POLICY RESEARCH WORKING PAPER 2244

True World Income Distribution, 1988 and 1993

First Calculations, Based on Household Surveys Alone

Branko Milanovic

Inequality in world income is very high, according to household surveys, more because of differences between mean country incomes than because of inequality within countries. World inequality increased between 1988 and 1993, driven by slower growth in rural per capita incomes in populous Asian countries (Bangladesh, China, and India) than in large, rich OECD countries, and by increasing income differences between urban China on the one hand and rural China and rural India on the other.

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Summary findings

Milanovic derives the distribution of individuals' income or expenditures for two years, 1988 and 1993. His is the first paper to calculate world distribution for individuals based entirely on data from household surveys. The data, from 91 countries, are adjusted for differences in purchasing power parity between the countries.

Measured by the Gini index, inequality increased from an already high 63 in 1988 to 66 in 1993. This increase was driven more by rising differences in mean incomes between countries than by rising inequalities within countries.

Contributing most to the inequality were rising urban-rural differences in China and the slower growth of rural purchasing-power-adjusted incomes in South Asia than in several large developed market economies.

This paper — a product of Poverty and Human Resources, Development Research Group — is part of a larger effort in the group to study inequality and poverty in the world. Copies of the paper are available free from the World Bank, 1818 H Street, NW, Washington, DC 20433. Please contact Patricia Sader, room MC3-556, telephone 202-473-3902, fax 202-522-1153, email address psader@worldbank.org. Policy Research Working Papers are also posted on the Web at www.worldbank.org/research/workingpapers. The author may be contacted at bmilanovic@worldbank.org. November 1999. (65 pages)

Comments welcome

True world income distribution, 1988 and 1993: First calculation based on household surveys alone

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The paper derives world income or expenditure distribution of individuals for two years 1988 and 1993. It is the first paper to calculate world distribution for individuals based entirely on household survey data from 91 countries, and adjusted for differences in purchasing power parity between the countries. Measured by the Gini index, inequality increased from an already very high 63 in 1988 to 66 in 1993. The increase was driven more by rising differences in mean incomes between the countries than by rising inequalities within countries. The most important contributors were: rising urban-rural differences in China, and slow growth of rural purchasing-power adjusted incomes in South Asia compared to several large developed market economies.

JEL Classification: D31, personal income and wealth distribution; I3 welfare and poverty; 057 comparative studies of countries

[1] I am very grateful to Costas Krouskas for his truly excellent help with the collection and processing of the data. I am very grateful too to a number of people who have helped me with identification of household surveys, and sometimes with the data processing and survey interpretation. They are mentioned in the text (Section IV) and Annex 1 where a detailed list of used survey data is provided. I am also indebted to Shlomo Yitzhaki for a discussion of the decomposition procedure, and to Francois Bourguignon, Thomas Pogge, Aart Kraay, Hamid Davoodi, Kalanidhi Subbarao, Richard Freeman, Timothy Heleniak, Richard Adams, Francisco Ferreira, and Stefano Paternostro for helpful suggestions. I am also grateful for comments and questions to the participants of the World Bank Macroeconomics seminar, Washington, June 1999, and International Economic Association meetings in Buenos Aires in July 1999 where the first version of the paper was presented. The research was financed by a World Bank Research Grant RPO 683-68, and a special grant by the World Bank Inequality Thematic Group.

I. The objective

The issues of income inequality have gained increased prominence in the last decade. There are several reasons for this. Some are empirical: increasing inequality in Western countries in 1980's, then an "explosion" of inequality in transition economies in the 1990's. Others are "theoretical": economic theory is able to incorporate the issues of inequality better today than a few decades ago. There is greater interest in the growth-equality tradeoff (Lundberg and Squire 1999); inequality plays a central role in endogeneous growth models; there are several new approaches to what determines inequality (Benabou 1996; Li, Squire and Zou 1998); inequality and political economy are linked through the median voter hypothesis. Finally, not the least important reason is a vastly increased availability of income distribution data. Without exaggeration, one could say that the increase in coverage of the world by income or expenditure surveys plays the same role in heightening the importance of income inequality today, that the work on national income aggregates played in the early 1930's in paving the way for a more thorough study of macroeconomics. [2]

Recently, the fact of rising inequality within many countries was linked with the issues of globalization. Several writers (Richardson 1995, Wood 1995) have wondered if rising inequality may be related to globalization, and others (Williamson 1999) have pointed to similar spurs in inequality at the turn of the last century—which also was a period of globalization. But globalization also implies that national borders are becoming less important, and that every individual may, in theory, be regarded simply as a denizen of the world. Then, the question may be asked: is *world* inequality increasing? For, even if within-country inequalities are rising, world income inequality need not increase, or may even decline, if the poor (and populous) countries grow faster than the rich (and less populous) countries. In other words, even if globalization can be shown to lead to an increase in within-country inequalities, globalization may lessen income differences between *individuals* in the world.

The objective of the paper is to answer this question empirically—or more exactly, since we lack the data for any prolonged (in time) study of world income inequality, to at least establish the benchmark for world inequality in two years, 1988 and 1993. We shall derive (the first ever) personal world income distribution based *directly and solely* on household survey data, and adjusted for differences in purchasing powers of individuals in different countries. The two years, 1988 and 1993, are chosen because these are the years for which the direct international price comparison data are available. Of course, such a study is made possible only thanks to a massively expanded data base on income distribution. Over the last decade, many countries in Africa conducted their first national, representative household income or expenditure surveys. The economic changes in China in the late 1970's, and the end of the Cold War in the late 1980's, opened up to the researchers the hitherto unavailable sources in China and the former Soviet Union. Thus, for the first time in human history, researchers have reasonably accurate data on distribution of income or welfare (=expenditures or consumption) amongst more than 90 percent of world population.

Section II will review the previous studies and explain how this one differs from them. In Section III, I explain in detail the procedure of calculation. In Section IV, I address source of

[2] See the recent discussion on the same topic by Kanbur and Lustig (1999).

data and coverage. Sections V, VI and VII present the findings, dealing respectively with regional income inequalities, world income inequality, and the issue of heterogeneity of the world population (in terms of income). Section VIII concludes the paper.

II. Previous work

How does this study differ from the earlier work? Most previous studies were studies of *international* inequality in the sense that they calculated what would be inequality in the world if the world were populated by representative individuals from all countries, that is by people having the mean income of their countries. The most notable examples are several studies by Henry Theil (Theil, 1979; Theil and Seale, 1994; Theil 1996; but see also Podder, 1995) who decomposed international inequality into regional components in order to show, among other things, decomposability properties of the Theil index of inequality. Moreover, for income, these studies used GDP per capita, not survey data.

The second group of studies is better in the sense that they acknowledge the fact that the world is not populated by representative individuals from each country, and try somehow to take into account income distributions within countries. However, since they do not have access to the survey data, which alone provide information on distribution, such studies use countries' Gini coefficients or other indicators of inequality in order to guesstimate the entire distribution from a single statistic. A good example of this type of work is a recent paper by T. Paul Schultz (1998) where he calculated (what he terms) inequality in world distribution. However, the analysis was based on a between-country component which reflects differences in Purchasing power parity ($PPP) GDPs per capita, and a within-country component where an inequality measure (log variance) for each individual country was obtained from a regression analysis using the Deininger-Squire (1996) data base. A very similar approach was adopted by Chotikapanich, Valenzuela and Rao (1997). They use the GDP per capita (in PPP terms) and the Gini coefficient for each country (also obtained from the Deininger and Squire data base), and assume that income distributions of all countries follow a log-normal pattern. Thus, they obtain estimates of within-country income distributions needed to derive world inequality. The approach followed by these studies is unsatisfactory for two reasons. First, distributions cannot be well predicted from single inequality statistics, nor is it acceptable to assume that all distributions follow a log-normal pattern. Indeed, this is a *pis-aller*, explicitly acknowledged as such by Chotikapanich, Valenzuela and Rao when they observe that "information on the income distributions, or, at least, the population and income shares for a number of income classes [by countries]...is not available" (1997, p. 535). Second, GDP is an imperfect indicator of household disposable income or expenditures, both because it fails to account for home-consumption which is particularly important in poor countries, while it includes (e.g.) undistributed profits or increase in stocks which do not directly affect current welfare of the population. Moreover, as we shall see below, there is a systematic relationship between the ratio of income or expenditures obtained from household surveys (HS) to GDP, and level of GDP per capita.

More accurate studies use survey data. For example, Berry, Bourguignon and Morrisson (1983) and Grosh and Nafziger (1986) combine survey-derived income or expenditure shares with countries' per capita GDPs (in PPP-adjusted terms). Both papers derive world (not *international*) income distribution using income shares from household budget surveys for

"developed countries and about forty less developed countries" (Berry, Bourguignon and Morrisson, p.219) and seventy one countries (Grosh and Nafziger, 1986, p. 349). Income shares are multiplied by countries' GDPs per capita in order to get mean income per each quantile.[3] In other words, household surveys are used to get income shares, but the actual incomes for different income classes are *not* obtained directly from the surveys. The difference may be important because, as mentioned before, the ratio of mean per capita survey income or expenditure to per capita GDP is not constant across countries. For other countries, Berry, Bourguignon and Morrisson (1983) simply estimate income shares "on the basis of observed relationships between the shares of seven quantiles in countries for which comparable...data do exist and a set of explanatory variables" (p.219). For these countries they use a regression analysis to determine income/expenditure shares.[4] Recently, Korzeniewick and Moran (1997), use the same approach although they multiply income shares (quintiles for 46 countries) by dollar per capita GDPs (*not* per capita GDPs in PPP terms). Not surprisingly, they find that between-country differences –which are magnified when simple dollar per capita GDPs are used—explain most of world inequality. Thus they feel justified in expanding their sample from 46 countries for which they have income-share data to 112 countries using simple GDPs per capita: in effect, they revert to a study of inter-national inequality. Firebaugh (1999), in response to Korzeniewick and Moran (1997), also presents a study of international inequality but he uses per capita GDPs in PPP terms.

Since Berry, Bourguignon and Morrisson published their article, some fifteen years ago, there has been a huge increase in the availability of surveys in the countries of the former Soviet Union, and Africa in particular. There are many more surveys from other countries as well, and data standardization (insuring that variables are defined the same way as much as possible) has progressed tremendously, thanks mostly to the efforts of the World Bank (Living Standrads Measurement Survey (LSMS), Africa Poverty Monitoring, HEIDE data sets), and Luxembourg Income Study (LIS).

More recently, Bourguignon and Morrisson (1999), have returned to the topic of world inequality in a historical perspective. They study the evolution of world inequality between 1820 and 1990. Similarly to Berry, Bourguignon and Morrisson (1983), they use quantile shares multiplied by GDPs per capita (in PPP terms) to derive world income distribution. Since, obviously, the data for such a long period of 170 years are sparsely available, they divide the world in 33 country groups whose income distributions are approximated by one or more countries belonging to the group. For example, distribution of 37 Latin American countries is assumed to be the same as that of Brazil; distribution of Indonesia the same as that of India until, of course, the data for Indonesia become available in the late 1960's etc.

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[3] There is an inconsistency in Grosh and Nafziger (1986) which is due to the nature of the data they use. The income (decile) shares with which they multiply countries' GDP *per capita*, are derived from distributions of *household* income across *households*. Berry, Bourguignon and Morrisson (1983) use –correctly—distrbution of per capita household income across individuals.

[4] Grosh and Nafziger (1986) similarly "allocate" some 40 additional countries into several groups (low income, middle income, industrialized, capital-surplus oil exporters) and apply to them income distribution of "their" group computed from the countries whose income distributions are available. For several centrally-planned countries they use wage distributions.

Finally, we come to the papers that are methodologically almost identical to this one. These are papers by Ravallion, Datt and van de Walle (1991), Chen, Datt and Ravallion (1994), and Ravallion and Chen (1997). The last study, for example, is based entirely on household survey data from 67 countries with 42 countries being represented with at least two surveys. These studies have produced the widely quoted World Bank estimates of the people living in absolute poverty (at less than $PPP1 per capita per day), and their results were repeatedly used in *World Development Reports* and *World Development Indicators*. The major difference between them and our work is in the coverage (they do not include advanced market economies)[5] and focus (they are interested in changes in world poverty; not in world inequality).

This is therefore the first study which is based solely on household survey data and where world income distribution is derived the same way as we would derive a country's income distribution from regional distributions.

It differs from the existing studies in the two following aspects:

- It is a study of world inequality, not international inequality. In other words, the unit of observation is the individual (each citizen in the world), not country.

- It uses actual data on income or expenditure per decile, ventile etc. from household surveys, not the survey-derived income shares which are multiplied by GDP per capita.

III. Methodology: how are the calculations done?

For each country for which nationally representative survey data are available, we take local currency (LC) mean income or expenditure per decile (if we have access to unit record data), or for any other population shares (e.g. ventiles, or each of say, 12 or 15 population and income groups etc.). The objective is that the number of such data points be at least ten in order to have a sufficiently precise description of a distribution. In total, for both years, there are 216 country surveys with an average of 10.8 data points in 1998 and 11.4 data points in 1993 (see Annex 1). Most countries' data are deciles; some countries however have 16, 18, 20 or more data points. There are only 12 surveys where we have only quintiles (5 data points). Each data point is weighted by the population it represents. For example, one decile in the US survey represents 1/10th of the US population, one decile in the Nigerian survey represents 1/10th of Nigeria's population etc. The unit of analysis is throughout the individual, which means that each decile includes 10 percent of *individuals* in a given country, and individuals are ranked by their household per capita income or expenditures (see Table 1)

[5] Two out of three papers (1991 and 1994) include only developing countries (as mentioned in the titles of the papers). The third (1997) adds transition economies.

Table 1. Summary of world income distribution characteristics

Unit of observation	Individual
Welfare concept	Disposable per capita income or expenditures per capita
Ranking criterion	Welfare concept per capita
Currency units	$PPP or $

Typically, the survey data for a country *X* will look as in rows (1)-(3) in Table 2 (they are shown only for the first four income groups). Obviously, in the case of deciles, the values in row 2 would be 10 percent throughout.

Table 2. Calculations for country *X*

(1) Income group	1	2	3	4
(2) % of sample population	5	10	8	22
(3) Mean annual income per group in LC	3190	4500	6100	9300
(4) Number of people (in million) [(2)* country population]	1	2	1.6	4.4
(5) Mean annual income in $PPP [(3) * PPP exchange rate]	638	900	1220	1860
(6) Mean annual income in $ [(3) * $ exchange rate]	319	450	610	930

Note: population=20 million; 1$PPP=5LC; 1$=10LC.

Row (4) shows what number of people is represented by each data point. If we suppose that country *X* has a population of 20 million, then the first income group composed of 5% of its population will represent 1 million people, etc.

Mean LC income per income class from row (3) is converted into $PPP and $ in rows (5) and (6). Let the purchasing power parity exchange rate for country *X* be 5 LC units=$1 PPP, and the dollar exchange rate be 10 LC units=$1. By dividing the LC values from row (3) by the two exchange rates, we get values in rows (5) and (6).

Exactly the same calculations are done for every other country. Obviously, the weights attached to some data points will be 2 million people as in the first income class in our example while in others it may be 200,000, and in China a few data points include more than 100 million people. These values (income or expenditure in $PPP terms [row 5] and population [row 4]) are then used to derive world income distribution.

What do we get? Once these calculations are done, we generate *directly* world income distribution or regional income distributions.[6] We also get poverty incidence curves (or

[6] For simplicity, I use the term "income distribution" although it would be more accurate to speak of "world income and expenditure distribution."

cumulative density functions) directly. For any given $PPP value, we can easily calculate the number of people whose incomes (expenditures) are below or above that level as well as their composition (how many are in different countries and in different continents). Finally, a number of simulations is possible: e.g. what happens to world inequality and poverty if China's real incomes grow at 5 percent p.a., and its income distribution becomes more skewed?

IV. Source of data and coverage

Data sources. All data come from nationally-representative household surveys. Most of the data for Western Europe, Northern America and Oceania come from Luxembourg Income Study (LIS). For some European countries not fully included in LIS (Greece, Portugal, France), the data were provided by individual researchers, or by countries' statistical offices (Ireland, Switzerland).

Most of the data for Eastern Europe and former Soviet Union are taken from Milanovic (1998) and different World Bank sources (e.g. poverty assessments for Georgia, Armenia).

For Latin American countries, most of the 1988 data are from Psacharopoulos, Morley, Fiszbein, Lee and Wood (1997). The 1993 data come from various World Bank sponsored surveys, in particular LSMS's (e.g. Ecuador, Jamaica, Guyana, Nicaragua etc.) and countries' own surveys available in the Bank (kindly provided by Kihoone Lee). Some of the surveys were obtained from an extensive data base created and maintained by Inter-American Development Bank (Dominican Republic, Costa Rica, Mexico, Peru, El Salvador, and Venezuela). They were kindly provided by Miguel Szekely, Mariane Hilgert, and Ricardo Fuentes. Finally, several surveys were obtained directly from countries' statistical offices (Brazil, Honduras).

For Africa, most of the data come from World Bank financed surveys which have been assembled and standardized in the Africa ISP-Poverty monitoring group. They have been kindly supplied by Olivier Dupriez and Hyppolite Fofack. In addition, some of the surveys were provided by the countries' statistical offices directly (South Africa, Mauritius).

For most Asian countries, the data were kindly supplied by Shaohua Chen and Benu Bidani. Some of these data were used in the study by Ahuja, Bidani, Ferreira and Walton, *Everyone's miracle?* and, as already mentioned, in Ravallion and Chen (1997) work on world poverty. Again, LSMS data and Diane Steele's help were invaluable. Data for some countries (Singapore, Hong Kong, South Korea) were supplied by the countries' statistical offices. For some of the countries (Nepal), household surveys were obtained from a very good and expanding World Bank's Poverty Monitoring Database maintained by Giovanna Prennuschi. The Database either provides the surveys themselves or identifies the institutions or people who might be contacted.

Many other people in the World Bank (Luisa Ferreira, Paul Glewwe, Jacqueline Baptist, Richard Adams, Bahjat Achikbakche, Peter Lanjouw, Ruslan Yemtsov, Francisco Ferreira, Kihoone Lee, Boniface Essama Nssah, Roy Canagaraja, Jeanine Braithwaite) and outside (Peter Krause for the East German data; Carlos Farinha Rodriguez for the Portuguese data; Carol Ernst

for the Swiss data; Panos Tsakloglou for the Greek data; Yap Yee Liong for the Singapore data) also helped with the information. Yonas Biru and Yuri Dikhonov helped me generously with the International Comparison (ICP) data. I am extremely grateful to all of them: clearly the project would have been impossible without their help. Costas Krouskas (and in the very early stages of the project, Nadia Soboleva) have done a splendid job in interlinking the country and regional files and providing research assistance.

About ¾ of the country data used in the study are calculated from individual (unit record) data. Most of them come from four sources: HEIDE data base for East European and FSU countries, LSMS Surveys, Africa ISP-Poverty monitoring group, and Luxembourg Income study.[7] This, of course, means that variables and recipient units could be defined to precisely reflect what I needed.

How many countries are included? Table 3 divides all the countries and territories[8] in the world into four groups: those included in our data base for both years (called "common sample"), those included in 1988, but not in 1993; those included in 1993 but not in 1988; and those not included in either year. The common sample consists of 91 countries, inclusive of the data for large countries (China, India, Bangladesh, and Indonesia) that have been divided into rural and urban parts. For 1988, other than the common sample, I had the data for 10 additional countries, and for 1993, for 28 additional countries. Thus the full 1993 sample was 119 countries (see the Map).

The largest difference between 1988 and 1993 is a much better coverage of African countries. While in 1988, I had data for only 14 African countries, their number increased to 29 in 1993. This is mostly thanks to a number of surveys in Africa conducted or organized by the World Bank, or to official countries' household surveys whose results were compiled and made more easily accessible to researchers by the Africa Region of the World Bank. Note the significant increase in the coverage of Africa shown in Table 4: the share of African population included went up from slightly less than ½ to almost ¾. The share of GDP covered reached almost 90 percent.

Sixty-one countries are not included in either year. However, our coverage, both in terms of income or population is much greater than this number suggests, because most of the non-included countries are very small, measured either by their GDPs or population. For example, the total population of 22 non-included Latin American and Caribbean countries (see Table 3) is 42 million, and their combined GDP in 1993 was $80 billion. This is about equal to the population and GDP of Poland.

All the countries are divided into five geographical regions: Africa, Asia, Eastern Europe and the former Soviet Union, Latin America and the Caribbean (LAC), and Western Europe,

[7] The web site are: for HEIDE data base http://www.worldbank.org/research/transition/index.htm;for LSMS surveys http://www.worldbank.org/html/prdph/lsms/lsmshome.html; for Luxembourg Income Study, http://lissy.ceps.lu/index.htm.

[8] For simplicity, in the rest of the paper, both will be called "countries." This includes not only territories such as Puerto Rico, but also "units" whose legal positions might have changed between 1988 and 1993: the republics of the former USSR, Yugoslavia, and Czechoslovakia that have become independent countries, or Hong Kong that has rejoined China.

North America and Oceania (WENAO). The last region is the "old OECD" region short of Japan, that is it includes the "old" OECD countries before the recent expansion of the organization in Eastern Europe, Mexico, and South Korea.

The countries included in 1988 and 1993 represent respectively about 4.4 and 5 billion people, or respectively 86 and 91 percent of world population. The common-sample countries cover about 84 percent of world population (Tables 4 and 5). The total current dollar GDP of the countries covered is about 95 percent of world GDP in both years. The common-sample countries account for about 93 percent of world GDP (Table 5).

Table 3. Countries included in the study

Countries in 1988 and 1993	Countries ONLY in 1993
Western Europe (22) Australia, Austria, Belgium, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Ireland, Israel, Italy, Luxembourg, Netherlands, Norway, New Zealand, Portugal, Sweden, Switzerland, U.K., USA Latin America and Caribbean (17) Argentina(urb), Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador(urb), Honduras, Jamaica, Mexico, Panama, Paraguay, Venezuela, Ecuador 1/, Uruguay 2/, Peru 3/ Eastern Europe(22) Armenia, Bulgaria, Czech Republic, East Germany, Georgia, Slovak Republic, Hungary, Poland, Romania, Belarus, Estonia, Kazakhstan, Kyrgyz Rep., Latvia, Lithuania, Moldova, Russia, Turkmenistan, Ukraine, Uzbekistan, FR Yugoslavia, Slovenia Asia (17) Bangladesh(rur), Bangladesh(urb), China(rural), China(urban), Hong Kong, India(rur), India(urb), Indonesia(rur), Indonesia(urb), Japan, Jordan, Korea South, Malaysia, Pakistan, Philippines, Taiwan, Thailand Africa (13) Algeria, Egypt(urb), Egypt(rur), Ghana, Ivory Coast, Lesotho, Madagascar, Morocco, Nigeria, Senegal, Tunisia, Uganda, Zambia *Total: 91*	Western Europe(1) Turkey Latin America and Caribbean(2) Guyana, Nicaragua Eastern Europe(1) Albania Asia(8) Laos, Mongolia(urb), Mongolia(rur), Nepal, Papua New Guinea, Singapore, Vietnam, Yemen Rep. Africa(16) Bissau, Burkina, Djibouti, Ethiopia, Gambia, Guinea, Kenya, Mali, Mauritania, Namibia, Niger (rur), Niger (urb), RCA, South Africa, Swaziland, Tanzania *Total: 28*
Countries ONLY in 1988	**Countries NOT included in either years**
Western Europe(1) Spain Latin America and Caribbean(2) Guatemala, Trinidad & Tobago Eastern Europe(5) Azerbaijan, Bosnia, Croatia, Macedonia, Tajikistan Asia(1) Sri Lanka Africa(1) Rwanda *Total: 10*	Western Europe(1) Iceland Latin America and Caribbean(21) Antigua and Barbuda, Argentina(rur), Aruba, Bahamas, Barbados, Belize, Bermuda, Cuba, Dominica, El Salvador(rur), French Guyana, Grenada, Guadeloupe, Haiti, Netherlands Antilles, Puerto Rico, St. Kitts and Nevis, St. Lucia, St. Vincent and Gr., Suriname, Virgin Islands Eastern Europe (0) Asia(18) Afghanistan, Bahrain, Bhutan, Brunei, Cambodia, Iran, Iraq, Korea North, Kuwait, Lebanon, Macao, Maldives, Myanmar, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates Africa (21) Angola, Benin, Botswana, Burundi, Cameroon, Cape Verde Is, Chad, Comoros, Congo, Gabon, Liberia, Malawi, Mauritius, Mozambique, Seychelles, Sierra Leone, Somalia, Sudan, Togo, Zaire, Zimbabwe *Total: 61*

1/ In 1988 only urban; in 1993 the whole country. 2/ In 1988 the whole country; in 1993 only urban. 3/ In 1988 only Lima; in 1993 the whole country.

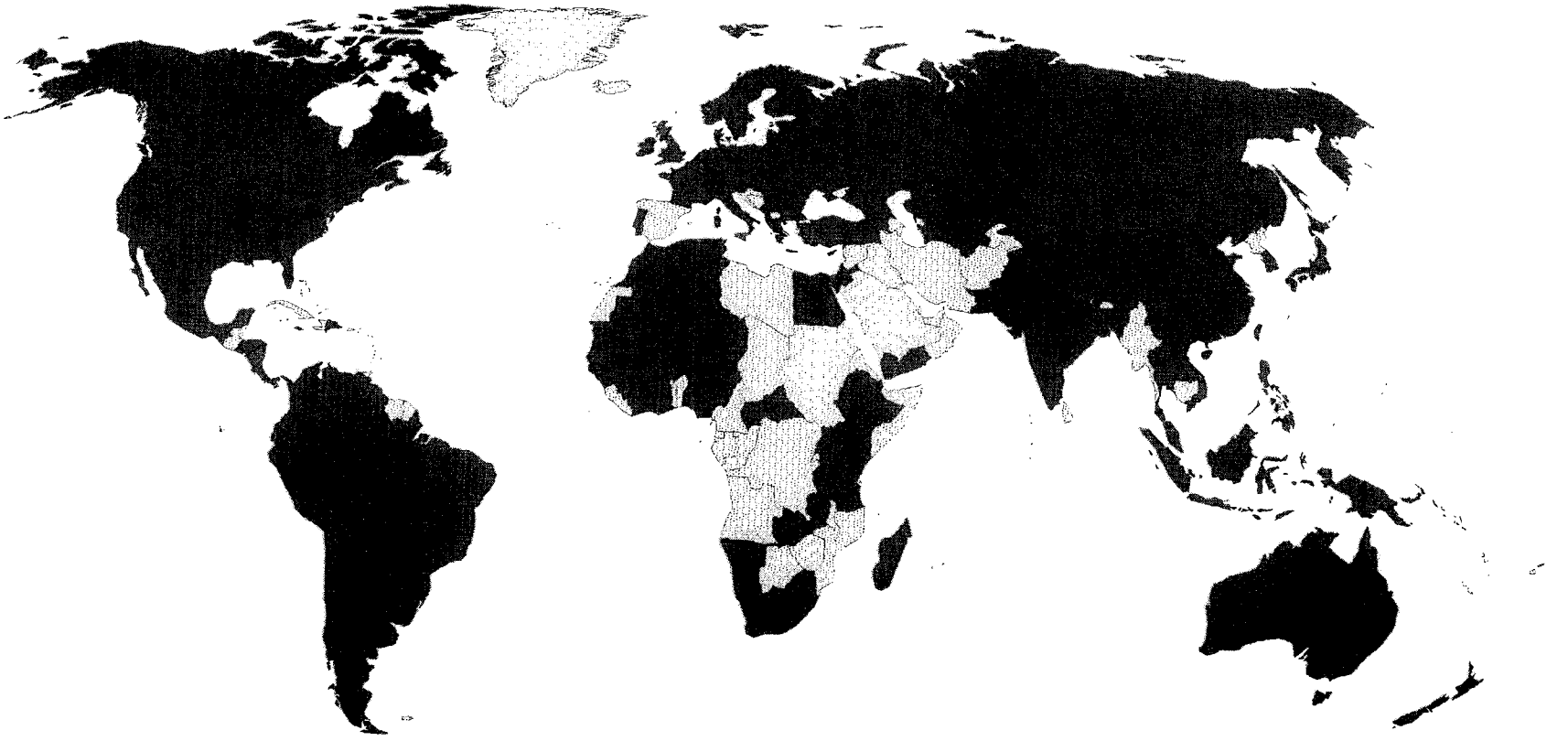
Turning to the regions, WENAO and Eastern Europe/FSU are covered almost in full (92 to 99 percent of population; not less than 95 percent of GDP). Asia and LAC are covered about 90 percent, both in terms of population and GDP. Finally, Africa's coverage, as already mentioned, has substantially increased between 1988 and 1993: from around ½ in both population and GDP to almost 90 percent in terms of GDP and ¾ in terms of population. The common-sample coverage is still low in Africa, at around ½ of both population and current GDP. The low common-sample coverage in Africa is the reflection of unavailability of household surveys until the very recent period. On the other hand, a significant jump in African coverage (for the full-sample) between 1988 and 1993 shows that in terms of household survey availability Africa is approaching the other continents.

Table 4. World population (in million)

	World population		Population included in the study (full sample)		Population included in the study (common sample)	
	1988	1993	1988	1993	1988	1993
Africa	607	672	293	503	286	306
Asia	2959	3206	2682	2984	2665	2868
E. Europe/FSU	425	411	422	391	399	388
LAC	427	462	373	423	363	418
WENAO	707	755	653	716	614	656
World	5125	5506	4423	5017	4328	4635

Table 5. How much of the world do our data cover (in percent)?

	Population		Current dollar GDP	
Full sample	1988	1993	1988	1993
Africa	48.3	74.8	52.0	89.2
Asia	90.6	93.1	91.0	91.3
E. Europe	99.3	95.2	99.4	96.3
LAC	87.4	91.6	90.2	92.5
WENAO	92.4	94.8	99.3	96.4
World	86.3	91.1	95.8	94.7
Common sample				
Africa	47.2	45.5	51.4	49.9
Asia	90.1	89.5	90.8	89.8
E. Europe	93.8	94.2	95.0	96.1
LAC	85.1	90.5	88.8	92.3
WENAO	86.8	86.9	96.5	95.6
World	84.4	84.2	93.7	93.1



A special consideration is due to China and India. These two countries have respectively 1.2 and 0.9 billion people, that is almost 40 percent of world population. In order to improve the analysis, their populations are shown separately for rural and urban areas (the same way that the data are generated in their Surveys). Thus, the largest single "country" in the world is rural China with 860 million people in 1993. [9] The same breakdown into rural and urban populations was done for three other large countries (Bangladesh, Indonesia and Pakistan[10]) for which such survey data were available.

What are the problems? Other than the issue of differential reliability (quality) of individual country surveys, the main problem is the mixing of income and expenditures. My original intention was to have two different distributions, one based on incomes, another on expenditures. However, the number of countries which would have been included in each would have been substantially lower. Moreover since countries tend to collect either income or expenditures survey data, there would have been two unrelated distributions, none of which would represent the "world." One distribution would have been for that part of the world where most of the survey data are expenditure-based (Africa and Asia; see Table 6); another for the part of the world where almost all surveys are income-based (WENAO, Eastern Europe, and Latin America). [11]

Table 6. Welfare indicators used in surveys: income or expenditures (number of countries)

	1988		1993	
	Income	Expenditure	Income	Expenditure
Africa	3	11	2	27
Asia	9	9	8	16
Eastern Europe	27	0	19	3
LAC	18	1	16	3
WENAO	23	0	23	0
World	*80*	*21*	*68*	*49*

Note: The difference between 117 surveys for 1993 here, and 119 countries in 1993 as listed in Table 3 stems from the fact that East Germany, existing in 1988, was incorporated into the West Germany, and in 1988 Pakistan was divided into rural and urban areas while that was not the case in 1993. We thus have 117 surveys, but 119 "countries."

[9] I am considering using in the future work as individual units several regions of China, and states of India. An advantage would be that the calculation of the Gini index would be more precise. The implicit assumption in the calculation of world Gini is that income distribution *within* each data point is perfectly equal. Obviously, the larger the size of such data points (as with rural China), the less tenable the assumption, and the greater the downward bias imparted to the world Gini.

[10] Pakistan though was divided into rural and urban in 1988 only.

[11] There are sevenm countries (Armenia, Ecuador, Georgia, Jamaica, Madagascar, Thailand, and Zambia) that are "cross-overs", that is which had income-based surveys in the 1988 data set, and expenditure-based HS in the 1993 data set. Peru is the "cross-over" in the other direction: from expenditures to income. But, the total importance of these countries is small. Their total population in 1993 is 126 million (or 2.7 percent of world population), and they account for 0.6 percent of world $PPP income.

Another problem is the use of a single PPP exchange rate for the whole country even if we know that regional price differences may be large. This is particularly a problem in the case of the four countries for which the survey data are broken down into rural and urban parts, because presumably different PPP rates should apply to each part. For all of them but China, I use the same PPP rates however. For China, in 1993, I use the rate reported in the International comparison project (ICP) for urban areas only (since the rate itself was obtained from surveys conducted in two cities: Guandong and Shanghai), and reduce the price level in rural areas by an estimated 20 percent (see Yao and Zhu, 1998, p. 138).

There are also possible inconsistencies and mistakes between the PPP rates calculated for 1988 and 1993. This might especially be a problem in the case of the four large countries for which PPP estimates may not always be reliable (witness, China), or may be subject to important swings. Yet these countries, because of their large populations, influence, often decisively, the shape of overall world distribution. Small errors in the estimates of their PPPs may produce large effects on the calculated world inequality. Table 7 shows the ratio between the domestic and world price levels in 1988 and 1993 for China, India, Bangladesh, and Indonesia. The four countries' price levels ranged from 27 to 34 percent of the world level in 1988; in 1993, they ranged from 23 to 30 percent. In three countries out of four, the relative price level went down, which –bearing in mind that these are poor countries—should reduce world inequality since it "transforms" a given amount of local currency into a higher $PPP income. We note, however, the opposite trends in India's and Indonesia's relative price levels. While in 1988, the price levels in India was the highest of the four countries, and some 20 percent higher than in Indonesia, in 1993, India's price level is the lowest of the four, and almost ¼ *less* than Indonesia's. This is a fairly large swing.

Table 7. Ratio between domestic and international price level in China, India, Indonesia and Bangladesh, 1988 and 1993

	Purchasing power exchange rate (LC per $)		Nominal exchange rate (annual average)		Ratio of domestic to world price level	
	1988	1993	1988	1993	1988	1993
India	4.756 a/	6.997 a/	13.917	30.493	0.342	0.229
China (urban)	1.038 a/	1.414 a/	3.72	5.762	0.279	0.245
Indonesia	453.453 b/	626.130 a/	1685.7	2087.1	0.269	0.300
Bangladesh	8.822 b/	9.496 a/	31.733	39.567	0.278	0.240

Note: China rural PPP exchange rate (and thus domestic price level) is reduced by 20 percent.

Sources: a/ Data from ICP tables provided by Yonas Biru (World Bank). b/ Data from Heston and Summers (1991).

V. Regional income inequalities

Average regional incomes. As already mentioned, the world is divided into five regions (continents): Africa, Asia, Latin America and the Caribbean, Eastern Europe and the FSU, and Western Europe, North America and Oceania (WENAO).

Table 8 shows mean regional GDPs and income per capita. In 1993, the ratio between the richest (WENAO) and the poorest (Africa) region was 30 to 1 using GDP per capita in current dollars, 11 to 1 using GDP per capita in international dollars (PPP), and 8 to 1 using the data from household surveys adjusted for the differences in purchasing power.

Table 8. GDP and income per capita

	GDP per capita ($)		GDP per capita ($PPP)		Household survey income/expenditure per capita ($PPP)	
	1988	1993	1988	1993	1988	1993
Africa	619	673	1320	1757	1036	1233
Asia	1422	2007	1927	2972	1175	1752
E. Europe	1889	1194	6355	4522	3634	2646
LAC	1967	3027	4829	5923	2702	3483
WENAO	16255	20485	14713	19952	7581	9998
World	3649	4531	4442	5642	2475	3092

Note: All amounts are annual. Full-sample countries.

We know since Kravis, Heston and Summers' (1982) work and UN International Comparison Project that adjusting for the differences in countries' price levels reduces the gap between poor and rich countries, because price level systematically increases with GDP per capita. But, in addition, we find here that there is a systematic relationship between (i) the ratio of income or expenditures from household surveys to GDP (RATIO), and (ii) level of per capita GDP. As GDP per capita increases, the RATIO variable decreases (see Figure 1). The fact that among poorer countries household surveys more often use expenditures rather than income affects both the intercept and the slope. If we regress RATIO against GDP per capita (in $PPP terms), a dummy variable taking a value of 1 if HS data are expenditures-based and 0 if income-based, and the interaction term between GDP per capita and the expenditure dummy, all variables, in both years, are significant at the 5 percent level (see Table 9).[12] Every $PPP 1,000 increase in GDP per capita lowers RATIO by about 1 percentage point in 1988 and 2 percentage points in 1993. The expenditure dummy is also significant implying that expenditure-based surveys would yield RATIO values that are 30 to 40 percentage points higher than income-based surveys. However, since the interaction term is negative and significant, RATIO variable declines faster when household surveys are expenditure-based, and the difference between expenditure- and income-based surveys in their RATIO values vanishes for GDP level of about $PPP 1,800 per capita in 1988 and $PPP 3,300 in 1993.

[12] Except $PPP GDP in 1993.

Table 9. Explaining RATIO variable

	1988	1993
Intercept	80.84	70.84
	(0.000)	(0.000)
GDP per capita (in $PPP)	-0.002	-0.001
	(0.015)	(0.067)
Expenditure dummy	41.1	29.9
	(0.015)	(0.008)
Interaction (GDP per capita and expenditure dummy)	-0.023	-0.009
	(0.008)	(0.029)
R^2	0.17	0.16
(F)	(6.4)	(7.1)

Note: The dependent variable is RATIO (income or expenditure per capita from household surveys divided by GDP per capita).

What explains the decrease in RATIO as GDP goes up? The cause seems to lie in the accounting divergence between GDP and household surveys. Four components, imperfectly or not at all included in household survey data, tend to rise with GDP. They are (i) undisbursed corporate profits, (ii) income from property, (iii) personal taxes, and (iv) government transfers in kind. Undisbursed corporate profits (or build-up of inventories) are a component of GDP, but not of household income, and they are not covered by household surveys. Their share in GDP is, of course, higher in richer countries, where the enterprise (firm) sector is larger and "formalized." Income from capital (property) is also greater in absolute and relative terms in richer countries, simply because income-rich countries are also capital-rich. But capital income is the most underreported type of income in household surveys, with underreporting estimated at up to 50 percent in some European OECD counties.[13] Finally, disposable income as covered by surveys is defined as factor income (wages, property income, self-employment income etc.) *plus* government cash transfers *minus* personal income taxes. In richer countries, taxes withdrawn at source (and thus not included in household surveys) as well as personal income taxes are a larger share of GDP than in poorer countries. While one part of transfers financed by taxes (cash transfers) is included in HS's, the other part –often very sizeable—government education and health expenditures is not. Moreover, if there is a current surplus in the financing of cash transfers (so that contributions and fees exceeds the outlays), disposable income in a country where such contributions are deducted at source will be underestimated compared to a country where there is only private insurance. In the latter case, all contributions and fees will be part of disposable income (see Lindbeck, 1990, pp.6-7). Most poor countries belong to this category; most developed countries belong to the former (contributions deducted at source).

These are the reasons why the difference between the rich and poor countries will be less if we use their HS disposable incomes or expenditures than if we use their GDPs. It is reflected in the fact that while in Africa household survey income (or expenditures) account for over 70 percent of GDP, in WENAO countries, the ratio is 50-51 percent. Asia, Eastern Europe, and

[13] For example, Concialdi (1997, p. 261) writes that the best available French household surveys conducted by the *Institut National de Statistique et Etudes Economiques* underestimate capital incomes by about 40 percent.

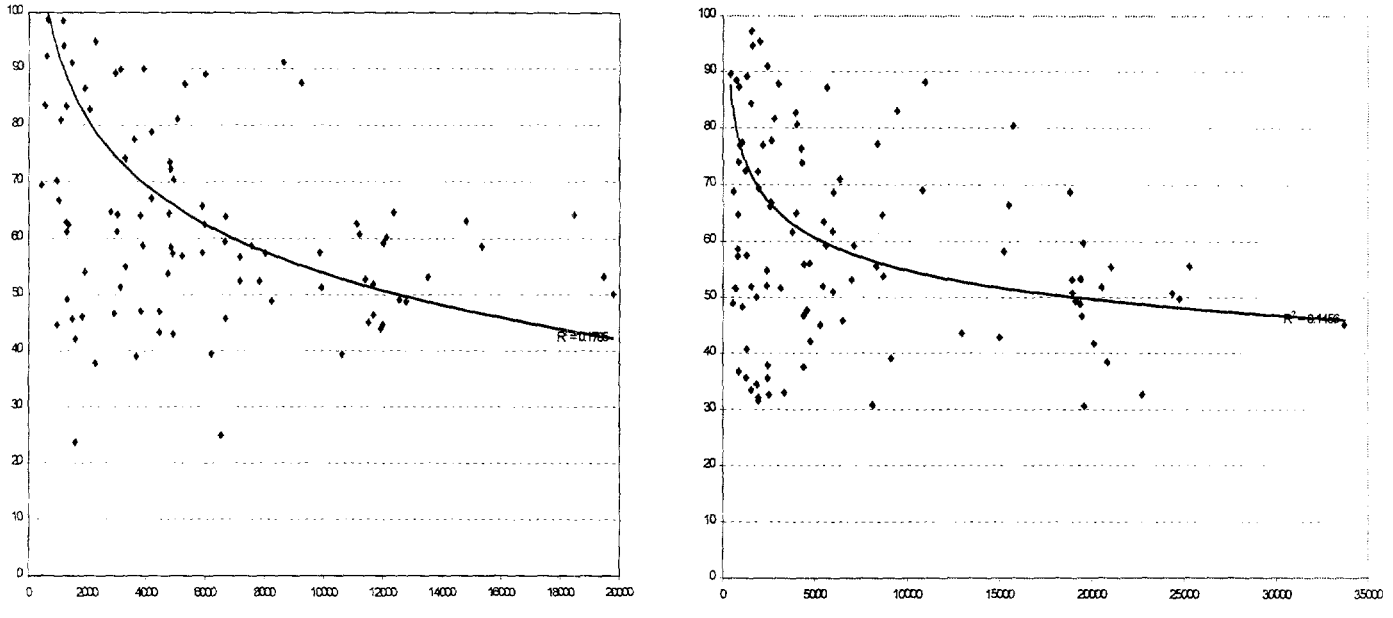
Latin America and the Caribbean are in between with the ratio of around 60 percent (Table 10).[14] Therefore, one important source of smaller world income inequality than that obtained with the use of GDP per capita will lie in the systematic difference –varying with income level—between the survey-collected incomes or expenditures, and GDP.

Table 10. Ratio between household income/expenditure from surveys and GDP

	1988	1993
Africa	78.5	70.2
Asia	61.0	58.9
E. Europe	57.2	58.5
LAC	55.9	58.8
W. Europe	51.5	50.1
World	*54.5*	*53.4*

Note: weighted average.

Figure 1. RATIO as function of $PPP GDP per capita



Year 1988 Year 1993

Note: Vertical axis: ratio (in percent) between average household survey income (or expenditure) and GDP. Horizontal axis: GDP in international dollars.

[14] With the exception of LAC in 1993 where the ratio reaches 72 percent.

Regional Ginis. Table 11 shows regional Gini coefficients for the common-sample countries. A regional Gini shows inequality in a given region (say, Asia) where each individual is treated equally—simply as an inhabitant of a given region. In other words, the aggregation of country distributions at the regional level proceeds in the same way as the aggregation of country distributions to generate world income distribution. (This is important to underline to show that the regional inequality is *not* simply *inter-national* inequality within the region.) Regional classifications are, of course, to some extent arbitrary. For example, Czech republic or Hungary are classified as part of Eastern Europe and FSU, although they could be included in WENAO too. Similarly, Mexico is included with the rest of Latin America, but one could argue that it would make sense to include it together with the U.S. and Canada as part of Western Europe, North America and Oceania. The distribution of countries by region is shown in Table 3.

Note, first, that the most unequal regions are Asia and LAC with Ginis between 55 and 60 (Table 11 and Figure 2). They are followed by Africa where Gini has increased sharply from 43 in 1988 to 47 in 1993. Eastern Europe/FSU, and WENAO have traded places. In 1988, former socialist bloc was the most equal region with a Gini of 26. However, the transition which has led to massive increases of inequality within individual countries (Milanovic, 1998) has also led to an "explosion" of inequality in the region as a whole. Its Gini in 1993 was more than 20 points higher than before the transition. It has surpassed the West European and North American region whose inequality has remained at the Gini level of 37, about the same as the Gini coefficient for the United States.

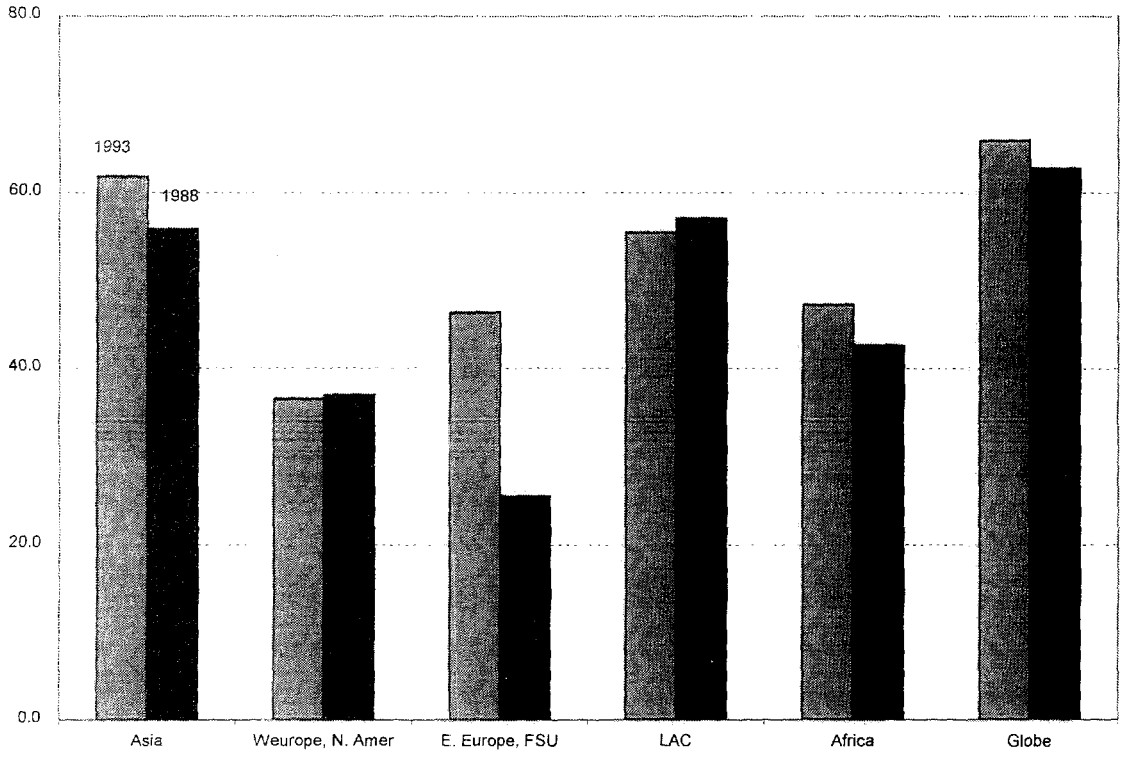
As Table 11 makes clear, between 1988 and 1993, inequality increased in three regions, went down slightly in WENAO, and decreased by 1½ Gini points in Latin America and the Caribbean. The most important increases occurred in Eastern Europe/FSU (+20 Gini points), Asia (+6 Gini points), and Africa (+4 ½ Gini points).

Table 11. Regional Gini coefficients in 1988 and 1993
(common-sample countries; distribution of persons by $PPP income per capita)

	1988	1993
Africa	42.7	47.2
Asia	55.9	61.8
Latin America and Caribbean	57.1	55.6
Eastern Europe, FSU	25.6	46.4
Western Europe, North America, Oceania	37.1	36.6

Note: For the list of countries included, see Table 3.

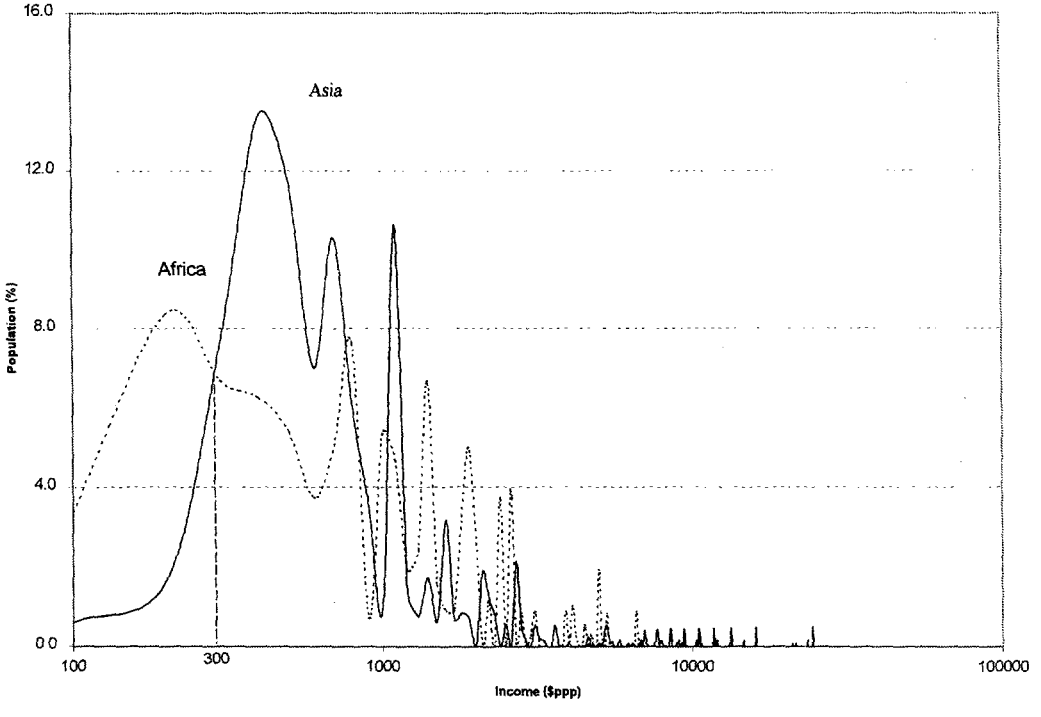
Figure 2. Gini coefficients in 1993 and 1988, by region



Note: Calculations based on the distributions of individuals ranked by their household per capita income in international (PPP) dollars.

Now, even if mean incomes and Gini values may be similar, the exact shape of income distribution curves may be different. I illustrate this on the example of Asia and Africa. In 1993, mean income in Asia was a little over $PPP 1,600, and in Africa about $1,355. The Gini coefficient in Asia was about 62, and in Africa 47. However, as Figure 3 illustrates, the pattern of distribution (the density functions) were quite different. The frequency of the very poor people is much greater in Africa. Note that up to $PPP 300, the curve for Africa lies significantly above the one for Asia. Africa's modal income is extremely low ($200), one-half of Asia's modal income ($400). The median incomes are about the same ($750 in Africa vs. $680 in Asia). However, Asian distribution extends much further to the right. 5 percent of Asian population have per capita incomes in excess of $PPP7,600 per year while only ½ percent of African have such high incomes. This is, of course, mostly because of people living in rich Asian countries: 83 percent of the Japanese have incomes higher than $PPP7,600 per year; so do 60 percent of the South Koreans, 50 percent of the Taiwanese and 50 percent of citizens of Hong Kong. There are also 20 percent of Malaysians with incomes higher than $PPP7,600 per year, and 10 percent of Jordanians. By contrast, there are almost no such people (in statistically significant numbers) in Africa.

Figure 3. Income distribution (density functions) for Asia and Africa, 1993



Note: x-axis in logs.

What factors were behind the increasing regional inequality? Tables 12-16 show for each region the Pyatt (1976)-type decomposition where the overall Gini is broken into three components: (a) within-country inequality, (b) between-country inequality, and (c) an

overlapping component.[15] The first component shows that part of inequality which is due to the differences in income between the recipients in individual countries. We call it "class inequality", to distinguish it from the second component ("the place inequality") which accounts for differences in mean incomes between the countries. "Class inequality" shows the differences due to (what may be called) class structure of each society. "Place inequality" shows inequality which is due to people being born/living in countries with different mean incomes (level of development). In other words, even if "class differences" were zero, there could still be differences between individuals due to the place where they live. Finally, the third ("overlapping") component appears because the Gini coefficient is not exactly decomposable by recipients. The overlapping component accounts for the fact that somebody who lives in a richer country may still have an income lower than somebody from a poorer country. One interpretation of the "overlapping" component is "homogeneity" of population (Yitzhaki and Lerman 1991, Yitzhaki 1994, Lambert and Aronson, 1993). The more important the "overlapping" component compared to the other two, the more homogeneous the population—or differently put, the less one's income depends on "class" or "place." We shall return to this point below in Section VII. The decomposition formula of the Gini is:

$$GINI = \sum_{i=1}^{n} G_i p_i \pi_i + \sum_{i}^{n} \sum_{j>i}^{n} \left(\frac{y_j - y_i}{y_i}\right) \pi_i p_j + L \qquad (1)$$

$$= \sum_{i=1}^{n} G_i p_i \pi_i + \frac{1}{\mu} \sum_{i}^{n} \sum_{j>i}^{n} (y_j - y_i) p_i p_j + L$$

where y_i=mean income of country i, G_i is Gini coefficient of country i; π_i is income share of country i in total income of the region (where countries are ranked by their mean incomes so that $y_j > y_i$); p_i is country's population share, and μ=mean income of the region.

A glance at Tables 12-16 reveals that in Africa, Asia, and Eastern Europe/FSU, the between-country component is the largest. In 1993, it is 54 Gini points in Asia (87 percent of total inequality in Asia), 30 Gini points in Africa (almost two-thirds of total inequality), and 26.4 Gini points in Eastern Europe/FSU (57 percent of total inequality). In LAC and WENAO, "place" is indeed important—it "explains" about ¼ of total inequality—but overlapping is more important. These two are the most homogeneous regions: note also that they have the lowest coefficient of variation of population-weighted GDP per capita. Asia is by far the most heterogeneous region.

As for the importance of "class", it is the largest in Latin America and the Caribbean (11.7 Gini points), followed by Eastern Europe/FSU, and Western Europe and North America (respectively 9.5 and 8.3 Gini points). In both Africa and Asia, "within country" inequality is of little importance—a fact which is explicable by relatively low inequality in the most populous

[15] The same decomposition formula is derived also by Mookherjee and Shorrocks (1984) and Shorrocks (1984). For different Gini decomposition rules see Silber (1989), Sastry and Kelkar (1994), Yitzhaki and Lerman (1991), Yitzhaki (1994).

and richest (by total GDP) countries.[16] In Asia, these are rural China (30 percent of Asia's population and 15 percent of income) with the Gini of 32.9 in 1993; urban China (12 percent of population and 14 percent of income) with the Gini 27; rural India (23 percent of population and 6 percent of income) with the Gini of 29; urban India (8 percent of the population and 4 percent of income) and the Gini of 35. Therefore, countries accounting for 73 percent of Asia's population and almost 40 percent of income, have Ginis between 27 and 35. In Africa, a similar role is played by three countries: Egypt—12 percent of Africa's income and 11 percent of population with Ginis respectively 21 (for rural areas) and 31 (for urban areas), Algeria (5 percent of population and 13 percent of income) with the Gini of 35, and Morocco (5 percent of population and 8 percent of income) with the Gini of 36.

How did various components evolve between 1988 and 1993? Consider what would be the most "desirable" type of evolution. It would involve lower overall inequality driven both by a declining inequality due to "class" and "place." Under such scenario, the overlapping component could even increase if countries' mean incomes get closer to each other and people become "bunched." Still, of course, the "overlapping" component could only partially offset the decline in the other two components (so that the overall Gini may decrease). The "desirable" pattern is present in WENAO and LAC countries. The importance of both class and place decreased while the overall Gini decreased a little bit in both. The most negative developments were in Eastern Europe/FSU where overall inequality increased driven by greater importance of both class and place. In Africa and Asia, place became a much more important determinant of inequality,[17] while class and homogeneity ("overlapping") decreased.

The overall conclusion, therefore, is of rising importance of place (inequality between the countries) in Asia, Africa and Eastern Europe/FSU regions, its unchanged importance in WENAO and declining importance in LAC. This is the reflection of increasing income divergence between the countries within each region—where, unlike in macro growth regressions—such divergence is calculated at the level of individual, not at the level of countries. The importance of class has gone down in all regions except in Eastern Europe/FSU.

However, the relevance of regional inequality is limited—both because regional "borders" are often arbitrary, and because study of regional inequality is not fundamentally different from a study of country-level inequality. Our primary interest is world inequality. In the following section, we shall investigate whether the conclusion of rising importance of between-country inequality holds for the world as a whole, and what particular factors were responsible for the change in world inequality between 1988 and 1993.

[16] The size of the "class" component depends on the product of the population and income weights (see equation 1). Countries with large population weights in Asia (India and China) have relatively low income weights. This depresses the within-country components.

[17] Particularly so in Africa where the between-country Gini component went up by 9½ points.

Table 12. Africa: Gini decomposition, 1988 and 1993

	1988	1993	Change
Within countries	6.2	5.0	-1.2
Between countries	20.9	30.4	+9.5
Overlapping	15.6	11.8	-3.8
Total Gini	42.7	47.2	+4.5
Number of countries	13	13	
Mean country Gini	41.8	39.4	-2.4
Coefficient of variation of Gini	25.2	25.0	-0.2
Average income per capita ($PPP)	1078	1293	+3.7
Standard deviation income per capita ($PPP)	695	844	
Coefficient of variation (%)	64	65	+1

Table 13. Asia: Gini decomposition, 1988 and 1993

	1988	1993	Change
Within countries	3.2	3.0	-0.2
Between countries	46.3	53.6	+7.3
Overlapping	6.4	5.3	-1.1
Total Gini	55.9	61.8	+5.9
Number of countries	17	17	
Mean country Gini	32.8	34.3	+1.5
Coefficient of variation of Gini	21.4	22.2	+0.8
Average income per capita ($PPP)	1129	1613	+7.4
Standard deviation income per capita ($PPP)	2178	3587	
Coefficient of variation (%)	193	222	+29

Table 14. Latin America and the Caribbean: Gini decomposition, 1988 and 1993

	1988	1993	Change
Within countries	15.0	11.7	-3.3
Between countries	13.9	13.6	-0.3
Overlapping	28.2	30.3	+2.1
Total Gini	57.1	55.6	-1.5
Number of countries	17	17	
Mean country Gini	48.1	49.1	+1.0
Coefficient of variation of Gini	13.4	12.9	-0.5
Average income per capita ($PPP)	2814	3634	+9.2
Standard deviation income per capita ($PPP)	1221	1899	
Coefficient of variation (%)	43	52	+9

Table 15. Eastern Europe and FSU: Gini decomposition, 1988 and 1993

	1988	1993	Change
Within countries	3.9	9.5	+5.6
Between countries	12.5	26.4	+13.9
Overlapping	9.1	10.4	+1.3
Total Gini	25.6	46.4	+20.8
Number of countries	22	22	
Mean country Gini	21.7	32.6	+10.2
Coefficient of variation of Gini	14.6	23.9	+7.2
Average income per capita ($PPP)	3681	2795	-5.7
Standard deviation income per capita ($PPP)	2000	1472	
Coefficient of variation (%)	54	53	-1

Table 16. Western Europe, North America, Oceania: Gini decomposition, 1988 and 1993

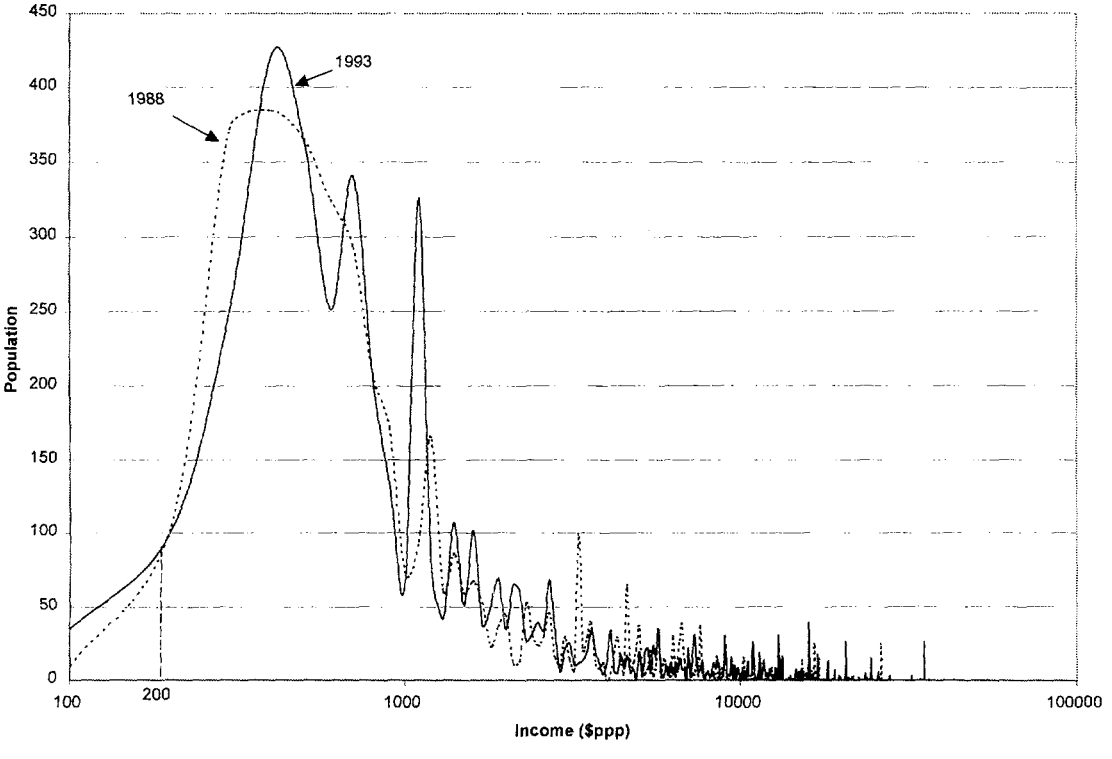
	1988	1993	Change
Within countries	8.5	8.3	-0.2
Between countries	14.4	8.9	-5.5
Overlapping	14.1	19.4	+5.3
Total Gini	37.1	36.6	-0.5
Number of countries	22	22	
Mean country Gini	30.4	31.8	+1.4
Coefficient of variation of Gini	15.9	22.0	+6.1
Average income per capita ($PPP)	7817	10684	+6.4
Standard deviation income per capita ($PPP)	3751	5284	
Coefficient of variation (%)	48	49	+1

Note: Ginis in Tables 12-16 calculated for individuals within each region ranked according to their household per capita $PPP income. Common-sample countries. Regional mean Ginis and their standard deviations are unweighted. Regional mean incomes and their standard deviations are population-weighted. Increase in average income per capita is per annum, in current $PPP.

VI. World income inequality

Figure 4 shows the density function of world income distribution in 1988 and 1993. It illustrates the rising number of people with extremely low incomes: note that the 1993 curve lies above the 1988 curve for incomes up to $PPP200 per year, or slightly more than ½ a dollar a day. The two modes of the distribution are around $PPP400 and $PPP700.[18] In 1993 there is also a peak around $PPP 1100 due to large numbers of people from rural China and India, urban China and India, and Bangladesh.[19] The mean world income in 1993 was $PPP3,160, some 29 percent higher than in 1988 (when it was $PPP 2,450). These are amounts in current international dollars. In order to be comparable we need to deflate the 1993 value by 22 percent which is equal to the increase in the US price level (PPP numeraire). We thus find that between 1988 and 1993, mean per capita world income increased by 5.7 percent in real terms (or by 1.1 percent p.a. on average). The median income in 1993 was $PPP1,041, some 18 percent higher than in 1988, or 3 percent less in real terms. [20] The fact that the mean real income would increase while the median would go down suggests that inequality (skewness) of the distribution increased.

Figure 4. World income distribution in 1988 and 1993 (in million of persons)



Note: x-axis in logs.

[18] Small changes around the mode might therefore produce large changes in the most commonly used poverty headcound based on the poverty line of $PPP1 per person per day.

[19] There are 158 million people with income around $PPP1100 (about $PPP3 per day) in rural China, 76 million in rural India, 24 million in urban India, 18 million in urban China, 5 million in Bangladesh.

[20] The median world per capita income in 1988 was $PPP 885.

How great is world inequality? The Gini coefficient for world per capita $PPP income (expenditure) distribution is 66.0. The value is almost the same whether we use the common-sample countries or the full sample. Compared to 1988, inequality has increased by 3.2 Gini points (for the common-sample countries) or 3.4 Gini points (for the full sample). The implied increase of about 0.7 Gini points per year is very high. During the 1980's, inequality in the US and the UK increased by about ½ a Gini per year. Similarly, Li, Squire and Zou (1998, p.32) in the panel analysis of 49 countries find that only two countries (China and Chile) had increases averaging more than ½ Gini point per year. Using the Theil index, world inequality is estimated at about 87, an increase of about 11 Theil points compared to 1988. The increase is more important if measured by the Theil index (13 percent) than if measured by the Gini index (6 percent). What is remarkable about the increase is that (i) it occurs at an already very high level of inequality, and (ii) is present in all measures reported here—that is, whether we use common-country sample or the full sample, PPP dollars or current dollars, Gini or Theil index (Tables 17).

Of course, the current dollar inequality is even higher. It reaches a Gini of 80 in 1993. This is, according to my experience and a personal communication by Shlomo Yitzhaki, the highest income or expenditure Gini coefficient ever reported.

Table 17. World international dollar inequality in 1988 and 1993
(distribution of persons by $PPP and $ income per capita)

	Full sample		Common sample	
International dollars				
	1988	1993	1988	1993
Gini index	62.5	65.9	62.8	66.0
Theil index	75.8	86.4	76.5	87.3
Dollars				
Gini index	77.5	80.1	77.8	79.9

Lorenz dominance. A comparison between the Lorenz curves for 1988 and 1993 shows that income distribution for 1988 is Lorenz-dominant (Figure 5). For any cumulative percent of world population, the 1988 curve lies above the 1993 curve. This is illustrated also by the data in Table 18. Note that the share of the bottom quintile of the population has decreased from 2.3 percent of total world $PPP income to 2.0 percent; that of the bottom half from 9.6 percent to 8.5 percent etc. Thus, not only is the Gini higher in 1993, but any quasi-convex social welfare function would rank the 1988 distribution above the 1993 distribution—provided, of course, mean incomes are the same. This condition, however, is not satisfied in our case because the 1993 real income was higher than the 1988 real income. We thus move to the investigation of stochastic dominance.

Figure 5. Lorenz curves for 1988 and 1993

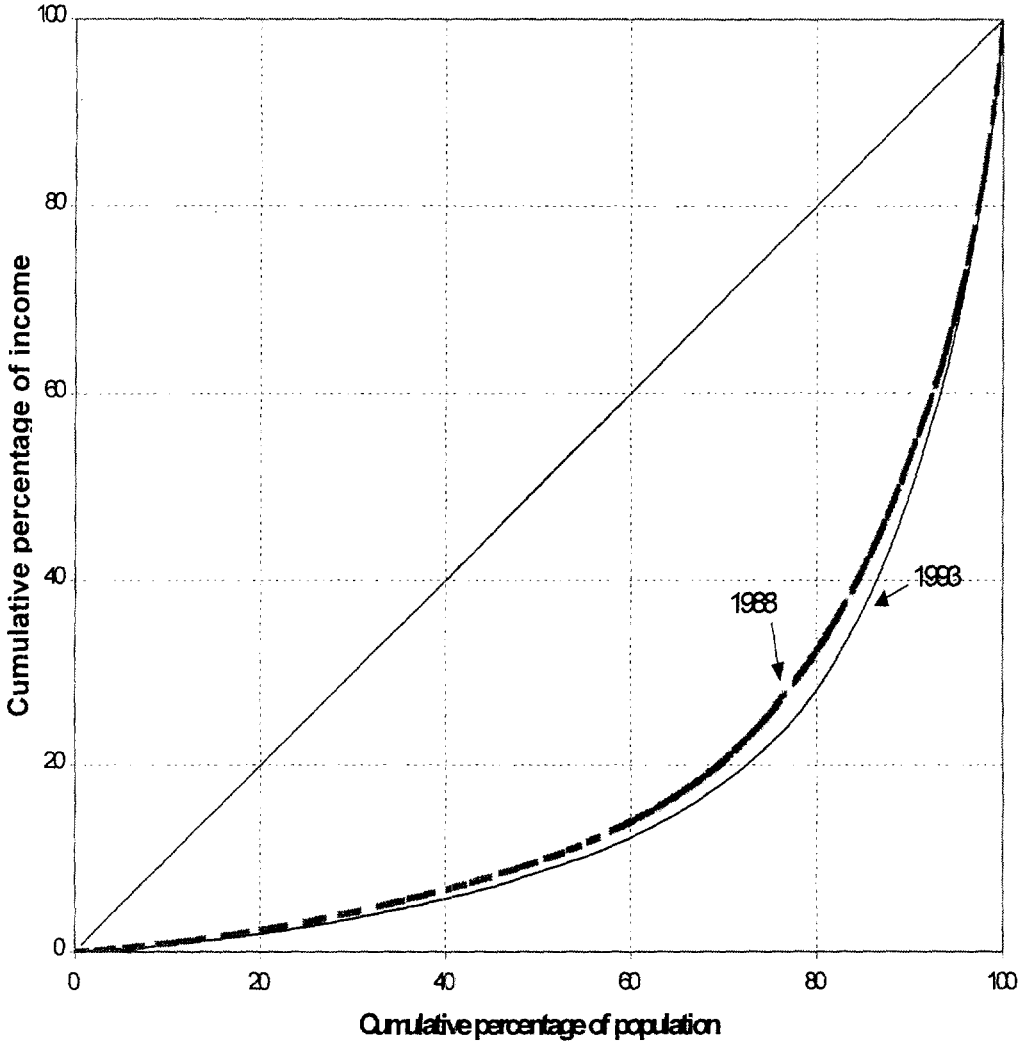


Table 18. Cumulative percentage of persons and income

	Cumulative percentage of world income	
Cumulative percentage of world population	1988	1993
Bottom 10 percent	0.9	0.8
Bottom 20 percent	2.3	2.0
Bottom 50 percent	9.6	8.5
Bottom 75 percent	25.9	22.3
Bottom 85 percent	41.0	37.1
Top 10 percent	46.9	50.8
Top 5 percent	31.2	33.7
Top 1 percent	9.3	9.5

Stochastic dominance. Lorenz dominance simply shows that inequality in 1993 was unambiguously greater than in 1988. But, as we have seen, world real per capita income increased between 1993 and 1988 by 5.7 percent. It is therefore possible that, at each percentile of income distribution, real income in 1993 was higher than in 1988 (first order stochastic dominance), even if inequality was greater. Table 19 shows the test of first order stochastic dominance. It is rejected. We see that income of the bottom 75 percent of people was less in real terms in 1993 than in 1988. The largest difference was for the bottom five percent and the 70-75th percentile who have lost 14-16 percent in real terms. Between the 10th and the 30th percentile, the loss amounts to about 10 percent; it then becomes smaller before it rises around the 70th percentile again. [21] The 1993 distribution dominates the 1988 distribution for the top quintile only. The people in the top quintile have gained between 3 and 18 percent in real terms. Thus, in a nutshell, a description of inequality changes that have occurred in the world between 1988 and 1993 is: the poorest five percent have lost almost 1/4 of their real income,[22] the top quintile has gained 12 percent.

[21] This last loss is largely caused by income declines in Eastern Europe and the FSU: a large chunk of East European population had incomes around the 70th world percentile in 1988, they slipped downards, and those who replaced them have lower incomes.

[22] The data in Table 19 are calculated at the exact percentage points. Thus, the real income of a person at the 5th percentile went down by 14 percent between 1988 and 1993. But the total real income of the bottom 5 percent is 23 percent less in 1988 than in 1993. *Ditto* for the top quintile.

Table 19. First order stochastic dominance: real per capita income by percentile of income distribution in 1988 and 1993

Percentile of income distribution	(1) Income in 1988	(2) Income in 1993	Ratio (2): (1) (in %)
5	277.4	238.1	86
10	348.3	318.1	91
15	417.5	372.9	89
20	486.1	432.1	89
25	558.3	495.8	89
30	633.2	586.0	93
35	714.5	657.7	92
40	802.7	741.9	92
45	908.3	883.2	97
50	1047.5	1044.1	100
55	1314.4	1164.9	89
60	1522.7	1505.0	99
65	1898.9	1856.8	98
70	2698.5	2326.8	86
75	3597.0	3005.6	84
80	4370.0	4508.1	103
85	5998.9	6563.3	109
90	8044.0	9109.8	113
95	11518.4	13240.7	115
99	20773.2	24447.1	118

Note: All values expressed in 1993 international dollars. The values show income exactly at the given percentile of income distribution.

Figure 6 displays a test of first order stochastic dominance for each of the regions. As already mentioned, a distribution A is first-order dominant over distribution B, if at any given percentile in income distribution, a person in distribution A has a higher income than a person in distribution B. If we accept that these are the same people (which they obviously are not when we compare two distributions in two different points in time), we can say that distribution A is Pareto-superior to B. (Note, however, that while A may be first-order dominant, distribution B can still be Lorenz-dominant. For example, income distribution in (say) Mali can Lorenz-dominate that in the US, although absolute income level for every percentile may be higher in the US than in Mali.) Only WENAO displays the first order stochastic dominance: 1993 dominates 1988. In Eastern Europe and FSU, in contrast, the 1988 distribution is almost first-order dominant were it not for the slightly higher incomes at the very top of income distribution in 1993. For other regions, and the world, the two distributions intersect. However, the situation varies between the regions. In Africa, real income of the population up to the 55^{th} percentile was higher in 1988 than in 1993. In LAC, the bottom decile has lost between 1988 and 1993, while for the rest the two distributions criss-cross, although on balance incomes are higher in 1993. Finally, in Asia, the two curves almost coincide up to the 65^{th} percentile, and those (people) above are better off in 1993 than in 1988. These results highlight the well-known decline in real incomes practically across the board in Eastern Europe/FSU, but also the worsening position of

the bottom half of the population in Africa (an issue which should be of greatest concern), and the bottom decile in Latin America and the Caribbean.

In Figure 7 we look at the second-order stochastic dominance.[23] In this case, the requirement for distribution A to dominate distribution B is that at each percentile of income distribution mean cumulative income of those in A be greater than mean cumulative income of those in distribution B. In other words, we require that (say) the bottom 20 percent of the population have a higher cumulative income—not necessarily that each individual percentile (18^{th}, 19^{th}, 20^{th}) have a higher income as in the case of first-order dominance. Here only Eastern Europe/FSU and Africa pass the test. In both cases, the 1988 distribution dominates the 1993 distribution. For the world, the bottom four quintiles received cumulatively more in real terms in 1988 than in 1993. Income gains were concentrated in the top quintile. For Asia, the 1988 distribution dominates the 1993 distribution up to the 60^{th} percentile, although the difference is small; for LAC countries, the 1988 distribution is better only for the lowest decile.

[23] The first-order dominance implies the second-order dominance. The second-order stochastic dominance means the same thing as generalized Lorenz curve dominance (as in Shorrocks, 1983).

Figure 6a. Test of first order stochastic dominance

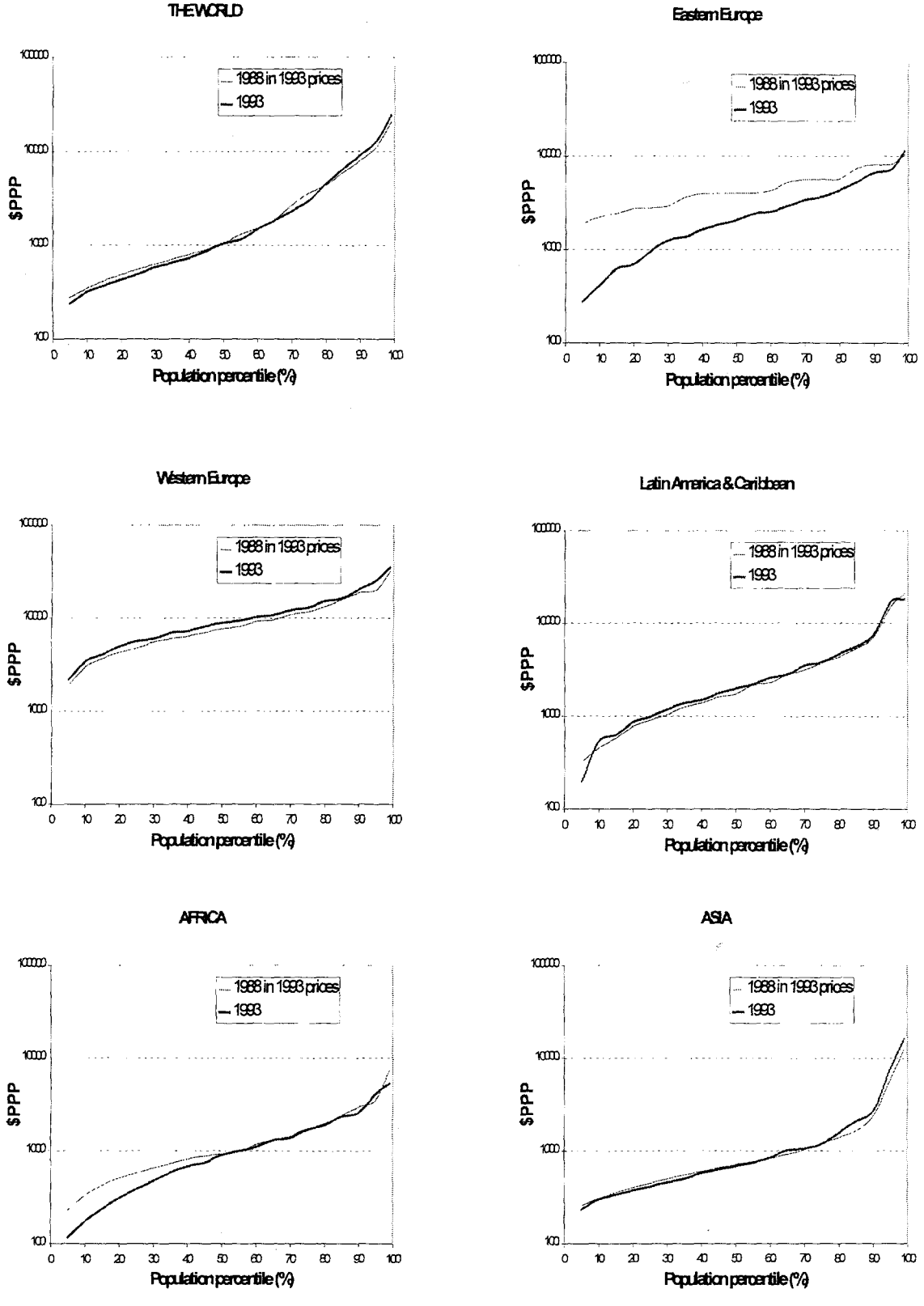
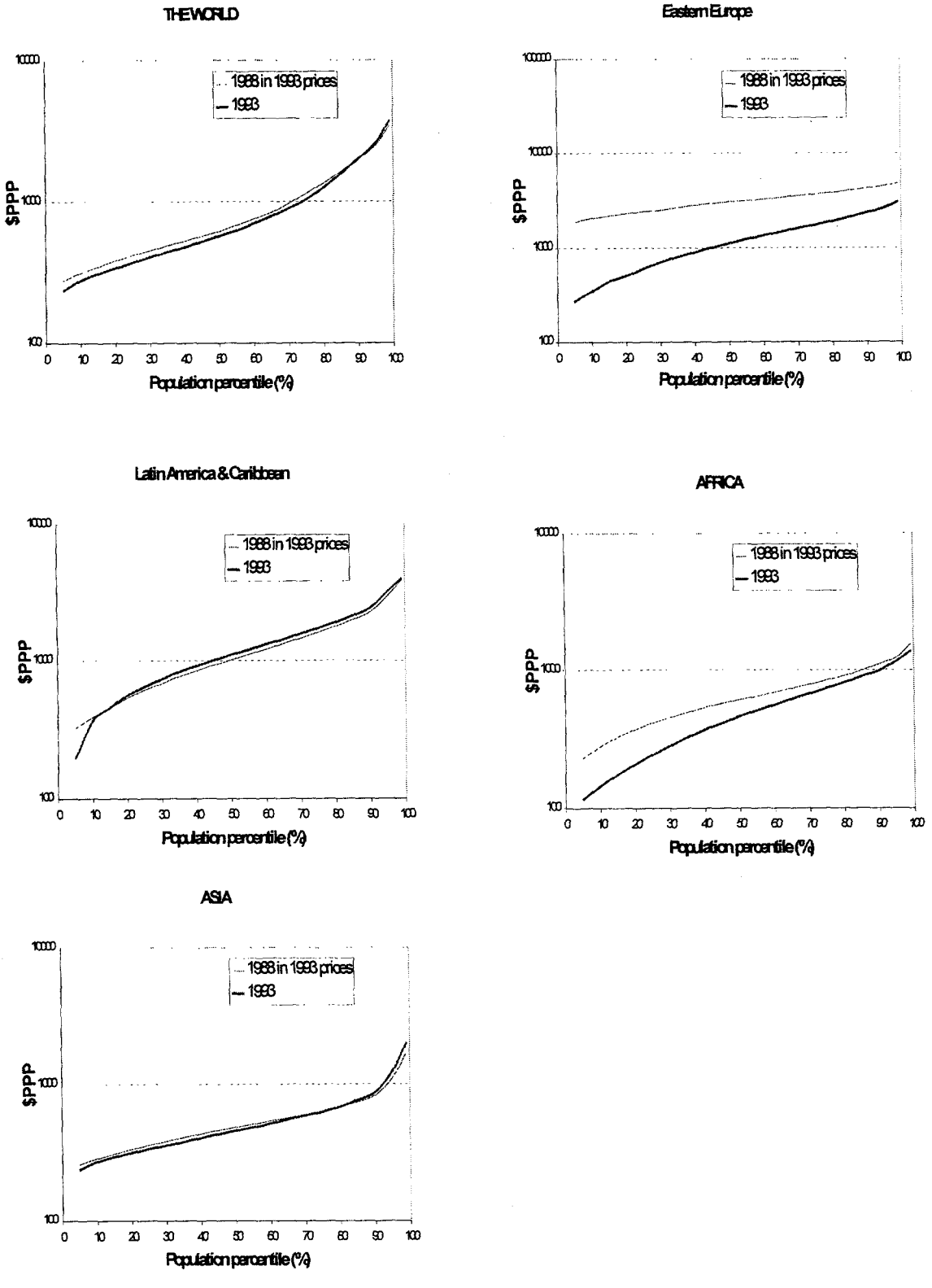


Figure 6b. Test of second order stochastic dominance: 1988 vs. 1993



Decomposition of total inequality. Using the same decomposition formula as before, the between-country component for the world turns out to be 57.8 Gini points in 1993, and 55.1 Gini points in 1988 (Table 20). This means that 88 percent of world inequality is due to differences in countries' mean incomes.[24] The within-country inequality accounts for only 1.3 Gini points or 2 percent of total world inequality. The remainder (10 percent of world inequality) is due to the "overlap" component.

According to the Theil index which, unlike Gini, is exactly decomposable, between-country differences explain ¾ of world inequality, and within-country inequality the remaining ¼ in both 1988 and 1993. According to both Theil and Gini indices, the individual components of inequality increased in step—keeping the composition of inequality the same in both years.

Table 20. World income inequality in 1988 and 1993
(common-sample countries; distribution of persons by $PPP income per capita)

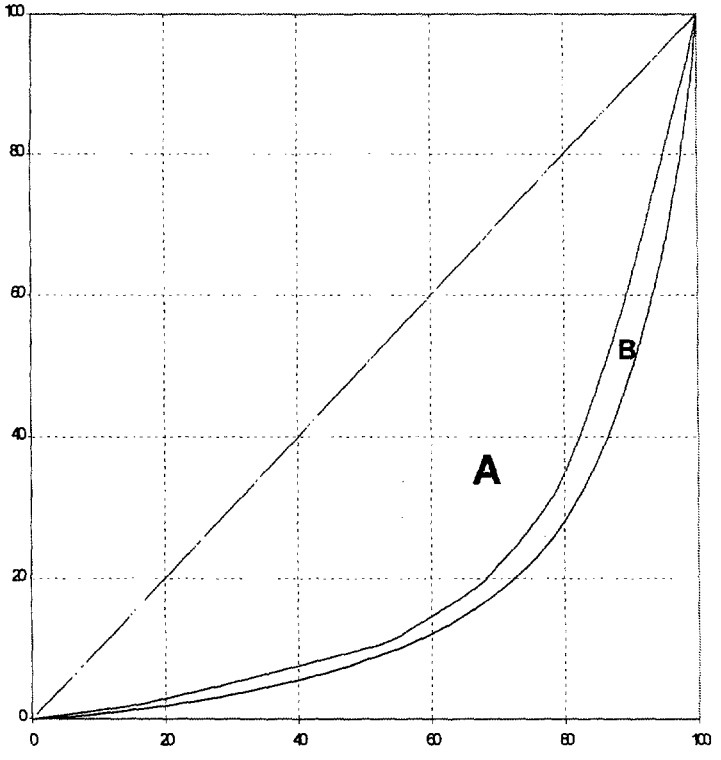
	Gini 1988	Gini 1993	Theil 1988	Theil 1993
Within-country inequality	1.3	1.3	19.4	22.4
	(2%)	(2%)	(25%)	(26%)
Between-country inequality	55.1	57.8	57.1	64.9
	(88%)	(88%)	(75%)	(74%)
Overlap	6.4	6.8	---	---
	(10%)	(10%)		
Total world inequality	62.8	66.0	76.5	87.3
Number of countries	91	91	91	91
Mean country Gini /Theil	33.7	36.9	23.7	26.7
Standard deviation of Gini/Theil	11.2	9.9	19.6	17.1
Average income per capita ($PPP)	2450	3160		
Standard deviation income per capita	2552	3591		
Coefficient of variation	1.04	1.14		

Notes: Percentage contribution to total inequality between brackets.
Common-sample countries. Mean world Gini and Theil and their standard deviations are unweighted. Average world income and its standard deviation are population-weighted.

Thus between ¾ (according to the Theil index) and 88 percent (according to the Gini coefficient) of world inequality is due to differences in countries' mean incomes. Figure 7 shows the decomposition on the example of the Lorenz curve for 1993. A very large area *A* covering 58 percent of the area of the triangle below the 45 degrees line represents inequality due to differences in mean country incomes (the "place inequality"). The area *B* covering 8.1 percent of the area of the triangle (so that A+B=Gini=66.0) shows the contribution of within-country inequality ("class") and overlapping.

[24] If I use unadjusted dollar incomes ("grenbacks"), between-country inequality explains 95 percent of total inequality in both 1988 and 1993.

Figure 7. Decomposition of world Lorenz curve for 1993



Note: A=inequality due to differences in mean country incomes. B=inequality due to within-country inequalities and "overlapping."

The decomposition results raise four questions that we shall address in turn. They are: (i) what lies behind the very high between-country component of inequality; (ii) why is the "pure" within-country inequality component in the Gini coefficient so small, (iii) what drove the increase of 2.7 Gini points in the between-country component which was the main factor behind the increase in the overall world inequality, and (iv) what happened to individual country Ginis between 1988 and 1993? The first two questions are "static": they refer to the decomposition of the 1993 measures of inequality. The next two questions are "dynamic": they ask how and why inequality increased between 1988 and 1993.

In the rest of the analysis, I shall consider only inequality adjusted for purchasing power ($PPP) and, in order to avoid spurious changes due to the difference in the composition of the sample, I shall consider only common-sample countries.

What are the main contributors to the between-country inequality? As we know from equation (1), the between-country component is equal to

$$\sum_{i}^{n}\sum_{j>i}^{n}\left(\frac{y_j - y_i}{y_i}\right)\pi_i p_j$$

$$= \frac{1}{\mu}\sum_{i}^{n}\sum_{j>i}^{n}(y_j - y_i)p_i p_j$$

For each pair of countries (*i,j*), its value depends on (i) the difference in mean incomes between the two countries, and (ii) the two countries' share in total population. The largest inter-country terms (ICT) will be those interacting poor and rich populous countries. Not surprisingly, therefore, the single largest terms (contributors to total inequality) belong, on the one hand, to China-rural and China-urban, and India-rural and India-urban, and, on the other, to the United States, Japan, Germany, France and the UK. India and China (both rural and urban) account for 45.2 percent of world population in 1993, [25] and the five rich countries for 12.6 percent. The interaction between these eight countries accounts for 18.9 Gini points or almost 30 percent of total world inequality (see Table 21). [26]

Table 21. The largest between-country contributors to inequality (ICTs) in 1993 (in Gini points)

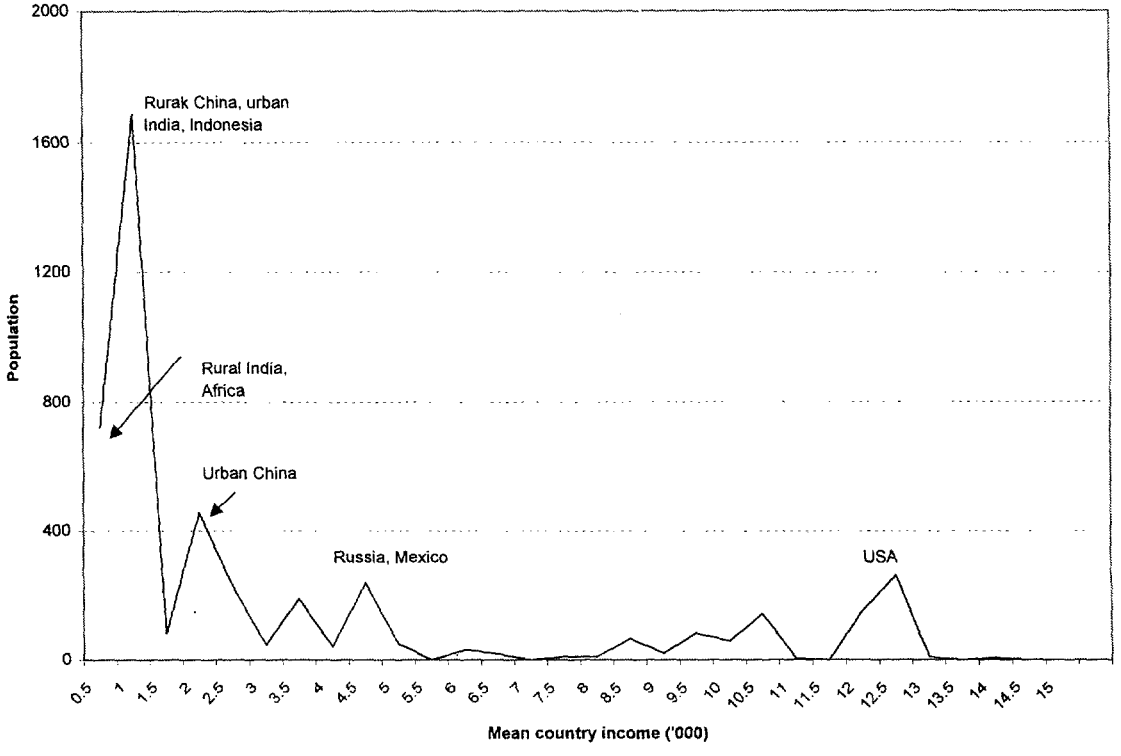
Poor / *Rich*	China(rur)	India(rur)	China(urb)	India(urb)	Total Gini points	Population share (%)
USA	3.8	3.0	1.3	1.0	9.1	5.6
Japan	1.7	1.4	0.6	0.5	4.2	2.7
Germany	1.0	0.8	0.3	0.3	2.4	1.8
France	0.7	0.6	0.2	0.2	1.7	1.2
UK	0.6	0.5	0.2	0.2	1.5	1.3
Total	7.8	6.2	2.7	2.2	18.9	12.6
Population share (%)	18.5	14.3	7.3	5.1		57.8

The greatest contributors to the world Gini are therefore large countries that are at the two poles of the income distribution spectrum, the so-called "twin peaks" (Quah, 1997). One pole is represented by more than 2.4 billion people who live in countries whose mean income is less than $PPP1,000 per year (Figure 8).[27] They include both rural and urban India, rural and urban Indonesia, and rural China. The next pole obtains for the income level of over $PPP 11,500. There are more than ½ billion people who live in such rich countries. They include US, Japan, Germany, France and the UK. The poor pole accounts for 42 percent of world (more exactly, common-sample) population and about 9 percent of world PPP income; the rich pole accounts for 13 percent of world population and 45 percent of world PPP income. Populous countries that have "middling" per capita incomes (e.g. Brazil, Mexico, Russia) do contribute to inequality but less so than the two polar sets. Fast growth of China and India would therefore have a huge impact on reducing world inequality since the difference between their mean incomes and those of OECD countries would go down. In 1993, the difference in mean per capita income between the US and rural China was $PPP 11,506, or 3.6 times greater than the average world $PPP income. Suppose that due to faster growth in rural China the difference is reduced to 3 times world average. With unchanged world population shares of rural China and

[25] More exactly, of the common-sample population.
[26] Note that the ICTs for rural India, rural China, and the US alone explain more than 6.8 points of the world Gini.
[27] Note that the difference between Figures 4 and 8 illustrates the difference between world and international income distribution.

the US, the ICT will be 3.2 Gini points instead of 3.6 Gini points now. The overall world inequality would be reduced by much more—by almost 4 Gini points due to the decreasing difference between the mean income in rural China and mean income in other richer countries.

Figure 8. Distribution of population (in million) according to average per capita country income where they live (in '000$PPP per year)



However, every synthetic index of inequality, and the Gini is no exception to that, is a very complex statistic. We have just seen that faster per capita growth of China reduces the ITCs between China, and the rich populous OECD countries. It is also absolutely crucial for the reduction of world inequality. As Table 22 shows, if China's and India's income were to increase by between 10 and 100 percent, while incomes of all other countries are assumed unchanged, world inequality would be reduced by between 0.8 and more than 6 Gini points.[28] However, if we suppose that China and India continue to grow faster than other populous countries, there may be a point where the gain in world equality achieved through them getting closer to the rich OECD countries may be offset by the growing difference between China and India, on the one hand, and Indonesia, Nigeria, and Bangladesh on the other, which we assume –for the sake of the argument—to grow slowly or not at all. This point occurs only for an extremely high increase in China's and India's per capita income: more than 7 times the current level so that urban China's income would be equal to that of Hong Kong, and rural India's income would equal that of Bulgaria. However, it illustrates the fact that the Gini coefficient is U-shaped even in income growth of the two largest, and among the poorest, countries. A situation might then ensue where instead of a bi-polar world, depicted in Figure 8, we might have a tri-polar world, with one or

[28] Populations are assumed unchanged throughout.

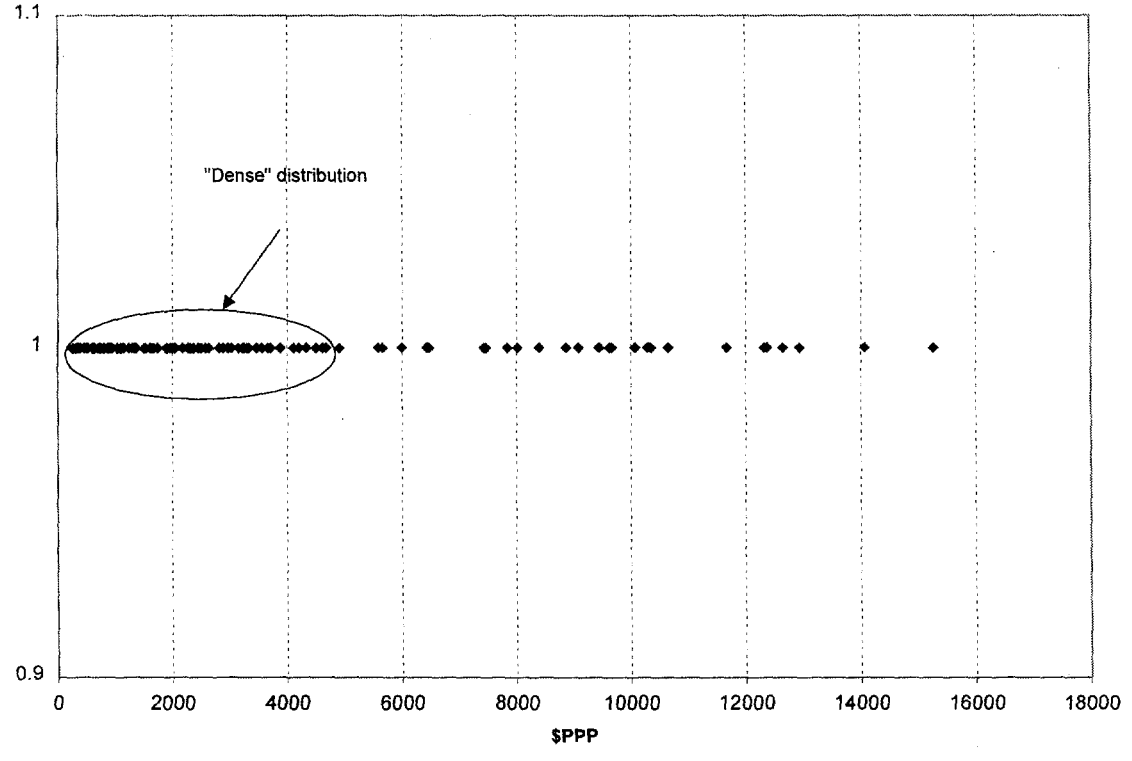
several large countries with incomes around the median or the mean. Yet this might imply the same or even higher Gini inequality.

Table 22. Change in world Gini and its components as India's and China's per capita incomes increase

Percent income change	0	10	20	50	70	85	100
Gini points							
Within countries	1.3	1.4	1.4	1.5	1.5	1.6	1.6
Between countries	57.8	56.9	56.0	53.6	52.2	51.2	50.3
Overlapping	6.9	7.0	7.0	7.4	7.5	7.8	7.9
Total Gini	66.0	65.2	64.4	62.5	61.2	60.6	59.8

Why is the within-country inequality is small? There are two reasons for this. First, it is because the countries with large total incomes (like the US) have relatively small populations, and the reverse for countries like China and India. (Note that the *within* component of the Gini coefficient is equal to $\Sigma G_i \pi_i p_i$.) This is the same reason noted above for the low value of within-country components for Asia. The largest population in the sample is that of rural China with 18.5 percent of world population but with only 5 percent of world $PPP income. Largest income weight is that of the US with 29 percent of world income but with only 5.6 percent of world population. Since the weight attached to the individual country Gini in the Pyatt decomposition is the product of country's income and population shares, this means that the largest weight is 0.0145 (i.e. 0.29 times 0.05). For most countries, the weights attached to their Ginis are thus very small. Obviously, if a very large country, like China and India, were also a very rich country its weight in both population and total income would be great, and it would strongly influence the within component. However, in reality, even if the Ginis of a number of countries were to significantly increase, the within-country component would not go up by much. For example, if both China's--rural and urban--Ginis increased to 50 (from the current values of respectively 33 and 27), and the US Gini increased to 60 (from the current value of 37), the within-country component would increase by only ½ Gini point.

Figure 9. Distribution of countries by mean annual $PPP income (1993)



This is but a mechanical explanation for the low within-country inequality component. A substantive explanation is as follows. Mean country incomes are very close to each other particularly among poor countries (see Figure 9). 62 countries have mean HS incomes that are less than $PPP 4000 per capita p.a. In other words, the countries' mean incomes are "crowded."

If mean incomes are very close, then the only way for the overlap component to be small, and for the within-country component to be relatively large, is if countries' own income density functions are very narrow with Ginis close to 0 (see Figure 10b).[29] But since individual country Ginis are, of course, not zero, poor people from a slightly richer country will overlap with the rich people from a slightly poorer country (see Figure 10a). This is the case for most countries in the world. To see this, superimpose density functions from Figure 10a onto the mean incomes (dots) in Figure 9. There would be a lot of overlapping particularly among the poorer countries. Thus any inequality above 0 will "feed" the overlap component. Or, in other words, the overlap component will be small only if (i) mean incomes are very far (different) from each other, or (ii) individual country distributions are very equal.[30] Neither is the case here.

[29] Imagine the situation where all mean country income differ by only Δx. Then, the overlap component will be 0 *only* if individual country Ginis are 0.

[30] This point is also made by Lambert and Aranson (1993, p. 1226) in their reinterpretation of the Gini decomposition.

Figure 10a. Large overlap component in Gini decomposition

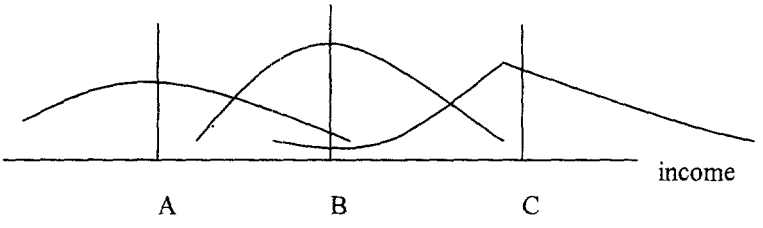
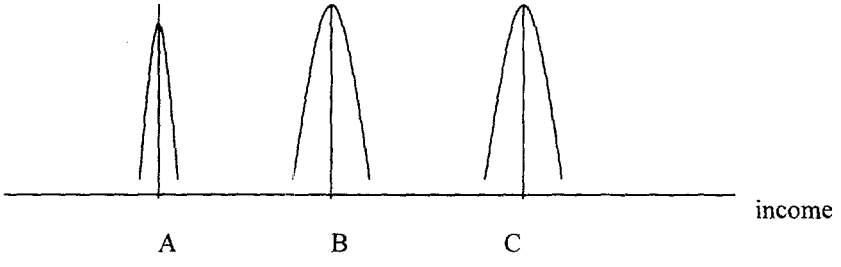


Figure 10b. Small overlap component in Gini decomposition



Note: vertical lines represent countries mean incomes.

What factors were behind the 2.7 Gini points increase in between-country inequality between 1988 and 1993? We have already seen that the most significant contributor to the overall Gini is the between-country component, and within it, the income differences between the poor populous countries of Asia (India and China), and the rich, but less populous, five OECD countries (US, Japan, France, Germany and the UK). But while these ICTs are large they may not be the ones that have also *increased* the most between 1988 and 1993, and may not therefore be the ones driving the increase in inequality between the two years. Indeed, as seen in Table 23, some of them have decreased in importance, that is they have contributed to *reducing* inequality. Shrinking difference between China's mean rural and urban income and the mean US income has shaved off almost ½ Gini points from world inequality. Similarly, decreasing income differences between rural China and rural India, on the one hand, and three large countries (Brazil, Russia and Ukraine) on the other, have reduced world Gini by 1.3 points (Table 23). Real incomes in Brazil, Russia, and Ukraine declined, [31] and the distance between the two groups narrowed: world Gini was reduced by more than 1 Gini point. [32]

[31] Per capita income in constant international dollars went down by 16 percent in Brazil, 18 percent in Russia, and by more than 50 percent in Ukraine.

[32] However, income declines (and rising inequality) in Eastern Europe/FSU did not have an overall equalizing effect on world income inequality. If we conduct a simulation exercise for 1993 keeping real incomes and inequality in the Eastern Europe/FSU at their 1988 level, world income Gini becomes 64.7 instead of the actual 66.0. Thus, changes *outside* the transition countries are responsible for an increase of almost 2 Gini points in world inequality (64.7 minus 62.8), while changes in transition economies added another 1.3 Gini points (66.0 minus 64.7).

But in addition the ICT between rural China and the US decreased also on account of shrinking percentage of world population living in rural China. In 1988, 19.5 percent of world population lived in rural China; in 1993, that percentage was 18.5. Thus, both the fact that China's income rose compared to the US, and that its population moved out of the poorer rural areas, contributed to reduce world inequality.

Table 23. Largest negative (inequality-reducing) changes in inter-country terms between 1988 and 1993 (in Gini points)

	China(rur)	China(urb)	India(rur)	Japan
USA	-0.40	-0.05		-0.14
Russia	-0.30	-0.12	-0.17	
Ukraine	-0.21		-0.14	
Brazil	-0.19	-0.09	-0.09	

This calculation allows us to illustrate the following problem. Consider growth of rural incomes in India vs. US. Rural incomes in India increased only by 5 percent, the mean income in the US increased by 24 percent. Since US started as, of course, richer country, this should, at first glance, imply that the inter-country Gini component should increase, and not decrease. However, note that the formula for each ICT is

$$\frac{yj - yi}{\mu} pip_j$$

so that –given unchanged *pi* and *pj*—it will go up only if the difference between the incomes increases faster than the mean world income. [One might remember that Gini is a mean-standardized measure of inequality.] In the case of rural India-US, the difference between these two countries' mean incomes increased from $PPP 9,495 to $11,870. However, this increase (25 percent) was less than the increase in the mean world income (29 percent). Thus the difference between mean income in rural India and income in the US *decreased* from being 3.87 times world mean income to being 3.75 times world mean income. This example illustrates that for a single ICT to go up, and thus to add to world inequality, it is not sufficient that a rich country grow faster than a poor country. The absolute difference between the two countries' incomes must increase faster than world mean income.

What were then the main factors underlying the increase in inequality between 1988 and 1993? They are two. First, slower growth of rural areas in large South Asian countries (India and Bangladesh) and in rural China compared to developed OECD countries (France, Japan, Germany)[33] is responsible for 2 Gini points increase of world inequality (see Table 24). Mean per capita rural income in India increased by 5 percent in current $PPP between 1988 and 1993;

[33] And to some extent, with respect to the US; see Bangladesh-US cell in Table 24.

in Bangladesh the increase was 14 percent, and in rural China 21 percent. [34] Meanwhile, mean current $PPP incomes in the US increased by 24 percent, in Japan by 60 percent, and in Germany by 43 percent.[35] The absolute income differences between a few large OECD countries and populous rural areas in Asia thus increased faster than did world income overall; this in turn increased the ICTs, and added to world inequality.

Second, the widening differences within China between urban and rural areas, and between urban China and rural India pushed world inequality up by about 0.45 Gini points.[36]

Table 24. Largest positive (inequality-increasing) changes in inter-country terms between 1988 and 1993 (in Gini points)

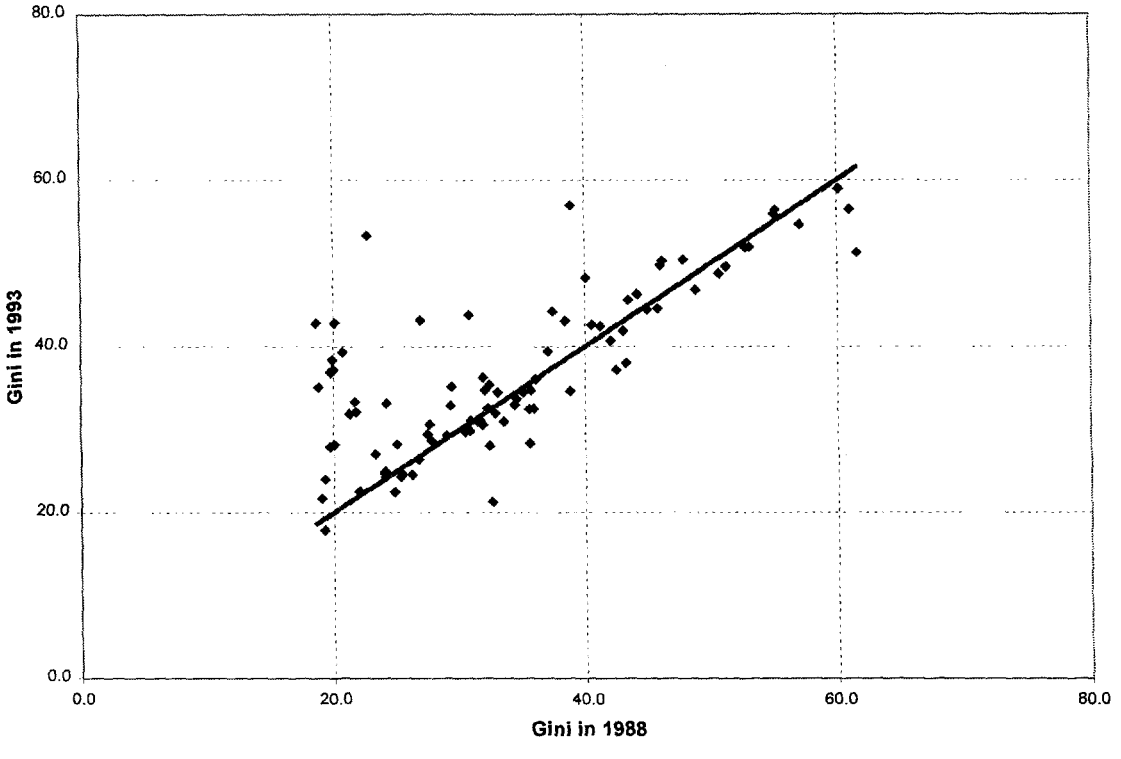
	Bangladesh	India(rur)	China(rur)
Japan	0.20	0.28	0.23
Germany	0.12	0.25	0.25
France		0.14	0.14
USA	0.42		
Subtotal	0.74	0.67	0.61
China(urb)		0.22	0.23
Total	0.74	1.11	1.08

In conclusion, what happens to world inequality is to a large extent determined by what happens to inequality between the countries, and what happens to the inequality between the countries depends, to a large extent, on what is the relationship between mean incomes in China, India, and several large OECD countries. This explains the ambiguous effects produced by the relatively fast growth of mean income in urban China. On the one hand, Chinese urban growth reduced its distance from the middle income and rich countries and thus the world Gini; on the other hand, though, the widening gap between urban and rural China, and between urban China and rural India, increased world inequality.

[34] Note that consumer prices in the US, which underly the international dollar, increased by 22 percent between 1988 and 1993. Thus, every increase smaller than 22 percent represents a *real* decline at constant world prices.
[35] This translates into 2 percent per capita real growth in the US, 17 percent in Germany and about 30 percent in Japan (all over the 1988-93 period). Compare this with real GDP growth over the same period of 9 percent in the US, 15 percent in Germany, and 16 percent in Japan.
[36] While current $PPP incomes in rural China increased by 21 percent, the growth in urban areas was over 70 percent.

What happened to individual country Ginis? Figure 11 shows the scattergram of individual country Ginis for 1988 and 1993. The thick line in the middle is the line of equality (no change in the Gini). We easily notice that there were more Gini increases than decreases, and that they have been larger. The Gini coefficient increased in 52 countries, and went down in 39. The average increase was 6.8 Gini points, the average decline only 2.4 Gini points. The variability of increases was also greater: the standard deviation of increases was 7.4 Gini points, that of declines only 2.5 Gini points. Most of the increases occurred in countries at low or medium level of (1988) inequality. These are, of course, the transition economies in Eastern Europe and the FSU. If we leave them out, the number of increases and decreases is about even (34 increases against 30 decreases), although the average increase would still be higher (5.3 Gini points) vs. the average Gini decline of 2.6 points. Notice however that in four countries with the highest inequality in 1988 (Zambia, Lesotho, Brazil and Honduras), Gini coefficient went down.

Figure 11. Individual country Gini coefficients in 1988 and 1993



Comparison with other studies. Table 25 shows the estimates of world inequality collected from several other studies mentioned in Section II. In terms of methodology, Bourguignon and Morrisson (1999) and Berry, Bourguignon and Morrisson (1982) are the closest to our study because they use income shares derived from household surveys. However, in both cases, income shares for a number of countries are approximated using income shares of "similar" countries—whether it is done by using econometric techniques (as in the 1982 paper), or by simply "assigning" what are deemed to be similar countries. Yet the results for the world inequality are very similar to the ones obtained here. The world Gini coefficient for 1992 is estimated by Bourguignon and Morrisson as 66.3; we find that, in 1993, it is equal to 66.0. Everything else being the same, we would expect to find a lower Gini value than Bourguignon and Morrisson because they use GDPs per capita and we use actual mean incomes from surveys. As mentioned above, the differences between the rich and poor countries are less when we use HS incomes or expenditures than when we use GDP per capita. On the other hand, the fact that for all countries we use actual survey data with at least 10 data points (while they mostly use quintiles) means that our estimation of within-country inequalities and the overlap term is more precise and thus greater. The two effects apparently offset each other. In effect, all four studies of world inequality by other authors as well and ours, show world Gini to lie within a narrow range of 64 to 66. Studies of inter-national inequality, on the other hand, show that the between-country Gini ranges between 53 and 55. The value for inter-national inequality that we get is somewhat higher: 57.8 Gini points. Nevertheless, it is possible to conclude that, using the standard Gini decomposition, about (or more than) 4/5 of world inequality is due to differences in mean PPP incomes between the countries.

Table 25. World and inter-national inequality as estimated by different authors

	Gini	Theil	Note
World inequality			
Berry, Bourguignon and Morrisson (1982)	64.9 (1970)		Uses GDP per capita and income shares; approximates distributions for a number of countries
Grosh and Nafziger (1986)	63.6 (1970's)		Uses GDP per capita and income shares; approximates distributions for some 40 of countries
Chotikapanich, Valenzuela and Rao (1997)	64.8 (1990)		Approximates distributions; uses GDP per capita data.
Bourguignon and Morrisson (1999)	66.3 (1992)	86.4 (1992)	Uses GDP per capita and income shares; approximates distributions for a number of countries
Milanovic (1999)	66.0 (1993)		Uses actual HBS data
Inter-national inequality			
Theil and Seale (1994)		64.5 (1986)	Only between-country component; uses GDP per capita
Podder (1995)	53.1 (1987)		Only between-country inequality; uses GDP per capita
T. Paul Schultz (1998)	55.2 (1989)		Only between-country component; uses GDP per capita
Firebaugh (1999)	54.3 (1989)	52.6 (1989)	Only between-country inequality; uses GDP per capita
Milanovic (1999)	57.8 (1993)		Uses actual HBS data

Note: Year of estimation between brackets. All GDP per capita are in $PPP terms.

VII. Heterogeneity of the world

This leads us to the following question: how homogeneous is the world in terms of incomes and distributions? One extreme would be if countries' borders were purely "decorational"—that is if there were neither income nor distributional differences between the countries. World inequality would still not be zero because income distributions—while the same across countries—would not have zero inequality. The "class" element though would be the same across countries. Yet one's income would be fully independent of his location. The fact that the Gini coefficient is decomposable into three terms (between-, within-inequality, and the overlap component) implies that it is particularly propitious for the analysis of homogeneity.[37] Under the assumptions of (i) equality of mean country incomes and (ii) equality of distributions between the countries, most of world inequality would be due to the overlap component. The measure of homogeneity derived in the next Section takes advantage of this feature of the Gini decomposition.

New measure of homogeneity. The decomposition formula of the Gini coefficient contains, as we have seen, an "overlap" component which shows what part of inequality is due to the "mixing" of people from rich and poor countries, i.e. to some people from poor countries having incomes greater than some people from rich countries. Clearly, the overlap component (which is calculated as a residual) can be interpreted as reflecting homogeneity (in terms of income per capita) of a population (see Lambert and Aranson, 1993; Yitzhaki, 1994, p. 147; Yitzhaki and Lerman 1991). The higher the value of the component, the more people's incomes "mix," and the more homogeneous the world.

Suppose that mean incomes and Gini coefficients of all countries in the world are the same. Then, the between-country inequality component in (1) would be zero and world Gini would be the same as individual country Ginis. The share of total Gini "explained" by the overlap component would be equal to (4):

$$L^* = \frac{G - \sum_{i=1}^{n} G\pi_i p_i}{G} = \frac{G - \sum_{i=1}^{n} G(p_i)^2}{G} = 1 - \sum_{i=1}^{n} (p_i)^2 \qquad (4)$$

where we use the fact that $\pi i = pi$ if mean incomes are the same. L* thus gives the value of the overlap component if the world were fully homogeneous. [38] We can define homogeneity as the ratio between the actual value of the overlap component (L) and its maximum value (L*):

$$H = \frac{L}{L^*} \qquad (5)$$

[37] "Thus, while the Gini produces a more complex decomposition, it provides more information than such neatly decomposable measures as the Theil index" (Yitzhaki and Lerman, 1991, p.323).

[38] The other extreme occurs when the world is fully heterogeneous: no two individuals from two different countries overlap, and the value of L is zero.

Table 26 shows that in both 1988 and 1993, the overlap component amounted to 10.8 percent of its maximum value. There was no change in income or distribution homogeneity of the world according to this measure.

Table 26. Index of income homogeneity of the world

	1988	1993
(1) % of actual inequality due to overlap a/	10.0	10.0
(2) % of total inequality due to overlap if world were fully homogeneous b/	92.5	92.6
Index of homogeneity (1): (2) (in %)	10.8	10.8

a/ From Table 20. b/ Formula given by (4).

The Yitzhaki decomposition. Under the standard (Pyatt) Gini decomposition, the overlap component, while informative, is still calculated as a residual. Yitzhaki and Lerman (1991) and Yitzhaki (1994) have proposed an alternative decomposition of the Gini coefficient by recipient where the Gini is exactly decomposable into three terms: within- country component, between-country component, and a stratification component.

The within country component is equal to[39]

$$\sum_{i=1}^{n} G_i \pi_i$$

The between country component is equal to

$$\frac{2\,\mathrm{cov}(\bar{y}, \bar{F})}{\mu}$$

where (barred) y, F are respectively mean income of country *i*, and F=mean rank of country *i*. All people in country *i* are assigned their ranks (reflecting their income) in world income distribution, and F is the country average of such ranks (calculated across individuals). This component must be less than the Pyatt between-country component (see Yitzhaki and Lerman, 1991, p.322).

Finally, the stratification term is obtained as

$$\sum_{i} \pi_i G_i Q_i (1 - p_i) \qquad (6)$$

[39] Note that the within-country component must be greater than in the Pyatt decomposition since weights are income shares only and they sum up to 1.

where

$$Qi = \frac{\text{cov } i[(Fi - Fni), y]}{\text{cov } i(Fi, y)} \qquad (7)$$

and all other symbols as defined before. *Fi* is rank of each individual within his country's income distribution (say, US), *Fni*=rank of that same individual within income distributions of all other countries (i.e. world minus the US), and *y*=individual's income.

The term Qi is crucial. If there is stratification, Qi will be positive. We can explain this as follows. For Qi to be positive, the numerator must be positive, since the denominator is always positive. The numerator will be positive only if country represents a meaningful "stratum." Consider a very poor country. Its own *Fi*'s will of course increase with income. However, since the country is very poor, both its own rich and own poor will have about the same rank in the rest of the world distribution. Thus the difference *Fi-Fni* will be throughout positive and rising more or less in step with *y*. The same logic applies to a very rich country: its *Fi-Fni* will start by being strongly negative, and will gradually grow less negative (increase) as *y* goes up. In both cases, therefore, the numerator will be positive as the difference *Fi-Fni* rises with income. In both cases too, the variability of income ranks within the country will be greater than the variability of its income ranks within the rest of the world. [40] This, in turn, implies that the country is different from the rest of the world: it represents a "stratum." When Qi>0, the expression (6) becomes negative. The stratification of the world thus *reduces* income inequality.

The opposite is true is a country does not represent a real "stratum": then variability of own distribution is less than variability of that same distribution across the rest of the world. "This means that [people in country] *i* are not a homogeneous group in overall [world] population, but [that people in country *i*] are composed of several different groups" (Yitzhaki and Lerman, 1991, p. 318). Finally, if country's own income ranks were to fully mimic its income ranks in the-rest-of-the-world distribution, the difference *Fi-Fni* would be zero throughout, and hence Qi=0, and the stratification (6) term collapses.

Table 27. The Yitzhaki decomposition: stratification of the world

	1988	1993	Change
Within-country	42.9	47.6	+4.7
Between-country	33.5	34.3	+0.8
Stratification	-13.6	-15.9	-2.3
Total Gini	62.8	66.0	+3.2

Table 27 shows that between 1988 and 1993, both within- and between-country inequality increased. The within-country inequality increased substantially, by 4.7 Gini points, that is, by more than 1/10 of its 1988 value. This was accompanied by an increase in the stratification of the world in terms of mean incomes by countries. The stratification component moved from –13.6 to –15.9 Gini points.

[40] For example, the very poor people in the US will have a very low own rank (say, 2nd or 3rd percentile), and the rich will have a very high rank. But in world income distributin, their ranks will not differ as much because even the US poor may have a high (say, 75th percentile) world rank.

Since in the Yitzhaki's decomposition the stratification term is *not* calculated as a residual, we can calculate the "contributors" to stratification—that is the countries that have added the most to the stratification of the world. This is, however, a very complex exercise because the term (7) needs to be calculated for each country. There are 91 countries in our sample. I plan to do so in another paper. Here, I have decided to calculate the individual stratification components for the five regions (see Table 28).

Table 28. Five regions: stratification terms and mean rank

	1993			1988		
	Q term	Stratification term (6)	Mean world rank	Q term	Stratification term (6)	Mean world rank
Asia	-2.16	16.10	41.7	-2.55	15.47	39.8
WENAO	0.78	-11.73	87.7	0.75	-10.81	87.2
E. Europe, FSU	0.37	-1.17	61.3	0.46	-1.48	78.1
LAC	0.20	-1.06	62.8	0.15	-0.75	60.2
Africa	-0.06	0.07	43.7	-0.96	1.12	45.8

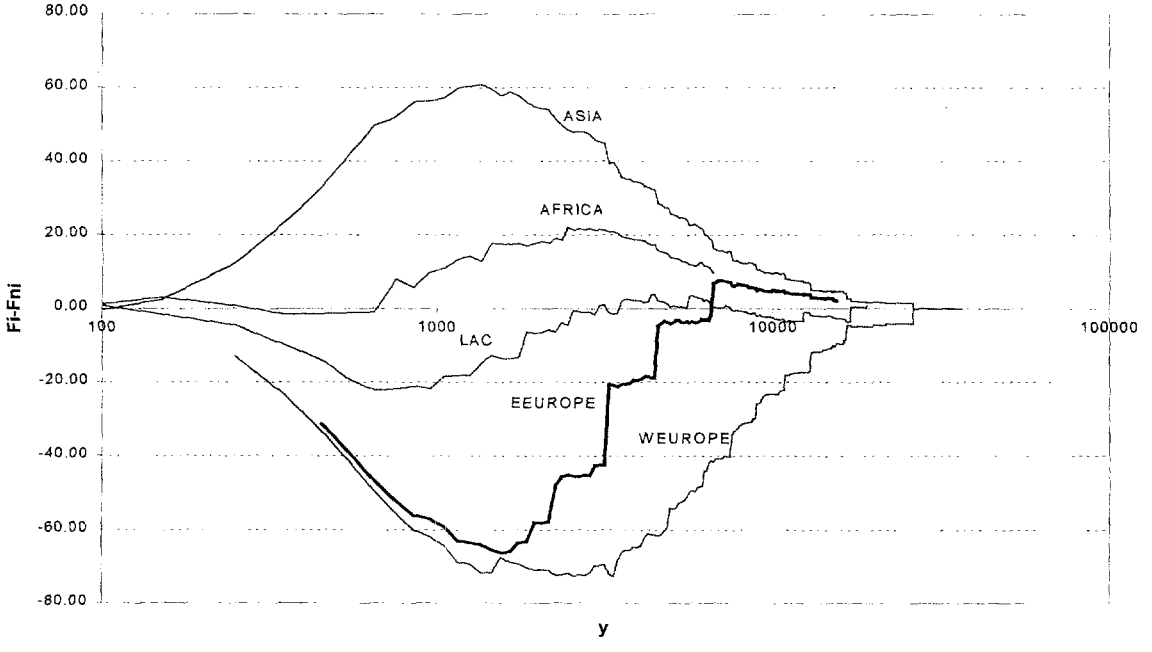
The largest positive Q term is found in WENAO countries. The positive sign shows that the region represents a separate stratum (of high income countries).[41] Eastern Europe and the FSU were also a high-income stratum in 1988. This is shown in Figure 12 (panel for 1988; bold line) where practically for all income levels except the highest, own income rank of people in Eastern Europe/FSU in 1988 is less than their income rank in the rest of the world (that is, a person whose income puts him at the 20th percentile in Eastern Europe/FSU, had an income that put him at the 75th percentile in the world). In 1988, income levels in Eastern Europe/FSU were clearly higher than those in LAC. But in 1993, the situation changed. The line for Eastern Europe/FSU follows very closely that for LAC. In consequence, the mean world income rank of people in Eastern Europe/FSU went down from 78th to 61st percentile; it is now lower than the mean income rank for LAC countries (63rd percentile).

Asia, both in 1988 and 1993 has a very high Q<0, implying that the region represents a combination of poor and rich people. The relative impoverishment of Africa is obvious when we compare Figure 12 for 1988 and 1993. While in 1988, own ranks of Africa poors mimic those of the world (thanks to the existence of similarly poor people mostly in Asia), in 1993, even the African poor's own ranks are higher than their world ranks. In 1993, the line for Africa lies above that for Asia for very low incomes, and the two intersect around $PPP 300. Similarly to what we have seen in Figure 3 this indicates a *new* presence of many extremely poor people in Africa.

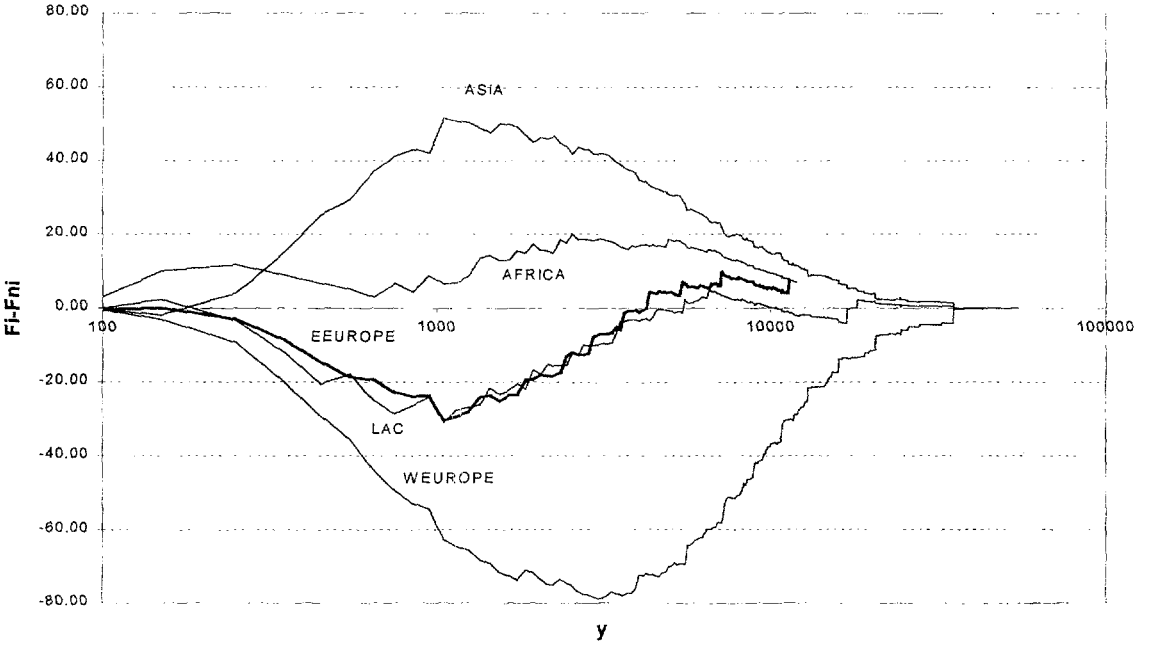
[41] Note that the mean income rank of WENAO countries is 87th percentile.

Figure 12. Five regions: difference in own income ranks and rest of the world income ranks

1988



1993



VIII. Conclusions

Our main conclusions from the first calculation of world income and expenditure inequality based solely on household surveys –which covers about 84 percent of world population and 93 percent of world GDP—can be summarized in several points:

1. World income inequality is very high: the Gini coefficient is 66 if one uses incomes adjusted for differences in countries' purchasing power, and almost 80 if one uses current dollar incomes. One can conjuncture that such a high inequality is sustainable precisely because world is not unified, and rich people do not mingle, meet or even know about the existence of the poor (other than in a most abstract way).

2. World inequality has increased (using the same sample of countries) from a Gini of 62.5 in 1988 to 66.0 in 1993. This represents an increase of 0.6 Gini points per year. This is a very fast increase, faster than the increase experienced by the US and UK in the decade of the 1980's. (The Gini coefficient is scale-invariant: thus larger and smaller units can legitimately be compared.)

3. Differences between countries' mean incomes (difference in "place") is the most important factor behind world inequality. It explains between 75 to 88 percent of overall inequality (depending on whether we use Gini or Theil coefficient to measure inequality).

4. The increase of inequality between 1988 and 1993 occurred as both between-country and within-country inequality increased. However, since their relative proportions remained the same, it was the between-country inequality which, being much larger, drove overall inequality up. More specifically, slow growth of rural per capita incomes in populous Asian countries (China, India and Bangladesh) compared to income growth of large and rich OECD countries, plus fast growth of urban China compared to rural China and rural India, were the main reasons why world Gini increased.

5. World income distribution in 1988 Lorenz-dominates the distribution in 1993. Neither year is stochastically dominant (either first- or second-order). However, if one considers different regions, in the Western Europe, North America and Oceania (WENAO), 1993 stochastically dominates 1988. Other regions display no such regularity. In Africa, and Eastern Europe/FSU, though, 1988 displays a second-order stochastic dominance over 1993.

6. WENAO and LAC show what may be deemed "desirable" income distribution changes between 1988 and 1993. The absolute importance of both "class" (within-country inequality) and "place" (between-country inequality) decreased, and the overall Gini went marginally down in both regions. WENAO level of inequality is now the lowest of all regions as Eastern European/FSU inequality pulled ahead. In Asia and Africa (as in the world), the importance of "place" as an "explanation" of inequality increased; that of "class" went down. In Eastern Europe/FSU both "place" and "class" became more important in absolute terms and pushed inequality up.

7. What happens to world inequality depends to a large extent on what happens to the relative position of China and India (on the one end of the spectrum), and US, Japan, France and Germany, on the other end.

8. The bottom 5 percent of the world grew poorer, as their real incomes decreased by ¼, while the richest quintile grew richer. It gained 12 percent in real terms, that is its income grew more than twice as much as mean world income (5.7 percent).

9. A number of other, at times stunning statistics can be generated from the first true world income distribution. I will give here only a few such examples:

- The richest 1 percent of people in the world receive as much as the bottom 57 percent, or in other words, less than 50 million richest people receive as much as 2.7 billion poor.

- An American having the average income of the bottom US decile is better-off than 2/3 percent of world population.

- The top 10 percent of the US population has an aggregate income equal to income of the poorest 43 percent of people in the world, or differently put, total income of the richest 25 million Americans is equal to total income of almost 2 billion people.

- The ratio between average income of the world top 5 percent and world bottom 5 percent increased from 78 to 1 in 1988, to 114 to 1 in 1993.

- 75 percent of world population receive 25 of world $PPP income; and the reverse.

- 84 percent of world population receive 16 percent of world (unadjusted) dollar income; and the reverse.

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Annex 1: Data sources

Source of data for 1988

List of Countries	Source of Data	Type of Data (X/Y)	Number of Income Groups	Year of Survey
Algeria	Expenditure data from "Growth Employment and Poverty Reduction", WB report no.16618-AL. Survey name: Enquete sur les Depenses de Consommation des Menages-EDCM.	X	10	1988
Argentina(urb)	Encuesta Permanente de Hogares (EPH), (Kihoone Lee)	Y	10	1989
Armenia	Distribution from B.Millanovic	Y	5	1988
Australia	Australian Income and Housing Survey (LIS)	Y	10	1989
Austria	Austrian Microcensus (LIS)	Y	10	1987
Azerbaijan	Distribution from B.Millanovic	Y	5	1988
Bangladesh(rur)	Data from Binyak Sen file	X	16	1988-89
Bangladesh(urb)	Data from Binyak Sen file	X	16	1988-89
Belarus	Distribution from "Income, Inequality and Poverty during the Transition from Planned to Market Economy", B.Milanovic.	Y	5	1988
Belgium	Panel Survey of the Centre for Social Policy (LIS)	Y	10	1988
Bolivia	INE-Encuesta Integrada de Hogares (EIH), '89 (primera ronda), (Gilda Lopez <ceninf@ine.gov.bo>)	Y	10	1989
Bosnia	Income Distribution from: Anketa o Potosnji Domacinstava U 1988", p.19	Y	10	1988
Brazil	Household per capita income from: Pesquisa Nacional por Amostra de Domicilios (PNAD) 1988	Y	10	1988
Bulgaria	Distribution from Lyn1: HBS89	Y	10	1989
Canada	Survey of Consumer Finances (LIS)	Y	10	1987
Chile	Encuesta Nacional de Empleo (PIDEH), 4/Q 89 (Household per capita income from all sources, including wages, salaries, self-employed income LAC report #27 WB12/92 A3.3 "Poverty and Income Distribution in Latin America: Story of 80s")	Y	10	4Q/1989
China(rural)	Data from Binyak Sen file; used also in Everyone's miracle (provided by B. Bidani).	Y	12	1990
China(urban)	Data provided by Shaohua Chen.	Y	20	1990
Colombia	Mean income and percentages from Ariel Fiszbein data (household per capita income adjusted by differences in prices between regions of the country)	Y	20	1988
Costa Rica	Encuesta de Hogares de Propositos (EHPM), Jul 89, (Household per capita income from all sources, including wages, salaries, self-employed income LAC report #27 WB12/92 A3.3 "Poverty and Income Distribution in Latin America: Story of	Y	10	Jun-89

80s")

Croatia	Income Distribution from: Anketa o Potosnji Domacinstava U 1988", p.35	Y	10	1988
Cyprus	Household Income and Expenditure Survey of 1990/91 (Income distribution data from National Statistical Office, (Ms Dora Kyriakidou <cydsr@cytanet.com.cy>))	Y	10	1990/91
Czech Republic	Distribution from "Income, Inequality,and Poverty during the Transition from Planned to Market Economy", B.Milanovic, p.166, (Microcensus)	Y	10	1988
Denmark	Income Tax Survey (LIS)	Y	10	1987
Dominican Republic	Encuesta de Gasto Social, (Household per capita income from all sources, including wages, salaries, self-employed income LAC report #27 WB12/92 A3.3 "Poverty and Income Distribution in Latin America: Story of 80s")	Y	10	Mar-89
Ecuador (urb)	Encuesta de Hogares, (Average Personal Income from Albert Berry,"Poverty,Economic Reform & Income distribution in Latin America", p.192)	Y	8	1988
Egypt(rur)	CAPMAS figure from Institute of National Planning, (Expenditure data from "Mr Richard Adams")	X	5	1990/91
Egypt(urb)	CAPMAS figure from Institute of National Planning, (Expenditure data from "Mr Richard Adams")	X	5	1990/91
El Salvador(urb)	Encuesta de Hogares de PropositosMultiples (EPHPM), (Kihoone Lee)	Y	10	1989/90
Estonia	Soviet HBS, (Distribution from "Income, Inequality,and Poverty during the Transition from Planned to Market Economy", B.Milanovic)	Y	5	1988
Finland	Income Distribution Survey (LIS)	Y	10	1987
France	Famil y Budget Survey (LIS)	Y	10	1989
FRYougoslavia	Income Distribution from: Anketa o Potosnji Domacinstava U 1988", p.27,59	Y	10	1988
FYROMacedonia	Income Distribution from: Anketa o Potosnji Domacinstava U 1988", p.43	Y	10	1988
Georgia	Distribution from B.Millanovic	Y	15	1990
Germany, East	Distribution from "pkrause@diw-berlin.de"	Y	10	1990
Germany, West	German Social Economic Panel Study (GSOEP), (LIS)	Y	10	1989
Ghana	Ghana Living standard survey 1993; data supplied by Canagarajah (see ghana.xls).	X	10	1988
Greece	Income data from "Chanhes in aggregate inequality and poverty in Greece after the restoration of democracy", T.Mtrakos,Dept.of Economics, paper# 97, 1998	Y	10	1987/88

Guatemala	Encuesta Nacional Socio-Demografica (ENSD), April-July 89, (Household per capita income from all sources, including wages, salaries, self-employed income LAC report #27 WB12/92 A3.3 "Poverty and Income Distribution in Latin America: Story of 80s")	Y	10	2Q/1989
Honduras	Encuesta Permanente de Hogares de Propositos Multiples (EPHPM) Sp 89, (Household per capita income from all sources, including wages, salaries, self-employed income LAC report #27 WB12/92 A3.3 "Poverty and Income Distribution in Latin America: Story of 80s")	Y	10	Sep-89
Hong Kong	Income Distribution from "1991 Population Cencus", Hong Kong Cencus & Statistics Dept	Y	10	1991
Hungary	Disposable income from Lyn1; HBS 89	Y	14	1989
India(rur)	Data from Binyak Sen file	X	12	1989-90
India(urb)	Data from Binyak Sen file	X	12	1989-90
Indonesia(rur)	Data from Binyak Sen file, used also in Everyone's miracle (provided by B. Bidani).	X	38	1990
Indonesia(urb)	Data from Binyak Sen file, used also in Everyone's miracle (provided by b. Bidani).	X	30	1990
Ireland	ESRI Survey of Income Distribution, Poverty and Usage of State Services (LIS)	Y	10	1987
Israel	Family Expenditure Survey (LIS)	Y	10	1986
Italy	The Bank of Italy Survey (Indagine Campionaria sui Bilanci Delle Famiglie), (LIS)	Y	10	1986
Ivory Coast	Cote d'Ivoire Living Standards Survey(CILSS), Data from LSMS (Diane Steele).	X	10	1988
Jamaica	Jamaica Survey of Living Conditions, July 89, (Household per capita income from all sources, including wages, salaries, self-employed income LAC report #27 WB12/92 A3.3 "Poverty and Income Distribution in Latin America: Story of 80s")	Y	10	Jul-89
Japan	Income Distribution from "Annual Report on the Family Income and Expenditure Survey, 1988", p.184	Y	10	1988
Jordan	Income Distribution from (Bahjat Achikbache): World Bank staff calculations based on IES-86/87	X	28	1992
Kazakhstan	Soviet HBS, (Distribution from "Income, Inequality,and Poverty during the Transition from Planned to Market Economy", B.Milanovic)	Y	5	1988
Korea, South	Income Distribution from "National Survey of Family Income and Expenditure", Nat. Stat. Office, p.155, Mean Disp.Income from SIMA (UN:Nat.Accounts)	Y	10	1988
Kyrgyz Republic	Soviet HBS, (Distribution from "Income, Inequality,and Poverty during the Transition from Planned to Market Economy", B.Milanovic)	Y	5	1988

Latvia	Soviet HBS, (Distribution from "Income, Inequality,and Poverty during the Transition from Planned to Market Economy", B.Milanovic)	Y	5	1988
Lesotho	1986-87 Household budget survey; reported in Gustafsson and Makonen, Journal of International Development, vol.6, 1994, p. 378.	Y	10	Oct.86-Sept.87
Lithuania	Soviet HBS, (Distribution from "Income, Inequality,and Poverty during the Transition from Planned to Market Economy", B.Milanovic)	Y	5	1988
Luxembourg	The Luxembourg Social Economic Panel Study "Liewen zu Letzebuerg", (LIS)	Y	10	1991
Madagascar	Income distribution data from:"Madagascar Poverty Assessment", Report No. 14044-MAG, p.107, 1977 National Diposable Income from SIMA: UN (National Accounts)	Y	8	1980
Malaysia	Data from Binyak Sen file	Y	5	1989
Mexico	Encuesta Nacional de Ingreso-Gasto de los Hogares (ENIGH) ,(Household per capita income from all sources, including wages, salaries, self-employed income LAC report #27 WB12/92 A3.3 "Poverty and Income Distribution in Latin America: Story of 80s")	Y	10	3Q/1989
Moldova	Soviet HBS, (Distribution from "Income, Inequality,and Poverty during the Transition from Planned to Market Economy", B.Milanovic)	Y	5	1988
Morocco	Kingdom of Morocco: Poverty, adjustment and growth, grey cover, January 1994, p. 5. (LSMS 1990-91)	X	10	1990-91
Netherlands	Additional Enquiry on the Use of (Public) Services (AVO), (LIS)	Y	10	1987
New Zealand	Household Economic Surveys, (Distribution of disp. income from New Zealand National Statistical Office (Download from http://www.stats.govt.nz/statsweb.nsf))	Y	10	1986
Nigeria	Data from "The evolution of poverty and welfare in Nigeria, 1985-92" by Canagarajan, Ngwafon and Thomas, World Bank Policy Tresearch paper No. 1715, January 1997, p. 13	X	11	1985-86
Norway	Income and Property Distribution Survey, (LIS)	Y	10	1986
Pakistan	Data from Binyak Sen file. Probably Pakistan Integrated HH [LSMS] survey (PIHS) 1991 (although the mean given there, in Basic info..., p. 62 is higher).	X	20	1991
Panama	Encuesta de Hogares, Mano de Obra (EMO), 1989, (Household per capita income from all sources, including wages, salaries, self-employed income LAC report #27 WB12/92 A3.3 "Poverty and Income Distribution in Latin America: Story of 80s")	Y	10	Aug-89

Paraguay	Encuesta de Hogares, Mano de Obra (EMO), 1990, (Household per capita income from all sources, including wages, salaries, self-employed income LAC report #27 WB12/92 A3.3 "Poverty and Income Distribution in Latin America: Story of 80s")	Y	10	3Q/1990
Peru(Lima)	Data from: Who is most vulnerable to macroeconomic shocks? Hypothesis tests using panel data from Peru, LSMS WP No. 117, by Paul Glewwe and Gillette Hall. June 1995, p. 10.	X	10	1990
Phillipines	Data from "Everyone's miracle" supplied by Beni Bidani.	X	20	1988
Poland	Distribution from Lyn1; HBS 1987	Y	8	1987
Portugal	Income distribution from: Portuguese Household Budget Survey, Rodrigues,C.F.(1999) 'Distribuição do Rendimento e Desigualdade - Portugal 1980-1995'	Y	10	1989/90
Romania	Distribution from Lyn1; HBS 89	Y	10	1989
Russia	Soviet HBS, (Distribution from "Income, Inequality,and Poverty during the Transition from Planned to Market Economy", B.Milanovic)	Y	5	1988
Rwanda	Rwanda: poverty reduction and sustainable growth, May 1994, report No. 124565, p.77, from Enquete nationale sur le budget et la consommation.	X	10	1983-85 (prices 85)
Senegal	Enquete sur les priorites, (Expenditure data from "Mr Olivie Dupriez")	X	10	1991
Slovak Republic	Distribution from "Income, Inequality,and Poverty during the Transition from Planned to Market Economy", B.Milanovic, p.168, (Microcensus)	Y	25	1988
Slovenia	Income Distribution from: Anketa o Potosnji Domacinstava U 1988", p.51	Y	8	1988
Spain	Expenditure and Income Survey, (LIS)	Y	10	1990
Sri Lanka	Income data extracted from table 1.1 in (World Bank, 1995) which has been based on report on Consumer Finances and Socio Economic survey 1986/87,Central Bank of Sri Lanka (http://www.cowan.edu.au/library/iorr/pdf/wdlch2.pdf).	Y	10	1986/87
Sweden	Income Distribution Survey (Inkomstfördelningsundersokningen), (LIS)	Y	10	1987
Switzerland	Swiss Income and Wealth Survey, (LIS)	Y	10	1982
Taiwan	Survey of Personal Income Distribution, Taiwan Area, (LIS)	Y	10	1986
Tajikistan	Distribution from B.Millanovic	Y	5	1988
Thailand	Data from Beni Bidani (Everyone's miracle).	Y	20	1988
Trinidad & Tobago	Average Personal Income from Household Budget Survey 1988, report No.1, Central statistical office, calculated from the Table 31, page 28.	Y	17	1988
Tunisia	INS Household Consumption Survey, (Expenditure data from "Republic of Tunisia, Poverty Alleviation",report no.13993-TUN)	X	10	1985

Turkmenistan	Soviet HBS, (Distribution from "Income, Inequality,and Poverty during the Transition from Planned to Market Economy", B.Milanovic)	Y	5	1988
U.K.	The Family Expenditure Survey, (LIS)	Y	10	1986
Uganda	Household Budget Survey, (Expenditure data from Mr Olivie Dupriez)	X	10	1989
Ukraine	Soviet HBS, (Distribution from "Income, Inequality,and Poverty during the Transition from Planned to Market Economy", B.Milanovic)	Y	5	1988
Uruguay	Encuesta Nacional de Hogares (ENH), 2/half 1989, (Household per capita income from all sources, including wages, salaries, self-employed income LAC report #27 WB12/92 A3.3 "Poverty and Income Distribution in Latin America: Story of 80s")	Y	10	3,4Q/1989
USA	March Current Population Survey, (LIS)	Y	10	1986
Uzbekistan	Soviet HBS, (Distribution from "Income, Inequality,and Poverty during the Transition from Planned to Market Economy", B.Milanovic)	Y	10	1988
Venezuela	Encuesta de Hogares por Muestra (EHM), 2/half 1989, (Household per capita income from all sources, including wages, salaries, self-employed income LAC report #27 WB12/92 A3.3 "Poverty and Income Distribution in Latin America: Story of 80s")	Y	10	3,4Q/1989
Zambia	Social dimensions of adjustment priority survey 1991; data provided by Robert Chase. (data for the last decile estimated from the ratio btw. 10th and 9th decile in Zambian distribution for 1993).	Y	10	1991

Source of data for 1993

List of Countries	Source of Data	Type of Data (X/Y)	Number of Income Groups	Year of Survey
Albania	Employment and Welfare Survey, (Expenditure data from LSMS, Diane Steel)	X	10	1997
Algeria	Enquete Nationale sur la Mesure des Niveaux de Vie des Menages Algeriens-ENMNV, (Expenditure data from "Growth Employment and Poverty Reduction",report no.16618-AL.)	X	10	1995
Argentina(urb)	Encuesta Permanente de Hogares (EPH), (Kihoone Lee)	Y	10	1992
Armenia	Distribution of expenditurees in Armenia from household survrey Nov. 1996 (R. Yemtsov).	X	10	1996
Australia	Australian Income and Housing Survey (LIS)	Y	10	1994
Austria	Austrian Microcensus (LIS)	Y	10	1991
Bangladesh	Data from Shahua Chen	X	17	1992
Belarus	Income and deciles from LYN1.XLS. (income in br/month) New Household survey (provided by Anna Ivanova).	Y	10	Dec-95
Belgium	Panel Survey of the Centre for Social Policy (LIS)	Y	10	1992
Bolivia	Income distribution data from National Statistical Office: INE-EIH'93 (sexta ronda), (Gilda Lopez <ceninf@ine.gov.bo>)	Y	10	1993
Brazil	Population data from: Household income per capita from: Pesquisa Nacional por Amostra de Domicilios (PNAD) 1993.	Y	10	1993
Bulgaria	Bulgarian HBS, (B. Milanovic)	Y	10	1993
Burkina	Enquête prioritaire sur les conditions de vie des ménages, (Distribution of houshold expenditures from the World Bank African DataBase, Mr H.Fofack)	X	10	1995
Canada	Survey of Consumer Finances (LIS)	Y	10	1994
Central Afr.R.	Enquête prioritaire sur les conditions de vie des ménages (EP1), (Distribution of houshold expenditures from the World Bank African DataBase, Mr H.Fofack)	X	10	1993
Chile	Household per capita income from: Leiva, Fernando "Flexible Labor Markets, Poverty and Soc. Disintegration..." 1996.	Y	20	1994
China (urban)	Data from Shaohua Chen	Y	20	1993
China(rural)	Data provided by Shaohua (also in Benu Bidani's Everyone's miracle).	Y	10	1993
Colombia	Mean income and percentages from Ariel Fiszbein data. Household per capita income adjusted by differences in prices between regions.	Y	20	Sep-92

Costa Rica	Household per capita income from: Székely, M. and M. Hilgert "What's Behind the Inequality We Measure: An Investigation Using Latin American Data for the 1990s". Research department, Inter American development Bank, mimeo, 1999.	Y	10	1993
Cyprus	Household Income and Expenditure Survey of 1996/97 (Income distribution data from National Statistical Office, (Ms Dora Kyriakidou <cydsr@cytanet.com.cy>))	Y	10	1996/97
Czech Republic	Net income; data supplied by Vecernik.	Y	10	1992
Denmark	Income Tax Survey (LIS)	Y	10	1992
Djibouti	First Djibouti survey (for PA).	X	10	1995
Dominican Republic	Household per capita income from: Székely, M. and M. Hilgert "What's Behind the Inequality We Measure: An Investigation Using Latin American Data for the 1990s". Research department, Inter American development Bank, mimeo, 1999.	Y	10	1996
Ecuador	Distribution: data provided by Peter Lanjouw. LAC report WB12/92 A3.48. Household per capita expenditure.	X	10	1995
Egypt(rur)	CAPMAS figure from Institute of National Planning, (Expenditure data from "Mr Richard Adams")	X	5	1995/96
Egypt(urb)	CAPMAS figure from Institute of National Planning, (Expenditure data from "Mr Richard Adams")	X	5	1995/96
El Salvador	Household per capita income from: Székely, M. and M. Hilgert "What's Behind the Inequality We Measure: An Investigation Using Latin American Data for the 1990s". Research department, Inter American development Bank, mimeo, 1999.	Y	10	1995
Estonia	Income and deciles from LYN1.xls. EMOR data.	Y	10	1993
Ethiopia	Welfare Monitoring Survey and Household Budget Survey, (Distribution of houshold expenditures from the World Bank African DataBase, Mr H.Fofack)	X	10	1996
Finland	Income Distribution Survey (LIS)	Y	10	1991
FR Yugoslavia	Distribution from Lyn1 file, 1993 HBS.	Y	10	1993
France	% shares from Francois Bourguingnon. Data for 1995 active HHs Budget des Familles 1995.	Y	20	1995
Gambia	Household Economic Survey, (Distribution of houshold expenditures from the World Bank African DataBase, Mr H.Fofack)	X	10	1992
Georgia	Distribution of expenditurees in Armenia from household survrey Nov. 1996 (R. Yemtsov).	X	20	Jun96-Dec97
Germany	German Social Economic Panel Study (GSOEP), (LIS)	Y	10	1994
Ghana	Ghana Living standard survey 1993; data supplied by Canagarajah (see ghana.xls).	X	10	1993
Greece	Income data from "Chanhes in aggregate inequality and poverty in Greece after the restoration of democracy", T.Mtrakos,Dept.of Economics, paper#	Y	10	1993/94

97, 1998.

Guinea	1994 Integrated HH survey. Provided by Boniface Essama-Nssah.	X	10	1994
Guinea-Bissau	Inquerito ligeiro junto às familias, (Distribution of houshold expenditures from the World Bank African DataBase, Mr H.Fofack)	X	10	1992
Guyana	Distribution Data from: LSMS	Y	10	1993
Honduras	Income Distribution from:"EPHPM database", Honduras National Statistical Office.	Y	10	Oct-94
Hong Kong	Income Distribution, mean income from "1996 Population Cencus" from Hong Kong Cencus & Statistics Dept.	Y	10	1996
Hungary	Income and people from LYN1.XLS.	Y	20	1993
India (rural)	Data from Shaohua Chen	X	12	1992
India (urban)	Data from Shaohua Chen	X	12	1992
Indonesia (rural)	Data provided by Jacqueline Baptist.	X	10	1995
Indonesia (urban)	Data provided by Jacqueline Baptist.	X	10	1995
Ireland	Income Distribution Source: Ireland HBS 1994-95, vol. 1, Detailed results for all households, Table 11.	Y	4	1994/95
Israel	Family Expenditure Survey (LIS)	Y	10	1992
Italy	The Bank of Italy Survey (Indagine Campionaria sui Bilanci Delle Famiglie), (LIS)	Y	10	1991
Ivory Coast	Enquête prioritaire sur les dimensions sociales de l'ajustement structurel, (Distribution of houshold expenditures from the World Bank African DataBase, Mr H.Fofack)	X	10	1993
Jamaica	Expenditure data from "Jamaica Survey of Living Conditions, 1993" (LSMS library).	X	10	1993
Japan	Income Distribution from "Annual Report on the Family Income and Expenditure Survey, 1993", p.158.	Y	10	1993
Jordan	Income Distribution from (Bahjat Achikbache): World Bank staff calculations based on IES-92.	X	28	1992
Kazakhstan	Statistical Bulletin CIS, Aug 94, pp.73ff, (Gross income from "Income, Inequality, and Poverty during the Transition from Planned to Market Economy",B.Milanovic,1998, p.181)	Y	17	1993
Kenya	Calculated from Kenya PA, March 95, Table 4.5, p.68. based on 1992-93 Household welfare monitoring system.	X	10	1992
Korea, South	Income Distribution from "National Survey of Family Income and Expenditure", Nat. Stat. Office, p.155.	Y	10	1993
Kyrgyz Rep.	Kyrgyz Multipurpose Poverty Survey, (Disposable income from "Income, Inequality, and Poverty during the Transition from Planned to Market Economy",B.Milanovic,1998, p.180).	Y	10	Oct-Nov 1993(Oct prices)
Laos	Data from "Everyone's miracle" provided by Benu Bidani.	X	10	1992

Latvia	New Latvian HBS, (Disposable income, XRate from "Income, Inequality, and Poverty during the Transition from Planned to Market Economy",B.Milanovic,1998, p.174)	Y	10	4Q/1995
Lesotho	Distribution of Household Income from Lesotho Poverty Assessment (Report No.13171-LSO),p12, (World Bank estimates)	Y	10	1993
Lithuania	Distribution from P.Cornelius Comp. Econ. Studies, Summer 95, Table 3.	Y	10	1994
Luxembourg	The Luxembourg Social Economic Panel Study "Liewen zu Letzebuerg", (LIS)	Y	10	1994
Madagascar	Enquête permanente auprès des ménages, (Distribution of houshold expenditures from the World Bank African DataBase, Mr H.Fofack)	X	10	1993
Malaysia	Data from Malaysia HIS 1995.	Y	10	1995
Mali	Enquête Malienne de conjoncture économique et sociale, (Distribution of houshold expenditures from the World Bank African DataBase, Mr H.Fofack)	X	10	1994
Mauritania	Enquête permanente sur les conditions de vie des ménages, (Distribution of houshold expenditures from the World Bank African DataBase, Mr H.Fofack)	X	10	1995
Mexico	Household per capita income from: Székely, M. and M. Hilgert "What's Behind the Inequality We Measure: An Investigation Using Latin American Data for the 1990s". Research department, Inter American development Bank, mimeo, 1999.	Y	10	1994
Moldova	Annuarul Statistic al Republica Moldova, (Gross income from "Income, Inequality, and Poverty during the Transition from Planned to Market Economy",B.Milanovic,1998, p.178)	Y	24	1993
Mongolia(rur)	Expenditure distribution data from National Statistical Office of Mongolia (http://statis.pmis.gov.mn/hholds1.htm).	X	9	1998
Mongolia(urb)	Expenditure distribution data from National Statistical Office of Mongolia (http://statis.pmis.gov.mn/hholds1.htm).	X	9	1998
Morocco	Distribution data from: Morocco:Poverty, Adjustment and Growth Vol. II, Table 3. Morocco LSMS 1990-91; Direction de la statistique.	X	10	1990-91
Namibia	Distribution from erika Ekstrom, Institute for Industrial Economics (IUI) Working paper No. 502, October 1998, Table 3.3, p.22.	Y	10	1993/94
Nepal	Data provided by LSMS (Diane Steel)	X	10	1996
Netherlands	Socio-Economic Panel (SEP), (LIS)	Y	10	1991
New Zealand	Statistics New Zealand, Household Economic Surveys, (Distribution of disp. income from New Zealand National Statistical Office. Download from: http://www.stats.govt.nz/statsweb.nsf)	Y	10	1991
Nicaragua	Distribution Data from: LSMS	X	10	1993

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