The Pakistan Development Review
Vol. XXVI, No. 1 (Spring 1987)

Flattening the Kuznets Curve: The Consequences for Income Distribution of Development Strategy, Government Intervention, Income and the Rate of Growth

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The relationship between growth and equity has been a disputed issue at least since Simon Kuznets [11] described it as U-shaped. Kuznets's hypothesis that as per capita income rises income distribution would first become less equal and then more equal has been supported by a large array of empirical studies (e.g.: Bacha [4], Ahluwalia [3], Chenery *et al.* [7], Adelman and Morris [2], Cline [8], Paukert [23]. As a result, there are only a few propositions in economics which have wider acceptance.

The Kuznets hypothesis, which applies to the secular process of development over several decades, has sometimes been cited as evidence that there is conflict between growth and equity. Alternative reasons were subsequently advanced for the conflict between these objectives. It was argued that there is also a trade-off between a high *rate* of growth and an equitable distribution of income, because the policies desirable for a high rate of growth involve strong incentives and rewards to the scarce factors in the hands of the rich. Finally, the related argument was sometimes made that reliance on private enterprise was favourable for growth, but unfavourable for equity. In combination, these three arguments led to a belief in a rather dismal trade-off for the poor in poor countries: rapid growth achieved in a private-enterprise economy resulted in a rapid decline in the income share of the

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An earlier, highly abbreviated, version of the same research was published in the *Journal of Development Economics*, 23 (1986) , pp. 55-65. Even earlier, PIDE published *Development Strategy, Growth, Equity and the Political Process in Southern Asia* (by G. F. Papanek) which included one lecture on the same subject. These earlier versions used somewhat different methodologies, reported preliminary results and are far less complete.

N. V. Jagannathan, I. A. S., did an excellent job of collecting the data on which this essay rests. It provides the framework for a more detailed study of five Asian countries supported by the Agency for International Development (AID) under grant AID/OTR-G-1872. We are grateful for this support, and the research assistance of N. V. Jagannathan, but neither can be held responsible for our analysis or conclusions.

poor; as they slide down the Kuznets Curve,[1] their slide was speeded by policies favourable to the rich. Indeed, the decline in the share of the poor was so great, Adelman and Morris [1; 2] claimed that their absolute income would fall in the early stages of development. The political consequences were sometimes noted as well: worsening income distribution in an environment of rapid development required an authoritarian regime to maintain the pace of development until the reversal of the Kuznets Curve came to the rescue of the poor and of political stability and democracy.[2] An alternative to rapid, inequitable growth under an authoritarian regime was massive government intervention in the economy to achieve greater equity, usually at the cost of growth.

Enough observations about income distribution have accumulated by now to permit further empirical testing of these arguments, using a combination of methodologies. These tests suggest that

(i) indeed, income distribution may tend to become less equal as per capita income rises and then become more equal, but this "Kuznets effect" is very weak and explains little of the variation in income distribution; and

(ii) results obtained by other authors were replicated for some factors (education; the share of primary exports) but not for others. Most notably, neither the rate of growth nor the extent of government intervention in the economy appears to influence income distribution. Finally, socio-political dualism appears to be a new, and important, factor in income distribution.

THE HYPOTHESES

With the Gini coefficient and the share of the poorest 40 percent of the population as dependent variables, we tested the following hypotheses:

(1) The Kuznets Curve does not exist. That is, the level of per capita income has no effect on income distribution, once other relevant factors are taken into account.

(2) Even if the Kuznets Curve exists, the relationship between per capita income and income distribution is not stable over time.

(3) Differences in socio-political systems are much more important than per capita income in explaining cross-country variations in income distribution. It will be more egalitarian in countries that are Communist, or suffer extensive government intervention in the economy, or have no dualistic socio-political structure.

(4) Spread of education leads to greater income equality.

(5) Rate of growth does not affect income distribution.

(6) Structure of the economy, especially the relative importance of

[1] "Down" when the curve is U-shaped, because income shares are measured on the vertical axis. It is an inverted U if the Gini coefficient is on the vertical axis.

[2] For an excellent discussion of the conflict between equity and efficiency or growth and the consequent relationship of efficiency and political repression, see Sheehan [24].

primary and manufactured exports, is a major factor in income distribution.

(7) There are no systematic differences in income distribution among the major regions of the world, once such explanatory variables as socio-political systems or education are included in the analysis.

THE DATA AND VARIABLES

Gini coefficients of income-distribution *data* were found for 83 countries. For 39 countries, observations for more than one year were available, resulting in 145 observations in total. For the share of the poorest 40 percent, the respective figures are 80 countries and 136 observations (see Appendix for list of countries). The data span the post-World War II years from 1952 to 1976, but are concentrated in the period from 1955 to 1971. Since the Kuznets Curve describes changes over time, it is reasonable to use several observations from a single country whenever income distribution data are available for several years. The basic source is Jain [10], supplemented by others listed in the Appendix.

Income distribution data are notoriously unreliable. The data used here, drawn from a variety of sources, suffer from all the defects common to the breed. However, we have statistically tested the influence of outliers on the results (see the Methodology section below) and found only two sets of outlier data which have much influence (Taiwan and Pakistan) and only one which seems implausible. The share of the poorest 40 percent for Pakistan is quite inconsistent with Pakistan's Gini coefficient and even more inconsistent with the shares reported for neighbouring countries with similar characteristics and per capita income. Indeed, Pakistan's share is double that of comparable countries.[3] Given our doubts about these particular figures, regressions in this paper for the share of the poorest 40 percent exclude Pakistan.[4] Note that if we had included Pakistan's share data our hypothesis on the Kuznets Curve would have been more strongly supported – indeed the Curve would have completely disappeared. That the results including Pakistan are quite inconsistent for the Gini and for shares suggests that shares data on Pakistan represent a "bad" outlier.

Inclusion of Taiwan reverses the signs of the purely intertemporal Kuznets Curve (Table 1) but in the case of the combined cross-country/intertemporal curve, it only weakens the Kuznets Curve effect. Moreover, while Taiwan is an outlier, the underlying data are plausible. They show a sharp improvement in income distribution as per capita income rose, but that is precisely what historical studies of Taiwan's experience have also shown. Therefore it seems reasonable to include Taiwanese data in the analysis. Results excluding Taiwan are available from the authors.

[3] In the 1963 – 1971 period the Gini coefficient is a reasonable .36 to .38 but the share of the poorest 40 percent in the same years ranges from 26 percent to 29.4 percent. For neighbouring and similar Bangladesh and India, with Ginis of .34 to .48, the share ranges are from 13.1 percent to 20.2 percent. At Pakistan's per capita income, the Bangladesh shares are rather typical.

[4] The results including Pakistan are available from the authors.

Outliers and their influence on the results are discussed further below.

Variables. For income distribution data, different sources use different definitions and differ in the populations covered, e.g. the whole country, rural or urban areas; population, households, income recipients or the economically active. Such differences in definition or coverage could influence the results. Ideally, separate regressions should be run for each definition, but there are not enough observations for some definitions. Moreover, the results of such independent regressions would hardly be comparable. We therefore made the simplifying assumption – not implausible in our view – that the differences in definitions and coverage of income-distribution data influence only the intercepts, not the slopes, of regression curves. This means, for instance, that while we allow for differences in inequality between rural and urban areas, we assume that this difference is identical at various levels of per capita income, or for different levels of education etc.[5] The assumption allowed us to reduce possible bias from ignoring definitional differences, by introducing a set of corrective dummy variables. The coefficients and t-statistics for these difinitional variables are quite stable and are not of great interest. They are therefore not reported.[6]

Dependent variables are the *Gini coefficient* and the *share of the poorest 40 percent,* as measures of income inequality. Alternative indexes were chosen because interest in income distribution has focused on both the shape of distribution and the absolute income and income share of the poor. The main explanatory variable was *per capita income* in the 1964 U.S. dollars. The Kuznets Curve is defined as the quadratic function of the log of per capita income, perfectly standard for studies of the Kuznets Curve.[7]

The *time variables* were introduced to capture any shift in the curve. The interaction of the time variable with the log of income and with the square of the log of income was to capture any changes in the slope (flattening) of the Kuznets Curve.

Dummy variables distinguished the Communist countries of *Eastern Europe* and countries with a *dualistic socio-political* structure. To be defined as dualistic, the elite had to be a minority and ethnically different from the majority of the population. Iran is not classed as socio-politically dualistic, although the economy is dualistic, because the elite is indigenous, but Gabon is, because of the foreign (French) role in the society and economy for the year concerned. Judgements may differ on the classification of some countries (see Appendix for list).

[5] With some loss of degrees of freedom one can construct a model to allow for systematic change in the differences between rural and urban income inequalities as per capita income increases. This is left for further work.

[6] Note that most previous studies have been limited to data for countries as a whole and have simply ignored differences in definition. Taking account of such differences should increase the accuracy of the results.

[7] Except for countries with extremely low levels of income.

The *extent of government intervention* in non-Communist countries is measured by the share of public investment in total investment. We considered this a more suitable index than stated ideology since some governments call themselves socialistic but rely heavily on the market and private enterprise, while a few proclaim their devotion to private enterprise but intervene massively in the economy. This index is flawed, since government can intervene as effectively by controlling private actions as by expanding the size of the government sector. But no index exists to measure the extent and effectiveness of controls. Other proxies are even more flawed than the one we used. For instance, the share of government expenditures in GNP is dominated in some countries by the size of military expenditures. By that measure, for instance, the U.S. appears far more interventionist than Japan, contrary to reality. The share of public in total investment also seems to be broadly correlated with the degree of control over the private economy. We therefore considered it the most suitable quantitative index available.

Education was measured by the proportion of children in primary and secondary school, combined into a weighted index, the same variable used for other studies. To take account of lags we have used participation rates for roughly five years before the year of the income-distribution data.

To test the effect of economic structure, the *share of primary and manufactured exports* in national income seemed more appropriate than the share of primary or manufactured exports in total exports. One would expect little effect on income distribution if total exports are 5 percent of GNP, even if the share of primary or manufactured exports is 90 percent of total exports.

Economic growth was measured by the mean rate of growth in GDP for the five years preceding the year for which income-distribution data are available, to take account of inevitable lags in the effects of growth-enhancing policies on income distribution.

Since *regional (dummy) variables* presumably stand for a variety of not clearly defined historical, social, political and economic factors which groups of countries have in common, we attempted to define regions that were not only contiguous, but also showed some other attributes. So, for instance, North Africa was combined with West Asia on the assumption that shared ethnicity, religion, history and social characteristics were more important than geographic definition. The reference region included Western Europe and the developed areas of European settlement (North America, Australia and New Zealand).

METHODOLOGY

Our methodology is based on a sequence of ordinary least-square regressions nested into the following general model:

$$Y_{it} = \alpha + \Sigma\beta_j D_{jit} + \gamma t + (\delta + \phi t)\, LIN_{it} + (\psi + \lambda t)\, LIN_{it}^2 + \Sigma\mu_s X_{sit} + u_{it} \quad \ldots \quad (1)$$

where

Y_{it} is a measure of income distribution, i.e. Gini coefficient or the share of the poorest 40 percent of population, for the country i in the year t;
D_{jit} are corrective dummy variables for differences in definitions and coverage of the left-hand variables; (j = 1,2.6)
t is time;
LIN_{it} is logarithm of per capita GNP in the 1964 U.S. dollars; and
X_{sit} is the value of the sth additional explanatory variable.

Two submodels for testing different groups of hypotheses can be derived from Equation (1).

(a) *First* we shall estimate a submodel that is obtained from Equation (1) by putting $\gamma = \phi = \lambda = 0$ and choosing the country-specific dummy variables CD_{iit} for the additional explanatory variables X_{sit}.

$$Y = \alpha + \Sigma\beta_j D_{jit} + \delta LIN_{it} + \psi LIN_{it}^2 + \Sigma\mu_i CD_{iit} + u_{it} \quad \ldots \quad (2)$$

In this model the only genuine (i.e. non-dummy) variables are the "Kuznets Curve" variable *LIN* and its square, LIN^2. The coefficient δ represents the slope of the Kuznets Curve at the $1 level of GNP per capita while the coefficient ψ indicates the degree of curvature of the Kuznets Curve. The Kuznets hypothesis implies $\delta > 0$, $\psi < 0$ for the Gini coefficient (inverted U) and $\delta < 0$, $\psi > 0$ for the share of the poorest 40 percent (regular U curve). The smaller the absolute value of both δ and ψ, the flatter the Kuznets Curve.

Because the coefficients δ and ψ in Equation (2) are neither country-nor time-specific, this model assumes that all the countries lie on a family of parallel (i.e. identically sloped) Kuznets Curves that are constant in time but have distinct, country-specific levels of income inequality. This model does not try to explain differences in the levels of income inequality across the countries. It just tries to test whether the hypothesis is tenable that all countries evolve in time along a stable U-shaped curve and whether the shape of the U curves corresponds to the Kuznets hypothesis. Although the model will be estimated from pooled time-series – cross-section data, it does not assume that (nor does it test whether) there exists a U-shaped curve across countries and that (nor whether) the two curves are the same. Obviously, this model tests a weaker version of the Kuznets hypothesis. Notice that in our model (2) there is only one country-specific coefficient to be estimated for

each country; all the other coefficients of the model are shared by all countries or at least by groups of them. This means that in the estimation of model (2) we can use data for all those countries for which we have observations for at least two distinct points in time. On the other hand, all the countries with a single observation have to be discarded, considerably reducing our degrees of freedom. One can think about an even weaker hypothesis according to which not only the levels but also the slopes of U curves would be country-specific, but this would require the estimation of at least 3 country-specific parameters and therefore would necessitate discarding of all countries with less than four data-points. There is not enough information in our data set for such a model.

(b) *Secondly* we shall estimate a submodel that is obtained from Equation (1) by putting $\gamma = \phi = \lambda = 0$ and using various sets of additional explanatory variables as discussed above.

$$Y_{it} = a + \Sigma\beta_j D_{jit} + \delta LIN_{it} + \psi LIN_{it}^2 + \Sigma\mu_s X_{sit} + u_{it} \quad \ldots \quad \ldots \quad (3)$$

The submodel (3) tests a stronger version of the Kuznets hypothesis, namely that the cross-country Kuznets Curve is the same as the intertemporal one and that it is the same for all the countries of our sample. Because there are no country-specific dummy variables in this submodel, both the cross-sectional and time-wise variation will be used to estimate coefficients δ and ψ. The addition of other explanatory variables, on the other hand, implies that variations of income distribution over time and across the countries do not depend just on the level of income; they depend on other social, political and economic factors as well. In other words, this submodel presumes that cross-country and intertemporal Kuznets Curves are identical but they explain only part of the variation in income distribution. One of the advantages of submodel (3) is that we can use our entire data set, including the countries with a single observation.

Within the submodel (3) we shall estimate several partial submodels nested into it. We shall do that by sequentially adding groups of variables X and perform a series of F-tests to determine which of the variables – including the two "Kuznets variables" – appear to be significant in explaining variation in income distribution across the countries and over time.

(c) *Finally*, we shall estimate the full model (1) which contains three additional coefficients (γ, ϕ and λ) signifying the time shift in the Kuznets Curve. This model is estimated to test the hypothesis that the Kuznets Curve is not stable over time. The three coefficients may cause the curve to move up or down and to change its curvature. Any joint significance of these coefficients would weaken the Kuznets hypothesis because it would imply that the cross-sectional curve and the temporal curve are not identical. It would also mean that different countries may evolve along

distinct paths during their development. In particular, it will be interesting to see whether the Kuznets Curve flattens over time. On the other hand, if the three time-shift coefficients are not statistically significant, that would support the hypothesis of a stable Kuznets Curve.

Four other methodological points need to be mentioned here.

(i) *Missing Observations.* For several countries, data were missing for one or more right-hand variables other than GNP. Where we had data for more than one point in time, we usually used interpolation or extrapolation to estimate the missing variable. For countries with a single time-point, the missing observation was replaced by the mean for a group of countries with similar characteristics. Although this procedure may cause a bias in estimates of parameters, such a bias is likely to be small and well compensated for by the benefit of reduced variance due to an increased number of observations.

(ii) *F-tests.* In several cases, we calculate F-statistics for a null hypothesis that both "Kuznets variables" have jointly no explanatory power. Similarly, we calculate F-statistics for the joint explanatory power of various groups of additional variables (see the diagonal in the section of F-statistics at the bottom of Tables 2, 3, 5 and 6). It is well known that the result of any F-test may depend a great deal on which and how many other variables are present in the regression (see the rows of the F-statistics sections). Because we report results of several regression in which groups of variables are sequentially added to the Kuznets Curve variables, for each group we also report a sequence of F-statistics showing the change of its significance as the other groups are added to the regression. It should be kept in mind, however, that the result of such sequential testing is not independent of the particular sequence in which groups enter in the regression – those groups that are added earlier are likely to show greater significance than those added later.

(iii) *Outliers.* To be sure that the results of our regression analysis are not distorted by influential outliers, we calculate influence statistics (see Belsley *et al.* [5]) for most of our regressions. The reported influence statistics and their meaning are as follows:

RSTUDENT are 'Studentized' residuals, i.e. OLS residuals divided by their standard errors obtained from the regression in which the respective observation was dropped. Dividing residuals by standard errors scales them so that they do not depend on units of measurement and makes them t-distributed, provided that the original errors were normal. This allows us to use t-tables for judging whether the given observation is or is not an outlier. Usually we would suspect any observation with RSTUDENT larger (in absolute value) than 2.

COVRATIO measures the influence of a given observation on standard errors. If it is less than one, then removal of that observation would reduce standard errors; if it is larger than one, then removal of that observation would increase standard errors. Therefore, outliers with a small COVRATIO are suspected of having an undesirable influence on a regression.

DFITS show how much and in what direction the fitted value at certain observation would change when that observation is added to the sample from which parameters are being estimated. Like RSTUDENT, DFITS are scaled by standard errors of fitted values to make them independent of units of measurement. DFITS have the same signs as RSTUDENT but their absolute value depends not only on residuals but also on the leverage that the given observation exerts over estimated parameters.

DFBETAS are statistics calculated for each estimated parameter and each observation showing the degree of change in the estimated parameter due to the addition of that observation to the sample. Again, DFBETAS are scaled by standard errors of estimated parameters so that they come close to measuring the change in the t-statistic of the estimated parameter due to the addition of a given observation.

These statistics are useful in identifying outliers and the influence they have on estimated parameters, standard errors and fitted values. But, of course, they do not indicate whether a particular influential outlier exerts a "good" or a "bad" influence. If it represents a correct observation, it is "good" because it helps to determine firmly the direction of the regression line and to reduce standard errors. But if it is an incorrect observation, it will be bad for the regression by pushing it in the wrong direction, if it is influential. Finally, if the outlier is not influential, it does not matter much whether it is correct or not, since it does not influence the results to any degree.

The calculation of influence statistics is especially important in any analysis of income-distribution data, because they are particularly subject to error and because much past work has been based on a limited number of observations. One or two influential incorrect outliers can determine results and the sample of countries used can explain to a substantial extent the differences in the results of different analysts. For further analysis, see the section on "Unusual Cases" below.

(iv) *Unreported Results and Probability Values.* To have manageable tables we have not reported the following results:

- regressions excluding the Kuznets Curve variables. Excluding of these variables does change coefficients and tests of significance, but not sufficiently to affect the conclusions;

- regression constants, which do not appear to be of particular interest;
- the coefficients for the definitional dummy variables, again of little or no importance for the major conclusions.

All these data are available from the authors.

In addition to the usual t-statistics, we have also reported probable values for each estimated parameter and most F-statistics. These are another indication of the individual or joint statistical significance of estimated parameters (e.g.: .021 means that the coefficient is different from zero at the 2.1-percent level of significance).

THE RESULTS

After reporting (in Table 1) the results for the intertemporal Kuznets Curve, the bulk of the paper analyses a combination of the effects of the intertemporal and cross-country Kuznets Curves. These results, with the Gini coefficient as the dependent variable, are given in Tables 2 and 5; for the share of the poorest 40 percent they are given in Tables 3 and 6. Tables 2 and 3 show a stable Kuznets Curve while Tables 5 and 6 introduce the time shift in that curve. The results overall are quite good, although the statistical significance of some estimated parameters is low. Regressions with all right-hand variables explain more than 60 percent of the variation in the Gini coefficient and nearly 60 percent of the variation in the share of the poorest 40 percent. However, some of the hypotheses are not supported.

Hypothesis 1: Per Capita Income/The Kuznets Curve

One of us had argued earlier that the widespread statistical support for the Kuznets hypothesis was due to the exclusion from models of those variables which represent the true causes of the variation in income distribution, most notably the export of primary products and a dualistic socio-political structure (Papanek [18; 19]). Because these variables are most likely to be correlated with the level of development, per capita income served as a proxy for the omitted true explanatory variables, thus producing an artefact which appeared to confirm the Kuznets hypothesis.

The structural changes resulting in the Kuznets Curve were set out originally by Kuznets [11; 13; 14] and elaborated by others e.g. Cline [8], Ahluwalia [3], Bacha [4]. A clear theoretical basis could have been provided by the Lewis [15] and Fei-Ranis [9] model: the poorest countries would include all labour surplus economies, where the real wage, or real labour income, remains unchanged in early stages of development.[8] Therefore, as development proceeds, initially all the additional income would accrue to owners of physical or human capital. Real labour

[8] See, however, Cline [8] who postulates a higher wage in the expanding modern sector and therefore concludes that the outcome is indeterminate.

income would rise only when enough labour has been transferred from agriculture to industry to raise the marginal product of labour in agriculture to the level of the agricultural wage, which has been kept above the marginal product by institutional factors. In this model, the faster the rate of growth, the more rapid the decline in the relative share of the poor, since their income is derived from labour at an unchanged wage.

An alternative model has been suggested (Papanek [20] ; Manove and Papanek, [16]) in which labour income is related to the average product in work-and-income-sharing activities. It can therefore increase even if the marginal product of labour remains below the wage (and may be zero). In that model, the change in income distribution depends on the relative rate of change in income from capital (physical and human) and from labour. Some preliminary evidence has been advanced that the real wage changes with the average product in agriculture. This model, therefore, provides plausible theoretical and empirical reasons for hypothesizing that the Kuznets Curve does not exist at an early stage of development.

Since there are plausible reasons for both sides of the argument, we turn next to empirical tests. The evidence is quite mixed, but tends to suggest that our hypothesis should be rejected and that the Kuznets Curve may exist.

Most empirical studies of the Kuznets Curve have relied on cross-country data, for lack of adequate time-series. Since the Kuznets Curve is supposed to describe a temporal relationship, this is less than satisfactory. We do not have enough observations for any country to use a pure time-series regression, but we have at least two observations at different times for 39 countries (34 in the case of shares), although per capita income and time interval between observations differ for different countries. These data were used to investigate the existence of the intertemporal Kuznets Curve. The estimates of model (2), described in the Methodology section, are presented in Table 1. But instead of using the country dummy variables, we run the regression with both the left-hand and right-hand variables expressed as deviations from country means. The resulting estimated parameters for the two Kuznets Curve variables – and also their standard errors and t-statistics – are exactly the same as if the regressions were run on the original variables but with country dummies. However, R-squares are different. The F-statistic tests the joint hypothesis that the coefficients for both Kuznets variables are simultaneously equal to zero. The results in Table 1 do *not* support the Kuznets hypothesis.

For the regressions for all countries (regressions 1 and 3) the Kuznets Curve coefficients have the wrong signs for both the Gini coefficient and the share of the poorest 40 percent. For the Gini their significance is weak (jointly 8.9%), but for the Share it is considerable (jointly 5.4%, individually below 2%). Only if Taiwan is excluded, which is not really justified (see above), do the Kuznets Curve variables have the right sign. Even then the Curve is flat and either completely insignificant

Table 1

The Intertemporal Kuznets Curve

	Dependent Variables*				
	Gini (1)	Gini (2)	Share (3)	Share (4)	Share (5)
Log of Income	–0.1580	0.0908	16.2318	.6185	–3.8247
t-stat.	(–1.453)	(0.957)	(2.400)	(.104)	(–.596)
prob. val.	(.1495)	(.3408)	(.0185)	(.9174)	(.5528)
Squared Log of Income	0.0103	–0.0075	–1.3205	–.1535	.1839
t-stat.	(1.255)	(–1.062)	(–2.444)	(–.326)	(.364)
prob. val.	(.2125)	(.2911)	(.0165)	(.7453)	(.7168)
R^2	.0482	.0207	.0635	.0487	.0647
SER	.0370	.0300	1.7355	1.4109	1.4156
F	2.482	0.955	3.016	2.174	2.768
Prob. value of F	.0888	.3736	.0540	.1200	.0688
No. of observations	101	97	92	88	83

Columns –

(1) All the countries with more than one observation as shown in the "List of Countries Used in Regressions";

(2) as in (1) but Taiwan excluded;

(3) all countries. However, the following had to be dropped because of missing values: Argentina, Brazil, Singapore and years 72 and 75 for Japan;

(4) as in (3) but Taiwan excluded;

(5) as in (3) but Taiwan and Pakistan excluded.

*Both the dependent and independent variables are expressed as deviations from country means.

(Gini) or only somewhat significant (for Share the joint significance is 6.9 percent, although separately the coefficients are insignificant). Excluding other outliers does not really change the results. The net effect of these regressions is to reject the existence of the intertemporal Kuznets Curve. However, the data base is poor, because we have very few observations for each country.[9] Intertemporal analysis is

potentially more significant than the pooled cross-country time-series data, since the Kuznets hypothesis is important largely because it is assumed to indicate what is likely to happen when per capita income rises with development. At the very least, therefore, these findings suggest that it is highly desirable to apply further tests for the Kuznets hypothesis as additional time-series data on income distribution accumulate. If taken at face value, they imply the absence of the intertemporal Kuznets effect.

All the following tests of the Kuznets hypothesis will assume the combined intertemporal and cross-country Kuznets Curve. The results of this regression analysis, shown in Tables 2 and 3, tend to lead to a rejection of our hypothesis and to the conclusion that the Kuznets Curve exists, especially for the Gini coefficient as a dependent variable. Considering the lack of evidence for the intertemporal Kuznets effect, this result seems to be due to the cross-country Kuznets effect. Although most of the additional variables are significant, the explanatory power of the Kuznets Curve did not disappear when they were added.

For the Gini (Table 2), the Kuznets Curve parameters have the right sign and are significant, both individually (t-statistics over 2) and jointly (probable values ranging from 1% to 5%). For the share of the poorest 40 percent (Table 3), the coefficients have the right sign and are reasonably stable, but the t-statistics are only between 1.0 and 1.8. The joint significance of the Kuznets Curve variables has a probability value of only 16 percent to 26 percent, that is barely significant to insignificant.

The pooled cross-country/time-series results for the Gini are consistent with other studies, all but one of which (Papanek [18; 19]) is the exception, support the Kuznets hypothesis. But the weakness of the Curve should also be noted. When the definitional variables are added to the Kuznets variables, as they should be, the R^2 is still only 0.35. Other significant variables raised that figure to about 0.6. As can be seen from Table 4, higher per capita income has relatively little effect in worsening income distribution once it exceeds $100 (in 1964 prices). While inequality continues to increase until it reaches about $300 (for the Gini) or $400 (for the Share – both in the more complete regressions), the estimated deterioration is small. With a complete regression, including all variables tested (except regions), the drop in the estimated share of the poorest 40 percent between $100 and $400 is 1.2 percent; the rise in the Gini is 0.02. The estimated deterioration in the share of the poorest also exists as countries move from $70 or $80 per capita to $100, but there were only 10 countries in our group of 85 which had such low incomes in the past and several of

[9] Ahluwalia, in [7], also concludes that time-series data show no systematic deterioration in the share of the poorest 40 percent.

Table 2

Factors in Income Distribution
Pooled Data – Stable Kuznets Curve

Dependent Variable: Gini Coefficient — Coverage: All Countries

Regression Number	1	2	3	4	5
Kuznets Curve:					
Log of Income	.1887	.1302	.2103	.1692	.1779
t-stat.	(2.331)	(1.560)	(2.418)	(1.984)	(1.963)
prob. val.	(.021)	(.121)	(.017)	(.049)	(.052)
Log of Income Squared	−.0176	−.0124	−.0172	−.0147	−.0155
t-stat.	(−2.625)	(−1.795)	(−2.459)	(−2.146)	(−2.183)
prob. val.	(.010)	(.075)	(.015)	(.034)	(.031)
Economic Factors:					
Growth Rate		.0010	.0001	.0004	−.0003
t-stat.		(.392)	(.221)	(.163)	(−.124)
prob. val.		(.695)	(.825)	(.871)	(.901)
Primary Exports		.0017	.0013	.0009	.0003
t-stat.		(2.730)	(2.034)	(1.492)	(.551)
prob. val.		(.007)	(.044)	(.138)	(.582)
Manufactured Exports		.0001	.0001	.0001	.0004
t-stat.		(.082)	(.116)	(.142)	(.539)
prob. val.		(.935)	(.908)	(.887)	(.591)

Continued –

Continued –

Table 2 – (*Continued*)

Education:			
Enrolment	−.0014	−.0007	−.0002
t-stat.	(−2.658)	(−1.435)	(−.363)
prob. val.	(.009)	(.154)	(.717)
Socio-political System:			
East Europe		−.1225	−.1083
t-stat.		(−2.863)	(−2.539)
prob. val.		(.005)	(.012)
Dualistic Society		.0412	.0322
t-stat.		(2.077)	(1.626)
prob. val.		(.040)	(.107)
Public Investment		−.0006	−.0006
t-stat.		(−1.137)	(−1.197)
prob. val.		(.258)	(.234)
Regions:			
South and Central America			.0351
t-stat.			(1.354)
prob. val.			(.178)
Africa, Sub-Sahara			.1285
t-stat.			(3.575)
prob. val.			(.000)

Continued –

Table 2 – (*Continued*)

Regression Number	1	2	3	4	5
Asia					−.0020
t-stat.					(−.068)
prob. val.					(.946)
West Asia and North Africa					.0702
t-stat.					(2.066)
prob. val.					(.041)
R^2	.3484	.3871	.4182	.5426	.6238
SER	.0895	.0877	.0858	.0770	.0709
F-stat.	9.088	7.636	7.908	10.203	10.909
Partial F-statistics:					
Kuznets Curve	8.742	4.762	3.037	3.088	3.496
prob. val.	(.0003)	(.0101)	(.0513)	(.0490)	(.0333)
Economic Factors		2.802	1.496	.821	.163
prob. val.		(.0418)	(.2172)	(.4873)	(.9185)
Education			7.063	2.058	.132
prob. val.			(.0088)	(.1538)	(.7171)
Socio-political System				11.696	7.198
prob. val.				(.0001)	(.0002)
Regions					6.743
prob. val.					(.0001)

Table 3

Factors in Income Distribution
Pooled Data – Stable Kuznets Curve

Dependent Variable: Share of the Poorest 40 Percent — Coverage: Pakistan Excluded

Regression Number	1	2	3	4	5
Kuznets Curve:					
Log of Income	−6.9289	−3.9827	−8.0062	−7.0360	−8.5734
t-stat.	(−1.743)	(−.961)	(−1.832)	(−1.611)	(−1.756)
prob. val.	(.084)	(.338)	(.070)	(.110)	(.082)
Log of Income Squared	.6473	.3770	.6323	.5804	.7239
t-stat.	(1.950)	(1.087)	(1.781)	(1.643)	(1.849)
prob. val.	(.053)	(.279)	(.077)	(.103)	(.067)
Economic Factors:					
Growth Rate		−.0706	−.0528	−.0552	−.0315
t-stat.		(−.552)	(−.421)	(−.481)	(−.267)
prob. val.		(.582)	(.674)	(.632)	(.790)
Primary Exports		−.0752	−.0513	−.0341	−.0197
t-stat.		(−2.650)	(−1.743)	(−1.211)	(−.703)
prob. val.		(.009)	(.084)	(.228)	(.484)
Manufactured Exports		.0357	.0368	.0399	.0361
t-stat.		(.919)	(.967)	(1.080)	(.858)
prob. val.		(.360)	(.336)	(.282)	(.393)

Continued –

Table 3 – (*Continued*)

Regression Number	1	2	3	4	5
Education:					
Enrolment			.0610	.0287	.0108
t-stat.			(2.480)	(1.179)	(.426)
prob. val.			(.015)	(.241)	(.671)
Socio-political System:					
East Europe				6.7108	6.4878
t-stat.				(3.369)	(3.048)
prob. val.				(.001)	(.003)
Dualistic Society				−1.6216	−1.7908
t-stat.				(−1.717)	(−1.773)
prob. val.				(.089)	(.079)
Public Investment				.0009	.0082
t-stat.				(.035)	(.325)
prob. val.				(.972)	(.746)
Regions:					
South and Central America					.4445
t-stat.					(.316)
prob. val.					(.753)
Africa, Sub-Sahara					−3.0385
t-stat.					(−1.593)
prob. val.					(.114)

Continued –

t-stat.					(−1.593)
prob. val.					(.114)

Continued –

Table 3 – (*Continued*)

Asia					.7598
t-stat.					(.459)
prob. val.					(.647)
West Asia and North Africa					−1.4793
t-stat.					(−.839)
prob. val.					(.403)
R^2	.3585	.4073	.4362	.5463	.5827
SER	4.0474	3.9385	3.8573	3.5043	3.4196
F-stat.	8.662	7.558	7.735	9.391	8.304
Partial F-statistics:					
Kuznets Curve	4.5405	1.5871	1.7284	1.3678	1.8395
prob. val.	(.0125)	(.2087)	(.1820)	(.2587)	(.1636)
Economic Factors		3.3173	1.6739	1.2735	.6007
prob. val.		(.0221)	(.1746)	(.2862)	(.6199)
Education			6.1520	1.3894	.1816
prob. val.			(.0145)	(.2409)	(.6708)
Socio-political System				9.4642	6.6771
prob. val.				(.0001)	(.0004)
Regions					2.4655
prob. val.					(.0490)

Table 4

Fitted Values of Gini and Share

Per capita Income	Gini		Share of Poorest 40 Percent	
	Regr. 1	Regr. 4	Regr. 1	Regr. 4
A. Income Distribution Statistics at various per capita Incomes				
$ 80	0.45	0.42	14.7	16.2
$ 100	0.45	0.43	14.6	15.8
$ 200	0.46	0.45	14.3	14.9
$ 300	0.46	0.45	14.3	14.6
$ 400	0.46	0.45	14.5	14.6
$ 500	0.45	0.45	14.7	14.6
$ 600	0.44	0.45	15.0	14.6
$ 700	0.44	0.44	15.2	14.7
$ 800	0.43	0.44	15.4	14.8
$ 900	0.43	0.44	15.6	14.9
$ 1000	0.42	0.43	15.8	15.0
$ 2000	0.37	0.40	17.5	15.9
$ 3000	0.34	0.38	18.8	16.8
$ 4000	0.31	0.36	19.9	17.4
$ 5000	0.29	0.34	20.7	18.1

The regression equations are taken from Table 2 and Table 3 respectively. Regression 1 uses only the Kuznets Curve and definitional dummy variables, and Regression 4 has all other explanatory variables except regional dummies. The fitted values of Gini and Share are representative of the mean (for our sample) of income distribution statistics at the given level of income.

B. Per Capita Income with the Greatest Predicted Inequality

Regression Used	Gini All Countries	Share Pakistan Excluding
1	213	211
2	191	197
3	452	562
4	316	429
5	310	373

Per capita income in 1964 U.S. Dollars.

these have now moved beyond this category (even in the 1964 dollars), e.g. Indonesia, India, Pakistan, and Malaysia, so theirs is not a very widespread problem.[10] The initial improvement in income distribution beyond $400 to $1,000 per capita is also not large, reaching only 0.02 of the Gini and 0.4 percent in the share of the poorest 40 percent. However, as per capita income continues to rise, the estimated improvement becomes quite large, with the share of the poorest at $5,000 at 3.1 percent above $1,000. However, only 5 countries in our sample had per capita incomes above $2,000 during the period under review.

The real concern has been with the presumed deterioration in distribution as per capita income first rises with development. But except for the handful of countries still below $100 (in the 1964 prices), the evidence is that the deterioration is rather small. These results provide little comfort to governments or societies that claim that an unequal income distribution is not their responsibility, but is due to the inevitable increase in inequality which accompanies development. Nor do they provide support to those who argue that massive government intervention is necessary to prevent a severe deterioration that would otherwise inevitably take place. In other words, the Kuznets Curve exists but appears to be quite flat in the relevant range. And once a country has passed through the plateau between $200 and $400, the Kuznets Curve works in its favour according to this analysis: other things being equal, income distribution will tend to become more equal. Altogether these are more optimistic conclusions than are generally drawn on the basis of the original Kuznets hypothesis.[11]

When the results of both tests are taken into account, one can reasonably conclude that the cross-country Kuznets Curve may well exist, but the limited evidence that we have for the intertemporal Kuznets effect is negative. In any case, the effect of the Kuznets Curve on income distribution seems to be quite weak.

Hypothesis 2: The Time Shift in the Kuznets Curve

There has been some discussion of a time shift in the Kuznets Curve. It has been argued that inequality has worsened. Bacha [4] summarizes the arguments of the (Latin American) structuralist school that benefits of growth in the recent past accrued primarily to the developed countries (DCs) or the "Centre" and to the elite

[10] Income distribution inevitably is highly egalitarian at per capita incomes below $100. "In countries with an average per capita income of $100, if the poorest 20 percent had less than 40 percent of total income, quite typical of countries with higher incomes, the average income of the poor would be less than $20 a year, probably not enough to live on, even if nearly all income goes for carbohydrates" [19]. Quite naturally income distribution tends to become less egalitarian as $100 is approached.

[11] Support comes from Bacha's results [4]. He has to exclude both Pakistan and Sri Lanka from the analysis to obtain any significant relationship between per capita income and income distribution.

in the less developed countries (LDCs) or the "Periphery" associated with the Centre. As a result, they argue, the trend towards equality, which came quite early in the Western European countries examined by Kuznets, is now postponed for an indeterminate period.

Conversely, one could argue that some of the same socio-political factors which made for greater equality in Europe are increasingly felt in the LDCs. After countries gained independence, some governments became more responsive to the demand of the poor majority, albeit with a lag (e.g. Tanzania, Sri Lanka). In other countries, land reform or the transfer of assets by populist or revolutionary regimes (e.g. Peru, Iraq, Libya) produced an irreversible change in income distribution. In still another group of countries, wages rose more rapidly than per capita income, as the result of increasing average product in the income-sharing sector. One can therefore hypothesize that there will be a lessening of any tendency towards greater inequality in the early stage of development.

The tests of the alternative hypotheses are reported in Tables 5 and 6. The regressions on which they are based are the same as in Tables 2 and 3, but with the three time-shift variables added. However, the estimated parameters for variables other than those for the Kuznets hypothesis are not reported. The effect of the time-shift variables on the significance of these other parameters can be seen from the F-statistics testing the joint significance of groups of variables.

For the Gini coefficient (Table 5), all five variables of the shifting Kuznets Curve are individually significant and their coefficients decrease only slowly as economic factors and education are added in regressions 7 and 8. The values and significance of the three time-shift variables indicate relatively fast flattening (that is declining importance) of the Kuznets Curve over time. However, when the three socio-political variables are added (regression 9), the three time-shift variables lose significance. Since there has been no increase over time in the number of Communist countries in the data set, one of the socio-political variables, and the share of government investment (another variable) is not significant in any regression, it is most plausible that this loss of significance is related to the third variable, that for socio-political dualism. One can speculate that a decline in dualism, with the ending of colonialism in a few countries and of neo-colonialism in a few others, is a factor in the flattening of the Kuznets Curve over time. We have so far not tested that speculation.

The joint significance of the time-shift variables is pretty low, even in regression 6 where only the Kuznets variables are included. Significance is further reduced as other variables are added and disappears when the socio-political variables are introduced. This is one of the rare cases where a group of variables is jointly less significant than each of them separately. The low F-statistic casts doubt on the significance of the time shift. The hypothesis of a stable Kuznets Curve can not be

Table 5

The Time Shift in the Kuznets Curve
(Gini Coefficient – All Countries)

Regression Number	6	7	8	9	10
Kuznets Curve:					
Log of Income	.6952	.6128	.6655	.4942	.4753
t-stat.	(2.915)	(2.520)	(2.783)	(2.222)	(2.213)
prob. val.	(.004)	(.013)	(.006)	(.028)	(.029)
Log of Income Squared	−.0607	−.0531	−.0557	−.0419	−.0408
t-stat.	(−3.017)	(−2.575)	(−2.757)	(−2.226)	(−2.225)
prob. val.	(.003)	(.011)	(.007)	(.028)	(.028)
Time Shift in Kuznets Curve:					
Time Trend	.0863	.0830	.0785	.0570	.0508
t-stat.	(2.143)	(2.076)	(2.003)	(1.600)	(1.527)
prob. val.	(.034)	(.040)	(.047)	(.112)	(.129)
Interactions of Time Trend with					
Log of Income	−.0305	−.0289	−.0273	−.0193	−.0178
t-stat.	(−2.219)	(−2.116)	(2.038)	(−1.586)	(−1.551)
prob. val.	(.028)	(.036)	(.044)	(.115)	(.124)

Continued --

Table 5 – (*Continued*)

Regression Number	6	7	8	9	10
Log of Income Squared	.0026	.0024	.0023	.0016	.0015
t-stat.	(2.259)	(2.123)	(2.049)	(1.578)	(1.553)
prob. val.	(.026)	(.036)	(.042)	(.117)	(.123)
R^2	.3739	.4082	.4366	.5527	.6312
SER	.0887	.0872	.0854	.0770	.0711
F-stat.	7.220	6.406	6.666	8.648	9.489
Partial F-statistics:					
Time Shift in Kuznets Curve	1.8067	1.5481	1.4066	.9419	.8108
prob. val.	(.1473)	(.2037)	(.2427)	(.4243)	(.4929)
Economic Factors		2.5160	1.3772	.7907	.1697
prob. val.		(.0601)	(.2517)	(.5041)	(.9141)
Education			6.5069	1.9377	.1102
prob. val.			(.0119)	(.1664)	(.7404)
Socio-political System				10.8918	5.8909
prob. val.				(.0001)	(.0010)
Regions					6.4908
prob. val.					(.0001)

Table 6

Time Shift in the Kuznets Curve
(Share of the Poorest 40 Percent – Pakistan Excluded)

Regression Number	6	7	8	9	10
Kuznets Curve:					
Log of Income	−24.2973	−19.0587	−22.0655	−16.8015	−16.9687
t-stat.	(−2.033)	(−1.586)	(−1.862)	(−1.517)	(−1.508)
prob. val.	(.004)	(.116)	(.065)	(.132)	(.134)
Log of Income Squared	2.0665	1.5892	1.7631	1.3448	1.4051
t-stat.	(2.032)	(1.549)	(1.749)	(1.423)	(1.468)
prob. val.	(.004)	(.124)	(.89)	(.156)	(.145)
Time Shift in Kuznets Curve:					
Time Trend	−3.3808	−3.0232	−2.8575	−2.1062	−1.6972
t-stat.	(−1.607)	(−1.467)	(−1.413)	(−1.137)	(−.926)
prob. val.	(.111)	(.145)	(.160)	(.258)	(.357)
Interactions of Time Trend with					
Log of Income	1.1500	1.0074	.9450	.6683	.5523
t-stat.	(1.578)	(1.408)	(1.347)	(1.040)	(.869)
prob. val.	(.117)	(.162)	(.181)	(.301)	(.387)

Continued –

Table 6 – (*Continued*)

Regression Number	6	7	8	9	10
Log of Income Squared	−.0937	−.0807	−.0756	−.0523	−.0445
t-stat.	(−1.522)	(−1.333)	(−1.274)	(−.962)	(−.829)
prob. val.	(.130)	(.185)	(.205)	(.338)	(.409)
R^2	.3744	.4204	.4477	.5562	.5883
SER	4.0462	3.9438	3.8662	3.5109	3.4428
F-stat.	6.583	6.114	6.323	7.938	7.144
Partial F-statistics:					
Time Shift in Kuznets Curve	1.0258	.8929	.8161	.8526	.4961
prob. val.	(.3847)	(.4492)	(.4901)	(.4704)	(.6897)
Economic Factors		3.1215	1.6076	1.3285	.6562
prob. val.		(.0283)	(.1898)	(.2678)	(.5845)
Education			5.7851	1.3453	.2135
prob. val.			(.0177)	(.2485)	(.6449)
Socio-political System				9.2913	5.8779
prob. val.				(.0001)	(.0010)
Regions					2.1396
Prob. val.					(.0081)

rejected. Moreover, when the share of the poorest is the dependent variable (Table 6), the time shift is only weakly significant in the regression with only the Kuznets variables (6) and becomes weaker as other variables are added. The time-shift variables are never jointly significant.

There is, therefore, little statistical support for the hypothesis that the effect of per capita income on income distribution may be weakening over time. The facts that coefficients all have the right sign, are reasonably stable and are significant in some regressions suggest that the flattening of the Kuznets Curve during the 20 years observed, illustrated in Fig. 1 and Fig. 2 (where fitted values are plotted), warrants further exploration as data on income distribution become available for the mid- and late 1970s for additional countries. That is especially desirable, because if one were to extrapolate the estimated linear trends, the Kuznets Curve would have all but disappeared, or even reversed itself, by the early 1980s. Given the lack of statistical support, neither extrapolation nor firm conclusions are warranted on the gradual flattening of the Kuznets Curve over time on the basis of our data, but it is a possibility worth investigating further.

Hypothesis 3: The Effect of Socio-political Systems

In all regressions, the most consistently significant group of variables are the three that reflect socio-political systems. It is significant in spite of the fact that it enters the regression late. This result is primarily due to the two dummy variables which are individually significant: for East European countries and societies with socio-political dualism.

(a) *The East European countries* for which we have data have an unusually egalitarian income distribution (Gini coefficient around .20 to .25) and a reasonably high per capita income (most are around $600–$800). They, therefore, do not fit well the Kuznets Curve, and in all regressions are significantly different from the rest of the observations. Most econometric analyses of the Kuznets Curve have taken account of this factor by excluding – completely or through the use of a dummy variable – the Communist countries. The dummy variable in most regressions shows a Gini for the few East European countries lower by .12, a major difference.

It is difficult to determine to what extent income distribution in these countries is in fact more equal because most property income accrues to the State and to what extent recorded equality is due to different statistical conventions and the failure to take full account of income in kind and fringe benefits for the elite (better health services, special stores, cars, etc.).

(b) *A dualistic socio-political structure*, with an elite drawn from a different ethnic or racial group than the poor majority, makes for an unequal income distribution. One would generally expect a "foreign" elite to be more forceful and blatant than one in a more homogeneous society in using its political power to ensure that it

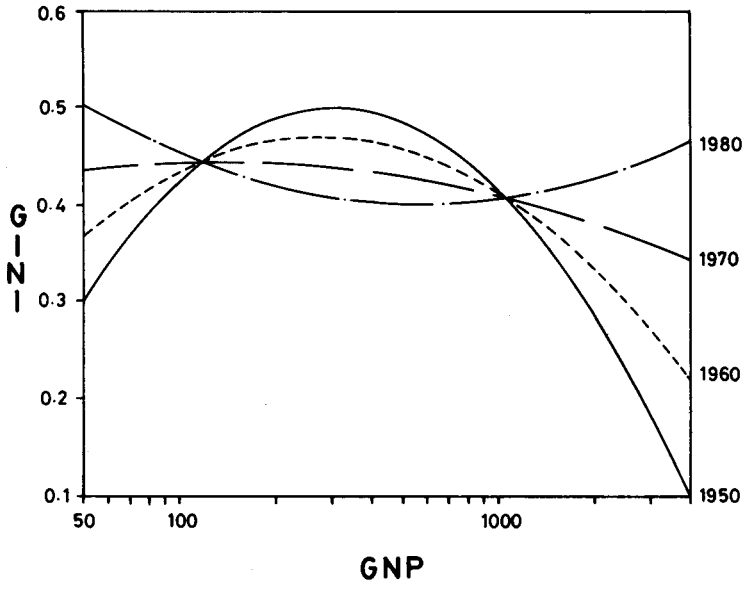

Fig. 1 Time Shift of Kuznets Curve

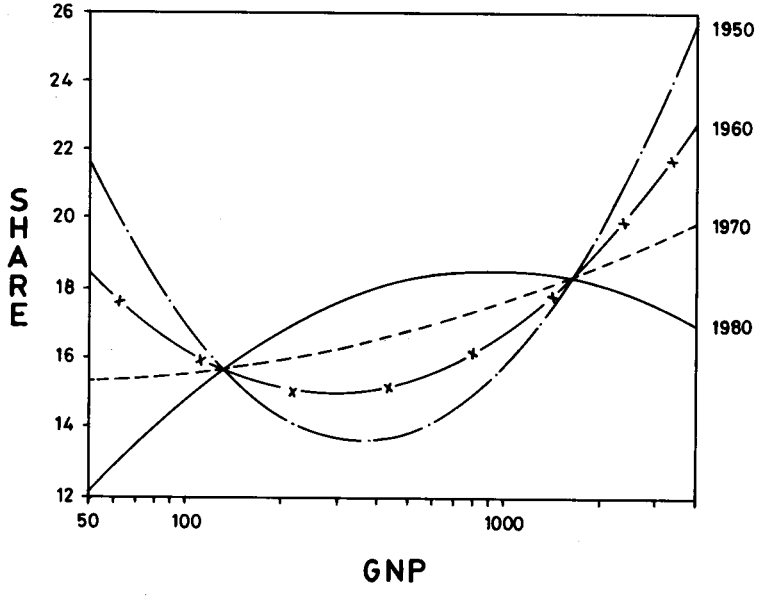

Fig. 2 Time Shift of Kuznets Curve

obtains a disproportionate share of income. These countries often also have a dualistic economic structure. Since economic dualism is usually defined in terms of a great gap between a high-productivity, high-income, modern sector and a low-productivity, low-income, traditional sector, one would expect to find a high correlation between dualism and inequality, but only because the same phenomenon is observed in both cases. Socio-political dualism differs analytically from economic dualism. It refers to countries dominated by a foreign elite, generally of European origin, with the majority of different racial or ethnic backgrounds. Examples include South Africa and Rhodesia; some countries of French West Africa before or shortly after independence; those countries of Latin America where the elite is of European origin, the majority Indian, Mestizo and Black; and a few other countries in Asia and Africa before or shortly after independence, before the indigenous elite took over real control. (See Statistical Appendix for full list.) The effect of socio-political dualism has been examined before (Papanek [18; 19] and Bacha, [4]) but the variable has not been clearly defined or rigorously tested in a multi-factor analysis.

In all regressions of Tables 2 and 3, dualistic societies are significantly less egalitarian but the t-statistic ranges from 2.1 to 1.6. The latter, implying very weak significance, is in the Gini coefficient regression with regional dummies. Since dualistic societies are concentrated in Sub-Saharan Africa and Latin America, the dualistic variables lose statistical significance, but not necessarily real economic significance, when regions are introduced into the regressions: it may not be location in a region that causes inequality, but socio-political dualism which happens to be especially pronounced in two regions.

Moreover, when the share of the poorest 40 percent is the dependent variable, the t-statistics for dualism are only 1.7 to 1.8, also indicating relatively weak significance. But this appears to be due in large part to the fact that the socio-political variables enter the regression quite late. In an earlier version of the work (Papanek and Kyn [21] and [17]) these variables entered earlier and the t-statistics ranged up to 2.6. They lost considerably in importance and significance (coefficients and t-statistics decline) when education was introduced in the regression and again when the structural variables were added, among which the importance of primary exports is the only significant one. A plausible explanation is that dualistic societies affect income distribution in part through indirect means, including education and the allocation of the concentrated resources generated by primary exports or primary production for the domestic market. Education is largely limited to the elite in dualistic societies. Concentrated (rental) income from primary exports can more easily be retained by the elite than more diffuse income from manufactured exports or primary production for the domestic market. Because of collinearity, the variable for dualistic societies loses statistical significance in the complete regression, but it probably does not lose real economic significance. The most reasonable explanation

of the statistical results is that some of the other variables represent instruments through which dualistic societies achieve their implicit objectives.

It should be emphasized that these two variables – for East European and socio-politically dualistic countries – explain a great deal of the variance in income distribution. Since neither is causally related to per capita income, they have little predictive value for other countries' income distribution as per capita income rises. As poor countries such as Tanzania, Bangladesh, India and Sudan reach the per capita income of the East European or dualistic countries, they will not as a result develop the more egalitarian income distribution of Eastern Europe or the unequal income of countries with an elite that is of different ethnic background from the majority. This is a case where cross-section data cannot be used to predict developments over time. Of course, the model has some predictive value in another sense: a change in socio-political systems is likely to lead to a change in income distribution. For instance, if a dualistic society changes to one in which the elite is drawn from the same ethnic group as the majority, we would expect income distribution to become more egalitarian.

(c) *The role of government in the economy,* unlike the other two socio-political variables, often changes over a relatively short period of time. Other studies (Adelman and Morris [2], Papanek [18]) have concluded that economies are egalitarian if government intervenes more extensively in the economy. Indeed, one of the primary justifications for government intervention is to improve equity. However, our results do not support the hypothesis that greater government intervention increases equality, at least when such intervention is measured by the share of public investment. The signs of the coefficients are almost universally in the right direction – negative for Gini, positive for the share of the poorest 40 percent – but the coefficients are very low. As the percentage of public investment increases from around 10 percent or 20 percent (Philippines, U.S.A., Lebanon) to 50 percent (Pakistan, Gabon, Taiwan, Sweden, India) the Gini would drop by only .02 and the share of the poorest 40 percent would increase by less than .04 percent. Even a radical shift from 100 percent private investment to 100 percent public investment would increase the share by less than 0.1 percent. Moreover, the coefficients are universally not significant, as indicated by t-statistics (even when the variable enters the regression very early), although they are again quite stable.

How does one explain the observation that greater government intervention does not significantly affect income distribution? One possible explanation is that we have chosen an inappropriate proxy variable, that a substantial proportion of interventionist governments do not control investment and vice versa, that a substantial proportion of *laissez-faire* governments actually control a good deal of investment. But an examination of the list of countries and their ranking on this variable – a small sample was given above – makes that an implausible explanation.

A more likely explanation (see Papanek [21]) is that interventionist or populist governments often intervene on behalf of a different part of the elite, not of the poor. Their intervention benefits some of the political, bureaucratic and military leadership, often the workers in the public enterprises and the businessmen who receive government patronage. The costs are borne by the landless rural workers, the casual urban workers, and sometimes a landed or business elite out of political favour. While evidence for this hypothesis comes largely from Southern Asia, we suspect it applies more widely. Clearly, the effect of government intervention on growth and equity in mixed economies warrants further study.

Hypothesis 4: The Effect of Education

The argument has been made that widely distributed education makes for greater equality because it reduces the differential return to human capital and provides access for a larger proportion of the population to the higher incomes accruing to the educated. Adelman and Morris [2] and Ahluwalia [3] found the postulated relationship between education and equality.

The spread of education proves generally to be significantly related to equality in this study, as in other studies, as long as the regression includes only the Kuznets Curve and economic variables. In these regressions both t-statistics and F-statistics are highly significant whether the dependent variable is the Gini coefficient or the share of the poorest 40 percent. However, once socio-political variables are taken into account, education is no longer statistically significant. This is the mirror image of the earlier discussion of the significance of dualism: in Eastern Europe education is widespread; in dualistic society it is concentrated on the foreign elite and its local clients. That is, socio-political and educational variables are correlated and when the former are added, the latter loses significance.

The coefficient and significance of education drop further when regional dummies are introduced. But the reason why the regional variables take away significance may be that the regions differ in educational level. So education declines in statistical, but probably not in real, economic significance, when regions are introduced.

In the more limited regressions, the coefficients for education are quite high. Comparing countries with 10 percent and 90 percent enrolment ratios – and only a few countries exceed those limits, since secondary school rates are included – the estimated Gini differs by about 0.11 and the share of the poorest 40 percent increases by an estimated 4.9 percent. Education alone explains much of the variance in income distribution in these regressions. But these coefficients probably overstate the effect of education, since they come from regressions with only a limited number of variables. Using the most complete regressions, excluding regional variables, the effect on the Gini is a small .056 and on the share a more impressive 2.3 percent.

These results suggest that spread of education benefits particularly the poorest groups in the population. This is quite a reasonable conclusion. For most countries, enrolments in both primary and secondary schools had reached 30 percent during the period covered by this study, and the mean was 62 percent. So a large proportion of the middle income groups had been educated for some years, given the proportion of young people in the labour force. (The education data are for five years earlier than the income distribution data.) A further spread of education therefore means a spread to the poor in most countries and could, therefore, help them disproportionately. However, the maximum increase in enrolment which it is realistic for most countries to achieve is 20–40 percent – the difference between Guatemala and Costa Rica, or Pakistan and Sri Lanka. The feasible improvement in education is likely to increase the income share of even the poorest group by only about one percent. This would represent a 5-percent increase in their typical share of income, a modest improvement.

Hypothesis 5: The Rate of Growth

The rate of growth, according to our hypothesis, should be positively correlated with the Gini and negatively with the share of the poorest 40 percent. A high rate of growth is supposed to increase inequality because it requires great rewards for savers, investors, entrepreneurs, technicians, managers, and land-owners, all well-to-do groups. And, indeed, in all but one of the regressions the sign is in the right direction. But in every case the coefficients are very low and not significant. *If* they were significant and where the sign is right, an increase in the growth rate from 2 percent to 7 percent would raise the Gini at most by .002 or lower the share of the poorest 40 percent by 0.26 percent in the most comprehensive regression (excluding regional variables). These are not important changes and, since they are also not statistically significant, there is no support for the hypothesis that a high rate of growth can be achieved only at the cost of equality.

Here again the reason may lie in the increase in labour income with rapid growth. Where rapid growth is not due to income from primary exports (see below), it is usually accompanied and caused by quite rapid growth in food output, given the importance of agriculture in the economies of LDCs, and in labour-intensive activities, since unskilled workers are the most abundant factor.

That labour-intensive and agricultural developments are favourable for an egalitarian income distribution remains a hypothesis, which needs to be analysed further, although there is preliminary supporting evidence (see Papanek [24; 21]). But it does plausibly explain why rapid growth can be followed by either an improvement in income distribution or a worsening or no change, depending on the pattern of development. That conclusion is consistent with our results, as with the similarly inconclusive results of earlier studies (e.g. Ahluwalia [3], Chenery *et al.* [7], Cline [8] and Papanek [18]).

Hypothesis 6: The Pattern of Development – Primary and Manufactured Exports

Some structural analysts have argued that a strategy emphasizing primary exports tends to lead to inequality, while manufactured exports are associated with a more egalitarian distribution. One reason is that primary exports (of oil, minerals and plantation crops) frequently generate rents, concentrated in a few hands. Those who exercise control over these economic resources derive political power from them which they use to ensure that private incomes in the sector are high. Whether an oil company, mine or plantation is in private or public hands seems to make relatively little difference to the income of those involved. Even where the primary export is a small-holder agricultural crop, the growers often have greater economic and political power and obtain higher incomes than those who produce staple foods for the domestic market, because they generate crucial foreign exchange.

On the other hand, exports of manufactured goods usually are competitive in the world market only if they are produced by labour-intensive industries. The increase in labour demand will raise wages, because either its marginal or average product rises. The rapid growth of labour-intensive manufactures may also strengthen the political position of workers, contributing further to ensuring them a larger share of income. Finally, economies able to compete on world markets are likely to have fewer of the windfall gains which result from distortions in the economy and which accrue mainly to the upper income groups.

In addition to Chenery and Syrquin [6], Papanek [19] has also examined the role of exports. Ahluwalia [3] has tested a different structural variable: the extent of urbanization as a measure of the importance of the modern, urban sector. Their results generally have been as hypothesized.

In our results as well *primary exports* are quite consistently associated with less equal income distribution, which is statistically significant until socio-political and regional variables are introduced. The sharp drop in statistical significance when regional dummies are added to the regression does not necessarily detract from the causal significance of primary exports, since primary-export dependence and regional location are substantially correlated.

While primary exports are significantly related to income distribution, the coefficients are relatively low. In regressions without regional dummies, very primary-export-intensive country (60% of GDP) would have a projected Gini .06 higher than one without any such exports and the share of the poorest 40 percent would be 2 percent lower, both about 15 percent less equal than the typical measure.

The rate of *manufactured exports*, in contrast, never has a significant effect on income distribution. The coefficients are low and for the Gini they have the wrong sign in terms of our hypothesis: a high rate of manufactured exports is associated with unequal incomes. The presumed association of industrial exports and equality, probably based on the experience of the Asian "Gang of Four" (Korea, Taiwan,

Hong Kong, and Singapore), just does not seem to apply elsewhere. Two plausible explanations are: (i) exporters of manufactured goods in some cases have received massive indirect subsidies (e.g. extremely cheap credit, losses by public enterprises), with distortions in factor and product markets, resulting in the creation of a relatively small number of jobs in export manufacturing; and (ii) the loss of jobs in other sectors, for instance by the tractorization of agriculture or greater capital intensity in domestic industrial production. If labour demand does not increase rapidly, labour income could stagnate and income distribution could become less equal. This relationship between structure of production, that is development strategy, and income distribution warrants further analysis as well.

Hypothesis 7: Regional Differences

There are no good reasons for differences in income distribution because a country is in a particular geographic location, but regions tend to share a variety of attributes. A number of such region-related variables – education, socio-political dualism, Communist governments and structure of exports – were identified, measured and independently tested.

But some of the geographic regions differ significantly in income distribution, even when account is taken of all the other explanatory variables and the Gini coefficient is the dependent variable. This is partly due to the fact, already noted several times, that the regions differ in mean value of other significant explanatory variables. The regions that tend to have less equal income distribution – West Asia, North Africa and Sub-Saharan Africa – are also the regions with more dualistic societies, more raw material exports and a lower rate of educational participation.[12] But there appear to be other, excluded variables associated with geographic regions. The distribution of wealth and particularly of land is undoubtedly one factor which affects income distribution, but which is not separately included in our analysis. Historical circumstances largely determine the land tenure system and history also affects the distribution of other assets.

[12] Note that regional differences are much less significant statistically when the dependent variable is the share of the poorest 40 percent (Table 3) than when it is the Gini coefficient (Table 2). These results suggest that the share of the poorest 40 percent is quite similar in different regions except in Sub-Saharan Africa.

In South and Central America the Gini coefficient is higher (less egalitarian than other regions), but for the share of the poorest 40 percent the region actually shows greater equality. A plausible explanation is that the share of the middle class is less, and of the rich greater, than elsewhere in the world. This conclusion runs counter to conventional wisdom. But when it is said that the middle class is more significant in middle-income countries, such as Latin America, reference is usually to the urban middle class. The usual middle peasantry is probably more important in Asia and in the developed countries than in Latin America. The weakness of the rural middle class in Latin America could be reflected in the results for the Gini coefficient.

The extent of effective fiscal redistribution of income and wealth may also distinguish the regions. This too we have not attempted to measure, except to the extent that it is reflected in government's share in investments.

THE SIGNIFICANCE OF DIFFERENT FACTORS – RELATIVE AND ABSOLUTE INCOMES

In examining the impact of the specific variables on the mixed economies (excluding Eastern Europe) it is most useful to concentrate on the range of per capita income between $100 and $400. There are very few countries below $100 and the problem of absolute poverty is somewhat less serious once per capita income exceeds $400.

Table 7 gives the range of predicted Gini coefficients and shares for the poorest 40 percent for the variables that are generally significant. The variable which could be altered most readily in the medium term is spread of education. Policy can also reduce reliance on primary exports. However, it is usually not desirable to go very far in this direction. A country with a very high primary-export ratio is likely to be natural-resource-rich. The low relative share of the poor may then be compensated in part by a relatively high absolute income. It would normally not make much sense to forgo the high absolute income which some primary exports can generate. Iraq, Venezuela, Iran and so on are in this group and while a more egalitarian strategy might consciously try to raise the importance of industry in the economy, it would generally not be very wise to bring the share of primary exports down from the 50–70 percent typical of these countries to the 1–15 percent typical of the resource-poor East Asian countries.

In a sense, primary exports and dualism are proxies reflecting the willingness and ability of the elite to appropriate a larger-than-average share of income. Another policy alternative, therefore, would be to deal with income distribution directly. The hypothesized reason for the impact of primary exports on inequality is the concentration of income from these exports. Fiscal policy or other steps could ensure the wider distribution of the resources from primary exports. Even a dualistic socio-political system is subject to change.

If one assumes for illustrative purposes that policy can change the education and primary-export variables by about one-third of the range, then the impact of the four variables significant in mixed economies is as shown in Table 8.

These magnitudes are not all that great. But at a per capita income of $100, a 2.5-percent increase in the share of the poorest 4 percent (say from 13.5% to 16%) would mean an increase of $34 to $40 in annual per capita income. This is a noticeable increase, an absolute amount equivalent to a 2-percent increase of per capita income over 8 years. But the main conclusion which seems to emerge is that none of the factors examined, by themselves, make a great deal of difference in the income

Table 7

Predicted Gini Coefficients and Predicted Shares of Poorest 40 Percent for Various Levels of per capita Income and Some Combinations of Other Variables

Variant	EE	Dual	ED	PREX	GNP per capita									
					$80	$100	$150	$200	$300	$400	$600	$1000	$2000	$4000
A. Predicted Gini Coefficients (All Countries)														
Market Economies	0	0	60	15	.427	.435	.447	.452	.455	.454	.449	.435	.405	.360
Eastern Europe	1	0	60	15	.305	.313	.324	.329	.332	.332	.326	.313	.282	.238
Dual Society	0	1	60	15	.468	.477	.488	.493	.496	.495	.490	.476	.446	.401
Low Education	0	0	5	15	.466	.474	.485	.490	.493	.493	.487	.474	.443	.399
High Education	0	0	100	15	.399	.407	.419	.424	.427	.426	.421	.407	.377	.332
Low Prim. Export	0	0	60	1	.415	.423	.434	.439	.442	.442	.436	.423	.329	.348
High Prim. Export	0	0	60	70	.476	.484	.495	.500	.503	.502	.497	.484	.453	.408
High Ed., Low PREX	0	0	100	1	.387	.395	.406	.411	.414	.414	.408	.395	.364	.320
Low Ed., High PREX	0	0	5	70	.514	.522	.534	.539	.542	.541	.536	.522	.492	.447
B. Predicted Shares of Poorest 40 Percent (Pakistan excluded)														
Market Economies	0	0	60	15	16.0	15.6	15.0	14.7	14.4	14.3	14.4	14.8	15.7	17.2
Eastern Europe	1	0	60	15	22.7	22.3	21.7	21.4	21.1	21.0	21.1	21.5	22.4	23.9
Dual Society	0	1	60	15	14.4	13.9	13.4	13.1	12.8	12.7	12.8	13.1	14.1	15.6
Low Education	0	0	5	15	14.4	14.0	13.4	13.1	12.8	12.8	12.8	13.2	14.1	15.7
High Education	0	0	100	15	17.1	16.7	16.1	15.8	15.6	15.5	15.6	15.9	16.9	18.4

Continued –

Table 7 – (*Continued*)

Low Prim. Export	0	0	60	1	16.5	16.0	15.5	15.2	14.9	14.8	14.9	15.2	16.2	17.7
High Prim. Export	0	0	60	70	14.1	13.7	13.1	12.8	12.5	12.5	12.5	12.9	13.8	15.4
High Ed., Low PREX	0	0	100	1	17.6	17.2	16.6	16.3	16.0	16.0	16.0	16.4	17.3	18.9
Low Ed., High PREX	0	0	5	70	12.5	12.1	11.5	11.2	11.0	10.9	10.9	11.3	12.3	13.8

Based on regression 4, excluding regional dummy variables.
EE = Eastern Europe. Dual = Socio-political dualism. ED = Education. PREX = Primary exports.

Table 8

The Predicted Effect of Various Factors on the Share of the Poorest 40 Percent in Mixed Economies

A 30 Percent Increase in Children in School	+0.9 Percent
A 25 Percent Decline in Primary Exports	+0.8 Percent
Dualistic Socio-political system	−1.6 Percent
Per capita Income Increasing from $100 to $400	−1.3 Percent
Per capita Income Increasing from $400 to $1000	+0.5 Percent
Per capita Income Increasing from $1000 to $4000	+2.4 Percent

distribution of non-dualistic, non-East European countries. But, in combination, the variables can make a difference. The share of the poorest 40 percent would be about 10 percent of national income in dualistic societies with reasonably high primary exports and low education and 60–75 percent higher in non-dualistic ones with reasonably low primary exports and high education.

One can similarly trace the effect of different significant variables on the absolute income (Table 9). The most important conclusion is that the absolute income of the poorest 40 percent rises quite dramatically, as per capita income increases from $80 to $400 despite the decline in their income share. Even in dualistic societies, their absolute income rises by 85 to 95 percent each time per capita income doubles from $100 to $200 and then to $400. There is no question that development on the whole has been highly favourable for the absolute income of the poor, even if their share declines slightly as per capita income rises initially.

Lessons from the Unusual Cases – The Role of Influential Outliers

Since the model explains only about half the variance, an examination of outliers, of countries whose income distribution is not well explained by the factors examined, may shed further light on what causes differences in income distribution.

The Appendix gives influence statistics for all influential observations. From these one can see which countries are outliers in the usual sense and what leverage they have on estimated parameters. These data also facilitate an analysis of the extent to which particular results stem from the unusual influence of outliers for which data may be incorrect. The statistics for DFBETAS are the most useful for that purpose. RSTUDENT indicates which observations have the largest residual, which are furthest from the fitted values; COVRATIO indicates influence; and DFBETAS in effect combines the two and indicates how the estimated parameter would change if the particular observations were removed.

Table 9

Predicted Average Absolute Income of Poorest 40 percent
(Pakistan excluded, in 1964 US $)

Variant	EE	Dual	EX	PREX	GNP per capita									
					$80	$100	$150	$200	$300	$400	$600	$1000	$2000	$4000
Market Economies	0	0	60	15	32	39	56	73	108	143	216	369	786	1723
Eastern Europe	1	0	60	15	45	56	81	107	158	210	317	536	1121	2393
Dual Society	0	1	60	15	29	35	50	65	96	127	192	328	705	1561
Low Education	0	0	5	15	29	35	50	65	96	128	192	329	707	1565
High Education	0	0	100	15	34	42	60	79	117	155	233	398	843	1838
Low Prim. Export	0	0	60	1	33	40	58	76	112	148	223	381	810	1771
High Prim. Export	0	0	60	70	28	34	49	64	94	125	188	322	692	1535
High Ed Low PREX	0	0	100	1	35	43	62	82	120	160	240	409	867	1885
Low Ed High PREX	0	0	5	70	25	30	43	56	82	109	164	282	613	1378

Based on regression 4, excluding regional dummy variables.
EE = Eastern Europe. Dual = Socio-political dualism. ED = Education. PREX = Primary exports.

For Table 1, the intertemporal Kuznets Curve, influence statistics are given in Appendix Tables A1 and A2. For a particular observation to have a major influence on the results, the DFBETAS should be about 2.0 or above. It can be seen immediately that there are none, and that there are only a handful DFBETAS that are even above 0.4. The most interesting result in these tables is that the exclusion of data for Pakistan from the analyses with the share of the poorest 40 percent as the dependent variables makes very little difference to the results. Pakistan is an outlier, but not an influential one. Two of the annual observations for Taiwan represent influential outliers and the decision to include that country in the analysis does have a small effect on the results. It weakens the Kuznets Curve because income distribution became more equal as per capita income rose. But, as already noted, there is ample evidence that Taiwanese data reflect reality and that it represents a "good" outlier. On the other hand, the two outliers that strengthen the Kuznets Curve, Mali in 1958 and India in 1955, may be of more dubious reliability. Both represent early efforts, when the data collection machinery may not have been well developed. But they were retained in the analysis to reduce any possibility of our inadvertently biasing the results otherwise.

Tables A3 and A4 report the influential influence statistics for the most complete regressions for Tables 2 and 3, which are based on the combined cross-country/intertemporal Kuznets Curve. Again, DFBETAS are not large, with only a few in the 0.5 – 0.6 range. A brief discussion of the most influential outliers may shed some light on the reliability of our results and on the possibility of excluded variables.

Our conclusion on the weakness of the Kuznets Curve is, if anything, strengthened by this examination. There are three observations from Pakistan that would be influential against the Kuznets Curve, with share as the dependent variable, *if* they had been included in the analysis. So, by excluding Pakistan, we weakened our hypothesis that the Curve does not exist. Most of the other outliers strengthen the Curve and are *all* from Africa (Chad, Gabon, Sierra Leone are outliers for both dependent variables). We have no basis for judging how good these observations are.

Our conclusion that rapid growth can occur without any deterioration in equality may also be strengthened by examining influential outliers. Rapid growth was followed by less equality, mostly in countries where inequality was less due to rapid growth than to a very unequal historical distribution of assets, especially land (Iran), or extreme dualism (Zambia in 1959), or other excluded variables (Taiwan in 1953, when substantial inequality may have reflected the difference between wealthy newcomers and poorer indigenous residents).

The most important outliers contradicting our conclusion that a high rate of primary exports and inequality go together are Mali and Zambia in the 1950s. This may be related to their classification as dualistic and to our inability to measure the degree of dualism, but this is speculation.

Singapore is influential (for the Gini in 1975) against our hypothesis that a high rate of manufactured exports and equality go together. Actually, equality increased steadily over time as manufactured exports increased, but the country started out with substantial inequality. That may have been due to socio-political dualism before independence and its after-effects. In intertemporal analysis Singapore would have supported the hypothesis but with combined cross-country/intertemporal data it does not. On the whole, though the influential outlier data do not really add much to our attempt to explain why manufactured exports and equality are not related.

The influential observations weakening the conclusion that education and equality are related can largely be explained by excluded variables, such as the low participation rates of girls in some Islamic countries (Libya in 1962, Pakistan) or our inability to measure the strength of dualism (Ecuador, for Gini in 1970).

That inability may also explain some of the observations pulling against our conclusion that dualism explains inequality to a considerable degree. Sierra Leone probably suffered from some measure of dualism in 1969, but we did not categorize it as dualistic, perhaps out of ignorance of the true situation. Similarly, neither Gabon (in 1968) nor Venezuela (in 1962 and 1971) was classified as dualistic. The former may be an error, if the economy continued to be French-dominated even if the country was independent, while in the latter case the dualism may be subtler or non-existent (as defined). On the other hand, Surinam, classed as dualistic, may have been very weakly so. If the strength of dualism could be measured, our conclusion on its importance might well have been further strengthened.

Finally, there are three influential observations acting against our conclusion that greater government intervention (more public investment) does not affect equality: Chad, Iraq and Surinam. The latter two lack actual observations for public investment, and so had to be estimated. Their influence on the results might, therefore, well be disregarded. Chad appears as an influential outlier for many variables. Together with the inherent difficulty of surveying, income distribution in that country may justifiably lead one to doubt the reliability of its income-distribution data. With possible doubts on the reliability of data for all three outliers pulling against our conclusion, that conclusion can be seen as further strengthened.

In sum, the following seem plausible explanations for the divergences from expected values.

(i) The distribution of assets, especially of land, reflects past history and current power-relationships. It would obviously affect income distribution, but was not included in the regression analysis because we could not find a good measure of asset distribution. This could affect the less-egalitarian-than-expected income distribution of such countries as Iraq (1956), Iran and the Dominican Republic, and the more egalitarian distribution in Taiwan (1972), Libya and Israel (1957).

(ii) The degree of dualism was not reflected in the regression since a dummy variable had to be used, which only indicates whether a country is dualistic, not by how much. As a result, the extent of inequality was not accurately predicted in countries with considerable dualism such as Gabon (1968) and Sierra Leone (1969).

(iii) Nor do the regressions take account of government policies limiting wages (or profits), or raising wages, or providing high windfall gains to particular segments of the elite. Only a great deal of knowledge about individual countries would enable one to take account of such factors in income distribution, which could have affected such countries as Brazil and Taiwan in 1953 (less egalitarian), and Israel (more egalitarian).

There may well be serious errors in some data, such as the astoundingly high Gini coefficient of 0.61 for Sierra Leone or the low 0.27 for Libya and 0.3 for Guatemala. Finally, in some countries more than one of the excluded variables probably come together: dualism, land tenure and policy in Rhodesia or land tenure and policy in Taiwan and Korea.

In any case, data on outliers suggest the direction of worthwhile further research. Since plausible explanation can be given for many of the outliers, their analysis may increase confidence in the basic results.

CONCLUSIONS

There is great variation in income distribution. Even if one leaves out extreme values because of doubt about their reliability, one finds that the share of the poorest 40 percent of the population in LDCs ranges between 6 percent and 7 percent and 22 or 23 percent of national income. Per capita income, or the Kuznets Curve, explains about 1.5 percent of the 16 percent of the range at low income levels, but its effect may be declining over time. Socio-political dualism – an elite drawn from an ethnic minority – explains about as much, but if it were possible to measure the degree of dualism, its explanatory power would most probably increase further.

Two variables which can be changed to some degree over several years also contribute significantly to variation in income distribution: the coverage of the educational system and the degree of reliance on primary exports. Since massive primary exports can provide a powerful stimulus to growth, there may be a trade-off here between growth and equity. But for all the countries under examination there appears to be no conflict between the objectives of rapid growth and an egalitarian income distribution, a rather optimistic conclusion. Nor is there a clear trade-off between greater government intervention in mixed economies and greater inequality.

The large number of observations in our study to a substantial extent compensate for the unreliable nature of many income distribution data. As a result of that large number, even the most influential outliers do not appear to have a major impact on the results, which increases confidence in the validity of the conclusions. New findings of this analysis include:

- some support for the argument that the intertemporal Kuznets Curve does not exist;
- good evidence that even in cross-country analysis its effect is rather weak: income distribution deteriorates only moderately as per capita income rises and the effect may be weakening over time;
- the absence of any statistically significant relationship between the importance of the role of government in the economy and equality – more interventionist governments do not achieve greater equality; and
- the great importance of socio-political dualism in explaining inequality.

All these run counter to much of previous work. Consistent with previous findings are:

- the relationship between the spread of education and equality, although the effect appears to be weak; and
- the effect of a large role for primary exports on greater inequality.

A good deal of variation – about half – remains to be explained. Some of that is now picked up in regional variables. The distribution of land and government policies may be among the variables requiring further investigation. But it is encouraging that a significant deterioration in income distribution does not necessarily follow from rising incomes or more rapid growth. Also, contrary to some widely accepted beliefs, the absolute income of the poor rises with average per capita income (economic development), even if their share declines slightly.

APPENDIX A 1

LIST OF COUNTRIES USED IN REGRESSIONS
(Years in parentheses)

Single Observation

Australia (68), Bahrain (70), Barbados (70), Burma (58), Chad (58), Chile (68), Cyprus (66), Dahomey (59), Denmark (68), Dominican Republic (69), Ecuador (70), Egypt (65), El Salvador (69), Fiji (68), Finland (62), Gabon (68), Greece (58), Guatemala (66), Guyana (55), Honduras (68), Iraq (56), Ivory Coast (70), Jamaica (58), Kenya (69), Lebanon (55), Libya (62), Malagasy Republic (60), Malawi (69), Nepal (76), Puerto Rico (63), Rhodesia (68), Senegal (60), Sierra Leone (69), South Africa (65), South Vietnam (64), Spain (65), Sudan (63), Surinam (62), Thailand (70), Tunisia (70), Turkey (68), Uganda (70), Uruguay (67), Zambia (59).

Two Observations

Argentina (61; 70*), Brazil (60*; 70), Canada (61; 65), Colombia (62; 70), Costa Rica (61; 71), Czechoslovakia (59; 64), France (56; 62), East Germany (67; 70), West Germany (68; 70), Hungary (67; 69), Indonesia (71; 76), Iran (59; 68), Israel (57; 69), Korea (66; 70), Mexico (63; 69), New Zealand (68; 71), Norway (57; 63), Peru (61; 70), Poland (56; 64), Sri Lanka (53; 70), Tanzania (67; 69), Trinidad (71; 76), United Kingdom (60; 68), Venezuela (62; 71).

Three Observations

Bangladesh (60; 64; 67), Bulgaria (57; 60; 62), Mali (58; 68; 70), Netherlands (52; 62; 69), Panama (60; 69; 72), Singapore (66*; 72*; 75*), Sweden (54; 63; 70), United States (60; 66; 72), Yugoslavia (63; 68; 78).

Four Observations

Japan (62; 68; 72*; 75*), Philippines (56; 61; 65; 71), Taiwan (53; 60; 64; 72), Hong Kong (57; 66; 71; 76).

Five Observations

India (55; 60; 65; 68; 76), Pakistan (63; 67; 69; 70; 71).

*Observations for the share of the poorest 40 percent missing.

APPENDIX A 2

SOURCES FOR DATA

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Table A1 *Appendix A 2*

Influence Statistics for Selected Influential Observations

Calculated from Regression (1) of Table 1. Dependent Variable: Gini Coefficient.

OBS	COUNTRY	YEAR	RSTUDENT	COVRATIO	DFITS	DFBETAS	
						LOG INC.	LOG INC. SQ.
26	Israel	1957	−2.0878	.9343	−.3831	−.0326	.0680
27		1969	2.0878	.9343	.3831	−.0326	.0680
28	Japan	1962	.1385	1.3242	.0739	.0333	−.0403
29		1968	.8116	1.0889	.2261	.1823	−.1928
30		1972	−.2108	1.0922	−.0519	.0215	−.0261
31		1975	−.7982	1.3188	−.4403	.3003	−.3330
32	Korea	1966	−.1786	.9676	−.3235	.2549	−.2438
33		1970	1.7786	.9676	.3235	.2549	−.2438
34	Mali	1958	−3.5119	.7423	−.6161	.4487	−.4202
35		1968	2.0746	.9148	.2128	.0449	−.0430
36		1970	1.2641	1.0061	.1985	.1335	−.1244
62	Taiwan	1953	4.6993	.5978	1.2654	−1.0968	1.0446
63		1960	.8858	1.0320	.1407	−.1001	.0947
64		1964	−1.9518	.9384	−.2859	−.1979	.1896
65		1972	−3.3782	.7990	−.9657	−.8312	.7873
86	India	1955	−2.4778	.8863	−.4512	.3663	−.3549
87		1960	1.3419	.9875	.1465	−.0568	.0549
88		1965	−.0026	1.0426	−.0003	.0001	−.0001
90		1968	1.7737	.9478	.1900	.0665	−.0646
89		1976	−.7084	1.0624	−.1524	−.1307	.1264

Table A2

Influence Statistics for Selected Influential Observations

Calculated from Regression (3) of Table 1. Dependent Variable: Share of the Poorest 40 Percent.

OBS	COUNTRY	YEAR	RSTUDENT	COVRATIO	DFITS	DFBETAS	
						LOG INC.	LOG INC. SQ.
26	Israel	1957	1.9889	.9772	.5549	.2669	−.3142
27		1969	−1.9889	.9772	−.5549	.2669	−.3142
32	Korea	1972	1.9860	.9433	.3976	−.3088	.2917
33		1975	−1.9860	.9433	−.3976	−.3088	.2917
34	Mali	1958	3.0779	.7876	.5727	−.3756	.3414
35		1968	−1.6315	.9570	−.1761	−.0386	.0366
36		1970	−1.2497	1.0076	−.2047	−.1205	.1078
62	Taiwan	1953	−4.5221	.6016	−1.3450	1.1229	−1.0537
63		1960	−.7516	1.0442	−.1280	.0863	−.0800
64		1964	1.9469	.9348	.3112	.2157	−.2043
65		1972	3.0397	.8412	.9477	.7698	−.7154
75	Yugoslavia	1963	.4468	1.1566	.1584	−.1158	.1042
77		1968	.2986	1.0515	.0417	−.0069	.0039
76		1978	−.7874	1.2157	−.3523	−.2304	.2008
81	Pakistan	1963	−.4448	1.1423	−.1486	.1323	−.1262
82		1967	−.2425	1.0438	−.0254	.0002	−.0001

Continued –

Table A2 – (*Continued*)

OBS	COUNTRY	YEAR	RSTUDENT	COVRATIO	DFITS	DFBETAS	
						LOG INC.	LOG INC. SQ.
83		1969	.2411	1.0493	.0308	.0166	−.0158
84		1970	−.2737	1.0603	−.0454	−.0327	.0311
85		1971	.7028	1.0396	.1041	.0686	−.0653
86	India	1955	2.8395	.8297	.5912	−.4907	.4727
87		1960	−1.4190	.9797	−.1654	.0689	−.0661
88		1965	.6433	1.0326	.0714	−.0222	.0213
90		1968	−1.9392	.9244	−.2217	.0856	.0827
89		1976	−0.188	1.0978	−.0046	−.0040	.0039

Table A3

Influence Statistics for Selected Influential Observations

Calculated from Regression (5) of Table 2. Dependent Variable. Gini Coefficient.

OBS	COUNTRY	YEAR	RSTUDENT	COVRATIO	DFITS	DFBETAS				
						LOG INC	LOG INC SQ	GROWTH	PRIM EXP	MAN EXP
7	Brazil	1970	1.7201	.8153	.5776	.0569	−.0243	.1215	−.2478	−.1865
14	Chad	1958	−2.0886	.7429	−1.0716	.2635	−.2664	.1550	.1870	.0266
25	Dominican Rep	1969	2.0862	.7594	1.1221	−.0850	.0689	−.0214	.1865	.0550
26	Ecuador	1970	1.4629	1.0485	.7419	−.1441	.1220	.1143	−.1276	−.0505
33	Gabon	1968	1.2921	1.1547	.6897	.2759	−.2614	.0690	.0021	−.0398
34	East Germany	1967	−1.2147	1.1477	−.5929	−.0778	.0550	.2064	.0483	.0429
35		1970	−.9703	1.2251	−.4486	.0029	−.0204	−.0184	.0679	.0471
44	Iran	1959	1.6972	1.0171	1.0339	−.1663	.1624	.5247	−.0330	.0414
46	Iraq	1956	2.0715	.8609	1.3860	−.1403	.1332	.0299	.5245	.1197
47	Israel	1957	−2.7912	.4452	−1.4831	.1136	−.1063	−.4752	.4206	.2121
49	Ivory Coast	1970	−1.4140	1.0471	−.6751	−.1549	.1454	.1120	−.1544	.0740
59	Libya	1962	−2.3093	.7154	−1.4863	−.2250	.2000	.0240	.2367	.1694
62	Mali	1958	−1.7918	.8728	−.8766	−.1317	.1140	.3630	−.6059	.0848
88	Sierra Leone	1969	2.5198	.5746	1.4444	.2685	−.2563	−.1409	−.0578	.2353
95	Surinam	1962	−2.7956	.3836	−.9237	.1964	−.1588	−.0476	−.2785	.0151
99	Taiwan	1953	2.3483	.5174	.5346	.0302	−.0362	.2801	−.0690	−.1792
102		1972	−2.5116	.4892	−.8837	−.0818	.1445	−.4118	.0396	−.4789
120	Zambia	1959	−1.2060	1.2202	−.6737	.0381	−.0380	−.2290	−.3241	.0485
142	Singapore	1975	1.1188	1.2626	.6274	−.1357	.1504	−.0542	.0750	.4331

OBS	COUNTRY	YEAR	EDUCAT	EAST EUR	DUAL	PUB INV	LAT AM	AFR	ASIA	MID EAST
7	Brazil	1970	−.2313	.0474	.2127	.0366	.1207	.0342	.0419	.0054
14	Chad	1958	−.1468	.3004	−.2412	−.4339	−.1138	−.1517	.0466	.0198
25	Dominican Rep.	1969	.2293	−.1795	−.2271	.2139	.2671	−.1092	−.0020	−.1230
26	Ecuador	1970	.2623	−.1182	.3004	.1881	−.0140	−.0629	−.0885	−.0061
33	Gabon	1968	−.1439	−.0485	−.2903	.1549	.1120	.3456	.1535	−.0146
34	East Germany	1967	.0999	−.4040	−.0305	−.0046	−.0580	−.1456	−.1384	−.1135
35		1970	.0666	−.2879	−.0377	−.0397	−.0392	−.0763	−.0602	−.0416

Continued –

Table A3 – (*Continued*)

OBS	COUNTRY	YEAR	EDUCAT	EAST EUR	DUAL	PUB INV	LAT AM	AFR	ASIA	MID EAST
44	Iran	1959	−.2452	.0989	−.0950	−.1907	−.0621	−.1864	−.2104	.0129
46	Iraq	1956	−.1404	.0842	.1290	−.4300	−.3085	−.4889	−.1844	.4090
47	Israel	1957	−.3113	−.0248	−.1226	−.0352	−.1377	−.2179	−.0614	−.4545
49	Ivory Coast	1970	.1469	−.2313	−.1016	.3149	.1571	−.2632	−.0416	−.0667
59	Libya	1962	.3226	−.1468	−.0426	.1962	.2646	.0844	−.0803	−.5531
62	Mali	1958	.1011	−.1107	−.1732	.0907	.1783	.0866	−.2175	−.0270
88	Sierra Leone	1969	−.2948	.0595	−.3732	−.0894	−.0344	.4327	.0593	−.0883
95	Surinam	1962	−.4756	.2341	−.3500	−.2877	−.1913	.1415	.1767	.0453
99	Taiwan	1953	.0039	−.1337	−.0390	.1746	−.0487	−.0662	.0553	−.1280
102		1972	−.2483	.2777	.2045	−.0881	.0469	.1101	.1843	.1860
120	Zambia	1959	−.0603	.0921	−.0822	−.1459	.0903	−.1011	.0871	.1029
142	Singapore	1975	−.0046	−.0246	−.1608	.0498	.2266	.0946	.0944	.0836

Table A4

Influence Statistics for Selected Influential Observations

Calculated from Regression (5) of Table 3. Dependent Variable: Share of the Poorest 40 percent

OBS	COUNTRY	YEAR	RSTUDENT	COVRATIO	DFITS	DFBETAS				
						LOG INC	LOG INC SQ	GROWTH	PRIM EXP	MAN EXP
7	Brazil	1970	−1.8555	.7525	−.6786	−.0261	−.0191	−.1484	.3094	.2407
14	Chad	1958	1.8084	.8655	.9346	−.2391	.2370	−.1318	−.1570	−.0233
29	Fiji	1968	−1.2871	1.4406	−1.0049	−.1885	.1239	.4350	.0026	.3478
33	Gabon	1968	−2.0233	.7729	−1.1024	−.4200	.3840	−.1161	−.0085	.0202
34	East Germany	1967	.9625	1.2616	.4774	.0384	−.0151	−.1608	−.0413	−.0319
44	Iran	1959	−1.2330	1.2614	−.7575	.1103	−.1039	−.3836	.0357	−.0033
46	Iraq	1956	−1.1431	1.3884	−.7774	.0523	−.0392	−.0074	−.2903	−.0538
47	Israel	1957	2.5941	.5011	1.4055	−.1551	.1621	.4719	−.4117	−.2399
59	Libya	1962	1.9625	.8787	1.2667	.1799	−.1553	−.0126	−.2082	−.1616
62	Mali	1958	1.3693	1.0726	.6755	.1064	−.0954	−.2796	.4633	−.0564
88	Sierra Leone	1969	−2.7488	.4536	−1.5974	−.2829	.2608	.1629	.0419	−.3168
89	South Africa	1965	−1.3113	1.1934	−.7733	−.2182	.1908	−.0412	.2564	.2634
95	Surinam	1962	2.9096	.3264	.9794	−.1485	.0965	.0388	.2794	−.0181
99	Taiwan	1953	−2.3179	.5098	−.5460	−.0193	.0184	−.2958	.0799	.1840
102		1972	1.4641	.9509	.5731	.0627	−.0941	.2426	−.0098	.3366
115	Venezuela	1962	−1.2924	1.0309	−.5082	−.0437	.0232	.1106	−.3157	−.0531
120	Zambia	1959	1.5811	1.0247	.8932	−.0348	.0298	.3079	.4199	−.0687
124	Pakistan	1963	1.8046	.7268	.4479	−.0015	.0095	.1446	−.1186	−.0432
125		1967	2.1325	.5926	.5706	.1882	−.1678	.1387	−.1859	−.0741
126		1969	2.4304	.4748	.6538	.3084	−.2768	−.0170	−.1865	−.1053
127		1970	2.2139	.5637	.6277	.3257	−.2928	−.0440	−.1660	−.0996
128		1971	2.6843	.3863	.7431	.3924	−.3540	−.1559	−.1777	−.1124

		YEAR	EDUCAT	EAST EUR	DUAL	PUB INV	LAT AM	AFR	ASIA	MID EAST
7	Brazil	1970	.2741	−.0950	−.2434	−.0239	−.1757	−.0816	−.0988	−.0480
14	Chad	1958	.1316	−.2450	.2122	.3718	.0953	.1248	−.0245	−.0054
29	Fiji	1968	.1778	−.2035	−.2452	−.0460	−.0860	−.2540	−.4840	−.0636
33	Gabon	1968	.2188	.0883	.4807	−.2633	−.1880	−.5297	−.2449	.0062

Continued –

Table A4 – (*Continued*)

		YEAR	EDUCAT	EAST EUR	DUAL	PUB INV	LAT AM	AFR	ASIA	MID EAST
34	East Germany	1967	−.0806	.3256	.0159	.0046	.0746	.1333	.1282	.1089
44	Iran	1959	.1808	−.0734	.0499	.1420	.0513	.1327	.1408	−.0018
46	Iraq	1956	.0775	−.0340	−.0866	.2463	.1997	.2908	.1413	−.1789
47	Israel	1957	.2932	.0616	.1164	.0492	.1886	.2646	.1540	.4635
59	Libya	1962	−.2730	.1279	.0515	−.1690	−.2085	−.0687	.0565	.4387
62	Mali	1958	−.0720	.0726	.1327	−.0693	−.1471	−.0810	.1178	.0032
88	Sierra Leone	1969	.3172	−.0445	.4513	.0752	−.0085	−.4611	−.0840	.0759
89	South Africa	1965	−.1910	.1474	−.1186	−.2341	−.0650	−.3888	−.2333	−.1378
95	Surinam	1962	.4755	−.2549	.3777	.2732	.1090	−.2009	−.2409	−.0982
99	Taiwan	1953	−.0096	.1238	.0342	−.1863	.0237	.0312	−.0861	.0995
102		1972	.1489	−.1899	−.1645	.0834	.0011	−.0390	−.0731	−.0995
115	Venezuela	1962	.0792	−.0284	.3044	.0165	−.2606	−.0996	−.1143	−.0407
120	Zambia	1959	.0896	−.1333	.1176	.1990	−.1389	.1006	−.1185	−.1453
124	Pakistan	1963	−.2298	−.0229	−.0631	.0465	−.0186	−.0781	.0273	−.0033
125		1967	−.3396	−.0673	−.1220	.1111	−.0327	−.0305	.0859	−.1078
126		1969	−.4160	−.0571	−.1586	.1264	−.0221	.0239	.1672	−.1257
127		1970	−.3969	−.0705	−.1602	.1511	−.0131	.0404	.1741	−.0924
128		1971	−.4350	−.0878	−.1848	.1982	.0026	.0703	.2321	−.0644

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