The Conjuncture of Poverty Microsimulation linked to a Macroeconomic Forecasting Model: A Case Study in Senegal

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Abstract

Poverty reduction policies have become the main guidelines of economic policies in many Sub-Saharan African countries. Therefore the authorities need new social indicators in order to follow the application and the effectiveness of their policies. In recent years renewed efforts have been made to develop new policy tools aimed at better understanding the channels through which PRSP measures affect the poor. We present an approach to linking macro models with representative households and micro household income data in terms of measuring poverty and the distributional effects of poverty reduction policies. This is a simple micro-accounting method which presents an interesting opportunity for linkage to a macro economic forecasting model, the Jumbo model run by the AFD for the CFA Franc Zone. Our approach consists of using a macroeconomic forecasting model (Jumbo) that integrates several representative household groups. An output of the forecast is introduced into a simple model of microsimulation in order to obtain yearly poverty and income distribution indicators. The interpretation of the results with the help of the macroeconomic environment described in the Jumbo model allows an analysis of the conjuncture of poverty.

1 Introduction

This paper is an attempt to give some statistical indicators for following the effectiveness of poverty reduction policies. The AFD takes part in local workshops in many Sub-Saharan African countries whose purpose is discussing the orientation of the national poverty reduction policies. Each year groups of donors ask governments to produce statistical indicators that could be useful for evaluating the improvement of the poverty situation. The list of variables published in each country is very large and include various data such as the evolution of GDP per head, the contribution of the primary sector production to total GDP growth, annual growth rates of domestic and imported prices, and rural prices. These statistics could be good proxies of the evolution of rural revenue or of the improvement of gross disposable revenue.

As the donors are asking the national institutes of statistics to produce more and more social statistics, and as those social statistics are often based on expansive surveys, this paper is an attempt to fulfil the need of the governments and the donor community by giving a statistical estimation of the poverty rate between two different household surveys. The objective is to discuss the efficiency of PRSP year to year and to identify, during the application of multi-annual programmes, which population (by activity or geography) could have experienced a deterioration of its situation, to identify some elements of explanations and to be able to correct a policy by concentrating its efforts on this particular population. The groups whose situation is worsening according to the estimation should be the focus of enhanced efforts of redistribution policies.

The exercise presented in this paper is an attempt to prevent the need for costly new household surveys. It could be a cheaper way to produce poverty rates and inequality indices between two household surveys, which could be conducted every 5 – 6 years. It is an answer to the question: what would be the best estimation of poverty and inequality indicators according to the evolution of the macroeconomic framework as described in a coherent macroeconomic forecasting model.

2 Method

Most of the macroeconomic models which try to address poverty and income distribution issues are Computable General Equilibrium (CGE) models which distinguish only a small number of representative household groups. Analysis of changes in inequality focuses on changes in inequality between the different groups. Empirically, changes in global inequality stem as much from changes within the groups themselves as between groups. Microsimulation linked to a macroeconomic model is a way to capture within-group inequality and the heterogeneity of households. This kind of Macro Micro linkage allows observing the reaction of household incomes to changes in factor endowments, labour supply, consumer preferences, and relative price changes.

This method has been mostly developed with CGE models. Its purpose is to analyse the impact of a crisis, an external shock or a major change in economic policy. The originality of the method developed here consists in linking a microsimulation module to a forecasting model: the Jumbo model. The horizon of the forecasting is well defined, in contrast with the result of a CGE model, which describes a new equilibrium of the economy at an unknown date. As the period is very short — a two-year forecasting — we can make the hypothesis that we observe less major structural changes than it would be the case with CGE model. The aim of this approach is original in so far as the main output of the model, poverty and inequality indicators, can be monitored between two different household budget surveys. This monitoring is most important in terms of the MDGs, as it measures the effectiveness of poverty reduction policies. It also meets the requirements of both the national government and the donor community. A yearly household survey would be too costly. In the absence of a crisis, it would only highlight minor statistical changes year on year. The microsimulation and forecasting model make it possible to follow the conjuncture of poverty and inequality. The indicators will evolve differently according to the composition of growth.

The Jumbo model can be easily connected with a household income survey to compute poverty and inequality indicators. In the Jumbo model, there are five categories of households, consisting of workers in the rural sector, workers in the rural

groundnut sector, urban workers in the formal sector, workers in the informal urban economy and workers in the public sector.

Data from a household survey are classified into the categories of households contained in the structural component of the model. Following the 2-year forecasting, real growth rates in per capita consumption and disposable income for all categories of households are obtained from the Jumbo model. These growth rates are applied to income and consumption expenditure to each household in the survey, therefore giving a new vector of consumption levels.
Poverty and income distribution indicators are then calculated with these new data, after updating the initial poverty lines (using the price indices generated by the macro-model).

The different steps of the method are the following:
- We first classify the survey's households into the categories of households distinguished by the macro-model, using the information of the main source of income of the household head in a first approach, and using the other source of income in a second attempt.
- We retain from the macro model the formation of revenue and we integrate the nominal growth rates in per capita consumption forecasted. We have to add a small demographic model, with different hypotheses according to the different categories of household. We have used the estimates of the comparisons of the last two global population censuses.
- We apply these growth rates separately to the per capita consumption expenditure of each household in the household survey.
- We adjust the poverty lines using the change in consumer prices given by the macro model. We then calculate the new income distribution and poverty indicators.
- The comparison of the three year indicators (first year observed and two year forecasted) gives some indications of the impact of the conjuncture on poverty.

A common observation is that the contribution of within-group income inequality to overall income inequality is much more important than that of between-group inequality.

A first improvement of the method consisted of breaking down the income of the household by its individual functional composition. We re-build the individual composition with a part of the household survey which gives a break down of the revenue of the household by its main sources. We apply this break down to the global household expenditure.
The expenditure of each household is re-calculated with the hypothesis that the allocation of the labour force to the different sources is unchanged.

This method is not entirely satisfactory to the extent that per capita consumption in the household survey is adjusted to the corresponding levels at the macro level but the employment structure is not. This implies that the modifications in the labour market affects poverty and income distribution only through relative income changes induced by changes in the employment structure at the macro level. When the changes are transmitted to the household survey, it is assumed that each individual remains in his initial activity. By the same way, the urban-rural distribution is unchanged at the macro level.
A further step would consist in taking into account the labour supply behaviour of the households and the evolution of the employment structure.

While appealing from a practical point of view, this approach is open to the criticism that it does not account for heterogeneity among individuals within groups
We present a simple approach to linking the macro model with information from a Household Income Survey. It is rather a micro-accounting approach which works directly with all the observations gathered in the household survey, but does not take explicitly into account the behaviour of agents at the micro level. But the analysis is limited to a two or three year horizon. We could make the assumption that short term variations are minor. We do not explore the consequences of a deep shock on the economy or that the behaviour of the household is not very different during those two years.

We do not use an integrated macro micro model which would require too sophisticated data and specifications such as a detailed labour market module or data reconciliation on the household account. A too detailed specification would not be relevant in African Franc-zone countries where statistics are more limited, especially on the demand side because the national accounts are built on an aggregated supply approach (ERETES).

3 Jumbo: A Macroeconomic Forecasting Model for the Franc Zone

The Jumbo model is a multi-sector model based on an input-output table. It can be developed in countries with detailed enough national accounts. It mainly applies to the Franc Zone countries (except the Comores). The main result of the model is a two-year macroeconomic forecast for each country, a synthesis for the West African Economic and Monetary Union (UEMOA), the Economic and Monetary Community of Central Africa (CEMAC) and for the global Franc Zone.
This macroeconomic and financial forecast model was devised at the AFD. The purpose of the model was to provide an instrument of close macroeconomic monitoring for a number of countries by building rapid accounts and short-term forecasts. It also aimed to allow the AFD to participate in debates on economic policy in Franc Zone countries.

It is a simple Keynesian type model. The tradable GDP is determined by the demand components. It integrates some behavioural relations with an econometric estimation of each national consumption function, for example. It was initially based on a two-sector economy : a tradable sector which produces a single composite good destined for consumption, investment and exportation, and a non-tradable sector (administration). The model has evolved to include other sectors, like the oil sector. The import and export international prices are exogenous in hard currency (price taker). Tax receipts are endogenous but the taxation rate is exogenous. Current public expenditure is considered as a variable of economic policy. It is exogenous in value. Interest paid outside of the country is calculated by the model and varies according to the exchange rate hypothesis. Credit to the public sector and to the rest of the economy is exogenous.

Jumbo model forecasts are reviewed every year. They are presented in two reports, one in April (economic outlook) and one in September (structural studies using the model), prior to the meeting of the Ministries of Finance of the Franc Zone. The report itself presents and comments on a short term (two-year) growth forecast. Our independent forecast can then be compared with those from the national governments, the central banks, the IMF and the OECD.

One advantage of the Jumbo model is that it uses a long-term macroeconomic database (over 10 years, 20 years for certain variables) and makes comparative analyses among the above countries possible. National statistics had to be re-processed in order to make the statistics of each country homogeneous and therefore comparable. Variants can be conducted either on one country or on the whole region. For example, the impact of a lower dollar or of an increase in the oil price can be compared between countries and also measured for UEMOA (West African Economic and Monetary Union) or CEMAC (Central African Economic and Monetary Community). Another variant revealed that the Côte d'Ivoire crisis had of course a big impact on its GDP growth but was contained in the rest of the region (see the Jumbo Reports of April 2003 and September 2003).

We first wanted to follow poverty indicators through a global macroeconmic approach using a restrictive hypothesis on income distribution and per capita consumption growth calculated by the model. The results of this study are presented in the September 2003 Jumbo report. The first results from the microsimulation approach show great differences, which highlights the utility of the macro-micro linkage method.

As most of the output is determined by the demand components, the household consumption and income group is particularly developed and regularly re-estimated, thus facilitating an exercise of microsimulation. In the macro model, households are disaggregated in several "representative household groups". Public wages are taken in the Consolidated Operations of the Central Government, private wages and urban informal revenues are estimated and linked to global economic activity and urban inflation, and rural incomes are divided into those from subsistence products and those from exported goods (mainly groundnut and cotton products in Senegal). The hypotheses on international prices of the main primary goods are those from the last IMF World Economic Outlook.

4 A Case Study in Senegal

4.1 The 2002 household survey ESAM II

An official study presenting the statistical analysis of the Senegalese household survey (ESAM II, 2001-2002) was published in February 2004 under the joint signature of the Senegalese Statistics and Forecasting Department (DPS) and the World Bank. This analysis was based on poverty lines calculated in terms of the costs of basic requirements. The poverty lines were re-estimated for the first survey (ESAM I 1994-1995); the results presented in this study are therefore different from those previously published in the PRSP.

"The food basket should theoretically allow households to consume 2400 kilo-calories per day and per equivalent adult, taking into account national consumption habits." The poverty line selected is based on a food basket using the results from ESAM II and re-calculated for ESAM I. The basket value is both different between 1994 and 2002 and between Dakar, other towns and rural areas. The total household consumption includes the consumption of non-food goods and some services. The total poverty line corresponds to the sum of the food poverty line and the amount required to cover non-food spending. This additional amount is particularly high in Dakar. The poverty line used for Dakar is over the level of three 1985 dollars, which is above the other Western African references. The poverty rate thus defined falls from 67.9% in 1994-1995 to 57.1% in 2001-2002.

A specific statistical analysis of the same database (ESAM II) at the AFD shows different results. Using a single poverty line for the whole country (regardless of geographical differences) of one 1985 dollar, the poverty rate rises between the two surveys from 26.3% to 29.1%. With a poverty line at two 1985 dollars the poverty rate increases from 67.8% in 1995 to 69.8% in 2002. The use of domestic, regionally disaggregated poverty lines is certainly more useful for the application of a national poverty reduction policy. However the poverty rate thus defined prevents any international comparison.

We do not want to discuss the importance of the statistical definitions, either for the needs of a national policy or for international comparisons. The flexibility of the model allows us to tailor the definitions of poverty lines to the users' needs. We can make a forecast or a variant, using for example specific regional poverty lines, in order to fuel

the national debate on the efficiency of the country's poverty reduction policy. This could also fuel a debate on setting up of a redistribution policy. Standard poverty lines at one or two 1985 dollars can also be used for international comparisons.

4.2 Senegal Economic Outlook 2002-2004

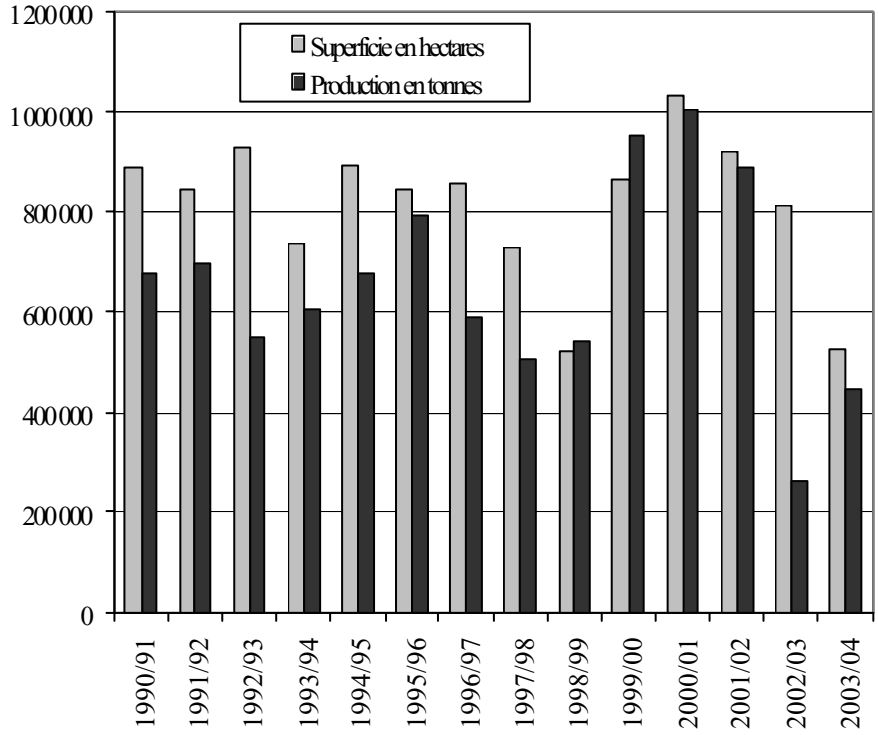
Senegal : Demand composition 2001-2004 , annual growth rates

	2001	2002	2003	2004
GDP (Jumbo estimate)	***4,7%***	***1,3%***	***5,0%***	***5,8%***
GDP (DPS)	*4,7%*	*1,1%*	*6,3%*	*6,0%*
GDP at factor cost	*4,2%*	*0,9%*	*5,0%*	*5,7%*
Imports	*11,4%*	*6,1%*	*2,5%*	*6,6%*
Consumption	*7,5%*	*2,4%*	*2,8%*	*6,8%*
households	*7,4%*	*4,7%*	*2,3%*	*7,1%*
administration	*8,2%*	*1,7%*	*6,4%*	*5,0%*
Investment	*3,2%*	*8,2%*	*8,5%*	*6,4%*
public	*8,8%*	*24,8%*	*14,9%*	*7,2%*
private	*7,0%*	*2,0%*	*5,0%*	*6,0%*
Exports	*7,1%*	*2,8%*	*-12,2%*	*3,9%*
primary goods	*10,8%*	*4,5%*	*-22,5%*	*5,9%*
others	*4,8%*	*1,7%*	*-5,3%*	*2,7%*

Source : Jumbo (April 2004)

The primary sector slumped by 20% in 2002 because of a 30% drop in agricultural production caused by a cold winter and severe drought during the following summer. Hardest hit was groundnuts with a 70% drop. Added to the unfavourable meteorological conditions were the effects of disrupted markets following privatisation. The crop failures cut rural incomes in early 2003. Farm production revived in 2003, auguring strong rural income growth for 2004. Groundnut production was up by 70% (but still below the long term annual average). The structural problems of the groundnut production process still curb the potential growth of production.

Senegal : Groundnut production and cultivated superficies



Source : Ministère de l'agriculture, Direction des statistiques

The primary sector outlook is essential for estimating the GDP growth. The contribution of the primary sector's output growth to total GDP growth is still high, although the sector is loosing importance in the economy. Attention should continue to be focused on this sector, especially in a review of poverty reduction policies.

Senegal : Primary sector production (% of GDP)

Source Direction de la Prévision et de la Statistique, Senegal

While industry, construction and services continue to grow on a steady path, these sectors allow a gradual growth of revenues. The government programme of raising spending on personnel with the creation of new civil service jobs also helped to improve the revenues of this category of workers. Consumption is largely fed by remittances from emigrants but this component of household revenue is difficult to estimate.

The global economic outlook for 2004 is the best since 2000. The slowdown in agricultural growth following the sharp rebound in 2003 is partially compensated by the consumption linked to the revenues generated by this rebound. A locust plague has entered the north of the country and it is possible that rural productions could be devastated in 2004. Groundnut farmers face the risk that the privatisation of the groundnut parastatal company, Sonacos, could be mishandled, which would deprive them of a market for their crop. Groundnut production will continue to be affected by marketing difficulties stemming from purchasing problems ongoing since the 2001/2002

season and from organisational problems resulting from the forthcoming privatisation of Sonacos.

4.3 Forecasting Poverty Trends in Senegal: Results by Household Category and by Region

According to our first study (Cogneau 2003), Senegal would appear to be in a position to meet some of the Millennium Goals. In comparison with other countries from SSA, particularly from the Franc Zone, a significant reduction of different aspects of poverty would seem feasible in the medium term but would have to be closely monitored.

The second stage of the Senegal study was to implement a more detailed projection method suppressing two hypothesis : (i) log-normal income distribution (ii) constancy in inequality. This method translates the outcome of the Jumbo model into a micro-accounting of household income from the national survey.

The study focuses on the Senegalese Household Survey II (ESAM II) which is the most recent basis of income distribution in Senegal. The first point of interest is that the hypothesis of log-normal distribution used in the first stage can be completely eliminated. Indeed, even if a constant growth rate of income is attributed to each household, thus maintaining constants in inequality, poverty indicators can be calculated on the basis of the true initial distribution of income.

Moreover, a typology of households by socio-economic group has been established according to the profession of the head of household, with five categories.

- Self-employed households in the rural sector
- Self-employed households in the non-rural sector
- Households employed in the private sector
- Households employed in the public sector
- Households with no professional activity

From this typology, a new micro-simulation can be established where differentiated growth rates of income are attributed to each household according to the disaggregated outcome of Jumbo as follows:

- Rural income (groundnut, cotton)
- Rural income (subsistance products)
- Income of individual entrepreneurs in the urban sector
- Wages from the private sector
- Wages from the public sector

Groundnut and cotton production is very concentrated in certain regions of Senegal. We therefore suppose that households working in the rural sector in these regions earn most of their income from these productions.

We also develop a simple demographic model for these categories of population according to the results of the latest global population census (2002). Firstly, per capita income growth from the macro model is applied at the micro level to households based on the head of household's activity. In a second approach, we differentiated the activity of each member of household, which gave similar results.

For a global poverty rate at 29.1% of total population, the situation between each group of household is very different. Inequality as measured by the Gini Index is relatively high with a Gini Index of 0.48.

Senegal 2002 : Poverty Indicators for a Poverty Line at One Dollar 1985 by category of household[1]

	P0	P1	P2	Gini
Total population	29,08%	7,69%	2,89%	0,48
Non workers	25,16%	6,62%	2,46%	0,44
Salaried from the pubic sector	4,31%	1,19%	0,41%	0,42
Salaried from the private sector	10,61%	2,94%	1,21%	0,50
Individual entrepreneurs in the urban sector	24,23%	6,56%	2,55%	0,46
Rural non salaried (groundnut, cotton)	57,24%	15,56%	5,88%	0,26
Rural non salaried (subsistence products)	41,82%	10,71%	3,93%	0,32

Source: calculation AFD

[1] "The most common standard indicator is the incidence of poverty (P0) (also called poverty rate or headcount rate). This describes the percentage of the population whose per capita incomes, or expenditures spending, are below the poverty line, that is, the population that cannot afford to buy a basic basket of goods. » (Coudouel et alii, 2000).
The Poverty Gap Index (P1) is the mean proportionate poverty gap across the whole population. It measures the magnitude of poverty, considering both the number of poor people, and how poor they are. The Poverty Gap Index is the combined measurement of incidence of poverty and depth of poverty.
The poverty severity index (P2) gives a weight to the poverty gap (more weight to very poor than to less poor). It is the average value of the square of depth of poverty for each individual. Poorest people contribute relatively more to the index.

Senegal 2002: Poverty Indicators for a Poverty Line at Two Dollars 1985

	P0	P1	P2
Total population	69,75%	30,06%	16,01%
Non workers	64,40%	26,57%	13,90%
Salaried from the pubic sector	32,23%	9,64%	4,03%
Salaried from the private sector	43,37%	14,57%	6,96%
Individual entrepreneurs in the urban sector	66,34%	26,86%	13,98%
Rural non salaried (groundnut, cotton)	94,79%	49,08%	28,40%
Rural non salaried (subsistence products)	88,09%	41,19%	22,43%

Source : calculation AFD

Poverty is the lowest in the households where the head of household works in the public sector, whereas poverty is the deepest in households where the main source of revenue is groundnut production. The poverty rate for the two dollar poverty line reaches nearly 95% in this group of population. That is also the more homogeneous population, with the lowest Gini Index: 0.26. With no inequality but at a very low level, efforts must be focused on this particular population. The reform of the groundnut production chain may be a move in the right direction if a sound policy of reorientation and diversification of production is being conducted.

Rural incomes are very concentrated around the poverty line at one dollar of 1985. A slight change of the poverty line gives very different results. Thus, the control of inflation is also essential in a poverty reduction policy.

Poverty in Senegal, like in most African countries, is concentrated in rural areas. There is a strong linkage between rural incomes and the quality of the previous farming year. As the 2002/2003 farming year was disastrous, it is not surprising to see a rise in poverty at the national level in 2003 (nearly +4 points between 2002 and 2003, from 29.1% to 32.8% for the $1 poverty line). The deterioration of the household situation is particularly important in the rural sector, and especially in the groundnut sector which is already very poor. However there was an improvement in the urban sector.

Senegal 2003: Poverty Indicators forecasted for a Poverty Line at One Dollar 1985

	P0	P1	P2
Total population	32,77%	9,69%	3,99%
Non workers	27,88%	7,64%	2,93%
Salaried from the pubic sector	4,31%	1,14%	0,39%
Salaried from the private sector	10,47%	2,81%	1,15%
Individual entrepreneurs in the urban sector	26,48%	7,29%	2,88%
Rural non salaried (groundnut, cotton)	86,43%	35,68%	17,73%
Rural non salaried (subsistence products)	42,53%	11,00%	4,05%

Source : calculation AFD

We should observe a new decline in poverty in 2004 after the good performing farming year 2003/2004. But the Gini Index continues to deteriorate particularly in the urban sector and mostly in Dakar, due to public and private sector wage hikes in comparison with individual entrepreneurs and the informal sector.

Senegal 2004: Poverty Indicators forecasted for a Poverty Line at One Dollar 1985

	P0	P1	P2
Total population	29,64%	8,06%	3,09%
Non workers	25,21%	6,71%	2,50%
Salaried from the pubic sector	3,83%	0,86%	0,27%
Salaried from the private sector	9,45%	2,57%	1,05%
Individual entrepreneurs in the urban sector	24,30%	6,61%	2,57%
Rural non salaried (groundnut, cotton)	69,68%	22,92%	9,63%
Rural non salaried (subsistence products)	40,66%	10,04%	3,64%

Source : calculation AFD

A regional distribution of poverty is very useful in a context of decentralisation and in relation to a redistribution policy. Senegal was divided in ten regions with very different characteristics. Senegal's government structures are in a state of transition owing to efforts to decentralise central government functions to the regions.

Senegal 2002 : Poverty Indicators for a Poverty Line at One Dollar 1985 by region

	P0	P1	P2	Gini
Dakar	3,6%	0,6%	0,2%	0,46
Ziguinchor	51,9%	16,6%	7,1%	0,37
Diourbel	39,7%	9,7%	3,5%	0,37
Saint Louis	28,9%	6,5%	1,9%	0,33
Tamba	43,2%	11,2%	4,0%	0,28
Kaolack	53,2%	16,1%	6,4%	0,38
Thies	23,9%	5,5%	1,9%	0,39
Louga	22,2%	5,1%	1,8%	0,32
Fatick	29,3%	5,9%	1,7%	0,27
Kolda	50,0%	16,1%	7,1%	0,32
Senegal	29,1%	7,7%	2,9%	0,48

Source : calculation AFD

The lowest poverty rate is observed in the most unequal region: Dakar. The disparity of revenue in Dakar is an expected result. It is also in Dakar where we observe the highest revenues in the country. The poverty rate for a one dollar poverty line is very low. The national presentation of the statistical analysis of the household survey was based on a poverty line above three dollars from 1985 in Dakar, owing to high expenses in the service sector in the main city and the high prices of those services (access to water, transportation, etc). A policy of poverty reduction could aim to improve these services and reduce their prices. For example, a rationalisation of public transportation in Dakar and its suburbs could be very useful for the population living very far from where they work. A vast programme of social housing would also help to calm the apparent boom in the housing sector in Dakar.

The other regions appear to be more homogeneous with a lower Gini index. But the situation from one region to another is very different, with the poverty rate (at the one dollar poverty line) ranging from 22.2% in the region of Louga to 53.2% in the region of Kaolack.

Source: *The Economist Intelligence Unit, Country Profile 2004, Senegal*

The regions of Kaolack and Fatick, specialising in groundnut production, are two regions with a high poverty rate. Nationally, the regions from the south and the east of Senegal show a higher poverty rate than the regions from the north and the west. The Sahel regions of Saint Louis and Louga have a better profile than the average of the country.

Senegal 2003 and 2004: Poverty Incidence (P0) forecasted for a Poverty Line at One Dollar 1985, by region

	2003	2004
Dakar	4,1%	3,4%
Ziguinchor	54,4%	50,4%
Diourbel	42,9%	39,0%
Saint Louis	30,7%	27,6%
Tamba	45,7%	42,8%
Kaolack	66,5%	58,1%
Thies	24,9%	23,5%
Louga	24,0%	21,4%
Fatick	43,6%	35,0%
Kolda	52,3%	49,1%
Senegal	32,8%	29,6%

Source: calculation AFD

Not surprisingly, the situation deteriorated in 2003. It particularly deteriorated in the rural areas. The situation in 2004 is nationally the same as in 2002 thanks to the rebound of agricultural output. It is noticeably worse in the two regions specialising in groundnut production: Kaolack and Fatick. The rise of poverty in those two regions justifies the emergency help programme of 2003. We note a slight deterioration of the Gini index between 2002 and 2004 due to the stagnation (or decrease) of rural revenues over the period while private and public wages were rising.

We can focus our attention on a specific region. The region of Dakar is very interesting because it recounts a very different situation. We present in the following table the poverty rate for a poverty line at two dollars of 1985.

Poverty indicators by category of household for a Poverty Line at Two Dollars

1985 Dakar 2002

	P0	P1	P2
Total population	30,9%	7,8%	3,0%
Non workers	30,6%	7,7%	2,9%
Salaried from the pubic sector	18,2%	4,1%	1,2%
Salaried from the private sector	25,8%	6,5%	2,4%
Individual entrepreneurs in the urban sector	35,4%	8,8%	3,4%
Rural non salaried (subsistence products)	53,5%	21,2%	10,1%

Dakar 2003

	P0	P1	P2
Total population	32,9%	8,6%	3,3%
Non workers	34,2%	9,0%	3,4%
Salaried from the pubic sector	18,2%	3,8%	1,1%
Salaried from the private sector	23,9%	6,2%	2,3%
Individual entrepreneurs in the urban sector	38,1%	9,9%	3,9%
Rural non salaried (subsistence products)	55,5%	21,5%	10,3%

Dakar 2004

	P0	P1	P2
Total population	29,9%	7,6%	2,9%
Non workers	30,6%	7,8%	2,9%
Salaried from the pubic sector	14,1%	2,7%	0,7%
Salaried from the private sector	22,0%	5,6%	2,0%
Individual entrepreneurs in the urban sector	35,6%	8,9%	3,4%
Rural non salaried (subsistence products)	49,7%	20,5%	9,7%

Source: calculation AFD

During the last three years, the poverty rate at the poverty line of two dollars of 1985 decreased from 30.9% to 29.9% in 2004. While the situation of the category of household whose main source of revenue is a wage from the private sector continuously improved, the amelioration for the other categories was mainly

concentrated in 2004. The poverty rate of the households whose head works in the public sector decreased only in 2004 when the programme of raising spending on personnel was effective. The situation of non-salaried people, whether in the primary sector or not, deteriorated in 2003, linked to the drop of agricultural revenue and subdued consumption, and revived in 2004.

5 Conclusion

The macro-micro linkage was recently developed to quantify poverty reduction policies. The Poverty Reduction Strategy Paper has changed the perception of monitoring a policy in many African countries as it needs to be a participatory process and it needs to be consensual. Poverty reduction policies are conducted in every country and the need for social indicators and statistics is essential.

This paper is an attempt to use simple microsimulations linked to a macroeconomic forecasting model in order to give the best estimation according to the environment described in the macro-model of the poverty rate, by category of household and by region. It is easier for a government to communicate to the citizens and to the press with the estimation of the evolution of a poverty rate rather than with a package of 20 different statistics.

This study has been made possible thanks to an agreement between the AFD and the Senegalese national statistics office. Our works are disseminated to and discussed with the Senegalese authorities. An advantage of this method is its simplicity. It can easily be conducted in every country where a Jumbo model is running. Its first application has been developed for Senegal, but we are already working on micro data from Mali, Burkina Faso and Benin. Such microsimulation works are planned in these three countries. This work will also allow comparative studies between countries. In the long term, the AFD would like to extend the method to all Franc Zone countries in order to obtain an indicator of the conjuncture of poverty within the framework of the monitoring of the Millennium Development Goals. Other improvements in the method will consist in introducing a more detailed labour market module.

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