Methodological Issues in Measuring the Impact of Sector-Level Policy Reform on Poverty*

by

Ravi Kanbur

Development Economics Research Centre
Department of Economics
University of Warwick
Coventry CV4 7AL
United Kingdom

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1. Introduction

The 1980s have ushered in a new era in development assistance. Whereas the previous three decades had seen major strides in the provision of assistance for major infrastructure and other projects, the present decade has seen a move towards non-project assistance. This is assistance which is tied not to use of physical and human inputs, but to the enactment of policy reforms. Of course, such assistance has to some extent been present in IMF operations, where quick disbursing loans are made conditional on performance criteria, and where the loans have to be repaid over a short period. But the major shift was undoubtedly heralded by the development of the World Bank's Structural Adjustment Loans facility. These loans are quick disbursing, conditional on policy reform and performance criteria, with a repayment period considerably longer than for the standard IMF agreement. Since the emergence of structural adjustment loans in the early 1980s, a number of other facilities have appeared, including sector adjustment loans (World Bank), structural adjustment facility and extended structural adjustment facility (IMF). Most recently, A.I.D.'s Development Fund for Africa has a significant component of non-project assistance - up to 20% without consultation with the Appropriations Committees and a further 10% with consultation.

It goes without saying that one of the major objects of development assistance is to make an appreciable dent in the poverty of the developing world. Of course opinions are divided on the best way to do this. The "trickle down" optimism of the 1950s was gradually replaced in the 1960s and 1970s with a view that projects should have a "poverty focus" i.e. that poverty impacts should be an integral part of project analysis and design. Despite a swing back of opinion in the 1980s, it would perhaps be a fair characterisation to say that the poverty consequences of projects are amongst the factors that are now more or less routinely taken into account in many project documents.

This raises the natural question - should the same be the case for non-project assistance? And, if so, how exactly is this to be done? It has to be said that in the first flush of structural adjustment loans and non-project assistance in the early 1980s, the poverty question was somewhat neglected (see Kanbur, 1988, for an analysis of structural adjustment loans to Côte d'Ivoire in the early to mid 1980s). It can be countered, of course, that to the extent that the reforms were growth oriented they were also oriented towards reducing poverty. But this is the same as the optimism of the 1950s concerning projects. By analogy, the trend now is very much to incorporate the poverty dimensions of sectoral reform and non-project assistance directly into the analysis, rather than relying on trickle down to do the job eventually.

If the trend identified above, and seemingly endorsed by all the major international agencies involved in development assistance, is indeed in place, then those previously charged with designing non-project assistance will have to acquire the techniques and tools of poverty analysis in the context of policy reform. The object of this paper is to provide a brief introduction and review of the major issues involved. Section 2 of the paper starts with the logic of non-project assistance - why is it necessary? It is argued that this must be because there are certain costs to policy reform - and if some of these costs are borne by the poor, there is a case for tracing and rectifying these impacts. Section 3 moves on from this to a discussion of issues in the quantification of poverty. Some of the conceptual issues are aired, but the focus is on arriving at practicable methods. Section 4 leads on to sectoral disaggregation of poverty, and its use in impact analysis. A simple model is presented which, despite its simplicity, allows one to use poverty profiles in identifying likely impacts. Section 5 illustrates this argument with three specific examples from Côte d'Ivoire, while Section 6 discusses more generally the data requirements. The recent World Bank initiative on data collection for the analysis of the social dimensions of adjustment is highlighted as a major factor on the scene over the next decade. Section 7 concludes the paper.

2. The Costs of Policy Reform and the Logic of Non-Project Assistance

At the outset, it should be recognised that any particular package of policy reform may have associated with it both project assistance and non-project assistance. However, from the analytical point of view we should start by considering these two aspects separately - to see whether there is indeed something in the logic of non-project assistance which makes it inherently different from project assistance. Let us begin by looking at project assistance.

Why Project Assistance? Suppose that a particular project has been identified in a developing country - by which is meant that the inputs required and the likely outputs have been identified and estimated to the best extent possible. If the commercial rate of return on such a project is sufficiently high, of course, the private sector should be willing to finance the project. While there are those who hold that the only projects that should be done are those that the private sector finds sufficiently profitable (a view which would, incidentally, question the role of national or multi-national development agencies), the current consensus does seem to be that there are some projects which are worth doing even though the commercial rate of return on them is not high enough to make them attractive to the private sector. There are two aspects to this counter to the complete free markets view. Firstly, the rate of return required by the private sector may be too high because of capital market imperfections. For example, the private sector may be nervous about financing projects with long gestation periods if its own time horizons are limited by the available futures markets. A multinational agency, it can be argued, is legitimately able to take a longer view. Secondly, it may be that the social rate of return to a project exceeds its commercial rate of return. For example, whether the incomes generated by a project go to the rich or to the poor is immaterial to a commercial rate of return calculation. However, the social rate of return is influenced by such factors. A multinational agency may well invest in a project with a high social rate of return.

For these reasons, then, project assistance for purchase of inputs into projects whose outputs are uncertain and accrue at distant dates, has a coherent logic which is reflected in the way projects are analysed and evaluated. In strict analytical terms, the inputs should be priced not at market prices but at "shadow prices" (Little and Mirrlees, 1974) that reflect market imperfections and social objectives. In practice, adjustment and qualifications are sometimes made as an adjunct to commercial rate of return calculations. The vast literature on theoretical and applied cost-benefit analysis speaks to these issues. However, a particular bone of contention between participants in the debate has been the extent to which sectoral or national policy imperfections should be taken into account in project appraisal. Little and Mirrlees (1969, 1974) argued that project appraisal should be done on the assumption that trade barriers and imperfections did not exist. Dasgupta, Sen and Marglin (1970) argued that this is to assume an environment that might ideally exist - not one which exists currently.

A simple illustration might prove helpful. Consider an agricultural project which will produce grain as output. How should this output be valued if the grain could be imported fairly cheaply, but whose domestic price is above the world price because of protection? Clearly, it matters which of these two valuation methods is used - the latter would put a much more favourable light on the project. Sen (1972) argues that if it is known that in fact the trade barriers will not be removed then this has to be taken as given. Little and Mirrlees (1974), in their famous injunction to use "border prices" argue that if free trade is the socially optimal policy then calculations should be done assuming this policy - at the very least the exercise would concentrate the mind wonderfully on the benefits of free trade!

While the logic of Sen's (1972) argument is incontrovertible, it is easy to see how the thrust for policy reform emerges quite naturally from the debates on project appraisal - it was felt by many that some projects looked good only because of bad

policies, and to support the project would be to condone and compound the effects of these policies. Hence policy reform.

Of course if policy reform is socially beneficial it should be considered irrespective of its implications for project assistance. But policy reform is different from projects in the sense that, in principle, all that is needed is to reform the policy - which requires no more input than the paper, pen and ink necessary for the signing of a Presidential Decree. Why, then, do we need special assistance for policy reform? Now, it is true that policy reform does need more than paper and ink: for example, reforms of tax rates may require greater administrative input (although in many cases the object of reform is to reduce the administrative burden). For this reason, project assistance may be tacked on to policy reform. But to insist upon this need for physical inputs is to miss the central point that the costs of policy reform are different from those of the physical inputs required for a project. To see this, one needs only to ask - if the policy reform in question is so good, why has the government not already undertaken the reform?

The answer is, of course, that the reform is costly in a precise sense - it hurts the groups whose welfare the government takes most account of. These costs may be long term, in the sense that beyond the transitional period the government's supporters will be made worse off. Or they may be short term, in the sense that although in the long term the government's supporters will benefit, the short term costs are too high to be acceptable to them. It might, however, be a safe generalisation to suppose that it is the short term costs (or benefits) that most exercise the minds of politically powerful groups. The logic of non-project assistance must include an element of overcoming these costs.

It may be that among the groups whose welfare the government takes account of are the poor. But it seems unlikely that all the poor everywhere will enjoy such influence. Some policy reforms may affect them adversely and, if multinational

agencies are sensitive to this, a second element of non-project assistance must consist of overcoming or mitigating these costs. Such a view is analogous to that for project assistance - rather than rely on the (hopefully) higher growth to do the job in the long run, the idea is to identify vulnerable groups and design reform accordingly.

To summarize, then, there is an analogy between project and non-project assistance. The "inputs" into policy reform are the short term costs borne by various socioeconomic groups. This is why non-project assistance is needed. The costs of policy reform should concern the international development agencies for two reasons - firstly, if they are borne by the politically powerful (in which case the reform process may not be sustainable); secondly, if they are borne by the poor (in which case the reform process may be sustained, but the benefits to the poor may not materialise for a considerable length of time). Whichever of these costs is considered paramount, the fact is that the existence of costs of reform is central to the logic of non-project assistance. Without them it is not clear why "assistance" is necessary at all. Given that they exist, it is important that we attempt to quantify these costs. The following sections of this paper focus on quantifying the poverty costs of policy reform.

3. Issues in the Quantification of Povery

Before the poverty costs of policy reform can be quantified, poverty itself has to be quantified. There is now a vast literature on the concept and measurement of poverty, and it would be inappropriate to provide a comprehensive review here. At the conceptual level there are many controversies - however, our object is to arrive at a method that is both practicable and reasonably acceptable.

In order to quantify poverty we require three building blocks:

(i) a distribution of some measure of the standard of living in a population,

(ii) a "poverty line" which distinguishes the "poor" from the "non-poor" and

(iii) a "poverty index" which aggregates information about the poor into a form that is manageable without doing undue violence to basic intuitions and value judgements about poverty.

3.1 The Standard of Living

What is the "standard of living" of an individual? There is no simple answer to this question, as indicated by the philosophical nature of some of the recent writings on this topic (e.g. Sen, 1983, 1987; Townsend, 1985). For our purposes, it suffices to restrict attention to the consumption of goods and services. For those goods and services traded in the market, the economic approach would be to go further and aggregate the quantities consumed by applying prices to arrive at a measure of the value of goods and services consumed. Goods that were produced for home consumption would be valued at their market prices and, if possible, the flow value of owned housing would be imputed.

The same approach could, in principle, be taken to publicly supplied services such as health and education. But imputing a flow value for these services for which no developed markets exist would be to strain one's faith in economic analysis. Any computation is bound to be controversial, depending as it does on an estimated "demand function" for these services. With this in mind, we would recommend that in practice the basic needs sectors of health, education and housing be treated separately from ordinary commodity consumption, and that poverty be thought of along the two dimensions of (i) consumption of private goods and services and (ii) access to basic needs and public services. We will focus on (i) in what follows; (ii) is taken up in Sections 4.5 and 5.

The above approach measures the standard of living through expenditure. An alternative is to attempt measurement through income, if such information is available. If measured correctly, then the "long run" value of income must equal the long run value of consumption (including bequests in the latter). However, as a matter of practice what we have is one (or at most two) "snapshots" in the form of household income-expenditure surveys. In such a situation the choice of one over the other is bound to be controversial. One view is that consumption measures the current standard of living and that is what is important. Another is that if high consumption is being sustained through dissaving, then to use current consumption as a measure of the sustainable standard of living is erroneous. To add to this controversy, Anand and Harris (1985) have argued that certain components of measured expenditure such as food expenditure may be better indicators of long run income (or long run expenditure) than either measured current income or measured current expenditure. However, Glewwe (1986) has contested this. Relatedly, there are certain deep questions as to whether the standard of living over different periods can indeed by averaged (Kanbur, 1987c). How would we respond to the proposition that an individual's poverty in one period be ignored because upon averaging over two periods, his expenditure turns out not to be quite so low?

We would argue that, in the context of the imperfect savings and capital markets one finds in Africa, the level of current expenditure is of significance in and of itself. Moreover, the income versus expenditure controversy is unlikely to be settled without the availability of a long run of panel data, and the question of whether any of the elements of expenditure is better is still controversial. In view of this, our recommendation would be that in practice total real expenditure be used as the indicator of the standard of living, perhaps supplemented by trying out food expenditure on its own.

The data that are typically available from household surveys allow us to construct more or less convincing measures of real expenditure at the household level. But our ultimate interest is presumably in individual living standards. The standard procedure is simply to calculate the per capita figure for each household and to allocate this expenditure for each of the individuals in the household. As might be imagined, this procedure in turn is not free of controversy, and there are two major objections to it.

Firstly, individual needs differ and the age-sex composition of a household will influence the adequacy of a given level of real expenditure at the household level. Thus, for example, if we compare two households each of four individuals and each with the same total expenditure, it must matter whether some of the individuals are children or not. However, while it is easy to make this criticism it is less easy to provide a solution to the problem, since it takes us into the vexed question of appropriate "adult equivalent scales" (see Deaton and Muellbauer, 1980). The estimations of such scales in based in turn on the estimation of consumer demand systems. Apart from inherent econometric difficulties in extracting such scales from the data, there is the question of whether such a time consuming effort is justified in a policy context. If it so happens (as for Sri Lanka) that there exist adult equivalent scales that command agreement, then they should of course be used. If this is not so,

then (i) such scales should not be "imported" from other countries (as Glewwe, 1986, does for Côte d'Ivoire) and (ii) it should be recognised that arriving at agreed scales may be a long process. In such circumstances, our recommendation would be to stick to the per capita real expenditure measure.

Secondly, even if adult equivalent scales could be calculated their use in translating household level expenditure into individual level expenditure assumes that, within the household, distribution is according to need. Many authors have questioned this assumption (e.g. Kynch and Sen, 1983) in connection with gender bias, while others (e.g. Deaton, 1987) seem not to have discovered such biases in the data. The basic problem that we face in identifying intra-household inequity is the lack of intra-household information on consumption. While future surveys might well focus on these issues (at great expense), the current run of surveys by and large collect expenditure data at the household level. While there are techniques for testing for intra-household discrimination using household level data, the translation of these results - and the results of other more specialised surveys -into an operational tool for arriving at individual standards of living is still some way off. In view of this, our recommendation is to continue using the per capita real expenditure measure. It should be emphasised that this is not to minimise the importance of the gender issue, but that as things stand it is best tackled using other information in a survey (e.g. hours of work and type of activities) rather than that of household expenditure.

3.2 The Poverty Line

Having arrived at a measure of the standard of living for each individual, we now have to specify a cut off that will distinguish those considered to be "poor" from those considered to be "non poor" - we cannot focus on poverty without a poverty line. But determining a poverty line, and deciding on how it might or might not change over time, is an issue fraught with controversy. A common enough approach is to start from what might be regarded as a basic intake of nutrition, as measured by calories

for example, and then go on to calculate the economic resources necessary to achieve this nutrition. Each of the steps in this approach is, however, controversial.

First of all, what is the minimum necessary nutritional intake? Despite the existence of WHO/FAO guidelines, there is no agreement among nutritionists on this (see the recent survey by Dasgupta and Ray, 1986). It depends on activity levels, height, weight and other more specific genotypical features. Given this, there is great resistance among some nutritionists in arriving at measures of malnutrition, for example, by comparing intake data with some average requirement for a socioeconomic group. Even if one overlooks the problem with using an average requirement, there is the further question of whether the body can adapt to low levels of intake in a manner that is not detrimental to health or productivity.

Going from a nutritional cut-off to a corresponding income cut off is also problematic for several reasons, not least of which is that since an individual has choice over the food bundle he buys, he may be opting for a low nutrition combination through ignorance or preference. Even if this is not a problem there is the problem of price variations within a country - the same nutritional bundle may cost more or less in some regions than in others, and if one is going to use a price index the weights must be related to the nutritional bundle and not general expenditure shares.

Even if one solves these problems there is the question of basic requirements for non-nutritional items such as clothing, or housing. Several approaches have been tried here. On the one hand, Orshansky (1965) simply grossed up the minimum expenditure for attaining nutritional adequacy by the average ratio of non-food to food expenditure in the whole population to arrive at an overall poverty line. In some cases (e.g. Altimir, 1979) an attempt is made to use the shares of the "poor" - but the circularity in this method is plain to see, since the object of the exercise is in fact to identify the poor. Another approach, going back to Rowntree (1901) is to specify a commodity bundle including food and non-food items which is considered as the basic

and all those unable to purchase the bundle are classified as poor.

The Rowntree approach bears some relation to Sen's (1987) concept of "capability", but it raises the question of how these basic items are to be decided. And do they change over time? If the definition of poverty is felt to be essentially a social question, it is not immediately clear who precisely is to give the answer. Atkinson (1969) in his work on the U.K. used the line he felt the government of the day was committed to. Even in countries where there isn't an "official poverty line, there is sometimes a line which has acquired this status through a concensus having been built up around it. The Orshansky line for the U.S. is one example. The Indian poverty line, which was agreed upon by a high level government committee and which has since been used by most analysts (the only updating being for inflation), is another example. Levels of minimum wages can sometimes be used since they embody, to some extent, social consensus.

Given the variety of approaches available, our recommendation would be twofold: (i) use a line that commands consensus and (ii) conduct sensitivity analysis around any line you choose. However, in many African countries poverty analysis is relatively recent, and no consensus has developed on what ought to constitute a poverty line. In these cases, our recommendation would be that, as a practical matter, choose a line which cuts off a specified proportion of the population below the poverty line. What proportion? This is open to debate and of course reflects lack of concensus. However, in Kanbur (1988) two poverty lines were chosen - one which cut off 30% of all individuals as poor and another cut off only 10% as poor. The latter was referred to as the "hard core" poverty line. Some results based on these are provided in Section 5, but it should be recognised that there is bound to be a degree of arbitrariness in specifying the poverty line. In an operational context, however, there is no choice but to bite this bullet - and to do sensitivity analysis.

3.3 The Poverty Index

Having chosen the measure of standard of living, and a critical level of this standard below which "poverty" begins, we now face the problem of summarising the information contained in this picture in a manageable form. When asked to report on poverty in a country, it is of course of little use to provide the policy maker with a list of incomes of all of the poor. A convenient summary measure that captures the essence of this information without doing violence to basic value judgements is what is required. This is the problem of finding the right "poverty index".

The simplest and most commonly used poverty index is the "poverty ratio" - the percentage of population below the poverty line. y_i represents the income (or expenditure, or whatever the right measure of the living standard is) of the i^{th} individual, and if these are ranked as follows

$$y_1 \leq y_2 \leq \ldots \leq y_q \leq z < y_{q+1} \leq \ldots \leq y_n \qquad (1)$$

where z is the poverty line, n the total number of individuals and q the number of poor individuals, then

$$P_0 = \frac{q}{n} \qquad (2)$$

is the so called poverty ratio (or "head count" ratio).

While easily understood and commonly used, the P_0 measure is open to a serious objection (see Sen, 1976). This is that it focusses purely on the numbers of the poor and ignores how poor the poor are. One measure which focusses on the latter is the "income" gap ratio:

$$I = \frac{z - \frac{1}{q}\sum_{i=1}^{q} y_i}{z} \qquad (3)$$

i.e. the proportionate shortfall of the average poor persons income below the poverty line. Of course, I ignores numbers in poverty. The obvious suggestion is to use a combination of (2) and (3) to give us

$$P_1 = P_0 I = \frac{1}{n}\sum_{i=1}^{q}\frac{z - y_i}{z} \qquad (4)$$

The measure P_1 is sensitive to the numbers of the poor and to the average depth of poverty. It is also related to the <u>minimum</u> financial transfer necessary to eliminate poverty:

$$\sum_{i=1}^{q}(z - y_i) = nzP_1 \qquad (5)$$

Clearly (5) is the minimum necessary to eradicate poverty because it assumes no leakages or other incentive effects.

While P_1 overcomes the problems of P_0 and I, it is clearly open to the objection that it does not evidence special concern about the very poor. Thus if a dollar was taken from the very poor and given to those just above them no change in P_1 would be registered whereas it might be argued that actually poverty should be seen as going up. This suggests the following family of measures:

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z-y_i}{z}\right)^\alpha \qquad (6)$$

Notice that when $\alpha = 1$, (6) collapses to (2) and that when $\alpha = 1$, (6) collapses to (4). Notice also that when $\alpha > 1$, special sensitivity is shown to the very poor in the sense that a dollar given to the very poor will reduce poverty by more than a dollar given to those slightly less poor (which is not the case when $\alpha = 1$). Higher and higher values of α show greater and greater concern for the poorest of the poor.

Which value of α should be chosen? This is a matter for value judgement and cannot be decided easily. However, as practical matter we would recommend that $\alpha = 0, 1, 2$ be tried always. The results in Section 5 show the difference that this choice can make. The beauty of the P_α family of measures, first put forward by Foster, Greer and Thorbecke (1984), is that they allow us to capture basic notions of poverty in a clear and operationally manageable way. While there are other indices of poverty in the literature, it is our view that the P_α family is likely to become the workhorse of the next generation of poverty studies.

4. Sectoral and Sub-Sectoral Disaggregation of Poverty, and its use in Impact Analysis

4.1 Poverty Decomposition and Poverty Profiles

Our focus in this paper is on the impact of sectoral reform on poverty. A basic requirement for such analysis is a profile of poverty disaggregated by sector or subsector. Only when we know the current patterns of poverty will we be in a position to gauge the impact of reform on poverty. It so happens that the P_α family of poverty indices is amenable to decomposition in a very straightforward and operationally convenient way. If we divide the population up into two mutually exclusive and exhaustive groups (sectors) with numbers n_1 and n_2, then Foster, Greer and Thorbecke (1984) show that

$$P_\alpha = \frac{n_1}{n} P_{\alpha,1} + \frac{n_2}{n} P_{\alpha,2} \qquad (7)$$

where $P_{\alpha,1}$ and $P_{\alpha,2}$ are the poverty indices in the two sectors separately. More generally, if we consider m sectors indexed j = 1,2,....n then

$$P_\alpha = \sum_{j=1}^{m} x_j P_{\alpha,j} \qquad (8)$$

where x_j is the proportion of total population in sector j. Thus the "contribution" of sector j to national poverty can be written as

$$C_j = \frac{x_j P_{\alpha,j}}{P_\alpha} \qquad (9)$$

An application of these decompositions to actual data from Côte d'Ivoire is presented in Section 5. We note here that the pattern of contributions can vary with the value of α - as α increases the sectors which begin to contribute more to national poverty are those where the depth of poverty is greatest. The disaggregation in (7) and (8) can be as detailed as the policy discussion requires and the data allows. In the case of Côte d'Ivoire, with around 1600 households in the sample, "small cell size" problems began emerging beyond a 5 sector disaggregation. To some extent, therefore, the sample size of the household survey being used as the data base can pose a restriction on the level of disaggregation at which policy reforms can be analysed - but this is bound to be the case. A discussion of data requirements and availability is to be found in Section 6.

Another problem with the use of these decomposable indices is that one has to assign an individual to one and only one sector. While this may be reasonable in the case of a short run regional disaggregation, for example, it becomes problematic when production sectors are being contemplated as defining the disaggregation. An individual may have several activities and multiple sources of income. Unless one goes to a full blown multivariate statistical analysis and thus abandons the notion of sectoral poverty profiles, this problem is bound to be with us. By judicious choice of sectors and careful classification of households we can do our best, and quite often do quite well, in defining the necessary disaggregations. For example, an obvious device is to classify as agricultural households those that earn a large fraction of their income from this sector, or to classify individuals on the basis of primary activity etc. The practicalities of this are reviewed in Section 5, but some element of overlap is bound to remain.

4.2 Targeting of Income Transfers

Before coming on to the central question of sectoral reform, let us address a question which, upon reflection, turns out to be closely related to our concerns. Towards which sectors should income growth be targeted? And which sectors should bear the burden of any income reduction that might be necessary? There might, of course, be no choice in the matter. But posing these questions, and attempting to answer them, proves useful.

What is the impact on national poverty if all incomes in a sector increase by a given amount Δ? And what is this reduction as a percentage of total resource outlay? It would not be appropriate to provide technical details in this paper, but it is shown in Kanbur (1986, 1987) that the change in poverty is approximately

$$dP_\alpha = -\Delta \frac{\alpha}{z} x_j P_{\alpha-1,j} \qquad (10)$$

since the resource outlay is $nx_j\Delta$, we have that

$$\frac{dP_\alpha}{nx_j\Delta} = -\frac{1}{n}\frac{\alpha}{z} P_{\alpha-1,j} \qquad (11)$$

Equation (10) has surprisingly strong implications. It says that if the ability to target is restricted only to targeting to sectors, then targeting priority should be established by ranking sectors according to their values of $P_{\alpha-1}$. Thus if national value judgements are such that $\alpha = 1$ then the targeting indicator is P_0 for each sector; if $\alpha = 2$ then the targeting indicator is P_1; and so on. Clearly, poverty profiles by sector for the P_α family of poverty indices turn out to be useful not simply as a description

of poverty - information in the very same poverty profiles can be put to use in developing a sector targeting ranking.

A slightly more complicated set of rules emerges if the economics of the underlying structure implies that each income in a sector increases by a multiplicative factor θ. Then, as shown in Kanbur (1986, 1987a),

$$dP_\alpha = - \theta \alpha x_j \left[P_{\alpha-1,j} - P_{\alpha,j} \right] \qquad (12)$$

$$\frac{dP_\alpha}{n \theta x_j \mu_j} = - \frac{1}{n} \cdot \frac{1}{\mu_j} \left[P_{\alpha-1,j} - P_{\alpha,j} \right] \qquad (13)$$

where μ is mean income of sector j. The targeting indicator is now related to $P_{\alpha-1}$ and P_α in each sector, and can be calculated directly from the poverty profile together with the extra information on group mean μ_j.

Yet more complex scenarios can be imagined, where the injection of resources into one sector leads to sectoral populations changing i.e. to x_j changing. These are discussed in detail in Kanbur (1987b). Suffice it to say that the poverty profile still remains relevant. It is the sectoral values of P_0, P_1, P_2 etc. which have to be combined to produce the relevant targeting indicators. The role of the poverty profile as a central tool of description and analysis is thus established.

4.3 Structural Adjustment Analysis : The Case of Sectoral Price Reform

Following Kanbur (1987b) we can view the basic macroeconomic problem facing developing countries in Africa as being a chronic excess of demand over supply, leading to inflationary pressures and unsustainable balance of payments deficits. The solution to the problem is in turn seen in terms of reducing demand or increasing supply. Aggregate demand policies with strict monetary targets are addressed to the former, while "structural" policies are addressed to the latter. It is recognised that supply side policies will take longer to come through, but in their absence the contraction in demand would have to be even more drastic.

Policies of "structural" adjustment, as the name implies, are geared towards altering the structure of the economy. Encouraging production for the international rather than the domestic market is one example of such a class of policies. However, another feature of many adjustment policies is that they use price reform as the major instrument i.e. they rely on price changes and the signals they provide in the relative profitability of different activities to induce the desired change in the composition of national income. Thus, for example, a devaluation is meant as a supply side policy to increase the profitability of producing export and import-competing goods i.e. the profitability of "tradeables" production. The resources for this extra production come of course from the other sectors, i.e. from "non-tradeables" production. In order to encourage the shift those engaged in the latter activities must be made relatively worse off - and absolutely so if the level of national income is fixed. This illustrates a general point that price reform that is designed to increase output in one sector must draw resources from somewhere else (at least in the short run). If this movement is to be in response to market incentives, some people must be made worse off (at least in the short run).

A simplified analysis can be provided for the case of two sectors (traded versus non-tradeable, exportable versus importable, food of one type versus food of another,

etc.) which produce output emplying two factors of production - say capital and labour. Suppose that the relative price between the two sectors is "distorted" and that the proposal is to increase the relative price of sector A and to correspondingly decrease the relative price of sector B. In the very short run, the profits of entrepreneurs in sector A will rise and those of entrepreneurs in sector B will fall. In the short run, as entrepreneurs in sector A compete for factors, factor prices in sector A will be bid up in this sector for both sectors (it being assumed that in the short run there is immobility of factors across the two sectors). In sector B, however, factor prices have to fall and if there is downward rigidity in these prices there may be some unemployment of factors initially (particularly labour). However, in the short to medium run factor prices will fall in this sector in response to the fall in factor demand.

But there is now a factor payments differential between the two sectors, and we would expect factors to migrate across the sectors, from B to A, in the medium to long run. Indeed, the increase in output of sector A to which this gives rise is the raison d'être of the original price reform policy. In theory, factor movement will continue till factor prices have been equalised. The impact on relative factor remuneration is governed by the conditions of the Stolper-Samuelson theorem in Trade Theory - the factor used most intensively in the production of A will benefit and that used most intensively in B will lose.

The poverty impacts of each of the four stages of the process described above can be followed through by constructing a relevant poverty profile - if the data so permits. Thus in the very short run profits of entrepreneurs in A benefit and those of entrepreneurs in B lose. According to (10), therefore, the net effect depends on the ranking of $P_{\alpha-1}$ among entrepreneurs in these two sectors. In the short run unemployment in sector B increases. If we imagine all those who become newly unemployed to end up having the same pattern of income distribution as the currently unemployed, the net effect depends upon the P_{α} amongst the employed

verus that amongst the unemployed. In the short to medium run (before factor mobility has taken place) all incomes in sector A increase and all incomes in Sector B decrease. Thus it is the overall $P_{\alpha-1}$ in the two sectors that should be compared in order to gauge the poverty impacts. Finally, in the medium to long run the factor used most intensively in sector A benefits at the expense of the other factor. Thus it is $P_{\alpha-1}$ of labour incomes versus capital incomes that is important.

There are two caveats to the above schema. Firstly, of one takes a "multiplicative" view of how group level income changes affect individual incomes in that sector, then the different rankings should use not $P_{\alpha-1}$ but $\frac{1}{\mu}\left[P_{\alpha-1} - P_{\alpha}\right]$. Secondly, in the final scenario if factor income is distributed differently in the two sectors then the factor movement effect should be added to the formulae (10) and (12), in the manner developed in Kanbur (1987b).

It should also be noted that the above scenario does not account for differing demand patterns and feed back effects from demand changes back to the price change. The latter can be handled methodologically by saying that the poverty analysis can proceed in terms of the eventual price change. The former is discussed by Knight (1976) and could be important, but it is not clear how it can be incorporated simply into analysis in an operational context. In order to do so we would require a full blown computable general equilibrium model of the variety discussed by Pyatt et al (1987) and Thorbecke and Berrian (1987).

4.4 Structural Adjustment Analysis : Food Subsidy Reform

Food subsidy reform (removal) is often a part of many adjustment packages. Analytically it tends to fall between the "demand" side and "supply" side policies because although the major motivation behind their removal is the budget deficit to which they give rise, they can be justified on "efficiency" grounds if food is being subsidised below its import price. In such a case, it can be argued from basic welfare economics that removing the subsidy removes a distortion and hence ("second best" considerations apart) must be efficiency enhancing.

The theory of food subsidy reform with the object of poverty alleviation has been developed by Besley and Kanbur (1988). Using the techniques of modern welfare economics, they have derived rules for gauging the poverty impact of subsidy removal from a commodity, and the P_α family of measures. When $\alpha = 1$ their results have a useful interpretation in terms of targeting commodities. They suggest that commodities should be ranked according to the fraction of national consumption of the commodity that is accounted for by the poor (not the fraction of poor consumption that is accounted for by the commodity). This ranking then allows us to make poverty sensitive choices, since the commodities with low values of this index provide the best bet for food subsidy reduction - their incremental impact on poverty per unit of fiscal deficit reduction is smallest.

The above supposes that consumer prices can be managed independently of producer prices. In fact, in many countries the deficit arises because producer prices exceed consumer prices. In this situation, what information is necessary before judgement can be reached on whether producer prices should be reduced or consumer prices should be increased? We should of course be careful to compare like with like, and look for poverty impact per unit of fiscal deficit reduction. It is shown in Besley and Kanbur (1988) that if we focus on P_α with $\alpha = 1$ then the appropriate indicators to

compare are (i) what fraction of total net production of the commodity is accounted for by the poor and (ii) what fraction of total net consumption of the commodity is accounted for by the poor. Here, then, is another dimension of the poverty profile that is highlighted by the specific policy question. An application to Côte d'Ivoire is to be found in Section 5.

4.5 Structural Adjustment Analysis : Basic Needs and Public Expenditure Restructuring

It was argued in Section 3 that basic needs and public services such as education, health and housing are best dealt with separately from income/expenditure measures of poverty, although it is of considerable interest to see the extent to which basic needs achievements do or do not correlate with income poverty. However, in the context of structural adjustment basic needs are of special concern because a focus of many programs has been the reduction or restructuring of public expenditures in the basic needs areas.

In order to assess the likely impact, we need a poverty profile along the relevant dimension. Thus, depending on data availability, we need a quantification of the access of the poor to the primary, secondary and tertiary sub-sectors in both health and education. The more detailed the policy question, i.e. whether or not user charges should be introduced for particular health services in a particular region, the more specific the poverty profile needs to be. For this reason, it is difficult to specify in advance the relevant profile - although it should be noted that we cannot get very detailed disaggregations without running into the small cell size problem for most African data sets. On housing, similarly, a poverty profile related to rental housing (in particular, public rental housing) can shed light on government disengagement from that sector. An illustration of just this sort of an exercise is provided in the next section.

5. Some Illustrations

In this section we will attempt to illustrate how the framework developed in this paper can be applied by taking the specific case of Côte d'Ivoire. As is well known by now, the country has had a classic pattern of stabilization and structural adjustment in the 1980s. After a period of high growth and prudent financial management in the 1960s and early 1970s, the mid 1970s commodity price boom brought in a period of high government expenditure and demand outstripping supply. As the commodity boom turned into a commodity slump in the late 1970s, the country borrowed heavily to maintain expenditures, but by 1980 drastic action was needed. In concert with IMF programs, the country entered into three structural adjustment loan (SAL) agreements with the World Bank, in 1981, 1983 and 1986. As is argued in detail in Kanbur (1988), these SALs have become progressively more specific and supply side oriented. In the early phase the measures taken essentially reinforced the demand contraction measures. However, by the mid 1980s the general thrust of the measures was clear, and it followed the lines discussed in Section 4. There was a general attempt to encourage production for export - specifically, real prices for export cash crops were increased. Within certain sectors, there was an attempt to reduce or eliminate price distortions. Thus a policy of harmonisation of rates of protection in industry was launched in the second SAL, as well as a policy of elimination of distortions in the rice market ("international prices will increasingly be taken into account in setting prices for rice, wheat flour and other products traded abroad, while ensuring that any resulting price increases do not have excessive repercussions on the purchasing power of Ivorian consumers"). On basic needs, there is little in the SALs on education and health, but in SALII there was a major committment to disengage from the housing sector ("the needs of the urban population exceed in effect the resources that the State can make available to the public sector for housing programs").

It is of course not an easy matter to go from these statements on paper to what

actually happened in practice. The housing reforms have in fact been carried out, the harmonisation of rates of protection is under way and rice reform is still on the agenda. In fact this illustrates a major difficulty in doing an ex post evaluation of the impact of different policies - the policy on paper can be very different from the policy as implemented. Another problem is that it is not easy to disentangle the effects of a specific policy from the effects of exogenous changes or other policy changes over a specific period. This requires a complicated modelling exercise which it is not our intention to enter into here. Rather, the object of this section is to illustrate how a poverty profile can throw light on specific policy proposals. We will take three examples based on Côte d'Ivoire : (i) raising export cash crop prices, (ii) rice price reform and (iii) housing policy reform, drawing on Kanbur (1988).

5.1 General Aspects of Poverty in Côte d'Ivoire

The data on which the Côte d'Ivoire analysis is based are described in greater detail in Section 6 and in Kanbur (1988). We need only note here that they allow us to construct a measure of real expenditure per capita at the household level and to use this to construct a poverty profile for 1985 - the year of the Côte d'Ivoire Living Standards Survey. The overall mean per capita expenditure as revealed by the survey was 202,800 CFA per annum. 30% of all Ivorians lived on a per capita expenditure of less than 96,560 CFA per annum, and this was chosen as the basic poverty line. Sensitivity analysis was conducted using a "hard core" poverty line of 53,000 CFA per annum, which cut off 10% of all Ivorians. The details of the sensitivity analysis are to be found in Kanbur (1988) - here we will focus only on the basic poverty line.

Table 1 summarises the regional decomposition of the P_α class of poverty measures. The country has been divided into five regions - Abidjan, Other Urban, West Forest, East Forest and Savannah. These divides have significance in terms of the policy debates within the country. It will be recalled that P_0 is simply the poverty ratio -

the fraction of individuals below the poverty line. The first column of Table 1 shows the enormous differences between Abidjan and Savannah. The incidence of poverty in Abidjan is 5.2% while that in Savannah is 61.3% - a factor of 12. But the regional ranking between other urban, West Forest and East Forest is also of interest. The second column in Table 1 shows the contribution to the national P_0 of 30%. This requires us to use the proportion of national population (poor and non-poor) living in a region (this is not shown in the Table). Using this we see that the ranking of contributions is pretty much the same as that for the index itself. However, as α increases, i.e. as we go from P_0 to P_1 to P_2, the contribution of the Savannah increases from 38.9% to 51.1%. This is a sure indication that not only is the incidence of poverty in this region severe, but so is its depth - recall that higher values of α give greater weight to the poorest of the poor.

It will be recalled from Section 4 that the targeting indicators for the objective of minimising P_α is to rank regions by $P_{\alpha-1}$. It follows that the poverty profile in Table 1 also provides this targeting information. When $\alpha = 1$ we use the ranking of P_0, when $\alpha = 2$ we use the ranking of P_1, when $\alpha = 3$ we use the ranking of P_2. On these criteria, income growth in Savannah dominates as the most effective way of reducing poverty. More complicated targeting indicators can also be calculated, but the position of Savannah remains unchanged - see Kanbur (1988).

TABLE 1 : Decomposition of the P_α Class of Poverty Measures by Region

	P_0 Value	Contribution to National Poverty (%)	P_1 Value	Contribution to National Poverty (%)	P_2 Value	Contribution to National Poverty (%)
Abidjan	0.052	3.3	0.010	1.9	0.003	1.2
Other Urban	0.129	9.7	0.029	6.4	0.011	5.1
West Forest	0.211	10.6	0.059	8.7	0.124	7.3
East Forest	0.456	37.5	0.151	36.6	0.070	35.3
Savannah	0.613	38.9	0.251	46.4	0.131	51.1
All	0.300	100.0	0.102	100.0	0.049	100.0

Source: Kanbur (1988)

5.2 Export Cash Crops Policy

As as made clear earlier in this section, a major plank of the structural adjustment policy in Côte d'Ivoire is the increased incentives to produce export crops. What are the likely impacts of this on poverty? In order to answer this question, a poverty profile was developed in Kanbur (1988) along the dimension of the type of productive sector in which a household was involved. Now, such a classification is bound to be problematic since households in general draw their income from multiple sources. However, one can nevertheless arrive at a classification which is useful, by judicious use of all the information available, even though it cannot be perfect. An attempt to develop such a classification, along dimensions consonant with Ivorian policy concerns, is described in detail in Kanbur (1988). The result is a five fold classification into export croppers (EXPC), food croppers (FODC), formal government sector (FORGOV), formal private sector (FORPRI) and informal sector (INFOR).

Table 2 presents the P_α decompositions for these five socio-economic groups for α = 0,1 and 2. It is seen immediately that export croppers are poorer than the average Ivorian, but that food crop farmers are even poorer than export crop farmers. In terms of targeting indicators ranking the five groups maintain the same pattern for P_0, P_1 and P_2 : FODC -> EXPC -> INFOR -> FORPRI -> FORGOV. The superior position of households whose major source of income is the government is taken up later on in this section. We note here that the claims of this sector for income growth are weak if the object is poverty alleviation. The policy of increases in export crop prices and hence increases in export cropper incomes is clearly justified in terms of the comparison with the three largely urban groupings of FORGOV, FORPRI and INFOR.

However, while rural sector feedback effects may in turn benefit food croppers, it is clear that they should be the object of special concern in terms of policies that increase their incomes directly.

TABLE 2 : Decomposition of the P_α Class of Poverty Measures by Socio Economic Group

	P_0		P_1		P_2	
	Value	Contribution (%)	Value	Contribution (%)	Value	Contribution (%)
EXPC	0.365	22.3	0.114	20.4	0.050	18.8
FODC	0.495	59.0	0.184	64.1	0.090	65.9
FORGOV	0.031	1.3	0.002	0.2	0.0002	0.1
FORPRI	0.061	1.9	0.009	0.8	0.003	0.6
INFOR	0.193	15.5	0.062	14.5	0.030	14.6
ALL	0.300	100.0	0.103	100.0	0.049	100.0

Thus the poverty profile as developed in Table is useful in informing the policy debate, but it may be thought to be too aggregative. In Kanbur (1988) the EXPC group is further broken up into its components - cocoa, coffee, rubber, cotton etc. A major feature which emerges is the high incidence of poverty among cotton farmers in the Savannah. Thus within the overall policy of increasing the price of export crops, there is a special case to be made out for cotton. However, disaggregation cannot be taken to finer and finer levels. At some stage the small cell size problem becomes dominant. This leads to questions of sample size and survey design, which are taken up in in Section 6.

5.3 Rice Price Policy

At the moment in Côte d'Ivoire the producer price and consumer price of rice differ from each other and from the world price. The consumer price of rice has tended to be subsidized for obvious reasons. On the producer side, one has to take into account not only the farmers but the middlemen. It has often been argued that producer price support is in effect a subsidy to the wealthy middlemen and that it is this subsidy which should be cut. While this is true, it is not clear whether, given the market structure, this loss will not simply be passed on by the middlemen to the farmers. In such a situation we have to weigh up the poverty costs of reducing support to consumers and producers.

Table 5 summarises some poverty characteristics of rice producers and rice consumers using the basic poverty line and the hard core poverty line. Rows 1 and 2 show that rice farmers tend to be poorer than the average Ivorian on either criterion. If we combine rows 1 and 3, and 2 and 4, we find that the ratio of land farmed by poor farmers to total land is 28.6% while the same ratio for the hard core poor is 6.4%. While ideally we would like to have the ratio of poor production to total production, these ratios may be adequate as a proxy. They are to be compared, according to the theory developed in Besley and Kanbur (1988) to the corresponding ratios in rows 5 and 6 - 8.7% of total rice consumption is accounted for by the poor, and only 1.3% is accounted for by the hard core poor. These figures come out very clearly in favour of protecting the producer price of rise in times of fiscal constraint.

To round off the discussion of rice, compare lines 6 and 7. Rice relative to food in general is seen to be very much a rich man's food. The case for subsidising rice relative to food in general is thus not strong.

TABLE 3 : Rice and Poverty

1. Incidence of Poverty Among Rice Farmers	35.7%
2. Incidence of Hard Core Poverty Among Rice Farmers	12.8%
3. Ratio of Mean Area of Poor to Mean Area of All	80.0%
4. Ratio of Mean Area of Hard Core Poor to Mean Area of All	50.0%
5. Ratio of Rice Consumption by Poor to Total Rice Consumption	8.7%
6. Ratio of Rice Consumption by Hard Core Poor to Total Rice Consumption	1.3%
7. Ratio of Food Consumption by Hard Core Poor to Total Food Consumption	3.0%

5.4 Housing

As in many developing countries, Côte d'Ivoire has had a policy of public intervention in housing - particularly public housing. This has consisted of government building housing and subsidising rents on publicly provided housing. One feature of Côte d'Ivoire is that only 25.6% of individuals live in rental accommodation. In the rural areas well over 90% of individuals live in non-rental accommodation. The exception is, not surprisingly, Abidjan where 68% live in rental accommodation of some sort. Row 7 of Table 4 shows that of the poor only 8.1% live in rental accommodation and Rows 2, 3 and 4 investigate the extent to which the poor rely on subsidised rental accommodation.

Row 2 of Table 4 shows that of those who rent, incidence of rental from public agencies is far higher among the non-poor than among the poor, while Row 4 establishes quite clearly the flow of subsidy to the non-poor. Of those for whom rent is paid for by someone else, for 80.5% the rent is paid by a Public Agency but none of these recipients is poor.

While it is always difficult to draw firm conclusions from a static picture as presented in Table 4, it does seem as though the Ivorian Government's policy of disengaging from the rental sector of housing is unlikely to have major effects on poverty. The poverty profile developed here in Table 4, and in much greater detail in Kanbur (1988) thus proves useful in informing the policy debate on the poverty consequences of restructuring public expenditure.

TABLE 4 : Rental Housing Characteristics by Poverty Group

		Poor	All
1.	Own House (%)	91.9	74.4
2.	Of those who rent, rental from Public Agency (%)	6.9	27.3
3.	Of those who rent, those for whom rent is paid by someone else (%)	6.9	12.8
4.	Of those for whom rent is paid by someone else, payment by Public Agency (%)	0.0	80.5

6. Data : Requirements and Prospects

The approach suggested here for analysing the impact of sector reform on poverty relies on the ability to construct policy relevant poverty profiles. As such, it cannot be implemented without the data to construct such profiles. It relies, therefore, on the availability of up to date household income and expenditure surveys which allow one not only to measure poverty of households but to classify them according to various types of activities. Also, it should allow us to quantify basic needs achievements.

An immediate reaction to this is that it is an impossible requirement - particularly in the African context. However, while this reaction would have had some substance a few years ago, it is less and less likely to reflect the reality of the years ahead. The data base for the illustration analysis from Côte d'Ivoire in Section 5 is the Côte d'Ivoire Living Standards Survey of 1985. This survey has been repeated every year since then, so that by next year there will be a run of four years of such data. Moreover, the World Bank has recently launched the Social Dimensions of Adjustment (SDA) project. The SDA Unit of the World Bank will be managing such surveys in an increasing number of African countries. The first year of survey activities are complete in Ghana and in Mauritania, and survey activities are to be launched soon in Gambia and Senegal. Overall, the SDA Unit has appraised these projects in eight countries : The Gambia, Guinea, Senegal, Ghana, Côte d'Ivoire, Mauritania, Madagascar and Zambia. In addition, the Unit has carried out identification missions in Zaire, Chad, Sudan, Mozambique, Malawi and Guinea-Bissau. As its report for 1988-1989 makes clear, up to 25 African countries have either already become participants or have made informal requests.

While for some of these countries survey activities are some way off, what is clear is that during the 1990s the usual comment on lack of good quality distributional data for Africa is likely to be less and less relevant. The Living Standards Survey (LSS)

instrument has now been tested in Côte d'Ivoire, Ghana and Mauritania and has shown its basic usefulness and effectiveness. While country specific modifications are bound to made, as well as general improvements in methodology, the basic structure of the survey is a good base on which to build.

The 1985 Côte d'Ivoire Living Standards Survey (CILSS) is based on a nationally representative sample of 1600 households. Since 1985 the survey has been repeated annually, with half of the households being replaced and the other half being interviewed again the following year. Thus poverty profiles could be extended to take in the dynamic or intertemporal dimension. A description of field work and data entry systems can be found in Ainsworth and Munoz (1986) and Grootaert (1986). The interviews are conducted in two rounds. After the first round the data are entered directly into a microcomputer which carries out various consistency checks. Inconsistencies can then be taken up when interviewers return for the second round. Given this structure, it is not surprising that data from CILSS are not only generally regarded as being of high quality, they also become available in timely fashion.

The questionnaire itself is divided into several sections including composition of the household, housing, education, health, activities, migration, farm and livestock, non-farm self employment, non-food expenditure, food expenditure and consumption of home produced food, fertility, other income and credit and savings. There is also a community level questionnaire which collects price information for key commodities, as well as information on community level infrastructure.

It is easy to see how such a comprehensive coverage helps the creation of detailed poverty profiles. Thus from the sections on expenditures we can construct a measure of nominal expenditure, and then use the prices from the community level questionnaire to allow for regional price variations so as to arrive at a real expenditure measure for each household. From the household roster the size and

composition of the household can be used to correct the total expenditure measure to a per capita basis. From this, poverty measures, such as the P_α family can be calculated. For decomposition, the regional dimension can be used from the household identification number or the activities dimension can be used from the several sections on activities. Net production and net consumption of a particular commodity (such as rice) amongst poor and non-poor can also be easily calculated.

The education, health and housing modules collect information that can be used to construct basic needs achievements indicators. The extent of public support for the housing of the poor, or the extent of tertiary sector usage by the poor in health and education, can be quantified (as was done in Kanbur, 1988).

7. Conclusion

The object of this paper has been to provide brief review of the methodological literature on poverty analysis, and to begin developing a framework within which the results of this literature can be brought to bear on measuring the impact of sector-level policy reform on poverty. The paper began by arguing that the very logic of non-project assistance implies the existence of costs in policy reform. If the international agency providing this assistance sees itself as essentially mitigating these costs through assistance, then the costs have to be quantified. If the special focus is on poverty costs, then a prerequisite is the quantification of the extent and pattern of poverty in the country. In particular, we have emphasised the construction of policy relevant poverty profiles as an important step.

While even a few years ago the data for this task would simply not have been available in most of Sub-Saharan Africa, the situation is changing very rapidly. Through the World Bank's Social Dimensions of Adjustment project, as many as 25 countries in this region are likely to initiate household income and expenditure surveys during the 1990s. This paper has provided an illustration of what can be done with the sort of data that is likely to become widely available in Africa over the next decade.

Quantification of costs is important, but it is of course only one step in the process. The next step is to design programs that utilise non-project assistance in a way that the poverty costs are mitigated. But how is this to be done in a way that does not undermine the reforms in the first place? How is compensation to be targeted to the poor - and is such targeting feasible? This is, of course, a topic for a separate paper on its own.

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