POVERTY IN MEXICO DURING ADJUSTMENT

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The paper analyzes the changes in poverty in Mexico during the 1980s adjustment program. We decompose poverty into its distribution and growth components, as well as by population subgroups, in order to illustrate the causes of the deterioration in the standard of living of the poorest of the poor. We suggest a transformation of the methodology by Datt and Ravallion (1992), to determine the likelihood of future compensation for those sectors of the population which suffered higher social costs derived from the contractionary policies. The importance of this exercise, is that it shows that contractionary measures may provoke deep structural transformations in an economy, which can make it more difficult to eradicate poverty in a reasonable time horizon.

INTRODUCTION

The purpose of this paper is to analyze the changes in poverty that occurred in Mexico during the stabilization and adjustment program implemented in the 1980s. During this period, a variety of contractionary measures, in line with the macroeconomic adjustment programs supported by loans from the International Monetary Fund (IMF) and the World Bank (WB), were implemented. Several empirical studies that analyze the effects of adjustment on poverty have shown that such a relation varies through countries and through specific programs, and that it is extremely difficult to identify the transmission mechanisms by which particular economic policies affect poverty.[1]

Up to 1994, the Mexican adjustment process had been considered a success due to its achievements in increasing Gross Domestic Product (GDP), reducing inflation, and achieving fiscal surplus[2], but the effects on poverty have not been analyzed yet.

Information about three central aspects would be required in order to analyze the changes in poverty observed during the period: the distribution of the costs of adjustment and the benefits of growth, the standard of living of the poor, and the likelihood of compensating the losers in the process. The last aspect is particularly important, due to the fact that most adjustment plans rely on the assertion that temporary economic contractions, that imply further losses in welfare during economic crisis, are necessary to establish the grounds for recovery, which in turn is expected to generate enough resources to compensate for previous welfare losses.

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[1]Such as the ones by IMF (1988), Meller (1991), Blejer and Guerrero (1990), Javry, Sadoulet and Fargeix (1991), Thorbecke (1991), and Ravallion and Huppi (1991), in which the cases range from very successful adjustment in terms of protecting the poor, as in Indonesia, to more inequality in income distribution and increases in poverty, as in the Philippines.

[2]The analysis by Loser and Kalter (1992) is an example of this.

According to the objectives of the stabilization package implemented in Mexico, we would expect overall increases in welfare as a consequence of positive growth rates observed during the 1980s, and fair compensation for those groups which suffered more during stagnation. However, there are two ways in which poverty levels may vary: through general changes in the welfare level of the whole population, or through the redistribution of resources. Due to the apparent success of the program, only the welfare effect would be relevant in the Mexican case.

This paper consists of five sections. Section I concerns the main theoretical and methodological aspects. In Section II we quantify the changes in poverty and decompose such changes into their welfare and distributive components. In Section III an alternative decomposition is applied in order to identify the losers among the poor. Section IV treats the likelihood of compensating the losers in the future, and Section V contains the conclusions.

I. METHODOLOGICAL ASPECTS

For the purposes of this work, we will rely on widely used poverty measurement techniques. The analysis will use decompositions for three purposes: (i) to analyze the distribution of costs and benefits during adjustment, and the effects on changes in the welfare of the poor, (ii) to identify those socioeconomic groups which were more affected by the contractionary policies, and (iii) to determine the likelihood of compensating the losers of the process in the future. With regard to the third aspect, in this paper we seek to transform, in a relatively simple way, an already existing analytical tool which can be used to study the relationship between economic growth and poverty.

1.1. The Data

In order to infer the level of individual welfare, we will rely on the common "basic needs" approach. In the case of Mexico, the necessary information about household incomes and expenditures during the 1980s exists in the 1983, 1984 (four different surveys), and 1989 "Income and Expenditure of the Household National Surveys" conducted by INEGI.[3]

However, only the information contained in the survey for the third quarter of 1984 (5,295 observations) will be used in this work, because it is the only survey which is strictly comparable to that of 1989 (13,550 observations). The two data sets were gathered during the same days of each year, they used identical sampling techniques, and they utilized identical instruments for obtaining the information.[4]

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[3]"Instituto Nacional de Estadística, Geografía e Informática," see INEGI, 1984 and 1989. Prior to 1983, household income surveys had been conducted by different institutions using different methodologies. In 1983, INEGI launched a pilot project which consisted of supervising three different surveys each representative at a national level, in order to perfect a new methodology. They were conducted during the last quarter of 1983, and each of the first two quarters of 1984. INEGI (1992) does not recommend their use for comparisons with further surveys. Another survey was conducted during the third quarter of 1984, and still another one during the fourth quarter of the same year. Only the methodology used in the 1984 third quarter survey has continued to be used in following years.

[4]Both surveys were conducted from August 11 to November 15 of each year. This period was chosen because of the low seasonal variations in income. The reference time period for incomes and expenditures was the previous quarter.

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In addition to the advantage of comparability, the timing of these two surveys is adequate for our purposes. From 1982 to 1990, per capita consumption followed approximately a "U" shape trend, which would be in line with one of the central arguments of IMF and WB policy packages: when an economy is exposed to a negative shock, some contractionary measures are necessary to achieve future sustainable growth. The first of our observations (1984) falls into the adjustment process which followed the 1970s growth decade. This is a good standpoint, as some of the positive effects of the high growth years, such as decreases in inequality and poverty, had not been reversed by the crisis yet.[5] Our second observation (1989) contains information about some of the costs of adjustment, but allows us to observe the situation during the distribution of the benefits. So, for the purposes of this work, the timing is ideal as we will be able to observe the changes practically between two sides of the "U."

The results presented in the following sections were obtained by processing the raw dissaggregated data (every household micro-observation) of both surveys, provided directly by INEGI. For our calculations, only information about incomes will be used. The main argument against using income as an indicator of welfare is that it is subject to temporary economic fluctuations, but when capital markets are imperfect and access to savings, which can be used to smooth consumption, is restricted (especially for the poor), it is an acceptable indicator of the capacity to acquire goods through time.

Two main transformations to the data were required. The first one consisted in inflating each 1984 observation to convert it into September 1989 prices.[6] In some cases, it is desirable to use different deflators for urban and rural households; however, in the case of Mexico, there are two reasons for allowing the use of the same deflator; the first one is that rural individuals in small communities do not necessarily face lower prices for basic goods than the urban individuals, because of the presence of monopolies and high transport costs in the commercial sector. The second one is that the cut in food subsidies and the commercial liberalization undertaken since 1982, make it likely for urban and rural individuals in large and medium communities to have similar prices for the same products.

The second transformation is concerned with the calculation of per capita incomes which calls for some assumption about the intra-family distribution of resources. Generally, income is adjusted by an equivalence scale, but because of the lack of recent data for Mexico, the assumption that each member of the household obtains the same proportion of total income than the others, will be made. The implication of doing so is that the intra-family inequality will not take account of the differences between family incomes and family needs. However, this will not affect the results, as the family structures are very similar for both years.[7]

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[5]Hernandez (1989) shows a decreasing trend in these two indicators between 1977 and 1984 using monetary incomes.

[6]Using the Consumer's Price Index, in Salinas, 1991, p. 197.

[7]This can be seen in INEGI (1984 and 1989).

1.2. *The Poverty Line*

The main problem with the "basic needs" approach is the controversy sur-rounding the definition of a poverty line, as it tends to be subjective to some degree. A solution has been to measure poverty at a wide range of poverty lines, and verify if any conclusion is strictly dependent on a particular definition. For Mexico, one of the only reliable data sources concerning basic needs requirements and prices is COPLAMAR.[8]

COPLAMAR (1983) provides the market cost of several items which may be incorporated into a "minimum consumption basket." These items are food, housing, health, education, culture, recreation, transport, communication, clo-thing, and personal appearance.[9] For the purposes of this study, we will use a "Sub-Minimal Bundle"[10] as a poverty line, which includes the costs of the mini-mum necessary food, housing, health and education per month per head (81,409 September 1989 pesos, equivalent to 30.37 dollars[11]), which is similar to the "dollar-a-day" poverty line used by the World Bank,[12] which allows for inter-national comparability.

1.3. *Measurement and Decomposition of Poverty*

A large literature concerning poverty measurement has been developed in the past twenty years, and many poverty indices have been suggested. The selection of a poverty measure is important, as different indexes can lead to different results.

In order to identify which groups among the poor were most affected by adjustment, we would require an index to allow for decomposition among popula-tion subgroups. This means that the overall level of poverty must fall if a subgroup of the population experiences a reduction in poverty, while poverty in the rest of the population remains unchanged (the index must be additively decomposable). On the other hand, we need an index which allows for the identification of the growth and distributional components of the changes in poverty.

Among the recent attempts to decompose poverty changes, the ones suggested by Datt and Ravallion (DR) (1992), and Kakwani (1993) are more rigorous than others.[13] Both methodologies allow for the specification of two components: growth and redistribution, and the DR method also provides a residual.

The method by Kakwani consists of deriving formulas for the elasticity of several poverty indexes with respect to changes in mean income and in inequality

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[8]"General Coordinator Agency for the National Plan for Marginated Zones," a governmental program which operated from the late 1970s to the early 1980s, with the intention of alleviating poverty.

[9]The food bundle included 34 different items, which were equivalent to 2,082 calories per day per adult, which was set as the minimum necessary intake by the study.

[10]Which includes only a subgroup of the extended basic needs basket. COPLAMAR (1983) suggests this bundle as a poverty line for quantifying extreme poverty.

[11]To inflate the value of the 1984 poverty line to its 1989 value, the CPI in Salinas (1991) was used.

[12]World Bank, 1990, p. 27.

[13]The other recent attempts have been those by Kakwani and Subbarao, and Jain (explained by Datt and Ravallion (1992)). The problem with these two approaches, is that they only provide a method for estimating the growth effect, and attribute the rest of the change in poverty to the distribu-tion component, which is not accurate.

(measured in this case by the Lorenz curve). Once the value of each elasticity is obtained, it is relatively easy to determine how poverty changes when the average income or the Gini index (the area between the Lorenz curve and the "perfect equality line") of a population are modified. The result is obtained simply by multiplying the value of each elasticity by the perceptual change observed in each variable. This methodology is ideal when there is only information about one time period, as it only needs to know the value of the poverty index, the mean income, the value of the poverty line, and the initial inequality level, in order to obtain the two components of the change in poverty. Its main shortcoming is that in order to make the procedure operational, it relies on the assumption that any distributional change results from a shift in the entire Lorenz curve according to certain predefined pattern, although inequality in a distribution can change in infinite ways (totally different patterns of income transfers in a given population can result in identical changes in the Gini index).

In our case, there is data available for two periods. Therefore, we have enough information to be able to determine with precision the pattern of income transfers which led to changes in inequality, without the need for any restrictive assumptions in this respect. This is the reason for using the DR methodology in this work to decompose the change in poverty, as it is specifically designed for cases when there is data for more than one time period, and when the exact pattern of transfers that makes the Lorenz curve shift, is known. The application of this procedure allows for a more efficient use of the information available for Mexico. Nevertheless, the formulas for the elasticities provided by Kakwani are useful in enriching other aspects of our analysis and thus will not be discarded.

By following the DR methodology, we can utilize the family of indices $FGT(\alpha)$ [named after Foster, Greer and Thorbecke (1984)] for our purposes, which are additively decomposable by population subgroups.[14,15] We can express the index in a general form as follows:

(1)
$$P_t = P(z/\mu_t, L_t)$$

where P_t is the poverty index for period t, z is the poverty line, μ_t is the average

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[14]In general, the index is written as:

$$FGT_\alpha(y; z) = (1/n) \sum_{i=1} (g_i/z)^\alpha \qquad i = 1, \ldots, q$$

where $g_i = z - y_i$ represents the income gap of the poor, which we can denote as I, α is a parameter which indicates the importance given to inequality among the poor in the measurement of poverty, y_i are incomes, z is a poverty line, and n is the number of members of the population. It is easy to observe that the head-count ratio index denoted as H, which indicates the proportion of poor, and the poverty gap index HI are members of the $FGT(\alpha)$ family of indices when α is assigned values of $\alpha = 0$ and $\alpha = 1$ respectively. To obtain our results, we can also give α a value of 2, which has been commonly used in empirical studies, because it gives a relatively high importance to the distribution of income among the poor.

[15]Foster, Greer and Thorbecke (1984), have demonstrated that the FGT index is additively decomposable for any vector y broken down into subgroup income vectors: $y^{(1)}, \ldots, y^{(m)}$:

$$P_\alpha(y; z) = \sum_{j=1} \{(n_j/n)^* P_\alpha(y^{(j)}; z)\} \qquad j = 1, \ldots, m$$

where n_j is the population in the j-th group, and $P_\alpha(y^{(j)}; z)$ measures poverty in the jth group. The increase in poverty in some specific subgroup of the population, will increase total poverty at the rate given by the population share.

income of overall population in period t, and L_t is the characteristic Lorenz curve of a particular distribution of income in period t. Broadly, the decomposition of the growth and distributional components can be represented by:

$$(2) \qquad P_{t+n} - P_t = G(t, t+n; r) + D(t, t+n; r) + R(t, t+n; r)$$

where P_{t+n} is the poverty index in a subsequent period. $G(t, t+n; r)$ denotes the growth component of the change in the poverty index, $D(t, t+n; r)$ denotes the distributional component, and $R(t, t+n; r)$ is the residual.

By using the General Quadratic model for the parametrization of a Lorenz curve, suggested by Villaseñor and Arnold (1989), Datt and Ravallion derive formulas for H, III and $FGT(2)$, in which the measurement of poverty will depend on the overall level of inequality, given by the inclusion of the parameters of the Lorenz curve into the formulas.

Then, the growth component is obtained by computing:

$$(3) \qquad G(t, t+n; r) = P(z/\mu_{t+n}, L_t) - P(z/\mu_t, L_t).$$

The first element refers to the poverty index calculated by using the average income of period $t+n$, but evaluated at the parameters of the period t Lorenz curve. The second element is the reference point. In other words, this is the change in poverty that would have occurred, if average income changed from t to $t+n$ but inequality remained the same as in t.

The distribution element is calculated as follows:

$$(4) \qquad D(t, t+n; r) = P(z/\mu_t, L_{t+n}) - P(z/\mu_t, L_t).$$

The first element refers to poverty calculated by utilizing the average income of the first period, but evaluating the $FGT(a)$ formula with the parameters obtained for the Lorenz curve in $t+n$. In other words, this is the change in poverty that would have occurred if average income remained unchanged from t to $t+n$, but inequality varied.

For our purposes, we also require some kind of analytical tool which allows the estimation of the likelihood of compensating the population for the costs suffered during adjustment. The approach followed here, consists in determining how many years of growth were necessary to eradicate poverty in 1984, as compared with the number of years required in 1989, where a reduction in the number of years would mean an increase in the likelihood of compensating the losers of the process. As explained before, two elements would be relevant: the availability of resources (future growth), and the possibility of progressive income redistributions.

Usually, the relation between poverty and growth is tackled as follows: the absolute poverty gap is calculated and then it is related to the percentage GDP increase that would generate an equivalent income. In this case it is assumed that all the benefits of growth would be given to the poor. Other less extreme calculations estimate the years of growth necessary to increase the income of the average poor individual up to z, by assuming that growth implies equal proportional increases in income for every member of the population.

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Kanbur (1985) offers a simple method for estimating the time needed to bring the initial mean income of the poor up to the poverty line, by calculating:

$$T = \{\ln (z/\mu^p)\}/\{\ln (1+g)\} \tag{5}$$

where T is the number of years required to make $\mu^p = z$, and g is the annual per capita growth rate. The main problem in using this formulae for our purposes is that we would require that when $\mu^p = z$, $H = 0$ (which is not implied by Kanbur's method in which the average income of the poor may reach z, and still H can be positive). Therefore in our case, using this method would be equivalent to assuming that the income of every poor individual is equal to μ^p, and therefore that the within-the-poor component of inequality would be non-existent. By knowing that the poor have different incomes from each other, we would require individuals to receive different benefits from growth, according to their initial income level (the poorest would have to receive larger gains). This would necessarily reduce the dispersion of the incomes of the whole population divided into poor and nonpoor, as the within-the-poor component of inequality would disappear and the between-group component would be reduced. This method may be used for our purposes, but as will be explained later, it seems more reasonable to think that the possibilities of benefiting from growth are positively related to the income level of each individual. Thus, we require a method which allows us to relate growth, with specific characteristics of a particular distribution of income.

Although as set originally, the Datt and Ravallion methodology is only appropriate for static comparisons between two periods of time, we can introduce a transformation in order to make it useful for the estimation of the likelihood of eradicating poverty. The transformation consists in using the parametrization of the Lorenz Curve in order to find the average income which would make H equal to 0, maintaining inequality constant, and then calculating the number of years that would be required for the observed income to reach the new target at some average growth rate. The DR methodology may also be used to simulate simultaneous changes in inequality and in average incomes. Here, the procedure would be first to obtain the parameters of a Lorenz curve representing some specific inequality level, and then determining the average income that would make H equal to 0 with this parametrization. This would provide the target income and then, the number of years required to increase the observed income up to the target income at a previously defined growth rate, may be obtained.

II. POVERTY IN MEXICO DURING 1984-89

2.1. *Changes in Poverty in Mexico Between 1984 and 1989*

The results of measuring poverty by using the COPLAMAR "sub-minimal bundle" as a poverty line are shown in Table 1.

The increase in poverty shown by the *FGT(2)* and *I* indexes, are consistent with the perception of a worsening in the standard of living during the 1980s, which is usually conceived as the "social cost" of the contractionary stabilization policies. However, these are not conclusive results, because H and HI show the

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TABLE I

POVERTY IN MEXICO BETWEEN 1984 AND 1989

Poverty Index	1984 (%)	1989 (%)	(%) Change
H	0.2984	0.2732	−8.3
I	0.3455	0.3682	6.5
HI	0.1031	0.1006	−2.4
FGT(2)	0.0510	0.0520	1.8

Source: Own calculations from the "Income and Expenditure of the Households National Survey," INEGI, 1984 and 1989. The results were obtained by using per capita incomes.

opposite trend. This indicates that although the proportion of poor individuals diminished, for the remaining poor there was a decline in average income.

Figure 1 shows poverty measured for a small range of different poverty lines (z) using the FGT(2) index. If the curve of one of the years was below the other for any z, the conclusion would be straightforward. However, in this case the curves clearly intersect when z equals approximately 92,000 1989 pesos (which is above the 81,409 pesos poverty line). For poverty lines below this one, poverty increased from 1984 to 1989, but for every $z > 92,000$ poverty declines and so it is not possible to obtain a conclusion independently of z.
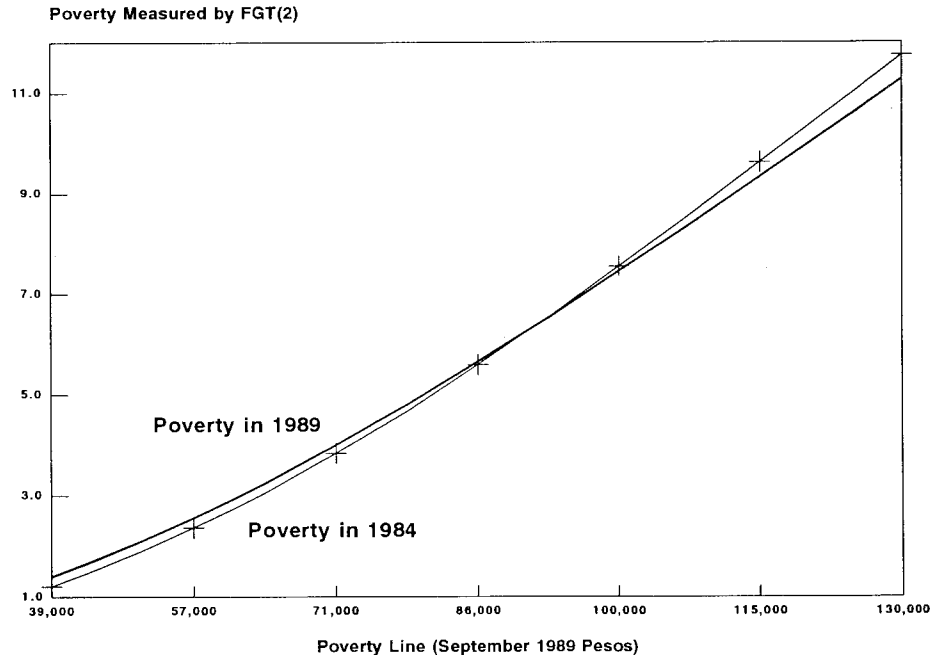

Figure 1. Poverty in Mexico in 1984 and 1989 Measured by FGT(2)
Data Source: Own calculations from the Income and Expenditure of the Households National Surveys of 1984 and 1989, INEGI

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As the poverty line rises, formerly non-poor individuals are now classified as poor, so the importance of the poorest of the poor in overall poverty declines. By calculating the value of the same $FGT(2)$ index but for a wider range of poverty lines (shown in Figure 2), some characteristics of the poverty curves can be observed (although it is more difficult to notice that the cross-over point occurs at 92,000 pesos). It is interesting to see that when $z < 114,000$ pesos (which includes the cross-over point), slight shifts in the poverty line, generate relatively high increases in the value of the index at increasing rates, but for $z > 114,000$ pesos, the marginal contribution to poverty of taking larger z's decreases, which illustrates that the dispersion of incomes among the non-poor is higher than within the poor.
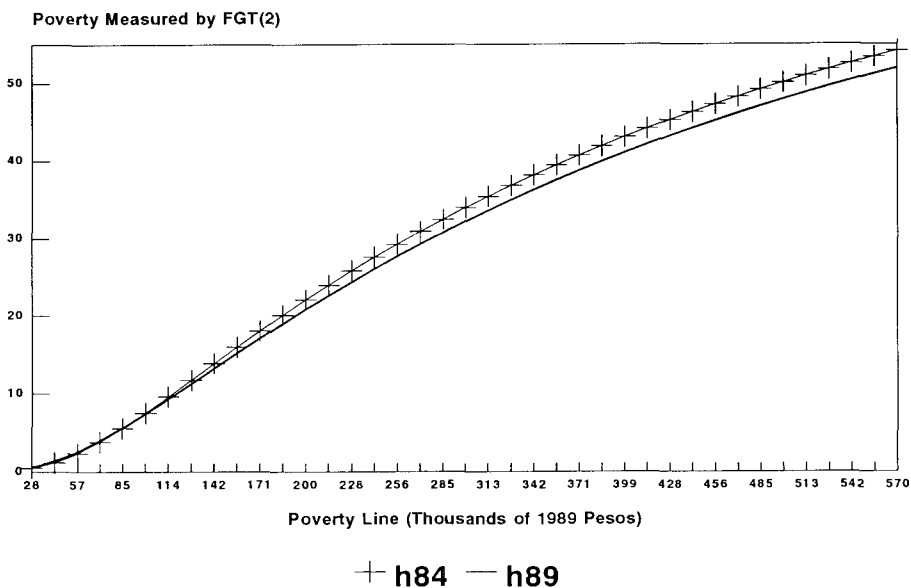
Poverty Measured by FGT(2)

Poverty Line (Thousands of 1989 Pesos)

$+$ **h84** $-$ **h89**

Figure 2. Poverty in Mexico in 1984 and 1989 Measured by the $FGT(2)$ for Various Poverty Lines
Data Source: Own calculations from the Income and Expenditure of the Household National Surveys of 1984 and 1989, INEGI

This result is interesting if we think of $z^* = 114,000$ pesos as the inflexion point for the $FGT(2)$ poverty curve. For public policy purposes, z^* would be the poverty line at which income transfers would have the largest marginal reductions in poverty, as for any $z < z^*$, rises in the poverty line augment the value of the poverty index at increasing rates (which means that a relatively high proportion of individuals which were close to z are easily integrated into the group of the poor), and for any $z > z^*$, larger rises in the poverty line give decreasing marginal increases in poverty, as it is more difficult to reach additional individuals.

Figure 3 offers further explanations as to the causes of the change in poverty. It shows the absolute differences [obtained by subtracting the value of each index in 1989 from its 1984 value; a negative (positive) difference means a rise (decline) in poverty] for H, HI and $FGT(2)$. We can observe that for H, when $z < 42,000$ 1989 pesos there is a negative difference, which means that poverty increased, but

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for $z > 42{,}000$ pesos increases in the poverty line imply positive differences. For the HI index, poverty lines lower than $71{,}000$ pesos indicate increases in poverty, but for greater levels of z, there is a clear pattern of higher positive differences. The fact that for $z < 71{,}000$ poverty is higher in the second year with III shows that the effect of high income gaps may offset reductions in H. In other words, although the proportion of poor decreased for any $z > 42{,}000$ pesos, the widening of the income gap for all $z < 71{,}000$ pesos had a stronger effect and thus resulted in a rise in the HI index.

$FGT(2)$ incorporates the distributional component among the poor to complete the picture. It can be seen that the differences in poverty between the two years are delayed longer than with H and III to become positive. The reason is that although for H and III poverty decreased at any $71{,}000 < z < 92{,}000$ pesos, the higher inequality in the distribution of income among the poor in the second year counteracts the decline in poverty generated by the reduction in the proportion of poor people and in the income gap.
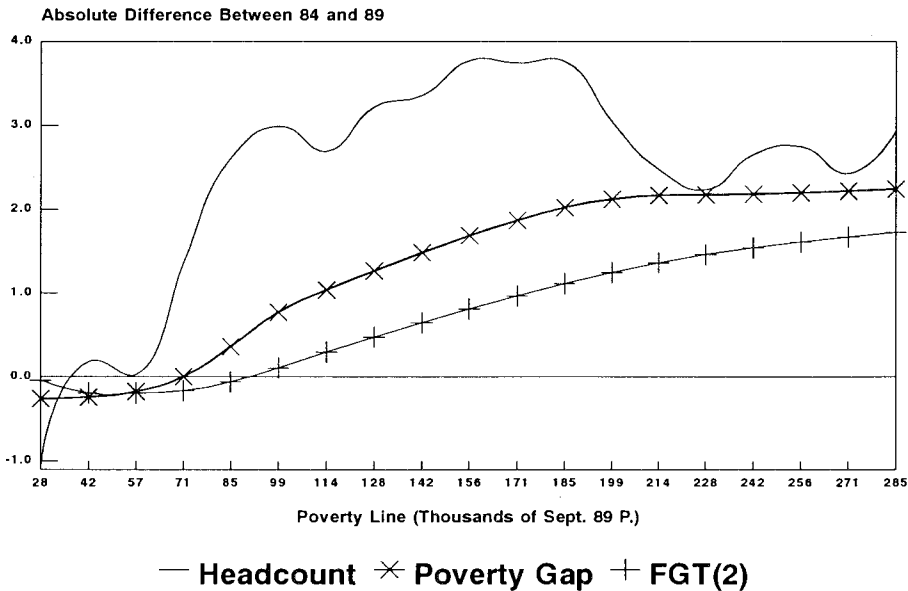

Absolute Difference Between 84 and 89

Poverty Line (Thousands of Sept. 89 P.)

— **Headcount** ✕ **Poverty Gap** + **FGT(2)**

Figure 3. Differences in Poverty in Mexico Between 1984 and 1989 for Three Poverty Indexes and Several Poverty Lines
Data Source: Own calculations from the Income and Expenditure of the Household National Surveys of 1984 and 1989, INEGI

By presenting the results above, a central conclusion can be derived independently of the poverty line: for those individuals with incomes lower than 92,000 monthly pesos in 1989, which constitute approximately 35 percent of the population, poverty measured by the $FGT(2)$ index increased, but this rise is determined by the losses amongst the poorest of the poor (approximately 8.5 percent of the population with incomes lower than 42,000 pesos). On the other hand, individuals with incomes above this level experienced welfare improvements.

TABLE 2

	*Share of Total Income		*(%) Change in Income Shares	*(%) Change in Average Income at 1989 pesos
Decile	1984	1989		
I	1.6	1.29	−19.38	−5.6
II	2.89	2.41	−16.61	−2.4
III	3.78	3.3	−12.70	1.6
IV	4.72	4.22	−10.59	4.2
V	5.91	5.26	−11.00	3.7
VI	7.32	6.57	−10.25	5.3
VII	9.18	8.26	−10.02	5.5
VIII	11.94	10.67	−10.64	4.3
IX	16.52	15.52	−6.05	9.8
X	36.14	42.5	17.60	37.5

*Own calculations from the "Income and Expenditure of the Households National Survey," INEGI, 1984 and 1989, by using per capita incomes.

2.2. Decomposition of the Change in Poverty

Although Mexico already belonged to the group of the most unegalitarian countries in the world, the Gini index indicates that simultaneously with the changes in poverty shown above per capita income inequality grew by around 11.5 percent between 1984 and 1989.

An increase in inequality implies that some relatively higher decile of the population manages to get a larger proportion of total income than some relatively lower one. Table 2 shows that in the case of Mexico, the increase was caused by a disproportionate rise (of 17.6 percent) in the share of individuals in the 10th decile, at the expense of the population in the other nine. The largest reductions in income shares are observed from the 1st to the 3rd decile. The increase in inequality was combined with an expansion in overall average per capita income of 17 percent in real terms, in which the 10th decile was clearly the most favored one (with a 37.5 percent rise), while the less favored individuals were found in the first three deciles.[16]

The change in average per capita income is not contradictory to the increase in poverty registered by the FGT(2) and I indexes (shown in Table 1) in the lowest three deciles, because in 1989, 2.52 percent of the individuals (which were the richest among the poor in 1984) crossed the poverty line, and thus, are no longer included in the subgroup of the poor in the second year. Therefore, we are not comparing the incomes of the same percentages of the population in the two cases.

Regarding the decomposition of the change in poverty, we have two clear effects: (i) a rise in inequality which is expected to increase poverty, and (ii) a

[16]It must be said that there are inconsistencies between the national accounts and the surveys regarding total average incomes, caused by income misreporting in the surveys, by discrepancies in the way in which entrepreneurial rents are measured (the national accounts estimate a higher value of entrepreneurial rent, as they include all nonwage income into its determination), and by the fact that the national accounts do not consider nonmonetary incomes (including imputed rent, auto consumption, gifts, and payment in kind).

rise in average income, which is expected to reduce poverty. By applying the parametrization suggested by Villaseñor and Arnold (1989), we obtain that the estimated parameters for the characteristic Lorenz curves in 1984 and 1989 using per capita incomes were significative at 99 percent and the R^2s are higher than 0.999.

As mentioned above, the results concerning poverty are not independent of z, so the identification of the growth and distributional effects were obtained for several poverty lines. Figure 4 shows that for every $z < 109,000$ pesos, the redistribution component (which increases poverty) was greater than the growth component (which reduces poverty).[17]

Recalling some of the results mentioned above, those individuals with an income lower than 92,000 monthly pesos experienced a rise in poverty measured by the *FGT(2)* index, which combined with this decomposition indicates that the decrease in the well-being of the poor was due to distributional, not growth, effects.

The positive growth effects for individuals with incomes below 92,000 pesos were fully offset by inequality. Although these results seem robust, further research about the relationship between income and fiscal policy would be necessary to determine if this effect was only due to the macroeconomic adjustment process.
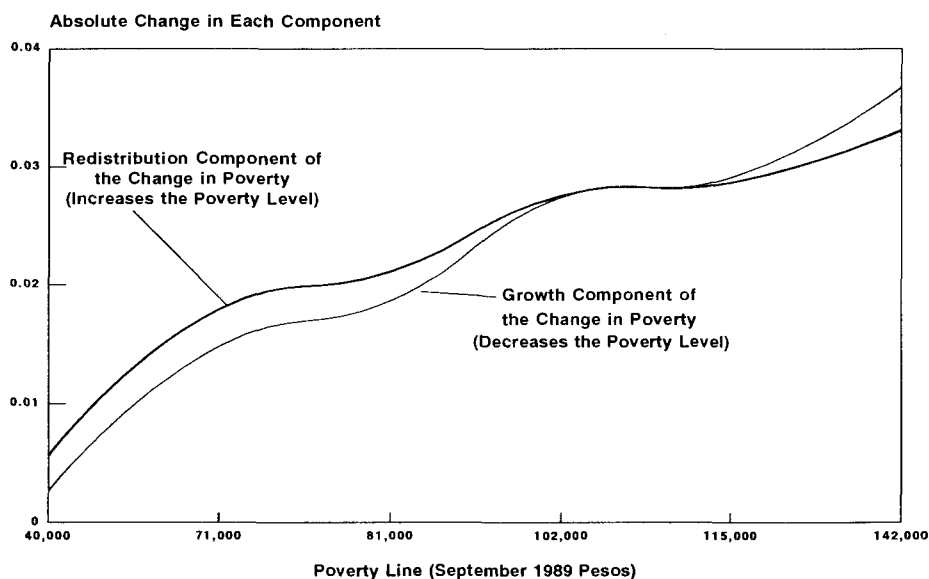

Absolute Change in Each Component

Growth Component of the Change in Poverty (Decreases the Poverty Level)

Redistribution Component of the Change in Poverty (Increases the Poverty Level)

Poverty Line (September 1989 Pesos)

Figure 4. Decomposition of Poverty by Growth and Redistribution Effects Between 1984 and 1989 with Various Poverty Lines
Data Source: Own calculations from the Income and Expenditure of the Household National Surveys of 1984 and 1989, INEGI

[17]The results were also computed by using the methodology suggested by Kakwani (1993). Although the two curves follow a similar pattern to those obtained with the DR method, the cross-point occurs at approximately 128,000 pesos. The difference rises because the DR methodology accounts for the exact nature of the shift observed in the Lorenz curve between 1984 and 1989, while the Kakwani method assumes a proportional change along the curve, and also, because the Kakwani methodology does not allow for the calculation of the residual.

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TABLE 3

CONTRIBUTION TO THE OVERALL POVERTY INDEX OF EACH
OCCUPATIONAL SUBGROUP IN MEXICO, 1984 AND 1989

Occupation Group	Proportion of Total Poverty	
	1984	1989
1. Small scale traders, Salesmen, Middle level workers	10.6	9.0
2. Industrial workers	13.0	15.8
3. Rural workers	64.8	62.5
4. Business owners and High level officials	0.2	2.0
5. Professionals and technicians	0.2	1.0
6. Other occupations	11.2	9.8

Source: Own calculations from the "Income and Expenditure of the House-
holds National Survey," INEGI, 1984 and 1989. The results were obtained by
using per capita incomes.

III. DECOMPOSITION BY POPULATION SUBGROUPS

If we classify the population by the occupation of the household's head, we
will achieve a more detailed explanation about the reasons for the increase in
poverty for the less favored groups. The criterion followed for constructing the
subgroups, is similar to the original sectoral organization in the country.[18] Table
3 shows that in 1984 (using the "sub-minimal bundle"), rural poverty explained
64.8 percent of overall poverty, industrial workers accounted for 13 percent, and
traders, salesmen and middle level workers for 10.6 percent (the importance of
the remaining groups is very small).

Although in 1989 the composition of poverty was similar, the contribution
of the industrial workers to overall poverty increased, while that of the other two
groups accounted for a lower proportion of the $FGT(2)$ index.[19] The calculations
were also made for 10 lower and 10 higher levels of z, and the conclusions hold.
As the poverty line rises, there are slight changes in the contributions: profession-
als and technicians, business owners and high level officials, and industrial workers
increased their share in poverty, and the importance of rural workers and sales-
men, traders and middle level workers declines. The results allow the inference
that a great deal of the decrease in the standard of living of the poor was due to
reductions in real wages registered in the modern industrial sector; in fact, between
1984 and 1989, the real minimum wage, which is the main reference point for

[18]Taken from INEGI (1989).

[19]It is interesting to note, that between the two years, the proportion of rural workers decreased
from 32 to 25 percent while poverty increased by approximately 25 percent in this sector. This means
that there were migrations from the rural to other sectors, but that the migrating individuals were the
less-poor among the rural who had the possibility of escaping from the adverse economic situation.
The poorest of the rural poor remained in the sector and on average experienced a deterioration in
their standard of living. One explanation may be that during the 1984-89 period, rigid controls over
the prices of agricultural products and reductions in subsidies to inputs were enforced.

Concerning small scale traders, salesmen and middle level officials, which include formal and
informal activities, a rise in the population share and a reduction in the $FGT(2)$ index were observed.
This may indicate that some of the migrating rural and industrial workers enrolled in urban informal
entrepreneurial activities.

wage determination at low income levels, fell by 27 percent, while the average remuneration per worker declined 16 percent in real terms.[20]

In conclusion, the main losers of the adjustment process were the industrial workers, and the rural poor who remained in that sector

IV. THE DISTANCE TO ERADICATE POVERTY

In order to estimate the likelihood of eradicating poverty in 1984 and 1989, we can use two possible growth rates for our calculations: an optimistic one (6.8 per cent annual increase in GDP per capita, which would be similar to the average growth rates from 1975 to 1981, years of high growth), and a moderate one (3.4 percent of annual growth, half of the optimistic rate).

As explained before, the application of the procedure suggested by Kanbur, modified by including the assumption that when $\mu^r = z$, $H = 0$, would imply a reduction in inequality. By using the Theil inequality index (a member of the Entropy family of indexes), the implications of such changes can be examined, since it allows us to decompose inequality in its between and within group components.[21] By dividing the Mexican population into poor and nonpoor individuals, the procedure would imply a reduction of around 30 percent in the Theil index. The result of this exercise (Simulation 1 presented in Table 4) by using the "sub-minimal bundle" as poverty line, is that for 1984, it would have taken 6.4 or 12.5 years under high and moderate growth rates respectively, to raise the incomes of all the poor up to z. However, as in the following five years, neither the decrease in inequality nor the mentioned growth rates were observed, 1989 constitutes a step backwards in the possibilities of poverty elimination: 7 and 13.6 years respectively would be required to eliminate poverty, under the assumption of large future improvements in the distribution of income.

After analyzing the case of Mexico, assuming future progressive distributions of the benefits of growth seems quite unreal. It is more reasonable to think that inequality in the distribution of the gains of growth is directly related to the initial inequality level. In the best case, we could expect all the population to obtain equal benefits from growth, which would be similar to a situation in which growth was obtained, by leaving the distribution of income constant (simulation 2). The result for 1984 from the latter simulation is that, if inequality had remained unchanged, 18.5 and 34 years with high and moderate growth rates respectively would be necessary to eradicate poverty. In 1989, the positive effect of the rise in total average income was offset by the increase in inequality for the poor, so practically the same number of years as in 1984 would be required to eliminate poverty, assuming no further increases in inequality. This would lead to the conclusion that the 1984–89 period was lost for the poor, as the likelihood of improving their situation in the near future remained unchanged after five years.

If starting from the 1989 observed situation, inequality returned to its 1984 level, our estimations show that there would be substantial progress towards the

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[20]Calculated from Salinas (1991). Lustig (1992) illustrates this fact in more detail.
[21]Shorrocks (1980), and Shorrocks (1984) proves this in a formal way.

TABLE 4

NECESSARY CHANGES TO ERADICATE POVERTY

Scenario		1984	1989
Simulation 1	Target income*	52,000	65,000
	Years of optimistic growth	6.4	7.0
	Years of moderate growth	12.5	13.6
Simulation 2	Target income*	107,475	130,910
	Years of optimistic growth	18.5	17.6
	Years of moderate growth	34	33.7
Simulation 3	Target income*		107,475
	Years of optimistic growth		14
	Years of moderate growth		28
Simulation 4	Target income*		142,650
	Years of optimistic growth		19
	Years of moderate growth		37

Source: Own calculations from the "Income and Expenditure of the Household National Surveys," INEGI, 1984 and 1989. The results were obtained using the disegregated data for per capita incomes.
  *September 1989 monthly pesos.

possibilities of reducing H to 0: 14 and 28 years under high and moderate growth rates respectively would be necessary (simulation 3).

To complete the scenario, we can analyze the effect of an increase in inequality (simulation 4). To do this, we obtain the parameters of a Lorenz curve for a distribution with a Gini index 1 percent greater than the one observed in 1989 (by increasing inequality with the same pattern of transfers as those observed from 1984 to 1989). The result is that departing from the 1989 situation, 19 and 37 years at high and moderate growth rates respectively would be needed, which constitutes a more than one year backwards step towards the elimination of poverty, compared with the situation of no further increases in inequality.

The latter results illustrate the enormous power that redistributions of income have in increasing the welfare level of the poor. It is clear that even with very high growth rates, the time horizon for the eradication of poverty seems too long if inequality does not diminish.

The application of the method suggested by Kakwani (1993) further illustrates this aspect. After computing the elasticities of the *FGT(2)* index with respect to changes in the mean income and in the Gini index for each year[22] for a range of poverty lines, it is possible to show that during the 1984–89 period an important change in the economy took place: the sensitivity of the *FGT(2)* index with respect to mean income decreased, while the sensitivity with respect to changes in inequality increased (see Table 5), which means that the potential impact of economic growth on poverty is lower, but that of income redistributions is higher.

It can also be seen that the lower the poverty line, the higher the sensitivity of poverty to changes in inequality, and the larger the difference between the two elasticities. This indicates that the poorer the subgroup of the population, the

[22]Although Kakwani does not use the method for inter-temporal comparisons.

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Value of the Poverty Line (1989 monthly pesos)	Elasticities with Respect to Mean Income		Elasticities with Respect to the Gini Index	
	1984	1989	1984	1989
42,808	2.42	2.15	17.49	20.41
57,077	2.24	2.06	12.08	14.47
71,347	2.11	1.94	9.00	10.91
81,409	2.04	1.87	7.53	9.18
114,155	1.75	1.65	4.58	5.78

Source: Own calculations from the "Income and Expenditure of the Households National Survey," INEGI, 1984 and 1989, by using per capita incomes.

higher the response of poverty alleviation to changes in income distribution as compared with economic growth.

V. CONCLUSIONS

The intention of this work has been to analyze the changes in poverty that occurred in Mexico during the implementation of the adjustment policies of the 1980s. The evidence provided here shows that, although at the macroeconomic level the Mexican adjustment seems to be successful, from a Rawlsian standpoint we could derive the opposite conclusion since for approximately 35 percent of the population poverty increased, but this rise is determined by the losses amongst the poorest 8.5 percent. The reasons for this change was not the lack of resources nor a generalized decline in the well-being of the whole population, but that the benefits from growth were offset by regressive transfers from the poor to the rest of the population.

Although it seems that the adjustment measures worked effectively as a mechanism to reduce inflation, our results indicate that this was achieved through a deterioration in income distribution, which shifted the benefits of growth from the poorest of the poor towards the richest groups. The main losers among the poor were the salaried workers and the rural workers, but among these the rural poor faced the highest welfare losses. These are indicators of the effect that the deterioration of agricultural prices and cuts in input subsidies have had on rural incomes; it is likely that this provoked shifts from low-scale agricultural entrepreneurial activities into urban salaried and informal activities.

Perhaps the main element for quantifying the social costs of adjustment is the change in the likelihood of eradicating poverty between 1984 and 1989, as it indicates the possibilities of compensating the poor in the future. In the case of Mexico, our decomposition method suggests that 1989 represents a step backwards towards the alleviation of the conditions of the poor.

The results shown here indicate that improvements in the distribution of income are as important or even more important than growth for the increase in

the well-being of the poor. Even with very high growth rates, decreases in inequality are indispensable in order to achieve this target in a reasonable time horizon. Perhaps this is because departing from a very skewed distribution of resources has as a consequence that relatively favored individuals have greater possibilities of benefiting from growth.

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