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Economic Transformation and Income Distribution: Some Evidence from the Baltic Countries

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The transition from a centrally planned to a market economy implies a massive reallocation of resources. The realignment of relative prices that is needed to achieve this may bring about important distributional effects. This paper examines the extent to which income differentials have changed in countries where bold reforms have been introduced. Discussing the experience in the Baltic states, it finds that recorded income differentials in these countries appear to have widened markedly largely as a result of an increase in the dispersion of earnings. The redistributive effects of social assistance and tax policies seem to have been only marginal. [JEL D31, P21]

THE PREVENTION of wide income differentials was an important political objective in prereform Central and Eastern Europe. This objective was widely achieved, however, at the cost of a severe misallocation of resources and economic stagnation. In order to channel resources into more productive uses, many countries have introduced bold, market-oriented reforms aimed at correcting distorted relative prices. Coupled with sustained financial adjustment, these measures have contributed to a marked increase in economic efficiency, and most countries in transition have seen

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a turnaround in output. However, relative price changes inevitably bring about important distributional effects.[1] Very few studies (for example, Stodder (1991)) have tried to estimate the welfare implications of the transition process; they suggest that the potential opportunity costs of rising inequality may be significant. This may be an important reason why some countries, particularly many countries of the former U.S.S.R., have moved rather cautiously in introducing market-oriented reforms.

In this paper, we examine the extent to which income differentials have widened in countries where bold policy measures have been introduced. The Baltic states are especially interesting cases. Following the dissolution of the former U.S.S.R., they embarked on ambitious stabilization and reform programs considerably earlier than other countries. These programs have proved very successful in stabilizing inflation at low levels and creating the necessary preconditions for sustained economic growth.[2] In fact, living standards in these countries have started to recover so that they are widely regarded as model cases for a successful transition.

It is important to note that an intertemporal comparison of income differentials is restricted by various factors. Apart from the dubious quality of the Family Budget Surveys, especially in the prereform period, and the presentation of income data in grouped form, there is virtually no information on nonmonetary incomes. The comparison is further restricted by the limited range of consumer goods that was available. As is well-known, privileges played an important role in centrally planned economies. At the same time, however, queuing was an important egalitarian device. While we discuss these caveats in greater detail in this paper, we make no attempt to estimate the extent to which our results might be distorted by these phenomena. Similarly, we do not examine the extent to which the distribution of wealth has been affected by the transformation. With the elimination of the monetary overhang at the onset of this process, monetary assets were largely eroded by high inflation. However, there is very little information on how much wealth has been accumulated by different income groups since then. Presumably, privatization and the repatriation of land have

[1] While the liberalization of prices (including factor prices) has probably the most direct impact on the dispersion of income, there are, of course, numerous other channels through which the distribution of income can be affected. These channels include, inter alia, tax and expenditure policies, monetary and exchange rate policies, and trade policies. For a discussion of these channels and the conceptual problems involved in measuring the effects of certain policies on income distribution, see, for example, Johnson and Salop (1980) and International Monetary Fund (1986).

[2] For a review of these programs, see, for example, Hansson and Sachs (1994), Lainela and Sutela (1994), and Saavalainen (1995). On individual country experiences, see International Monetary Fund (1994a, 1994b, and 1994c).

played a particularly important role in the accumulation of wealth, and this will likely be reflected in future income streams.

With these caveats in mind, the rest of the paper is structured as follows. In Section I, we start by examining the distribution of income in the former U.S.S.R. in the prereform period. On the basis of various standard summary statistics of income inequality, we analyze in Section II the degree to which monetary income differentials have widened since then. In Section III, we examine the contributions to inequality of different components of income, whereby we pay particular attention to the distribution of earnings. In Section IV, we discuss the redistributive effects of social benefits and direct taxes, employing Kakwani's (1995) *progressivity index*. In Section V, we summarize our findings and draw some conclusions.

I. The Distribution of Income in the Prereform Period

Although innumerable surveys were conducted on the distribution of income, very few figures were actually published in the pre-*glasnost* period in the former U.S.S.R. Censorship was widespread, and, despite several attempts to make deductions from the limited information that was released, little was known about income inequality.[3] For individual states, there was virtually no information.

The availability of data improved considerably in the late 1980s when Goskomstat released several new statistical series on the distribution of personal money income for the individual states. As regards the distribution of earnings, figures were published not only for the recent year but also retrospectively for a number of years back to 1956. However, the quality of the Family Budget Surveys remained dubious.[4] Most important, they were not representative of the population, as they covered the territory of the former U.S.S.R. incompletely and unevenly. Families were mainly selected on the basis of the industrial affiliation of their wage earners, with the selection probability increasing with the number of wage earners in the households.

Moreover, the analysis of these data remained difficult. First of all, income data were grouped, that is, presented as percentages of the total population falling into various income intervals. Second, there was no information about the distribution within the intervals, in particular, the intrainterval means. Finally, the data were doubly censored, as both the lower and upper income ranges were open-ended.

[3] These attempts include Wiles and Markowski (1971) and Bergson (1984).

[4] For a detailed discussion of these surveys, see Atkinson and Micklewright (1992).

To overcome these problems, Alexeev and Gaddy (1993) applied Kolmogorov-Smirnov estimators to fit the Soviet data to a log-normal distribution. While the presentation of income data did not permit reliable estimation of the underlying Lorenz curves,[5] their nonparametric approach allowed Alexeev and Gaddy to estimate summary statistics of income inequality, namely, the Gini coefficient and the Atkinson indices of income inequality.[6] In estimating the Atkinson indices, Alexeev and Gaddy chose various levels of inequality aversion, ranging from 0.5, where almost equal weight is given to all individuals, to 3, where considerably more weight is attached to the poorer groups relative to the mean.

Alexeev and Gaddy's results suggest that there were marked differences in the distribution of income across individual countries before the dissolution of the former U.S.S.R., with the Baltic countries enjoying not only the highest mean incomes but also the lowest degree of overall income inequality, as measured by the Gini coefficient (Table 1).[7] According to this measure, the overall dispersion of income was significantly smaller in the Baltic countries than in all other countries of the former U.S.S.R. except Belarus and Ukraine.[8] At the same time, the Atkinson indices suggest that there was less inequality in the Baltic countries at the lower end of the size distribution, regardless of the level of inequality aversion.

Table 1 also includes variation coefficients and decile ratios estimated by Atkinson and Micklewright (1992).[9] Variation coefficients are particularly sensitive to the upper ranges of the distribution, and high values suggest that the inequality is being generated by very rich individuals. These estimates imply that, at the upper end of the size distribution, income in the Baltic countries has been distributed more unequally than in most countries of the former U.S.S.R. However, as the estimates are based on interpolations of the open-ended top and bottom intervals, rather than on the Kolmogorov-

[5] Various approaches have been taken to estimate Lorenz curves from grouped observations (for example, Kakwani and Podder (1976), and Villaseñor and Arnold (1989)). However, these approaches do not always work well. Certain groupings of the data can yield distorted estimates.

[6] For an overview of different measures of inequality, see, for example, Atkinson and Micklewright (1992) and Blackwood and Lynch (1994).

[7] However, this result should be regarded with caution; it is well-known that an unambiguous ranking of income distributions across countries requires that the Lorenz curves do not intersect. Otherwise, alternative income distributions might rank differently, depending on the precise shape of the households' common utility function.

[8] These results are in line with those derived by Kakwani (1995), who estimated a separate, continuously differentiable function fitting the data points.

[9] The decile ratios reported in Table 1 refer to the ratio of gross income at the top decile relative to the median (P_{90}) over the gross income at the bottom decile relative to the median (P_{10}).

Table 1. *Mean Income and Inequality Measures, 1990*

	Mean income[a]	Gini coefficient	Decile ratio	Variation coefficient	Atkinson indices A = 0.5	A = 2	A = 3
Estonia	234	0.240	3.31	0.909	0.130	0.243	0.311
Latvia	216	0.240	3.08	0.716	0.135	0.249	0.316
Lithuania	212	0.248	3.11	0.738	0.139	0.259	0.329
Armenia	169	0.269	3.14	0.532	0.169	0.304	0.381
Azerbaijan	119	0.345	...	0.701	0.245	0.441	0.542
Belarus	189	0.233	2.73	0.520	0.145	0.250	0.314
Georgia	176	0.291	3.53	0.673	0.169	0.326	0.413
Kazakstan	158	0.297	3.46	0.654	0.188	0.347	0.435
Kyrgyz Republic	119	0.308	...	0.564	0.229	0.390	0.479
Moldova	163	0.267	3.08	0.547	0.167	0.301	0.378
Russia	186	0.259	3.16	0.685	0.155	0.284	0.358
Tajikistan	129	0.334	...	0.618	0.282	0.458	0.551
Turkmenistan	115	0.308	...	0.617	0.234	0.396	0.484
Ukraine	175	0.240	2.76	0.489	0.155	0.266	0.331
Uzbekistan	105	0.315	...	0.605	0.251	0.416	0.504
Former U.S.S.R.	171	0.281	3.53	0.659	0.144	0.295	0.381

Sources: Alexeev and Gaddy (1993, Tables 3 and 4b); and Atkinson and Micklewright (1992, Table UE13).
[a] In rubles per month per head.

Smirnov estimators employed by Alexeev and Gaddy (1993), the results are very sensitive to the method of interpolation and may well overstate the true magnitude of income dispersion.

II. The Distribution of Income in the Early Phase of the Transition

Following the dissolution of the former U.S.S.R., the Baltic states embarked on ambitious stabilization and reform programs. At the same time, important efforts have been made to improve the quality of economic statistics. Under Soviet planning, household surveys were conducted by polling employees—more or less throughout their lives—from chosen enterprises and farms in each branch of industry; however, new sampling methods have been introduced to make the surveys more representative. In all three countries, individuals are now chosen from the population register, with gender, age, and household size used as stratifying criteria. In Estonia, some 1,780 persons living in 575 households are surveyed. In Latvia and Lithuania, income and expenditure data from about 3,200 and 4,000 persons living in 1,180 and 1,500 households, respectively, are collected.[10] In addition, the presentation of these data has been radically changed; rather than presenting data based on certain income intervals, household incomes and expenditure are now shown in all three countries by decile, which greatly facilitates their analysis.

Based on these new household surveys, summary statistics have been estimated for the distribution of income in 1994 (Table 2). These estimates suggest that the transformation process in the Baltic states has been accompanied by a marked increase in the dispersion in income. This increase is particularly significant in Latvia, where the Gini coefficient increased by 17 percentage points, compared with increases of about 10 and 11 percentage points in Estonia and Lithuania, respectively. The overall increase in the dispersion of income seems to reflect widening income differentials, particularly at the lower end of the size distribution. If people did not care much about income inequality, such that equal weight were given to all individuals, the increase in income dispersion would have had little impact on social welfare. In fact, with an aversion parameter of 0.5, the Atkinson index of income inequality was hardly affected. However, the more weight was attached to the poorer segments of the population, the more the Atkinson index increased. With an aversion parameter of 3, the Atkinson

[10] Notwithstanding these improvements of the household surveys, a number of important problems still remain. See Cornelius (1995a).

Table 2. *Baltic States: Mean Income and Inequalities, 1994*

	Mean income[a]	Gini coefficient	Decile ratio	Variation coefficient	Atkinson indices A = 0.5	A = 2	A = 3
Estonia	87.9	0.342	5.05	0.670	0.092	0.303	0.866
Latvia	36.0	0.411	8.92	0.810	0.136	0.445	0.964
Lithuania	50.3	0.360	6.56	0.716	0.105	0.354	0.920

Sources: National authorities; and IMF staff estimates.
[a] In U.S. dollars per month per head.

index rose in 1994 in all three countries to levels almost three times higher than in 1990.

In contrast, the variation coefficients indicate relatively smaller changes since 1990 at the top of the size distribution. While the coefficient increased somewhat in Latvia, it remained almost unchanged in Lithuania and even declined in Estonia. Data on recorded income thus seem to suggest that the emergence of relatively rich individuals, who have pushed ahead of the rest of the population, can play only a limited role in explaining the overall increase in the dispersion of income in the Baltic states.

An examination of the decile ratios in Table 2 provides further support for this hypothesis. Although the decile ratio more than doubled in Latvia and Lithuania and almost doubled in Estonia, this increase was largely due to a decline in the income of the bottom decile relative to the median, rather than to an increase in the relative income at the top decile. While P_{10} in the prereform period amounted to nearly 60 percent, it declined in 1994 to less than 30 percent in all three countries. In contrast, P_{90}, which ranged from 180 percent in Latvia to 190 percent in Estonia in the prereform period, experienced its largest change in Latvia, where it increased to 266 percent in 1994. P_{90} remained below 200 percent in Estonia and Lithuania.

However, in examining changes in the distribution over time, a number of caveats relating to statistical weaknesses of the household surveys, particularly in the prereform period, need to be taken into account. The statistics for the prereform period are likely to have understated the true extent of inequality in the former U.S.S.R. because the Family Budget Surveys undersampled from both the upper and the lower part of the income distribution by excluding some occupational groups, for example, party officials, military officers, and students. Virtually no information is available on nonmonetary incomes, which in the prereform period likely played a particularly important role. Many consumer goods were not readily available, and there is strong reason to believe that the system of privileges in the prereform period benefited mainly people at the upper end of the distribution.

At the same time, the prereform data were probably also biased in the other direction by excluding queuing, which was an important egalitarian rationing device in the former U.S.S.R.[11]

Second, the household surveys do not reflect incomes earned in the shadow economy. According to estimates made by Alexeev and Gaddy (1993, p. 33) on the basis of surveys of Soviet immigrants to the United States, the inclusion of illegal income had virtually no effect on the Gini coefficient estimated for the Baltics in the period before independence. However, anecdotal evidence suggests that the transformation has been accompanied by particularly large increases in income in the informal sector. To the extent that high-income earners have a particular interest in underrecording their incomes—irrespective of whether the incomes stem from legal or illegal sources—it seems likely that the data derived from household surveys underestimate income differentials, especially in the upper ranges of the size distribution.[12] This likelihood implies that market-oriented reforms may have been accompanied by an even larger widening of income differentials at the top than suggested by the summary statistics presented here.

Finally, very little information is available on the distribution of wealth and the extent to which it has been affected by the transformation. While monetary assets were largely eroded by high inflation at the onset of the transition, we do not know how much wealth has been accumulated by individual income groups since then. Although mass privatization through vouchers should reduce inequalities in the distribution of wealth, future income streams and, hence, the distribution of income will greatly depend on the financial restructuring of the former state-owned enterprises.

These caveats need to be taken into account also when comparing income distributions across countries. In particular, countries of the former U.S.S.R. should be compared with considerable caution, as many of them still base their household surveys on the methodology of the Family Bud-

[11] The egalitarian effect of queuing was probably largest in the lower and middle range of the income distribution. In contrast, such privileges as access to special shops and preferential treatment in ordinary shops, restaurants, or cafeterias, as well as privileges in connection with foreign currency, housing, official cars, and hospital and holiday resort facilities, benefited mainly people at the upper end of the distribution, estimated at 0.2–0.3 percent of the total population. According to Morrisson (1984), whose estimates were based on rather generous assumptions about the value of such benefits, the prereform Gini coefficients in various Central and Eastern European economies could have been distorted downward by a maximum of 3–4 percentage points.

[12] This supposition seems especially likely in the case of Latvia, where according to the household surveys the mean income per month *per head* amounted to only $36 in 1994—compared with an average monthly wage of nearly $200.

get Surveys employed before 1990. Notwithstanding these caveats, the increase in the dispersion of income in the Baltic countries seems to have been larger than in most other countries in Central and Eastern Europe and the former U.S.S.R. According to estimates by Milanovic (1995), the central Asian republics, which showed the highest degree of income inequality before the dissolution of the former U.S.S.R., experienced an average increase in the Gini coefficient of 8 points between 1988 and 1993.[13] In Russia and Ukraine, the increase amounted to 7 and 3 Gini points, respectively. Finally, the income distribution in Poland widened by 6 Gini points and in the Czech Republic by 8 Gini points.

With Gini coefficients ranging from 0.34 in Estonia to 0.41 in Latvia, the distribution of income in the Baltic states appears more unequal than the average for members of the Organization for Economic Cooperation and Development (OECD).[14] Within the OECD, however, the distribution of income has varied markedly, and the Baltic countries seem to be comparable with the Southern European countries, such as Greece and Portugal. Compared with most developing countries, particularly those in Latin America and Africa, the dispersion of income in the Baltics has remained significantly lower (Figure 1).

III. Income Inequality by Components

In examining the factors that explain the overall distribution of income, we disaggregate inequality by income components, employing Kakwani's (1977) approach.[15] According to this approach, the Gini coefficient of the total income may be expressed as

$$G = \frac{1}{\mu} \sum_{i=1}^{n} \mu_i C_i \qquad (1)$$

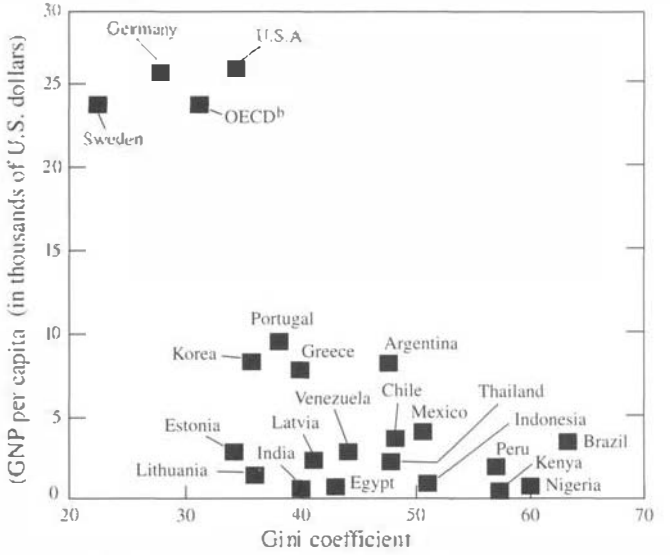
where C_i is the concentration index of the ith income component and μ_i its mean. The concentration index is similar to the Gini coefficient except that

[13] However, according to a representative multipurpose poverty survey conducted in the Kyrgyz Republic in the fall of 1993, the actual increase in the dispersion of income seems to have been much larger than suggested by official data. Based on this survey, a Gini coefficient of 0.678 was estimated, implying that the distribution had widened by 37 Gini points. For details, see Ackland and Falkingham (forthcoming, 1996).

[14] Based on data from the 1980s, Milanovic (1994) has estimated the average Gini coefficient for the OECD at 0.312.

[15] Recently, this approach was used by Kakwani (1995) to analyze Ukrainian income data.

Figure 1. Gini Coefficients for Selected Countries[a]



Sources: Milanovic (1994), Annex Table 4; and World Bank (1994).
[a]Estimates refer to different years of the 1980s, except for the Baltic states, which refer to 1994.
[b]The OECD average does not include Mexico, which became a member in 1994.

it ranks individuals by their total income rather than by the ith income component, so that it may be negative. The concentration of an income component measures how evenly that income component is distributed over the total individual income. If C_i is smaller (greater) than the Gini coefficient, then the ith income component is distributed over the total income in favor of poorer (richer) individuals.

While in 1994 the absolute dispersion of income from entrepreneurship, dividends, and other sources was particularly large, the contribution of these income sources to total inequality in Estonia and Lithuania, for which disaggregated income data are available, was relatively small, owing to their small share in total income (Table 3). In contrast, the most important source of income inequality was the dispersion of earnings. As the most important source of income, earnings contributed about 77 percent and 67 percent, respectively, to the overall degree of inequality. While disaggregated income data are not easily comparable with prereform data, there is reason to believe that their share in overall income inequality has increased significantly over time.

Although somewhat less equally distributed than total income in the prereform period, earnings in the top decile were only about three times higher

Table 3. *Inequality by Income Components, 1994*

	Estonia			Lithuania		
	Share (percent)	Concentration index	Contribution to total inequality (percent)	Share (percent)	Concentration index	Contribution to total inequality (percent)
Wages	69.4	37.7	76.6	55.8	43.1	66.7
Entrepreneurship[a]	5.9	43.5	7.5	20.2	37.5	21.0
Dividends	6.1	55.1	9.8	1.0	74.2	2.0
Social insurance	0.5	21.9	0.3	0.7	10.8	0.2
Social assistance	5.1	−4.1	−0.6	1.8	−9.6	−0.5
Pensions	6.5	−11.9	−2.3	12.1	−3.6	−1.2
Other income	6.5	45.5	8.6	8.5	50.1	11.8
Total income	100.0	34.2	100.0	100.0	36.0	100.0

Sources: National authorities; and IMF staff calculations.

[a] Includes agricultural income, which plays a particularly large role in Lithuania.

than those in the bottom decile.[16] Since then, however, the distribution of earnings has been allowed to rise considerably, especially after the abolition in 1993 of the excess wage tax in Estonia and the statutory incomes policy in Lithuania, which has led to a marked increase in wage differentials.[17] In 1994, earnings in the top decile in Lithuania were more than 240 percent higher than the median, while earnings in the bottom decile amounted to only 21 percent of the median. For Estonia, an even higher decile ratio was estimated, with earnings in the top and bottom deciles amounting to 221 percent and 17 percent of the median, respectively. The increase in the dispersion of earnings is also mirrored by the coefficient of variation, which rose by more than 25 points in the initial stages of the transformation.

Apart from increasing wage differentials, two other factors have likely affected the dispersion of earnings. First, while there was general job security in the prereform period, unemployment has risen to 5–10 percent in the Baltic states since the beginning of their transformation. It can be assumed that this sharp increase has affected especially low-skilled wage earners at the lower end of the size distribution. Second, there has been a sharp drop in participation rates, notably in Estonia, where they fell from almost 95 percent in the late 1980s to about 75 percent in 1994. This decline is largely explained by tight eligibility rules for unemployment benefits and the low benefits themselves, which have amounted to less than 15 percent of the average wage. Presumably, the decline in participation rates has been concentrated on the lower end of the size distribution, contributing to an even larger widening of earnings differentials.

[16] In Estonia, the percentage of earnings in the lowest decile relative to the median (P_{10}) amounted to 53.7 percent in 1989. Earnings in the top decile relative to the median (P_{90}) were estimated at 172.8 percent. In Latvia, these ratios were estimated at 53.5 percent and 173.6 percent, respectively; in Lithuania, they were estimated at 53.9 percent and 178.7 percent, respectively (Atkinson and Micklewright (1992, Table UE 6)). Earnings in the Baltic countries have been far more dispersed than in other former centrally planned economies. Atkinson and Micklewright (1992, p. 80), for example, report decile ratios of 2.5, 2.6, and 2.8 for former Czechoslovakia, Hungary, and Poland, respectively.

[17] Whereas the Baltic states moved rapidly in liberalizing prices of goods and services, authorities in those countries initially continued to intervene in the labor market. In order to deal with a sharp deterioration in their terms of trade and to break the momentum of inflation expectations, the authorities in Estonia and Latvia imposed a tax on excessive wage increases in the state sector in 1992, while Lithuania implemented a statutory incomes policy. These wage controls have contributed to a significant adjustment in real incomes, which was regarded as indispensable in light of the severe supply shock caused by the sharp rise in imported energy prices (Cornelius (1995b)). Consequently, the wage controls, which inevitably had important distortionary effects, were converted into voluntary guidelines in early 1993.

IV. The Redistributive Effects of Social Benefits and Direct Taxes

Although social insurance benefits (mainly unemployment and health benefits) have been distributed far less unequally than income from wages and salaries, Table 3 indicates that these benefits did increase the dispersion of total income in Estonia and Lithuania. In contrast, pensions—as well as social assistance in the form of cash benefits—have had a redistributive effect in both countries. However, their effect on the distribution of income has been even smaller, reducing the extent of total income inequality by only 0.6 percent in Estonia and 0.5 percent in Lithuania.[18] An important reason for this may be that most cash benefits are not means tested but are rather based on a broad categorical approach, according to which all individuals falling into a certain category (for example, those having children) are eligible for social assistance regardless of their income. Not surprisingly, therefore, cash benefits have had only limited success in alleviating poverty.[19]

These preliminary conclusions ignore, however, the effect of social benefits on not only the distribution of income but also the level of income and, hence, economic welfare. To examine the welfare effects of social benefits, we employ the concept of the generalized Lorenz curve, which was suggested by Shorrocks (1983) and further developed, for example, by Tam and Zhang (1996). According to this approach, the standard Lorenz curve is scaled by the average income of the distribution so that a partial welfare ordering may be established, provided that the social welfare functions are Schur concave and nondecreasing functions of all incomes.

Based on the following welfare function proposed by Sen (1974),

$$W = \mu(1 - G), \tag{2}$$

with μ denoting the mean income and G the Gini coefficient, Kakwani (1995) suggested decomposing total welfare into individual income components by combining equations (1) and (2):

$$W = \sum_{i=1}^{n} \mu_i (1 - C_i). \tag{3}$$

[18] A similar value (−0.3), for example, has been estimated by Kakwani (1995, Table 10) for Ukraine.

[19] Cornelius (1995a) estimated that cash benefits in Lithuania have reduced the poverty gap by only about 1 percentage point. With perfect targeting of the poor, a three-and-a-half-times larger reduction could have been achieved. However, as Ahmad (1992) argues, detailed means testing is likely to be administratively cumbersome, so that the actual impact of social assistance reforms would probably be considerably smaller.

The welfare elasticity with respect to the ith income component may then be expressed as follows, assuming that income from the ith component changes infinitesimally across all income recipients, that is, that the change does not affect the ranking of recipients:

$$\eta_i = \frac{\mu t_i (1 - C_i)}{\mu t (1 - G)}. \tag{4}$$

In order to separate the income and inequality effects, equation (4) may be rewritten as

$$\eta_i = \frac{\mu_i}{\mu} + \frac{\mu_i (G - C_i)}{\mu (1 - G)}. \tag{5}$$

Kakwani (1995) defined the ratio of the inequality component to the income component as the progressivity index P of the ith income component:

$$P_i = \frac{(G - C_i)}{(1 - G)}. \tag{6}$$

If the ith component is distributed in proportion to total income, C_i is equal to G so that P_i is zero; in this case, a change in the ith income component is distribution neutral.

Table 4 presents calculations of the welfare contributions of social benefits and progressivity indices in Estonia and Lithuania in 1994. Pensions contributed significantly to welfare in both countries. In contrast, social insurance benefits contributed to welfare only marginally. While cash benefits had a significant share in total welfare in Estonia, their role was rather limited in Lithuania. However, pensions, social insurance benefits, and cash benefits in both countries show a positive progressivity index, indicating that an increase in these components favors the poor.

Table 4. *Welfare Contributions of Social Benefits, 1994*

	Estonia		Lithuania	
	Contribution to total welfare (percent)	Progressivity index	Contribution to total welfare (percent)	Progressivity index
Social insurance	0.6	0.19	0.9	0.40
Social assistance	8.1	0.58	3.1	0.71
Pensions	11.0	0.70	19.6	0.62

Sources: National authorities; and IMF staff estimates.

Table 5. *Redistributive Effects of Direct Taxes, 1994*

	Gini coefficient		
	Per capita before tax income	Per capita after tax income	Redistribution effect of taxes[a]
Estonia	0.342	0.332	−0.010
Lithuania	0.360	0.341	−0.019

Sources: National authorities; and IMF staff estimates.
[a] Negative sign indicates reduction in income inequality.

Notwithstanding these results, there appears to be considerable room for reforming the social safety net in a financially sound manner, aiming at a better targeting of the poor. In 1994, the Baltic states spent on average about 10 percent of GDP on social security and welfare, which is comparable to the level of spending in high-income countries and considerably higher than the average spending on social safety nets in middle-income countries.[20] Future reform efforts will need to be directed mainly at improving the efficiency of the social safety net, and the authorities in all three countries have recognized the importance of improving protection for the poorest segments of the population.[21] Although these measures aim primarily at alleviating poverty, our results suggest that at the same time they may result in a lower dispersion of income, at least partly offsetting the redistributive effects that have accompanied market-oriented reforms during the early phase of the transition. However, as the experience in other countries suggests, reforms of the social safety net are politically difficult, as they imply redirecting transfers away from middle- and high-income groups that have a vested interest in the present pattern of transfers.

Finally, we need to take into account that the previous analysis has focused on pretax income, while from a welfare point of view disposable income may be regarded as a more suitable measure. However, the redistributive effects of direct taxes seem to have been rather small in both Estonia and Lithuania, amounting to only 1 and 2 Gini points, respectively (Table 5),[22] In fact, personal and corporate incomes in both countries are

[20] In 1992, the average expenditure for social security and welfare in a sample of 19 high-income countries was about 12 percent of GDP; the corresponding figure in a sample of 29 middle-income countries was about 5 percent of GDP (International Monetary Fund (1994d)).

[21] For a discussion of reform options for the social safety net in transition economies, see International Monetary Fund (1995).

[22] Ceteris paribus, the distribution of disposable income becomes more equal with higher average tax rates. However, as the average tax rate may be changed without changing the tax elasticity or the tax progressivity, the comparison of the pretax and posttax Lorenz curves as a measure of the redistributive effects of direct taxes should be regarded with considerable caution.

taxed at flat rates. With indirect taxes becoming more important as a source of budget revenue, the redistributive effects of taxes may become even smaller.

V. Conclusions

The Baltic countries enjoyed lower degrees of income inequality in the prereform period than Russia or the other countries of the former U.S.S.R., but the initial phase of their transformation into market economies has been accompanied by a significant change in the distribution of income. While their stabilization and reform programs have been highly successful in establishing the preconditions for sustained economic growth, income differentials have widened markedly in all three countries. To a large extent, this widening is attributable to a greater dispersion of earnings caused by greater wage differentials, lower participation rates, and increased unemployment. These distribution effects have been cushioned only marginally by social assistance programs, which are still largely based on a broad categorical approach. Similarly, the redistributive effects of direct taxes have been very limited owing to flat tax rates, and, with indirect taxes expected to gain in importance, the equalizing effects of the tax system may be eroded further.

Four years after the beginning of the transition, the dispersion of incomes in the Baltic states is now comparable to that of Southern European countries, while in the prereform period the degree of income inequality appeared more akin to that of Northern European countries. Despite the considerable widening of income differentials in the early phase of transition, there seems to have been broad political support for the reform programs in all three countries. Whether this support will continue will depend not only on the expected increase in average living standards but also on the success of the authorities' efforts to redirect social assistance to better protect the poorest segments of the population.

Provided that reforms of the social safety net are implemented in an efficient and financially sustainable manner, there is reason to believe that the initial widening of income differentials will partly be reversed. Moreover, there seems to be considerable room for reforming the tax system, which could also have important redistributive effects. Although our analysis of the first few years of the transition in the Baltic countries suggests that income differentials have widened markedly, it should be emphasized that this process is not inevitable. Rather, it depends to a large extent on the concrete policy measures implemented. As the experience in the advanced industrial countries shows, growth-oriented policies may well be consistent with equity.

REFERENCES

Ackland, Robert, and Jane Falkingham, "Economic Transition and the Profile of Poverty in Kyrgyzstan," in *Household Welfare in Central Asia*, ed. by Jane Falkingham and others (London: McMillan, 1996, forthcoming).

Ahmad, Ehtisham, "Poverty, Inequality, and Public Policy in Transition Economies," *Public Finance*, Vol. 47 (Supplement, 1992), pp. 94–106.

Alexeev, Michael V., and Clifford G. Gaddy, "Income Distribution in the U.S.S.R. in the 1980s," *Review of Income and Wealth*, Vol. 39 (March 1993), pp. 23–36.

Atkinson, Anthony B., and John Micklewright, *Economic Transformation in Eastern Europe and the Distribution of Income* (Cambridge and New York: Cambridge University Press, 1992).

Bergson, Abram, "Income Inequality under Soviet Socialism," *Journal of Economic Literature*, Vol. 22 (September 1984), pp. 1052–99.

Blackwood, D.L., and R.G. Lynch, "The Measurement of Inequality and Poverty: A Policy Maker's Guide to the Literature," *World Development*, Vol. 22 (April 1994), pp. 567–78.

Cornelius, Peter K. (1995a), "Cash Benefits and Poverty Alleviation in an Economy in Transition: The Case of Lithuania," *Comparative Economic Studies*, Vol. 37 (September 1995), pp. 49–69.

——— (1995b), "Unemployment During Transition: The Experience in the Baltic Countries," *Communist Economies and Economic Transformation*, Vol. 7 (December 1995), pp. 445–64.

Hansson, Ardo H., and Jeffrey D. Sachs, "Monetary Institutions: A Comparison of the Experience in the Baltics," paper presented at Conference on Central Banks in Eastern Europe and the Newly Independent States, University of Chicago Law School, April 22–23, 1994.

International Monetary Fund, *Fund-Supported Programs, Fiscal Policy, and Income Distribution*, IMF Occasional Paper No. 46 (Washington: International Monetary Fund, September 1986).

——— (1994a), *Lithuania*, IMF Economic Reviews, No. 6 (Washington: International Monetary Fund, August 1994).

——— (1994b), *Estonia*, IMF Economic Reviews, No. 7 (Washington: International Monetary Fund, August 1994).

——— (1994c), *Latvia*, IMF Economic Reviews, No. 10 (Washington: International Monetary Fund, November 1994).

——— (1994d), *Government Finance Statistics Yearbook* (Washington: International Monetary Fund, 1994).

———, "Social Safety Nets for Economic Transition: Options and Recent Experiences," IMF Paper on Policy Analysis and Assessment 95/3 (Washington: International Monetary Fund, February 1995).

Johnson, Omotunde, and Joanne Salop, "Distributional Aspects of Stabilization Programs in Developing Countries," *Staff Papers*, International Monetary Fund, Vol. 27 (March 1980), pp. 1–23.

Kakwani, Nanak C., "Applications of Lorenz Curves in Economic Analysis," *Econometrica*, Vol. 45 (April 1977), pp. 719–27.

——, "Income Inequality, Welfare, and Poverty: An Illustration Using Ukrainian Data," World Bank Policy Research Working Paper No. 1411 (Washington: World Bank, January 1995).

——, and N. Podder, "Efficient Estimation of the Lorenz Curve and Associated Inequality Measures from Grouped Observations," *Econometrica*, Vol. 44 (January 1976), pp. 137–48.

Lainela, Seija, and Pekka Sutela, *The Baltic Economies in Transition*, Series A, No. 91 (Helsinki: Bank of Finland, 1994).

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

——, "Poverty, Inequality and Social Policy in Transition Economies," World Bank Policy Research Working Paper No. 1530 (Washington: World Bank, 1995).

Morrisson, Christian, "Income Distribution in East European and Western Countries," *Journal of Comparative Economics*, Vol. 8 (June 1984), pp. 121–38.

Saavalainen, Tapio O., "Stabilization in the Baltic Countries: Early Experience," in *Road Maps of the Transition: The Baltics, the Czech Republic, Hungary, and Russia*, IMF Occasional Paper No. 127, by Biswajit Banerjee and others (Washington: International Monetary Fund, September 1995).

Sen, Amartya K., "Informational Bases of Alternative Welfare Approaches: Aggregation and Income Distribution," *Journal of Public Economics*, Vol. 3 (November 1974), pp. 387–403.

Shorrocks, Anthony F., "Ranking Income Distributions," *Economica*, Vol. 50 (February 1983), pp. 3–17.

Stodder, James, "Equity-Efficiency Preferences in Poland and the Soviet Union: Order Reversals under the Atkinson Index," *Review of Income and Wealth*, Vol. 37 (September 1991), pp. 287–99.

Tam, Mo-Yin S., and Renze Zhang, "Ranking Income Distributions: The Tradeoff between Efficiency and Equality," *Economica*, Vol. 63 (May 1996), pp. 239–52.

Villaseñor, José A., and Barry C. Arnold, "Elliptical Lorenz Curves," *Journal of Econometrics*, Vol. 40 (February 1989), pp. 327–38.

Wiles, Peter J.D., and Stefan Markowski, "Income Distribution under Communism and Capitalism," Part 1, *Soviet Studies*, Vol. 22 (January 1971), pp. 344–69; Part 2, *Soviet Studies*, Vol. 22 (April 1971), pp. 487–511.

World Bank, *World Tables* (Baltimore: Johns Hopkins University for the World Bank, 1994).