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Miguel Pardo Székely

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EXPLAINING CHANGES IN POVERTY: SOME METHODOLOGY AND ITS APPLICATION TO MEXICO

Miguel Székely*
CEE, EL Colegio de México
St. Antony's College, Oxford

Abstract: This work suggests a methodology for generating information about what causes a change in poverty. The central argument developed, is that by using standard poverty measurement techniques and classifying the population into subgroups, it is possible to decompose a change in poverty into the effect of: economic growth, population shifts across subgroups, income redistributions between groups, within-group redistributions, and a residual. We claim that our decomposition generates information analogous to the R^2 in regression analysis, although by avoiding the complications and large data requirements inherent in econometric estimations. We apply the method to data from Mexico, for which we generate the first consistent poverty estimates for the whole 1950-1992 period, and show that the ways in which economic development has affected the poor, do not coincide with what theory predicts.

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Introduction

The first years of the 1990s have seen a revival in the interest on the relationship between economic growth, inequality and poverty, and on the ways in which the benefits of development are shared among a population[1]. One of the main reasons for this renewed interest is that it has been recognized in several empirical studies[2] that despite the positive growth rates registered for long periods of time, poverty in the developing world and even in some developed countries, has not decreased consistently as expected. The topic has become even more relevant since the widespread implementation of economic liberalization and macroeconomic stabilization programmes, as these measures usually involve intensive resource reallocation processes that might affect the poor negatively, even in the context of positive growth.

One of the issues that arise when exploring the relationship between poverty, inequality and economic growth, is that it is quite difficult to disentangle the transmission mechanisms involved in a change in poverty, which in turn makes it difficult to determine if the specific development pattern followed by a country, is generating costs or benefits for the poor. Furthermore, although throughout the literature some ways of exploring the cause of a change in poverty have already been suggested, they either constitute rather limited tools for policy evaluation and design, or impose large data requirements that limit their applicability.

The purpose of this work, is to find ways of extracting additional information from standard poverty measurement techniques, to improve the understanding of what causes a change in poverty. The central theoretical argument we develop, is that by classifying the population into subgroups according to certain identifiable characteristic, it is possible to decompose a change in poverty into the effect of: (i) economic growth, (ii) population shifts

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[1] Some recent examples are the works by Datt and Ravallion (1992), Galor and Zeira (1993), Kakwani (1993), Persson and Tabellini (1994), Alesina and Rodrik (1994), and Ravallion (1995).

[2] Lipton and Ravallion (1995) provide a survey of some of the main works on the subject.

across subgroups, (iii) income redistributions between groups, (iv) within-group redistributions, and (v) a residual. By these means, we claim that the effects of specific policies and external shocks can be traced down to each of the above components, and that this considerably simplifies the task of explaining the change.

Apart from developing some methodology, we will illustrate its usefulness by using data from Mexico. This country offers a rather uncommon advantage for explaining changes in poverty in the long run, as a series of nine household surveys spanning over 42 years (from 1950 to 1992) is available. An additional element of interest is that by using this data, we generate the first consistent series of poverty estimates for the country for the whole period.

The work consists of three sections. Section I engages in the discussion of how to identify the causes of a change in poverty from the theoretical stand point. Section II adds to the discussion of the relation between growth, inequality and poverty, by applying the method to Mexican data. Section III draws the conclusions.

I. Explaining Changes in Poverty

During the past 20 years, the literature concerned with the measurement of poverty has evolved significantly, and a large number of poverty indexes have been suggested[3]. Even though most of the indexes are helpful for quantifying the magnitude of a change in poverty through time, one of the issues that arises in their application is that they constitute rather limited tools when searching for the causes of such a change. In this section we intend to show that it is possible to extract additional information from some of the indexes, and that this may help to understand the nature of a change in poverty.

Before engaging into the discussion it must first be said that broadly speaking, poverty in any population depends on the amount of resources available in the economy, and on the ways in which such resources are distributed. Thus, in general terms any poverty index P, can be expressed in the following generic form:

$$P = P[z,\mu^*,L^*] \tag{1}$$

where z is the poverty line, L^* represents the parameters that fully describe the characteristic Lorenz curve of a population (which includes the relevant information about the distribution of resources), and μ^* is the average value of the variable chosen as welfare indicator (which we can call income for simplification purposes).

From all the indexes included in P, we will follow the literature and restrict our attention to the widely used family of "distributionary-sensitive" poverty indexes suggested by Foster et.al. (1984) (denoted P_α), which have several desirable properties that have enhanced their usefulness in applied work[4]. These indexes can be expressed as:

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[3] Atkinson (1987) and Ravallion (1994) provide a list of the most common measures.

[4] One of the most attractive properties of the P_α family is that it includes the headcount ratio H (the proportion of poor in a population) and the poverty gap HI (the average distance from the incomes of the poor to the poverty line (I) weighted by H) as special cases when $\alpha=0$ and $\alpha=1$ respectively, and that they allow to incorporate information on the distribution of income among the poor by setting $\alpha=2$.

(2)
$$P_\alpha = \frac{1}{N}\sum_{i=1}^{n}\left(\frac{z - y_i}{z}\right)^\alpha \qquad \text{for all } y_i<z$$

where N is the size of the population, n is the number of poor, y_i represents the income level of individual i for all $y_i<z$, and α is a parameter indicating the relative importance attached to the incomes of the poorest of the poor.

1.2 Standard Approaches to Tackle the Problem

Through out the literature on the measurement of poverty, it is possible to identify three different approaches to explore the causes of a change in P_α in more detail. The first of them focuses on the principle in (1) which shows that given the value of z, any change in P can be traced up to shifts in either L^* or μ^*. Datt and Ravallion (1992) and Kakwani (1993) have followed this approach, and have provided formulae to decompose a change in poverty into a growth and a redistribution component, that isolate the impact of changes in either μ^* or L^*, respectively, on P_α.

The second alternative has developed from the fact that, as proved by Foster and Shorrocks (1991), given some characteristic π (e.g. education, occupation, age, gender, geographic location, etc.), by which the population can be classified into subgroups, P_α can be expressed as:

(3)
$$P_\alpha = \sum_{j=1}^{k}\beta_j(\pi)P_{j,\alpha}[z,\mu_j(\pi),L_j(\pi)]$$

where $\beta_j(\pi)=N_j(\pi)/N$ is the population weight of sub-group j, $P_{j,\alpha}$ is the poverty level registered in sub-group j, μ_j and L_j represent the average income and inequality level within j, and k is the number of mutually exclusive subgroups defined by characteristic π. Thus, by classifying the population into subgroups, any change in overall poverty from this perspective can be traced up to shifts in either β_j or $P_{j,\alpha}$ (a "population shift effect" and a "poverty

effect", respectively)[5].

A third approach has consisted on using regression analysis to identify some of the causes of a change in poverty. This method uses the value of some of the members of the P_α indexes as endogenous variables, and then incorporates a series of indicators such as economic growth, infrastructure provision, income redistributions, sectoral growth, and a series of socioeconomic characteristics of the population, as explanatory variables[6].

Even though the first and second of the above approaches generate useful information for identifying the causes of a change in poverty through time, we will show that if they are applied independently as has been done in the literature, their potential as policy tools is limited. With regards to the third approach, we will argue that the combination of the two principles just mentioned can be used to generate a statistic analogous to the R^2 in regression analysis, although in this case it is obtained avoiding the complications and large data requirements inherent in the construction and testing of econometric models.

1.2 Combining the Two Approaches

As already explained, one of the most straight forward ways of analyzing the reasons why P_α changes, consists first on classifying the population into subgroups according to certain identifiable characteristic π, and then simply quantifying the effect that a shift in either β_j or $P_{j,\alpha}$ in equation (3), has had on P_α. This can be done by departing from the definition of a change in poverty from period t to period $t+g$:

(4)
$$P_{\alpha,(t+g)} - P_{\alpha,t} = \sum_{j=1}^{k} \beta_{j,(t+g)} P_{j,\alpha,(t+g)} - \sum_{j=1}^{k} \beta_{j,(t)} P_{j,\alpha,(t)}$$

[5] This approach has been followed by Huppi and Ravallion (1991), Ravallion and Huppi (1991), and Ravallion (1994).

[6] Some recent examples of this growing literature, are the works by Kakwani and Subbarao (1993) Ravallion and Datt (1995a), Ravallion and Datt (1995b), Ravallion (1995), and Datt and Ravallion (1995).

which after some manipulation can be expressed as:

$$(5) \qquad P_{\alpha,(t+g)} - P_{\alpha,t} = \sum_{j=1}^{k} P_{j,\alpha,(t+g)}(\beta_{j,(t+g)} - \beta_{j,(t)}) + \sum_{j=1}^{k} \beta_{j,(t)}(P_{j,\alpha,(t+g)} - P_{j,\alpha,(t)})$$

The first term on the right hand side of (5) represents the contribution of population shifts from one subgroup to another to the change in P_α, while the second includes the effect of changes in the poverty level within each j[7]. Although the formulae takes aggregation weights of different time periods for β_j and $P_{j,\alpha}$, these weights can be switched around with no implication but, as argued by Mokherjee and Shorrocks (1982) (who have applied a similar procedure to the decomposition of inequality by population subgroups), it is also appropriate to use the average between the base and final period. Thus, if we define $P^{+}_{j,\alpha} = (P_{j,\alpha,(t)} + P_{j,\alpha,(t+g)})/2$ and $\beta^{+}_{j} = (\beta_{j,(t)} + \beta_{j,(t+g)})/2$, we can express the change in total poverty as:

$$(6) \qquad \Delta P_\alpha = \sum_{j=1}^{k} P^{+}_{j,\alpha} \Delta\beta_j + \sum_{j=1}^{k} \beta^{+}_{j} \Delta P_{j,\alpha}$$

where *delta* denotes a change in time, and (6) yields an exact decomposition. By using the first term on the right hand side of (6) we can define:

$$(7) \qquad C_s(\pi) = \frac{\sum_{j=1}^{k} P^{+}_{j,\alpha} \Delta\beta_j}{P_{\alpha,(t)}}$$

which could be labeled the "population shift" effect on P_α. By computing the value of this

[7] In contrast to the procedure suggested by Ravallion and Huppi (1991), who address the same issue, equation (5) does not include a "joint effect" and thus, yields an exact decomposition.

statistic, we would obtain the proportion in which poverty would have been modified if the only change registered between t and $t+g$ were the population shifts observed among the subgroups. Similarly:

(8)
$$C_p(\pi) = \frac{\sum_{j=1}^{k} \beta^{+}_{j} \Delta P_{j,\alpha}}{P_{\alpha,t}}$$

would represent the "poverty" effect, which identifies the proportion in which P_α would have been modified if the only change between periods t and $t+g$ were those in the poverty index of the subgroups, while each of the β_j's remained unaltered. Therefore, given a change in poverty, equations (7) and (8) provide formulae to compute each of the C_s and C_p effects separately.

Although the information provided by (7) and (8) is useful, we should recall the fact that as indicated by equation (1), a change in poverty can also be caused either by redistributions of income, or by a change in the average income of the population; therefore, it seems that some additional information can still be extracted from the C_p term above. In order to do so, it would be necessary to determine the exact influence that changes in each of the L_j and μ_j terms, have on $P_{j,\alpha}$, and thus on P_α. Datt and Ravallion (1992) have already suggested a method to assess the impact of changes in either μ^* or L^*, on P_α that could be used for these purposes[8].

The methodology, by Datt and Ravallion (1992) consists of decomposing a change in P_α by:

(9)
$$P_{\alpha,(t+g)} - P_{\alpha,t} = G(t,t+g) + D(t,t+g) + E(t,t+g)$$

[8] Kakwani (1993) has also suggested a procedure based on the same principle. However, Kakwani's method is designed for cases in which information about the exact pattern of transfers by which the distribution of income changes, is unknown, while the one by Datt and Ravallion does incorporate information on the exact parameters of the Lorenz curve at different points in time, which makes it preferable.

where the first term on the right hand side of (9) can be called the "growth effect" (an indicator of the influence that economic growth has had on a change in poverty between periods t and $t+g$), and the second term can be called the "redistribution" component of a change in poverty (that isolates the impact of changes in income distribution on P_α). The last term is a residual.

The calculation of $G(t,t+g)$ in (9) consists on comparing the original poverty level $P_{\alpha,t}$) with the poverty that would have been observed if income distribution had remained constant, while average income changed between t and $t+g$ as it actually did. Thus, the value of this term can be obtained by estimating both, the original poverty level $P_\alpha(z,\mu^*_t,L^*_t)$, as well as the value of the poverty index by using the parameters in L^*_t, but evaluating the function at μ^*_{t+g} instead of at μ^*_t, which is expressed as $P^G_\alpha(z,\mu^*_{(t+g)},L^*_t)$. Therefore, $G(t,t+g)$ could be computed by:

(10)
$$G(t,t+g) = P^G_\alpha(z,\mu^*_{t+g},L^*_t) - P_\alpha(z,\mu^*_t,L^*_t)$$

where the second term in the right hand side of (10) is simply obtained through the application of equation (2), while the value of the first can be computed by using the formulae suggested by Datt and Ravallion (1992).

Similarly, the $D(t,t+g)$ term in (9) is obtained by comparing $P_{\alpha,t}$ with the value of the poverty index obtained if the mean income had remained constant between t and $t+g$, while the Lorenz curve shifted as it actually did. In other words, this component is computed by comparing $P_{\alpha,t}$ with the poverty index estimated by using μ^*_t, but evaluating the function at the parameters of L^*_{t+g} rather than of L^*_t, which can be represented as $P^D_\alpha(z,\mu^*_t,L^*_{(t+g)})$. Therefore, the distributionary component of a change in poverty is given by:

(11)
$$D(t,t+g) = P^D_\alpha(z,\mu^*_t,L^*_{t+g}) - P_\alpha(z,\mu^*_t,L^*_t)$$

where the value of the first term in (11) can also be obtained by applying the formulae

suggested by Datt and Ravallion. Regarding the residual, this component is calculated as the difference between the growth (redistribution) components evaluated at the terminal and initial Lorenz curves (mean incomes) respectively.

As poverty can also be expressed as a weighted sum of subgroup poverty indexes, we could use the above principle to decompose a change in poverty within each subgroup, into a growth and a redistribution component. Therefore, we can suggest a different way of expressing the C_p effect in equation (8), by rewriting it as:

$$(12) \qquad C_p(\pi) = \sum_{j=1}^{k} \frac{\beta^+_j}{P_{\alpha,t}} [G_j(\pi,t,t+g) + D_j(\pi,t,t+g) + E_j(\pi,t,t+g)]$$

where $G_j(\pi,t,t+g)$ would asses the effect of changes in the average income of j over $P_{j,\alpha,t}$, $D_j(\pi,t,t+g)$ includes the effect of changes in inequality within each subgroup over $P_{j,\alpha,t}$, and $E_j(\pi,t,t+g)$ is the residual. By using obvious notation, the first term in the right hand side of (12) would thus be computed by comparing the value of the observed $P_{j,\alpha,t}$ with the hypothetical $P^G_{j,\alpha}(z,\mu_{j,(t+g)},L_{j,t})$, while the second would be obtained by comparing $P_{j,\alpha,t}$ with $P^D_{j,\alpha}(z,\mu_{j,t},L_{j,(t+g)})$. Therefore, the combination of equations (6) and (12) implies that a change in P_α can be traced down either to population shifts, to changes in the average income of a subgroup, or to income redistributions within certain j.

1.3 Accounting for the "Within-Group" Effect

In principle, it could be thought that the weighted sum of the $D_j(\pi,t,t+g)$ terms in (12) would indicate the influence that a change in overall inequality, would have on P_α. However, as indicated by Cowell and Jenkins (1995), when a population is divided into subgroups, total inequality (I) arises not only from the weighted sum of the inequalities within each subgroup (the "within-group" component, denoted I_W), but also from the inequalities arising from the differences between the subgroup mean incomes (the "between-group" element of inequality, denoted I_B), in such a way that $I=I_W+I_B$. Given a partition π, the I_W component indicates the extent by which inequality would be reduced if the differences

/ithin the subgroups were eliminated, and it is interpreted as the amount of inequality that an be attributed to characteristics other than π. Similarly, the "between-group" component , indicates the extent by which inequality would decline if the differences between the mean ıcomes of the subgroups disappeared, and so it is interpreted as the amount of inequality accounted for" or "explained" by partition π.

In this context, it is evident that any shift in L^* that affects poverty, can be originated ither by a redistribution within or between the subgroups defined by π. Therefore, if by sing the $D_j(\pi,t,t+g)$ terms above we define:

(13) $$W(\pi,t,t+g) = \sum_{j=1}^{k} \beta^{*}_{j} D_j(\pi,t,t+g) = \sum_{j=1}^{k} \beta^{*}_{j} [P^{D}_{j,\alpha} - P_{j,\alpha,t}]$$

is clear that $W(\pi,t,t+g)$ in equation (13) would only incorporate the changes registered /ithin each j. In a similar fashion than the case of the I_W component of inequality, it could e argued that the $W(\pi,t,t+g)$ term in (13) is an indicator of the impact that redistributions f income within the subgroups, have on total poverty. We can therefore label it the "within-roup" component of a change in poverty, where $W(\pi,t,t+g)$ could be thought of as the mount of the change in P_α not associated with characteristic π.

Regarding the "between-group" element, the link with poverty is not as straight ɔrward, because in the case of inequality, any change in I_B is in fact an indicator of the xtent to which a change in the differences among the subgroups, affect I, while $G_j(\pi,t,t+g)$ ı (12), simply assesses the impact of a shift in a particular μ_j, on $P_{j,\alpha}$, regardless of the hanges in the rest of the subgroups. Thus, it seems that the straight forward application of ıe Datt and Ravallion methodology in this case does not allow for the direct identification f all the inequality effects included in L^*. We now turn to explore some ways in which ırther information on the influence of I_B on poverty, can be obtained.

1.4 Accounting for the Between-Group Effect

Given the interpretation attached to the I_B component of inequality, it could be said that any shift in I_B that affects I could be regarded as the extent to which a change in inequality is "explained" by characteristic π. In the context of the measurement of poverty, it seems obvious that any change in the differences among the mean incomes of the subgroups, would have implications for poverty given the relationship between μ_j and $P_{j,\alpha}$. Therefore, it could be argued that if it were possible to asses the contribution that a change in the differences among all the μ_j's had on total poverty, this would allow to determine the extent to which the partition π chosen to define the subgroups, can "explain" the change in P_α.

In this respect, it should be noted that using the $G_j(\pi,t,t+g)$ terms for this purposes would impose two problems. First, as it is, the term does not provide information about the differences between the subgroups, and secondly, it is not compatible with the principle in (9), as it does not allow to obtain the overall growth effect $G(\pi,t,t+g)$ directly. Therefore, it seems necessary to introduce other elements into the analysis.

This can be done first by looking at the $G(\pi,t,t+g)$ term in equation (12) which, as already mentioned, indicates the extent to which overall poverty would have changed between periods t and $t+g$, had total inequality (including the within and between group elements) remained constant while average income shifted. By including this concept, it could be said that if economic growth was in fact distributed in a neutral way among the population, average income in period $t+g$ would be calculated as:

(14)

$$\mu^*_{(t+g)} = \sum_{j=1}^{k} \beta_j \mu_j (1+\Delta\mu^*_t)$$

as μ^* results from a weighted sum of the subgroups means. Therefore, the principle in (14) would imply that if economic growth was distributed neutrally, the μ_j's of all the subgroups would change at the same rate, leaving the differences between the subgroups unaffected. This situation would actually arise if the mean income in the subsequent period for every subgroup, was in fact given by:

(15)
$$\mu^{h}_{j,(t+g)} = \mu_j(1+\Delta\mu^{*}_{t}) \qquad for\ all\ j$$

where $\mu^{h}_{j,(t+g)}$ represents the average income that would be observed in subgroup j in period $t+g$, had μ_j grown at the same rate than μ^{*}. From this it follows that in order to calculate the "neutral" effect when the population is divided into subgroups, we would need to compare the value of $P_{j,\alpha,t}$ with the poverty index for j estimated at the parameters of $L_{j,t}$, but evaluated at the hypothetical $\mu^{h}_{j,(t+g)}$ (which can be expressed as $P^{h}_{j,\alpha}(z,\mu^{h}_{j,(t+g)},L_{j,t})$), rather than at the actually observed $\mu_{j,(t+g)}$. In this case, the term $P^{h}_{j,\alpha}(z,\mu^{h}_{j,(t+g)},L_{j,t})$ would be given by:

(16)
$$P^{h}_{j,\alpha}(z,\mu^{h}_{j,(t+g)},L_{j,t}) = \frac{1}{N_j}\sum_{i=1}^{n_j}\left(\frac{z-[y_{i,j}(1+\Delta\mu^{*})]}{z}\right)^{\alpha} \qquad for\ all\ \ [y_{i,j}(1+\Delta\mu^{*})] < z$$

and thus, we could define:

(17)
$$H_j(\pi,t,t+g) = P^{h}_{j,\alpha}(z,\mu^{h}_{j,(t+g)},L_{j,t}) - P_{j,\alpha,t}(z,\mu_{j,t},L_{j,t})$$

where it can be verified that the weighted sum of the $H_j(\pi,t,t+g)$ terms, equals the $G(\pi,t,t+g)$ component in equation (9) (this is $G(\pi,t,t+g)=\Sigma\beta_j H_j(\pi,t,t+g)$). Thus, each of the $H_j(\pi,t,t+g)$'s provides information about the impact that distributionary neutral growth would have had over each subgroup j. In other words, it represents the extent to which each $P_{\alpha,j}$ would have changed, had income distribution within and between the subgroups defined by π remained unaffected, while overall average income shifted as it actually did.

Additionally, the principle in (16) is also useful for exploring the between-group effects involved, as it provides a benchmark for comparing the growth rates among the subgroups. Following this idea, we can now define:

(18)
$$B(\pi,t,t+g) = \sum_{j=1}^{k} \beta'_j B_j(\pi,t,t+g) = \sum_{j=1}^{k} \beta'_j [P^G_{j,\alpha}(z,\mu_{j,(t+g)},L_{j,t}) - P^h_{j,\alpha,}(z,\mu^h_{j,(t+g)},L_{j,t})]$$

where each of the $P^G_{j,\alpha}$ terms indicates the poverty level that would have been observed in period $t+g$, had the average income of j changed as it actually did, while the distribution of income within the subgroup remained unaltered. Therefore, each $B_j(\pi,t,t+g)$ provides information about the extent to which the poverty level in each subgroup would have been modified, had its the mean income changed as it actually did, and not as μ^*.

From this it follows that $B(\pi,t,t+g)$ could be interpreted as the "between-group" component of a change in poverty, or as the change in poverty associated with characteristic π, because it shows the extent to which changes in the differences between the subgroup means, affect the value of P_α. It should be noted that when the subgroups for which the rise in average income is largest (smallest), correspond to those with greater (lowest) μ_j's, $B(\pi,t,t+g)$ would quantify the effect of the expansion (or narrowing) of the gap between the subgroup mean incomes, on poverty.

By using (17) and (18), it can be verified that each $G_j(\pi,t,t+g)$ in (12) can be rewritten as:

(19)
$$G_j(\pi,t,t+g) = H_j(\pi,t,t+g) + B_j(\pi,t,t+g)$$

and by taking this definition and equation (13), it is easy to see that C_p in (12) could be computed by calculating:

(20)
$$C_p(\pi) = \sum_{j=1}^{k} \frac{\beta^*_j}{P_{\alpha,t}} [H_j(\pi,t,t+g) + B_j(\pi,t,t+g) + W_j(\pi,t,t+g) + E_j(\pi,t,t+g)]$$

1.5 An Alternative Approach

If from equation (20), we define:

$$
\begin{aligned}
C_H(\pi) &= \sum_{j=1}^{k} \frac{\beta^{+}_{j}}{P_{\alpha,t}} H_j(\pi,t,t+g) \\
C_B(\pi) &= \sum_{j=1}^{k} \frac{\beta^{+}_{j}}{P_{\alpha,t}} B_j(\pi,t,t+g) \\
C_W(\pi) &= \sum_{j=1}^{k} \frac{\beta^{+}_{j}}{P_{\alpha,t}} D_j(\pi,t,t+g) \\
C_E(\pi) &= \sum_{j=1}^{k} \frac{\beta^{+}_{j}}{P_{\alpha,t}} E_j(\pi,t,t+g)
\end{aligned}
\tag{21}
$$

hen, by using equations (6) and (7), we can suggest an alternative way of decomposing a change in poverty, as follows:

$$
\frac{\Delta P_{\alpha}}{P_{\alpha,t}} = \sum_{j=1}^{k} [C_s + C_H + C_B + C_W + C_E] \tag{22}
$$

which allows to identify the influence of population shifts (C_s) among subgroups, "pure" neutral growth (C_H), "between-group" effects (C_B), "within-group" redistributions (C_W), and a residual (C_E) (where $C_p = C_H + C_B + C_W + C_E$), on P_α. This equation therefore provides a method of decomposing changes in poverty by combining information on overall economic growth with that of changes in income distribution when the population is divided into subgroups. As compared to the method by Datt and Ravallion (1992), equation (22) allows to compute each of the $B_j(\pi,t,t+g)$ and $D_j(\pi,t,t+g)$ terms, which are not considered in their decomposition.

It should be noted that the C_W term will only be positive if the parameters of the Lorenz curve within a subgroup actually change, and will not be modified by any other variable, while C_B will only be equal to 0 when the inequalities among the subgroups between one period and another, remain unaltered. Additionally, it can be seen that if poverty changes

under a constant μ^*, the decomposition will allow to attribute the shift to C_W and/or C_B.

Regarding the advantages of this method as compared to other alternatives, it can be seen that as (22) encompasses the two standard approaches (described in Section 1.1) that focus exclusively on the principles either in equation (1) or (3), it is preferred[9]. With respect to regression analysis, it could be argued that while the method in (22) simply uses the decomposability property of poverty indexes and avoids the problems involved in econometric estimations, it still provides information that is analogous to the R^2 in regression analysis, as each of the C_S, C_H, C_W, and C_B statistics indicate the proportion of poverty that can be associated or "explained" by population shifts, economic growth, specific characteristics of the population, and changes in the distribution within each j, respectively. But perhaps its main advantage, is that the method does not require of large time series on household incomes to be operational, while econometric estimations are usually constrained by data availability[10].

Given the analogy between the C_H, C_W, and C_B components of a change in P_α, and the R^2 in regression analysis, it seems necessary to establish some criteria to determine the significance of each of these terms in different circumstances. Kakwani (1993) has suggested formulae to compute the standard errors of the P_α family of indexes, which can be used to establish the statistical significance of differences in poverty at different points in time. By recalling that each of the components of a change in poverty as defined by (22) is obtained by comparing the value of P_α with a hypothetical poverty index (namely P^H_α, P^D_α, and P^G_α, respectively), an obvious choice would be to use Kakwani's method to determine if each of the C_H, C_W, and C_B statistics is significantly different from the value of the original P_α. By this means, it could be argued that, given the choice of π, if the difference is (or is not) statistically significant, C_H, C_W, and C_B will (or will not) "explain" a statistically significant

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[9] Up to now, the only alternative that also allows to derive a "between-group" component of a change in poverty, is the method suggested by Kakwani (1993). However, it seems that decomposing the changes in poverty through equation (22) is more rigorous, because Kakwani does not incorporate information about the exact nature of a shift in the Lorenz curve. Besides, in order to make the procedure operational, Kakwani's method assumes that the within-group inequalities remain unchanged, rather than quantifying their effect.

[10] In this respect, Ravallion and Datt (1995b) suggest a model that can be used to test the incidence of economic growth, population shifts from one subgroup to another, and the sectoral composition of growth, on total poverty. Although the model proves useful for identifying some of main determinants of the changes in poverty through time, it can be applied to a very limited set of countries due to data availability, and as the authors argue, India seems to be about the only developing country for which estimation is possible.

roportion of the change in poverty.

By following the procedure in Kakwani (1993), the statistic t defined as:

(23)
$$t = \frac{P^{x}_{\alpha} - P_{\alpha}}{\sqrt{\frac{(P^{x}_{2\alpha} - [P^{x}_{\alpha}]^2) + (P_{2\alpha} - [P_{\alpha}]^2)}{M}}}$$

where P^{x}_{α} is substituted for P^{0}_{α} and P^{y}_{α} respectively in the case of C_H and C_W, while P^{x}_{α} and P^{y}_{α} are substituted by P^{G}_{j} and P^{0}_{α} in the case of C_B), can be used to test the null hypothesis hat the C_H, C_W, and C_B terms are statistically significant (M denotes the number of bservations in the sample).

he Choice of Characteristic

In practical terms, the degree to which the procedure suggested in (22) is useful will epend on the relevance of the characteristic chosen to classify the subgroups, as only ieaningful partitions will be able to provide a link between specific policy variables or xogenous shocks, and a change in poverty through time.

In principle, the problem of choosing π could be thought to consist on defining a road characteristic, and then specifying finer partitions in order to incorporate more xplanatory variables into the analysis, until the information available allows to do so. urthermore, most of the times, some of the characteristics that are available are highly orrelated among each other (e.g. the case of education and occupation or labour market atus), and thus, it will generally also be of interest to determine the joint "explanatory" ipacity of a set of correlated variables.

After a single characteristic or a group of them has been identified as a "cause" of change in poverty, the same decomposition in equation (22) can be applied to a specific ibgroup in order to "explain" each of the $C_{W,\alpha}$ terms further. This can be done by taking e population in subgroup j as an independent population and choosing a π (which has to e different to the one selected for classifying the subgroups in the first place), with which e change in $P_{j,\alpha}$ can also be decomposed into a between-group, within-group, neutral owth, and population shift component, respectively.

In order to illustrate the usefulness of the principle in equation (22), we will apply it to data from Mexico in the next section.

II. Application to Mexico 1950-1992

In light of the renewed interest on the long run relationship between growth, inequality, and poverty, one straight forward application of the methodology suggested above, would be to use the principle in equation (22) to examine the effects of specific development patterns on the standard of living of the poor.

In order to undertake this kind of analysis, we can follow most of the literature on the subject and focus on the well known "inverted U hypothesis" suggested by Kuznets (1955), who predicted that inequality would grow during the first stages of development, but decline consistently after a turn-point. The advantage of focusing on the so called Kuznets process, is that besides constituting the most popular theory for explaining long run distributionary trends, it involves some mechanisms that can be easily captured by applying the principle in equation (22). For instance, the hypothesis predicts that during the phase of industrialization, the population shifts from rural traditional activities towards urban modern ones - which can be related to the C_s term in (22) - will determine the changes in income distribution, as this will first cause an expansion of the gap between the rural and urban sectors of the economy (which would be captured by the C_B term in the decomposition) that will tend to be inequality increasing. Secondly, after the turn-point, the theory predicts that the migrations will tend to reduce the remunerations received by the enlarging urban sector while rising those received in the rural, which will tend to be inequality reducing due to the narrowing of the rural-urban gap (which will also be captured by C_B). Additionally, the Kuznets process implicitly assumes that the inequalities within the subgroups (related to C_W) remain unaltered through development.

Analyzing the changes in poverty under this framework is interesting, because up to the early 1980s, the evidence supporting the inverted U hypothesis produced by Adelman and Morris (1973), Ahluwalia (1976), Ahluwalia, et.al. (1979), and Chenery and Syrquin (1975), had in fact lead to the belief that poverty would decline unambiguously as a natural outcome

of the development process in the long run, as if a country was subject to decreasing inequalities and positive growth, this would guarantee some "spill over" effects as well as a reduction in the rural-urban gap, both of which would necessarily reduce poverty at some stage. However, recent empirical work has questioned the validity of such results, and has recognized that poverty has remained at high levels in a number of developing countries despite of long periods of growth[11]. This has even lead to serious doubts about the existence of the Kuznets process itself[12].

It has also been argued recently that even if the inverted *U* hypothesis was corroborated for a particular country, this would not necessarily guarantee a systematic improvement in the standard of living of the poor. Specifically, Anand and Kanbur (1985), Kakwani (1988), and Anand and Kanbur (1993a) have formalized the argument that although the between-group gap may be shrinking, the inequalities within the subgroups may rise, and that this may outweigh the effect of a closing urban-rural gap[13].

One interesting aspect of the above controversy, is that most of the evidence supporting the arguments in favor or against the inverted *U* hypothesis, has consisted of cross-section series of countries at different stages in the development process, but very few studies have actually followed poverty through time for a single country. The reason for this is that only few observations on poverty and inequality are usually available in developing countries, which makes it impossible to estimate a model econometrically.

Thus, from the methodological stand point, our intention in this section is to show that the decomposition method we have suggested may constitute a useful tool, as it allows to identify the transmission mechanisms involved in a change in poverty, even when only two observations for the same country, are available. From the empirical perspective, we intend to apply the method to data from Mexico to add evidence to the discussion on the relation

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[11] Some examples are the works by Gottschalk, et.al. (1985), Fields (1989), Kakwani (1988), Anand and Kanbur (1991), de Javry and Sadoulet (1993), Anand and Kanbur (1993b), Smolensky et.al. (1994), Chen, et.al. (1994), Psacharopolous et.al. (1993), and Grilli (1994).

[12] For instance, the works by Bruno et.al. (1995), Ravallion (1995), Chen et.al. (1994), Clarke (1995), Fields (1989) and Lipton and Ravallion (1995), support this argument.

[13] It has been shown that under a range of specifications for measuring inequality, the between-group component of a number of indexes does follow an inverted *U* pattern, but the within-group element is an increasing function of average income. This implies that poverty may still be rising in some subgroups even after the turn-point.

between growth, inequality and poverty. As mentioned before, Mexico constitutes a particularly interesting case in light of the long run poverty trends because there is a relatively long series of household surveys spanning over 42 years. Nevertheless, it should be stressed that the analysis could be undertaken even if a more limited data set was available.

2.2 Aggregate Changes Between 1950 and 1992

Despite the existence of ten household surveys representative at a national level, held in 1950[14], 1956, 1958, 1963, 1968, 1975, 1977, 1984, 1989 and 1992, a comparable series of poverty and inequality estimates for Mexico covering the whole period is not available at the moment[15]. The main reason seems to be that there are considerable comparability problems among the different sets of information. Annex I explains how we have solved these problems in order to generate the first set of comparable and consistent poverty statistics for these years, and offers a detailed description of the data and of the poverty lines we will use.

One interesting feature of the case of Mexico, is that even though the country is usually classified as middle-income, there have been persistently high poverty levels that have been a major cause of concern[16]. In order to determine the exact magnitude of the problem in a historical context, we have measured poverty by applying the P_2 index and inequality

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[14] The data for 1950 was obtained by reconstruction of the information in the 1950 population census.

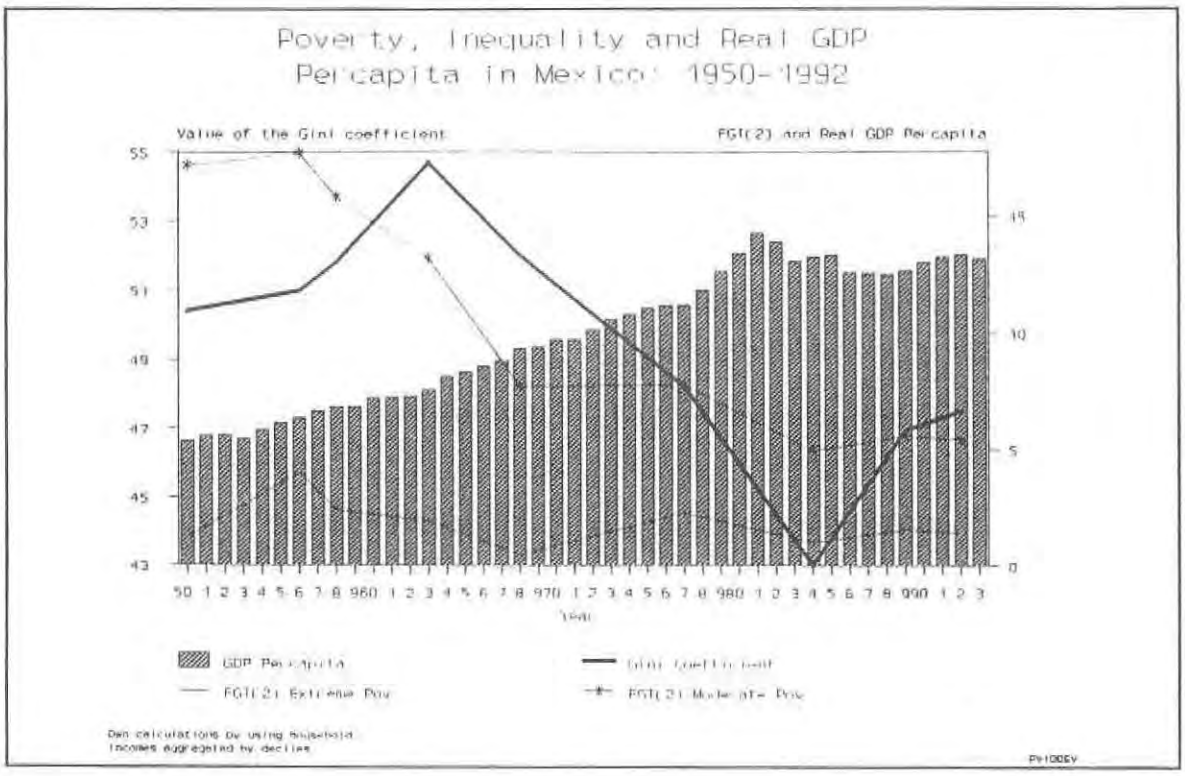
[15] Up to date, the list of published work dealing with the measurement of poverty and/or inequality by using this data, seems to be limited to Navarrete (1960, 1970), Weisskoff (1970) and Felix (reported in Altimir (1982)), all of which cover the 1950-1963 period, Bergsman (1980) and Gollás (1983) who use the data for 1963-1977, Van Ginneken (1980), who covers the 1963-1975 period, Altimir (1982), who refers to the surveys between 1950 and 1977, Aspe and Beristain (1982), who focus only on 1977, Hernandez Laos (1989) and García Rocha (1990), who use the surveys held between 1963 and 1984, Levy (1991) and Lustig (1992), who concentrated on 1984, Psacharopoulos et.al. (1993) and Lustig and Mitchell (1995), who focus on the 1984-1989 period, and INEGI-CEPAL (1993), who compare the 1984, 1989 and 1992 surveys.

[16] For instance, a recent study by Psacharopolous et.al. (1993) has ranked Mexico in 9th and 8th place with respect to 16 Latin American countries regarding moderate and extreme poverty, even though Mexico registers the second highest GDP percapita in the region.

by using the Gini coefficient, for the data since 1950[17]. Figure 1 shows the results.

Additionally, we have divided the population into four socioeconomic classes: extremely poor, moderately poor, middle class and rich, according to the classification criteria defined in Annex I, and we have calculated the proportion of the population included in each of them for each year. The results are shown in Figure 2[18].

Figure 1



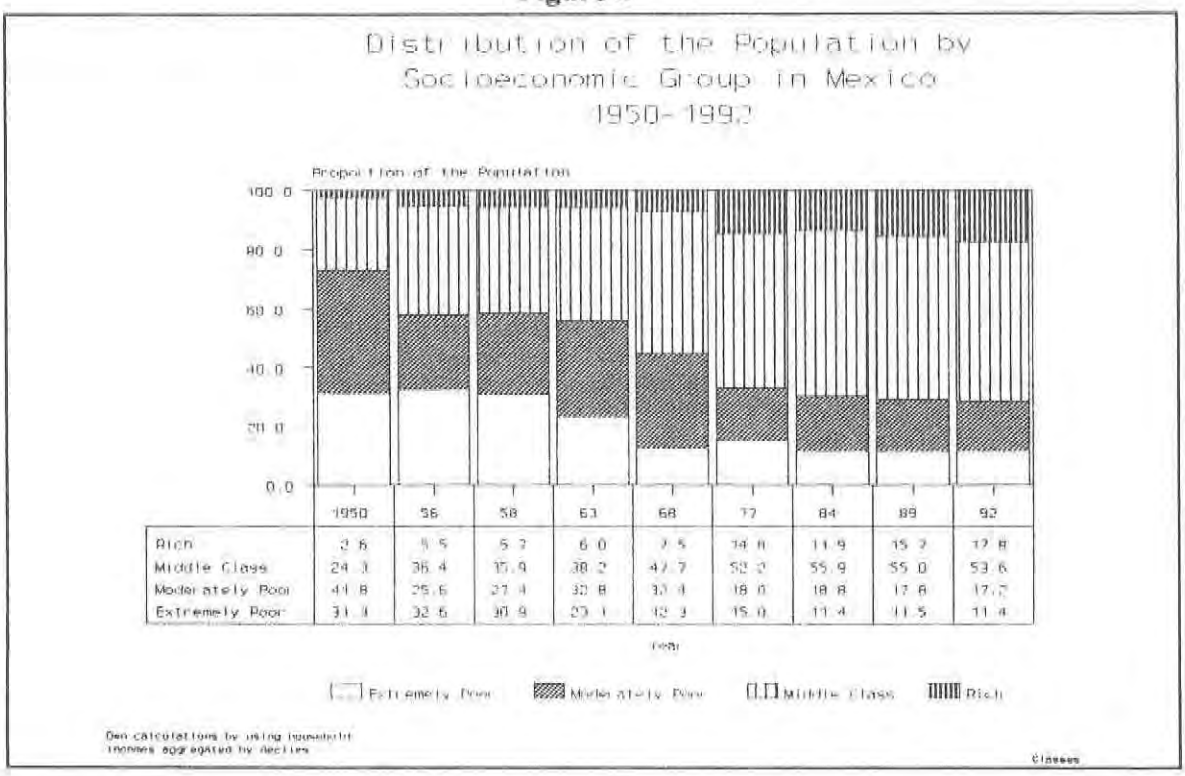
There are at least four general features from our calculations that are worth noting. First, it can be observed that inequality does follow an inverted *U* shape trend between 1950 and 1984 with a turn-point around 1963. As our calculations from PR (1994) show that the proportion of the population located in rural areas declined from 57% in 1950, to 41% in

[17] For these calculations we have used household data aggregated by deciles (which is the only available for the 1950-1968 period). In order to obtain the value of each of the P_2 indexes, we have used the formulae suggested by Datt and Ravallion (1992), which allows to measure poverty by simply knowing the parameters of the Lorenz curve and the average income of the population.

[18] Here we have also relied on the formulae in Datt and Ravallion (1992) to estimate the value of the *H* index (the proportion of poor) at the two poverty lines and the rich-dividing line.

1970 and to 29% in 1990, in principle this could be thought to be associated to the Kuznets process. However, by 1984 a second turn-point, which is not in line with the theoretical predictions, is also observed[19].

Figure 2



Second, as shown in figure 2, it can be said that there was a considerable expansion of the middle classes during the whole 1950-1992 period, as this subgroup only included around 24% of the population by 1950, but accounted for more than 50% by 1992. Although at first sight this seems to be a considerable achievement in terms of welfare, it should also be noted that through the course of 42 years of high growth, significant declines in both

[19] It should be stressed that the trend followed by the Gini index is not dependant on the method we have used to make the distributions comparable among each other (see Appendix I). In fact, we performed two tests to check for the robustness of this result: one, by using the uncorrected data for the whole 1950-1992 period, and another using alternative "correction" methods, and in all cases, the inverted *U* relationship, and the turn-point in 1963, are confirmed (only in the case of the data used by van Ginneken (1980), the turn-point shifts to 1968). The only significant differences are, on the one hand, that the changes in inequality from year to year appear to be smoothed by adjusting the data, and on the other that when the Gini index is computed for the uncorrected distributions, a decline, rather than a rise in inequality, is observed during the 1950s.

moderate and extreme poverty are only observed between 1956 and 1968, and between 1977 and 1984[20]. Moreover, a sharp rise in extreme poverty was registered between 1968 and 1977 even though GDP percapita expanded by more than 27% during these years. It should also be said that according to our calculations, the absolute number of poor has actually augmented throughout the 42 year period, from 18.8 million in 1950, to 24.64 million by 1992. Therefore, it seems that in general terms, the results are not in line with the predictions of the inverted *U* hypothesis, as we would have expected a consistent improvement in the standard of living of the poor for the whole sub-period after the turn-point.

Thirdly, it can be seen in figure 1 that moderate poverty has declined significantly faster than extreme poverty between 1950 and 1992, which means that the gains from development have had a direct relationship with the initial position of individuals: those who were relatively better-off among the poor, were more able to improve their standard of living. Fourthly, it seems that poverty started declining earlier in the development process than income inequality.

In order to analyze these trends in more detail, and to identify the underlying mechanisms by which poverty has changed, we have applied the decomposition method in equation (22) to the data by using the extreme poverty line and using the rural-urban classification criteria. However, it was only possible to decompose the changes in poverty since 1963, as the information from the 1950-1958 surveys make it impossible to obtain the distribution for the rural and urban sectors separately[21].

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[20] To check for the robustness of the results, we also performed several tests when calculating P_2 and H for each year. We computed the value of the indexes under four combinations: (i) original distributions and original average incomes, (ii) corrected distributions (for 1950-1968) and original average incomes (presented in the figure), (iii) adjusted distributions (for 1950-1968) with adjusted incomes, and (iv) corrected distributions and obtaining average incomes by multiplying the income observed in the previous year, by the GDP percapita real growth rate from the National Accounts. It should be stressed that in all four cases, the general trend for both moderate and extreme poverty was very similar (although not as smooth in cases (iii) and (iv)), and that the only significant difference was found in experiment (i), in which poverty appeared to be declining (although insignificantly) between 1950 and 1956.

[21] As the criteria adopted in 1963 and 1968 for classifying the subgroups into urban and rural was the occupation of the household head, we have divided the population by following this same principle for 1977, 1984, 1989 and 1992. Up to now, there do not seem to have been any attempts either to use or "correct" the rural and urban distributions for 1963 and 1968. In order to make the information for these two years, compatible with the overall corrected distributions, we have applied a "correction" factor to the income share of each decile in the rural and urban sectors. The correction factor was obtained by comparing the original overall distribution, with the adjusted data obtained by Altimir (1982).

Figure 3

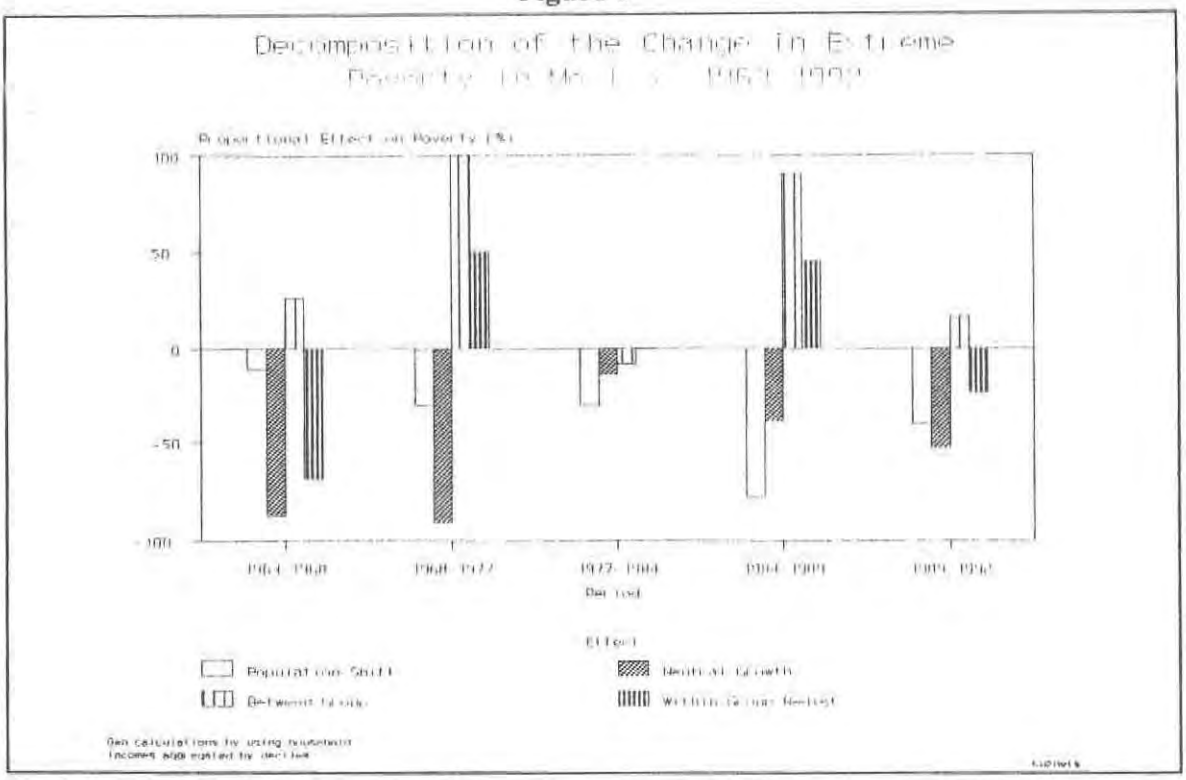

Figure 3 shows the results from the decomposition, and presents the value of each of the "population shift", "neutral growth", "between-group" and "within-group" effects of the change in poverty, for each of the periods for which information is available[22]. It should be noted that a negative (positive) value implies that the component has had a poverty reducing (increasing) effect, and we should stress that after applying the principle in equation (23), we found that all the terms presented in the figure (with the exception of the C_w term for the 1977-1984 period) are statistically significant.

For discussing the results, we can divide the 1950-1992 period in three phases: (i) the 1950-1970 in which the country followed an inward-oriented strategy; (ii) the public expenditure-led growth period and the "oil boom" years of 1970-1984; and (iii) the crisis and stagnation period that accompanied the implementation of the stabilization and liberalization measures, comprising 1982 to 1992.

[22] In all cases, the value of the residual is negligible.

2.3 Poverty During 1950-1968

The 1950s

With regards to the first decade under analysis, figure 1 shows that moderate poverty started to decline while extreme poverty still remained at high levels during the 1950s[23]. The information in figure 2 clarifies these changes, as it shows that most of the shifts were given by an expansion of the middle classes (presumably by the mobility of those closer to the moderate poverty line), but that more than 30% of the population still remained in extreme poverty throughout the decade. Table 1 throws further light on this by illustrating that even though average income was expanding considerably, the share received by the poorest 30% of the population reduced, while the share of the following 65% was enlarged.

Table 1

Year	Share of Total Income			
	Poorest 10%	Deciles 2 and 3	Deciles 4 to 9.5	Richest 5%
1950	2.70	7.29	55.98	34.00
1956	2.00	5.50	65.96	26.00
1958	2.09	6.09	63.38	28.39
1963	1.50	5.78	62.37	30.31
1968	1.90	6.18	61.76	30.09
1977	1.20	5.70	69.49	23.60
1984	1.72	7.32	69.60	21.36
1989	1.58	6.55	64.50	27.37
1992	1.55	6.43	66.02	26.00

Source: Own calculations from the Income and Expenditure Surveys by Inegi, 1984, 1989, 1992.

As explained by Maddison (1992), and Aspe and Beristain (1984), the 1950s were characterized on the one hand by high growth rates of the order of 6% each year, and on the other, by the initiation of an import substitution strategy that tended to promote industrialization. Following Bergsman (1980) and García Rocha (1990), perhaps the best explanation to the results is that the main feature of the inward-oriented growth period was a decline in the relative price of capital relative to labour, which tended to reduce the demand for unskilled workers. As unskilled labour has traditionally been relatively abundant in

[23] The only study in which an attempt has been made to measure poverty during the 1950s, is van Ginneken (1980), who, as opposed to our calculations, concludes that poverty declined during this decade. The difference is that van Ginneken has used the uncorrected distributions.

Mexico and its supply was increasing rapidly in urban areas as consequence of the rural-urban migrations, the process tended to shift the benefits towards those who were able to acquire the necessary qualifications to incorporate into the expanding industrial sectors, which were presumably the middle classes and those who were better off among the poor.

Decomposing the Changes During the 1960s

As can be seen in figure 1, the 1960s were years of both, accelerated growth and improvements in the distribution of income, which led to important reductions in both moderate and extreme poverty[24]. Figure 2 takes a closer look at the shifts, and shows that the middle classes continued their expansion by the incorporation of formerly poor individuals, but more importantly, that there were significant gains for the extremely poor, who represented around 30% of the population at the end of the 1950s but only included 12.3% by 1968. In fact, as shown in table 1, the extremely poor expanded their income share from 1.5% to 1.9% during these years.

The results in Figure 3 indicate that there are three identifiable "causes" for the decline in extreme poverty between 1963 and 1968. First, in line with the Kuznets process, the rural-urban population shifts tended to be poverty reducing (given by the negative sign of the "population shift effect"). Secondly, the high rates of growth reflected in the large "neutral growth" component imply that the economy was expanding significantly. Thirdly, the fact that income distribution was improving within the sectors, tended to reduce poverty further.

In contrast, the "between-group" element of the change in poverty registers a positive rather than the expected negative sign, which means that the expansion of the gap between the rural and urban sectors tended to be poverty-increasing, and in fact prevented further gains for the extremely poor. This constitutes an important finding because according to the theory, we would have expected a decline in poverty after the turn-point in the inequality-development relationship, precisely due to a narrowing of the rural-urban gap. However, it seems that in the case of Mexico, the mechanisms acted in the opposite direction.

Following Bergsman (1980), one explanation to the improvement in the standard of living of the poor was that a rise in rural employment - due to land redistribution and large

[24] The trends presented in figure 2 are in line with the results reported by the other studies that estimated the value of the H index for these years.

public investment in infrastructure - combined with a growth in urban employment by 4.8% each year - among other things because of the expansion in public investment in large scale infrastructure projects -, generated a rise in the demand for unskilled labour that tended to benefit those at the bottom of the distribution.

2.4 Decomposition of the 1968-1977 Change

It is interesting to note in figure 1, that even though inequality was declining and average income continued to expand during the 1970s, there was a sharp rise in extreme poverty that is not in line with the predictions of the Kuznets process either. Additionally, the fact that moderate poverty, measured by P_2 did not increase considerably between these two years, means that the main losses were registered among the poorest of the poor. Regarding the decomposition of the change, it is rather surprising to observe in Figure 3 that the main causes of the deterioration in the standard of living of the extremely poor were the expansion of the rural-urban gap, and that inequality within both subgroups raised. These two effects outweighed the benefits from growth at the lower tail of the distribution and do not correspond to the predictions of the inverted U hypothesis[25].

Perhaps the best explanation to these trends, is that the improvement in income distribution was given by a rise in the income share of the middle deciles (see table 1), at the expense of the poorest and richest households. Thus, while the middle class continued its expansion through the incorporation of formerly moderately poor individuals, the proportion of extremely poor was still rising from 12.3% to 15%.

This constitutes an important finding, as it allows to observe that even when inequality is declining and average income is expanding, this does not necessarily imply that the poorest of the poor will benefit from the development process. Furthermore, it seems that the mechanisms through which economic development affects poverty, may be totally different to those predicted by theory.

It is interesting to note that this period coincides with a shift in development strategy

[25] Apparently, these results do not coincide with the estimation of the H index by Bergsman (1980), van Ginneken (1980), and Hernandez (1989), who used the same data but higher poverty lines, and conclude that there was a sharp decline in the proportion of poor between these two years. Figure 2 clarifies the issue, as it shows that in line with those results, the proportion of moderately poor (which are more comparable with the other estimates) declined considerably (from 32.4% to 18%) during these years.

towards a government expenditure-led growth model, which tended to favor the middle classes through various mechanisms (e.g. subsidies to manufacturing activities, public expenditures on higher education, rises in public sector employment, and shifts in the terms of trade against the rural sector to subsidize urban consumption). As this strategy was combined with an acceleration in the rate of growth of the economically active rural population and with a decline in rural growth, employment, productivity and investment, the result was a severe deterioration in the position of those individuals who remained in rural occupations, as they were already the poorest by the beginning of the period.

2.5 Poverty, Inequality and Growth Between 1977 and 1984

The 1970-1981 period was characterized by the highest GDP percapita growth rates registered in the Mexican economy since 1950. To a large extent, this performance can be attributed to the "oil boom" which allowed for a dramatic expansion of public sector employment and expenditures (public spending raised from 20% of GDP in 1970, to 46.7% in 1982). Given this shift, the strategy became unsustainable after the collapse of international oil prices towards the end of 1981, having the 1980s debt crisis as consequence.

The main problem for examining the relation between poverty, growth and inequality during these years, is that the last point of observation before 1982 is 1977, which makes it difficult to asses the welfare effects of the years of highest growth. Nevertheless, it can be seen in figure 1, that both moderate and extreme poverty declined during the period, presumably because GDP percapita was still much higher in 1984 than in 1977[26], and because there was an improvement in income distribution. Figure 2 helps to understand the nature of this shifts, as it shows that the proportion of poor at both definitions of z, declined (although only slightly) during the period.

It is interesting to observe in figure 3, that the 1977-84 years are the only corresponding to the predictions from the Kuznets process, as poverty in fact declined due to a reduction in the rural-urban gap, while the within-group inequalities played an insignificant role.

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[26] It should be said that the trend in figure 2 is in line with the results obtained by Bergsman (1980) and Hernandez (1989) who are the only authors who estimate the value of the *H* index for this years.

6 Decomposition for the 1984-1992 Period

The years of 1982 and 1983 constitute an important point in the long run development ɔnd because of two reasons. First, as can be seen in figure 1, they are the first years since e 1950s in which GDP percapita did not expand, and secondly, they coincide with a change development strategy towards market orientation. In the historical context, the 1984-1992 ɔriod as a whole marks a turn-point in the inequality-development and in the poverty-ɔvelopment relationships, because the declining trends observed since the 1950s, were verted.

In terms of figure 3, it is interesting to note that the changes in poverty are not in line ith those predicted by the inverted *U* hypothesis in this case either, as even though there ll appear to be poverty-reducing population shifts, there was a significant expansion of the p between rural and urban incomes as well as a deterioration in the distribution within the bgroups (this is only the case for 1984-1989) which tended to be poverty-increasing even the context of positive growth. Additionally, it is surprising to find, that the largest opulation shift" effects were registered precisely during this sub-period, rather than at the ginning of the development process, as would have been expected.

There are several explanations to the changes in poverty during these years. Székely 995) and Panuco and Székely (1996) have argued for instance, that the changes are closely ated to the implementation of the stabilization and liberalization policies introduced since 83. As our results show, it seems that such policies were accompanied by an enlargement percapita income, but also by a large deterioration in income distribution (see figure 3), ıich outweighed the benefits from economic growth for the poorest sectors of the pulation.

III. Conclusions

The central objective of this work, has been to search for ways of obtaining information that can be used to understand the reasons why poverty changes through time. By using standard poverty measurement techniques, we have shown that when there is information about a characteristic by which the population can be classified into subgroups, it is possible to decompose a change in poverty into the effect of economic growth, population shifts among the groups, income redistributions within groups, between group redistributions, and a residual.

As compared to the other alternatives suggested in the literature, our method has the advantage of simplifying the task of finding the links between growth, inequality and poverty, and between a change in poverty, and external shocks or specific economic policies, because it permits to trace down their influence on each of the terms involved in the decomposition. But perhaps its main feature is that it generates information analogous to the R^2 in regression analysis, although by avoiding the econometric complications and large data requirements inherent to the construction and testing of economic models (the main alternative found in the literature to address the same question), which makes it significantly more operational.

We have applied the decomposition method to information from nine household surveys held in Mexico since 1950 in an attempt to identify the underlying transmission mechanisms through which the pattern of long run development, has affected poverty. In order to do so, this work has provided the first consistent estimates of poverty for Mexico for the whole 1950-1992 period.

From our results, it is possible to assert that even though the inequality-development relationship does seem to follow the inverted U pattern suggested by the main development theories, extreme poverty has not declined consistently as a natural outcome of the development process, as expected. Moreover, the mechanisms through which poverty was supposed to change, were actually only observed during a relatively small sub-period (of 1977-1984).

One of our main findings is that contrary to what the theory predicts, the main causes of the change in the standard of living of the extremely poor after the turn-point in the inequality-development relationship, were on the one hand, that the rural-urban gap (which is expected to reduce) continued to expand, generating significant poverty-increasing effects, and on the other, that the distribution of income within the subgroups (implicitly assumed as

ɔnstant) changed considerably in most of the years.

In sum, the application of our methodology has led us to conclude that even in the ɔntext of positive economic growth and declining inequalities, it is still possible to observe deterioration in the standard of living of the poorest members of a population. This ıggests that even in these situations it may be necessary to introduce policies that guarantee at the benefits from development accrue to the lower tail of the distribution.

Annex I

The Data

Perhaps the main problem found when dealing with the information from the Mexican surveys is that, as explained by INEGI (1994), the only surveys among the ten available that are strictly comparable among each other, are those held by (INEGI)[27], in 1984, 1989, and 1992, as these are the only that were held under the same time period of each year, they use identical sampling techniques, and utilize identical instruments for obtaining the information[28]. Regarding the rest of the observations, there are several differences that complicate any straight forward comparison[29], but perhaps the two most important limitations are first, that the surveys up to 1968 used a rather weak definition of non-monetary incomes, and second, that the degree of under-reporting differs from one survey to another.

In an attempt to achieve at least a minimum degree of comparability between some of the surveys, several authors have "corrected" the information for some years by adjusting the incomes and expenditures reported, to make them compatible with the information in the National Accounts[30]. By this means, both, the original distributions, and the aggregate income level for each year, have been modified.

Although it should be said that any attempt to "adjust" the surveys contains a high

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[27] Instituto Nacional de Estadística, Geografía e Informática.

[28] INEGI (1994) provides a more detailed explanation of the characteristics of the surveys.

[29] As explained by Altimir (1982), some of the main differences among the surveys held between 1950 and 1968 include the use of unequal sampling techniques, the differences in the representativity of specific subgroups, the various definitions of the unit under observation, the range of reference periods for incomes and expenditures, the nature of the questionnaires applied, and the proportion of unsuccessful interviews.

[30] Among these attempts, two strategies have been followed. On the one hand, Navarrete (1960, 1970), Felix (reported in Altimir (1982)), Bergsman (1980), van Ginneken (1980), and Altimir (1982), assume, that the degree of under-reporting is related to the income level of each household. In this case, the adjustments have focused on the incorporation of non-monetary incomes for the 1950-1968 surveys. On the other hand, Cepal-BM (reported in Altimir (1982)), Hernandez Laos (1989), Lustig and Mitchell (1995), and INEGI-Cepal (1993), have concentrated on making the information for each income source compatible with the National Accounts, by assuming that the degree of under-reporting is more associated with the sources of income.

degree of arbitrariness[31], we have decided to use the distributions corrected by Altimir (1982) for the 1950-1968 period, and the original distributions for 1977, 1984, 1989 and 1992[32]. There are two main reasons for doing so. First, the greatest methodological differences arise precisely in the comparison of the five earliest surveys, but if each of them is "corrected" by using the same criteria, it is possible to obtain a consistent set. Secondly, as Altimir's method is the most satisfactory among those that "correct" the inconsistencies in non-monetary incomes, its application guarantees a higher degree of comparability with the surveys between 1977 and 1992, which did capture non-monetary incomes in an adequate way.

Regarding the incomes in the surveys, we have decided to use uncorrected incomes in all cases, mainly because as the information for 1950-1968 is only available at an aggregate level, it is not possible to apply any consistent adjustment to all the incomes in the surveys.

Even though the above choices do include an element of arbitrariness, it should be stressed that the results presented in this work are not strictly dependant on our decision. In fact, we performed a number of experiments by using all the possible combinations of adjusting the distributions and aggregate incomes (we explain this further in the text), and our conclusions as well as the long run trends in inequality and poverty, remain unaltered. Thus, as in this work we are interested in the direction of the long run trends rather than on the exact value for the poverty and inequality indexes for each year, the exercise is valid.

The Poverty Line

For the purposes of this study, we will use two different definitions of poverty line, both based on the information in Coplamar (1983) - which is about the only reliable source

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[31] Altimir (1982) and Bergsman (1980) provide a detailed criticism to the method that relates under-reporting to the level of income of each household. Regarding the alternative method of focusing on the sources of income, there are also a number of limitations. Perhaps the most important ones are: (i) only the incomes which are lower than the value reported in National Accounts are adjusted, while those for which the amount is larger, are assumed to be more accurate than the National accounts, which is clearly inconsistent; (ii) the incomes are "corrected" by multiplying each household's source by a correction factor, which implies that household incomes will only be adjusted when they have partially under-reported a source, but not when they have omitted it completely from the survey; (iii) it is assumed that all households, regardless of their income levels, underreport each source to the same extent.

[32] The survey for 1975 has been discarded as it is the least reliable among all those available (Bergsman (1980) and INEGI (1994) discuss this in more detail).

concerning the definition of consumption bundles for the poor - who provides the market cost of several items which may be classified as "basic needs". By using this information, we have defined an *extreme poverty line* which includes the necessary income to have access to a minimal food bundle, equal to 92,986 monthly 1992 pesos (equivalent to 30$ US, and similar to the dollar-a-day poverty line used in most international comparisons), and a *moderate poverty line*, which besides food, includes the minimum necessary income to acquire housing, health, and education, equal to 167,949 pesos of 1992 per month per head (equivalent to 54.28$ US).

In order to translate the value of these poverty lines from 1992 *pesos* to each year's prices, the average price index by item of consumption for the prior six months (which was the reference period for incomes) was used for the surveys held between 1968 and 1992. Due to the lack of more detailed information, we have relied on the general consumer's price index (CPI) in the case of the surveys held before 1968, but as these were years of very low inflation, the influence of this decision, can be said to be negligible. Regarding incomes, we have inflated the value of the average incomes from each year to their 1992 value, by using the CPI for the six months prior to the survey.

As it seems convenient for our analysis to separate the middle class from the rich, we have also set a *rich-dividing line* at 4.5 times the value of the poverty line, as this is the cut-off point at which households receive a larger proportion of their incomes from financial sources. We have done this under the argument that the importance of those income sources are a distinctive characteristic of rich households.

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