable for a further poverty reduction. Since late 1998 growth has slowed, partly due to bad climatic conditions, and real GDP per capita has stagnated and even declined in 1999 and 2000. The process of structural adjustment slowed as well. The economy has also been adversely affected by a sharp decline in the terms of trade, with cocoa prices in the summer of 2000 quoted at 40 percent below their level at the end of 1998 (IMF, 2000). Furthermore, the political instability since December 1999 and the following freeze of international aid discourages and hinders private investment, suggesting that the Ivorian economy currently faces a crisis comparable to that of the end of the 1980s.

## NOTES

1. But also the HIPC initiative and its conditions for the poverty reduction.
2. See, for example, Lollivier & Verger (1997 and 1999) for an analysis of French data, Klasen (2000) for a study on South Africa, and Razafindrakoto & Roubaud (2001) who analyze Malagasy data.
3. The methodological choices made for the calculation of household expenditures and concerning the updating of the poverty line are presented in DIAL (2000).
4. This examination proved to be delicate simply due to differences between the surveys. Indeed, none of the surveys is identical concerning the information on occupations and sectors of professional activity. Thus we were unable to find identical criteria in all the surveys to distinguish informal and formal activities. Also the 1993 EP only covers the income of the two main income earners of a household, whereas the others do it for all household members. As a result, the salary of young people may be frequently omitted, which brings an upward bias to the computation of the average salary in 1993. We finally chose to use a fairly simple desegregation of the active population and to examine only the average evolutions in public and private salaries, without any distinction between formal and informal activity.
5. This severe drop was of the same magnitude as that of the real minimum wage and the average real public wage computed from national budget data.
6. The minimum wage rose from 192 CFA Francs to 210 CFA Francs per hour between 1982 and 1994. Since 1994 the minimum wage has not been modified (IMF, 2000).
7. Due to the weak size of the 1995 sample and the short delay to 1993, we chose to analyze only the surveys of 1985, 1988, 1993 and 1998.
8. However the number of persons per room shows a rather weak correspondence with other subsistence condition elements. This can be explained by the fact that well equipped households are logically located in the city centers and therefore have smaller areas than less equipped households in suburbs. However, because this indicator shows a relative strong association with the composite indicator, it remains one of its components.
9. The Kolmogorov tests indicate that all curves are significantly different from one another with the exception of the curves in 1985 and 1988 for Abidjan, and those in 1988 and 1998 for other cities.
10. Alternatively, we could use a binary model (probit or logit), estimating the probability that a household is poor or not. The advantage of the latter type of model with respect to the OLS method is that it does not impose constant parameters over the whole distribution and thus does not make any implicit hypothesis that the impacts of education, the composition of the household etc. are independent from the standard of living. On the other hand, the advantage of the OLS model arises from the fact that it uses the entire distribution and that it can be robustly estimated under less stringent hypotheses with respect to the error term.
11. With respect to the homogeneity between the different analyzed surveys, the typology used is not very detailed, although the data from 1993, for example, would allow a finer analysis of the socio-professional category of household heads.
12. The area of land and the agricultural equipment of a household are not included in the model due to the weak level of agricultural activity in urban areas.
13. It should be noted that the variable indicating migrant status is not very satisfactory. It has the value 1 if the household head was not present in his current place of residence five years prior to the survey date. The variability of the questionnaire from one survey to another prevents us from constructing a more relevant variable.
14. This result clearly does not take into account transfers to their home country nor their level of savings, which could be higher than that of Ivorians and thus qualify our analysis in terms of poverty.

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## **APPENDICES**

(Please insert Table A1)

(Please insert Table A2)

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(Please insert Table A4)

(Please insert Table A5)

## TABLES

**Table n° 1: Changes in FGT indicators of monetary poverty in urban areas of Côte d'Ivoire (values in percent)**

Region/Indicator	Poverty line at 1 US\$ per capita per day					Poverty line at 2 US\$ per capita per day				
	1985	1988	1992/93	1995	1998	1985	1988	1992/93	1995	1998
<b>ABIDJAN</b>										
Incidence of poverty (P0)	0.3	0.0	0.9	4.6	1.2	1.0	4.3	15.2	29.3	18.8
<i>Confidence interval</i>	[0.0 – 0.8]		[0.5 – 1.4]	[1.5 – 7.7]	[0.4 – 1.9]	[0.0 – 2.4]	[1.6 – 6.9]	[12.7 – 17.7]	[20.1 – 38.5]	[14.2 – 23.5]
Depth of poverty (P1)	0.0	0.0	0.1	1.1	0.2	0.2	0.3	3.1	8.6	4.3
Severity of poverty (P2)	0.0	0.0	0.0	0.3	0.1	0.0	0.0	1.0	3.8	1.5
<b>OTHER CITIES</b>										
Incidence of poverty (P0)	3.4	3.0	15.9	14.5	10.0	12.3	25.4	51.0	52.4	41.9
<i>Confidence interval</i>	[0.0 – 7.7]	(0.0 – 5.8)	[13.7 – 18.1]	[6.7 – 22.2]	[7.0 – 13.1]	[4.4 – 20.1]	[16.7 – 34.0]	[47.6 – 54.3]	[42.9 – 61.8]	[36.2 – 47.6]
Depth of poverty (P1)	1.1	0.7	4.3	4.0	2.3	3.8	6.5	19.1	19.8	13.5
Severity of poverty (P2)	0.5	0.2	1.7	1.5	0.8	1.9	2.6	9.6	9.7	6.2
<b>ALL URBAN</b>										
Incidence of poverty (P0)	1.8	1.6	8.9	9.0	5.9	6.7	15.6	34.4	39.7	31.1
<i>Confidence interval</i>	[0.0 – 4.0]	(0.1 – 3.1)	[7.6 – 10.3]	[5.1 – 13.0]	[4.3 – 7.5]	[2.7 – 10.7]	[10.9- 20.3]	[31.8 – 37.0]	[32.9 – 46.4]	[27.5 – 34.7]
Depth of poverty (P1)	0.6	0.4	2.4	2.4	1.3	2.0	3.6	11.7	13.6	9.2
Severity of poverty (P2)	0.3	0.1	0.9	0.9	0.4	1.0	1.4	5.6	6.4	4.0

*Sources:* LSMS 1985, 1988; EP 1993; ENV 1995 and 1998; computations by the authors.

**Table n° 2: Trends of the Gini coefficient between 1985 and 1998**

	1985	1988	1993	1995	1998
<b>ABIDJAN</b>					
Gini	0.34	0.37	0.37	0.44	0.38
95 % confidence interval	[0.31 - 0.37]	[0.33 - 0.40]	[0.36 - 0.39]	[0.39 - 0.48]	[0.35 - 0.40]
<b>OTHER CITIES</b>					
Gini	0.38	0.29	0.37	0.34	0.36
95 % confidence interval	[0.35 - 0.42]	[0.27 - 0.31]	[0.36 - 0.38]	[0.31 - 0.38]	[0.33 - 0.39]
<b>ALL URBAN</b>					
Gini	0.38	0.37	0.40	0.43	0.38
95 % confidence interval	[0.36 - 0.41]	[0.34 - 0.39]	[0.39 - 0.42]	[0.39 - 0.46]	[0.35 - 0.41]

*Sources:* LSMS 1985, 1988; EP 1993; ENV 1995 and 1998; computations by the authors.

**Table n° 3: Cramer's V statistic of correspondence between monetary poverty and subsistence conditions from 1985 to 1998**

	ABIDJAN		OTHER CITIES	
	Subsistence score/ expenditure quintile	Subsistence score/ 2 US\$ indicator	Subsistence score / expenditure quintile	Subsistence score/ 2 US\$ indicator
1985	0.39	0.23	0.41	0.50
1988	0.31	0.36	0.33	0.43
1993	0.29	0.32	0.28	0.41
1998	0.30	0.41	0.23	0.34

*Sources:* 1985, 1988 LSMS; 1993 EP; 1998 ENV; computations by the authors.

**Table n° 4: Analysis of the correspondence between both forms of poverty**

	% of households suffering from the both forms of poverty		% of households suffering from monetary poverty among households defined as poor in terms of subsistence conditions		% of households suffering from insufficient subsistence conditions among households defined as poor in terms of the monetary approach	
	ABIDJAN	OTH. CITIES	ABIDJAN	OTH. CITIES	ABIDJAN	OTH. CITIES
1985	0.0	6.8	0.0	53.5	0.0	55.8
1988	1.3	14.6	21.0	45.0	30.8	57.3
1993	5.6	32.3	35.1	66.7	36.2	63.4
1998	8.3	24.3	48.3	53.1	43.9	58.1

*Sources:* 1985, 1988 LSMS; 1993 EP; 1998 ENV; computations by the authors.

**Table n° 5: Determinants of real household per capita expenditures, dependent variable: logarithm of real per capita household expenditures (OLS model)**

Explanatory variables	1985	1988	1992/93	1998	1985-1998
Abidjan (=1)	0.441 **	0.354 **	0.517 **	0.377 **	0.463 **
Male HH (=1)	-0.189 **	-0.079	-0.148 **	-0.076 **	-0.131 **
Age of HH	-0.008	-0.005	0.006	0.021 **	0.008 **
(Age of HH) <sup>2</sup> /100	0.013	0.008	-0.004	-0.019 **	-0.006
Immigrant HH (=1)	-0.015	-0.007	0.034	-0.054 *	0.000
Ivorian HH (=1)	0.102 *	-0.076	0.032 *	0.159 **	0.059 **
Education of HH					
no education	Ref.	Ref.	Ref.	Ref.	Ref.
primary level	0.272 **	0.242 **	0.180 **	0.241 **	0.213 **
secondary and higher level	0.589 **	0.449 **	0.565 **	0.533 **	0.549 **
Education of spouse					
no education	Ref.	Ref.	Ref.	Ref.	Ref.
primary level	0.052	0.188 **	0.130 **	0.093 **	0.114 **
secondary and higher level	0.392 **	0.428 **	0.462 **	0.378 **	0.429 **
Activity of HH					
agri. or non-agricultural independent	Ref.	Ref.	Ref.	Ref.	Ref.
inactive or unemployed	0.067	0.065	0.042	-0.001	0.043 **
public sector wage earner	0.124 *	0.140 **	0.163 **	0.160 **	0.164 **
private sector wage earner	0.067	0.052	0.100 **	0.056 *	0.084 **
Type of household					
nuclear or enlarged non-polyg. family	Ref.	Ref.	Ref.	Ref.	Ref.
single parent family	-0.051	-0.180 *	-0.097 **	-0.151 *	-0.110 **
polygamous family	0.126 *	0.032	0.112 **	0.048	0.099 **
Composition of household					
number of children 0 to 5 years	-0.171 **	-0.308 **	-0.268 **	-0.297 **	-0.253 **
(number of children 0 to 5 years) <sup>2</sup>	0.013 **	0.038 **	0.038 **	0.044 **	0.031 **
number of children 6 to 14 years	-0.116 **	-0.114 **	-0.190 **	-0.205 **	-0.183 **
(number of children 6 to 14 years) <sup>2</sup>	0.008 **	0.008 **	0.014 **	0.017 **	0.014 **
number of adults	-0.226 **	-0.171 **	-0.121 **	-0.168 **	-0.132 **
number of adults) <sup>2</sup>	0.015 **	0.014 **	0.008 **	0.008 **	0.008 **
number of persons 65 years and older	0.066	-0.277 **	-0.172 **	0.185	-0.107 **
number of persons 65 y. and older) <sup>2</sup>	-0.146 **	0.070 *	0.066 **	-0.088	0.033 *
Year					
1998					Ref.
1985					0.846 **
1988					0.390 **
1993					0.036 **
Constant	13.883 **	13.446 **	12.687 **	12.415 **	12.625 **
R <sup>2</sup>	0.559	0.521	0.481	0.498	0.529
Number of observations	670	732	5 359	1 913	8 674

HH: household head; \* significant at 10%; \*\* significant at 5%.

*Sources:* 1985, 1988 LSMS; 1993 EP; 1998 ENV; estimations by the authors.

**Table n° 6: Determinants of subsistence conditions, dependent variable: poverty score in terms of subsistence conditions (ordered probit model)**

Explanatory variables	1985	1988	1992/93	1998	1985-1998
Abidjan (=1)	-0.578 **	-0.967 **	-0.455 **	-0.406 **	-0.480 **
Male HH (=1)	0.439 **	0.348 **	0.264 **	0.289 **	0.288 **
Age of HH	-0.01	-0.004	0.008	-0.022 *	-0.002
(Age of HH) <sup>2</sup> /100	-0.004	0.011	-0.010	0.015	-0.001
Immigrant HH (=1)	0.055	-0.197 **	0.017	0.043	0.036
Ivorian HH (=1)	-0.262 **	-0.053	-0.233 **	-0.246 **	-0.226 **
Education of HH					
no education	Ref.	Ref.	Ref.	Ref.	Ref.
primary level	-0.970 **	-0.655 **	-0.709 **	-0.766 **	-0.731 **
secondary and higher level	-1.817 **	-1.391 **	-1.566 **	-1.499 **	-1.558 **
Education of spouse					
no education	Ref.	Ref.	Ref.	Ref.	Ref.
primary level	-0.431 **	-0.582 **	-0.433 **	-0.466 **	-0.447 **
secondary and higher level	-0.939 **	-0.965 **	-0.908 **	-0.989 **	-0.925 **
Activity of HH					
agri. or non-agricultural independent	Ref.	Ref.	Ref.	Ref.	Ref.
inactive or unemployed	-0.046	-0.691 **	-0.200 **	-0.222 **	-0.222 **
public sector wage earner	-0.386 **	-0.467 **	-0.522 **	-0.704 **	-0.537 **
private sector wage earner	-0.096	-0.212 **	-0.095 **	-0.222 **	-0.130 **
Type of household					
nuclear or enlarged non-polyg. family	Ref.	Ref.	Ref.	Ref.	Ref.
single parent family	0.151	0.152	0.068	0.133	0.091
polygamous family	-0.215 *	0.108	0.029	0.213 **	0.030
Composition of household					
number of children 0 to 5 years	0.191 **	0.223 **	0.164 **	0.231 **	0.167 **
(number of children 0 to 5 years) <sup>2</sup>	-0.020 *	-0.039 **	-0.022 **	-0.045 **	-0.022 **
number of children 6 to 14 years	-0.020	-0.040	0.003	-0.034	-0.009
(number of children 6 to 14 years) <sup>2</sup>	0.004	-0.003	-0.005 **	-0.001	-0.003 *
number of adults	0.076	-0.019	-0.081 **	-0.038	-0.065 **
number of adults <sup>2</sup>	-0.008 *	-0.001	0.000	0.000	0.000
number of persons 65 years and older	0.125	0.323	0.228 **	-0.091	0.151 *
number of persons 65 y. and older) <sup>2</sup>	0.051	-0.111	-0.058	-0.025	-0.032
Year					
1998					Ref.
1985					-0.253 **
1988					-0.179 **
1993					0.194 **
Pseudo R <sup>2</sup>	0.164	0.163	0.127	0.121	0.134
Prediction of the model (in %)					
exact score	14.7	15.2	15.4	14.5	15.6
exact score ± 2	70.0	70.2	64.8	65.3	66.1
Number of observations	670	732	5 359	1 913	8 672

HH: head of household; \* significant at 10%; \*\* significant at 5%.

*Sources:* 1985, 1988 LSMS; 1993 EP; 1998 ENV; estimations by the authors.

**Table n° 7: Probabilities of different subsistence condition scores (in %) predicted by the ordered probit model (pooled sample) according to citizenship and place of residence**

	Weak deficiencies (score 3)	"Simple" poverty (score 8)	"Extreme" poverty (score 11)
Citizenship of the household head – All urban			
Ivorian household head	3.8	16.7	6.8
Foreign household head	2.5	16.7	9.1
Difference (Ivorian/foreigner)	1.3	0.0	-2.3
Citizenship of the household head – Abidjan			
Ivorian household head	6.0	15.4	4.2
Foreign household head	4.3	16.5	6.0
Difference (Ivorian/foreigner)	1.7	-1.1	-1.8
Citizenship of the household head – Other cities			
Ivorian household head	2.8	16.8	8.6
Foreign household head	1.8	16.1	11.0
Difference (Ivorian/foreigner)	1.0	0.7	-2.4

*Sources:* 1985, 1988 LSMS; 1993 EP; 1998 ENV; computations by the authors.

**Table n° 8: Probabilities of different subsistence condition scores (in %) predicted by the ordered probit model (pooled sample) according to the education level of the household head**

	Weak deficiencies (score 3)	"Simple" poverty (score 8)	"Extreme" poverty (score 11)
Uneducated household head			
Uneducated household head	1.0	14.3	14.2
Other	11.0	10.5	1.4
Difference (uneducated/other)	-10.0	3.8	12.8
Household head with primary education level			
Household head with prim. level	7.9	13.8	2.8
Other	2.6	16.7	8.9
Difference (primary level/other)	5.3	-2.9	-6.1
Household head with secondary or higher education level			
Househ. head with sec. or higher	13.4	7.6	0.7
Other	1.8	16.2	11.0
Difference (sec or higher/other)	11.6	-8.6	-10.3

*Sources:* 1985, 1988 LSMS; 1993 EP; 1998 ENV; computations by the authors.

**Table n° 9: Probabilities of different subsistence condition scores (in %) predicted by the ordered probit model (pooled sample) according to the activity of the household head**

	Weak deficiencies (score 3)	"Simple" poverty (score 8)	"Extreme" poverty (score 11)
<b>Public sector wage earner</b>			
Public wage-earner	6.6	14.9	3.7
other	2.9	16.8	8.4
Difference (public/other)	3.7	-1.9	-4.7
<b>Private sector wage earner</b>			
Private wage-earner	3.9	16.7	6.6
other	3.1	16.8	7.9
Difference (private/other)	0.8	-0.1	-1.3
<b>Independent worker</b>			
Independent worker	2.7	16.8	8.8
other	3.9	16.7	6.5
Difference (independent/other)	-1.2	0.1	2.3
<b>Inactive or unemployed</b>			
Inactive or unemployed	4.6	16.3	5.6
other	3.2	16.8	7.7
Difference (inact. /other)	1.4	-0.5	-2.1

*Sources:* 1985, 1988 LSMS; 1993 EP; 1998 ENV; computations by the authors.

## Appendix n°A 1: Analysis of first and second order dominance of poverty trends (amounts in CFA Francs)

FIRST ORDER DOMINANCE, KOLMOGOROV TEST (P0),					
ABIDJAN	1985 – 88	1988 – 92/93	1992/93 – 95	1995 – 98	1993 – 98
Difference between cumulative expenditures curves	significant	significant	significant	significant	significant
Number of intersections	3		9	11	6
Interval	[161 000 – 166 700] indeterminate $\Rightarrow$ 161000, above 166700 $P0(88)>P0(85)$	no intersection $P0(93)>P0(88)$	[526 000 – 592 000] $P0(95)>P0(93)\Rightarrow$ 400 000, above 400 000 indeterminate	[57 000 – 500 000] indeterminate $\Rightarrow$ 60 000 from 60 000 to 400 000, $P0(95)>P0(98)$ , above 400 000 indeterminate	[79 000 – 101 000] indeterminate $\Rightarrow$ 150 000 from 150 000 to 300 000 $P0(98)>P0(93)$ , above 300 000 indeterminate
OTHER CITIES	1985 – 88	1988 – 92/93	1992/93 – 95	1995 – 98	1993 – 98
Difference between cumulative expenditures curves	significant	significant	significant	significant	significant
Number of intersections	3	1	20	no intersection	20
Interval	[108 000 – 116 500] indeterminate $\Rightarrow$ 150000, above 150000 $P0(88)>P0(85)$	at 645 500 $P0(93)>P0(88) \Rightarrow$ 600000, indeterminate above	[28 000 – 113 000] indeterminate $\Rightarrow$ 350 000, above 350 000, $P0(95)>P0(93)$	indeterminate $\Rightarrow$ 150 000, above 150 000 $P0(95)>P0(98)$	[448 000 – 612 000] $P0(93)>P0(98) \Rightarrow$ 200 000, indeterminate above

**Appendix n°A 1: Analysis of first and second order dominance of poverty trends (amounts in CFA Francs) (Continued)**

SECOND ORDER DOMINANCE (P1, P2)					
ABIDJAN	1985 – 88	1988 – 92/93	1992/93 – 95	1995 – 98	1993 – 98
P1	indeterminate $\Rightarrow$ 190 000, P1(88) > P1(85) above	no intersection P1(93)>P1(88)	no intersection P1(95)>P1(93)	indeterminate $\Rightarrow$ 60 000, from 60 000 to 400 000 P1(95)>P1(98), above 400 000 indetermin.	no intersection P1(98)>P1(93)
P2	indeterminate $\Rightarrow$ 200 000, P2(88) > P2(85) above	no intersection P2(93)>P2(88)	no intersection P2(95)>P2(93)	indeterminate $\Rightarrow$ 60 000, P2(95)>P2(98) above	indeterminate $\Rightarrow$ 200 000, P2(98)>P2(93) above
OTHER CITIES	1985 – 88	1988 – 92/93	1992/93 – 95	1995 – 98	1993 – 98
P1	indeterminate $\Rightarrow$ 140 000, P1(88) > P1(85) above	no intersection P1(93)>P1(88)	indeterminate $\Rightarrow$ 350 000, P1(95) > P1(93) above	indeterminate $\Rightarrow$ 150 000, above 150 000 P1(95)>P1(98)	no intersection P1(93)>P1(98)
P2	indeterminate $\Rightarrow$ 180 000, P2(88) > P2(85) above	no intersection P2(93)>P2(88)	indeterminate $\Rightarrow$ 350 000, P2(95) > P2(93) above	indeterminate $\Rightarrow$ 200 000, above 200 000 P2(95)>P2(98)	no intersection P1(93)>P1(98)

Sources: 1985, 1988 LSMS; 1993 EP; 1998 ENV; computations by the authors.

## Appendix n°A 2: Composition of subsistence condition indicators

Item	Components	Description	Scores		
			2	1	0
1	Housing	Number of persons per room	More than 3 persons	Between 1 and 3 persons	<= 1 person
				Shared yard	
2		Type of housing	Banco		Flat, house
3	Water	Type of access to water	River, pump	Shared tap	Private tap
4	Lighting	Type of connection to electricity	Not connected	Shared counter	Indiv. counter
5	Hygiene	Type of toilet	No toilet	Pit	Flush toilet
6	Fuel	Type of fuel used in the kitchen	Collected wood	Charcoal, oil	Gas, electricity
7	Education	Ratio between the number of years of study effectively completed by all household members over the maximum number of years of study possible given the age of each member	<0.2	>=0.2 & <0.5	>=0.5
8	Wealth	Number of possessed goods (among bicycle, moped, automobile, television, radio, refrigerator, air conditioner, fan, stove)	<=1	>1 & <=4	>4

**Appendix n°A 3: Evolution of the components of the subsistence condition indicator (% of households), 1985-1998**

	ABIDJAN				OTHER CITIES				ALL URBAN			
	1985	1988	1993	1998	1985	1988	1993	1998	1985	1988	1993	1998
Number of persons per room												
<=1	20.4	27.3	22.4	25.1	38.8	31.6	29.6	32.1	29.8	29.6	26.2	28.8
>1 & <=3	68.5	68.1	66.2	60.8	57.4	64.7	63.6	61.5	62.9	66.2	64.8	61.2
>3	11.1	4.6	11.4	14.1	3.8	3.7	6.8	6.4	7.3	4.2	8.9	10.0
Type of housing												
flat, house	42.3	42.1	28.0	42.7	44.5	33.3	25.6	43.8	43.4	37.4	26.7	43.3
shared yard	54.5	56.9	57.5	49.1	40.7	58.8	63.9	52.0	47.5	57.9	61.0	50.6
banco	3.2	1.0	14.5	8.2	14.8	7.9	10.5	4.2	9.1	4.7	12.3	6.1
Type of access to water												
indiv. tap	35.1	42.8	30.5	39.2	21.3	10.7	21.2	30.4	28.1	25.5	25.5	34.5
shared tap	64.3	57.2	66.1	57.7	34.6	36.3	19.4	23.6	49.2	46.0	41.0	39.5
pump	0.6	0.0	3.4	3.1	44.1	53.0	59.4	46.0	22.7	28.5	33.5	26.0
Type of connection to electricity												
indiv. cnt.	50.1	60.9	41.6	48.9	57.7	43.6	39.2	46.2	53.9	51.6	40.3	47.5
shared cnt.	19.2	24.7	36.2	39.6	14.7	20.7	23.7	29.0	16.9	22.6	29.5	33.9
not connect.	30.7	14.5	22.2	11.5	27.6	35.7	37.1	24.8	29.2	25.8	30.2	18.6
Type of toilet												
toilet	67.9	72.3	43.6	39.0	22.7	14.4	14.0	16.9	44.9	41.1	27.8	27.2
pit	19.0	25.7	46.7	58.1	72.5	71.9	78.1	77.5	46.2	50.6	63.5	68.4
none	13.1	2.0	9.7	2.9	4.8	13.7	7.9	5.6	8.9	8.3	8.7	4.4
Type of fuel												
gas, electr.	24.3	32.2	25.1	40.3	15.5	9.3	5.9	11.3	19.8	19.9	14.8	24.8
charc. oil	75.7	67.8	73.9	58.0	67.6	67.4	78.5	75.8	71.6	67.6	76.4	67.5
coll. wood	0.0	0.0	1.0	1.7	16.9	23.3	15.6	12.9	8.6	12.5	8.8	7.7
Household's education level												
>=0.5	17.7	17.8	21.0	34.3	17.1	10.2	14.6	22.8	17.3	13.7	17.6	28.2
>=0.2 & <0.5	39.0	42.1	39.4	34.6	34.0	42.1	31.9	34.3	36.5	42.1	35.4	34.5
<0.2	43.3	40.1	39.6	31.1	48.9	47.7	53.5	42.9	46.2	44.2	47.0	37.3
Number of goods possessed by the household												
>4	51.8	50.3	21.4	19.9	47.9	45.8	13.3	14.2	49.8	47.9	17.0	16.8
>1 & <=4	32.3	40.1	44.4	44.7	39.1	37.0	39.2	37.3	35.8	38.4	41.6	40.7
<=1	15.8	9.6	34.2	35.4	13.0	17.2	47.5	48.5	14.4	13.7	41.3	42.4

*Sources:* 1985, 1988 LSMS; 1993 EP; 1998 ENV; computations by the authors.

**Appendix n°A 4: Threshold level of the subsistence condition indicator such that the resulting poverty rate is the closest to the one observed for monetary poverty using the 2 US\$ poverty line**

	ABIDJAN			OTHER CITIES		
	Poverty rate	Score	Maximum value	Poverty rate	Score	Maximum value
1985	4.3	10	12	12.8	11	14
1988	5.9	10	12	32.4	10	15
1993	16.0	11	15	48.4	10	16
1998	17.1	10	15	45.8	9	15

a) Defined as corresponding to the closest proportion to that of the poor at 2 US\$.

Sources: 1985, 1988 LSMS; 1993 EP; 1998 ENV; computations by the authors.

**Appendix n°A 5: Descriptive statistics of the samples used for the econometric analyses**  
(Household level, non-weighted observations)

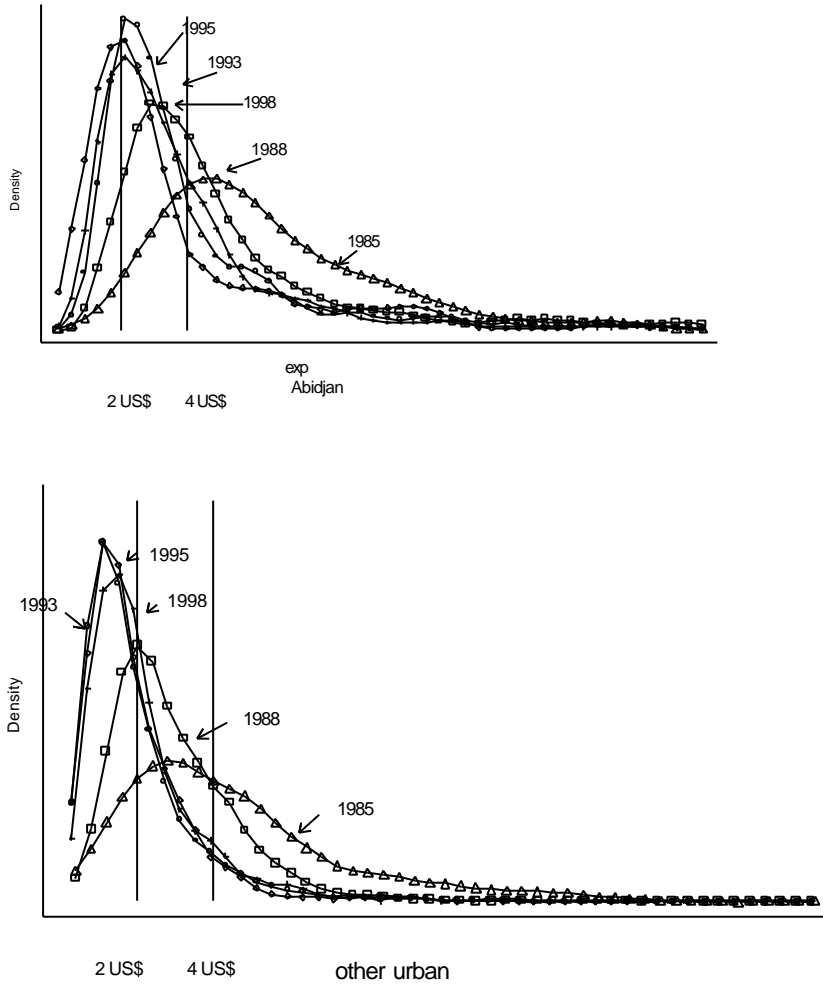
Variables	1985		1988		1992/93		1998		1985-1998	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Abidjan (=1)	0.49	0.50	0.42	0.49	0.31	0.46	0.45	0.50	0.37	0.48
Male HH (=1)	0.89	0.32	0.82	0.38	0.84	0.37	0.81	0.39	0.83	0.37
Age of HH	43.18	12.41	42.28	12.37	43.45	12.72	41.47	12.75	42.90	12.70
Immigrant HH (=1)	0.58	0.49	0.30	0.46	0.13	0.34	0.35	0.48	0.23	0.42
Ivorian HH (=1)	0.76	0.43	0.76	0.43	0.67	0.47	0.71	0.45	0.69	0.46
Education of HH										
uneducated	0.54	0.50	0.58	0.49	0.66	0.47	0.47	0.50	0.60	0.49
primary level	0.16	0.37	0.18	0.39	0.15	0.36	0.30	0.46	0.19	0.39
secondary of higher level	0.30	0.46	0.23	0.42	0.19	0.39	0.23	0.42	0.21	0.41
Education of spouse										
uneducated	0.83	0.38	0.84	0.37	0.87	0.34	0.86	0.35	0.86	0.35
primary level	0.07	0.26	0.09	0.28	0.08	0.28	0.10	0.30	0.09	0.28
secondary of higher level	0.10	0.30	0.07	0.26	0.05	0.21	0.04	0.20	0.05	0.22
Activity of HH										
agri. or non-agric. independent	0.34	0.47	0.41	0.50	0.44	0.50	0.42	0.49	0.42	0.49
inactive or unemployed	0.11	0.31	0.10	0.30	0.12	0.33	0.13	0.33	0.12	0.32
public sector wage earner	0.28	0.45	0.24	0.43	0.16	0.37	0.09	0.28	0.16	0.37
private sector wage earner	0.27	0.44	0.26	0.44	0.28	0.45	0.37	0.48	0.29	0.46
Type of household										
Nuclear or enlarged non-polyg. family	0.81	0.39	0.84	0.37	0.83	0.37	0.89	0.32	0.84	0.36
Single parent family	0.02	0.14	0.04	0.20	0.04	0.20	0.04	0.19	0.04	0.20
Polygamous family	0.17	0.37	0.12	0.32	0.13	0.33	0.07	0.26	0.12	0.32
Composition of the household										
number of children 0 to 5 years	1.52	1.47	1.29	1.34	0.95	1.09	0.78	1.02	0.99	1.15
number of children 6 to 14 years	2.42	2.37	1.91	2.01	2.00	2.10	1.47	1.79	1.91	2.07
number of adults	4.19	2.66	3.11	1.91	3.21	2.14	3.38	2.50	3.32	2.27
number of persons 65 years and older	0.14	0.42	0.12	0.43	0.10	0.35	0.09	0.31	0.10	0.36
Number of observations	670		732		5 359		1 913		8 674	

HH: head of household.

Sources: 1985, 1988 LSMS; 1993 EP; 1998 ENV; computations by the authors.

## FIGURES

**Figure n° 1: Kernel expenditures curves - Abidjan and other urban, 1985-1998. Source: LSMS 1985, 1988; EP 1993; ENV 1998; computations by the authors.**



**Figure n° 2: Cumulative distributions of the subsistence condition indicator - Abidjan and other urban, 1985-1998. Sources: LSMS 1985, 1988; EP 1993; ENV 1998; computations by the authors.**

