Investigating the Effects of Structural Adjustment Programmes on Poverty in the Ivory Coast (1985 and 1988)

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Abstract. In investigating the effects of structural adjustment programmes (SAPs) on poverty, it is necessary to put into context the rationale behind SAPs and the measurements of poverty used to define and qualify poverty. The objective of the study was to assess the determinants of poverty in the adjustment period (1985) and non-adjustment period (1988). The study uses the mean per capita household expenditure as a measure of poverty and a logit model to examine the factors affecting the likelihood of a household being poor. The Cote d'Ivoire Living Standard Survey (CILSS) data for 1985 and 1988 was used to compare the level, and composition of the poor class both in rural and urban areas. The most important variables affecting the probability of poverty are the household size, the type of industry where the household head is employed and expenditure on education and health. The study has also shown that gender of the household head has no effect on the probability of poverty. The effects of both structural adjustment policy of subsidy removal in 1985 and the re-instatement of subsidization during the non-adjustment period starting in 1988 were compared and are presented here; the results suggest that poverty had actually been reduced.

Keywords: Structural Adjustment Program, Logit Model, Poverty, Ivory Coast

Introduction

Structural adjustment programmes are aimed at moving away from controlled based to market based economics. The program is implemented under the assistance and supervision of the International Monetary Fund and the World Bank. The package is normally a two-tier approach. The stabilization approach aims to achieve macroeconomic stability while the adjustment approach at achieving economic growth.

In the early years when the IMF and World Bank conceived the idea about SAP, stabilization and adjustment policies were applied haphazardly in all countries requiring economic reforms. The fact that countries have different social, economic, political and cultural set ups were ignored. Studies later revealed that although macroeconomic stabilization was achieved, the masses (the poor) are made worst off. This led to UNICEF's adjustment with a human face. It is now very clear to economists that the usually held view that structural adjustment programmes should lead to economic growth and reduction in poverty may not happen in practice due to the existence of market failures in developing countries.

Ivory Coast is an agriculture dependent economy. Coffee and cocoa are the major cash crops. It was due to rise in the terms of trade of these crops that contributed to the trade balance surplus experienced in the 1970's. This was called the "Ivorian miracle" and it came to an abrupt halt in 1980 as a result of collapse of world prices of coffee and cocoa –the country's two main exports – and the economy started a continuing decline. The drought exacerbated the situation.

In the Pre-SAP period, the economy experiences a positive annual real GDP growth rate of over 7% from 1960 to 1975 (the "Ivorian miracle"). The policies were focused on developing agriculture i.e an export sector led growth. The political system was very stable. There was a one party under the leadership of Felix Houphouet-Boigny. This factor, together with the wealth of resources and the availability of cheap labour attracted foreign investors. Due to the fall in the world price for cocoa and coffee and as a result of the events in the developed

countries, the economy ran into a serious macroeconomic imbalance. Coupled with this were some of the policies implemented by the government, which led to the market failure. For example, Import Substitutions Industrialisation, Non-tariff Barriers, import restriction, high public sector spending e.g. high civil services wage bills and the construction of Africa's largest cathedral, the Basilica (costing $250 million); taxing agriculture heavily and prices of agricultural products were administratively determined (usually set below world prices).

The country was able to absorb the effects of oil price shock of 1973/74 and the world recession that resulted in a fall in the export prices. This was followed by an increase in the world price of cocoa and coffee in 1975-1977, but the oil price hike of 1979/81 was difficult to absorb. This is the situation of the Dutch Disease, because the increase in the revenue from coco and coffee (agricultural surplus) was not challenged into productive investment. This was mostly directed towards consumption. In the 80's, the economy was characterized slow growth and growth rate of GDP, current account deficits and a fiscal deficit. In a developing country like Ivory Coast, the revenue based is weak and therefore, very difficult if not impossible to raise. Major source of revenue are taxes, savings and export revenue. These are constrained by the fact that tax base is limited and exports are primary products that are volatile. Also, the terms of these primary products are deteriorating. Furthermore, revenue can also be raised through domestic saving mobilization and or external resource mobilization. External resources can be obtained through borrowing from international capital markets or the West African Monetary Union's (WAMU's) Central Bank.

The SAP period started in 1981 and ran for 6 years (1981-1987). It was supported by a 3 year World Bank Structure Adjustment Loan (SAL) in 1981, 1983 and 1986. This programme was abandoned in 1987/88 and resumed in late 1989 which more of a sectoral approach. Another SAL was provided in 1989. This package included: public sector reform, removal of non-tariff barriers, financial liberalization, market reforms, elimination of timber export quotas and privatization

As a result of the programme, economics conditions were worst and the government stopped and started again in 1989. Government budget deficit rose by 15% of GDP in 1988 as a result of the fall in receipts (Grootaert, 1995). The good performance of the economy in 1985/86 is attributed to rise in the world price of cocoa and coffee. According to Grootaert (1995), a priori, one would expect a positive impact on poverty, since the negatively affected civil servants were not generally a poor group, while the positively affected farmers included many poor smallholders. Using data on household incomes and expenditures as a measure of level of living, he concluded that during the adjustment phrase, the overall incidence of poverty did not change and the incidence of extreme poverty was reduces. Poverty increases the destabilization phase (1987/88) and in 1988, the incidence of poverty was 50% higher than 1985.

The paper examines the determinants of household poverty in adjustment and non-adjustment periods in Ivory Coast. A logistic regression model is used to estimate the effects of determinants of poverty among households for the different periods. The direction of the effects for 1985 and 1988 will be compared and the significant of variables will be established. This empirical evidence from Ivory Coast will also be used to examine several assumptions or hypotheses about the impact of SAPs on poverty. The assumptions are:

- Whether the percentage of poor households increases. In other words, during the study period, there are more poor households getting poorer and more non-poor households falling below the poverty line (1985 and 1988). If the widely held view that adjustment is better than non-adjustment is true, this should hold.
- The likelihood of being poor for female head is greater than male household head. It is widely believed that women are marginalized in developing countries and hence the probability of being poor should be higher for female heads compared to male heads.

- The probability of household head becoming poor decreases with living in an urban area. This is meant to confirm the widely held view that those residing in rural areas are affected more by poverty. This is attributed to the fact that they are farmers who lack assets and rely on few crops.
- The probability of poverty increases with the household head working in agriculture related industry or being a self-employed in agricultural will be examined. In other words, poverty is associated with working in agriculture.
- Poverty increases during the adjustment period (1985), and decreases in the non-adjustment period (1988). Structural adjustment policy of subsidy removal on education and health is expected to increase the price of these services and hence more people falling below the poverty line.
- Finally, this paper uses the logit model to evaluate the effects of adjustment and non-adjustment on education and health sector. These two sectors are chosen because they are mostly subsidized by the government without SAP and not subsidized (or reduced subsidization) with structural adjustment programmes.

Poverty and Structural Adjustment Programs

Poverty is defined as the "inability of an individual or family to command sufficient resources to satisfy basic needs" (Gray Fields, 1994). Basic needs refer to what is needed to survive as human beings e.g shelter, clothing, water and nutrition. Absolute poverty is the situation where the individual cannot meet the minimum bundle of goods required for survival. In other words, the individual lives below the subsistence level. This is why the term absolute and subsistence poverty is often interchanged. Relative poverty is the "exclusion from participation in normal economic life of society" (Peter Smith).

The causes of poverty can be attributed to many issues some of which include lack of political commitment, government policies (e.g. devaluation and import substitution industralisation), disputes, external shocks, e.g oil price shocks of 1973/74, 1979/80 and , 1994 and drought of the 80's. Other causes include falling TOT, debt crisis, high population growth, landlessness, mechanization, education, high dependency, malnutrition and low agricultural productivity. For the case of Ivory Coast, the major cause can be attributed to the drought of 1981, the falling terms of trade of cocoa and coffee, debt crisis, government policies and high level of population growth. Considering the fact that a greater portion of the population of developing countries in general and Ivory Coast in particular are farmers and hence rely heavily on farm incomes and farm output, these factors resulted in a deteriorating output in the agricultural sector, the end result of this rural-urban migration. This leads to increased pressure on urban facilities, congestion and over-urbanisation.

Poverty line is a line drawn to separate the poor from the non-poor. According to Debraj Ray (1998), the poverty line is a critical threshold of income, consumption, or, more generally, access to goods and services below which individuals are declared to be poor. Studies use different poverty lines: "legally decreed minimum wage, 60% of mean income of a country", national poverty lines, international poverty lines, nutrition-based poverty lines (e.g. Food-Energy-Method poverty line). Some of these poverty lines are discussed below.

National poverty line is country specific and is based on welfare determining variables e.g. consumption, expenditure, nutrition etc. International poverty line is useful for cross-country comparison. Instead of a single line, World Bank uses the limits US 275 and US 370 (in 1985 PPP prices) per person per year (see World Development Report, 1990). Consumption-based poverty line is better as a basis for determining economic status than income, because of the fluctuations in income especially rural incomes. United Nations Development Program poverty line was developed by the UNDP and it is used as an international measure of poverty line. This refers to the population below $1 (in PPP) per day.

The mean per capita household expenditure is used in the study.Using this measure does not mean that it is the best measure. The choice is based on the ease of computation of the measure. Some researchers also use the one-third of the mean per capita expenditure to reflect the poorest of the poor. This is meant to show the fact that the poor are a heterogeneous group. That is, in the group of the poor, we have the poorest of the poor (ultra poor) or people in extreme poverty. Kakwani (1993), on a study about Ivory Coast uses two poverty lines to identify the poorest 10% (ultra poor) and the poorest 30% of the population respectively.

According to Kakwani (1984), the poor are those who lack the resources to obtain the minimum necessities of life. In identifying the poor, a poverty line is used and in this sense, it is the level of income which is just sufficient to buy those so-called minimum necessities of life. Therefore, a person is poor if his or her income falls below that line (see Kakwani 1984). In terms of assets, the poor are a group that lacks assets. Their main source of income is agriculture, but they also get income through informal sector jobs, self-employment, wage labour, rural non-farm employment and transfers from the government. The regional dimension of poverty often shows poverty to be higher in rural area as compared to the urban area. This can be attributed to the fact that development is mostly urban bias. Furthermore, the major source of income in rural areas is agriculture and agriculture-related activities that are subjected to fluctuations due to weather conditions and the international price changes. The source of income in urban areas is more diverse (formal and informal sector jobs).

Poverty has been high on the preference scale since the fading away of the "Ivorian Miracle". Although it is a national problem, it has a regional dimension as well. The rural population that constitutes farmers comprises the highest number of the poor. Poverty is also rampant among the disadvantaged groups in society. Structural adjustment programmes hit children and women most.

The study uses the CILSS data to analyse the effects of structural adjustment programmes on poverty. The question about whether poverty is increasing with adjustment or with non-adjustment will be answered with the help of the data and using the mean per capita household expenditure as the poverty line.

Sub-Saharan African economies including Ivory Coast tried almost all of the difference routes that the developed countries have passed through to achieve economic growth but still unable to reach the point that these developed countries reach today. Some countries developed through industrialisation e.g. the industrial revolution in Britain. Countries like Denmark and New Zealand are primary producers. Others use import Substitution Industrialisation and export promotion strategies. Most Sub-Saharan African countries like Ivory Coast adopted the strategy of Industrialisation and agricultural sector development in the 1970's. Some of the developing countries achieve economic growth using some of these strategies. The million-dollar question to ask is why is it that Sub-Saharan African (SSA) countries' imitation of these models usually worsened the problem. The raison d'être being the differences in economic structures, political system, cultural diversity etc. Moreover, economies rely heavily on agricultural products whose prices are volatile or very unstable due to the low elasticities of primary products. Moreover, the Ivorian economy like other agricultural dependent developing economies is highly sensitive to shocks in international prices of primary goods and the weather conditions e.g. drought of 1983. Although government made attempts to diversity its agricultural-based economy, it still employs more than 60% of the population.

Periods before the structural adjustment programmes (SAPs) witnessed a lot of Government intervention in the running of the economy, which is in line with the Keynesian view of state intervention. Although this proved successful during the Great Depression of the 1930's, it falls out of favour new. The reason being that Government should not interfere in areas where private individuals or firms can run successfully or Government should interfere

in areas where the market mechanism will fail. This is called a market-friendly development approach.

The neo-classicalists' view of structural adjustment can be summarised as the transformation of a controlled economy to a market-oriented economy. This was the earlier view held by the proponents of the structural adjustment programs, the World Bank and the IMF. To the neo-classicalists like Solow, sustained growth is as a result of technological progress that is exogenous. Firms are assumed to be price takers, markets are competitive, there are no externalities and no government intervention. The exogenous technological progress will offset the threat of diminishing returns that may prevent sustained growth taking place. But in real economies, there exist monopolies, externalities, missing markets and imperfect markets. There also exist other objectives of government different from growth like equity and welfare. Therefore, government intervention is inevitable.

Summers and Pritchett (1993) pointed out that the design of structural adjustment programs is directed as the four "…..ations" – stabilisation, liberalisation, deregulation and privatization. The stabilisation aspect is concerned with the demand side of the economy while the adjustment part deals with the supply side of the economy. The tools are used in the stabilization phase are fiscal policy, monetary policy and devaluation while in the structural adjustment phase, the tools are public sector resources allocation, market liberalization, resource mobilization and institutional reform (see van der Hoeven and van der Kraaij, p.34, 1994). The objectives of SAPs are to increase production, improve trade balance, restore macroeconomic equilibria and increase in the long term growth rates of the economy (Weissman, 1990). Although it is worth working towards achieving the objectives behind SAPs, the initial stages (short-run effects) are always rough especially for the poor who constitute the largest section of the population.

Crockett (1981) highlighted the Monetarists and the Structuralists views about stabilisation. To the monetarist, an inflation and balance of payments deficit that follows is caused by aggregate demand being greater than aggregate supply and hence stabilisation is achieved through aggregate demand restriction. For the Structuralists, rigidities in the pattern of production and demand typically prevent monetary restraint from being smoothly reflected in a moderation of inflationary pressures and a redirection of resources towards the external sector. In other words, the problem is a supply-side problem and hence the need to remove supply bottlenecks and other structural rigidities in order to increase output. It is therefore, obvious that both schools of though can achieve a zero excess demand which is the major objective of stabilisation program.

The package includes short-term and long-term stabilisation policies. The short-term stabilisation policies aimed at reducing the imbalances in the balance of payments and budget deficits by restricting aggregate demand. In other words, "a stabilisation (or financial) program is a package of policies designed to eliminate disequilibrium between aggregate demand and aggregate supply in the economy, which typically manifests itself in balance of payments deficit and rising prices."

Literature Review

Theoretical Literature

Researchers have applied various techniques in addressing the issue of analysing the effects of macroeconomic adjustment and stabilisation on poverty. The methodologies proposed in the literature in analysing the effects of structural Adjustment Programmes on poverty are briefly discussed.

A Computable General Equilibrium model of the whole economy was used by Adelman and Robinson (1978), De Melo and Robinson (1982), and Dervis, De Melo and Robinson (1982). Demery and Demery (World Development, 1991) used CGE model in a study about

Malaysia. The major criticism levied on these types of models is that they are based on simulations and not actual numbers. CGE models with the assumption of parameter invariance (related to the Lucas critique, 1978), is a very simplistic way of modelling reality. There is considerable evidence in Sub-Sharan Africa that parameters of models are likely to change calibration as pointed by Adelman and Robinson (1978). Considering the importance of the parameter invariance property of models to be used for forecasting, the non-compliance of model to the invariance property makes its forecasting power weak.

The Qualitative Approach looks at the effects of relative price changes on relative factor rewards using the Stolper-Samuelson theorem. It looks at the short-run effects (when factors are immobile) and the long-run effects (when factors are mobilised or factor prices are equalised). This approach is criticised on the fact that it cannot provide quantitative estimates. It also involves a large number of equations dealing with the whole economy. The assumption of factor price equalization may not hold as assumed due to differences in transport costs incurred in trade, differences in technology, existence of trade barriers and factor intensity reversals. However, this approach has the advantage that it is applicable to all relative price changes.

Micro Data approach uses data on the microeconomic units, e.g. household income and expenditure. The micro data is used in quantifying the effect of structural adjustment programmes on poverty. This is collected through the Living Standard Surveys. Under the leadership of the World Bank, these surveys have been done for certain countries. This method uses household level data with the assumption that expenditure or income within the household is equally distributed. The merit of this approach is that it uses actual data or information about the microeconomic units affected by the SAP policies.

Scarce in the literature on the determinant of poverty is the use of multivariate analysis. Appleton (1995) modelled the shortfall of household consumption from the poverty line with the help of a tobit model. Another example of the use of multivariate analysis is Demery (1993) used a probit model to model whether a household is poor or not. This dissertation will adopt the approach used by Rodriguez and Smith (1994). They modelled the determinants of the likelihood of poverty of a household.

The human poverty index is a poverty index due to the United Nations Development Programme (UNDP). The use of this index involves looking at how it has changed as a result of SAP implementation. The components of the HPI are longevity (life expectancy at birth), knowledge (adult illiteracy rate) and resources (access to safe water, health services etc.). The human poverty index assumes the values between 0 and 1, where 0 is the lowest state of poverty and 1 is the highest.The problem with this measure is its attempt to combine indicators of HPI and assign values along the scale stipulated. In other words, assigning a single numerical value to indicators that bear different units of measurement is prone to so many questions.

In conclusion, it can be postulated that all the measures are not free from faults. The use of micro data can be considered as the best due to the reasons pointed earlier.

Structural Adjustment Policies and Poverty

The rationale behind SAP as explained earlier is to move away from a regulated economy to a market friendly economy. This leads to a Pareto efficient allocation of resources.

Poverty, which can also be seen as very low levels of income per capita to command certain basic needs or being below a certain poverty line, can be reduced if incomes of the poor are raised. Moreover, operating and economy efficiently is expected to increase output. Considering the relationship between output and income, an increase in output is expected to increase income. Therefore, SAP, which is expected to increase output, should reduce poverty ceteris paribus. Due to characteristics inherent in developing countries, this hardly achieved. SAPs, which results in worker redundancy impact on poverty. Furthermore, the agricultural

sector (rural sector) which is the major contributor to GDP in most developing countries and employs more than 60% of the population in the most LDCs is more affected by the program.

The Bank's conclusion regarding the effects of structural adjustment program on the poor is that "adjustment is better for the poor than non-adjustment, and that distributional effects of well-designed policies often favour the poor" (see David Reed, p. 31).

In using micro data to look at what structural adjustment programmes has done to poverty, we need to check what has happened to household welfare. An important in social welfare would mean a reduction in poverty and reduction in social welfare would mean an increase in poverty. A very important point to not is that the relationship between adjustment policies and poverty depends on the country under study, the policy mix and the timing of the study.

Empirical Literature

The literature concerning what structural adjustment programmes has done to poverty and income distribution is huge. Some studies revealed that structural adjustment programmes (SAPs) increase poverty while others concluded that it reduces poverty.

Sahn, Dorosh and Younger (1999) stated that reduction of export crop taxation contributes to higher income for the poor, and domestic food crop liberalization has not led to increases in purchase prices of stable commodities for most low-income households. They went further to say that in most countries were SAP was implemented and sustained, income distribution improves and the poor are not adversely affected (Sahn et al., 1996, p.719). The study made use of 10 Sub-Saharan African countries. The Computable General Equilibrium (CGE) model was used. It was neo-classical in nature since it used individuals as agents with the objective of maximizing utility and profits.

De Maio, Stewart and van der Hoeven (1999), criticized Sahn et.al (1996) paper on the basis that "since neither tracking nor sensitivity analysis are carried out systematically by Sahn et al, their simulation results regarding the effects of adjustment on poverty cannot be considered conclusive". Moreover, their conclusions were based on CGE models and not on what happens to actual poverty. Their study was based on Tanzania and Madagascar (both included in the Sahn et al. model) and the conclusion was that the poor are made worst off as a result of structural adjustment programmes. This study uses before and after historical information. Sahn et al. criticized this study on the basis that there was no control for drought, changes in terms of trade, foreign capital flow etc., which can affect the poor as well. Therefore, structural adjustment policies may not be the only cause of poverty. Other causes are population explosion, landlessness and natural disasters. Therefore, neglecting these issues in analyzing the impact of SAP on poverty could lead to invalid conclusions.

Ghana's drastic devaluation in the mid 1980's had overall negative impact on food producing regions of the country. Trend in food prices in Ghana 1970 - 1983 (i.e real whole sale prices of food) have been declining. Although prices of certain foodstuff were very high during the inception of the reform in 1983, they drop back to lower levels (Weissman, 1990). Therefore, this study shows that the initial stages of adjustment are always tough .i.e. the stabilization phase. As the country reaches the adjustment phase, the condition of the masses – the poor improves. This uses historical data to make a before and after analysis. The demerit of this is that there is no control for the other factors that might contribute to the changes in poverty. Devaluation is not the policy measure that can affect food prices. Another policy in the package that can affect food prices is the removal of subsidies.

In a study by Erik Thorbecke (1991) on Indonesia from 1982 -1988, a disaggregated computable general equilibrium model was used (micro-macro economy wide simulation model – "Marguette") and through simulations concluded that SAP restores macroeconomic

stability, improves income distribution and reduces poverty and undernutrition. Bourguignon, Branson and De Melo (1989), Bourguignon, De Melo and Suwa (1991) also used this approach.

Ravillion and Huppi (1989), Huppi and Ravillion (1990) used household consumption data for 50,000 randomly selected households in 1984 and 1987. They used measures like the head count ratio, the poverty gap and a distributionally sensitive measure. They concluded that incidence of poverty in rural and urban areas reduces in 1987 compared to 1984. Also income distribution was more even in 1987 compared to 1984.

In a study by Grootaert (1995) about Ivory Coast, he separated the adjustment effects (1985 – 1986) from recessionary effects (destabilization in 1987/88). A micro data was used i.e. the Cote d'Ivoire Living standard survey (CILSS). This study covered the period 1985-1988 and the aim was to find out the effects of SAP on household welfare and poverty i.e. what has happened to overall incidence and depth of poverty and regional and socio-economic patterns of poverty. The double decomposition of poverty index methodology was used and the conclusion was that economic stabilisation and the absence of managed structural in an economy can be more harmful to the welfare of the poor, than the adjustment process itself. Furthermore, during SAP, overall incidence of poverty is unchanged, incidence of extreme poverty reduced, poverty rose in the destabilization phase and in 1988, the incidences of poverty was 50% higher than that in 1985.

Stewart (1991) concluded that stabilization and adjustment policies, together with adverse external development and other weaknesses of internal policy and structure, have reduced the welfare of the poor, Slowing and sometimes reversing progress in nutrition, health and education (world Development (1991) pp. 1861). This shows that structural adjustment policies are not the only source of poverty. Therefore, in analyzing the effects of macroeconomic adjustment on poverty, it is necessary to control for these other factors.

In a study in Bolivia by Kaimowitz, Thiele and Pacheco (1999), they found out that structural adjustment policies adopted in 1985 increases poverty. In other words structural adjustment programmes contributed to the increased poverty witnessed in the mining districts and the highland agricultural regions. Berry (1995) focusing on Latin America Concluded that SAP increases poverty and inequality. A study by Handa and King (1997) on Jamaican economy concluded that SAP increase inequality in certain years and reduces it in other (no single pattern). This study uses living condition survey which contains detailed information on household consumption expenditure, health, education etc., stretching from 1989 to 1993. The information about the trend in real consumption is used in assessing the effects on poverty. Therefore, empirical studies reveal that SAP does not necessarily reduce poverty.

To conclude, it is clear that empirical studies do not show a one to one relationship between structural adjustment programmes and the direction of changes in poverty. SAP policies may increase, decrease or leave poverty unchanged. Furthermore, studies on this issue are country specific.

Modelling the Probability of Being Poor

Data and Methodology of Study

The study focuses on Ivory Coast, a Sub-Saharan African country. The data used is the Cote d'Ivoire Living Standards Survey (CILSS), a micro data obtained from the World Bank's LSMS data bank. The survey included a price survey, a household survey and a community survey. The data collected is a household survey and include information on incomes, employment, assets, expenditures, basic needs and other socio-economic characteristics of the household. The community survey collects data on the economic and demographic characteristics of the rural communities whilst the price survey collects information about prices at the nearest market to each cluster. The living standard survey for the case of Ivory Coast stretches from 1985 to 1988. The period 1985 – 1986 covers the adjustment phase whilst

1987 – 1988 covers the non-adjustment phase. A sample of 1588 households was used in 1985 and 1600 households in the following years. Surveys used rotating sample in order to avoid sampling bias.

Model Formulation

The study will focus on households and the dependent variable is the probability of household i being poor. The probability of being poor being the dependent variable takes values 0 and 1, where the probability of being poor is 1 and non-poor is 0. The model is specified as follows:

$$P_i = (Y_i = 1) = F(X_i'\beta) \dots\dots\dots\dots\dots,,,,,,,,\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (1)$$

Where X_i' = 1 x k vector for the i[th] poor household β = kx1 vector of unknown coefficients.

The linear probability model which assumes $F(X_{ik}'\beta_k)$ to be linear is subjected to so many questions and hence the simple ordinary least squares cannot be used[21]. Our case is that of modelling a qualitative dependent variable and therefore, non-linear specifications like the probit and logit will be more sensible. The study uses the logit specification[22] and applies the method of maximum likelihood estimation. The logistic regression model is given by

$$P_i = (Y_i = 1) = F(\alpha + \beta_k X_{ik}) = \frac{1}{[1 + e^{-(\alpha + \beta X_i)}]} \dots\dots\dots\dots\dots \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2)$$

P_i is the probability that household i is poor;

Y_i = the poverty status of household i; Y_i = 1 if the household is poor, and zero if the household is non-poor;

X_{ik} = k-th explanatory variables of the likelihood of poverty of household i; and β_k = the parameter associated with X_k (Aldridge and Nelson, 1984).

$$i = 1,2,\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots,n$$

Analysis of Data

The study uses the mean per capita household expenditure as the measure of the poverty line. Appleton (1995) uses household consumption per adult equivalent as a proxy for welfare in a study on Uganda. In 1985, the national poverty line is 135748.8 CFAF. The standard deviation is very high, at 664128.6.

The 1985 data reveals that the percentage of poor households is 82.81% and that of non-poor households is 17.19%. The mean household expenditure for a poor household is 1340515 CFAF while for the non-poor it is 3163719 CFAF. Their variances are very high showing that the variation in household expenditures is great.

Poverty has a regional dimension and therefore, it is important to use different poverty lines: urban poverty line and rural poverty line. The poverty line in the rural area is 101862.5 CFAF whilst that in the urban area is 180996.9 CFAF. The percentage of poor households in rural areas is 84.58% and that of non-poor households is 15.42%. In urban areas, there are 81.62% poor households and 18.38% non-poor households.

The average household expenditure for a rural poor household is 981716 CFAF with a high variance. For the rural non-poor households, the mean household expenditure is 1983135 CFAF with a high variance. For an urban poor household, the mean household expenditure is 1976082 CFAF while for a non-poor household it is 3985205.

From the 1988 data, the national poverty line is equal to 245254.4 CFAF. The percentage of poor households is 77.5% while that of non-poor households is 22.5%. For a poor household, the average household expenditure is 854913.4 CFAF per annum while a high standard deviation of 606937.3. For a non-poor household, the mean household expenditure is 2089167 CFAF and a standard deviation of 1611105.

Poverty various across regions and therefore, the rural and the urban poverty lines differ. This can be attributed to the differences in prices of commodities and the associated cost of living. The poverty line in the rural area is 174006.3 CFAF whilst that in the urban area it is

328893.5 CFAF. The percentage of poor households in rural areas 76.04% and that of non-poor households is 23.96%. In urban areas, there are 78.4% poor households and 21.6% non-poor households.

For a rural poor household, the mean household expenditure is 643686.7 CFAF while for a rural non-poor household it is 1322846 CFAF. Also for a urban poor household, the mean household expenditure is 1201146 CFAF and it is 2655306 CFAF for an urban non-poor household.

Changes in Percentage Poor and Non-Poor Households

The changes in the percentage of poor and non-poor in urban and rural areas are tabulated below.

Table 1. Percentage of poor and non-poor households in urban Cote d'Ivoire

1985 (poverty line = 180996.9 CFAF)		1988 (poverty line = 328893.5 CFAF)		Rate of change (%)	
Poor households (%) 81.62	Non-poor households (%) 18.38	Poor households (%) 78.4	Non-poor households (%) 21.6	Poor households (%) -3.945	Non-poor households (%) +17.519
Source: Authors' own calculations					

From 1985 to 1988, the percentage of poor households in urban areas has decreased and the rate of decrease is 3.945%. Likewise, the percentage of non-poor households increased during this period at a rate of 17.519%. This would mean that households are better off during this period.

Table 2. Percentage of poor and non-poor households in rural Cote d'Ivoire

1985 (poverty line = 101862.5 CFAF)		1988 (poverty line = 174006.3 CFAF)		Percentage change	
Poor households (%) 84.58	Non-poor households (%) 15.42	Poor households (%) 76.04	Non-poor household (%) 23.96	Poor households (%) -10.097	Non-poor households (%) +55.383
Source: Author's own calculations					

In rural areas, the percentage of poor households has decreased and the rate of decrease is 10.097%. The percentage of non-poor households increased during this period but at a rate higher than in the urban area i.e 55.383%. This implies that there are more households escaping or moving off the poverty line. This is in line with Grootaert and Kanbur (1995) findings about Ivory Coast. They concluded that 30% to 45% of households improved their living standards from 1985 through 1988.

Therefore, the member of households classified as poor has been falling while those classified as non-poor has been increasing. This does not necessarily imply that non-adjustment (in 1988) is better than adjustment (1985 per se. The cause of the decline in the number of poor households cannot be solely attributed to the non-adjustment policy of government. This could be attributed to the lag effect of adjustment from1981 to 1986.

Choice and Description of Explanatory Variables

The explanatory variables selected for modeling the probability of being poor are as follows.

Human Capital Related Variables

Education of household head is captured by the variable Diploma. This variable, which reflects the level of education of household head is expected to have a negative relationship to poverty. In other words, getting a diploma would imply getting a well-paid job and hence a

reduction in poverty. The same reasoning applies to the questions as to whether the household head attended school or not. The same signs hold true.

Regional Characteristics

Since poverty has a regional dimension, the dummy variable Dreg is used to represent the region of residence. The likelihood of being poor is inversely related to living in an urban area. Also, the probability of being poor is higher in for those residing in rural areas. In other words, the probability of being poor is directly related to residing in a rural area. Poverty being higher in rural areas can be attributed to government policies that are urban-biased and centralized development strategies.

Demographic Characteristics

The variables include are age (years) – Age, marital status –Mar, gender –Dsex and nationality – Nat. Age squared is also used i.e Age^2. The probability of being poor does not have a direct relationship with age. It is expected to vary along the life cycle. The probability of being poor is high for the very young and the old. Also, the likelihood of poverty is low at middle age. This argument can be linked to the age-earning profile of an individual, which shows earnings to be high at middle ages. Therefore, the relationship between likelihood of poverty and age is non-linear. This necessitated the inclusion of Age^2 in the model.

The likelihood of poverty is inversely related to being married. Getting married could be seen as putting resources together and hence an increase in the welfare of the household. Also the likelihood of being poor is lower for a male household head and higher for a female head. The marginalisaation of women in a developing country like Ivory Coast, reduces their claim for assaets, availability of credits and hence more women falling into the "poverty trap".

Occupational Characteristics

Occupational characteristics is captured by parents of household members, employment status of household head and the type of industry that household head works.

Occupation of parents of household members

The aim of modeling these characteristics is to reflect the importance of experience in affecting poverty. The household head's parents working in agriculture/fishing is directly related with the probability of poverty. Therefore, a positive sign is expected here. The variables used are Mocc and Focc.

Employment status of household head

The likelihood of being poor is directly related to household head being self-employed in agriculture in the past 12 months. This rationale behind this is that people self employed in agriculture are normally or generally the poor. The variable used here is selagly.

Type of industry that head works

The probability of poverty is positively related with the household head working in agriculture-related activities. In developing countries, working in agriculture and agriculture related activities is associated with farmers, rural residents and those whon cannot get well-paid or white-collar jobs. In sum, a higher percentage of those working in agriculture related activities are the poor. The variables used here is Indmy.

Household size

The likelihood of poverty is positively related with household size. A larger household size would mean a lower per capita consumption of variable household resources and hence higher chances of poverty. The variable used to represent the household size is Nh i.e household number.

Household expenditure

Expenditure of household on health

The cost of medicine (Costmed) is used to represent the expenditure on health. The relationship between the cost of medicine and the likelihood of poverty is expected to be positive.The structural adjustment policy of subsidy removal is expected to increases the of

medicine and hence increases poverty. In the non-adjustment period, increase in cost of medicine does not necessarily increase the likelihood of poverty. This is due to government intervention in terms of subsidy.

Education of children living elsewhere

The variable used here is expenditure on food and lodging, Expfl. This is a portion of the total investment on education made by household. Therefore, as expenditure on food and lodging increases, the probability of being poor increases. This can be linked to the structural adjustment policy of subsidy removal on education. This is expected to increase the expenditure on education by households and hence the likelihood of poverty, ceteris paribus.

Summary of Explanatory Variables

Dummy explanatory variable will be made great use of in the modeling. An explanation of how the dummy variables were arrived at is provided in appendix C. Table 3 shows the percentage of poor and non-poor across some of the characteristics used.

Table 3. Percentage of poor and non-poor across household characteristics in Cote d'Ivoire

Variable	Dummy	1985			1988		
		Observations as a percentage of total population	Poor (%)	Non-poor (%)	Observations as a percentage of total population	Poor (%)	Non-poor (%)
Region	**Dreg** Urban areas=1 Rural areas=0	 42.05 57.95	 69.07 84.21	 30.93 15.79	 46.43 53.57	 60.55 78.27	 39.45 21.73
Gender of Household head	**Dsex** Male=1 Female=0	 48.34 51.66	 78.1 77.6	 21.9 22.4	 48.7 51.3	 69.96 70.12	 30.04 29.88
Current Nationality Of head	**Nat** Ivorian=1 Non- Ivorian=0	 86.22 13.78	 76.29 87.57	 23.71 12.43	 86.55 13.45	 69.2 75.44	 30.8 24.56
Marital status of head	**Mar** Married=1 Not married=0	 29.16 70.84	 79.65 77.1	 20.35 22.9	 30.65 69.35	 73.75 98.4	 26.25 31.6
Main Occupation Of mother of Household	**Mocc** Agriculture/fishing=1 Others=0	 29.16 70.33	 81.5 76.3	 18.5 23.7	 36.11 63.89	 74.02 67.79	 25.98 32.21
Main Occupation Of father of Household	**Focc** Agriculture/fishing=1 Others=0	 42.07 57.93	 79.9 76.34	 20.1 23.66	 42.41 57.59	 74.1 67.06	 25.9 32.94
Highest diploma attained	**Diploma** Diploma=1 No Diploma	 72.1 27.9	 78.21 76.34	 21.79 23.11	 70.11 29.89	 71.85 65.8	 28.15 34.2
Ever Attended School	Sch						

	Yes=1 No=0	44.02 55.98	73.28 81.43	26.72 18.57	46 54	61.82 77.06	38.18 22.94
Self Employed in Agriculture in the past 12 months	**Selagly** Yes=1 (Self employed) No=0 (Not employed)	8.75 91.25	84.93 77.16	15.07 77.16	5.92 94.08	72.99 64.48	27.01 35.52
Type of industry worked in the past 12 months by head of household	**Indmy** Agriculture: Agricultural production (food & export crops), livestock farming, logging and forestry, fishing & hunting = 1 Others = 0	60.58 39.42	83.11 69.73	16.89 30.27	55.19 44.81	78.11 60.11	21.89 39.89

As shown in Tables 1 & 2, the percentage of poor households has dropped between 1985 and 1988 across all the characteristics chosen. The percentage of non-poor has also increased. For example, in the urban area, the percentage poor is 69.07 in 1985 but it dropped to 60.55. In the same period, the percentage of non-poor rose from 30.93 to 39.45. Similarly, in the rural area, the percentage poor reduced (from 84.21% to 78.27%) and the percentage non-poor surged from 15.79 to 21.73.

Empirical Results

Results from the logit regressions

The logit results for both models (1985 & 1988) are reported in Tables 4 to 5.

The expected signs of the relationship between the likelihood of poverty and gender of household head if male (Dsex), marital status of head if married (Mar) and occupation of mother of household head if employed in agriculture/fishing (Mocc) differ from what is explained in expected. The positive coefficient on Dsex means that the probability of being poor is positively related with being a male household head. The hypothesis that the coefficient on household head being male (if Dsex = 1) is zero will be accepted at both 5% and 1% significance level*. This buttresses the buttresses the findings of Groothaert, Kanbur and Gi-taik Oh (1995) that households with female heads did not fare worse than others. It further contradicts their findings that being non-Ivorian is associated with welfare improvement. The conclusion of this dissertation is that being an Ivorian is associated with less likelihood of poverty.

* **The critical values of z at 5% and 1% significance are 1.645 and 2.326 respectively.**

Table 4. Logit estimates for the determinants of poverty for the period 1985 (Adjustment period)

Prpoor85	Coefficient	Standard error	Z	P >|z|	95% Conf. Interval	
Dreg	-0.7351729	0.2128151	-3.455	0.001	-1.152283	-0.318063
Dsex	0.0621724	0.1232174	0.505	0.614	-0.1793222	0.303681
Nat	-1.19909	0.2283945	-5.250	0.000	-1.646735	-0.7514449
Mar	0.2730593	0.1949875	1.400	0.161	-0.1091092	0.6552278
Age	-0.0369251	0.0138484	-2.666	0.008	-0.0640674	-0.0097828
Age^2	0.0005614	0.0001933	2.905	0.004	0.0001827	0.0009402
Mocc	-0.1132711	0.1808258	-0.626	0.531	-0.4676832	0.241141
Focc	0.2525109	0.1650463	1.530	0.126	-0.0709739	0.5759958
Diploma	-0.8397308	0.161986	-5.184	0.000	-1.157218	-0.5222441
Sch	-0.5111884	0.1616188	-3.163	0.002	-0.8279553	-0.1944214
Expfl	-0.0000102	5.35e-06	-1.913	0.056	-0.0000207	2.54e-07
Costmed	-0.00004	8.74e-06	-4.579	0.000	-0.0000571	-0.0000229
Selagly	0.257693	0.2781578	0.926	0.354	-0.2874862	0.8028722
Indmy	0.6541856	0.2063144	3.171	0.002	0.2498168	1.058554
Nh	0.1468265	0.0060016	24.464	0.000	0.1350635	0.1585895
Contant	-0.1326467	0.3574774	-0.371	0.711	-0.8332895	0.5679961
Number of obs = 2902				Chi2(15) = 1578.01		
				Prob > chi2 = 0.0000		
Log Likelihood = -858.63137				Pseudo R2 = 0.4789		

Table 5. Logit estimates for the determinants of poverty for the period 1988 (Non-adjustment period)

Prpoor88	Coefficient	Standard error	Z	P> |z|	[95% Conf. Interval	
Dreg	-1.515861	0.5717743	-2.651	0.008	-2.636518	-0.3952043
Dsex	0.1057709	0.4236206	0.250	0.803	-0.7245102	0.936052
Nat	-0.5744336	0.7783733	-0738	0.461	-2.100017	0.9511501
Mar	0.7995189	0.7706739	1.037	0.300	-0.7109743	2.310012
Age	0.004155	0.0500988	0.083	0.934	-0.0940369	0.1.23469
Age^{2}*	0.0001982	0.0007992	0.248	0.804	-0.0013683	0.0017646
Mocc	0.8117367	0.6193206	1.311	0.190	-0.4021093	2.0.25583
Focc	-0.2825164	0.5992212	-0.471	0.637	-1.456968	0.8919355
Diploma	-0.6083035	0.5248525	-1.159	0.246	-1.636995	0.4203885
Sch	-0.632164	0.6223931	-1.016	0.310	-1.852032	0.5877041
Expfl	-0.0000107	0.0000446	-0.239	0.811	-0.000098	0.0000767
Costmed	-0.0001141	0.0000458	-2.492	0.013	-0.0002038	-0.0000243
Selagly	0.4702535	1.457649	0.323	0.747	-2.386685	3.327192
Indmy	1.042053	0.5808976	1.794	0.073	-0.0964856	2.180591
Nh	0.5428398	0.0696384	7.795	0.000	0.406351	0.6793286
Contant	-1.765531	1.184359	-1.491	0.136	-4.086832	0.5557693
Numbers of obs = 251				Chi2(15) = 187.68		
				Prob > Chi2 = 0.0000		
Log likelihood = -78.220243				Pseudo R2 = 0.5454		

The positive sign on marital status (Mar) means that the likelihood of being poor increases with being married. The parameters Dsex, Mar, Mocc Selagly and Focc are insignificant at 95% and 99% confidence intervals. At 95% confidence interval, region of residence, current nationally, age, age squared, having a diploma, ever attend school, cost of medicine, expenditure on food and lodging, type of industry worked in the past 12 months and household size are significant. At 99% confidence interval, region of residence, current nationally, age, age squared, having a diploma, ever attended school, cost of medicine and expenditure on food and lodging, type of industry worked in the past 12 months and household size are significant. The conclusion about the effect of living in rural or urban area on poverty is in line with the findings of Grootaert and Kanbur (1995). The conclusion of the dissertation is that the probability of poverty is inversely related with living in an urban area and the reverse is true for the case of a rural resident.

The χ^2 is jointly testing that all the parameters of the model except the constant term equal to zero. This hypothesis is rejected at 5% and 1% significance levels respectively. The Pseudo $-R^2$ measures the performance of the model. It is a measure of goodness of fit.

The variables gender of household head (Dsex), marital status (Mar), age of head (Age) and occupation of father of head (Focc) carry signs different from expected. The interpretation of the positive sign of the coefficient on Dsex means that the likelihood of poverty increases with being a male household head. The hypothesis that the coefficient on Dsex is zero will be accepted at both 5% and 1% significance level due to a very low z –value of 0.25. The same conclusion can be drawn as before. That is, gender has no effect on the likelihood of poverty.

The positive coefficient on marital status, means that the likelihood of being poor increases with being married. This is the same as the 1985 model. The effect of age of head on the probability of poverty is positive here. This confirms the fact that the relationship between the probability of being poor and age non-linear.

The model parameters Dsex, Nat, Mar, Age, Age^2, Mocc, Focc, Diploma, Sch, Expfl and Selagly are insignificant at 95% and 99% confidence intervals. At 99% confidence interval, Indmy is also insignificant. At 95% confidence interval, region of residence, cost of medicine, type of industry employed in the past 12months (Indmy) and household size variables are significant. At 99% confidence interval, region of residence cost of medicine and household size variables are significant.The use of the chi square test (χ^2) is to jointly test hypothesis that all the parameters of the model except the constant term equal to zero. This hypothesis is rejected at 5% band 1% significance levels respectively. The Pseudo – R^2 value of 0.5454 showed that this model fits better than the previous model.

Results from 1985 showed the importance of investing in human capital accumulation to reduce poverty. This is evident in the signs of the variables diploma and Sch. This positive effect of having a Diploma on welfare is in contradiction with Grootaert, Kanbur and Gi-Taik Oh (1995) conclusion. They concluded that having a diploma reduces welfare. The conclusion of this dissertation is the same as that of Rodriguez and Smith (1994) on Costa Rica. Glewwe (1991) arrived at a similar conclusion on a study about Ivory Coast using CILLSS data. He concluded that higher levels of education for both men and women are strongly associated with higher levels of household welfare. Grootaert, Kanbur and Gi-Taik Oh (1995) in their findings on Ivory Coast stressed the strong effect of household size on poverty. They concluded that larger households suffered larger welfare decline and those experiencing increases in size were not able to compensate sufficiently to maintain welfare.

Adjustment, Non-Adjustment and Poverty

To capture the effects of structural adjustment programmes, one can look at the signs carried by cost of medicine and expenditure on food and lodging on children of household. These variables reflect expenditure of the household head on education and health. The

structural adjustment policy of subsidy removal is expected to hit the households hard but this is an understatement. Both logit models showed that the poverty has been poor falls as the expenditure on heath and education rises. Therefore, poverty has been reducing in both periods. The components of expenditure are significant at 5% significance level in 1988, it is only the cost of medicine that is significant at this level.

Conclusion and Recommendations

Structural adjustment programs implemented under the auspices of the world BANK and IMF is geared towards salvaging countries from a host of economic problems ranging from budget deficits, debt crisis, rampant civil service mismanagement to poverty. The results gathered from countries that had implemented structural adjustment programs differ. Some were successful while others saw it as policies that compounded the problems.

The issue of poverty and how policies will affect the direction of change of poverty are crucial and is usually ranked high on the government's preference scale. Studies showed that there is no one-way relationship between SAPs and poverty.

The main findings of the study using the Cote d'Ivoire Living Standard Survey (CILSS) data and a logit model, is that poverty has fallen and the drop is higher during adjustment period than during the non-adjustment period. It is observed poverty has a regional dimension. The likelihood of poverty is directly related with being a rural resident. Poverty, which is normally believed to be increasing among female household heads, is not true in the case of Ivory Coast. The effects of region, cost of medicine, household size and type of industry that the household head is working on the likelihood are very significant. The cost of medicine is inversely related with the likelihood of poverty and working in agriculture related activities increase with the probability of poverty.An increase in the cost of health and education does not increase poverty in both periods. Investment on human capital reflected by variables Diploma and sch seem to reduce the likelihood of poverty. Evidence gathered from the study led to following recommendations for alleviating poverty. Some of the recommendations are summarized below health.

Targeting social safety net to large households is justified by the findings. From the study, both the adjustment and the non-adjustment period showed the likelihood of poverty to be directly related with large households. Therefore, whether adjustment or non-adjustment, targeting poverty reducing policies at large households is very important.

The importance of government investing in human capital development is evident. The effect of attending school and getting a diploma on poverty reduction buttresses the role of human capital investment in development. Since poverty increases with the household head being self-employed in agriculture in the past 12 months or working in an agriculture-related industry in both periods, poverty alleviating policies should be targeted to the agricultural sector.

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Appendix

Explanation of Dummy Variables

Region of residence (Dreg)

Abidjan = 1, Other cities =2, East Forest = 3, West Forest = 4, Savanna = 5
1 + 2 = Urban (=1) and 3 + 4 + 5 = Rural (=0)

Current nationality of household head (Nat)

Ivorian = 1, Burkinabe = 2, Malian = 3, Guinean = 4, Ghanian = 5, Other African = 6, Other = 7.
2 + 3 + 4 + 5 + 6 + 7 = Other (=0)

Main occupation of father of household head (Focc)

Agriculture/Fishing = 1, Trade = 2, Transportation = 3, Technical/professional = 4, Government service secretaries = 5, Construction = 6, Handcraft = 7, Industry = 8, Service Industry = 9, Other (specify) = 10.

2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 = Other (=0)

Note: Same as Mocc

Highest diploma attained by household head (Diploma)

None = 0, CEPE or equivalent = 2, BECP or equivalent = 3, Baccalaureat = 4, Licence = 5, Masters = 6, Doctorate = 7, Technical or professional diploma = 8, Other = 9, Other (specify) = 10.

2 + 3 + 4 + 5 + 6 +7 + 8 + 9 = Diploma (=1)

None = No diploma (=0)

Ever attended school (Sch)

Yes (attended school) = 1,

No (never attended school) = 0

Self-employed in agriculture in the past 12 months (Selagly)

Yes (self-employed in agriculture) = 1,

No (not self-employed in agriculture) = 0

Type of industry in which household head is working (Indmy)

Agric. Production: food and export crops = 1, Livestock farming = 2, Logging and forestry = 3, Fishing and hunting = 4

1 + 2 + 3 + 4 = Agriculture (= 1)

Other = Non-agriculture (= 0)