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Reform and Inequality during the Transition

An Analysis Using Panel Household Survey Data, 1990–2005

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&
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Abstract

Using for the first time household survey data from 26 post-Communist countries, covering the period 1990–2005, this paper examines correlates of unprecedented increases in inequality registered by most of the economies. The analysis shows, after controlling for country fixed effects and type of survey used, that economic reform is strongly negatively associated with the income share of the bottom decile, and positively with the income shares of the top two deciles. However, breaking economic reform into its component parts, the picture is more nuanced. Large-scale privatization and infrastructure reform (mostly consisting of privatization and higher fees) are responsible for the pro-inequality effect; small-scale privatization tends to raise the income shares of the bottom deciles. Acceleration in growth is also pro-rich. But democratization is strongly pro-poor, as is lower inflation. Somewhat surprisingly, the analysis finds no evidence that greater government spending as share of gross domestic income reduces inequality.

This paper—a joint product of the Poverty Team in Development Research Group, and Human Development Network in Europe and Central Asia (ECA) Region—is part of a larger effort in the department to study social effects of economic policies during the transition to market economy.. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at bmilanovic@worldbank.org.

Reform and Inequality during the Transition:
An Analysis Using Panel Household Survey Data, 1990-2005

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1. Inequality in ECA: Literature Review

Inequality considerations are important to policymakers not only because they are linked to the economic state of affairs, but also to the social and political conditions of a given country. This is even more so in the countries of the Eastern Europe and the former Soviet Union that underwent transition from state-control to market economy in the era of globalization. However, there are a limited number of rigorous empirical studies on the evolution of inequality in the transition economies. Although there is a lack of consensus on the impact of inequality on economic growth, the limited empirical evidence that has recently become available for transition countries shows that the effect of inequality on growth can be negative and robust (e.g., Ferreira,1999; Ivanova, 2006; Sukiassyan, 2007).

This section provides a brief review of the literature on the determinants of inequality in transition countries, with particular emphasis on the role of institutions and government policies pursued under the new economic order following the transition. The paper then attempts to investigate the causes of, and establish some stylized facts on the changes in inequality, using a rich data base of household surveys collected over 16 years (1990-2005).

The empirical studies on inequality in transition countries are relatively few in number despite the importance of the topic. There are only several studies that have attempted to systematically and empirically investigate inequality in the transition countries and provide some possible explanations for its evolution since the beginning of transition (Mitra and Yemtsov, 2006; Ferreira, 1999; Milanovic, 1999; Ivaschenko, 2002; Giammatteo, 2006). These studies on the distribution of income immediately, during and after the transition show that there has been appreciable increase in inequality in most of Eastern Europe and the former Soviet Union countries, albeit at varying degrees in magnitude and pace. A widespread view is that the transition to market economy, which entailed several transformations including liberalization capital, goods and services, and

labor markets and their integration into regional and world markets; privatization of state owned enterprises; and the formation of new institutions to serve the market economy, has invariably led to a significant shift in the distribution of income.

Mitra and Yemtsov (2006) provide a summary of the findings of many studies. After careful review of the existing literature, they conclude that all the countries in Eastern Europe and the former Soviet Union experienced an increase in inequality, but with considerable variations. A rapid increase in inequality took place in the middle-income and low-income CIS (Commonwealth of Independent States)[2] countries, whereas the new member states of the European Union appear to have experienced a smaller and a more gradual increase in inequality. For example, in Russia, Gini increased from 25.9 in 1989-90 to 40.9 in 1994, showing a very rapid increase immediately after dismantling of the old Communist system. In contrast, in Poland, despite a similar level of inequality in 1989-90 (Gini of 25.5), the level of inequality increased to only 32 by 1995.

Milanovic (1999) argues that the observed increase in inequality in transition countries is driven mainly by higher inequality in wage distribution following the dismantling of the state sector with compressed wage structure, and its replacement by the newly-emerging private sector with much broader wage distribution. He also finds the effects of social transfers to have varied widely, in some cases halting further increases in inequality (Poland), and in others (e.g., Russia during the early years of transition) having a perverse effects of contributing to inequality. Ivaschenko's (2002) looks at the determinants of changes in income inequality using a panel of inequality estimates for 24 Eastern European and former Soviet Union countries for the period 1989-1998. His is the first panel analysis of inequality during transition. Ivaschenko's main conclusion is that increases in inequality are associated with privatization and "deindustrialization" (often the two facets of the same phenomenon). He also finds out that there was no significant impact of unemployment rate and the size of government spending on income distribution. Another interesting finding of the study was the contrast between Eastern

[2] It includes all republics of the former Soviet Union expect the three Baltic republics, and since September 2008, Georgia.

Europe and the former Soviet Union country groups in the relationship between income inequality and per capita GDP. While there was no association between GDP per capita level and changes in inequality in Eastern Europe, Ivaschenko found a significant U-shaped relationship (the increase in inequality was smallest among middle-income countries) between the two variables for the former Soviet Union countries.

A study by Ivanova (2006) highlighted the effect of government policies on inequality using evidence from Hungary, Poland, and Bulgaria. She shows that government policies prompted by the trend towards liberalization and privatization, such as reducing social spending, limiting access to social assistance through strong selectivity and conditionality criteria, and introducing market-regulated (fee-based) access to many social services, have had profoundly negative impact on socioeconomic equality and contributed to inequality's getting embedded in the transforming societies. According to this study, inequality was not only a byproduct of macroeconomic policies, but also a natural outcome of the particular model of society chosen by the transition economies, for instance, the choice of the minimalist safety-net approach as opposed to the universalistic welfare-state approach of the European social market economies.

While inequality increased in the transition region overall, country specific studies provide a clearer trend of changes in inequality within each country. A study of Poland's income distribution before and during the transition (Keane and Prasad 2002) reveals significant increases in inequality as measured by wages from formal employment. Keane and Prasad also find that the reallocation of workers from a public sector with a compressed wage distribution to a private sector with much higher wage inequality, accounts for the bulk of increased earnings inequality during transition. They highlight the role that increased social transfers had in limiting the increase in inequality.

The unemployment benefits, pensions, family and child allowances that provided economic protection for the most vulnerable citizens prior to the transition underwent major transformations. Giammateo (2006) looked at the impact of state transfers (and taxes) and market oriented reforms on gross and disposable income inequality.

Giammateo's study uses the Luxemburg Income Study (LIS) data for Poland, Hungary and Russia, and concludes that these changes led to an increase in inequality in these countries between 1990 and 2000. The study showed that Russia had the most unequal market and disposable income distribution, followed by Hungary and then Poland. The paper concludes that the redistribution policies in some countries played a key role during the transition period, allowing the government to contain inequality during the period of profound economic and social reforms. The inequality-decreasing effects of state transfers were robust and continued to be effective during the latter part of the 1990s, particularly in Poland and Hungary.[3]

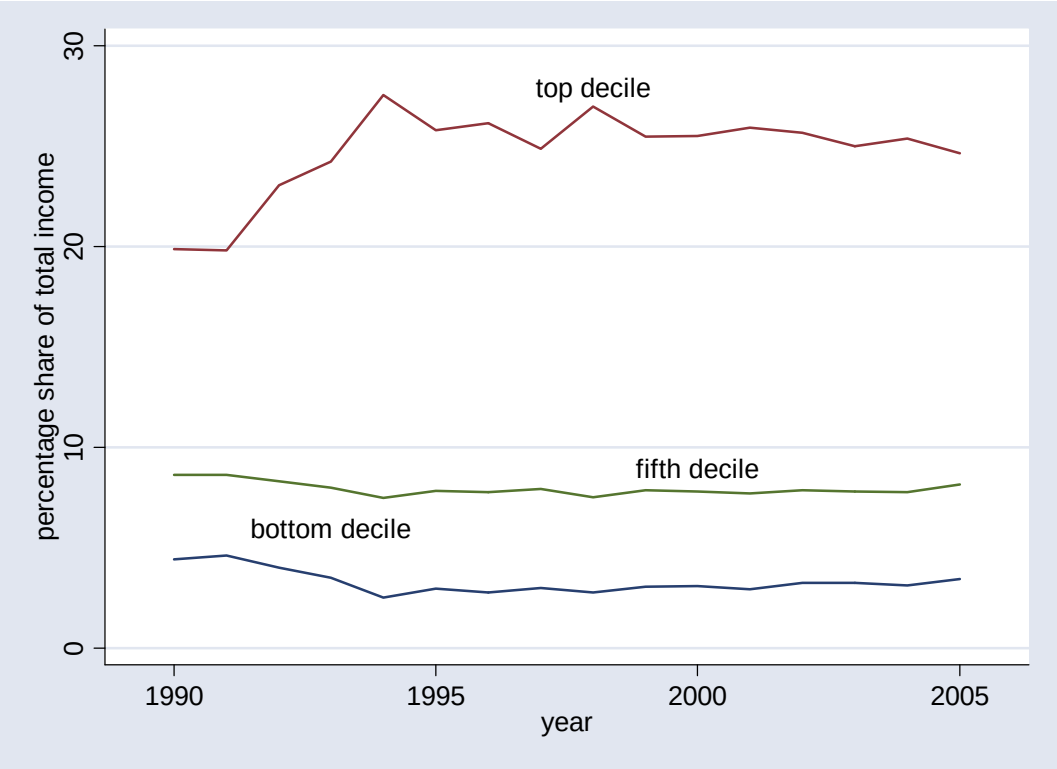
[3] Insignificant, and possibly perverse, effect of social transfers on inequality in Russia coincides with the earlier finding by Milanovic (1999, p. 316).

2. Main trends

In this paper, we use a newly-created data base of inequality statistics for 26 transition economies. It has three important characteristics: (i) it is the largest data base because it includes detailed inequality data for more than 200 country/years covering the 16 year period (1990-2005), (ii) it is overwhelmingly calculated from micro (household-level) survey data, and (iii) we are therefore able to go, in the empirical analysis (Sections 3 and 4), beyond the use of the synthetic inequality statistics (such as the Gini coefficient) and to use decile shares. The advantage of the last point is that it allows us to have many more observations, and more importantly, presents a much more nuanced and accurate picture of the entire distribution than a single number can, be it a Gini, Theil or any other synthetic inequality indicator.

Figure 1 summarizes the evolution of inequality in transition countries over the period 1990-2005. The top line shows the share of the top decile in total income, the bottom line the share of the lowest decile. The biggest distributional changes occurred between 1990 and 1995, and since then the distributions have, on average, been stable. What happened between 1990 and 1995 was that the share of the top decile increased from about 20 percent of total income to about 25 percent (and has been remarkably stable since) while the share of the bottom decile dropped from about 4.5 percent of total income to 3 percent. The top and the bottom deciles registered the biggest swings: positive by about a quarter of its previous share for the top decile and negative by almost a third for the bottom decile. In contrast, the shares of the middle deciles did not change much: the share of the fifth decile dropped from about 8.6 percent to 8.1 percent; the share of the sixth from 9.6 to 9.3 etc. This is consistent with other evidence which shows that the biggest difference (in cross-country studies) between the relatively unequal and relatively equal countries resides in their top and bottom decile shares whereas the middle classes' income shares are relatively stable (Milanovic, 2008; Palma, 2006). One can thus expect that a temporal change in inequality as here would involve most important swings for the two extreme deciles.

Figure 1. The evolution of the bottom, middle and top decile's share of total income (in percent of total income)



Note: The unweighted (unbalanced panel) average for 26 economies.

The total number of inequality observations we have is 209. At the beginning of the period (1990 and 1991), we have observations for only 6 and 7 countries respectively, and at the very end of the period (2005) for 9 countries.[4] In between, for all other years, the number of countries included ranges from 15 to 21. This is because annual data for each of the 26 countries are not available whether because the surveys were not conducted, or because (less frequently) we did not have access to them. The list of countries with their number of observations, and the average top and bottom decile shares is given in Annex 1. We therefore have an unbalanced panel where the number of observations ranges from 16 (*i.e.*, available for all years) for Poland to only 2 (for Bosnia, Croatia, and Montenegro). The average number of observations per country is about eight (209 divided by 26 countries).

[4] Azerbaijan and Turkmenistan are not included in the analysis because of unreliability of their household surveys.

Among our explanatory variables, the one that we are most interested in is a set of policy variables as defined and numerically estimated by EBRD. We shall use these variables both as an indicator of the average intensity of reforms (taking an unweighted average of all nine EBRD reform indexes), and as each reform separately.[5]

Other right-hand side variables are pretty straightforward. They include annual real growth rate, government expenditures as percentage of GDP, and annual inflation rate as measured by the change in the consumer price index (all three obtained from World Development Indicators). It may be worth briefly mentioning their evolution in time since all three are reflective of the transition process.

The growth rates are available annually for 24 countries.[6] The average unweighted rate at the onset of transition, in 1991 and 1992, was –13 and –19 percent.[7] Beginning with 1995, the average unweighted growth rate turned positive, almost monotonically increasing from about 1 percent in 1995 to more than 6 percent at the end of the period. This is a remarkable turnaround although the depth of the early depression means that 11 countries' GDPs per capita are still below their 1990 levels. [8] The population-weighted area's average GDP per capita is now only 2 percent above its 1990 level, and total real GDP of the area is exactly the same as sixteen years ago. However, illustrating the recent turnaround, we note, for example, that since 2000, there have been only five observations of negative (and mildly so) growth rates while there were 18 observations of growth rates in excess of 10 percent per annum. At the beginning of the period, the situation was exactly the reverse: in the years 1991 and 1992, there were no fewer than 30 observations of *double-digit* negative growth.

[5] The reform areas are the followings: large scale privatization, small scale privatization, governance and enterprise restructuring, price liberalization, trade and foreign exchange system, competition policy, banking reform and interest rate liberalization, securities markets and non-bank financial institutions, and infrastructure reform. The EBRD indices come from the EBRD Transition Report, reflecting progress in all of these areas. Each of these individual EBRD indices is reported on a 1 to 4+ scale with higher numbers indicating greater reform progress.

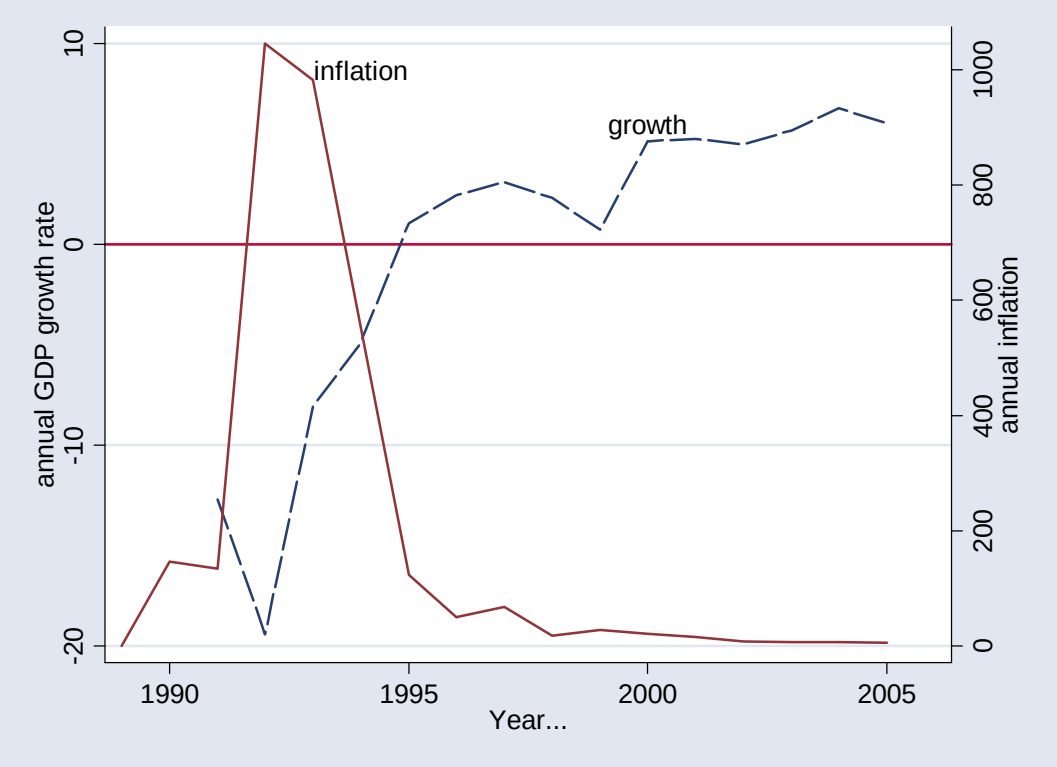
[6] We do not have data for Bosnia and Herzegovina, and Montenegro.

[7] The average unweighted means that each country/year counts as one observation.

[8] GDP per capita (and total GDP) are measured at 2005 international prices.

The evolution of inflation is very similar to that of growth: years of low growth were also the years of high inflation, and vice versa. The average unweighted inflation rate for the transition countries decreased from its peak of more than 1,000 percent in 1992, and just below 1,000 in 1993, to around 6 percent in both 2004 and 2005. Again, from 1993, the decline in the unweighted inflation rate was monotonical: each successive year saw a lower average rate. The evolutions of unweighted growth rate and inflation are shown in Figure 2.

Figure 2. Average (unweighted) growth rate and inflation during the transition, 1990-2005



Note: GDP growth in percent per annum (broken line; left axis). Inflation in percent per annum (right axis). Data are unweighted average of 26 transition economies.

The situation is just slightly different with government expenditures as a share of GDP. Government spending was inelastic, both when incomes severely dropped at the onset of the transition and when they kept on increasing later. Thus, the unweighted

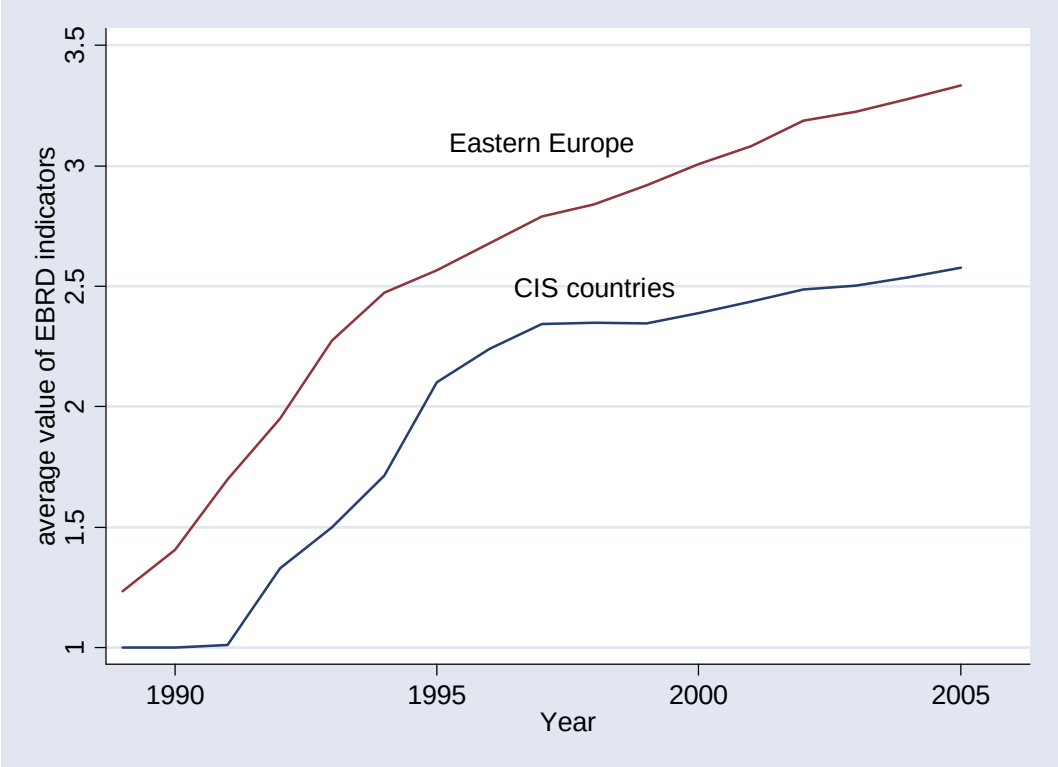
government spending as a share of GDP reached its peak of 42 percent in 1992, and more of less continuously dropped to under 30 percent by the end of the period.

The broad contours of the changes in our key variables during the transition are remarkably clear. Of course, this holds for the sample as a whole; the evolution for each individual country is bound to show peculiarities of its own. On average, inequality grew between 1990 and 1995 and stayed stable since; growth was negative over the same period, and after 1995 increased steadily year after year; inflation peaked in 1992 and 1993 and has since steadily gone down, and government expenditures as a share of GDP peaked around the point where the average output hit its bottom (1993 and 1994) and has gone down ever since.

With regard to transitional reforms, over the past decade and half, most transition countries have made significant progress (see Figure 3 and Annex 2), but two broad patterns have emerged. In the more advanced countries such as Poland and Estonia, rapid liberalization and sustained macroeconomic stabilization have laid the basis for gradual institutional change. The bulk of these changes have been driven by the process of European integration. By 2005, the countries with the highest average EBRD index were Hungary with the value of almost 4 (out of the maximum of 4.33), Estonia and Czech republic (around 3.8). In the beginning of the transition, in 1989, Estonia and Czech republic had a reform index at the very minimum level of 1, and Hungary at 1.3. Overall, as Figure 3 shows, East European countries remained ahead of CIS countries and the difference even increased recently. As for the least advanced countries such as Turkmenistan, Belarus and Uzbekistan, progress in liberalization and privatization has been slow and uneven and stabilization has been jeopardized by the persistence of soft budget constraints. In 2005, Turkmenistan's mean reform index stood at 1.3, Belarus's 1.8 and Uzbekistan's 2.1. Thus, reform-wise, they seem to be almost where many of the advanced countries were after one or two years of the transition. For both East European and particularly CIS countries, the intensity of reforms was greater up to the mid-1990s (as shown by the steepness of the line in Figure 3 and a flexion point around 1995) than

afterwards. This is as expected since reform index is bounded from above (as are, in a more substantive sense, reforms too).

Figure 3. The evolution of average EBRD reform indicator in Eastern Europe and Commonwealth of Independent States, 1990-2005



Note: Unweighted average.

3. What explains change in inequality?

Explaining the increase of inequality during the transition has to rely on very little theory. The reason is to some extent obvious, namely that the transition from Communism to capitalism took place quickly and unexpectedly, so no a priori theory was developed. After the beginning of transition, and faced with the often dramatic increases in inequality, several papers tried to formalize the factors and mechanisms associated with the increase. They were reviewed in Section 1. Milanovic (1999) saw increased inequality arising from the transfer of labor force from an egalitarian public sector to a much more in inegalitarian private sector. In his view, the structural, or rather, ownership, transformation was the primary force behind increased inequality. Similarly, Ivaschenko (2002) linked privatization and structural change expressed as "deindustrializaton" to increased inequality. But, as discussed in the review of the existing literature, other factors were, in a heuristic fashion, also associated with changes in inequality. Noticing smaller increases in Central Europeans countries whose welfare systems "survived" the first wave of transition much better than those of the former Soviet republics. Keene and Prasad (2002) argued that maintaining social expenditures provided a strong cushion against runaway inequality. In an early article on the political economy of reforms, Hellman (1988) linked high levels of inequality to non-completed reforms. In his simple cross-section, both the more advanced reformers in Central Europe and non-reformers in Central Asia had lower levels of inequality than reformers that stopped "halfway" like Russia and Ukraine. Hellman ascribed these developments to the entrenched role of the new oligarchic elites.

Following on some of these insights, we estimate a country fixed-effect model where inequality is associated with the growth rate of the economy (measured by the annual GDI increase), inflation rate (measured by the annual increase in the consumer price index), intensity of structural reforms (measured to be the unweighted average value of nine EBRD reform indices), government spending as a share of GDI, and level of country's democracy (as measured by the Polity database). In addition, we control for

the type of survey instrument used (income or expenditures), and the survey reference period (whether monthly, quarterly, semi-annual, or annual). From the existing literature, both transition-, and non-transition-based, we can derive expectations regarding the role of some of the explanatory variables. For example, inflation is generally found to be positively associated with inequality (Bulir, 2001). Social expenditures, as already mentioned, are expected to dampen the rise in inequality. Democracy is also generally found to be anti-inequality although the evidence is not very robust (e.g., Bollen and Jackman, 1985; Li, Squire and Zou 1998; but see also Rodrik, 1999). But for a couple of variables we do not have strong priors based on theory or existing empirical evidence. For example, different types of reforms may be thought to affect inequality differently. While there is little disagreement that privatization is likely to increase inequality (see in particular Ivaschenko, 2002), other reforms may have the opposite effect. Thus, financial liberalization, associated with financial deepening and easier access to credit could be thought to be pro-equality, as indeed some influential papers have argued (e.g., Li, Squire and Zou, 1998). For this reason, in addition to reforms overall whose effects are explored in this section, we shall look (in Section 4) at the effect of each individual reform. Even less *a priori* obvious is the effect of the growth rate of the economy. Its effect cannot even be postulated in advance since some growth-inducing policies may be pro-poor and others anti-poor. Therefore, whether the growth process as such has been pro- or anti-poor should emerge as result of the empirical analysis rather than be hypothesized in advance.

The regressions are run across each decile share defined as the share of *i*-th decile (deciles running from 1, the poorest, to 10, the richest) in total survey income (or total survey expenditures. depending of what is the survey instrument).We use the method of SURE (seemingly unrelated regressions) where each individual left-hand side variable is regressed on the same set of explanatory variables.[9] Since the decile shares sum to 1, we impose constraints on the coefficients such that the sum of products of coefficients associated with a given variable and decile shares be equal to 0. In other words, we want

[9] Although OLS estimators are consistent, SURE provides greater efficiency, and efficiency gains increase as correlation between errors across equations goes up (which is the case here; see Greene, 2000).

to guarantee that an infinitesimal increase in an explanatory variable leaves the sum of income shares unchanged, that is equal to 1.

The regression is written as

$$D_{ijt} = \beta_0 + \beta_1 G_{jt} + \beta_2 INF_{jt} + \beta_3 REF_{jt} + \beta_4 EXP_{jt} + \beta_5 DEM_{jt} + \beta_6 DIj_t + \beta_7 DS_{jt} + \\ + \beta_8 DD_j + e_{ijt} \quad (1)$$

where subscripts *i*, *j* and *t* denote respectively decile, country, and time (year), D = decile share, [10] G = real growth rate, INF = annual inflation, REF = the average unweighted EBRD reform index, EXP = total government expenditures as percentage of GDI, DEM = value of *Polity2* variable from the Polity database (ranging from -10 for complete dictatorship to +10 for full democracy), DI = dummy variable for whether survey is income- or expenditures-based, DS = dummy variable for survey reference period (monthly, quarterly, semiannual and annual), DD = country dummy and e_{ijt} = error term.[11] To control for inter- and intra-country heteroskedasticity, the regressions are run with robust (Huber-White) standard errors.[12] Since reforms were, in almost all cases, influenced or imposed from abroad, being at first mostly of the Washington Consensus type favored by the World Bank, EBRD and the IMF, and later of the "milder" type favored by the European Union, their exogeneity seems patent. It is very unlikely that they were responding to domestic income distribution concerns.

[10] In regressions, decile share are expressed as a multiple as the mean rather than as the percentages of the total. Thus, the bottom decile's share of (say) 3 percent of total income is translated as 0.3 mean incomes. This can be interpreted as the average income of the bottom decile normalized by the mean.

[11] Inflation is defined, as usual, as ln (1 + annual inflation rate); EBRD index runs from 1 to 4.33. Real growth rate, annual inflation, government expenditures as a share of GDI are all from the World Bank database (World Development Indicators). *Polity2* variable is from PolityIV database (accessible at http://www.systemicpeace.org/polity/polity4.htm), and EBRD index is compiled from various annual EBRD reports.

[12] We perform Breusch-Pagan test of independence to see whether correlations are zero or not. The null hypothesis of no correlation is rejected.

The results are shown in Table 1. As can be seen, there are 177 surveys which gives a total of 1,770 data points (for all ten deciles).[13] Each regression is run over 177 points belonging to a given decile. The panel is unbalanced as some countries have many more observations than others. However, since we adjust for unobserved fixed country effects this should not affect the estimated values of the coefficients. The R-square runs between 0.5 and 0.6 for the bottom six deciles and the top decile. For the four upper-middle deciles, R^2 are lower, ranging between 0.2 and 0.38.

[13] Some of income distribution (decile) information is lost because of lack of independent variables for those particular countries and years.

Table 1. Explaining decile shares in transition countries (with the overall EBRD index)

Decile	**First**	**Second**	**Third**	**Fourth**	**Fifth**	**Sixth**	**Seventh**	**Eighth**	**Ninth**	**Tenth**
Growth rate	-0.265	-0.066	-0.010	0.001	0.002	-0.011	-0.004	-0.003	0.135	0.221
	(2.80)**	(0.81)	(0.13)	(0.01)	(0.03)	(0.20)	(0.08)	(0.05)	(1.34)	(0.58)
Inflation	-0.019	-0.019	-0.016	-0.011	-0.008	-0.005	-0.001	0.005	0.021	0.052
	(3.43)**	(3.89)**	(3.47)**	(2.83)**	(2.33)*	(1.59)	(0.48)	(1.75)	(3.60)**	(2.33)*
EBRD_total	-0.067	-0.072	-0.059	-0.038	-0.025	-0.013	-0.003	0.018	0.084	0.176
	(3.16)**	(3.90)**	(3.40)**	(2.51)**	(1.83)	(1.09)	(0.29)	(1.51)	(3.67)**	(2.04)*
Exp_gdp	-0.001	0.0003	0.0003	0.001	0.0004	0.0001	-0.0002	0.00001	0.002	-0.002
	(0.85)	(0.36)	(0.41)	(0.94)	(0.78)	(0.16)	(0.50)	(0.02)	(2.17)*	(0.62)
Polity2	0.008	0.008	0.007	0.006	0.005	0.004	0.002	-0.001	-0.005	-0.034
	(3.01)**	(3.45)**	(3.37)**	(3.19)**	(3.00)**	(2.63)**	(1.73)	(0.77)	(1.78)	(3.20)**
Dincome	-0.013	-0.001	0.007	0.013	0.015	0.016	0.016	0.025	0.040	0.012
	(0.96)	(0.06)	(0.60)	(1.27)	(1.46)	(1.67)	(1.65)	(2.13)*	(1.69)	(0.21)
Quarterly	-0.005	-0.015	-0.012	-0.016	-0.018	-0.018	-0.013	-0.005	0.013	0.155
	(0.09)	(0.29)	(0.25)	(0.36)	(0.42)	(0.43)	(0.31)	(0.09)	(0.13)	(0.64)
Semiannual	0.030	-0.004	-0.010	-0.021	-0.020	-0.038	-0.052	-0.065	-0.040	0.153
	(0.47)	(0.08)	(0.19)	(0.42)	(0.43)	(0.84)	(1.14)	(1.17)	(0.36)	(0.59)
Annual	-0.005	-0.010	-0.011	-0.013	-0.009	-0.006	-0.001	0.007	0.038	0.091
	(0.39)	(0.95)	(1.02)	(1.33)	(0.93)	(0.67)	(0.16)	(0.67)	(1.70)	(1.78)
Constant	0.577	0.721	0.764	0.793	0.860	0.937	1.058	1.187	1.202	1.901
	(6.71)**	(9.61)**	(10.91)**	(12.67)**	(15.01)**	(18.28)**	(21.98)**	(21.36)**	(11.19)**	(5.44)**
No of obs	177	177	177	177	177	177	177	177	177	177
R-square	0.546	0.606	0.604	0.589	0.510	0.379	0.200	0.280	0.312	0.539

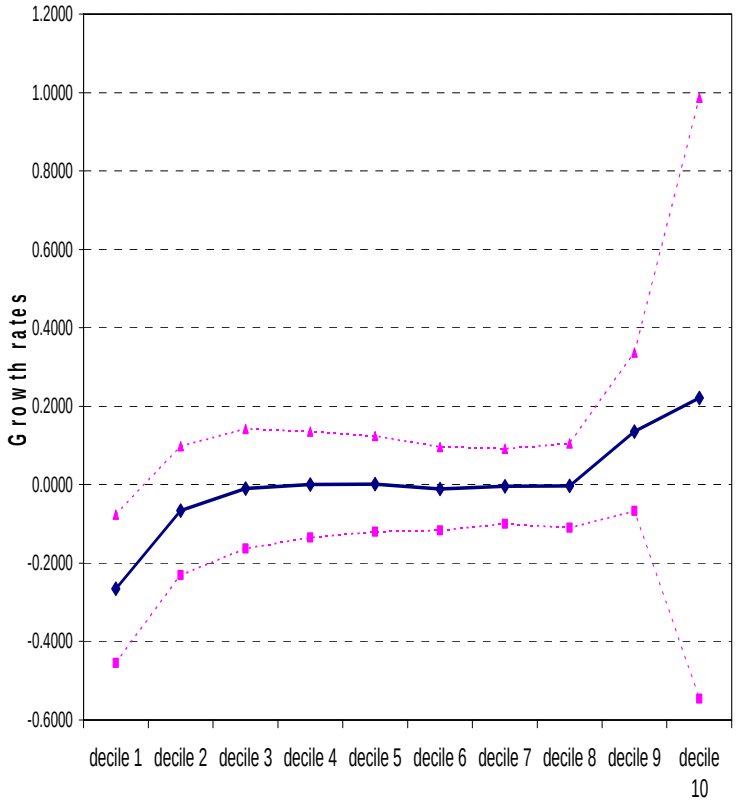
Note: Statistically significant coefficients (at 1 and 5 percent levels) denoted by respectively two and one asterisks; *z* values between brackets Dincome is a binary variable taking value of 1 is survey is income-based and 0 is expenditure- or consumption-based. Quarterly, semiannual, annual are binary variables for survey reference period (the omitted variable is monthly). Inflation rate is expressed in natural logs. All regressions include country dummies.

We shall consider the results one by one. The growth rate is strongly anti-poor as the coefficients on the two bottom deciles are statistically significantly negative and likewise the coefficients on the top two deciles are significantly positive. Across the rest of the income distribution, higher growth rate is neutral, that is, does not affect decile shares. The implication is that acceleration of growth has generally left the income share of the poor lower. This does not imply however that their average income had gone down since a smaller share might have been counterbalanced by a higher overall income but it still highlights a concern that advantages of growth were unbalanced and tended to accrue mostly to higher income groups. And in effect, while statistically significant, the absolute amount of the effect seems to be small. For the bottom decile, one percent acceleration in growth is associated with a decrease in its income share by 0.026 percentage points. The average income share of the bottom decile is 3.2 percentage points. Thus, to keep the absolute real income of the bottom decile from falling, the growth acceleration needs to be greater than 0.8 percent[14] which, as we have seen, is the case by assumption. For the second decile, the outcome is ever stronger, as the implicit growth rate needed to keep its absolute income from falling is only 0.13 percent. We conclude that higher growth tended to increase absolute incomes of the poorest too but did so less than in proportion to the rest (see Figure 4, left panel).

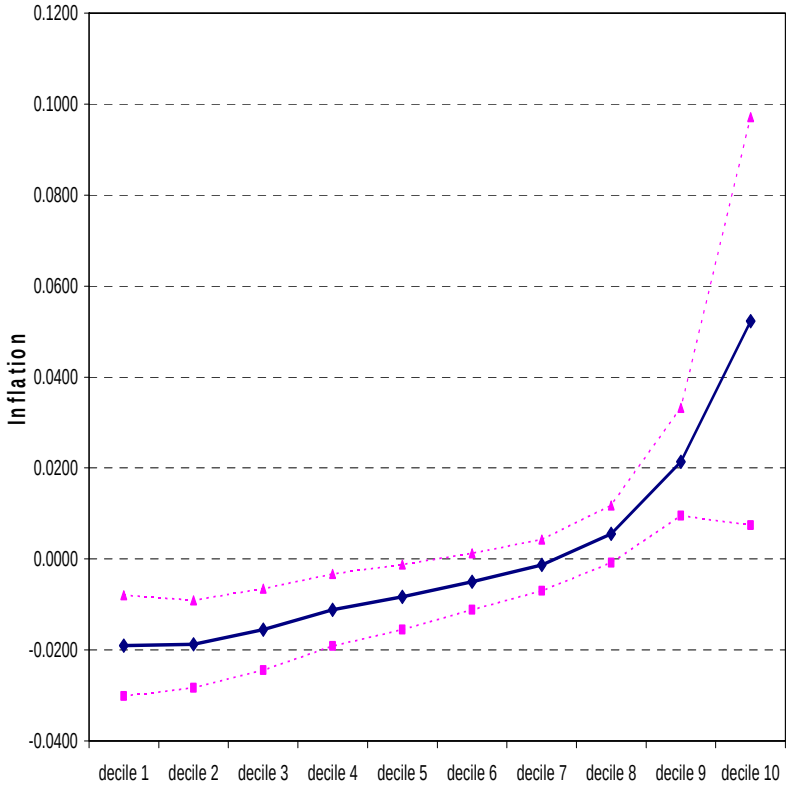
[14] Calculated as follows. One percent (0.01) acceleration multiplied by the coefficient of -0.265 and multiplied further by 10 (since deciles shares as expressed as the multiples of the mean) and then divided by the average decile share of the bottom (3.2 percent).

Figure 4. The regression coefficients on growth and inflation variables (by decile)

Growth



Inflation



Note: The broken line around the coefficient gives the spread of two standard deviations.

The effect of inflation is clear. It tended to influence negatively (in a statistically significant way), the income shares of the bottom five deciles, and positively the top two (see Figure 4, right panel). This result, as mentioned before, does correspond with our expectations and with earlier findings in the literature.

There is a similar effect in the structural reforms measured by the EBRD index. Greater *level* of reforms is strongly negatively associated with the income shares of the four lower deciles, and positively with the shares of the top two deciles. For example, one standard deviation increase in the reform index (0.84 EBRD points) is associated with about 1.1 percentage point share increase for the top decile. Note that the top decile receives, on average, 25 percent of total income. Hence, the gains from reforms are not negligible for the top income group. For the bottom decile, on the other hand, one-standard deviation increase in reforms reduces the share by 0.4 percent. Their (bottom decile's) average share in the sample is 3.2 percent of total income. Accordingly, in order for greater reforms to increase the absolute income of the bottom decile, the increase in total income generated by reforms must be in excess of 12.5 percent (0.4 divided by 3.2). This is, of course, an extremely high growth on a yearly basis and, in the short term, reforms are therefore very unlikely to be pro-poor in an absolute sense as far as the bottom income decile is concerned.

A somewhat surprising finding is that greater government expenditures seem to be distribution-neutral. In effect, for no decile, except weakly for the ninth decile, do greater expenditures (as a share of GDI) show either positive or negative statistically significant coefficient. The effect which is generally very strong (including here; regressions not shown in the text) when run in a cross-country setting dissipates in a model where we control for country effects. In other words, the conclusion that the difference between inequality in (say) Poland and Russia may be related to their governments' spending amounts does not seem to be warranted. Once we control for unobserved country characteristics, we cannot argue that greater government spending in Russia (or in Poland) would result in less inequality. It seems that all of the identification

of this variable's effect on inequality comes from cross-country variation. Part of the problem may lie, however, in the fact that government expenditures include all kinds of expenditures not all of which may be directed toward the poor or lower middle classes. If one could isolate social component of total government expenditures (which unfortunately the data do not allow us to do), it could be that the effect would cease to be insignificant.

The effect of democracy is very interesting. Its pro-equality effect cuts very "deeply" because it raises the income shares of the bottom six deciles, is then "neutral" for the following three deciles, and strongly anti top decile. The increase of one democracy point on the 21-point Polity scale increases the share of the bottom decile by 0.08 percentage points which seems small in absolute amounts but not so when we reflect that the average share of the bottom decile is only 3.2 percentage points. In other words, one point increase in the democracy indicator is equal to a distribution-neutral growth rate of some 2.5 percent (0.08 divided by 3.2). The effect is similar for the following two deciles (second and third). An intriguing result is that a combination of modest democratization (increase of 1 *Polity* point) and modest acceleration in growth (1 percent), will, on average, increase absolute incomes of the bottom deciles even if growth *per se* has a disequalizing effect. However, a very strong negative effect of reforms on bottom decile share cannot be so easily offset by democratization.

As a robustness check, we also introduce the ratio between exports of some key natural resources (oil, natural gas, diamonds and gold) and GDI.[15] This is done in order to test the hypothesis that natural resource exports tend to be associated with more unequal distributions. In this case, however, the coefficient on natural resource exports variable is insignificant throughout, while coefficients on the other variables are not affected.

Finally, the effects of the survey instrument (income or expenditure) or reference period are statistically insignificant throughout.

[15] The results are not shown here; they are available from the authors on request.

4. The role of individual EBRD reform indicators

In the previous section, the intensity of structural reforms in transition countries has been measured by the unweighted average of the nine EBRD transitional indicators: However, as already mentioned, it is highly likely that these various components of the EBRD transition index could have different and even opposing effects in the evolution of inequality. For example, while large scale privatization may likely lead to an increase inequality (e.g., Ivaschenko, 2002), financial liberalization could have the opposite effect (e.g., Li, Squire and Zou, 1998). Hence, in this section we analyze the effect on decile shares of each of the nine EBRD transitional indicators separately.

Table 2 presents the coefficients from a seemingly unrelated regression equation (SURE) of the share of deciles where all nine EBRD transition indicators are used explanatory variables. Before discussing the results, it is worth mentioning that the other key explanatory variables stayed robust despite introducing a new set of explanatory structural reform variables. For example, both the signs and significance of growth, inflation, government expenditures, and democracy variables remained robust, i.e., the same as they were in the previous regressions (Table 1). Therefore, this section discusses the effects on inequality of the EBRD transition indicators only.

Large and small scale privatization schemes appear to have opposing effects on the evolution of inequality in the transition countries. The statistically significant and positive coefficients on the bottom five deciles suggest that progress in small scale privatization is strongly pro-poor. This observation is further strengthened by the statistically significant negative coefficients on the top three deciles. On the other hand, large scale privatization tends to worsen inequality as implied by the negative coefficients (albeit not significant at conventional level) on the bottom deciles' income shares.

Another EBRD reform that has significant bearing on the evolution of inequality is progress in reforming infrastructure, which includes electric power, railways, roads,

telecommunications, water, and waste. Reforms in these infrastructure and utility sectors have worsened inequality. They appear to benefit mostly those in the top two deciles (*i.e.*, the richest 20 percent) of the population. Nearly 70 percent of the population has seen their share of consumption or income decline as a result of infrastructure privatization and fee-changes. This outcome may be partly explained by the fact that infrastructure privatization meant the abolition of monolithic government ownership of these structures that used to provide at times inefficient, yet subsidized and/or free, services to their citizens. The sizes of the two strongly significant effects (pro-poor small scale privatization and pro-rich infrastructure reform) are such that they almost exactly balance each other out: 1 point increase in the respective EBRD indexes produces about the same absolute effect.[16]

The rest of the EBRD transition indicators played a more or less non-discriminatory role in the evolution of inequality. Enforcement actions to reduce abuse of market power and to promote a competitive business environment appear to favor those in the middle income classes, with no significant effect on the poorest and the richest. Improvement in the banking laws and regulations, and financial deepening also benefit more those in the middle and upper income brackets. There is some indication that enterprise restructuring tends to favor the very top income class to the detriment of the middle. If job losses, following upon restructuring, are concentrated among middle classes, this is not surprising. The rest of the EBRD components are inequality-neutral. But in some cases, that neutrality is quite remarkable: thus price liberalization, and foreign trade and exchange rate liberalization, frequently regarded as anti-poor, at least in the short term, appear to have an entirely neutral effect on income distribution.

[16] Of course, this is merely of an econometric rather than real relevance since one point increase in EBRD index may involve vastly different policies in the case of infrastructure reform than in the case of small-scale privatization.

Table 2. Explaining decile shares in transition countries (with individual EBRD indexes)

Decile	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth
Growth	-0.332	-0.133	-0.068	-0.047	-0.039	-0.040	-0.006	0.034	0.185	0.446
	(3.50)**	(1.63)	(0.89)	(0.69)	(0.63)	(0.75)	(0.13)	(0.65)	(1.76)	(1.16)
Inflation	-0.021	-0.021	-0.018	-0.014	-0.012	-0.009	-0.004	0.004	0.025	0.068
	(3.68)**	(4.14)**	(3.87)**	(3.26)**	(3.11)**	(2.65)**	(1.48)	(1.39)	(3.95)**	(2.91)**
Large scale privatization	-0.017	-0.022	-0.010	-0.004	0.002	0.002	0.002	0.012	0.039	-0.004
	(1.15)	(1.72)	(0.82)	(0.35)	(0.23)	(0.23)	(0.30)	(1.44)	(2.32)*	(0.06)
Small scale privatization	0.036	0.037	0.033	0.027	0.021	0.014	-0.002	-0.024	-0.034	-0.108
	(2.44)*	(2.94)**	(2.77)**	(2.56)*	(2.17)*	(1.71)	(0.21)	(2.96)**	(2.08)*	(1.82)
Governance and	-0.028	-0.021	-0.024	-0.022	-0.023	-0.023	-0.017	-0.016	-0.010	0.183
enterprise restructuring	(1.38)	(1.22)	(1.52)	(1.56)	(1.82)	(2.03)*	(1.67)	(1.42)	(0.44)	(2.27)*
Price liberalization	0.029	0.024	0.018	0.013	0.006	-0.000	-0.006	-0.009	-0.002	-0.073
	(1.69)	(1.60)	(1.27)	(1.06)	(0.52)	(0.03)	(0.70)	(0.90)	(0.10)	(1.04)
Trade & foreign	-0.017	-0.005	-0.002	-0.003	-0.004	-0.004	-0.006	-0.011	0.009	0.043
exchange liberalization	(1.27)	(0.43)	(0.18)	(0.33)	(0.48)	(0.51)	(0.80)	(1.50)	(0.62)	(0.78)
Competition policy	0.022	0.003	-0.003	0.002	0.009	0.019	0.021	0.013	-0.021	-0.065
	(1.31)	(0.23)	(0.20)	(0.15)	(0.79)	(1.98)*	(2.50)*	(1.36)	(1.12)	(0.95)
Banking system	-0.015	-0.012	-0.013	-0.009	0.001	0.008	0.018	0.030	0.018	-0.025
Liberalization	(0.85)	(0.81)	(0.91)	(0.74)	(0.06)	(0.86)	(2.01)*	(3.09)**	(0.91)	(0.36)
Infrastructural reform	-0.039	-0.044	-0.045	-0.034	-0.034	-0.030	-0.020	0.005	0.054	0.187
	(2.32)*	(3.06)**	(3.32)**	(2.85)**	(3.12)**	(3.22)**	(2.29)*	(0.58)	(2.91)**	(2.74)**
Capital market reform	-0.011	-0.012	-0.005	-0.004	-0.005	-0.005	-0.001	0.008	0.011	0.022
	(0.70)	(0.89)	(0.38)	(0.34)	(0.50)	(0.52)	(0.12)	(0.97)	(0.67)	(0.35)
Exp_gdp	-0.001	-0.000	0.000	0.001	0.000	0.000	-0.000	0.000	0.002	-0.002
	(0.61)	(0.24)	(0.44)	(0.93)	(0.74)	(0.10)	(0.41)	(0.28)	(1.82)	(0.67)
Polity2	0.008	0.009	0.008	0.007	0.006	0.004	0.002	-0.002	-0.006	-0.037
	(3.23)**	(4.08)**	(4.06)**	(3.70)**	(3.43)**	(2.98)**	(1.74)	(1.41)	(2.17)*	(3.52)**
Dincome	-0.011	0.002	0.009	0.014	0.015	0.016	0.017	0.024	0.029	0.015
	(0.80)	(0.13)	(0.71)	(1.25)	(1.42)	(1.67)	(1.76)	(2.17)*	(1.30)	(0.25)

Decile	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth
Quarterly	0.008	0.004	0.003	-0.006	-0.010	-0.010	-0.009	-0.013	-0.016	0.116
	(0.13)	(0.08)	(0.06)	(0.14)	(0.24)	(0.25)	(0.23)	(0.26)	(0.16)	(0.49)
Semiannual	0.048	0.033	0.025	-0.000	-0.010	-0.039	-0.061	-0.082	-0.042	0.061
	(0.69)	(0.53)	(0.43)	(0.00)	(0.20)	(0.82)	(1.29)	(1.50)	(0.38)	(0.21)
Annual	-0.002	-0.006	-0.007	-0.010	-0.007	-0.005	-0.002	0.003	0.029	0.088
	(0.17)	(0.56)	(0.63)	(1.00)	(0.70)	(0.52)	(0.21)	(0.26)	(1.36)	(1.75)
Constant	0.385	0.515	0.602	0.679	0.800	0.920	1.098	1.309	1.336	2.357
	(3.33)**	(5.16)**	(6.45)**	(8.10)**	(10.50)**	(13.75)**	(17.81)**	(19.19)**	(9.76)**	(5.05)**
No of obs	177	177	177	177	177	177	177	177	177	177
R-square	0.579	0.629	0.622	0.602	0.532	0.413	0.263	0.388	0.364	0.567

Note: Statistically significant coefficients (at 1 and 5 percent levels) denoted by respectively two and one asterisks; *z* values between brackets. Dincome is a binary variable taking value of 1 is survey is income-based and 0 is expenditure- or consumption-based. Quarterly, semiannual, annual are binary variables for survey reference period (the omitted variable is monthly). Inflation rate is expressed in natural logs. All regressions include country dummies.

5. Conclusions

Using for the first time micro data from household surveys in an unbalanced panel framework covering 26 transition economies over a 16-year period, the paper has investigated the correlates of inequality increase in post-Communist countries. Another feature the paper has been the use, not of a single inequality index like a Gini coefficient, but decile shares which give a much more detailed picture of changes in the entire distribution. While, for example, the Gini coefficient can remain unchanged with increases in income shares among both the rich and the poor (and a corresponding decline in the middle); the share-based analysis captures these changes well. Using the method of seemingly-unrelated regressions, run for each decile, and fixed (country effect) specification, we find that reforms, as measured by the average EBRD index for a given country/year, have had a robust negative effect on income shares of the bottom four deciles, and positive on income shares of the top two deciles.

The intuitive feeling that reforms in post-Communist countries were anti-poor (at least in the distributional sense) is confirmed. Breaking down the reform index into its nine EBRD-defined types of reforms, we find that the negative effect on income shares of the bottom is associated mostly with infrastructural reforms which included introduction (or increases) of fees for services, and privatization of electricity, railways, roads, water provision etc. On the other hand, small scale privatization is associated with the opposite (pro-poor) effect. Among the other relevant variables, the most important and significant is the role of democracy which raises the incomes shares of the bottom and middle deciles. Not surprisingly, we find inflation to be anti-poor: highly significant for the income shares of both the bottom and the top. Growth as such has, on the other hand, been disequalizing. However, this effect is sufficiently small so that growth overall is associated with an increase in real income of the bottom deciles (including the lowest)—that is, even if the bottom decile's income share is reduced. In other words, growth was anti-poor in relative, but not in an absolute, sense. Finally, once we control for country-effects, we find absence of association between government expenditures as a

share of GDI and inequality. Thus, the oft-quoted relationship between government spending and inequality in (say) Poland vs. Russia (with spending being high in Poland and hence, it is argued, inequality low) seems to get its entire identification from cross-country level regressions.

What policy implications emerge from this work? First, it is important to look at the reform process in a more nuanced and discriminating way. This in particular refers to the negative role played by infrastructural reform that might have been often pushed onto the population too fast and too hard. The result also shows that the attempts to cushion low income groups from the effects of such reforms have been unsuccessful. Second, it confirms the importance of small-scale privatization in keeping inequality in check—probably by providing much needed jobs. Third, it shows a crucial role played by democratization and control of inflation. Fourth, it leads us to be much more skeptical in using government spending as a means to redistribute resources toward the poorer strata. Fifth, it shows that growth is crucial for real incomes of all including the poor, even if it tends to be (in relative terms) disequalizing. Sixth, it shows that price and trade liberalization, often regarded as detrimental to the poor, were not so in the context of post-Communist transition: the effect of both is entirely distribution-neutral.

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Annex 1. Average share of bottom and top decile, by country, period 1990-2005

Country	Country abbreviation	Bottom decile	Top decile	Top-to-bottom ratio	Number of observations
Albania	ALB	3.63	23.40	6.45	3
Armenia	ARM	3.43	26.53	7.74	7
Bulgaria	BGR	3.07	25.39	8.28	14
Bosnia	BIH	3.72	23.27	6.26	2
Belarus	BLR	3.98	21.66	5.44	9
Czech Republic	CZE	4.50	22.29	4.95	6
Estonia	EST	2.58	27.05	10.46	11
Georgia	GEO	2.30	28.70	12.46	11
Croatia	HRV	3.43	24.98	7.29	2
Hungary	HUN	3.51	23.83	6.80	13
Kazakhstan	KAZ	3.26	24.30	7.45	6
Kyrghyz Republic	KGZ	3.59	25.31	7.06	9
Lithuania	LTU	2.94	25.25	8.59	10
Latvia	LVA	3.05	25.70	8.42	11
Moldova	MDA	2.48	29.94	12.05	7
Macedonia	MKD	2.92	24.47	8.37	8
Montenegro	MON	3.21	25.13	7.84	2
Poland	POL	3.01	24.96	8.29	16
Romania	ROM	3.13	24.93	7.96	9
Russia	RUS	2.50	27.52	11.00	12
Serbia	SRB	3.31	24.03	7.26	7
Slovakia	SVK	4.50	21.20	4.71	4
Slovenia	SVN	4.00	20.78	5.20	11
Tajikistan	TJK	3.29	25.70	7.82	3
Ukraine	UKR	3.61	22.45	6.22	11
Uzbekistan	UZB	2.77	27.01	9.77	5
Total		*3.21*	*24.97*	*7.78*	*209*

Annex 2: Evolution of the main EBRD transition indices

Country Code	EBRD index	1990-1995	1996-2000	2001-present
ALB	Large scale privatization	1.14	2.47	3
	Small scale privatization	2.29	4	4
	Infrastructure	1.05	1.46	2
	Restructuring	1.29	2	2
	EBRD Average	1.58	2.58	2.84
ARM	Large scale privatization	1.14	3	3.33
	Small scale privatization	1.71	3.2	3.8
	Infrastructure	1.14	2.07	2.33
	Restructuring	1.14	2	2.26
	EBRD Average	1.39	2.61	2.97
AZE	Large scale privatization	1	1.67	2
	Small scale privatization	1	3	3.6
	Infrastructure	1	1.4	1.8
	Restructuring	1.1	1.67	1.87
	EBRD Average	1.21	2.21	2.55
BGR	Large scale privatization	1.52	2.93	3.8
	Small scale privatization	1.52	3.2	3.67
	Infrastructure	1.14	2.2	3
	Restructuring	1.29	2.26	2.53
	EBRD Average	1.76	2.81	3.3
BIH	Large scale privatization	1	1.6	2.4
	Small scale privatization	2.43	2.07	2.93
	Infrastructure	1	1.46	2.26
	Restructuring	1	1.4	1.87
	EBRD Average	1.35	1.84	2.43
BLR	Large scale privatization	1.29	1	1
	Small scale privatization	1.43	2	2.2
	Infrastructure	1	1.13	1.33
	Restructuring	1.1	1.13	1
	EBRD Average	1.34	1.62	1.78
CZE	Large scale privatization	2.29	4	4
	Small scale privatization	3	4.33	4.33
	Infrastructure	1.62	2.73	3.2
	Restructuring	2.14	3.07	3.33
	EBRD Average	2.34	3.49	3.71
EST	Large scale privatization	1.86	4	4
	Small scale privatization	2.29	4.33	4.33
	Infrastructure	1.86	2.8	3.33

Country Code	EBRD index	1990-1995	1996-2000	2001-present
	Restructuring	2	3	3.4
	EBRD Average	2.04	3.44	3.77
GEO	Large scale privatization	1.14	3.26	3.4
	Small scale privatization	1.57	4	4
	Infrastructure	1	1.87	2.33
	Restructuring	1.14	2	2.07
	EBRD Average	1.29	2.73	2.95
HRV	Large scale privatization	1.71	3	3.2
	Small scale privatization	3.43	4.33	4.33
	Infrastructure	1.43	2.13	2.87
	Restructuring	1.29	2.67	2.8
	EBRD Average	2.05	3.07	3.35
HUN	Large scale privatization	2.43	4	4
	Small scale privatization	2.19	4.26	4.33
	Infrastructure	2.14	3.33	3.67
	Restructuring	2.29	3.2	3.4
	EBRD Average	2.54	3.73	3.88
KAZ	Large scale privatization	1.43	3	3
	Small scale privatization	1.76	3.87	4
	Infrastructure	1.1	2	2.33
	Restructuring	1	2	2
	EBRD Average	1.4	2.76	2.89
KGZ	Large scale privatization	1.86	3	3.27
	Small scale privatization	2.29	4	4
	Infrastructure	1.09	1.33	1.6
	Restructuring	1.29	2	2
	EBRD Average	1.63	2.77	2.86
LTU	Large scale privatization	2	3	3.67
	Small scale privatization	2.43	4.13	4.33
	Infrastructure	1.1	2.33	2.67
	Restructuring	1.43	2.74	2.93
	EBRD Average	1.84	3.11	3.5
LVA	Large scale privatization	1.57	3	3.47
	Small scale privatization	2.29	4.07	4.33
	Infrastructure	1.29	2.53	3
	Restructuring	1.57	2.74	2.87
	EBRD Average	1.87	3.14	3.49
MDA	Large scale privatization	1.57	3	3
	Small scale privatization	1.43	3.27	3.67

Country Code	EBRD index	1990-1995	1996-2000	2001-present
	Infrastructure	1	1.93	2.2
	Restructuring	1.29	2	1.87
	EBRD Average	1.53	2.67	2.81
MKD	Large scale privatization	1.43	3	3.13
	Small scale privatization	3.29	4	4
	Infrastructure	1.28	1.74	2.13
	Restructuring	1.29	2.07	2.33
	EBRD Average	1.94	2.67	2.93
MON	Large scale privatization	1	1.27	2.6
	Small scale privatization	3	2.2	2.8
	Infrastructure	1.19	1.33	1.6
	Restructuring	1	1	1.67
	EBRD Average	1.57	1.5	2.25
POL	Large scale privatization	2.14	3.26	3.33
	Small scale privatization	3.43	4.33	4.33
	Infrastructure	1.86	2.93	3.33
	Restructuring	2.29	3	3.4
	EBRD Average	2.53	3.47	3.68
ROM	Large scale privatization	1.62	2.74	3.47
	Small scale privatization	1.71	3.4	3.67
	Infrastructure	1	2.2	3.13
	Restructuring	1.43	2	2.07
	EBRD Average	1.62	2.81	3.13
RUS	Large scale privatization	2	3.26	3.26
	Small scale privatization	2.14	4	4
	Infrastructure	1.29	2.13	2.47
	Restructuring	1.24	1.93	2.33
	EBRD Average	1.74	2.7	2.88
SRB	Large scale privatization	1	1	2.07
	Small scale privatization	3	3	3.13
	Infrastructure	1.19	1.67	2
	Restructuring	1	1	1.87
	EBRD Average	1.57	1.46	2.33
	EBRD Average	2.23	3.24	3.58
SVN	Large scale privatization	1.52	2.93	3
	Small scale privatization	3.43	4.33	4.33
	Infrastructure	1.43	2.4	3
	Restructuring	1.62	2.67	2.93
	EBRD Average	2.24	3.18	3.36

Country Code	EBRD index	1990-1995	1996-2000	2001-present
TJK	Large scale privatization	1.14	2.13	2.33
	Small scale privatization	1.57	2.73	3.74
	Infrastructure	1	1	1.13
	Restructuring	1	1.4	1.67
	EBRD Average	1.25	1.94	2.25
TKM	Large scale privatization	1	1.6	1
	Small scale privatization	1.1	1.93	2
	Infrastructure	1	1	1
	Restructuring	1	1.4	1
	EBRD Average	1.06	1.4	1.3
UKR	Large scale privatization	1.14	2.33	3
	Small scale privatization	1.43	3.26	3.8
	Infrastructure	1	1.6	2
	Restructuring	1.14	2	2
	EBRD Average	1.31	2.48	2.77
UZB	Large scale privatization	1.38	2.67	2.67
	Small scale privatization	1.71	3	3
	Infrastructure	1	1.2	1.67
	Restructuring	1.14	1.93	1.67
	EBRD Average	1.4	2.1	2.1