

**CAN WE DISCERN THE EFFECT OF  
GLOBALIZATION ON INCOME DISTRIBUTION?  
EVIDENCE FROM HOUSEHOLD SURVEYS**

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**ABSTRACT**

The effects of globalization on income distribution within rich and poor countries are a matter of controversy. While international trade theory in its most abstract formulation implies that increased trade and foreign investment should make income distribution more equal in poor countries and less equal in rich countries, finding these effects has proved elusive. The paper presents another attempt to discern the effects of globalization by using the new data derived directly from household surveys. The paper looks at the impact of openness (trade/GDP ratio) and direct foreign investment on relative income shares across the entire income distribution. In contrast to what one would expect from theory, we find strong evidence that at low average income level, it is the rich who benefit from openness. As income level rises, that is around the income level of \$5-7,000 per capita at international prices, the situation changes and it is the relative income of the poor and the middle class that rises compared to the rich. It seems that openness makes income distribution worse before making it better—or differently that the effect of openness on income distribution depends on country's average income level.

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## **1. Introduction: Globalization and its effect on income distribution**

The issues of globalization and income inequality have during the last ten years received a huge attention. Most of it, however, was concentrated on the effects of globalization on within-country inequality in rich economies. In other words, the discussion was mostly on how globalization is (or might) affect wage and income inequality in the United States or Western Europe (e.g. Slaughter and Swagel 1997; Dluhosch, 1998; Schott, 1999). A second strand of the literature was focused on how globalization might affect world or international income distribution principally via differences in mean per capita growth rates between the countries (see Milanovic, 1999; Milanovic and Yitzhaki, 1999; Melchior et al. 1999; Schultz 1998, Sala-i-Martin 2002).

One recently has there been more interest in how globalization affects within-country distribution in less developed countries, LDC (Cornia and Kiiski, 2001; Lustig and Kanbur, 1999; Ravallion 2001; Galbraith 2002). There is also a discussion of the effects of globalization on LDC's growth and technology transfer (Gundlach and Nunnenkamp, 1999). There are theoretical models of income distribution as affected by trade (e.g. Wood, 1998; Benarroch and Gaisford, 1996; Kremer and Maskin, 2003). The detailed empirical analyses of the effects of economic change, including market reforms and increased integration, on within-country income distribution are limited mostly to Latin American countries. Hanson and Harrison (1999) and Robertson (2000) study wage inequality in the wake of Mexican trade reforms; Beyer, Rohas and Vergara (1999) look at the similar issue in the context of Chile; Arbache (1999) studies the effect of market liberalization on inter-sectoral wage dispersion in Brazil; Behrman, Birdsall and Szekely (2001) assess the effects of various policy changes (including trade liberalization and capital account opening) on wage differentials in Latin America.

Particularly relevant to this paper which deals with the cross-country analysis are the two recent papers by World Bank researchers. In both cases, the main objective was to look at the relationship between openness and growth, but both papers provided some interesting—even if conflicting—evidence on the relationship between openness and inequality. Lundberg and Squire

(1999) consider growth and inequality to be simultaneously determined. They find, in an unbalanced panel comprising more than 700 observations from 125 countries and covering the period 1960-1998, that openness, measured by the Sachs-Warner (0-1) indicator, has either no effect or a mild negative effect on income growth of the bottom quintile. However the higher one moves along the income distribution ladder, the more significant and positive are the effects of openness on income growth (Lundberg and Squire, 1999, pp. 31-32).<sup>2</sup> The implication of the Lundberg-Squire results is that the effect of openness on income distribution varies in function of level of development (country's mean income). This is very similar to the results obtained by Barro (2000) and Ravallion (2001, p. 1811): they also find statistically significant non-linearity in the relationship between openness and inequality, with openness associated with increased inequality in poor countries.

A different conclusion is reached by Dollar and Kraay (2000). They also use an unbalanced panel covering the same period and (almost exactly) the same countries as Lundberg and Squire, and find first, that openness (defined as exports plus imports as a share of GDP) is positively associated with per capita income growth, and second, that this effect carries across all income quintiles.<sup>3</sup> Trade has no systematic impact on inequality. The implication of their finding is that trade is neutral to income distribution, and since trade is good for growth, the effects across all income groups are the same—where the “same” means that each decile's gain is proportional to its initial income. (In other words, of course, the rich benefit more in absolute amount, but not in relative terms.) Similarly, Birdsall and Londono (1997 and 1998), report no differences between growth in income of the poorest quintile and other quintiles due to trade variables, though initial distribution of land and education do matter. Finally, Li, Squire and Zou (1998) have, in one of the sensitivity runs of their main model, export-to-GDP (a proxy for openness) as an explanatory variable of the Gini coefficient. They find no statistically significant effect of openness on the Gini coefficient.

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<sup>2</sup> They also find that openness is a trade-off variable: its effect is positive for growth, negative for equality (the result obtained when using the Gini coefficient to measure inequality).

<sup>3</sup> There are some definitional differences compared to Lundberg and Squire. For example, Dollar and Kraay “space” observations on the mean income of the poorest quintile by at least five years. They do so in order to avoid relying in their estimation on too many annual and adjacent income distribution statistics from the rich countries. In addition, it is reasonable to be concerned with the medium-term effects of growth on inequality—a fact which would be obfuscated by overreliance on annual data.

These different findings—especially because they are derived by using very similar data sources—have generated intense discussion. Dollar and Kraay (2000, pp. 16-18) address some empirical and methodological differences between their paper and that by Lundberg and Squire. A recent paper by Ravallion (2001) attempts to find out where the difference in results comes from, and to “reconcile” their findings. Birdsall (2001) argues that Dollar and Kraay fail to distinguish between the effects of negative growth spells on the poor vs. others, and that volatility including some spells of negative growth is more likely in more open economies.<sup>4</sup>

Thus, in conclusion, we have inconsistent results regarding the effects of openness on inequality. On the one hand, Li, Squire and Zou (1998), Birdsall and Londono (1998), and Dollar and Kraay (2000) find that openness has no systematic and significant effect on inequality. On the other hand, Lundberg and Squire (1999), Barro (2000) and Ravallion (2001) find that openness has a negative effect on equality in poor countries, and moreover, in some formulations, that it has a *negative* effect on real income of the poorest 40 percent of people. The conclusions thus run the full gamut, from openness having a negative effect on real income of the poor, to raising income of the poor less than income of the rich in relative terms, to raising both the same (in relative terms, again). Note however, that there are no results that show openness reducing inequality, that is raising real income of the poor by more (in percentage terms) than income of the rich. Let alone raising absolute incomes of the poor by more.

#### *The new data base*

The objective of this paper is to provide some additional empirical evidence on how globalization affects income distribution in developed and developing countries using the newly developed data base created in the context of the work on world income distribution. The advantages of World Income Distribution (WYD) data base are twofold: (i) it is entirely based on national household surveys “anchored” around three benchmark years (1988, 1993 and 1998), so that income inequality data are almost fully mutually comparable (that is, they are all derived from nationally representative surveys)<sup>5</sup>; (ii) it gives not one or two synthetic inequality

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<sup>4</sup> The latter point is also argued in Easterly, Islam and Stiglitz (2001).

<sup>5</sup> There are problems though. Some surveys are income- and some expenditure-based. However, since countries generally “specialize” in producing either one of the other type of survey, it is mostly the “cross-over” countries

measures (say, Gini coefficient or Theil index) but the actual data on income levels across ten deciles of income distribution. It thus describes practically the entire income distribution which none of the papers reviewed above has been able to do. This ability to look at what is happening behind a change in one summary statistic is crucial if we want to get a better grasp on how globalization affects the entire distribution. The total number of available surveys with decile data is 321 with 95 countries (surveys) in 1988, and 113 countries both in 1993 and 1998. Almost 2/3 of deciles are calculated from individual (micro) level data.<sup>6</sup> There are 82 countries (called common sample countries) with decile data for all three years. Incomes are expressed in \$PPP (international dollars) of each benchmark year but since we are interested in within-country *distributions*, the currency used is irrelevant (the share of a decile is the same whatever currency we use).<sup>7</sup> However, the use of PPP data is relevant if we want to adjust for the impact of openness in function of level of development or income of a country (e.g. openness might have a different impact in a poor compared to a rich country).

The coverage of world income and population by the WYD data is shown in Table 1. Additional details regarding the data sources and surveys are given in Milanovic (2004, forthcoming, Chapters 9 and 10) and Milanovic (2002, Appendix 1). The data are available at [www.worldbank.org/research/inequality/data](http://www.worldbank.org/research/inequality/data).

Table 1. Coverage of world GDP and population by household survey data (in percent)

|               | Population  |             |             | GDP (in US\$) |             |             |
|---------------|-------------|-------------|-------------|---------------|-------------|-------------|
|               | 1988        | 1993        | 1998        | 1988          | 1993        | 1998        |
| Africa        | 48.0        | 76.1        | 67.1        | 48.7          | 85.2        | 71.2        |
| Asia          | 92.5        | 94.9        | 94.4        | 94.4          | 93.2        | 95.6        |
| E. Europe/FSU | 99.3        | 95.2        | 100         | 99.4          | 96.3        | 100         |
| LAC           | 87.4        | 91.8        | 93.0        | 90.2          | 92.8        | 95.2        |
| WENAO         | 92.4        | 94.8        | 96.6        | 99.3          | 96.2        | 96.3        |
| <i>World</i>  | <i>87.3</i> | <i>92.4</i> | <i>91.6</i> | <i>96.5</i>   | <i>95.4</i> | <i>96.0</i> |

Source: Milanovic (2004; forthcoming). WENAO is Western Europe (inclusive of Israel), plus Northern America, and Oceania (more exactly, Australia and New Zealand only). LAC is Latin America and the Caribbean.

(those that in one year use income and in another year expenditure survey) that pose problems. Their number however is limited. There are 9 such cases out of 113 surveys in 1993, and 13 such cases (out of 113 surveys) in 1998.

<sup>6</sup> The proportions differ between the years though. In 1988, the percentage is 44; in 1993, it is 55, and in 1998, it is 70.

<sup>7</sup> About 1/3 of all available distributions are expenditure-based. In order to simplify the writing, we shall always refer to income distributions though.

The paper is organized as follows. In Section 2, we look at the definition of globalization and what are the channels through which it may affect within-country income distributions. In Section 3, we propose a simple model on how globalization affects income distribution. Section 4 gives some descriptive statistics of the data with an emphasis on the measures of globalization. Section 5 gives the estimates of the regressions. Section 6 presents our findings and gives some policy implications.

## **2. What it means to be “globalized”?**

It is sometimes useful to begin with the official definition. The official World Bank definition of globalization is “Freedom and ability of individuals and firms to initiate voluntary economic transactions with residents of other countries”. Empirically globalization translates into greater mobility of the factors of production (capital and labor) and greater world integration through increased trade and exchange of ideas. Several recent papers that compare the two globalization waves, the one at the end of the last century up to 1914, and the current one thus look precisely at these indicators (Bordo, Eichengreen, and Irwin, 1999, Williamson, 1996, Craft, 2000, Baldwin and Martin 1999): how much trade there is now (as the share of world GDP) compared to a century ago, how much direct and portfolio foreign investment, and how easy it is for people to move or to settle in different countries. The studies come with a mixed verdict on the past vs. current globalization. Portfolio investments and trade as a share of world GDP are about the same now as then, direct foreign investment is greater as is the ease of travel, but the ability to resettle elsewhere is less. Thus, it appears that both labor and capital are in some sense more, and in some sense less, mobile than they were a century ago, and that trade is about as important now as it was then. However, our objective here is to look at how thus defined and empirically understood globalization affects income distribution. .

Consider first the effects of openness on less developed countries. They are affected principally in two ways. First, they are able to export more of their own goods (and to import more), and they can be expected to be recipients of direct foreign and portfolio investments from the capital-rich countries. According to the simple version of the Heckscher-Olin-Samuelson (HOS) model, less developed countries will tend to export low-skill-intensive products (because

low-skill labor is their abundant factor and its is therefore low). Second, and for similar reasons, foreign investors will also tend to invest in low-skill intensive processes. Moreover as the more advanced countries have an advantage in skill-intensive products and tend to export these, there should be also a reduction in relative wages of highly-skilled workers in less developed countries. When we translate this into what it should imply for income distribution, and approximate the latter by the ratio between high-skill and low-skill wage, it appears that income inequality *within* the LDCs should go down. Mirroring these developments, income distribution in more developed countries should become more unequal. This is directly derived from factor price-equalization theorem in its most abstract formulation (see Freeman, 1995 and caveats therein), and is argued, for example in Wood (1995, 1999).

Moreover, as less developed countries continue their process of modernization which implies improvement in educational attainment, the relative supply of high-skill workers increases compared to low-skill workers (although not to the extent that it would reverse the comparative advantage of the country). This seems to further reduce the wage difference between the high- and low-skilled workers and to shrink wage (and thus income) distribution. In conclusion, relative demand shifts occasioned by globalization would tend to favor less-skilled workers in LDCs, and so do relative supply shifts brought about by better educational achievement. The reverse would, of course, hold for rich countries where globalization would tend to favor high-skilled workers although that effect should, in the longer-term, be lessened by their greater supply.

What may be the offsetting elements? There are, at least, two. First, rather than looking at globalization through HOS lenses, we may look at it as a Kuznetsian process. Suppose that instead of two types of labor (low- and high-skill) we have three types of labor (low-, medium-, and high-skilled). Globalization may produce movement of labor from low-wage sector (agriculture) where wage differentiation is minimal, to medium-skill sectors (in urban areas) where wage differences are larger. Then, even if the ratio between the top and bottom shrinks (that is, the ratio between high-skill and low-skill wage becomes smaller), overall wage (and hence, we assume for the moment) income inequality might increase simply because of the greater wage differentiation in the middle. In conclusion, the ratio between the average wages of different types of labor is not sufficient to describe what happens to the distribution.

In effect, as soon as we move from the very simplifying HOS assumptions of two types of labor, the effects of trade (and globalization) on income distribution in developing countries become ambiguous. In a model developed by Wood (1994), there are three types of labor (skilled, intermediate and unskilled). Then, very poor countries that open up may experience increased inequality because demand generated by openness helps those with basic and high education (that is those with intermediate and high skills) and reduces the income share of those with no education. This introduces not only greater realism in the assumptions, but highlights the fact that speaking of a single effect of globalization on developing countries may be wrong. Poor developing nations with abundance of unskilled agricultural labor may experience an increase in inequality (e.g. Bangladesh), while those that enter globalization with a mostly educated labor force, and where primary education is the norm (e.g. South Korea) might see increased trade bring about lower inequality.

Second, although wages constitute, even in developing nations, the largest chunk of total income, there are two other income sources that affect income inequality significantly. They are self-employment income (including home-consumption), and capital (property) income. The share of self-employment income would tend to go down as people move from subsistence agriculture (this assumes that peasants are mostly land-owners), to becoming wage-workers. The importance of capital income will depend on the distribution of wealth and on what happens to the real interest rate, whose level is, in turn, dictated by what happens in rich countries. This is particularly so in an era of globalization, and more or less free movement of capital. Since property income is strongly concentrated among top income classes, that element might provide a strong countervailing force to decreasing inequality—much greater in effect than a simple share of capital income in total income would imply.

### 3. Channels of influence on the entire income distribution and estimation issues

By definition, absolute income level of the  $i$ -th decile in the  $j$ -th country at the time  $t$  can be written as a function of an inequality index ( $I_{jt}$ ) and mean income of the country ( $m_{jt}$ ).<sup>8</sup>

$$y_{ijt} = f(I_{jt}, m_{jt}) \quad (1)$$

The relative income of the  $i$ -th decile (normalized by the mean) is then<sup>9</sup>

$$\frac{y_{ijt}}{m_{jt}} = g(I_{jt}) \quad (2)$$

We then assume that *level* of the inequality index depends on the *levels* of the variables listed below.

- (1) two “standard” globalization variables, namely openness ( $OPEN_j$ ) measured as the sum of exports and imports in country’s GDP,<sup>10</sup> and direct foreign investment as a share of GDP ( $DFI_j$ ),
- (2) financial depth ( $FD_j$ ), the ratio of M2-to-GDP, introduced on the assumption that greater financial depth should reduce the importance of the financial constraint to borrow for education purposes, and thus should help those who are talented but lack resources (see, for example, Li, Squire and Zhou, 1998), and
- (3) an indicator of democracy ( $DEM_j$ ), on the assumption that democratization, through the median voter hypothesis, should lead to a reduction in inequality (see Gradstein, Milanovic, Ying, 2001 and all other papers mentioned in the literature review by Gradstein and Milanovic, 2000)

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<sup>8</sup> Deciles go from the poorest, 1, to the richest, 10.

<sup>9</sup> The movement from (1) to (2) implies the homogeneity assumption

<sup>10</sup> We use the standard measure of openness in order not to stray from the rest of the literature. Note however that in this measure exports and imports are treated unevenly: an increase in exports rises both the numerator and the denominator (since exports are a component of GDP) while the same increase in imports rises only the numerator, and does not affect GDP. Yotopoulos (1996, p. 127) proposes an alternative measure of openness:

$$OPEN = \frac{X + M}{D + \frac{X + M}{2}} \text{ where } X=\text{exports, } M=\text{imports and } D=\text{domestic demand.}$$

Financial depth and democracy are not thought to be linked directly with globalization even if one might plausibly entertain such a view too. For example, one can regard increasing financial depth, that is increasing monetization of the economy, to proceed directly from better integration of a country into the international economy, and democratization to occur in response to greater international exchanges. However, we view these two variables as controls for the “non-globalization related” part of the influence on income distribution, and orthogonal to the “globalization-proper” variables. We introduce them primarily to avoid misspecification of our model. We then rewrite (2) in the reduced form as

$$\frac{y_{ijt}}{m_{jt}} = \Psi(OPEN_{jt}, DFI_{jt}, FD_{jt}, DEM_{jt}) \quad (2a)$$

However, we need also to take into account the fact that the globalization variables will not affect the share of a given decile the same regardless of country’s level of development. Consider the following fact. Increased openness and direct foreign investments will, as the theory tells us, tend to benefit low-skilled workers in poor countries since it would be these low-skill-intensive industries which would be both attractive to foreign investors and likely to take advantage of export opportunities. Thus, we would expect that the signs of OPEN and DFI variables will be positive among the bottom deciles in poor countries. For a rich country, the situation is exactly the reverse. Openness will mean that it is the low-skilled workers in rich countries that would be exposed to increased foreign competition; low-skill intensive products are likely to be imported by rich countries, and we would expect that the signs of OPEN and DFI variables will be negative in a rich country setting. The coefficients of the two globalization variables will therefore vary in function of the income level of the country. Ideally, of course, the coefficients should vary in function of the skill composition of each income decile and country’s income level. However, since we do not have information on who exactly *is* in each decile and what is the skill composition of people per decile, we shall use country’s income level to interact with the openness variable. Interaction between OPEN and income has been used in at least several papers: by Barro (1999), Ravallion (2001), and Dollar and Kraay (2002).

We can write (omitting time subscripts) for each decile:

$$\frac{y_{ij}}{mj} = \beta_{i0} + \beta_{i1} OPEN_j + \beta_{i2}(OPEN_j * mj) + \beta_{i3} DFI_j + \beta_{i4}(DFI_j * mj) + \beta_{i5} FD_j + \beta_{i6} DEM_j + e_{ij}$$

(2b)

The  $\beta$  coefficients vary across deciles and thus subscripted. We expect the signs of  $\beta_{i5}$  and  $\beta_{i6}$  associated with respectively financial depth and democracy to be positive among the low deciles, and negative among the higher income deciles—on the hypothesis that lack of deep financial markets (inability to borrow against one’s future income) is bad for the poor and for equality, and that democratization should likewise help the poor by leading to greater redistribution.

There are ten pooled cross-section regressions: one for each income decile run across all countries with the same independent variables. The regressions such as (2b) can be run independently (with one omitted) or as a simultaneous system (seemingly unrelated regressions) with a constraint.<sup>11</sup> The constraint ensures that the sum of coefficients adds up to zero: this is necessary since an increase in the share of some deciles must be balanced by the decrease in the share of other deciles. Because of shares’ likely autocorrelation (within country and across years), the regressions are run with robust (Huber/White) standard errors.

There are two additional problems: (i) the introduction of income as explanatory variable and endogeneity, and (ii) robustness of the results to the introduction of other variables.

If we believe that income and inequality are jointly determined, there is the issue of endogeneity. The argument that income affects inequality and should hence be included on the RHS is based on some variant of the Kuznets-type relationship. However, whether one subscribes to the Kuznets hypothesis or not, it is clear that income serves only a proxy for several *structural* changes—transfer of labor from a more equally distributed agriculture to a more

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<sup>11</sup> If we assumed that the slopes are homogeneous across countries and that intercepts are “fixed” (different between countries), we could use fixed-effect (FE) estimator. The advantage of the FE (or first-difference) estimator lies in the fact that it allows us to argue that marginal effects of openness (and other explanatory variables) are the same across countries while letting inequality be determined (through varying intercept) by other unobservable country-specific effects. This seems quite reasonable. The problem however is that our panel is very short (three observations only) and that since shares, within county, change but slowly most of the data variability is contained in cross-sectional observations. Thus, the use of the FE estimator yields very poor results. The same problems plague random-effect estimation (none of these results are reported here).

unequal industry, or educational change (increasing share of highly skilled people and decreasing education premium), or demographic change (increasing share of the elderly and rising social transfers)—which are all associated with a rising GDP per capita. Once we “solve in” for income by introducing its structural correlates like financial deepening and democracy, there is no additional *independent* role played by income. This is the reason why we do not introduce income as independent variable in (2b).

The endogeneity problem may plague both openness and other RHS variables. Inequality might influence financial depth, or democracy, or government spending (variable introduced below). To adjust, in part, for it, all RHS variables are calculated as five-year lagged averages. There is a substantive reason for it too: to reflect the fact that openness or financial depth do not affect income distribution instantaneously. Time is required to do so. We address endogeneity also by instrumenting the possibly endogenous variables by their lagged values and using GMM (generalized method of moments) estimator whose efficiency properties are superior to those of traditional IV/2SLS estimators.

The robustness of the results can be questioned as well because our RHS variables could reasonably include other variables that may affect income shares such as the extent of government spending, or real rate of interest. The first is expected to be pro-poor, the second, due to a typically high concentration of assets in the hands of the income-rich, to be pro-rich. We shall introduce both of these controls to check for the robustness of the results.

#### **4. Descriptive statistics**

Before trying to link globalization and other macro variables to changes in income distribution, we need to define the variables more precisely. For the distribution, we use the data on annual per capita \$PPP incomes of each decile from 321 surveys and 129 countries in total (with 82 countries being a balanced panel). As mentioned before, the income data are for the benchmark years 1988, 1993, and 1998. Each decile contains 10 percent of individuals (not households) of a country.

All RHS variables are calculated as the averages over a five-year period. There are two reasons for this rather than simply using a single value for 1988, 1993 and 1998. First, the distribution data are only “benchmarked” in 1988, 1993 and 1998. The actual surveys which we use to calculate the decile data might have been conducted in the years around 1988 (say, 1986 or 1989). The situation is the same for the benchmarks years of 1993 and 1998. Overall, however, more than 70 percent of surveys are within a year of the benchmark; more than 90 percent of surveys are within two years of the benchmark date.

Second, even if all the surveys were conducted in the same year, there would be some advantage in relating changes in mean incomes to, say, several years’ average share of exports and imports in GDP. This in order to avoid having the results being swamped by “noise”, that is very short run changes. As mentioned before, globalization is reflected in two variables: openness—share of combined exports and imports in GDP—and the share of direct foreign investments in GDP of the recipient country. Thus openness that is associated with income distribution around 1988 is taken to be the average of exports and imports over GDP during the five-year period ending in 1988 (that is, 1984-88). Likewise, openness that is associated with income distribution in 1993 and 1998 is defined as the average over respectively 1989-93 and 1994-98 periods. Identical calculations are done for all other RHS variables.

Table 2 shows mean-normalized average incomes of each decile in 1988, 1993 and 1998. For example, we see that on average (calculated across all countries)<sup>12</sup> in 1988, the bottom decile's income was 30.7 percent of the mean. The same decile calculated across the common-sample countries received an income equal to 30.3 percent of the mean. By 1993, the bottom decile's income was only 23.5 percent of the mean in one case and 24.4 percent in the other. Finally, in 1998, it declined even further to 23.3 percent of the mean. Note that between 1988 and 1993, relative incomes of the bottom eight deciles went down—with the negative change the largest among the poor deciles—while the relative income of the top two deciles went up, again with the greatest positive change among the very top. The situation changed between 1993 and 1998. All deciles between the second and the seventh (inclusive) gained, while the very bottom decile and the three top deciles lost (all of course in relative terms). The situation with the common-sample countries is quite similar.

Table 2. Mean-normalized average incomes of each decile  
(across countries, not weighted for population)

|                     | All countries |       |       | Panel (common sample countries) |       |       |
|---------------------|---------------|-------|-------|---------------------------------|-------|-------|
|                     | 1988          | 1993  | 1998  | 1988                            | 1993  | 1998  |
| First               | 0.307         | 0.235 | 0.233 | 0.303                           | 0.244 | 0.233 |
| Second              | 0.441         | 0.375 | 0.380 | 0.437                           | 0.391 | 0.387 |
| Third               | 0.539         | 0.476 | 0.482 | 0.535                           | 0.495 | 0.491 |
| Fourth              | 0.635         | 0.571 | 0.581 | 0.631                           | 0.593 | 0.590 |
| Fifth               | 0.736         | 0.677 | 0.686 | 0.733                           | 0.701 | 0.697 |
| Sixth               | 0.855         | 0.804 | 0.810 | 0.853                           | 0.831 | 0.821 |
| Seventh             | 1.000         | 0.959 | 0.962 | 1.000                           | 0.984 | 0.972 |
| Eighth              | 1.201         | 1.182 | 1.181 | 1.202                           | 1.207 | 1.188 |
| Ninth               | 1.541         | 1.566 | 1.552 | 1.548                           | 1.580 | 1.553 |
| Tenth               | 2.745         | 3.156 | 3.138 | 2.757                           | 2.973 | 3.068 |
| Total               | 1             | 1     | 1     | 1                               | 1     | 1     |
| Number of countries | 95            | 113   | 113   | 82                              | 82    | 82    |
| Decile ratio        | 8.9           | 13.4  | 13.5  | 9.1                             | 12.2  | 13.2  |

Note: Deciles formed based on per capita income or expenditures (obtained from household surveys). The decile ratio is the ratio between the average income of the tenth and the first decile.

Table 3 shows the recent upsurge in globalization as reflected in the openness variable. It shows the increase in the combined share of exports and imports in GDP, all at current prices. There is a sustained increase in the (unweighted) share of openness from around 70 percent in the mid-1980's to more than 90 percent at the turn of the century. The (dollar) weighted share of

<sup>12</sup> Each country is one observation regardless of its population size.

trade in world GDP similarly increased by almost a full 10 percentage points from 37 to 46.5 (see Table 4). The higher unweighted trade/GDP average ratio reflects the fact that smaller (and poorer) countries' trade shares are greater. It is notable that consistently the most closed economies are Brazil and Japan. The most open economy is almost throughout Singapore.

Table 3. Share of combined exports and imports in GDP  
(unweighted; cross country)

| Year | Number of countries | Average share of openness<br>(in percent; all countries) | Minimum<br>(in %) | Maximum<br>(in %) | Average share of openness<br>(in percent; common sample) |
|------|---------------------|--|-------------------|-------------------|--|
| 1985 | 124                 | 72.8   | 13 (Lao)          | 317 (S'pore)      | 70.7   |
| 1986 | 125                 | 67.5   | 10 (Iran)         | 308 (S'pore)      | 66.0   |
| 1987 | 128                 | 68.1   | 10(Sudan)         | 341(S'pore)       | 67.0   |
| 1988 | 129                 | 69.1   | 15(Sudan)         | 375(S'pore)       | 69.5   |
| 1989 | 130                 | 73.5   | 13(Sudan)         | 362(S'pore)       | 71.6   |
| 1990 | 132                 | 76.5   | 14(Brazil)        | 539(Suriname)     | 73.3   |
| 1991 | 130                 | 75.0   | 15(Brazil)        | 399(Suriname)     | 72.6   |
| 1992 | 140                 | 75.9   | 16(Tajik)         | 385(Suriname)     | 70.1   |
| 1993 | 150                 | 76.8   | 16(Japan)         | 326(S'pore)       | 72.6   |
| 1994 | 152                 | 79.7   | 16(Haiti)         | 331(S'pore)       | 75.7   |
| 1995 | 154                 | 82.8   | 16(Brazil)        | 339(S'pore)       | 80.2   |
| 1996 | 155                 | 83.9   | 15 (Brazil)       | 328(S'pore)       | 83.1   |
| 1997 | 155                 | 84.9   | 17 (Brazil)       | 317(S'pore)       | 85.0   |
| 1998 | 153                 | 86.8   | 17 (Brazil)       | 457(Eq. Guinea)   | 86.0   |
| 1999 | 152                 | 85.3   | 19(Japan)         | 313(S'pore)       | 85.1   |
| 2000 | 149                 | 91.9   | 20(Japan)         | 341(S'pore)       | 94.0   |

Source: Own calculation from *World Development Indicators*; World Bank. SIMA (Statistical Information Management and Analysis) database, World Bank. The number of common sample countries is 82.

The increase in openness was registered in all the regions (Table 4). The increase was very large in transition economies, Latin America and Asia. In 2000, Asia and transition economies (Eastern Europe and FSU) had the highest unweighted openness. It is remarkable that differences in openness between the continents are relatively small, and that the view, often expressed, of insufficient integration of Africa in global economy is belied by these numbers.<sup>13</sup> Openness of Africa is not much different, or is even higher, from that of the rest of the world. In 2000, for example, Africa's trade-to-GDP ratio was 62 percent, some 15 percent higher than that of the

<sup>13</sup> For example, Yusuf (2003, p. 68) in an article on globalization points to "inability of African countries to integrate with world economy."

rich world (not shown in the table).<sup>14</sup> Africa's low share in total world trade simply mirrors its low share in total world income. Or differently put, the "problem" with Africa may not be trade but small size of domestic markets.

For 85 countries whose openness increased between 1985 and 2000, the average unweighted change was 27 GDP points. The most significant increases were registered by Malaysia (127 percentage points), Angola (107), and Hong Kong (87). For 32 countries where openness decreased, it did so by an average of 15 GDP points. The most significant decreases were for Mauritania (52), Bahrain (49), and the Bahamas (48). Openness for several of the largest (by GDP) countries went up. For example, for the US it increased from about 16 to 24 percent of GDP, for China, from 20 to 49, for India, from 15 to 30, from Brazil, from 19 to 23 percent, for Germany from 42 to 67 percent. But, on the other hand, for Japan, openness went down from 24 to 20 percent of GDP.

Table 4. Openness (exports plus imports) as percentage of GDP  
(unweighted regional averages unless stated otherwise)

|                                    | First period<br>(1984-88) | Second period<br>(1989-93) | Third period<br>(1994-98) | Change in<br>openness |
|------------------------------------|---------------------------|----------------------------|---------------------------|-----------------------|
| Africa                             | 62.9                      | 68.4                       | 73.2                      | +10.3                 |
| Asia                               | 72.1                      | 80.8                       | 91.7                      | +19.6                 |
| Latin America                      | 57.8                      | 72.2                       | 78.7                      | +20.9                 |
| Eeurope/FSU                        | 64.0                      | 61.6                       | 84.6                      | +20.6                 |
| WENAO                              | 71.0                      | 69.3                       | 75.7                      | +4.7                  |
| <i>World</i>                       | <i>70.4</i>               | <i>75.8</i>                | <i>83.5</i>               | <i>+13.1</i>          |
| <i>World (dollar<br/>weighted)</i> | <i>37.7</i>               | <i>38.8</i>                | <i>43.9</i>               | <i>+6.2</i>           |
| Number of<br>countries             | 130                       | 150                        | 155                       |                       |

Source: Own calculation from *World Development Indicators*; World Bank. SIMA Database, World Bank. The openness ratios for each period are calculated as the means of five-year averages of all the countries (this is exactly the same definition as used when creating the variables for the regression analysis below). These values are slightly different than if the period openness ratios were calculated as the means of all individual countries' openness ratios for these years (the reason is that for some country/years openness ratios may be missing).

Even more dramatic were increases in foreign direct investments as percentage of GDP of the recipient countries. The unweighted importance of foreign direct investments increased from less than 1 percent of GDP in the late 1980's to 4.6 percent in 2000 (Table 5). The increase was

<sup>14</sup> This is the dollar-weighted openness (the ratio between total value of Africa's trade and its total GDP).

most dramatic in the second part of the 1990's (see Table 6) when the importance of DFI measured in terms of total world output doubled.

If we compare the amounts of DFI's in 1985-90 and ten years later (1995-2000), for 62 countries the share of DFI inflows in GDP increased by an average of more than 3 GDP points, while for only seven countries DFI became less important. In ten countries (Lesotho, Ireland, Bolivia, Sweden, Panama, Denmark, the Netherlands, Chile, Czech republic, and Bulgaria) the share of direct foreign investment in GDP in the most recent period exceeded by more than 5 GDP percentage points their share in the late 1980's. For China, the importance of DFI went up, over the same period, from an average of 0.5 percent of GDP to between 3 and 4 percent of GDP. India, which started with almost no direct foreign investments, reached some ½ one percent of GDP in the late nineties. In the US, similarly, the share went up from 0.5 percent of GDP to between 2 and 3 percent. As we have recently come to expect (Lucas 1990), per capita DFI (in current dollar terms) and GDP per capita (also in current dollar terms) are positively associated with each 10 percent increase in income accompanied by a little over 10 percent increase in foreign investments.<sup>15</sup>

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<sup>15</sup> The hypothesis of unitary elasticity is accepted: income elasticity was somewhat greater in the first than in the last five-year period.

Table 5. Foreign direct investment as percentage of recipient country's GDP (unweighted average)

| Year | Number of countries | Percentage of GDP | Maximum a/        |
|------|---------------------|-------------------|-------------------|
| 1985 | 65                  | .70               | 5.7 (New Zealand) |
| 1986 | 65                  | .67               | 4.2 (New Zealand) |
| 1987 | 66                  | .84               | 3.5 (New Zealand) |
| 1988 | 67                  | .86               | 4.2 (Lesotho)     |
| 1989 | 68                  | 1.17              | 7.9 (Nigeria)     |
| 1990 | 70                  | 1.25              | 6.2 (Zambia)      |
| 1991 | 70                  | 1.17              | 8.1 (Malaysia)    |
| 1992 | 80                  | 1.13              | 8.8 (Malaysia)    |
| 1993 | 82                  | 1.39              | 7.5 (Malaysia)    |
| 1994 | 82                  | 1.79              | 8.3 (Nigeria)     |
| 1995 | 82                  | 2.28              | 29.5 (Lesotho)    |
| 1996 | 83                  | 2.39              | 30.5 (Lesotho)    |
| 1997 | 83                  | 3.22              | 26.1 (Lesotho)    |
| 1998 | 83                  | 4.13              | 29.7 (Lesotho)    |
| 1999 | 81                  | 4.17              | 24.6(Sweden)      |
| 2000 | 81                  | 4.63              | 24.3 (Ireland)    |

a/ Luxembourg, which in all years has the highest share of direct foreign investment in GDP is not shown.  
Source: Own calculations from *UNCTAD Handbook of International Trade and Development Statistics*, 1996, 1997, 2000.

Alike trade, the flow of direct foreign investment has increased in all regions of the world with the most significant *unweighted* increases occurring in Africa, Latin America, and transition economies (Table 6).<sup>16</sup>

Table 6. Direct foreign investment as percentage of GDP  
(unweighted regional averages unless stated otherwise)

|                                    | First period<br>(1984-88) | Second period<br>(1989-93) | Third period<br>(1994-98) | Change in DFI |
|------------------------------------|---------------------------|----------------------------|---------------------------|---------------|
| Africa                             | 0.9                       | 1.3                        | 3.8                       | +2.9          |
| Asia                               | 0.5                       | 1.2                        | 1.6                       | +1.1          |
| Latin America                      | 0.7                       | 1.4                        | 3.5                       | +2.8          |
| Transition economies               | 0.0                       | 0.6                        | 3.0                       | +3.0          |
| WENAO                              | 1.1                       | 1.4                        | 2.2                       | +1.1          |
| <i>World</i>                       | <i>0.8</i>                | <i>1.2</i>                 | <i>2.8</i>                | <i>+2.0</i>   |
| <i>World (dollar<br/>weighted)</i> | <i>0.7</i>                | <i>0.8</i>                 | <i>1.4</i>                | <i>+0.7</i>   |
| Number of countries                | 67                        | 82                         | 88                        |               |

Source: Own calculations from *UNCTAD Handbook of International Trade and Development Statistics*, 1996, 1997, 2000. The period averages are calculated as explained in Table 4.

We are less interested in the other two control variables, financial depth (M2/GDP) and democracy. The former is measured in a straightforward fashion, as the ratio of M2 to GDP (see Table 7). The dramatic decline in financial depth in transition economies is due both to the very high level of money to GDP ratio before the transition,<sup>17</sup> and then to the effects of hyperinflation which reduced real money balances. Democracy is measured by the *Democracy* variable from *PolityIV* database created by Monthy Marshall, Keith Jeggors, and Ted Gurr.<sup>18</sup> The variable ranges from 0 (absence of democracy) to 10 (best).

<sup>16</sup> In dollar-weighted terms, the picture is somewhat different. For example, in the five-year period ending in 1998, the unweighted DFI/GDP was 3.8 percent for Africa and 2.2 percent for WENAO (see Table 6); but the GDP-weighted percentages were respectively 1.7 and 1.4.

<sup>17</sup> This was known as “the money overhang” problem: too much cash chasing too few (price-controlled) goods. There was some recovery in monetization however in 1999 and 2000 (not shown in Table 7).

<sup>18</sup> The data are available at [www.cidcm.umd.edu/inscr/polity/](http://www.cidcm.umd.edu/inscr/polity/). Democracy is defined as “general openness of political institutions.”

Table 7. M2 as percentage of GDP  
(unweighted regional averages)

|                     | First period<br>(1984-88) | Second period<br>(1989-93) | Third period<br>(1994-98) | Change |
|---------------------|---------------------------|----------------------------|---------------------------|--------|
| Africa              | 47                        | 38                         | 37                        | -10    |
| Asia                | 68                        | 82                         | 78                        | +10    |
| Latin America       | 30                        | 31                         | 33                        | +3     |
| E. Europe/FSU       | 76                        | 33                         | 28                        | -48    |
| WENAO               | 60                        | 63                         | 65                        | +5     |
| <i>World</i>        | 53                        | 50                         | 48                        | -5     |
| Number of countries | 66                        | 76                         | 80                        |        |

Source: Own calculations from *World Development Indicators*, World Bank (SIMA database). The period averages are calculated as explained in Table 4.

Democracy variable shows a sustained increase in democracy in all the regions over the three periods. The most important gains were registered in Eastern Europe and the former Soviet Union. Population-weighted democracy, largely held back by the absence of progress (as measured by the variable) in China, also improved although less than unweighted democracy.

Table 8. Democracy proxied by the *Polity IV* Democracy variable  
(unweighted regional averages unless stated otherwise)

|                                       | First period<br>(1984-88) | Second period<br>(1989-93) | Third period<br>(1994-98) | Change |
|---------------------------------------|---------------------------|----------------------------|---------------------------|--------|
| Africa                                | 1.1                       | 1.5                        | 3.0                       | +1.9   |
| Asia                                  | 3.0                       | 4.2                        | 5.0                       | +2.0   |
| Latin America                         | 5.5                       | 7.0                        | 7.8                       | +2.3   |
| E. Europe/FSU                         | 0.1                       | 4.2                        | 6.0                       | +5.9   |
| WENAO                                 | 9.5                       | 9.7                        | 9.8                       | +0.3   |
| <i>World</i>                          | 3.5                       | 4.8                        | 5.9                       | +2.4   |
| <i>World (weighted by population)</i> | 3.8                       | 4.5                        | 5.0                       | +1.2   |
| Number of countries                   | 129                       | 129                        | 130                       |        |

Source: Own calculations from *Polity IV* database. Democracy index ranges from 0 (least democratic) to 10 (most democratic). For explanation on how the index is derived, see *Polity IV* available at [www.cidcm.umd.edu/inscr/polity/](http://www.cidcm.umd.edu/inscr/polity/). The period averages are calculated as explained in Table 4.

## 5. Estimation of the regressions

We estimate ten level regressions for each formulation, with the first formulation being the most parsimonious one

$$\frac{y_{ij}}{m_j} = \beta_{i0} + \beta_{i1} OPEN_j + \beta_{i2}(OPEN * mj) + \beta_{i3} DFI_j + \beta_{i4}(DFI * mj) + \beta_{i5} FD_j + \beta_{i6} DEM_j + e_{ij}$$

(2b)

where all the variables and coefficients are already explained, and subscript  $t$  is omitted for simplicity. All the RHS variables are five-year averages except in the IV estimation below where we use contemporaneous data. The results of the simultaneous decile estimation (seemingly unrelated regressions or SURE) are shown in Tables 11-13. The results of instrumental variable estimation are shown in Table 14.

The first regression is an unbalanced panel run across 207 decile shares in years 1988, 1993 and 1998. As can be seen in Table 11, for all the deciles between the second and the seventh, increased openness negatively affects their income shares. However, the negative effect of openness is lessened for richer countries as the interaction term between openness and mean income is positive. Openness would therefore seem to have a particularly negative impact on the poor and middle-income groups in *poor* countries—which is directly opposite to what we would have expected based on standard theory. It is only when income level (calculated from household surveys) reaches a little over \$4,000 in purchasing power terms, that is around the income level of Malaysia and Brazil, that for the poor and the middle classes openness becomes a “good thing”—that is, raises their share in total income.

How large is the openness effect? Let us suppose that we are looking at a poor country whose mean income is \$PPP 2,000 per capita, and whose second decile's share of total income is about 4 percentage points (an average value in our sample). The second decile's mean income is therefore \$PPP 800. Let now the trade/GDP ratio increase from 0.7 to 0.9 (again, an about average change between 1985 and 2000). This will reduce the decile's share of the total pie to about 3.9 percent, or absolute income to \$PPP 780 (of course, absent any other effect including change in total income).<sup>19</sup>

For the top two deciles, openness exerts the opposite effect. It raises incomes of the rich in poor countries, and its positive effect on the rich is reduced as mean income increases. For mean income levels around \$4,000, the impact of openness on the income share of the rich becomes negative. On balance, therefore, openness is pro-equality in rich countries and pro-inequality in poor countries.

Direct foreign investments have a very small negative effect on the income of the poor in poor countries, but otherwise they are not statistically significant. Financial depth, as we would expect, increases income share of the poor and middle class, while democracy has no significant effect.

The regressions in Table 12 are the same as in Table 11 except that we now add real rate of interest among explanatory variables.<sup>20</sup> The main thrust of the results is unaffected except that democracy now becomes positively related to the shares of the two middle deciles.  $R^2$  increases

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<sup>19</sup> This is obtained as follows. At \$PPP2000 and openness=0.7, the sensitivity of the ratio variable is  $-0.09*0.7 + (0.00002 * 0.7 * 2000) = -0.035$  which means that, with an infinitesimal increase in openness, the share of the bottom decile will go down by 0.35 percent (0.035 multiplied by 10 since the regression is run across relative incomes). If we now keep everything the same and change only openness to be 0.9, the effects is -0.045. So, the effect due to a parametric 20 percentage point increase in the trade share is a decline of 0.1 percent in the decile's income share.

<sup>20</sup> The nominal interest rate is the deposit rate on 12-month deposits as reported in IMF's *International Financial Statistics* (various issues; the variable is 60L...ZF). The real rate is obtained by deflating the nominal by the 12-month consumer price index (also as reported in *International Financial Statistics*). The data are available on World Bank SIMA.

significantly to an average value of 0.3<sup>21</sup> as real interest rate enters as a rather strong predictor of decile shares. It is shown to be statistically strongly anti-poor throughout the whole income distribution, again a result that is not unexpected. Income shares of the top two deciles are increased by higher interest rate. How strong is this effect? Income share of the top decile is about 30 percent (of total country income). Each percentage point increase in real rate of interest raises that share by almost 0.1 percent. In other words, real income of the rich (assuming the size of the pie to be fixed) goes up by 1/3 of one percent.

Since (1) the period 1988-98 was characterized by rising income inequality (see Table 1) and (2) there is a pro-rich effect of high interest rates, it is interesting to look at changes in real interest over the same years. The unweighted average real interest rate across countries in our sample shows a mild increase. For example, during 1996-2000, the average real interest was always positive ranging between less than 1 percent and more than 3 percent p.a.; but during 1985-90 period, the rate was negative in three out of six years. The number of countries with negative real deposit interest rates is also smaller now although it is not negligible (there were 17 out of 69 countries with negative real interest rates in 2000). The introduction of real interest in the regressions pushes the turning point of the effect of openness on decile shares past the \$5,000 mark; in other words, openness becomes pro-poor only at higher average income levels.

In the regressions shown in Table 13, we add government expenditures expressed as a share of GDP.<sup>22</sup> Similarly to what we found when adding real interest rate, the R<sup>2</sup> and the precision of the estimates go up. Openness remains as before anti-poor in poor countries and pro-poor in rich countries, direct foreign investment is not significant, and democracy is shown to have a positive effect on the income shares of the middle classes (fourth to eighth decile). This is an interesting result which suggests that earlier works which have failed to detect the effect of democracy on inequality (Bollen and Jackman, 1985; Gradstein, Milanovic and Ying, 2001, but for an exception see Tavares and Wacziarg, 2001) might have done so because democracy

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<sup>21</sup> Notice that throughout R<sup>2</sup>'s for middle income groups are higher than those for the low deciles. This is not surprising: explaining income of the poorest members of a society is generally more difficult since the role played by idiosyncratic factors is greater.

<sup>22</sup> The data on government expenditures are the sum of central government (consolidated accounts), local and state or provincial government's expenditures. The data are taken from the IMF's *Government Financial Statistics* available on-line in World Bank SIMA database.

affects primarily income shares of the middle groups while leaving unchanged those at the top and the bottom. In consequence, synthetic inequality measures like the Gini coefficient may not show much change.

Government expenditures have a positive effect on the shares of all low and middle-income deciles, and a negative effect on the shares of the two top deciles. For example, a ten percentage point increase in government expenditures/GDP ratio raises the bottom decile's share of the pie (total country's income) by 0.2 percent. This represents almost one-tenth of what the bottom decile receives on average (see Table 2).

Finally, in Table 14, we show the results of GMM estimates. Openness and government expenditure as a share of GDP which may be thought to be endogenous are instrumented by their lagged values and country's population. The Hansen J statistics (test of overidentifying restrictions) is throughout insignificant indicating that instruments are valid.  $R^2$ 's remain high and most of the conclusions are unchanged. Openness reduces income share of all deciles between the third and the seventh, and raises the income share of the top decile. The turning point now occurs at a higher average income level, around \$PPP7,000 where countries such as Spain and Israel are located. Government expenditures and financial depth are pro-poor as before, and high real rate of interest is anti-poor. Democracy is now insignificant throughout.

In conclusion, the results of the level regressions that when a country is relatively poor, increased openness raises the income share of the top, and reduces the income share of the poor groups as well as of the middle class. (We are throughout talking of "shares", not absolute incomes.) However, at some medium- to high level of average country income, between \$PPP4,000 and \$PPP7,000 per capita depending on the specification, the income shares of the poor and the middle class begin to be positively affected by openness while the income share of the rich begins to decline. Finally, for the rich countries, openness is associated with an increasing share of the bottom and middle deciles, and a decreasing share of the top deciles. Openness thus helps inequality chart an inverted U shape as income level increases. At low income levels, openness is bad for equality; at high income level it promotes equality.

This suggests that only the middle-income countries may behave as the rigorous version of the theory would imply. But poor countries whose equality should be helped by openness, and the rich countries where openness should increase income differentials, behave in the exactly the reverse fashion from what we would expect. These results are only *partly* consistent with those posited by Wood (1994), or Kremer and Maskin (2003). In both models, poor countries that open up may experience increased inequality because there are various types of labor by skill, and openness helps those with middle and high level of education, but reduces the income share of those with no education. In Kremer and Maskin (2003), the latter are basically “unemployable” by rich countries’ firms because of their low productivity (they cannot be “matched” with more skilled workers), and hence globalization marginalizes them. It is only when basic education becomes the norm—and even the poor have it—that openness exerts an income-equalizing effect. This is what we might be picking up in the results which show at some middling level of income, the share of the lower and middle income classes begins to rise. In other words, a strategy based on exports of manufactures that require at least basic education would be equitable in Korea but inequitable in Burkina Faso or Pakistan (Wood 1994, quoted in Kanbur, 1998). However, in Wood’s and Kremer and Maskin’s models, rich countries too exhibit increased inequality—a result we do not find here however.<sup>23</sup>

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<sup>23</sup> To be more exact, Kremer and Boskin (2003, p.17) are agnostic about the effect on inequality in rich countries: inequality may go up or down

Table 11. Explaining mean-normalized decile incomes (1988, 1993, 1998): Parsimonious formulation  
(regressions estimated simultaneously; dependent variable: decile mean income/overall mean income)

|                      | <b>First</b>         | <b>Second</b>        | <b>Third</b>         | <b>Fourth</b>        | <b>Fifth</b>        | <b>Sixth</b>         | <b>Seventh</b>        | <b>Eighth</b>        | <b>Ninth</b>        | <b>Tenth</b>       |
|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|----------------------|-----------------------|----------------------|---------------------|--------------------|
| Open5                | -0.055<br>(.074)     | -0.090<br>(.007)     | -0.093<br>(.005)     | -0.095<br>(.003)     | -0.087<br>(.004)    | -0.076<br>(.006)     | -0.056<br>(.022)      | -0.010<br>(.643)     | 0.057<br>(.139)     | 0.511<br>(.009)    |
| Open5*mean<br>income | 0.0000164<br>(.001)  | 0.000023<br>(0)      | 0.000022<br>(0)      | 0.0000232<br>(0)     | 0.0000215<br>(0)    | 0.0000182<br>(0)     | 0.0000136<br>(0)      | 0.0000047<br>(.15)   | -0.000015<br>(.010) | -0.000129<br>(0)   |
| DFI5                 | -0.005<br>(.932)     | -0.0029<br>(.664)    | -0.006<br>(.341)     | -0.0069<br>(.291)    | -0.008<br>(.192)    | -0.0094<br>(.094)    | -0.0089<br>(.072)     | -0.007<br>(.11)      | 0.0016<br>(.833)    | 0.048<br>(.233)    |
| DFI5*mean<br>income  | -0.0000036<br>(.012) | -0.0000033<br>(.030) | -0.0000024<br>(.116) | -0.0000024<br>(.106) | -0.000002<br>(.155) | -0.0000011<br>(.352) | -0.00000045<br>(.687) | 0.00000065<br>(.517) | 0.0000021<br>(.233) | 0.000012<br>(.160) |
| M2gdp5               | 0.0905<br>(.001)     | 0.103<br>(.001)      | 0.0931<br>(.002)     | 0.0829<br>(.005)     | 0.0724<br>(.009)    | 0.0638<br>(.011)     | 0.0512<br>(.021)      | -0.0291<br>(.141)    | -0.00035<br>(.920)  | -0.5846<br>(.001)  |
| Democr5              | -0.002<br>(.287)     | 0.0009<br>(.705)     | 0.001<br>(.454)      | 0.002<br>(.328)      | 0.002<br>(.266)     | 0.002<br>(.224)      | 0.0017<br>(.359)      | -0.00037<br>(.822)   | -0.001<br>(.647)    | -0.008<br>(.567)   |
| Constant             | 0.228<br>(0)         | 0.356<br>(0)         | 0.490<br>(0)         | 0.562<br>(0)         | 0.670<br>(0)        | 0.797<br>(0)         | 0.956<br>(0)          | 1.178<br>(0)         | 1.56<br>(0)         | 3.22<br>(0)        |
| No of obs            | 207                  | 207                  | 207                  | 207                  | 207                 | 207                  | 207                   | 207                  | 207                 | 207                |
| "R-sq"               | 0.182                | 0.259                | 0.278                | 0.293                | 0.297               | 0.296                | 0.252                 | 0.095                | 0.072               | 0.281              |

Note: Statistically significant (at 1 and 5 percent levels) coefficients are shaded. The p-values between brackets.

Table 12. Explaining mean-normalized decile incomes (1988,1993, 1998). Adding real rate of interest (regressions estimated simultaneously; dependent variable: decile mean income/overall mean income)

|                      | <b>First</b>         | <b>Second</b>        | <b>Third</b>         | <b>Fourth</b>        | <b>Fifth</b>         | <b>Sixth</b>        | <b>Seventh</b>       | <b>Eighth</b>       | <b>Ninth</b>         | <b>Tenth</b>       |
|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|
| Open5                | -0.071<br>(.025)     | -0.112<br>(.001)     | -0.117<br>(.001)     | -0.118<br>(0)        | -0.109<br>(0)        | -0.097<br>(.001)    | -0.075<br>(.002)     | -0.025<br>(.250)    | 0.065<br>(.089)      | 0.664<br>(.001)    |
| Open5*mean<br>income | 0.0000177<br>(0)     | 0.000024<br>(0)      | 0.000023<br>(0)      | 0.0000235<br>(0)     | 0.0000215<br>(0)     | 0.000018<br>(0)     | 0.0000131<br>(0)     | 0.0000038<br>(.250) | -0.0000172<br>(.003) | -0.00012<br>(0)    |
| DFI5                 | -0.0001812<br>(.977) | -0.0022<br>(.745)    | -0.00556<br>(.411)   | -0.005<br>(.359)     | -0.007<br>(.244)     | -0.008<br>(.124)    | -0.008<br>(.094)     | -0.006<br>(.137)    | -0.00035<br>(.963)   | 0.0435<br>(.274)   |
| DFI5*mean<br>Income  | -0.0000034<br>(.016) | -0.0000032<br>(.038) | -0.0000022<br>(.141) | -0.0000022<br>(.128) | -0.0000018<br>(.185) | -0.000001<br>(.404) | -0.0000036<br>(.743) | 0.0000063<br>(.524) | 0.0000019<br>(.269)  | 0.000012<br>(.183) |
| M2gdp5               | 0.1095<br>(.001)     | 0.1296<br>(0)        | 0.1173<br>(.001)     | 0.1073<br>(.002)     | 0.096<br>(.003)      | 0.087<br>(.003)     | 0.0741<br>(.004)     | -0.0497<br>(.030)   | -0.0000689<br>(.862) | -0.76687<br>(0)    |
| Democr5              | -0.002<br>(.328)     | 0.001<br>(.492)      | 0.003<br>(.234)      | 0.004<br>(.114)      | 0.0046<br>(.061)     | 0.004<br>(.033)     | 0.004<br>(.035)      | 0.002<br>(.126)     | -0.00057<br>(.851)   | -0.022<br>(.162)   |
| Rint5                | -0.00111<br>(.014)   | -0.0015<br>(.002)    | -0.001<br>(.001)     | -0.0016<br>(0)       | -0.0016<br>(0)       | -0.0015<br>(0)      | -0.0014<br>(0)       | -0.0009<br>(.003)   | 0.002<br>(0)         | 0.009<br>(.001)    |
| Constant             | 0.217<br>(0)         | 0.339<br>(0)         | 0.442<br>(0)         | 0.541<br>(0)         | 0.649<br>(0)         | 0.776<br>(0)        | 0.936<br>(0)         | 1.164<br>(0)        | 1.578<br>(0)         | 3.35<br>(0)        |
| No of obs            | 179                  | 179                  | 179                  | 179                  | 179                  | 179                 | 179                  | 179                 | 179                  | 179                |
| "R-sq"               | 0.223                | 0.322                | 0.347                | 0.367                | 0.375                | 0.380               | 0.343                | 0.162               | 0.145                | 0.353              |

Note: Statistically significant (at 1 and 5 percent levels) coefficients are shaded. The p-values between brackets.

Table 13. Explaining mean-normalized decile incomes (1988,1993, 1988: Aging government expenditures as share of GDP  
(regressions estimated simultaneously; dependent variable: decile mean income/overall mean income)

|                      | <b>First</b>          | <b>Second</b>        | <b>Third</b>         | <b>Fourth</b>        | <b>Fifth</b>        | <b>Sixth</b>         | <b>Seventh</b>       | <b>Eighth</b>       | <b>Ninth</b>        | <b>Tenth</b>        |
|----------------------|-----------------------|----------------------|----------------------|----------------------|---------------------|----------------------|----------------------|---------------------|---------------------|---------------------|
| Open5                | -0.068<br>(.044)      | -0.113<br>(.001)     | -0.113<br>(.001)     | -0.113<br>(.001)     | -0.104<br>(.001)    | -0.091<br>(.002)     | -0.066<br>(.014)     | -0.007<br>(.789)    | 0.098<br>(.029)     | 0.577<br>(.005)     |
| Open5*mean<br>Income | 0.0000078<br>(.205)   | 0.0000138<br>(.032)  | 0.0000131<br>(.040)  | 0.0000133<br>(.030)  | 0.0000123<br>(.033) | 0.0000104<br>(.050)  | 0.0000069<br>(.153)  | 0.0000036<br>(.938) | -0.000019<br>(.022) | -0.000058<br>(.118) |
| DFI5                 | 0.0000397<br>(.995)   | -0.002<br>(.741)     | -0.0055<br>(.397)    | -0.0066<br>(.336)    | -0.007<br>(.236)    | -0.008<br>(.121)     | -0.009<br>(.079)     | -0.008<br>(.076)    | -0.0042<br>(.614)   | 0.05<br>(.190)      |
| DI5*mean<br>Income   | -0.00000214<br>(.151) | -0.0000018<br>(.222) | -0.0000011<br>(.456) | -0.0000012<br>(.408) | -0.000001<br>(.438) | -0.0000006<br>(.630) | -0.0000009<br>(.937) | 0.0000007<br>(.527) | 0.000002<br>(.316)  | 0.000055<br>(.540)  |
| M2gdp5               | 0.1222<br>(.001)      | 0.1321<br>(.001)     | 0.119<br>(.003)      | 0.107<br>(.005)      | 0.097<br>(.007)     | 0.088<br>(.007)      | 0.076<br>(.013)      | -0.059<br>(.037)    | -0.008<br>(.874)    | -0.811<br>(0)       |
| Democr5              | -0.003<br>(.302)      | 0.0018<br>(.542)     | 0.004<br>(.17)       | 0.0056<br>(.048)     | 0.006<br>(.017)     | 0.007<br>(.006)      | 0.006<br>(.006)      | 0.005<br>(.020)     | -0.0014<br>(.717)   | -0.034<br>(.050)    |
| Rint5                | -0.001<br>(.007)      | -0.0015<br>(.001)    | -0.0016<br>(0)       | -0.0016<br>(0)       | -0.0016<br>(0)      | -0.0015<br>(0)       | -0.0014<br>(0)       | -0.0009<br>(.007)   | 0.002<br>(0)        | 0.009<br>(0.001)    |
| Expdp5               | 0.259<br>(0)          | 0.331<br>(0)         | 0.323<br>(0)         | 0.310<br>(0)         | 0.286<br>(0)        | 0.237<br>(0)         | 0.172<br>(0)         | 0.055<br>(.172)     | -0.163<br>(.023)    | -1.810<br>(0)       |
| Constant             | 0.132<br>(0)          | 0.231<br>(0)         | 0.330<br>(0)         | 0.428<br>(0)         | 0.541<br>(0)        | 0.684<br>(0)         | 0.865<br>(0)         | 1.126<br>(0)        | 1.613<br>(0)        | 4.050<br>(0)        |
| No of obs            | 140                   | 140                  | 140                  | 140                  | 140                 | 140                  | 140                  | 140                 | 140                 | 140                 |
| "R-sq"               | 0.347                 | 0.499                | 0.519                | 0.539                | 0.547               | 0.541                | 0.473                | 0.220               | 0.218               | 0.519               |

Note: Statistically significant (at 1 and 5 percent levels) coefficients are shaded. The p-values between brackets.

Table 14 Explaining mean-normalized decile incomes (1988,1993, 1998)  
(GMM/IV estimation; dependent variable: decile mean income/overall mean income)

|                                     | <b>First</b>         | <b>Second</b>       | <b>Third</b>        | <b>Fourth</b>       | <b>Fifth</b>        | <b>Sixth</b>        | <b>Seventh</b>      | <b>Eighth</b>       | <b>Ninth</b>         | <b>Tenth</b>         |
|-------------------------------------|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|
| Openness                            | -0.030<br>(.439)     | -0.0818<br>(.005)   | -0.096<br>(.024)    | -0.104<br>(.017)    | -0.097<br>(.017)    | -0.089<br>(.016)    | -0.071<br>(.018)    | -0.009<br>(.688)    | 0.065<br>(.177)      | 0.505<br>(.038)      |
| Openness*mean<br>income             | 0.000005<br>(0.419)  | 0.00001<br>(.039)   | 0.00001<br>(.03)    | 0.000015<br>(.021)  | 0.00001<br>(.022)   | 0.000012<br>(.03)   | 0.000009<br>(.05)   | 0.000001<br>(.767)  | -0.000019<br>(.025)  | -0.000066<br>(0.078) |
| Expgdp                              | 0.281<br>(0)         | 0.35<br>(0)         | 0.340<br>(0)        | 0.328<br>(0)        | 0.307<br>(0)        | 0.258<br>(0)        | 0.193<br>(0)        | 0.072<br>(.058)     | -0.1559<br>(.008)    | -1.976<br>(0)        |
| M2gdp                               | 0.106<br>(.003)      | 0.121<br>(0.001)    | 0.112<br>(.003)     | 0.099<br>(.007)     | 0.086<br>(.012)     | 0.077<br>(.014)     | 0.0624<br>(.026)    | 0.042<br>(.101)     | 0.0604<br>(.152)     | -0.769<br>(.001)     |
| DFI                                 | -0.007<br>(.891)     | 0.0004<br>(.941)    | 0.0013<br>(.823)    | 0.002<br>(.710)     | 0.0014<br>(.778)    | 0.0004<br>(.926)    | 0.0006<br>(.878)    | -0.0016<br>(.655)   | -0.0012<br>(.824)    | -0.00035<br>(.991)   |
| DFI*mean<br>income                  | -0.0000016<br>(.181) | 0.0000014<br>(.270) | 0.0000011<br>(.426) | 0.0000014<br>(.341) | 0.0000012<br>(.382) | 0.0000008<br>(.567) | 0.0000050<br>(.737) | 0.0000025<br>(.850) | -0.0000087<br>(.472) | -0.0000069<br>(.466) |
| Rint                                | -0.0022<br>(.018)    | -0.0030<br>(.009)   | -0.0032<br>(0.006)  | -0.0032<br>(.011)   | -0.0032<br>(.013)   | -0.003<br>(.018)    | -0.0026<br>(.03)    | -0.0017<br>(.100)   | 0.004<br>(.033)      | 0.018<br>(.018)      |
| Democracy                           | 0.00095<br>(.800)    | 0.0032<br>(.404)    | 0.0044<br>(.256)    | 0.005<br>(.186)     | 0.0058<br>(.127)    | 0.006<br>(.093)     | 0.0053<br>(.101)    | 0.0047<br>(.115)    | -0.0024<br>(.594)    | -0.0324<br>(.205)    |
| Constant                            | 0.098<br>(.037)      | 0.194<br>(0)        | 0.297<br>(0)        | 0.403<br>(0)        | 0.519<br>(0)        | 0.6644<br>(0)       | 0.852<br>(0)        | 1.118<br>(0)        | 1.637<br>(0)         | 4.230<br>(0)         |
| Hansen J<br>statistics (p<br>level) | 0.152<br>(.696)      | 0.004<br>(0.952)    | 0.16<br>(.689)      | 0.445<br>(0.504)    | 0.747<br>(.387)     | 0.843<br>(.359)     | 0.944<br>(.331)     | 1.053<br>(.305)     | 1.571<br>(.210)      | 0.775<br>(.379)      |
| No of obs                           | 119                  | 119                 | 119                 | 119                 | 119                 | 119                 | 119                 | 119                 | 119                  | 119                  |
| Centered R <sup>2</sup>             | 0.354                | 0.500               | 0.518               | 0.526               | 0.526               | 0.508               | 0.427               | 0.182               | 0.238                | 0.504                |

Note: Statistically significant (at 1 and 5 percent levels) coefficients are shaded. Openness and government expenditure as share of GDP are instrumented. GMM calculations performed using ivreg2.ado routine developed by Baum, Schaffer, and Stillman (2002). The p-values between brackets.

## 6. Conclusions

The effects of globalization on income distribution within rich and poor countries are a matter of controversy. While international trade theory in its most abstract formulation implies that increased trade and foreign investment should make income distribution more equal in poor countries and less equal in rich countries, finding these effects has proved elusive.

Here we have tried to discern the effects of globalization by using data from household surveys and by looking at the impact of openness (trade as share of GDP) and direct foreign investment (as percent of the country's GDP), on relative income shares of low and high deciles. We are thus able to chart as it were the effect of globalization on the entire income distribution in both poor, middle-income and rich countries. We find rather robust evidence that at a very low income level, it is the rich who benefit from openness. As income level rises, that is for countries with survey-incomes of between \$4-7,000 at international prices, the situation changes and the relative income of the poor and the middle class rises compared to the rich (top two deciles). It seems that openness makes income distribution worse before making it better—or differently that the effect of openness on country's income distribution depends on initial income level.

These results run counter to simple factor-price equalization theorem with two types of labor. They are however consistent with a view propounded by Wood (1994) and more recently Kremer and Boskin (2003) that, with three types of labor (no education, basic, and highly skilled), openness in very poor countries might increase inequality by helping those with basic education, and leaving even further behind those with no education. Only when the poor become reasonably skilled, can the low deciles share begin to benefit from increased labor demand; then inequality falls. This seems to provide a strong argument for free basic education, and for the strong externality effects of more educated population.

As for the other variables, we do not find any effect of direct foreign investments on income distribution. We find that democracy raises income shares of the middle deciles and leaves those of the top and the bottom unchanged (thus possibly explaining why synthetic measures of inequality like the Gini coefficient have generally failed to detect an effect of

democracy on inequality). Government expenditures and financial depth, as expected, do help increase income shares of the bottom and middle income groups and lower those of the top. Real rate of interest—a topic which surprisingly has attracted very little attention—is always pro-rich. Even middle classes lose (in relative share) when real interest is high.

Increased trade seems to result in greater inequality, that is reduced income share of the poorest deciles in poor countries. Those who, according to economic theory and according to policy prescription of international organizations, should benefit the most from increased trade appear, on the contrary, to be losers in relative terms. The case for trade as an engine of growth for the poorest of the poor is not however irretrievably lost. It must be based on trade's impact on average incomes which, if sufficient, might lift real incomes of the poor as well. The case however cannot be made, we think, on trade's favorable impact on income distribution.

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