IMF WORKING PAPER

© 1995 International Monetary Fund

This is a Working Paper and the author(s) would welcome any comments on the present text. Citations should refer to a Working Paper of the International Monetary Fund, mentioning the author(s), and the date of issuance. The views expressed are those of the author(s) and do not necessarily represent those of the Fund.

WP/95/86

INTERNATIONAL MONETARY FUND

Monetary and Exchange Affairs Department

Inflation and Income Distribution: Further Evidence on Empirical Links

Prepared by Aleš Bulíř and Anne-Marie Gulde 1/

Authorized for distribution by William E. Alexander and Charles Enoch

August 1995

Abstract

This paper examines the effects of inflation and associated financial instability on income distribution. Using both pooled cross country and single country time series models, the level of inflation, inflation variability, and the variability of the nominal exchange rate are shown to impact negatively on overall income equality. Looking at disaggregate measures of income distribution, the issue as to whether inflation is a progressive or regressive tax is found to be negatively correlated with the level of development and the sophistication of the financial structure. The paper argues that these results point towards financial variables as a partial way of rectifying the generally poor explanatory power of both cross-country and time series models of income distribution.

JEL Classification Numbers:
E25, E31, 015

1/ We would like to thank William Alexander and Charles Enoch for valuable discussions, and Carlo Cottarelli, John Green, Vincent Koen, Branko Milanovic, Ceyla Pazarbasioglu, and Holger Wolf for helpful comments. Kiran Sastry provided excellent research assistance. The views expressed in this paper are those of the authors and do not necessarily reflect the views of the International Monetary Fund.

Contents

Summary

This paper examines the effects of inflation and associated financial instability on income distribution. There has long been a presumption that the inflation tax is regressive, being borne disproportionately by the poorer segments of society. However, remarkably little is known about the quantitative importance of inflation for income distribution. Most studies have focused on the relation between growth and income distribution (the Kuznets model) and only a few explicitly have incorporated macroeconomic policies. Those that do generally find that there is some improvement in the usually low explanatory powers of the Kuznets model.

To test the hypothesis of a negative link between inflation and income equality, both pooled cross-country and single-country time series models are estimated. They include, alongside the more traditional explanatory factors, three financial instability variables: the level and variability of inflation and the variability of the nominal exchange rate. In a cross-section test, the paper tests an "extended" variant of the Kuznets model for a large sample including some 130 observations, drawn from 18 developed and developing countries. The paper confirms weak evidence for the importance of per capita income for differences in the level of income distribution (the Kuznets hypothesis), but finds strong support for the importance of fiscal spending and all of the proposed financial instability variables. Among the inflation-related costs, inflation variability--a proxy for inflation uncertainty--tends to have a particularly strong impact on income equality. In the time series test, new data for three countries are used to test the Schultz and Blinder-Esaki models. The results support the hypothesis that inflation changes the relative standing of different groups of society. Combining and contrasting the observed pattern with previous tests of the model for seven other countries, it is suggested that inflation tends to be a regressive tax in lower-income countries with a relatively unsophisticated financial sector. The models estimated fail to reject the hypothesis that, in some countries, inflation might have the effect of a progressive tax.

The paper concludes that income distribution is significantly influenced by financial policies. Such effects can arise from schemes explicitly designed to impact on income equality but also as an unintended side effect. The paper shows that the explanatory power of income distribution models can be improved by including the effects of financial policies. Given its policy relevance, more research on these links seems warranted, not least also to find properly specified lagged, cumulative, or threshold effects.

I. Introduction

There has long been a presumption that the inflation tax is regressive, being born disproportionally by the poorer segments of society. However, remarkably little is known about the quantitative importance of inflation for income distribution. Can accounting for differences in inflation reduce the sizeable cross-sectional differences in Gini coefficients, differences which remain substantial even after controlling for the standard determinants? Does inflation provide a significant additional factor to the hypothesis of a secular decline when explaining changes in the income share of the poor over time?

In this paper, we examine the income distribution-inflation link in both cross-section and time-series frameworks. Our results suggest that accounting for inflation indeed reduces the unexplained differences in income distribution. Examining a comprehensive pooled cross country data set, we find that, controlling for other factors, both a higher and a more variable inflation rate worsens income inequality. Examining changes in the income distribution in a particular country over time, we likewise find the relative standing of different income groups to be systematically related to the rate of inflation, again controlling for other determinants of the income distribution. Our results thus suggest caution regarding the often held view that stabilization programs worsen income distribution and hurt the poor: a complete assessment of their impact on income distribution must evaluate both the immediate--and perhaps mostly adverse--effect of the fiscal actions proper, and their longer-term indirect--and generally positive--effect through a reduced inflation rate, higher growth and employment.

The remainder of the paper is organized as follows. Section II reviews the (scant) literature on income distribution and inflation, sections III and IV present our empirical results for the cross section and time series samples respectively. Section V concludes. Appendices I to III provide background on likely channels of impact of inflation on income distribution, calculate the ex-post impact of inflation on income distribution for a range of countries, and detail data and sources.

II. Inflation and Income Distribution

On a theoretical level, the distribution of income at a point in time reflects both the distribution of income earning assets--financial, real, and human capital--with their associated returns, and the distributive activities of the government (financial transfers). Given the empirical complexities of asset distributions and returns, the dominant theories on macroeconomic distribution differences in both the time-series and the cross-section dimension are remarkably generalistic, a tradition going back

to Pareto's "iron law of inequality." 1/ While Pareto's view of a stable income distribution both across countries and across levels of economic development was empirically rejected in the 1930s (Shirras (1935), Johnson (1937), Staehle (1937)), the widely accepted successor theory put forth by Kuznets (1955), a simple inverted U-curve as countries move through development stages, allowed for only marginally more diversity in income distribution. 2/ Tests of the Kuznets' hypothesis, while generally weakly supportive (e.g., Kuznets (1963), Paukert (1973), Ahluwalia (1976), Stewart (1978), Campano and Salvatore (1988)) fail to significantly reduce the unexplained differences in income distribution. 3/ For our sample of 18 countries, the level and the squared level of income explains a mere 10 percent of the cross sectional variation.

There are thus ample reasons to doubt the rather mechanical "policy invariance proposition" of the original Kuznets hypothesis. Indeed, for our sample the inclusion of country dummies proxying determinants other than development status raises the explained fraction of cross-sectional variance to above 80 percent. Recent empirical work aims to identify these determinants: regional features (Field (1980)), education spending, economic structure, and foreign trade openness (Bourguignon and Morrisson, (1990)), and "social choice" variables, such as the share of state employment, interregional and social transfers (Milanovic, 1994). In general, these explanatory variables--in particular government spending and transfer policies--are found to be significant, improving the fit of the simple Kuznets model.

The effect of inflation has been examined in a small subset of this literature. In a cross section study, Adelman and Fuwa (1992) include inflation alongside a number of other determinants, finding a significant negative link between inflation and equality. A similar finding is reported by Schultz (1969) and Haslag and Taylor (1993) for time series models with aggregate measures of income distribution. Blinder and Esaki (1978),

---

1/ There is, however, an extensive literature on the microeconomic determinants of inequality and income distribution, stressing the importance of education, intelligence, urbanization and industrialization, population policies, nature of the government (democracy or authoritarian regime), distribution of assets etc. See Frank and Webb (1977) for a review and Beach (1977), Budd and Seiders (1977), Minarik (1979), and Wolff (1979) for simulations based on microdata.

2/ While the causality running from economic development to income distribution is straightforward, recently another view had gained attention. There seems to be some evidence that economies with more equally distributed incomes tend to grow faster in the long term, see for example Alesina and Perotti (1994) and Persson and Tabellini (1994).

3/ While originally formulated as a time series proposition, the lack of data largely prevented single country studies. A qualitative assessment of the Kuznets hypothesis for the U.S. and the U.K. was presented by Lindert and Williamson (1984), and for Japan and selected Asian countries by Oshima (1992) and (1994).

enriching the model by Schultz (1969), examine the effect of inflation separately for the income quintiles in the United States and find a positive effect of inflation on the income share of the bottom quintile. Similar studies for a number of other developed countries (Buse (1982), Weil (1984), Nolan (1987), Björklund (1991), van Wijck (1992), Livada (1992), Yoshino (1993), and Brandolini and Sestito (1994)) reveal, however, a more mixed pattern. The results, in particular when seen in conjunction with our own estimates, suggest that a negative effect of inflation on income equality is more likely in countries with a less developed financial sector. This finding is also born out by the significant negative linkage detected in the sole developing country study in the literature (Blejer and Guerrero (1990)).

Finally, poverty studies, while different in focus, have shed some light on the impact of inflation on the poor. Work undertaken by Fox and Morley (1991), Cardoso (1992), and Morley (1992, 1994) for Latin American countries established that inflation affects the incomes of the poor mainly through declining real wages, with costs particularly pronounced during the transition from low to high inflation, a finding confirmed by Gulde (1991) for Sri Lanka.

In summary, the evidence suggests that income distribution is, to a certain degree, in the hands of the policy maker. While other research in this area has largely focused on measures explicitly designed with a distributive goal in mind, our results suggest that there is also a need to examine the side-effects of policies designed with other purposes in mind. Those effects can be significant and--at least in the case of inflation--support calls for a stable macroeconomic environment.

III. Cross Country Empirical Evidence

1. Background and data

As noted, issues related to both sample size and comparability of data have been a major problem in previous studies. Therefore, we devoted considerable efforts to compile a more comprehensive data base than used in most other studies. 1/ A complete list of sources is given in Appendix III.

The cross country data base--underlying the estimates in the next section--is limited to countries with a minimum of two observations on Gini coefficients (G) from a single reliable source, allowing us to control for country effects as well as to help capture some time series elements. The countries included are Austria (2 observations), Bangladesh (3), Brazil (3), Chile (2), Greece (27), Indonesia (8), Israel (7), Italy (12), Malaysia (4), Netherlands (4), Norway (2), Pakistan (6), Peru (6), Korea (4), Switzerland (4), Thailand (4), the United Kingdom (19), and the United States (9). The Gini observations are taken from the period 1960 to 1992. Our sample thus spans a wide range of development levels as well as different past and present macroeconomic policies.

2. Estimation

In this section we estimate an extended variant of the Kuznets model for the cross country sample outlined above. We explicitly introduce three innovations compared to earlier work: (i) we use several observations per country (pooled cross-section time series); (ii) we include several measures of inflation and the exchange rate to test the hypothesis that inflation or the exchange rate variables are part of the "missing explanatory variables" noted in the previous work; 2/ and (iii) we estimate the model in differences to test the robustness of the results.

1/ In theory, one should use the broadest possible definition of household income, including interest, capital gains, and rental income. This might, however, bias somewhat the measurement of the impact of inflation compared to a simple wage based income. For example, inflation would tend to increase interest payments but would not take into account the change in the principal, see Minarik (1979). Similarly, rents might be adjusted to inflation with lags significantly different from wage adjustments, see Argawal and Meagher (1988). In any case, data in such an ambitious form are not available but for the most developed countries. The ultimate--and equally unrealistic--solution would be to use distribution of household wealth as a substitute for permanent income.

2/ Given the high multicollinearity between inflation and the variability of inflation and the exchange rate it was not possible to include all measures at the same time.

a. Model and hypotheses

The general form of our regression equation looks as follows:

$$G_i(t) = f(c,\ y_i(t),\ y^2{}_i(t),\ \pi_i(t),\ \sigma(\pi)_i(t),\ \sigma(e)_i(t),\ EXP/GDP,\ country),$$

The variables and hypotheses are as follows:

- G are Gini coefficients calculated from the post-tax distribution of households according to total household disposable income;

- c is a constant referring to the level of income distribution in the United States;

- y and y^2 measure income. We use two different measures: the Purchasing Power Parity (PPP) adjusted level of per capita GDP, and the PPP per capita income relative to the U.S. per capita income. 1/2/ In both cases, if income distribution is an inverted U-shaped function of per capita income (the standard Kuznets hypothesis), we would expect a positive sign on y (growth initially worsens income distribution) and a negative sign on y^2, to capture the non-linearity of the process; 3/

- $\pi_i(t)$ measures the level of contemporaneous inflation. The standard presumption--that the cost of inflation falls disproportionately on lower income groups--would predict a positive sign on this relation;

- $\sigma(\pi)_i(t)$ stands for the variability of inflation, approximating inflation uncertainty. The inclusion of this argument is based on the presumption that inflation uncertainty has specific costs of its own (see Appendix I). We construct for every year inflation variability as the monthly standard deviation (coefficient of variability) of inflation; we test for a positive sign and also for a higher level of statistical significance than $\pi_i(t)$;

- $\sigma(e)_i(t)$ stands for the variability of the nominal exchange rate. To test for the effect of overall financial stability on income distribution we also include the effect of external fluctuations, proxied by the annual values of the monthly standard deviation and

---

1/ The PPP method avoids changes in income arising simply from exchange rate fluctuations.

2/ For econometric reasons the second measure is preferable. In the first case, using per capita income, problems might arise due to regressing a bounded variable (Gini coefficient) on an unbounded variable (income).

3/ Robinson (1976) has shown that a U-shaped income distribution can be derived from a simple two-sector model in which sectors have different income distributions and monotonically changing shares of sectoral employment.

coefficient of variation of the nominal exchange rate. The hypothesis that financial instability disproportionately affects holders of nominal assets would again predict a positive sign on this variable;

- *EXP/GDP* stands for public expenditure to GDP, an approximation to capture the income distribution equalizing efforts of government policy. 1/ We expect a negative sign on this variable, stating that high government spending should have an equalizing effect;

- *country* represents 17 country-specific dummies capturing idiosyncratic factors relative to the United States.

b. Evidence on levels

Table 1 summarizes the results linking the level of income distribution to the explanatory variables noted above. We note that the overall fit of the equation is quite satisfactory--around 90 percent of the variance of the dependent variable is explained by the above independent variables. Excluding country dummies, however, reduces the level of explained variance to between 20 and 30 percent. This is in line with other research which finds that the largest part of the difference in the levels of income distribution is due to idiosyncratic factors captured by the country specific dummies.

The results are consistent with previous findings concerning the effect of development: we see limited support for the Kuznets hypothesis as we find the expected signs on the income variables. In five cases the estimated coefficients are significant at the 10 percent confidence level. In addition, the role of public expenditures as an equalizing factor receives strong support. In all cases, we find the expected negative sign and either significance at the 10 percent level (two cases) or 5 percent level (four cases).

The results show statistically significant results with the expected signs for the financial components of the model. Both higher inflation and higher variability of inflation and of the nominal exchange rate lead to a deterioration of the overall income distribution. While the increase in the Gini coefficient due to 10 percent annual inflation is rather small in the short term (the Gini coefficient would increase from its mean, say, 0.4000 to 0.4001), the short-term impact of inflation variability is about ten

---

1/ The share of government employment in overall employment might be a better measure, but no time series evidence on this variable was available.

Table 1. Effects of Inflation on Income Distribution--Cross Country Evidence
(OLS results for pooled cross section time series)
Dependent variable = Gini coefficient

Equation Number	Constant	y (A)	y^2 (A)	y (B)	y^2 (B)	EXP/GDP	$\pi_i(t)$	$\sigma(\pi)_i(t)$	$\sigma(e)_i(t)$	R^2	SEE	N
1	0.445**	0.0052*	-0.0005*	--	--	-0.0005*	0.00001**	--	--	0.88	0.019	121
	(14.01)	(1.70)	(1.72)			(1.81)	(4.71)					
2	0.398**	0.0009	-0.00002	--	--	-0.0009**	--	0.0021**	--	0.94	0.014	114
	(25.92)	(0.50)	(0.18)			(3.10)		(2.43)				
3	0.447**	0.0052*	-0.00051*	--	--	-0.0005*	--	--	0.0004**	0.88	0.019	123
	(13.91)	(1.74)	(1.78)			(1.65)			(4.91)			
4	0.311**	--	--	0.0012	-0.0000	-0.0009**	0.00001**	--	--	0.88	0.020	118
	(2.67)			(0.63)	(0.07)	(2.46)	(4.58)					
5	0.420**	--	--	0.0020*	-0.00002	-0.0008**	--	0.0023**	--	0.94	0.014	111
	(7.70)			(1.80)	(1.51)	(3.40)		(2.55)				
6	0.323**	--	--	0.0008	-0.0000	-0.0009**	--	--	0.0004**	0.87	0.020	120
	(2.75)			(0.53)	(0.01)	(2.12)			(4.75)			

Notes: Absolute value t-ratios in parenthesis; standard errors are heteroscedastic-consistent estimates.

Interpretation of results: for example, the estimated coefficient for inflation variability in equation 2, 0.0021, suggests that inflation variability of 1 would increase the Gini coefficient by 0.0021, say from 0.400 to 0.4021.

Definition of variables:

A	is PPP based per capita income;
B	is PPP based per capita income relative to the U.S. per capita income;
EXP/GDP	is percent share of government expenditure in GDP;
$\pi_i(t)$	is average annual inflation;
$\sigma(\pi)_i(t)$	is standard deviation of monthly inflation over the year;
$\sigma(e)_i(t)$	is standard deviation of monthly nominal exchange rate changes;
N	is number of observations;
*, **	denotes significance at the 10 and 5 percent level of confidence, respectively.

times stronger. 1/ Also the overall fit of the model using the standard deviation of inflation is marginally better than for other formulations. 2/ The variability of the nominal exchange rate also exerts a significant effect as inflation variability, albeit with a lower coefficient. For all financial variables tested, the high level of statistical significance instills confidence in the validity of the relationship and indicates a need for more specific analyses of this relationship.

c. Evidence on changes

As noted, models of the above type can also be used to explain the determinants of the change in income distribution. To test this variant of the model, we constructed Gini coefficients, income and government spending variables in difference form and combined them with three measures of inflation: (i) the average level of inflation ($\bar{\pi}_i$) over the period between the observed changes in the Gini coefficient; (ii) the standard deviation of inflation ($\sigma(\pi)_i$); and (iii) the coefficient of variation of inflation ($v(\pi)_i$) over that same period. 3/4/

In general, explaining differences is a much stronger test of an economic relationship. The much weaker fit of the results summarized in Table 2, thus, is not totally unexpected. We confirm the expected sign pattern for the income and the government expenditure variables. For the inflation measures, the signs are as expected in three out of four cases. In a single case, the result is statistically significant (at the 10 percent confidence level). Interestingly, the latter is a measure of variability, which fares well with our earlier argumentation that the unexpected part of inflation should be the predominant culprit in changing income distribution.

1/ The relative impacts of inflation and inflation variability, controlling for the level of inflation, can be computed in the following way. A randomly chosen country had the annual inflation of 10 percent in 1994 and the standard deviation thereof was 0.55. Substituting into equation 2, the inflation variability would raise the Gini coefficient from 0.4000 to 0.4012.

2/ Unlike in the case of aggregated changes of Gini coefficients (see below), the coefficient of variability of inflation seems to be a poorer estimator compared to its standard deviation.

3/ High inflation countries tend to have a high standard deviation of inflation. In this case the coefficient of variation may be more reliable since it is normalized by the average inflation.

4/ The estimates of the nominal exchange rate variability were statistically insignificant, consistent with the view that, in the long run, agents can hedge against inflation.

Table 2. Inflation and Changes in Income Distribution--Cross Country Evidence
(OLS results of pooled data)
Dependent variable = Change in Gini coefficient

Equation Number	Constant	Dy (A)	Dy (B)	D(EXP/GDP)	π_i	$\sigma(\pi)_i$	$\upsilon(\pi)_i$	R^2	SEE	N
7	-0.0021	0.00004	--	-0.0008	--	--	0.0134	0.08	0.024	55
	(0.36)	(0.84)		(1.30)			(0.96)			
8	-0.0032	--	-0.0014	-0.0006	--	--	0.0235*	0.09	0.024	53
	(0.54)		(1.13)	(1.00)			(1.61)			
9	0.0020	0.00005	--	-0.0007	--	0.00001	--	0.09	0.024	55
	(0.53)	(1.18)		(1.22)		(1.08)				
10	0.0019	0.00005	--	-0.0008	0.00001	--	--	0.09	0.024	55
	(0.51)	(1.18)		(1.28)	(1.02)					

Notes: Absolute value t-ratios in parenthesis; standard errors are heteroscedastic-consistent estimates.

Definition of variables:

Dy(A)	is change in per capita income (PPP basis);
By(B)	is percentage point change in relative income position to the U.S. (PPP basis);
D(EXP/GDP)	is percentage point change in share of government expenditures to GDP;
π_i	is average level of inflation during the period between two Gini observations;
$\sigma(\pi)_i$	is standard deviation over the period between two Gini observations
$\upsilon(\pi)_i$	is coefficient of variation over the period between two Gini observations;
N	is number of observations;
*,**	denotes significance at the 10 and 5 percent level of confidence, respectively.

IV. Empirical Evidence from Single-Country Studies

1. Background and data

With "idiosyncratic factors" explaining the bulk of cross country income distribution, the research agenda seems clear: Looking at one country at a time, how and why does income distribution change? Does the impact of inflation have a progressive or regressive effect on income distribution? And, is there room for national policy or is the distributional outcome largely determined by factors outside the immediate scope of the policy maker? Below we will test a variant of what has become the "standard" model in the area of single country-time series studies of income distribution--the initial model by Schultz and its refinement, the Blinder and Esaki model.

To test a time series model, uninterrupted data series for a single country are required. Those tend to be scarce, limiting our original empirical work, reported in section II to three countries not covered in the literature so far: Finland (annual data, 1977-1984); Israel (annual data, 1982-1992); and Russia (quarterly data, December 1991 to September 1994). 1/ We also recomputed the Schultz model with newer data for the United States and the United Kingdom.

2. Estimation

a. Model and hypotheses

We first use Schultz' simpler version of the relationship between income distribution, unemployment and inflation. This model explains the level of the overall income distribution as a function of following variables:

$$G(t) = \alpha + \beta\pi(t) + \gamma U(t) + \delta T(t) + e(t),$$

- $G(t)$ is the Gini coefficient of income distribution;
- $\pi(t)$ is the current rate of inflation,
- $U(t)$ is the current overall unemployment rate,
- $T(t)$ is a linear trend separating secular trends in the income distribution data from cyclical influences, and
- $e(t)$ is the error term.

1/ To put our results in perspective, we will present them alongside of the available estimates for other countries. These include the US (Blinder and Esaki, 1947-1974), the U.K. (Nolan, 1961-1975), Canada (Buse, 1947-1978), Japan (Yoshino, 1964-1988), Italy (Brandolini and Sestito, 1977-1991), Greece (Livada, 1963-1986), and Sweden (Björklund, 1975-1988).

This version of the model is essentially a short-term version of the augmented Kuznets approach tested in the preceding section of the paper which ignores the longer-term non-linearity of income. 1/ Again, we would expect inflation to increase income inequality, i.e., result in a "positive" coefficient. 2/ In the same vein, it is postulated that the overall effect of unemployment will be a widening of income distribution, i.e., show up with a "positive" coefficient.

We then turn to the "innovation" proposed by Blinder and Esaki. Their model looks at the determinants of the relative income shares of different segments of the population, postulating that they may be affected through unemployment or inflation.

The estimated model then becomes:

$$S_i(t) = \alpha_i + \beta_i \pi(t) + \gamma_i U(t) + \delta_i T(t) + e_i(t) \ ,$$

- $S_i(t)$, the dependent variable, is the share of the ith quintile (i=1,...,5) in the distribution of income among families in the tth year; and all other variables are identical to the Schultz' model.

The first hypothesis tested is that the side effects of inflation change the relative income position of the different income groups of society (for more detail see Appendix I). The Blinder and Esaki model does not predict a specific sign pattern. Rather it should depend on institutional characteristics of each country, with "winners" and "losers" determined by the relative distribution of non-indexed financial assets and liabilities across income groups as well as by particular groups' ability to anticipate price shocks.

The second hypothesis tested is that all macroeconomic policies, including but not limited to financial policies, which impact on unemployment, will also have an impact on income distribution. This, of course, would mean that, in the short run, monetary policy--in addition to its effect on inflation--can also impact indirectly (and in the opposite direction) through its effect on the output gap. The overall effect and its distribution across income groups will depend on the relative importance of wage and other types of income, the generosity of unemployment benefits, and the coverage of the social safety net.

1/ The Schultz model can only measure whether inflation and unemployment fluctuations influence overall income distribution and it may miss cases in which offsetting changes leave the Gini coefficient unaffected, while significant changes in the distribution of various quintiles occur.

2/ Note, however, that the impact of monetary policy on the level of income distribution can be, similarly to the Blinder-Esaki model, indeterminate: an expansionary monetary policy impacts both through a short-term Phillips curve (decreasing inequality) and through the inflation tax (increasing inequality).

b. Results: short-term impact

Tables 3 and 4 list the estimated short-term impacts of inflation and unemployment on income distribution. 1/ To allow for comparison with previous results, we also list--along with our own estimates of the Schultz and Blinder-Esaki models for Finland, Israel, and Russia--the results of the major earlier studies of this relationship mentioned earlier. 2/

The eight estimates with the Gini coefficients as dependent variable (the Schultz model) show "mixed" results (Table 5). For the United States, Finland, and Italy inflation actually appears to lower inequality in income distribution, while in Canada, Greece, Israel, and Russia we obtain the expected "deteriorating" effect. Concerning unemployment, in the United States, Greece, Finland, and Russia more unemployment would appear to make the overall income distribution more equal. However, the coefficients are statistically significant at least at the 10 percent confidence level for inflation only for Italy, Greece, and Israel and for unemployment only for Finland, Italy, and Israel. 3/

The disaggregated results (Blinder-Esaki model) are much more diverse. Confirming the results of previous studies, we find a lack of a "universal impact" across countries of inflation or unemployment on income distribution. Still, a limited generalization seems possible: the effects of inflation and unemployment on the groups at the bottom and the top of the income distribution appear to be stronger than on the middle groups.

1/ Some illustrative calculations of the longer-term impact of inflation are contained in the Appendix II.

2/ Some of the other studies differed moderately from our estimated equation. The regressions for Canada included the aggregate participation rate and several dummy variables, the regression for Japan included terms of trade and differentiated between the impact of expected and unexpected inflation, etc.

3/ The issue of seemingly poor goodness of fit should be addressed. Looking solely at the estimated t-ratios and R^2s (not reported in the paper), about one half of the equations appear to give a poor fit. This contrasts, however, with the overall stability of estimates over time as suggested by the Recursive Least Square Coefficients Test, performed for all new estimates. Moreover, t-ratios are generally poor measure of goodness of fit in very small samples. It is likely that estimates of standard errors of coefficients somewhat overestimate the true variance of coefficients.

Table 3. Impact of Inflation on Income Distribution in the "Blinder-Esaki Model"
(OLS results for time series)

Dependent variable	United States 1/	United Kingdom 2/	Canada 3/	Japan 4/ Expected inflation	Japan 4/ Unexpected inflation	Italy 5/	Greece 6/	Sweden 7/	Finland 8/	Israel 9/	Russia 10/
Gini coefficient	-0.005 (3.69)	0.000 (0.01)	0.0003 (0.65)	n.a.	n.a.	-0.00137 (2.50)	0.023 (4.00)	n.a.	-0.0003 (0.42)	0.00003 (1.57)	0.000007 (0.19)
Bottom quintile	0.031 (2.82)	0.02 (1.80)	-0.0111 (0.78)	-0.008 (0.67)	-0.038 (3.05)	0.0297 (2.32)	-0.036 (2.40)	0.0005 (1.66)	-0.0200 (0.60)	-0.00079 (1.85)	-0.00049 (0.38)
Second quintile	0.010 (0.77)	-0.03 (1.80)	0.0022 (0.08)	-0.035 (2.33)	-0.061 (3.90)	0.0317 (1.95)	-0.027 (4.10)	0.0007 (3.50)	0.0438 (1.26)	-0.00073 (1.53)	-0.00022 (0.24)
Third quintile	-0.007 (0.50)	0.01 (0.64)	-0.0176 (1.33)	n.a.	n.a.	0.0402 (2.25)	-0.009 (3.03)	-0.0003 (1.50)	0.0084 (0.32)	-0.00038 (0.64)	0.00134 (1.88)
Fourth quintile	-0.023 (1.64)	-0.01 (1.46)	0.0107 (0.94)	-0.073 (3.75)	0.004 (0.20)	0.0135 (1.09)	-0.001 (0.27)	-0.0004 (4.00)	-0.0101 (0.21)	-0.00050 (0.58)	-0.00140 (1.23)
Fifth quintile	-0.005 (0.16)	-0.01 (0.34)	0.0158 (0.37)	0.075 (2.36)	0.127 (3.87)	-0.1150 (2.42)	0.013 (3.30)	-0.0011 (2.75)	0.0015 (0.03)	0.00263 (1.46)	0.00077 (0.28)
Top five percent	-0.008 (0.24)	-0.01 (0.32)	n.a.	0.071 (2.90)	0.081 (3.35)	n.a.	-0.050 (1.00)	n.a.	n.a.	n.a.	n.a.
Top ten percent	n.a.	n.a.	0.0231 (0.62)	n.a.	n.a.	n.a.	n.a.	n.a.	0.0062 (0.18)	0.00213 (1.25)	n.a.

Notes: Absolute value t-ratios in parenthesis.

Interpretation of results: For example, the coefficient in the first column, second row, 0.031, suggests that inflation of 10 percent would increase the share of income accruing to the poorest quintile by 0.3 percent.

Sources:

1/ Blinder and Esaki (1978), 1947-1974 (annual data), GNP deflator. Own computations for Gini coefficients, 1978-1988. Pre-tax family income.

2/ Nolan (1987), 1961-1975 (annual data), GDP deflator. Own computations for Gini coefficients, 1965-1982. Pre-tax income of tax units.

3/ Buse (1982), 1947-1978 (annual data), GNP deflator. Pre-tax income data including taxable and non-taxable incomes.

4/ Yoshino (1993), 1964-1988 (annual data), GNP deflator. Unexpected inflation is computed as $\pi^e_t = \pi^e_{t-1} + 0.2(\pi_{t-1} + \pi^e_{t-1})$. The shares of the income among families are bottom 20 percent, 21-50 percent, 51-80 percent, and top 20 percent. Household pre-tax monetary income (without in-kind transfers).

5/ Brandolini and Sestito (1994), 1977-1991 (annual data), consumer price index. Equivalized household income net of taxes and social contributions an excluding income from final assets.

6/ Livada (1992), 1963-1986 (annual data), consumer price index. The type of income distribution data is not known.

7/ Björklund (1991), 1975-1988 (annual data), consumer price index, without time trend. Pre-tax income data, taxable social and unemployment benefits.

8/ Own computations, 1977-1984 (annual data), consumer price index, without time trend. Pre-tax household income shares.

9/ Own computations, 1986-1992 (annual data), consumer price index, without time trend. Disposable individual equivalized income.

10/ Own computations, December 1991-September 1994 (quarterly data), consumer price index. Pre-tax individual monetary incomes.

Table 4. Impact of Labor Market Indicators on Income Distribution in the "Blinder-Esaki Model"
(OLS results for time series)

Dependent variable	United States 1/	United Kingdom 2/	Canada 3/	Japan 4/	Italy 5/	Greece 6/	Sweden 7/	Finland 8/	Israel 9/	Russia 10/
Gini	-0.002	0.006	0.0007	n.a.	0.00442	-0.059	n.a.	-0.0036	0.0050	-0.0006
coefficient	(1.17)	(3.90)	(0.58)		(3.05)	(1.10)		(1.77)	(5.48)	(1.03)
Bottom	-0.129	-0.21	-0.0156	0.255	-0.1457	-0.866	0.0003	0.1296	-0.1000	0.0206
quintile	(4.78)	(2.03)	(0.49)	(1.15)	(4.29)	(3.70)	(0.15)	(1.40)	(4.55)	(0.92)
Second	-0.135	0.04	-0.0050	0.787	-0.1014	0.155	-0.0007	0.1722	-0.1637	0.0169
quintile	(4.50)	(0.28)	(0.08)	(3.12)	(2.35)	(3.00)	(0.22)	(1.79)	(6.67)	(1.09)
Third	-0.031	-0.02	-0.0148	n.a.	-0.0455	-0.247	-0.0005	0.0116	-0.1167	0.0089
quintile	(0.91)	(0.12)	(0.50)		(0.96)	(2.00)	(0.55)	(0.16)	(3.81)	(0.74)
Fourth	0.042	0.32	-0.0104	0.140	-0.0033	0.297	0.0005	-0.1619	-0.0629	0.0045
quintile	(1.24)	(4.58)	(0.41)	(0.60)	(0.10)	(4.07)	(0.71)	(1.19)	(1.41)	(0.23)
Fifth	0.272	-0.13	0.0458	-1.644	0.2959	-0.144	0.0012	-0.1794	0.4354	-0.0509
quintile	(3.68)	(0.38)	(0.44)	(3.11)	(2.35)	(2.54)	(0.57)	(1.18)	(4.67)	(1.07)
Top	0.053	-0.41	n.a.	-1.224	n.a.	0.510	n.a.	n.a.	n.a.	n.a.
five percent	(0.65)	(1.93)		(3.31)		(0.23)				
Top	n.a.	n.a.	0.0306	n.a.	n.a.	n.a.	n.a.	-0.0994	0.3479	n.a.
ten percent			(0.37)					(1.05)	(3.94)	

Notes: Absolute value t-ratios in parenthesis.

Sources:

1/ Blinder and Esaki (1978), 1947-1974 (annual data), overall unemployment rate. Own computations for Gini coefficients, 1978-1988.

2/ Nolan (1987), 1961-1975 (annual data), overall unemployment rate. Own computations for Gini coefficients, 1965-1982.

3/ Buse (1982), 1947-1978 (annual data), overall unemployment rate.

4/ Yoshino (1993), 1964-1988 (annual data), ratio of job offers to applicants. As this ratio is high when there is demand for labor and vice versa, expected coefficients should have opposite signs compared to unemployment variables. The shares of the income among families are bottom 20 percent, 21-50 percent, 51-80 percent, and top 20 percent.

5/ Brandolini and Sestito (1994), 1977-1991 (annual data), rate of growth of GDP.

6/ Livada (1992), 1963-1986 (annual data), rate of change of employment in non-agricultural sectors. Expected coefficients should have opposite signs compared to unemployment variables.

7/ Björklund (1991), 1975-1988 (annual data), unemployment rate, without time trend.

8/ Own computations, 1977-1984 (annual data), unemployment rate, without time trend.

9/ Own computations, 1986-1992 (annual data), unemployment rate, without time trend.

10/ Own computations, December 1991-September 1994 (quarterly data), index of industrial production. Expected coefficients should have opposite signs compared to unemployment variables.

Table 5. Impact of Inflation on Income Distribution in Selected Countries

Country	Gini coeff.	Income share of lowest quintile	Income share of second quintile	Income share of third quintile	Income share of fourth quintile	Income share of top quintile
U.S.A.	↓	↑	...	...	↓	...
U.K.	...	↑	↓	...	↓	...
Canada	...	...	...	↓	...	...
Japan	n.a.	↓	↓	n.a.	↓	↑
Italy	↓	↑	↑	↑	↑	↓
Sweden	n.a.	↑	↑	↓	↓	↓
Finland	...	...	↑	...	...	...
Greece	↑	↓	↓	↓	...	↑
Israel	↑	↓	↓	...	...	↑
Russia	...	...	...	↑	↓	...

Source: Tables 3 and 4.

Note: A "↑" means that the Gini coefficient or the income share of a given quintile increased due to inflation, a "↓" means that it decreased. A "..." means that the estimated regression coefficient is significant at less than 20 percent level.

For inflation, the poorest segments of the population are more often losers than winners. During inflation spells in our three newly estimated countries the first three quintiles generally lose, and the top quintile wins. Yet for Israel the intermediate three quintiles all lose, while in Finland and Russia the sign pattern is mixed. Similarly, the fifth quintiles happen to be most likely to profit. However, in the United States, the United Kingdom, Italy, and Sweden the relation is reversed--the poorest gain and the richest lose. Had we excluded the countries with the lowest GDP per capita in our sample (Greece, Israel, and Russia), the first quintile gains in four out of seven rich countries, while the second quintile gains in five. In turn, in the fifth quintile the losers would outweigh the winners four to three and in the fourth quintile five to two. Excluding Japan, for which different inflation data are being used, Canada and the Scandinavian countries for which the evidence is mixed, the only countries which exhibit inflation as an unambiguously regressive "tax" are Greece, Israel, and Russia. Those countries also happen to be the lowest income countries with the least degree of financial sophistication. In contrast, in the United States, the United Kingdom, and Italy, inflation appears to be a progressive "tax."

The estimates of the impact of labor indicators and their proxies on income distribution are also equivocal and to some extent depend on the underlying level of economic development. Although the poorest two quintiles lose in both the full and the reduced samples, the exclusion of Greece, Israel, and Russia somewhat levels off the winner-loser ratio. The only unambiguously losing segment of the population in both samples appears to be the middle quintile. Finally, the highest income group tends to increase its income share during periods of unemployment.

V. Conclusions: Does Inflation Matter?

Our study provides further evidence that inflation matters for income distribution. In both the cross country and the time series models, estimated coefficients were significant and the direction of the impact was generally consistent with theoretical predictions. Yet, two critical questions remain. First, why are there such striking differences between countries? Second, can ad-hoc studies substitute for an "across the board" theory?

As to inter-country differences of the impact of inflation on overall or sectoral income, we suspect three possible factors. First, it would appear that, apart from the more common explanation relating income distribution to the level of development and to the degree of financial indexation, we may also have to take a closer look at the nature of the initial price shock and which commodities were affected most. In aggregate, this is likely to account--at least in part--for differences in the overall response. It may also explain why inflation could have both progressive and regressive implications. Second, the distribution of non-wage income (return on capital, rents, social benefits, etc.) is known to be different across countries. In most cases the components of this type of income change--in real terms--differently from wage income. 1/ Finally, there remains, of course, a lot of work in terms of obtaining a proper statistical base. In particular, the effects of taxes, transfer and in kind payments--the major channels for government redistribution policies--need to be expressed more explicitly.

With country specific "idiosyncratic factors" explaining in most cases about 70 percent of variation in income distribution, it appears that the Kuznets' hypothesis has not too fared well. While the inclusion of "ad-hoc variables" such as inflation can contribute to highlighting possible channels, it would appear even more urgent to focus on a "new" theory. Such a task surpasses the frame of this study. Yet, our analysis clearly rejects the notion of "policy invariance" of the income distribution and would suggest that any new theoretical model should include--inter alia--the effects of real/financial inter-linkages.

1/ Argawal and Meagher (1988) show for the example of Australia that all income deciles have several sources of income with different degrees of implicit or explicit indexation.

Inflation, Exchange Rate and Income Distribution: Channels of Possible Impact

(a) Anticipated inflation

Cost	Description	Negatively affected	Positively affected
Inflation tax	Transfers resources from holders of currency and non-interest bearing deposits to government and reduces currency demand	Currency holders	State budget
"Bracket creep"	Inflation-induced increase in marginal income taxes when tax brackets are less than fully adjusted for inflation; transfers resources from taxpayers and reduces labor supply	Income tax payers and employers	State budget
Taxation of nominal interest income	Transfers resources from savers to the government	Interest and capital income recipients	State budget
Interaction with tax incentives	Tax deductibility of debt payments reduces real cost of borrowing and increases debt financing relative to other sources	Net creditors	Net debtors
Cost of price adjustments	Creates price variability and misallocation of resources--makes it difficult to distinguish inflation from relative price changes	Producers and consumers	

(b) Unanticipated inflation

Cost	Description	Negatively affected	Positively affected
Reduction of real returns	Reduction in real value of gross return from holding nominal debt; transfers resources from net monetary creditors to net monetary debtors	Net creditors	Net debtors
Reduction in real wages	Real wages are reduced if wages are set in nominal terms	Wage recipients	Employers

(c) Inflation and exchange rate uncertainty

Cost	Description	Negatively affected	Positively affected
Erratic price and exchange rate movements	Causes confusion about source and strength of price and exchange rate movements and a misallocation of resources	Agents with assets in domestic or foreign currency	
Wage uncertainty	Increases reluctance to enter into nominal wage contracts and increases cost of nominal wage contract negotiations (increases indexation of nominal contracts)	Employers and employees	
Change in risk premia	Increase in risk premia of longer maturity nominal bonds causes movement from longer to shorter-term maturities and increases the real cost of capital	Holders of longer term paper	
Hedging cost	Increases incentives to hedge against inflation and exchange rate movements; imposes transaction cost in attempts to hedge against inflation and exchange rate uncertainty and distortions in asset accumulation	Investors, savers	

Longer-Term Impact of Inflation--Some Illustrative Calculations

Work of the Schultz and Blinder-Esaki type has often been criticized to simply capture cyclical elements. However, in the "limiting case" where all variability of the income distribution could be ascribed to changes in inflation, unemployment, and some secular trend, one can sum the short-term effects to gauge the actual total longer-run impact of inflation (or unemployment) on income distribution, i.e., the combined effect of the responsiveness of the economy (the estimated coefficient) and the actual inflation (unemployment) outcomes. 1/ Thus, the long-term impact of inflation and unemployment would simply be computed as $\beta_i * \Sigma\pi_t$ and $\gamma_i * \Sigma U_t$, respectively. Appendix Table 1 reports the results of these computations for our sample of countries. The results underline that over time the combination of even moderate responsiveness of country's responsiveness (low βs and γs) in combination with sizeable inflation and unemployment can lead to important changes in income distribution. The estimates suggest, for example, that the poorest segments of the U.S. society increased their income share by over 3 percentage points due to inflation during 1947-1974 but lost dramatically due to unemployment. 2/

1/ This requires, of course, to assume structural stability of the estimated coefficients. While assuming structural stability obtains for periods which exceed the sample estimation period would be farfetched, this approach can be safely used for the period for which the coefficients were estimated.

2/ This does not necessarily mean, however, that the share of income of the same individuals or families fell by this amount. In countries with high income mobility people frequently move upward (or downward) on the income scale. For example, Haslag and Taylor (1993) report that 18 percent of U.S. income earners in the lowest quintile in 1979 moved to the highest quintile in 1988. Similarly, only 29, 33, and 38 percent of those initially in the second, third, and fourth quintiles, respectively, preserved their income position over the period 1979-1988.

Table 1
Effects of Inflation, Unemployment, and Secular Trend on Income Distribution
(cumulative changes in the Gini coefficient and percentage income shares)

Country sample period	Dependent variable	Inflation	Unemployment	Secular trend	Total change
United States	GINI	n.a.	n.a.	n.a.	n.a.
1947-1974	1Q	3.23	-17.25	0.39	-13.62
	2Q	1.04	-18.05	1.68	-15.33
	3Q	-0.73	-4.14	2.83	-2.05
	4Q	-3.44	5.62	1.04	3.21
	5Q	-0.52	5.88	-6.36	-0.99
	10D	n.a.	n.a.	n.a.	n.a.
	Top 5%	-0.83	36.37	-3.81	31.72
United Kingdom	GINI	n.a.	n.a.	n.a.	n.a.
1961-1975	1Q	2.18	-5.15	1.05	-1.92
	2Q	-3.27	0.98	0.60	-1.68
	3Q	1.09	-0.49	-0.15	0.45
	4Q	-1.09	7.85	0.75	7.51
	5Q	-1.09	-3.19	-2.40	-6.68
	10D	n.a.	n.a.	n.a.	n.a.
	Top 5%	-1.09	-10.06	-2.70	-13.85
Canada	GINI	0.03	0.03	0.05	0.11
1961-1978	1Q	-1.05	-1.60	-2.11	-4.76
	2Q	0.21	-0.51	-1.80	-2.11
	3Q	-1.67	-1.52	-0.58	-3.76
	4Q	1.01	-1.07	2.01	1.96
	5Q	1.50	4.69	2.48	8.67
	10D	2.19	3.14	0.54	5.86
	Top 5%	n.a.	n.a.	n.a.	n.a.
Italy 1/	GINI	-0.24	0.18	-0.06	-0.12
1977-1991	1Q	5.10	-5.99	1.54	0.66
	2Q	5.44	-4.17	1.25	2.52
	3Q	6.90	-1.87	1.49	6.52
	4Q	2.32	-0.14	0.70	2.89
	5Q	-19.75	12.16	-5.01	-12.60
	10D	n.a.	n.a.	n.a.	n.a.
	Top 5%	n.a.	n.a.	n.a.	n.a.
Greece	GINI	0.08	n.a.	...	n.a.
1964-1986	1Q	-12.34	n.a.	...	n.a.
	2Q	-9.26	n.a	...	n.a
	3Q	-3.09	n.a.	...	n.a.
	4Q	-0.34	n.a.	...	n.a.
	5Q	4.46	n.a.	...	n.a.
	10D	n.a.	n.a.	...	n.a.
	Top 5%	-17.14	n.a.	...	n.a.

Table 1 (concluded)
Effects of Inflation, Unemployment, and Secular Trend on Income Distribution
(cumulative changes in the Gini coefficient and percentage income shares)

Country sample period	Dependent variable	Inflation	Unemployment	Secular trend	Total change
Sweden	GINI	n.a.	n.a.	...	n.a.
1975-1988	1Q	0.10	0.01	...	0.11
	2Q	0.14	-0.02	...	0.12
	3Q	-0.06	-0.02	...	-0.08
	4Q	-0.08	0.02	...	-0.06
	5Q	-0.22	0.04	...	-0.18
	10D	n.a.	n.a.	...	n.a.
	Top 5%	n.a.	n.a.	...	n.a.
Finland	GINI	-0.02	-0.16	...	-0.18
1977-1984	1Q	-1.53	5.80	...	4.26
	2Q	3.36	7.70	...	11.06
	3Q	-0.64	0.52	...	-0.13
	4Q	-0.77	-7.24	...	-8.02
	5Q	-0.12	-8.02	...	-8.14
	10D	0.48	-4.45	...	-3.97
	Top 5%	n.a.	n.a.	...	n.a.
Israel	GINI	0.01	0.30	...	0.31
1986-1992	1Q	-0.32	-5.95	...	-6.27
	2Q	-0.30	-9.74	...	-10.04
	3Q	-0.16	-6.94	...	-7.10
	4Q	-0.20	-3.74	...	-3.95
	5Q	1.08	25.91	...	26.98
	10D	0.87	20.70	...	21.57
	Top 5%	n.a.	n.a.	...	n.a.
Russia 2/	GINI	0.01	0.12	0.12	0.24
1991:4-1994:3	1Q	-0.55	-4.08	-3.35	-7.97
	2Q	-0.25	-3.35	-3.34	-6.94
	3Q	1.49	-1.76	-2.40	-2.67
	4Q	-1.56	-0.89	-0.18	-2.64
	5Q	0.86	10.09	9.24	20.19
	10D	n.a.	n.a.	n.a.	n.a.
	Top 5%	n.a.	n.a.	n.a.	n.a.

Source: Tables 3 and 4 in the text, International Financial Statistics, and World Economic Outlook.

Definitions of variables:

GINI is the Gini coefficient;
1Q, .., 5Q is the first, ..., fifth quintile of the income distribution;
10D is the tenth decile of the income distribution;
Top 5% is the top 5 percent of the income distribution.

1/ Labor indicator is proxied by the GDP growth.
2/ Labor indicator is proxied by the industrial production percentage change.

Data and Sources

1. Cross country data

Gini coefficients for the cross-country database were obtained from the following sources:

Austria, Switzerland, Netherlands, Norway:	Flora et al. (1985)
the United States:	Campano (1991)
the United Kingdom:	Nolan (1987)
Italy:	Brandolini and Sestito (1994)
Peru, Chile, Brazil:	Morley (1994)
Indonesia, Korea, Thailand:	Fields (1989)
Malaysia, Bahamas, Pakistan, Israel:	Monthly bulletin of Statistics (various national issues)
Greece:	Livada (1994)

Macroeconomic data: PPP adjusted per capita income was taken from Summers and Heston 1991. All other data are from IMF, International financial statistics (IFS).

2. Time series database

Income shares by quintiles was taken from:

Finland:	Statistical Yearbook of Finland (various issues)
Israel:	Monthly Bulletin of Statistics (various issues)
Russia:	Russia-1994 (1994)

Macroeconomic data for Finland and Israel are from IFS and World Economic Outlook (WEO) database. Data for Russia are from IMF country documents.

References

Adelman, Irma and Nobuhiko Fuwa, "Income Inequality and Development during the 1980s," Indian Economic Review, Special Number, 1992, pp. 329-345.

Ahluwalia, M.S., "Inequality, Poverty and Development," Journal of Development Economics, Vol. 3, No. 4, (1976), pp. 307-342.

Alesina, Alberto and Roberto Perotti, "The Political Economy of Growth: A Critical Survey of the Recent Literature," The World Bank Economic Review, Vol. 8, No. 3, (1994), pp. 351-371.

Argawal, Nisha and G.A. Meagher, "Structural Reform, Macro Policies, and Income Distribution," Australian Economic Review, 3rd Quarter, (1988), pp. 42-53.

Beach, Charles M. "Cyclical Sensitivity of Aggregate Income Inequality, Review of Economics and Statistics, Vol. 59, (February 1977), pp. 56-66.

Björklund, Anders, "Unemployment and Income Distribution: Time-Series Evidence from Sweden," Scandinavian Journal of Economics, Vol. 93, No. 3, (1991), pp. 461-465.

Bléjer, Mario and Isabel Guerrero, "The Impact of Macroeconomic Policies on Income Distribution: An Empirical Study of the Philippines," The Review of Economics and Statistics, Vol. 72, (August 1990), pp. 414-423.

Blinder, Alan S. and Howard Y. Esaki, "Macroeconomic Activity and Income Distribution in the Postwar United States," The Review of Economics and Statistics, Vol. 60, (November 1978), pp. 604-609.

Bourguignon, François and Christian Morrisson, "Income Distribution, Development and Foreign Trade," European Economic Review, Vol. 34, (September 1990), pp. 1113-1132.

Brandolini, Andrea and Paolo Sestito, "Cyclical and Trend Changes in Inequality in Italy, 1977-1991," Banca d'Italia, Servizio Studi (Roma, July 1994).

Budd, Edward C. and David F. Seiders, "The Impact of Inflation on the Distribution of Income and Wealth," American Economic Review, Papers and Proceedings, Vol. 61, (May 1971), pp. 128-138.

Buse, Adolf, "The Cyclical Behavior of the Size Distribution of Income in Canada: 1947-78," The Canadian Journal of Economics, Vol. 15, (May 1982), pp. 189-203.

Campano, Fred, and Dominick Salvatore, "Economic Development, Income Inequality and Kuznets' U-Shaped Hypothesis," Journal of Policy Modeling, Vol. 10, No. 2, (1988), pp. 265-280.

Campano, Fred, "Recent Trends in U.S. Family Income Distribution: A Comparison of All, White, and Black Families," Journal of Post Keynesian Economics, Vol. 13, (Spring 1991), pp. 337-350.

Cardoso, Eliana, "Inflation and Poverty," Working Paper Series No. 4006, National Bureau of Economic Research, (March 1992).

Fields, Gary S., "Assessing Progress Toward Greater Equality of Income Distribution," Third-World Poverty: New Strategies for Measuring Development Progress, edited by McGreevey, William P., Lexington, MA, Lexington Books, (1980).

Fields, Gary S., Poverty, Inequality, and Economic Growth, Cornell University, mimeo, (1989).

Flora, Peter et al., State, Economy, and Society in Western Europe 1815-1975, Campus Verlag, Frankfurt am Main, (1985).

Fox, M. Louise and Samuel A. Morley, "Who Paid the Bill?" Policy, Research, and External Affairs Working Paper, No. 648, World Bank (Washington D.C.: April 1991).

Frank, Charles R. and Richard C. Webb (editors), Income Distribution and Growth in the Less Developed Countries, The Brookings Institution, Washington, D.C., (1977).

Gulde, Anne-Marie, "Sri Lanka: Price Changes and the Poor," IMF Working Paper, No. 91/46, (1991).

Haslag, Joseph H. and Lori L. Taylor, "A Look at Long-Term Developments in the Distribution of Income," Economic Review, Federal Reserve Bank of Dallas, (First Quarter 1993), pp.19-30.

Israel, Central Statistical Office, Monthly Bulletin of Statistics, Vol. 44, No. 9, (September 1993).

Johnson, Norris, "The Pareto Law," The Review of Economic Statistics, Vol. 19, No. 1, (1937), pp. 20-26.

Kuznets, Simon, "Economic Growth and Income Inequality," The American Economic Review, Vol. 45, (March 1955), pp. 1-28.

Kuznets, Simon, "Quantitative Aspects of the Economic Growth of Nations: VIII. Distribution of Income by Size," Economic Development and Cultural Change, (January 1963), pp. 1-80.

Lindert, Peter H. and Jeffrey G. Williamson, Growth, Equality, and History, Discussion Paper Series, No. 1052, Harvard Institute of Economic Research, (April 1984).

Livada Alexandra, "Macroeconomic Effects on Income Distribution," Athens University of Economics and Business, Greece, mimeo, (1992).

Milanovic, Branko., "Determinants of Cross-Country Income Inequality: An 'Augmented' Kuznets' Hypothesis." Policy Research Working Paper, No. 1246, World Bank, Policy Research Department, Transition Economies Division, (January 1994).

Minarik, Joseph J., "The Size Distribution of Income During Inflation," in Review of Income and Wealth, Series 25, (December 1979), pp. 377-392.

Morley, Samuel A., "Structural Adjustment and the Determinants of Poverty in Latin America." Vanderbilt University Working Paper, No. 92-W03, Department of Economics and Business Administration, (May 1992).

Morley, Samuel A., Poverty and Inequality in Latin America: Past Evidence, Future Prospects, Policy Essay No. 13,. Overseas Development Council, Washington, D.C., (1994).

Nolan, Brian, Income Distribution and the Macroeconomy, Cambridge: Cambridge University Press, (1987).

Oshima, Harry T., "Kuznets' Curve and Asian Income Distribution Trends," Hitotsubashi Journal of Economics, Vol. 33, (June 1992), pp. 95-111.

Oshima, Harry T., "Impact of Technological Transformation on Historical Trends in Income Distribution of Asia and the West," Developing Economies, Vol. 32, (September 1994), pp. 237-255.

Paukert, Felix, "Income Distribution at Different Levels of Development: A Survey of Evidence," International Labour Review, Vol. 108, (August-September 1973), pp. 97-126.

Persson, Torsten and Guido Tabellini, "Is Inequality Harmful for Growth?" American Economic Review, Vol. 84, (June 1994), pp. 600-621.

Robinson, Sherman, "A Note on the U Hypothesis Relating Income Inequality and Economic Development," American Economic Review, Vol. 66, (June 1976), pp. 437-440.

Rossia-1994, Ekonomicheskaya Konyunktura, Centr dlya Ekonomicheskoy Konyunktury, Moscow, (1994).

Schultz, T. Paul, Secular Trends and Cyclical Behavior of Income Distribution in the United States: 1944-1965, National Bureau of Economic Research. Studies in Income and Wealth, Vol. 33 (Columbia University, New York: 1969), pp. 75-106.

Shirras, G. Findlay, "The Pareto Law and the Distribution of Income," Economic Journal, Vol. 45, (1935), pp. 663-681.

Staehle, Hans, "Short-period Variations in the Distribution of Incomes," The Review of Economic Statistics, Vol. 19, No. 3, (1937), pp. 133-143.

Statistical Yearbook of Finland, Helsinki, various issues.

Stewart, Frances, "Inequality, Technology and Payment Systems," World Development, Vol. 6, (March 1978), pp. 275-293.

Summers, Robert, and Alan W. Heston, "The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950-1988," Quarterly Journal of Economics, Vol. 106 (May 1991), pp. 327-68.

Van Wijck, Peter, "Cyclical and Political Influences on the Size Distribution of Income in the US (1959-1989)," Applied Economics, Vol. 24, (1992), pp. 169-173.

Weil, Gordon, "Cyclical and Secular Influences on the Size Distribution of Personal Income in the UK: Some Econometric Tests." Applied Economics, Vol. 16, No. 2, (1984), pp. 749-755.

Wolff, Edward N., "The Distributional Effects of the 1969-75 Inflation on Holdings of Household Wealth in the United States," The Review of Income and Wealth, Vol. 25, (June 1979), pp. 195-207.

Yoshino, Osamu, "Size Distribution of Workers' Household Income and Macroeconomic Activities in Japan: 1963-88," Review of Income and Wealth, Vol. 39, (December 1993), pp. 393-400.