ECONOMIC DEVELOPMENT AND INCOME INEQUALITY : SOME NEW EVIDENCE

By
PANOS TSAKLOGLOU*,
Department of Economics University of Warwick

1. INTRODUCTION. THE THEORY OF INTERSECTORAL SHIFTS

Until the last half of our century very few economists were interested in the size distribution of income (D.I.). Among them the most famous was the work of Pareto who claimed that D.I. or at least the upper tail of D.I. is constant both over time and across countries and does not depend on chance or stochastic factors.

Modern analysis has shown that there are big differences in D.I. in various countries at different points in time and as Greedy (77, p. 409) concludes : «Pareto's statements... are not supported by the evidence which he actually used and some of his statements are not consistent».

The pioneering work on this topic, in modern literature is that of Kuznets (55) who examined data on D.I. from three countries (U.S.A., U.K. and Prussia-Saxony-Germany) and concluded that during the process of economic development income inequality first rises, reaches a peak and then declines. This process is closely associated with a shift of population from the agricultural to the non-agricultural sector of an economy. According to Kuznets there exist two sectors in a national economy ; an agricultural sector with lower average income

* The author is a scholar of the State Scholarships' Foundation (I.K.Y.). Many thanks are due to Dr Shiv Nath for very useful comments and to Mr David Rees for computational assistance.

but more equal D.I. and an urban (or non-agricultural) sector with higher average income but more unequal D.I. In the beginning of the process of economic development the average national income is very near to the subsistence level and the sector with the more equal D.I. (agricultural) is much bigger than the sector with the more unequal D.I. (non-agricultural) ; so we have relative equality in D.I. Later, as the population of the agricultural sector declines and that of the urban sector increases, inequality rises. An additional reason for the above is that within the framework of a capitalist economy, ceteris paribus, in order to achieve high rates of economic development, we need investment ; order to finance investment we need savings, and as it is well known only the very rich income groups save. So we expect development to be accompanied by increasing inequality. In the later phase of economic development agricultural sector gets smaller and under the political and legislative pressure of the labour movement, income inequality declines gradually. This is in simple words the famous U-hypothesis or Kuznets' hypothesis, which is the basis of the theory of intersectoral shifts· This theory can be given in a simple mathematical formula[1].

If we use the variance of the logarithms of income as a measure of inequality, the variance V for the whole population (agricultural and non - agricultural) can be decomposed as follows :

$$V = S_u \cdot V_u + S_r \cdot V_t + S_u (\bar{Y}_u - \bar{Y})^2 + S_r(\bar{Y}_r - \bar{Y})^2$$

$$V_u > V_r \quad O \leq S_u \leq 1 \quad 0 \leq S_r \leq 1$$

where S_u : proportion of the population in the non-agricultural sect or

S_r : proportion of the population in the agricultural sector

V_u : variance of logarithms of income within the non - agricultural sector

V_r : variance of logarithms of income within the agricultural sector

$\bar{Y}_u, \bar{Y}_r, \bar{Y}$: mean logarithms of income for non-agricultural and agricultural sectors and the whole economy, respectively.

1 See Ahluwalia(76a) pp. 315-317.

The first two terms constitute the «within» sectors component of inequality and the last two terms constitute the «between» sectors component of inequality.

Then using the fact that

$$s_u + s_r = 1$$

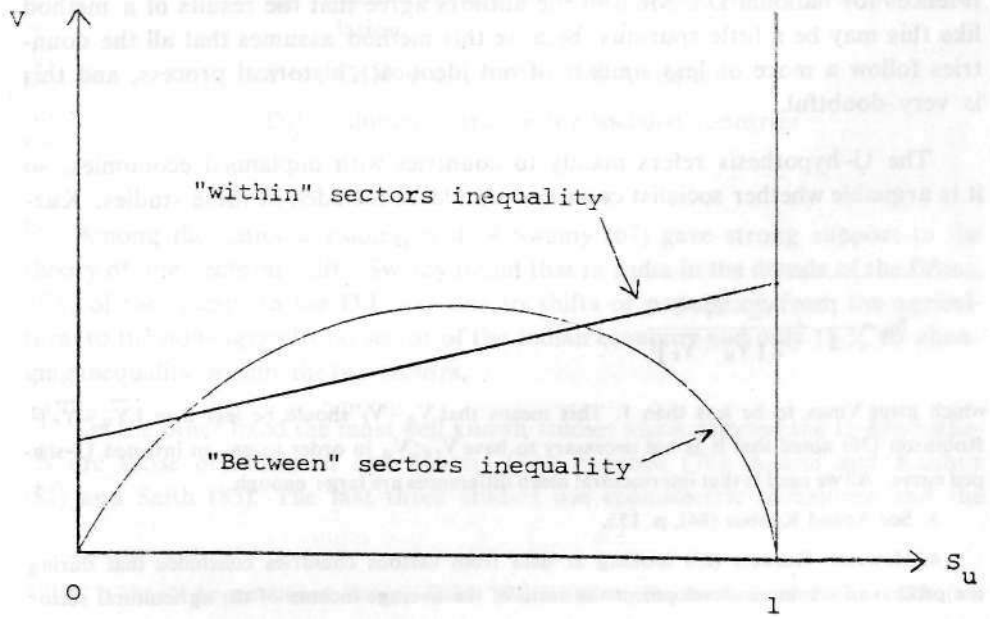
and $$\overline{Y} = \overline{Y}_u = Y_u \,.\, S_u + \overline{Y}_r\,(1 - S_u)$$

we can rewrite the above equation as :

$$V = V_r + S_u\,[\,(V_u - V_r) + (\overline{Y}_y - \overline{Y}_r)^2\,] - S_u^2\,[\,\overline{Y}_u - \overline{Y}_r\,]^2$$

which is a quadratic function of Su·

Development is associated with an increase of S_u and as the coefficient of S_u^2 is a negative one, inequality follows an inverted U - shaped pattern.



2. Of course, as $O < S_u < 1$ we need

We can also depict this relationship in a diagram.[3].

The model of Kuznets says the strikingly simple fact that in a dualisticeconomy, even if the per capital income differential between agricultural and non-agricultural sector remains constant and the degree of inequality within each sector is always the same, the transfer of population from the agricultural to the non -agricultural sector can create an inverted U- shaped curve of inequality[4]. As Lydall (79) indicates, this model also predicts that the turning point in the income share of the top (richest) 10% of the population comes first, then follows the turning point of the top 20 % and at the end of this process comes the turning point for the income share of the bottom (poorest) 20 % of the population. -

2. A SHORT SURVEY OF EMPIRICAL EVIDENCE

The theory of intersectoral shifts refers to secular trends of D.I. of national economies so it is natural to expect that it should have been tested with national data, for long periods. Unfortunately for no country do reliable data exist on D.I. for long periods ; so all the empirical works try to capture the above time- series relationship using cross-country data, and from their results try to draw inferences for national D.I. Most of the authors agree that the results of a method like this may be a little spurious, because this method assumes that all the countries follow a more or less similar-if not identical - historical process, and this is very doubtful.

The U-hypothesis refers mainly to countries with unplanned economies, so it is arguable whether socialist countries should be included in these studies. Kuz-

$$S_u = \frac{1}{2} + \frac{V_u - V_r}{2\,[\bar{Y}_u - \bar{Y}_r]^2}$$

which gives Vmax to be less than 1. This means that $V_u - V_r$ should be less than $[\bar{Y}_u - \bar{Y}_r]^2$. Robinson (76) noted that it is not necessary to have $V_r < V_u$ in order to get an inverted U-shaped curve. All we need is that intersectoral mean differences are large enough.

3. See Anand Kanbur (84), p. 155.

4. However Kuznets (63) looking at data from various countries concluded that during the process of economic development the ratio of the average income of the agricultural sector to the average income of the non-agricultural sector increases substantially, but remains less than one.

nets (63) argues that it is preferable to exclude them, but most authors include them with a dummy variable.

Among the empirical works that gave support to the U-hypothesis the most well known are those of Kuznets (63), Paukert (73), Ahluwalia (74a, 76a, 76b), Ahluwalia and Chenery (74), Chenery and Syrquin (75), Cline (75), Lydall (79), Bornschier (83) and in some cases Cromwell (77). Among these works, Kuznets (63) and Paukert (73) are statistical and the rest of them are econometric[5]. Econometric works usually regress an index of inequality on some transformation of GDP p.c. (i.e. index of economic development), in simple and quadratic forms. The most influential of these works are undoubtedly those of Ahluwalia (76a and 76b) and the most well known result of his is the following (Ahluwalia (76a), p, 311)

$$I_{40} = \underset{(5.38)}{70.57} - \underset{(4.61)}{44.38}\ (\log_{10} Y) + \underset{(4.82)}{8.31}\ (\log_{10} Y)2 + \underset{(8.45)}{11.95}\ D.1$$

$$R2 = 0.594 \quad F = 29.79 \quad N = 60 \quad \text{(t- ratios in parentheses)}$$

where :

I_{40} : relative income share of the bottom 40 % of the population

Y : GDP p.c. in 1970 U.S.A. dollars

D.1 : dummy variable for socialist countries

Among the national studies, that of Swamy (67) gave strong support to the theory of intersectoral shifts. Swamy found that in India in the decade of the fifties, 85 % of the change in the P.I. was due to shifts of population from the agricultural to the non-agricultural sector of the Indian economy and only 15 % to changing inequality within the two sectors.

On the other hand the most well known studies which rejected the U-hhypothesis are those of Adelman and Morris (73), Papanek (78). Anand and Kanbur (81) and Saith (83). The last three studies use econometric techniques and the

5. It should be mentioned that as Fields (80) indicates, the method of Paukert (73) (see section 4) eliminates the variance among the countries of any given group.

study of Adelman and Morris (73) uses the technique of analysis of variance. It should be mentioned that as Paukert(73) indicates the techuique of analysis of variance cannot capture non-linear relationships. Anand and Kanbur (81) used other functional forms different from that of Ahluwalia (76a) that can create an inverted U-shaped curve for inequality, and got very different results (sometimes U-shaped instead of inverted U-shaped curves:) and Saith (83) used a subsample of the sample of Ahluwalia (76a) and got insignificant results in terms of statistical significance. The most important of the studies that reject the U-hypothesis is probably that of Papanek (78). Papanek observed that most of the middle income L.D.C.'ç with very unequal D.I. are countries rich in natural resources with «neo-colonial» socioeconomic systems. So he split the sample of Ahluwalia (76a) into four groups (export oriented L.D.C.'s, other L.D.C.'s, socialist countries and D-C.'s) and regressed Gini Ratios of these countries on log Y and $(\log Y)^2$ (without dummy variables for socialist countries) for all the sample. Then he did the same thing for every group separately. All the regressions turned out to be insignificant according to statistical criteria. He then regressed Gini Ratios on eight dummies, four for the intercepts of the groups and four for their slope. He got very significant t-ratios for the intercept dummies, but insignificant t-ratios for the slope dummies. In order to illustrate his argument, Papanek (78) gave the following example. Bangladesh or India which are not countries rich in natural recources will not probably face a situation similar to that of Kenya or S. Africa (as the cross country studies suggest) when they will have the relevant GDP p.c. because they will not have a similar socio-economic system. Finally Nugent (83) has raised a new objection to the U-hypothesis. He argues that in most surveys on D.I. the response rate tends to vary at different levels of income. On the one hand in most poor countries the very poor tend not to get included in the samples or not to respond. On the other hand at the very high income levels, income tends to be under - reported for land reform avoidance and tax evasion reasons, particularly in richer countries. Therefore in a cross country context inequality may be the same for all the countries, but the non-response of the «poor» in the very poor countries and of the «rich» in the very rich countries has as a result an under- estimation of inequality in both very poor and very rich countries and can generate an inverted U-shaped relatiénship between economic development and income inequality.

Adelman and Morris (73, p. 189) found that «economic development is accompanied by an absolute decline in the average income of the very poor». This is the well known «absolute impoverishment hypothesis»[6]. However Cline (75)

6. Cromwell (77) using a different method was led to a similar conclusion.

asserted that their finding was a result of inappropriate techniques and manipulation of their data. In a reply to this critique, Adelman and Morris (75) answered that their finding was just a tentative hypothesis for countries below the Latin American standards. They replied also that when they regressed the average income of the poorest 20 % of the population on GDP p.c. the coefficient was positive. However when they included improvement of human resources in the explanatory variables, the coefficient of GDP p.c. became negative. So they concluded that education is positively related to the absolute income of the very poor and development is negatively associated [7].

Ahluwalia's (76a) tests rejected the absolute impoverishment hypothesis within his cross country context. However as Kuznets (55, p.2) indicates «to say that the lower income classes gained or lost during the last 20 years in that their share of the total income increased or decreased has meaning only if the units have been classified as members of the lower income classes throughout those 20 years - and for those who have movel into or out of those classes recently, such a statement has no significance».

During the process of development some socio-economic groups may face an absolute decline of their incomes. Griffin and Khan (78) survey some cases of reduction in the absolute income of specific socio-economic groups, at least in the short run. These groups belong usually to the traditional sector of dualistic economies and compete against groups of the modern sector for markets and resources. In this competition the latter groups are the winners because they have both advanced technology and better connections with the political and institutional establishment. Another factor that can create absolute impoverishment of some groups in the short run is the various types of lags in factor mobility across regions, sectors, etc. All these things cannot be captured by regressions referring to percentile groups of the population.

3. SOME PROBLEMS WITH METHODOLOGY AND DATA

Apart from the main methodological problem («can we capture a time series relationship using cross country data?»), there are plenty of other metho-

7. In Ahluwalia (76a), the inclusion of other explanatory variables apart from log Y and $\log Y)^2$ has the result of substantially moving the turning points of his equations. We can speculate that it is not economic development per se (expressed as GDP p.c.) that improves D.I. in its later phases, but other socio-economic factors associated with economic development.

dological problems in these studies. This section is an attempt to describe some of these problems.

First of all, what is the appropriate measure of inequalityc? [8]. As Atkinson (70, p. 244) emphasizes, «underlying any measure of inequality is some concept of social welfare function». As a result if we have two different distributions, two different inequality measures mea can give us different results (different ordering). A lot of inequality measures have been used in all these studies, reflecting the different value judgements of the authors. Fields (80) makes the following classification of these measures :

a) Those focusing on relative inequality, which are based on the Lorenz curve, like the Gini ratio, the Atkinson index, the Theil index, the ratio of the income share of the «rich» to the income share of the «poor» and the various fractile measures (eg. income share of poorest 40 % or richest 20 % etc.).

b) Those focusing on absolute income, which divide the population of a country into homogeneous socio-economic or percentile groups, measure the income growth of each group, weight them with certain weighting schemes and then sum for all the groups. Such measures have been proposed by Atkinson (70) and Ahluwalia and Chenery (74).

Finally Oshima(60)has argued that different countries exhibit different D.I.'s (normal, lognormal, skewed, two-peaked, etc.) so it is very difficult to find a unique measure of inequality for all the countries of cross country studies. On the other hand GDP p. c. is undoubtedly an index of economic development but it is very arguable if it should be used as the only measure of economic development.

Another methodological problem is the choice of unit of measurement for D.I. Should we use data on personal D.I. or data on D.I. by household? There is a general agreement that the most appropriate data would have been data on distribution of pre-tax income by household adjusted for the number of the members of the household. Unfortunately data like them exist for very few countries, so we return to our original question («data on personal D.I. or data on household D.I.?»)

Kuznets (63) argues very convincingly that in this case the most appropriate unit of measurement is household (family) income, because both economically

8. For a very good discussion of the various inequality measures, see Fields (80) Ch. 3. A very good discussion from a different point of view is in Atkinson (70).

active and dependent persons are included, the family is the unit that decides how to allocate goods and services among its members and additionally it is difficult to attribute jointly received incomes or earnings to a specific individual in family farms or businesses (which contribute a great part of GDP in most L.D.C.'s). Finally member or members of a household may supplement another member's income or replace the loss of his or her income.

On the other hand as Fields (80) points out the basic counter-argument in favour of personal D.I. is that families may systematically distribute their resources inequitably, in favour of the head of the family.

Kuznets (63) argues also that as we are interested to capture a secular relationships it is preferable to use data on secular life cycle» or «permanent» income. An additional reason for this is that weather conditions in L.D.C.'s and business cycles in D.C.'s affect the short-run variability in D.I. He argues also that the definition of income should include fringe benefits but exclude income taxes.

According to Friedman (53) the distribution of consumer expenditures is a better approximation of the long-run income differentials than the distribution of annual incomes. However this view understates the role of accumulation of savings both as productive assets and as determinant of consumer expenditure.

In some countries the definition of income does not include income in kind and this can lead to an under-estimation of income in these countries (particularly in L.D.C.'s where families consume part of their production and a lot of transactions are barter transactions, and in socialist countries where some services that are provided freely by the government are not included in the National Accounts). It should also be mentioned that the non-inclusion of income in kind for some L.D.C.'s has as a result an over-estimation of inequality in these countries, because the individuals who receive incomes in kind are usually among the poorest groups of the population. Another factor that makes cross country comparisons of household income very difficult for these studies is that the small size of the average household in D.C.'s in comparison with L.D.C.'s clearly underestimates inequality in L.D.C.'s.

Finally interregional price differences affect the «real» D.I. among the population of the same country and, particularly, international price differences (differences in cost of living) affect the «real» D.I. on an international base. As Kravis et al (78) stress, a lot of studies have shown that the purchasing power of GDP p.c. in low income countries is systematically greater than what conversion of

GDP p.c. in official exchange rates indicates, in comparison with purchasing power of p.c. in high income countries so the use of official exchange rates causes an under-estimation of the real GDP p.c. for low income countries. This is the drawback that the work of Kravis- Heston-Summers is trying to eliminate with the use of the International Comparison Project Dollars (I.C.P. dollars) or with the use of «Kravis factors».

Another big problem of these studies is the quality of the data they use. Kuznets (55) required for similar studies data of «good quality». Although the term «good quality» is a little vague, we can say that the existing data on D.I. are not of «good quality». International standards on this subject do not exist and as Saith (83) indicates, most of the above studies -with the exception of Anand and Kanbur (81)-include data which cover sometimes all the country, sometimes only rural or only urban areas (and sometimes only one or some cities), some of the data refer to household D.I. and some of them to personal D.I., some of them refer only to money incomes and some of them include also incomes in kind and finally some of them are for pre-tax income, some of them are for after tax income. A wonderful picture indeed ! ! !

4. SOME EMPIRICAL RESULTS

This section contains some econometric results of mine on the relationship between development and inequality. The basic methodology followed here is that of Ahluwalia (74a, 76a) and particularly of Anand and Kanbur (81, 84). The framework of my analysis is the cross country one, so all the results are subject to the usual drawbacks of crossection studies.

The data that I use are data with national coverage, on household D.I. for 55 countries. These data are reported in Table A of the Appendix. For 43 of these countries the Data are from various editions of the World Development Report, for 11 of them they are from Jain (75) and for Taiwan the data are from Kuo et al (81). Most of the data on GDP p.c. are from the Statistical Yearbook of I.M.F. (83) and for few countries from various other sources listed in the Appendix [9].

9. It may sound very strange, but even for the simplest economic indicator (GDP p.c.) there does not exist reliable data for long periods for various countries. It is worth mentioning here that Ahluwalia (76a, 76b) does not report any source for his data on GDP p.c.

As indices of inequality I use the most well known index of inequality, the Gini ratio, that most of the studies use, and the income shares of the top 10 % and bottom 40 % of the population (like Chenery and Syrquin (75) and Ahluwalia (76a, 76b)) as indices of the relative income shares of the very rich and the poor [10]. However it should be mentioned that the Gini ratio is calculated from only six observations on the Lorenz curve, so there is a clear under-estimation of the «real» Gini ratio. Even though as this under-estimation exists for all the countries of the sample, it does not affect the results significantly.

The functional form used in all the equations is that of Ahluwalia (76a, 76b), but instead of using the income shares of the various income groups as dependent variables, I used as dependent variables their logit transformations, because as Anand and Kanbur (84) indicate the fitted values of all these income shares should be restricted (for example, the income share of the poorest 40 % of the population cannot be more than 40 % of the total national income). Similar argument holds for the Gini ratio all well. So if we assume that Ahluwalia's dependent variable is x, the revevant dependent variable of this paper is

$$I = \log\left(\frac{X}{Xmax - X}\right)$$

The equations with logit transformations as dependent variables have also the property, as Anand and Kanbur (1984) indicate, that they have the same turning points as the equations with Ahluwalia's dependent variables.

The results are reported in Table 1. We can see that the signs of the quadratic terms are the expected ones, $\bar{R}^2$, F and t ratios are satisfactorily high and the turning points confirm the theory of intersectoral shifts. (Turning point for TIO is before turning point for B_{40}) [11].

10. All the following regressions have also been ran for the relative income shares of the top 20% and the bottom 60 % of the population. The results were almost identical with the results for the relative income shares of the top 10 % and bottom 40 % respectively.

11. Between them are the turning points for the top 20% and the bottom 60%, not reported here. The same result (i.e. turning point of T_{10} before the turning point of T_{20}, this before the turning point of B_{60} and this before the turning point of B_{40}) was obtained in all the following sets of equations.

So we can conclude that these results give support to the U-hypothesis. I tried also a dummy variable for industrialised countries, which in all cases turned out to be insignificant. I tried the same dummy for all the equations to follow, except those concerning only L.D.C.'s, and the outcome was always the same (very low t-ratio for this dummy).

TABLE 1

Household distribution of income : 55 countries

Dependent Variable	Constant Term	Log Y	$(\log Y)^2$	D_1	$\bar{R}^2$	F	Turning Point
G	-5.191 (4.23)	1.486 (4.34)	-0.109 (4.68)	-0.743 (3.45)	0.46	16.27	913
B_{40}	6.428 (3.81)	-2.070 (4.39)	0.148 (4.62)	0.841 (2.84)	0.37	11.39	1089
T_{10}	-4.108 (3.70)	1.117 (3.60)	-0.086 (4.09)	-0.630 (3.24)	0.52	20.28	661

(t-ratios in parentheses)

G : Gini Ratio

B_{40} : Relative Income share of the poorest 40 % of the population

T_{10} : » » » » » richest 10 % » » »

Among the 55 countries of the sample there are two socialist countries (German Dem. Rep. and Yugoslavia). It is for these countries that I used the dummy variable, which turned out to be significant in all cases. Most of the empirical studies include socialist countries in their sample (with a dummy variable), but Kuznets (63) has argued against this practice. So, in the next step I ran the same regressions for 53 capitalist countries and, of course, without dummy variables. The results are reported in Table 2. We can see that there is no significant change in any case. I did the same thing for all the following equations (e.g. I ran them both with and without socialist countries) but the outcome was always the same ; the difference was insignificant.

TABLE 2

Household distribution of income : 53 capitalist countries

Dependent Variable	Constant Term	log Y	$(\log Y)^2$	$\bar{R}^2$	F	Turning Point
G	-5.123 (4.18)	1.466 (4.27)	-0.107 (4.61)	0.40	18.26	944
B_{40}	6.340 (3.76)	-2.044 (4.33)	0.146 (4.55)	0.32	13.27	1096
T_{10}	-4.077 (3.64)	1.108 (3.54)	-0.085 (4.02)	0.47	23.50	677

(t–rations in parentheses)

As it is generally accepted that GDP p.c. converted in official exchange rate is probably a misleading indicator for cross country studies, I used also GDP p.c. in I.C.P. dollars as a measure of the «real» level of economic development. However these results should be treated as tentative both because my source is not the final report of the International Comparison Project and because as Kravis et al (78) admit, these estimates are still subject to large margins of error. The data on GDP p.c. in I.C.P. dollars are from Kravis et al (78) and are reported in the Appendix. In Kravis et al (78) there are data on GDP p.c. in I.C.P. dollars only for 1970 and 1974, but they also describe a method to get estimates for other years. The results using GDP p.c. in I.C.P. dollars are given in Table 3. We can see that in comparison with Table 1 there is a reduction in the measures of statistical significance (R^2, F-ratios, t-ratios), but even then all of them are very much significant. The signs of the quadratic terms and the turning points in all the equations are also as we expected. I ran the rest of the regressions using GDP p.c. in I.C.P. dollars instead of GDP p.c converted into dollars using official exchange rates. In almost all cases the results were the same as the results using GDP p.c. in official exchange rates, but with lower measures of statisticaltsignificance. Of these results I shall give an analytical report for only one, but I shall also give a short report for the rest of them[12].

12. I think that in the future the literature on this topic should and will use GDP p.c. in I.C.P. dollars either instead or together with GDP p.c. in dollars converted in official exchange rates.

Some authors (e.g. Saith (83)) argue that if we exclude D.C.'s from the sample and include only L.D.C.'s, the results change dramatically and we can get on confirmation of the U-hypothesis. It is true that the distinction between L.D.C.'s and D.C.'s is more or less an arbitrary one and the case is even more difficult when the data for the various countries refer to different years. In this paper I use a rather broad definition of «L.D.C.'s» and define as L.D.C.'s 36 countries, those with numbers 1 to 37 of Table A of the Appendix excluding Ireland. The results of the regressions using this sample are given in Table 4.

TABLE 3

Household distribution of income : 55 countries, using Kravis factors

Dependent Variable	Constant Term	Log Y	$(\log Y)^2$	D_1	$\bar{R}^2$	F	Turning Point
G	-9.147 (3.15)	2.490 (3.25)	-0.172 (3.45)	-0.630 (2.64)	0.35	10.84	1392
B_{40}	12.420 (3.16)	-3.566 (3.43)	0.241 (3.65)	0.695 (2.19)	0.26	7.45	1600
T_{10}	-6.529 (2.52)	1.753 (2.55)	-0.109 (2.86)	-0.510 (2.42)	0.43	14.92	962

(t–ratios in parentheses)

TABLE 4

Household distribution of income : 36 L.D.C.'s

Dependent Variable	Constant Term	log Y	$(\log Y)^2$	D_1	$\bar{R}^2$	F	Turning Point
G	-5.505 (2.47)	1.564 (2.30)	-0.113 (2.22)	-0.572 (1.74)	0.15	3.13	1013
B_{40}	7.080 (7.25)	-2.247 (2.35)	0.159 (2.22)	0.614 (1.32)	0.16	3.24	1171
T_{10}	-4.702 (2.30)	1.286 (2.06)	-0.096 (2.09)	-0.560 (1.85)	0.15	3.08	811

(t–rations in parentheses)

The change is really significant. The signs of the quadratic terms are as expected and the turning points follow the process predicted by the theory of intersectoral shifts, but there is a substantial reduction in the values of R^2, F and t-ratios. None of the equations passes the F-test at the 1 % level of significance (but all of them pass it at the 5 % level of significance). This is in line with Saith's (83) objections. On the other hand the coefficients of log Y and $(\log Y)^2$ turn out to be significant, and this is the point really interests us. Two other interesting points in these equations are that the turning points in all equations have been moved to greater values and that the explanatory power of the dummy variable for the socialist countries is insignificant. The latter is due to that the only socialist country of this sample (Yugoslavia) is very much market oriented and as Lydall (79, p. 293) remarks «market inevitably entails economic inequality since the market is a system of economic incentives». In regressions for the L.D.C.'s using GDP p.c. in Ï.C.P. dollars everything became insignificant. I think that these results give some support to the criticisms of Saith (83).

Anand and Kanbur (84) argue that apart from Ahluwalia's functional form

$$1 = a + b.\log Y + c.\ (\log Y)^2$$

there are other functional forms that can generate an inverted U-shaped curve for inequality. In their work they found that using the technique of non-nested hypotheses test, Ahluwalia's functional form does not dominate any of the following functional forms :

(1) $I = a + b.\log Y + c.Y$

(2) $I = a + b.\log Y + c.1Y-$

(3) I=a+b.(4^) + c ^ y

(4) $I = a + b.Y + c.$ —-

and is dominated by the functional form

(5) $I = a+b.Y.+c.Y^2$

which gave not an inverted U-shaped curve for inequality, but a U-shaped curve (i.e. inequality first decreases and then increases with GDP p.c.)

As a next step in this work I tried to test all these functional forms against Ahluwalia's functional form, using a Davidson-MacKinnon J test for testing non-nested hypotheses[13], both with GDP p.c. using official exchange rates and with GDP p.c. using I.C.P. dollars[14]. The results are very different from those of Anand and Kanbur (8Î, 84). Ahluwalia's functional form is found to dominate functional forms (2) and (3). For functional forms (1), (4) and (5) sometimes the test was inconclusive and sometimes it is in favour of Ahluwalia's functional form. However when I ran regressions using functional forms (1), (4) and (5), in all cases either one or both the coefficients of GDP p.c, or its transformation, turned out to be insignificant (very low t-ratios). It should be mentioned here that the data sets of Ahluwalia (76a) and Anand and Kanbur (81, 84) on the one hand and mine on the other hand, are very different. The above authors use the data set given by Jain (75) which is rather heterogeneous, but I use data from Jain (75) only complementarily. My main source of data is the rather homogeneous set from World Development Reports. On the basis of this evidence, I continued my analysis using only Ahluwalia's functional form and rejecting the functional forms proposed by Anand and Kanbur.

In Jain (75), apart from the data on D.I. by household, there are also data on personal D.I. For 44 countries there are data on personal D.I. with national coverage and these data are given in Table E in the Appendix. However it should be emphasized that the definition of income recipient unit for these data varies substantially from country to country. Even then, the results using this personal incomes data set are excellent in terms of statistical significance, given that it is a cross country study. These results are given in Table 5. Again the signs and the turning points are as we expect them but we can also see that the most significant explanatory variable is the dummy variable for the socialist countries

13. See Mackinnon (83).

14. I did the same test also, for countries with two observations (see below) and the results were exactly the same.

and, as we argued previously, it is very doubtful if socialist countries should have been included in studies like these. If we look carefully at the data we can see that the relative weight of the socialist countries in this data set is much bigger than in the set with data on household D.I. Now there are five socialist countries in a sample of 44 countries. In the previous sample of 55 countries only two were socialist. However when I ran these regressions without the socialist countries and the relevant dummy variable, the results-in terms of statistical significance - were much worse than those reported in Table 5, but generally better than those reported in taple 2. Eqnations using GDP p.c. in I.C.P. dollars gave similar but a little worse results.

All the empirical studies reported in the previous section except Kuznets (63) and in some cases Anand and Kanbur (81) mix data on both personal D.I. and D.I. by household without any justification for it. In order to do it justifiably,

TABLE 5

Personal distribution of income : 44 countries

Dependent Variable	Constant Term	log Y	$(\log Y)^2$	D_1	$\bar{R}^2$	F	Turning Point
G	-5.939 (4.07)	1.797 (4.34)	-0.134 (4.69)	-1.253 (9.25)	0.72	37.68	817
B_{40}	7.333 (3.77)	-2.446 (4.44)	0.178 (4.69)	1.508 (8.35)	0.66	29.12	964
T_{10}	-5.242 (3.25)	1.544 (3.37)	-0.119 (3.77)	-1.052 (7.02)	0.65	27.07	657

(t–ratios is parentheses)

hey need two arguments. First, they need evidence that the ratio income receivers over dependent persons per household is more or less the same or very similar for all the countries of their samples. Kravis (60, p. 410) gives evidence for the opposite, i.e. that in D.C.'s this ratio is higher than in L.D.C.'s[15]. Second, they need to show that these two sets of observations belong to the same structure, through a Chow test.

15. However the sample of Kravis (60) was a very small one.

Among the 44 countries of the Table E of the Appendix there are 17 countries (Chad, Dahomey, Madagascar, Botswana, Senegal, Ivory Coast, Iraq, El Salvador, Tunisia, Colombia, Ecuador, Bulgaria, Gabon, Barbados, Hungary, Poland and Czechoslavakia) for which there are no data on household D.I. If we add these 17 observations to the 55 observations of Table A of the Appendix, and run the same regressions, we get the results reported in Table 6. It is obvious that these 17 observations improved almost everything, but again the biggest part of the improvement came through the increase in the significance of the dummy variable for the socialist countries. In order to examine if these new observations are generated from the same structure, we can apply a Chow test for structural stability[16]. Surprisingly in all the cases these new observations passed this test at the 1 % level of significance, but failed to pass it at the 5 % level of significance.

TABLE 6

72 countries with both household and personal distribution of income

Dependent Variables	Constant Term	log Y	$(\log Y)^2$	D_1	$\bar{R}^2$	F	Turning Point
G	-5.553 (4.97)	1.628 (5.19)	-0.120 (5.61)	-1.025 (7.55)	0.58	34.06	883
B_{40}	6.808 (4.42)	-2.227 (5.14)	0.160 (5.42)	1.228 (6.56)	0.49	24.15	1053
T_{10}	-4.615 (4.44)	1.301 (4.45)	-0.100 (5.03)	-0.834 (6.61)	0.60	36.01	668

(t–ratios in parentheses)

The case is undoubtedly ambiguous, but because of the arguments of Kuznets (63), the evidence of Kravis (60), and most of all for reasons of homogeneity of the sample, I decided not to include these new observations in this analysis.

16. See Maddala (79) pp. 198 - 201.

TABLE 7

Household distribution of income : 30 countries with two observations (n = 60)

Dependent Variable	Constant Term	log Y	$(\log Y)^2$	D_1	$\bar{R}^2$	F	Turning Point
G	-4.789 (5.07)	1.374 (5.38)	-0.101 (5.39)	-0.793 (5.88)	0.52	21.40	900
B_{40}	4.982 (4.16)	-1.663 (4.84)	0.120 (5.05)	0.888 (5.01)	0.44	16.46	1022
T_{10}	-4.705 (5.29)	1.277 (5.01)	-0.096 (5.44)	-0.682 (5.18)	0.55	24.99	774

TABLE 8

Household distribution of income : 30 countries with two observations using Kravis factors (n = 60)

Dependent Variable	Constant Term	log y	$(\log Y)^2$	D_1	$\bar{R}^2$	F	Turning Point
G	-8.575 (3.44)	2.320 (3.49)	-0.160 (3.69)	-0.691 (4.51)	0.42	15.08	1408
B_{40}	9.461 (3.01)	-2.761 (3.30)	0.188 (3.42)	0.775 (4.01)	0.33	10.56	1545
T_{10}	-8.399 (3.59)	2.220 (3.57)	-0.156 (3.83)	-0.578 (4.02)	0.46	17.65	1231

(t – ratios in parentheses)

For some of the countries of the Table A of the Appendix, there exist data for more than one year. For 30 of them there exist data for at least two years. The data set of the second observations for these countries is given in Table B of the Appendix. For the countries for which data for more than two years were available, the data for the two most far removed years are used. Data for those

25 countries of Table A for which data for only a single year were available are not included in the following regression, in order to avoid over-emphasizing national peculiarities of some countries and under - emphasizing national peculiarities of some other countries. The results of the same regressions using as data set the 60 observations from these 30 countries (both with GDP p.c. converted into dollars at official exchange rates and with GDP p.c. using I.C.P. dollars) are given in Tables 7 and 8. Comparing these results with the results given in Tables 1 and 3 respectively we find that the results in Tables 7 and 8 are very similar to those in Tables 1 and 3, and there is an improvement in terms of statistical significance.

Among those countries with data for two different years, these are 19 L.D.C.'s we can repeat regressions for these countries, in order to see if they offer a further confirmation or a rejection of Saith's (83) criticisms. These results are reported in Table 9. They are again much worse than the results of the full sample,

TABLE 9

Household distribution of income : 19 L.D.C.'s with two observations (n = 38)

Dependent Variable	Constant Term	log Y	$(\log Y)^2$	D_1	$\bar{R}^2$	F	Turning Point
G	-4.705 (3.02)	1.337 (2.78)	-0.097 (2.61)	-0.575 (2.71)	0.23	4.78	984
B_{40}	4.922 (2.48)	-1.633 (2.66)	0.117 (2.53)	0.618 (2.28)	0.21	4.27	1073
T_{10}	-4.693 (3.08)	1.262 (2.69)	-0.094 (2.65)	-0.592 (2.86)	0.23	4.76	823

(t – ratios in parentheses)

but now there is a substantial improvement in comparison to the results given in Table 4. Now all the equations pass the F test at the 1 % level of significance. There is also no insignificant explanatory variable in all the equations. We can fairly say that these results do not give support to Saith's criticisms[17].

17 Even though, using GDP p.c. in I.C.P. dollars, the same regressions gave very low $\bar{R}^2$, F and t-ratios.

Finally there are 17 countries with data for three different years and 15 countries with data for four different years. These data are reported in Tables C and D of the Appendix. The results of the regressions using these two data sets are given in Tables 10 and 11.

The change now is an impressive one ; R^2, F and t-ratios are much lower in Tables 1 and 7, but even then the coefficients of log Y, $(\log Y)^2$ (and D_1) than are not insignificant.

TABLE 10

Household distribution of income : 17 countries with three observations (n = 51)

Dependent Variable	Constant Term	log Y	$(\log Y)^2$	D_1	$\bar{R}^2$	F	Turning Point
G	-3.107 (3.03)	0.847 (2.81)	-0.063 (3.01)	-0.418 (2.36)	0.22	5.66	831
B_{40}	3.950 (2.28)	-1.036 (2.74)	0.075 (2.86)	0.428 (1.93)	0.14	3.75	999
T_{10}	-3.117 (3.33)	0.771 (2.81)	-0.060 (3.11)	-0.463 (2.88)	0.32	8.91	617

TABLE 11

Household distribution of income : 15 countries with four observations (n = 60)

Dependent Variable	Constant Term	log Y	$(\log Y)^2$	D_1	$\bar{R}^2$	F	Turning Point
G	-3.118 (2.38)	0.835 (2.24)	-0.061 (2.40)	-0.426 (2.61)	0.16	4.87	938
B_{40}	3.155 (1.93)	-1.068 (2.29)	0.076 (2.37)	0.453 (2.22)	0.09	3.03	1126
T_{10}	-3.158 (2.58)	0.774 (2.22)	-0.059 (2.47)	-0.469 (3.07)	0.27	8.17	706

(t – ratios in parentheses)

What is the reason for this change? The answer can be found if we look carefully at the samples of the countries with three and four observations. We can find an over-representation of the most egalitarian L.D.C.'s (Taiwan, Rep· of Korea, Yugoslavia, Pakistan) and of the most inegalitarian D.C.'s (U.S.A., France, Canada). The most inegalitarian L.D.C.'s with highly dualistic economies are not represented at all and some of the Western European countries with advanced Welfare states (e.g. Benelux or Scandinavian countries) are represented only in the first sample by Netherlands. Such a sample in no sense can be assumed to be a representative one. Even then as is reported previously, the variables that interest us more, turned out to be significant again.

All our regressions are in a cross country context, so we should test if they exhibit heteroscedasticity. We can do it using the most general test, the Breusch-Pagan test[18]. Testing equations of Tables 1, 3, 7 and 8 at the 1 % level of significance, no equation found to exhibit heteroscedasticity.

We can also try to verify the results on the U-hypothesis using the method of Paukert (73). This is done in Table 12 where the 53 capitalist countries of Table A of the Appendix are divided into nine groups according to their GDP p.c. and then averages of the groups for the various indicators are taken. Before examining the results it should be mentioned that this method has the disadvantage that it eliminates the within-group variation. All the indicators give support to the U-hypothesis with one exception. In the group of the richest countries (GDP p.c. more than 10,000 dollars), there is a reversal of the U curve for all the indices. This may happen because in this group is included the most inegalitarian country of the last three groups (U.S.A.) It is characteristic that without the U.S.A. in the sample most of the indices follow their «normal» route. This result may be interpreted as an indication that a cubic term (log Y^3) should be included in the regressions. I tried it but in all the cases the coefficient of the cubic term was found to be insignificant using either GDP p.c. converted into official exchange rates, or GDP p.c. using I.C.P. dollars. This may be an indication that the reversal observed in the last group of countries of Table 12 is simply due to the inclusion of one far outlier.

All these results can also be illustrated in a diagrammatic way. This is dome in diagrams 1 - 3 in the Appendix. Each of them depicts three functions, taken from Tables 1, 4 and 5 respectively. One for the household D.I. for all the countries, one for the household D.I. for L.D.C.'s only, and one for personal

18. See Stewart and Waliis (81), pp. 250 - 5 1 .

TABLE 12

Indicators of household distribution of income (average of groups of countries) : Capitalist countries only (n = 53).

GDP per. cap. (1980 U.S.$)	Number of countries	Bottom 20 %	Second 20 %	Third 20 %	Fourth 20 %	Top 20 %	Top 20 %	Bottom 40 %	Bottom 60 %	Top 20 % / Bottom 20 %	Gini Ratio
Below 250	7	7.2	10.6	14.4	19.8	48.0	34.0	17.8	32.2	6.67	0.383
251 – 500	6	5.0	8.3	13.1	20.3	53.3	38.3	13.3	26.4	10.66	0.459
501 – 1000	5	4.7	8.1	12.4	20.2	54.6	40.0	12.8	25.2	11.62	0.470
1000 – 2000	7	3.2	7.4	12.1	19.8	57.5	40.9	10.6	22.7	17.97	0.508
2001 – 3000	6	4.7	9.6	14.5	22.1	49.1	32.6	14.3	28.8	10.45	0.422
3001 – 5000	5	4.8	10.0	14.5	22.5	48.2	31.8	14.8	29.3	10.04	0.410
5001 – 8000	4	6.6	11.9	16.8	23.2	41.5	25.5	18.5	35.3	6.29	0.333
8001 – 10000	5	6.8	12.1	17.4	24.1	39.6	23.7	18.9	36.3	5.82	0.318
10001 and ab.	8	6.5	11.8	17.0	23.6	41.1	25.6	18.3	35.3	6.32	0.334

D.I. for all countries. We can see that in almost all cases household D.I. for all countries is more egalitarian than both household D.I. for L.D.C.'s only, and personal D.I. The latter gives support to the previous decision about not mixing data for D.I. by household with data for personal D.I. It should be emphasized that in the vertical axis of the diagrams is depicted the logistic transformation of the Gini Ratio and the relative income shares of the various groups and not the Gini Ratio and the relative income shares of the various groups per se.

5. SUMMARY OF FINDINGS AND CONCLUSIONS

Under the assumption that cross country studies can capture national time series relationships, this paper undoubtedly gives support to the theory of intersectoral shifts. Its results are not so «good» as the results of Ahluwalia (76a), but it has big advantage of the homogeneity of its sample. The Kuznets hypothesis is found to be appropriate in explaining the behaviour of both D.I. by household and personal D.I. Personal D.I. is found to be more unequal that D.I. by household, as Kuznets (63) speculated [19].

The higher values of the various statistical criteria in the equations concerning the top income group (when dependent variable is T_{10}), than in those concerning the bottom income group (when dependent variable is B_{40}), are clear evidence that as Kuznets (63) indicated, the U-hypothesis fits better to the «rich» than to the «poor».

The same results hold also when we use GDP p.c in I.C.P. dollars and when we restrict the sample to L.D.C.'s only. However, in both these cases the results are worse than before.

The high t-ratios in combination with the relatively low values of R^2 are a clear indication that in this analysis there is room for other explanatory variables. The high explanatory power of the dummy variable for socialist countries gives support to the role of political and legislative factors in the determination of D.I.

An extention of this study and particularly of its empirical part, can be based on more reliable data on GDP p.c. in I.C.P. dollars, and can also use the method of Papanek (78) describetd in Section 2. We can also use the technique of pooling together time series and cross section data for a representative sample of countries, provided reliable data on D.I. could be obtained for several years for these countries.

19. It should be emphasized that this speculation (personal D.I. more unequal than D.I. by household) is not part of the theory of intersectoral shifts.

A P P E N D I X

TABLE A :

Household distribution of income

Country – Year		GDP/cap. in 1980 U.S.A. $	Real GDP/cap. I.C.P. $	Income Shares						Gini Ratio
				Bottom 20 %	Second 20 %	Third 20 %	Fourth 20 %	Top 20 %	Top 10 %	
1. Bangladesh (73 – 74)	a	96 a	363	6.9	11.3	16.1	23.5	42.2	27.4	0.344
2 Nepal (76 – 77)	a	171	360	4.6	8.0	11.7	16.5	59.2	46.5	0.505
3. Sri Lanka (73)	b	209	946	7.3	12.0	16.1	21.8	42.8	28.0	0.336
4. Tanzania (69)	a	210	483	5.8	10.2	13.9	19.7	50.4	35.6	0.416
5. Malawi (67 – 68)	a	211	379	10.4	11.1	13.1	14.8	50.6	40.1	0.366
6. India (75 – 76)	a	228	592	7.0	9.2	13.9	20.5	49.4	33.6	0.402
7. Pakistan (70 – 71)	b	240	857	8.4	12.2	16.0	21.9	41.5	26.8	0.316
8. Sierra Leonne (67 – 69)	a	304	746	5.6	9.5	12.8	19.6	52.5	37.8	0.439
9. Thailand (75 – 76)	a	377	1077	5.6	9.6	13.9	21.1	49.8	34.1	0.418
10. Indonesia (76)	a	383	714	6.6	7.8	12.6	23.6	49.4	34.0	0.424
11. Kenya (76)	a	403	700	2.6	6.3	11.5	19.2	60.4	45.8	0.545
12. Sudan (67 – 68)	a	408	585	4.0	8.9	16.6	20.7	49.8	34.6	0.433
13. Zambia (59)	b	500	1120	5.4	7.6	11.1	17.7	58.2	44.0	0.493
14. Philippines (70 – 71)	a	528	937	5.2	9.0	12.8	19.0	54.0	38.5	0.453
15. Honduras (67)	a	608	1251	2.3	5.0	8.0	16.9	67.8	50.1	0.604
16. Egypt (64 – 65)	b	623	1013	4.6	9.5	14.6	22.9	48.4	31.1	0.419
17. Peru (72)	a	884	1618	1.9	5.1	11.0	21.0	61.0	42.9	0.561
18. Suriname (62)	b	997	1263	9.3	12.0	15.5	21.2	42.0	27.3	0.311
19. Turkey (73)	a	1015	1924	3.5	8.0	12.5	19.5	56.5	40.7	0.495
20. Jamaica (58)	b	1078	1796	2.2	6.0	10.8	19.8	61.2	43.8	0.554
21. Rep. of Korea (76)	a	1232	2109	5.7	11.2	15.4	22.4	45.3	27.5	0.371
22. Brazil (72)	a	1233	2555	2.0	5.0	9.4	17.0	66.6	50.6	0.599
23. Malaysia (73)	a	1263	2157	3.5	7.7	12.4	20.3	56.1	39.8	0.495
24. Panama (70)	a	1496	2632	2.0	5.2	11.0	20.0	61.8	44.2	0.564
25. Costa Rica (71)	a	1656	2317	3.3	8.7	13.3	19.9	54.8	39.5	0.481
26. Taiwan (79)	d	2040 d	2836	8.6	13.7	17.5	22.7	37.5	23.3	0.276

27. Mexico (77)	a	2258	2828	2.9	7.0	12.0	20.4	57.7	40.6	0.516
28. Chile (68)	a	2262	2880	4.4	9.0	13.8	21.4	51.4	34.8	0.444
29. Uruguay (67)	b	2378	3026	4.4	9.8	15.2	23.1	47.5	30.4	0.411
30. Puerto Rico (63)	b	2521 c	3699	4.6	9.1	14.0	21.9	50.4	33.6	0.433
31. Bahamas (70)	b	2910 c	4270	3.4	8.8	14.3	22.9	50.6	32.9	0.449
32. Yugoslavia (78)	a	2957	4863	6.6	12.1	18.7	23.9	38.7	22.9	0.311
33. Trinidad and Tobago (75–76)	a	3460	4544	4.2	9.1	13.9	22.8	50.0	31.8	0.435
34. Venezuela (70)	a	3862	3934	3.0	7.3	12.9	22.8	54.0	35.7	0.478
35. Hong Kong (80)	a	4264 c	5664	5.4	10.8	15.2	21.6	47.0	31.3	0.392
36. Ireland (73)	a	4296	4610	7.2	13.1	16.6	23.7	39.4	25.1	0.311
37. Argentina (70)	a	4896	3963	4.4	9.7	14.1	21.5	50.3	35.2	0.435
38. Spain (74)	a	5152	4697	6.0	11.8	16.9	23.1	42.2	26.7	0.346
39. Israel (79 – 80)	a	5221	6848	6.0	12.0	17.7	24.4	39.9	22.6	0.326
40. German Dem. Rep. (70)	b	5260 a	6042	10.4	15.9	19.6	23.4	30.7	16.9	0.196
41. Italy (77)	a	6022	5100	6.2	11.3	15.9	22.7	43.9	28.1	0.360
42. New Zealand (66)	b	6431	5739	8.3	12.6	16.8	22.6	39.7	24.6	0.301
43. Finland (77)	a	8889	7185	6.8	12.8	18.7	24.9	36.8	21.2	0.294
44. Japan (79)	a	9028	7772	8.7	13.2	17.5	23.8	36.8	21.2	0.273
45. Norway (70)	a	9136	7057	6.3	12.9	18.8	24.7	37.3	22.2	0.302
46. Australia (75 – 76)	a	9225	7597	5.4	10.0	15.0	22.5	47.1	30.5	0.398
47. United Kingdom (79)	a	9695	7034	7.0	11.5	17.0	24.8	39.7	23.4	0.322
48. Canada (77)	a	10129	9939	3.8	10.7	17.9	25.6	42.0	26.9	0.377
49. Belgium (74 – 75)	a	10182	7123	7.7	12.4	17.0	23.1	39.8	24.3	0.308
50. France (75)	a	10225	7986	5.3	11.1	16.0	21.8	45.8	30.5	0.382
51. Netherlands (77)	a	11194	7447	8.1	13.7	17.9	23.3	37.0	22.1	0.207
52. U.S.A. (78)	a	11546	11546	4.6	8.9	14.1	22.1	50.3	33.4	0.435
53. German Fed. Rep. (78)	a	11864	8609	7.9	12.5	17.0	23.1	39.5	24.0	0.304
54. Denmark (76)	a	11896	8000	7.4	12.6	18.3	24.2	37.5	22.4	0.295
55. Sweden (79)	a	14376	9442	7.2	12.8	17.4	25.4	37.2	21.2	0.296

TABLE B

Household distribution of income (2nd observation)

Country – Year		GDP/cap. in 1980 U.S.A.$	Real GDP/cap. I.C.P. $	Income Shares						Gini Ratio
				Bottom 20 %	Sesond 20 %	Third 20 %	Fourth 20 %	Top 20 %	Top 10 %	
1. Bangladesh (63–64)	b	85 a	322	6.9	11.0	15.4	22.2	44.5	28.7	0.359
2. Sri Lanka (53)	b	133	700	5.2	9.4	13.1	18.5	53.8	40.6	0.453
3. India (60)	b	189	492	4.1	9.5	14.1	20.6	51.7	36.7	0.447
4. Tanzania (67)	b	207	475	5.0	8.3	12.6	18.5	55.6	41.5	0.473
5. Pakistan (63 – 64)	b	213 a	760	6.4	11.1	15.5	21.7	45.3	30.2	0.369
6. Thailand (62)	b	327	607	5.6	7.8	11.0	18.2	57.4	42.6	0.484
7. Taiwan (59)	b	347 c	482	5.6	9.3	13.6	20.6	50.9	35.4	0.428
8. Philippines (61)	b	469	779	4.9	7.1	12.1	19.5	56.4	40.6	0.486
9. Malaysia (60)	b	553 c	778	3.2	6.4	10.7	18.5	61.2	45.7	0.543
10. Korea (66)	b	582	950	6.5	11.9	17.0	24.0	40.6	24.3	0.329
11. Turkey (68)	b	875	1683	2.9	6.5	11.0	19.0	60.6	44.7	0.540
12. Brazil (70)	b	1016	2170	3.0	6.2	10.6	18.7	61.5	45.5	0.548
13. Yugoslavia (63)	b	1138	1871	6.9	12.1	16.7	22.8	41.5	26.2	0.331
14. Costa Rica (61)	b	1181	1608	5.7	7.3	10.7	17.4	58.6	44.0	0.494
15. Mexico (63)	b	1484	1877	3.7	6.7	11.3	19.6	58.7	41.9	0.517
16. Hong Kong (71)	b	1808 c	2865	5.6	10.0	14.3	21.1	49.0	33.7	0.410
17. Japan (62)	b	3041	2534	4.8	10.5	15.7	22.9	46.1	29.7	0.393
18. Spain (64 – 65)	b	3154	2847	6.0	10.5	15.4	22.6	45.5	29.3	0.378
19. Venezuela (62)	b	3203	3263	3.3	6.3	11.2	20.2	59.0	41.2	0.525
20. Argentina (61)	b	4434	3626	6.9	9.7	13.3	19.2	50.9	37.0	0.413
21. France (56)	b	4626	3621	3.1	8.7	14.2	22.5	51.5	34.3	0.460
22. German Dem. Rep. (67)	b	4627 c	5176	10.7	16.2	19.6	23.2	30.1	16.9	0.188
23. Italy (69)	a	4954	4391	5.1	10.5	16.2	21.7	46.5	30.9	0.391
24. Canada (61)	b	5780	5587	7.0	12.7	17.5	23.8	39.1	23.4	0.301
25. United Kingdom (60)	b	6371	4705	6.4	11.7	16.5	23.4	42.0	25.8	0.341
26. U.S.A. (60)	b	7230	7230	4.4	11.5	16.9	24.0	43.2	26.7	0.371
27. Australia (66 – 67)	a	7252	5669	6.5	13.5	17.8	23.4	38.8	23.7	0.307
28. German Fed. Rep. (68)	b	7351	6280	6.2	10.6	15.4	22.8	45.0	28.6	0.371
29. Netherlands (67)	a	7556	5019	6.5	11.6	16.4	22.7	42.8	27.7	0.347
30. Sweden (72)	a	12625	8329	6.6	13.1	18.5	24.8	37.0	21.3	0.296

TABLE C

Household distribution of income (3rd observation)

Country – Year		GDP/cap. in 1980 U.S.A. $	Real GDP/cap. I.C.P. $	Income Shares						Gini Ratio
				Bottom 20 %	Second 20 %	Third 20 %	Fourth 20 %	Top 20%	Top 10 %	
1. Bangladesh (66–67)	b	88 a	332	7.9	11.7	15.8	22.3	42.3	26.7	0.329
2. Sri Lanka (63)	b	144	667	4.5	9.2	13.7	20.5	52.1	36.9	0.448
3. India (67 – 68)	b	203	528	4.7	8.4	13.0	20.8	53.1	36.7	0.457
4. Pakistan (66 – 67)	b	222 a	792	7.6	11.6	15.7	21.7	43.4	28.3	0.340
5. Philippines (65)	b	473	849	3.7	7.9	12.7	20.3	55.4	39.3	0.486
6. Malaysia (67 – 68)	b	748 c	1277	3.2	7.2	11.5	18.9	59.2	44.1	0.524
7. Rep. of Korea (70)	b	771	1245	7.1	10.6	15.2	22.6	44.5	28.0	0.359
8. Taiwan (71)	a	821 c	1140	8.7	13.2	16.6	22.3	39.2	24.7	0.291
9. Mexico (67 – 68)	b	1791	2265	3.7	7.5	12.1	19.8	56.9	40.9	0.500
10. Yugoslavia (73)	a	1857	3054	6.5	11.9	17.6	24.0	40.0	22.5	0.321
11. Japan (71)	b	6745	5620	8.8	13.5	17.5	22.6	37.6	23.1	0.275
12. Canada (65)	b	6858	6630	6.7	12.3	17.2	23.8	40.0	24.0	0.320
13. United Kingdom (68)	b	7749	5723	6.6	11.9	17.0	24.2	40.3	23.9	0.326
14. France (70)	a	8742	6765	4.3	9.8	16.3	22.7	46.9	30.4	0.406
15. U.S.A. (70)	b	9435	9435	4.8	10.5	15.7	23.2	45.8	29.1	0.391
16. German Fed. Rep. (70)	b	9845	7029	5.9	10.5	15.3	22.7	45.6	29.1	0.379
17. Netherlands (75)	a	9882	6374	8.5	13.6	17.8	23.0	37.1	22.5	0.274

TABLE D

Household distribution o income (4th observation)

Country – Year		GDP/cap. in 1980 U.S.A. $	Real GDP/cap. I.C.P. S	Income Shares						Gini Ratio
				Bottom 20 %	Second 20 %	Third 20 %	Fourth 20 %	Top 20 %	Top 10 %	
1. Sri Lanka (69 – 70)	b	183	886	6.9	10.9	15.3	22.0	44.9	29.1	0.352
2. India (64 – 65)	a	207	593	6.7	10.5	14.3	19.6	48.9	35.2	0.396
3. Pakistan (68 – 69)	b	231 a	825	8.2	12.1	16.0	21.7	42.0	27.3	0.321
4. Taiwan (61)	b	389 a	540	4.4	9.1	13.8	20.9	51.8	36.1	0.447
5. Philippines (56)	b	398	714	4.9	8.00	12.3	20.0	54.8	38.9	0.470
6. Rep. of Korea (68)	b	644	1051	8.6	12.8	16.9	22.5	39.2	24.2	0.293
7. Malaysia (70)	a	1051	1623	3.3	7.3	12.1	20.7	56.6	39.6	0.503
8. Yugoslavia (68)	b	1419	2334	6.6	11.8	16.7	23.5	41.4	25.3	0.334
9. Mexico (69)	b	1880	2377	4.2	6.0	9.77	16.9	63.2	48.8	0.550
10. Japan (69)	a	6016	5012	7.7	13.1	16.8	21.2	41.0	27.2	0.311
11. France (62)	b	6179	4335	2.4	7.8	13.1	22.0	54.7	37.2	0.495
12. Canada (69)	b	1871	7609	5.0	11.8	17.9	24.3	41.0	25.1	0.347
13. United Kingdom (73)	a	8909	6608	6.3	12.6	18.4	23.9	38.8	23.5	0.313
14. U.S.A. (72)	a	10089	10089	4.5	10.7	17.3	24.7	42.8	26.6	0.373
15. German Fed. Rep. (74)	a	10807	7883	6.9	11.0	15.4	21.9	44.8	28.8	0.360

TABLE E

Personal distribution of income

Country – Year		GDP/cap. in 1980 U.S.A. $	Real GDP/cap. I.C.P. $	Income Shares						Gini Ratio
				Bottom 20 %	Second 20 %	Third 20 %	Fourth 20 %	Top 20%	Top 10 %	
1. Chad (58)	b	135 c	324	7.7	11.6	15.2	20.7	44.8	30.7	0.350
2. Dahomey (59)	b	176	402	5.5	10.3	13.9	18.6	51.7	39.3	0.430
3. Tanzania (67)	b	207	475	5.2	7.3	10.8	17.0	59.7	46.5	0.508
4. India (63 – 65)		208	539	5.5	10.0	13.7	18.9	51.9	38.9	0.433
5. Sri Lanka (73)	b	209	946	5.1	10.2	15.3	23.1	46.3	29.5	0.394
6. Madagascar (60)	b	262	667	5.2	7.8	11.0	15.9	60.1	48.6	0.509
7. Botswana (71 – 72)	b	282	481	1.6	6.0	11.3	20.8	60.3	42.1	0.553
8. Indonesia (71)	b	294	494	6.8	10.5	13.4	17.3	52.0	40.7	0.418
9. Kenya (69)	b	344	665	3.9	5.6	8.8	14.8	66.9	54.9	0.584
10. Senegal (60)	b	512	1323	3.2	6.2	10.4	17.7	62.5	47.8	0.554
11. Ivory Coast (70)	b	550	1462	3.9	6.7	11.2	19.7	58.5	41.5	0.513
12. Iraq (56)	b	586	1294	2.1	4.4	8.8	17.8	66.9	49.8	0.605
13. Honduras (67)	b	608	1251	2.5	5.9	10.9	20.1	60.6	42.5	0.546
14. El Salvador (61)	b	622	1082	5.1	6.5	10.2	17.4	60.8	45.7	0.520
15. Peru (61 – 63)	b	728	1333	3.3	5.0	8.3	14.2	69.2	57.4	0.610
16. Tunisia (70)	b	756	1293	4.2	7.2	12.0	21.1	55.5	37.3	0.485
17. Rep. of Korea (70)	b	771	1245	6.1	10.1	14.8	21.9	47.1	31.0	0.390
18. Colombia (70)	b	902	1651	2.9	7.1	11.6	18.9	59.5	44.4	0.529
19. Ecuador (70)	b	912	1236	1.8	3.4	7.3	15.5	72.0	56.6	0.651
20. Brazil (70)	b	1049	2170	2.8	5.3	9.0	15.6	67.3	54.3	0.599
21. Malaysia (70)	b	1051	1623	3.3	8.0	12.9	20.6	55.2	39.1	0.489

22. Bulgaria (62)	b	1327 a	2623	11.3	15.3	18.5	22.5	32.4	18.8	0.203
23. Gabon (68)	b	1387	2597	3.2	5.3	8.8	15.2	67.5	54.7	0.596
24. Yugoslavia (68)	b	1419	1944	10.6	14.3	17.8	22.3	35.1	21.1	0.236
25. Panama (72)	b	1627	2862	4.6	10.6	15.5	21.9	47.4	32.2	0.405
26. Costa Rica (71)	b	1656	2317	5.0	8.6	12.9	20.3	53.2	37.5	0.454
27. Barbados (69 – 70)	b	1782	2255	6.8	11.8	15.8	21.6	44.0	29.3	0.351
28. Hungary (69)	b	1914 a	3783	9.1	15.0	19.0	23.5	33.4	19.3	0.234
29. Poland (64)	b	1954 a	3862	9.8	13.6	17.5	23.0	36.1	21.2	0.254
30. Uruguay (67)	b	2378	3026	3.0	7.6	13.1	22.8	53.5	34.5	0.480
31. Bahamas (70)	b	2910 c	4270	3.6	8.6	13.8	21.6	52.4	35.9	0.462
32. Czechoslavakia (64)	b	3012 a	4763	11.9	15.5	18.7	22.8	31.1	17.4	0.187
33. Spain (64 – 65)	b	3154	2847	6.4	10.7	15.2	22.1	45.6	29.8	0.373
34. Argentina (61)	b	4434	3626	5.1	9.3	13.1	18.6	53.9	40.7	0.455
35. Finland (62)	b	5299	4194	2.7	9.0	14.7	23.2	50.4	32.9	0.454
36. New Zealand (71 – 72)	b	6966	6243	5.7	12.1	17.2	23.7	41.3	25.4	0.341
37. Japan (72)	b	7230	6024	8.2	12.7	17.0	22.8	39.3	24.2	0.298
38. Norway (63)	b	7369	5134	4.7	12.4	17.6	24.3	41.0	25.0	0.347
39. United Kingdom (67)	b	7466	5514	6.3	12.0	16.5	22.3	42.9	28.0	0.347
40. Netherlands (67)	b	7556	5019	4.0	9.7	14.7	22.3	49.3	33.0	0.430
41. German Fed.Rep. (64)	b	7883	5659	5.6	9.9	13.3	18.0	53.2	41.0	0.442
42. Denmark (66)	b	8812	5859	5.4	11.5	16.8	24.1	42.2	25.5	0.354
43. U.S.A. (70)	b	9435	9435	6.8	12.7	17.5	23.9	39.1	23.4	0.311
44. Sweden (70)	b	10062	8171	5.2	11.0	16.2	23.5	44.1	27.5	0.372

Sources :

a : World Development Reports

b : Jain (75)

c : United Nations

d : Kuo, et al (81)

DIAGRAM 1. GINI RATIOS (see p. 29)

G1 = HOUSEHOLD DISTRIBUTION
G2 = HOUSEHOLD DISTRIBUTION (L.D.C.s ONLY)
G3 = PERSONAL DISTRIBUTION

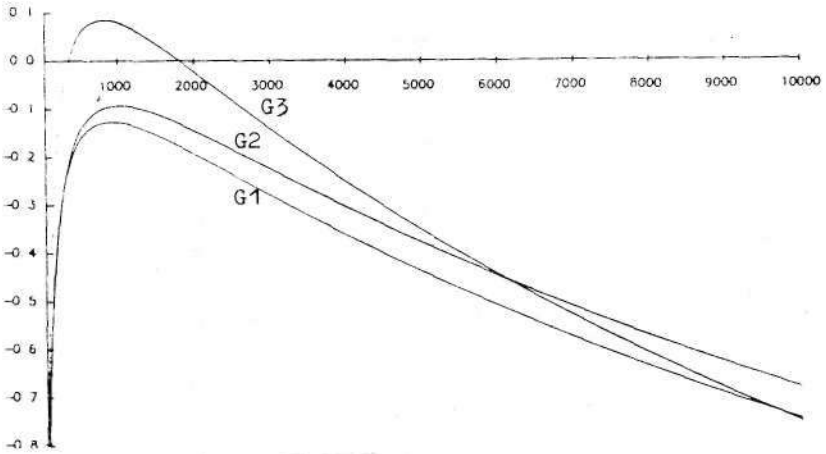


DIAGRAM 2. INCOME SHARE OF BOTTOM 40% (see p. 29)

B40A = HOUSEHOLD DISTRIBUTION
B40B = HOUSEHOLD DISTRIBUTION (L.D.C.s ONLY)
B40C = PERSONAL DISTRIBUTION

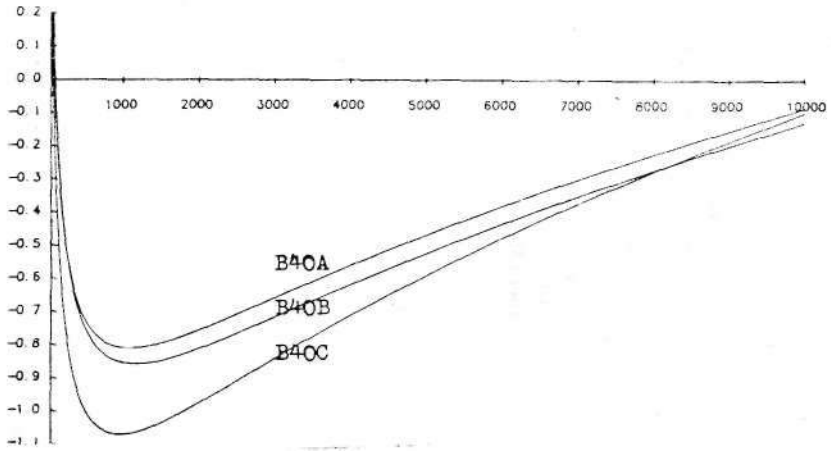
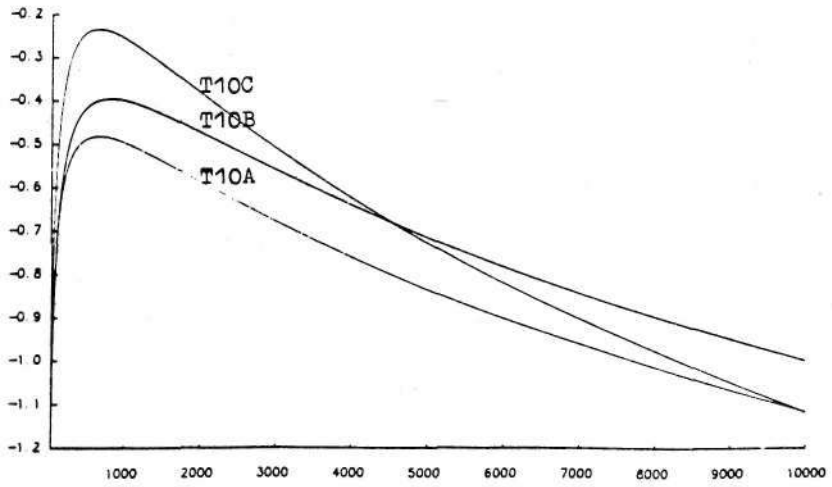


DIAGRAM 3. INCOME SHARE OF TOP 10% (see p. 29)

T10A = HOUSEHOLD DISTRIBUTION
T10B = HOUSEHOLD DISTRIBUTION (L.D.C.s ONLY)
T10C = PERSONAL DISTRIBUTION



REFERENCES

Adelman, I. and Morris, C.T., «Economic growth and social equity in developing countries», Stanford University Press, Stanford, 1973.

Adelman, I. and Morris, C.T., «Distribution and Development, a Comment», Journal of Development Economies 1, 1975, pp. 401 -402.

Ahluwalia, M., «Income inequality, some dimensions of the Problem», in Chenery et al «Redistribution ...», pp. 3-37.

Ahluwalia, M., «Inequality, povery and development», Journal of Development Economics 3, 1975, pp. 307-342.

Ahluwalia, M., «Income distribution and development : Some stylized facts», American Economic Review 66, 1976, pp. 128-135.

Ahluwalia, M., and Chenery, H., «The economic framework» in Chenery et al, «Redistribution.. », pp. 38—51.

Anand, S., and Kanbur, S.M., «inequality and Development : a critique», St. Catherine's College, Oxford, 1981 (mimeo).

Anand, S. and Kanbur, S.M., «Inequality and Development : a reconsideration, in H.P. Nissen (ed.) «Towards income distribution policies», EAI, Book Series 3, 1984.

Atkinson, A.B., «On the measurement of inequality», Journal of Economic Theory 2, 1970, pp. 244-263.

Bornschier, V., «World economy, level of development and income distribution», World Development 11, 1983, pp. 11-20.

Chenery, H., Ahluwalia, M., Bell, C.L.G., Dulloy, J., Jolly R., «Redistribution with growth», Oxford University Press, New York, 1974.

Chenery, H., and Syrquin, M.. «Patterns of Development 1950-1970», Oxford University Press, Oxford, 1975.

Cline, W., «Distribution and Development», Journal of Development Economics 1, 1975, pp. 359-400.

Creedy, J., «Pareto and the distribution of income», Review of Income and Wealth 23, 1977, pp. 405-411.

Cromwell, J., «The size distribution of income : An international comparison», Review of Income and Wealth 23,1977, pp. 291 - 308.

Fields, G., «Poverty, inequality and development», Cambridge University Press, Cambridge, New York, Melbourne, 1980.

Friedman, M., «Choice, chance and the distribution of personal income». Journal of Political Economy 61,1953, pp.277 - 290.

Griffin, K., and Khan, A.R., «Poverty in the third world : Ugly Facts and Fancy Models», World Development 7, 1978.

Jain, S., «Size distribution of income : A compilation of data», Johns Hopkins University Press (for the World Bank), Baltimore, Maryland, 1975.

Kravis, I., «International differences in the distribution of income», Review of Economics and Statistics, 1960, pp. 408-416.

Kravis, I., Heston, A., Summers, R., «Real GDP per capita for more than one hundred countries», Economic Journal 8S, 1978, pp. 215-242.

Kuo, S., Ranis, G., Fei, J., «The Taiwan success story», Westview Press, Boulder, Colorado, 1981.

Kuznets, S., «Economic growth and income inequality», American Economic Review 45, 1955, pp. 1 - 28.

Kuznets, S., «Quantitative aspects of the economic growth of nations VIII, Distribution of income by size», Economic Development and Cultural Charge, 1963, pp. 1 - 80.

Lydall, Harold, «A theory of income distribution», Clarendon Press, Oxford, 1979.

MacKinnon, J.G., «Model specification tests against non-nested alternatives», Econometric Reviews 1,1983., pp. 85-110.

Maddala, G.S., «Econometrics», McGraw-Hill, 1979.

Nugent, J., «An alternative source of measurement error as an explanation for the inverted U-hypothesis», Economic Development and Cultural Change, 1983, pp. 385-396.

Oshima, H.T., «The international comparison of size distribution of family incomes, with special reference to Asia», Review of Economics and Statistics, 1962, pp. 439-445.

Papanek, G., «Economic Growth, Income Distribution and the Political Process in L.D.C.'s» in Z. Griliches et al fed.) «Income Distribution and Economic Inequality», Campus Verlag-Halstead Press, Frankfurt - New York, 1979, pp. 259-273.

Paukert, F., «Income distribution at different levels of development», International Labour Review, 1973, pp. 97-125.

Robinson, S., «Toward an adequate long-run model of income distribution and economic development», American Economic Review 66, 1976, pp. 1233 - 1277.

Saith, A., «Development and Distribution: A critique of the crosscountry U - hypothesis», Journal of Development Economics 13, 1983, pp. 367- 382.

Stewart, M.B., and Wallis, K.F., «Introductory Econometrics», 2nd edition, Blackwell, Oxford, 1981.

Swamy, S., «Structural changes in the distribution of income by size : the case of India», Review of Income and Wealth 13, 1967, Spp. 155-173.

I.M.F., «International Financial Statistics», Yearbook 1983, United Nations «Statistical Yearbook», various editions, New York.

United Nations «Statistical Yearbook», various editions, New York.

World Bank, «World Development Reports», 1978-1984, New York, Oxford University Press.