## Initiative *for* **Policy Dialogue**

Based at **Columbia University**

*Working Paper Series*

**WHO GOT WHAT, THEN AND NOW?
A FIFTY YEARS OVERVIEW FROM THE
GLOBAL CONSUMPTION AND INCOME
PROJECT**

Arjun Jayadev, Rahul Lahoti and Sanjay
G.Reddy

# WHO GOT WHAT, THEN AND NOW?[1]
# A FIFTY YEARS OVERVIEW FROM THE GLOBAL CONSUMPTION AND INCOME PROJECT

## Arjun Jayadev[2], Rahul Lahoti[3] and Sanjay G. Reddy[4]
### This version: May 4, 2015.

Using newly comprehensive data and tools from the Global Consumption and Income Project or CGIP (www.gcip.info), covering most of the world and five decades, we present a portrait of the changing global distribution of consumption and income and discuss its implications for our understanding of inequality, poverty, inclusivity of growth and development, world economic welfare, and the emergence of a global 'middle class'. We show how regional distributions of income and consumption have evolved very differently over time. We also undertake sensitivity analysis to quantify the impact of various choices made in database construction and analysis. We find that levels of consumption and income have increased across the distribution, that the global distribution has become more relatively equal due to falling inter-country relative inequality, and that by some measures global poverty has declined greatly but by others it has hardly declined at all, even over the fifty years. The global middle class has grown markedly in certain countries but only slightly worldwide. Most of the marked changes have occurred after 1990. China's rapid economic growth is by far the most important factor underlying almost all of them, notwithstanding sharply increasing inequalities within the country. Most improvements outside of China are associated with rapid developing country growth after 2000, and are of unknown durability. Country-experiences vary widely; there is for instance some evidence of 'inequality convergence' with previously more equal countries becoming less equal over time and the obverse. We provide support for previous findings (e.g. the replacement of the global 'twin peaks' by a unimodal distribution) but also arrive at some conclusions that overthrow old 'stylized facts' (e.g. that the Sub-Saharan African countries, and not Latin American ones, have the highest levels of inequality in the world, when measured using standardized surveys). The GCIP provides a resource for ongoing analysis, and forecasting, of developments in the world distribution.

JEL Codes: D30, D31, D60, D63, I30, O10, O15, P50

---

[1] Apologies to Harold Lasswell (1936).
[2] University of Massachusetts at Boston, Azim Premji University and Institute for New Economic Thinking; arjun.jayadev@umb.edu
[3] University of Goettingen; rahul.lahoti@gmail.com
[4] The New School for Social Research and the Initiative for Policy Dialogue; reddysanjayg@gmail.com

### 1. Overview and Introduction to the Data

The global distribution of income has been the subject of considerable academic and popular commentary in the recent past, because of concerns with poverty, inequality and inclusivity, which are distinct but interdependent. All of these concerns can be illuminated by data on who had what income and consumption, notwithstanding the need to look beyond this in order to adequately characterize living standards in their non-income dimensions as well as to recognize other aspects of social inequity and inequality (involving command over wealth, power and status).

Interest in these themes is partly the result of the world becoming more globally integrated. Anxieties and concerns about the distributional effects of cross-border flows of trade and finance have grown. Along with the substantial increase in the movement of capital and goods across borders there has also been a great increase in the ease and quantity of communication. The greater perceived and actual connection between individuals has created a global 'imagined community' in which well-being of distant others, and disparities between members of world society, are perceived by many to matter. The success or failure of the project of world development over the last seventy years, and over the contemporary period of international economic integration in particular, are also of pressing evaluative and practical interest. Unsurprisingly, evaluations of the trend of global poverty have played a large role in discussions of the impact of globalization as well as of national policy choices over the last twenty-five years. Inequality, both at the national and global level, is a topic that has become increasingly politically salient in national debate (appearing as a central consideration in US President Obama's State of the Union Address in 2015) or in international policy dialogues (e.g. as an key theme in discussions toward the Post 2015 Millennium Development Goals agenda). The role of inequality as cause and consequence of the global financial crisis of 2008 and afterwards has been one recent aspect of that concern. Similarly, the demand for inclusive growth and development in India or for a harmonious society in China in the last fifteen years have reflected a concern not merely to moderate

relative inequalities but to ensure that gains are realized by all, in the presence of sometimes unprecedentedly high and unevenly distributed rates of growth.

The last three decades have also experienced a data revolution. More and better surveys have been collected by multiple agencies, including the World Bank (e.g. through the Living Standards Measurement Surveys) the LIS (formerly known as the Luxembourg Income Study) and others, with some effort being made to achieve greater international comparability. These are now available in readily portable format that is analyzable in unprecedented ways on desktop computers. Extensive efforts to collect price data by the International Comparison Program (ICP) have also provided greater ability account for differences in purchasing power across countries (if not over time). The ICP collects comparative price and expenditure data from countries to estimate purchasing power parities (PPPs) of countries periodically. PPPs are meant, *inter alia*, to facilitate cross-country comparisons of material well-being through better assessment of differences in price levels and resulting command over real resources. As a result of these developments, researchers have come to be able to produce estimates of global inequality based on collections of household surveys -- as opposed to on estimates of GDP per capita[5] -- in the last twenty years. They continue to update their efforts (see, inter alia Milanovic, 2012, Lakner and Milanovic 2013 and Anand and Segal 2010 for useful examples of such work) so as to provide a more comprehensive portrait of the pattern of material living standards of the world's population. Nevertheless, there are serious limitations of comparability, coverage and transparency of such data. Each effort also has a 'one-off' character, whereas an ongoing monitoring system for collation and analysis of data would have evident uses.

The Global Consumption and Income Project (for a detailed description see Lahoti, Jayadev, Reddy 2014) aims to address these needs by generating more comprehensive and internally consistent data than has been available thus far, constructed according to a transparent methodology, which may be applied to diverse purposes. Our goals are

---

[5] Early estimates of global differences in income based on per-capita income data go back at least to Nurkse (1953) who draws on early data from the United Nations.

however not merely descriptive but also analytical.  In this paper, we undertake three separate but interlinked tasks using this dataset and the methods and tools we have developed along with it. First, we provide a portrait of the global distributions of income [in what follows we will often refer to income as shorthand for 'income and consumption'] and its constituent regional distributions and describe their evolution over time. Second, we describe changes in poverty across the world and in different regions at different poverty lines. Third, we describe the degree to which incomes of individuals have increased at various points in the distribution.  In all three cases we aim to understand the respective contributions of movements of specific countries within the world distribution and of changes within countries.   While taking cognizance of broader concerns for non-income advantages and for wealth, power and status, for the moment we limit our own investigations to a narrow terrain.

We use data constructed from the Global Consumption and Income Project (GCIP) for our analysis.  A fuller description of the methods we mention below is presented in Lahoti, Jayadev and Reddy 2014.  The GCIP can be used to generate estimates of the consumption and income means for an arbitrary number of quantiles, which we call a profile, for each country, any user-defined set of country aggregates (such as regions, income groups, or countries which share specific traits such as rapid growth) and for the world as a whole.  We construct estimates of annual data from 1960 to 2012, for each percentile of the population. The GCIP is a complete 'time-space system' which produces estimates for every country-year, which is essential in order for us to be able to use it in a flexible way to construct estimates for country aggregates. We restrict ourselves to surveys that provide household per-capita data, as data employing equivalence scales in their construction use widely variable and incomparable methods and constitute a smaller proportion of the available data. For country-years with no consumption and income survey we interpolate or extrapolate the consumption or income profile using survey data from the closest survey years and appropriate growth rates from the national accounts. The GCIP uses a regression-based 'standardization' method to predict the consumption shares of each quintile of the population for the Global Consumption Database (GCD) in country-years, which have an income survey but no consumption survey and the obverse

for the Global Income Database (GID). These quintile estimates are then used to estimate the entire Lorenz curve. The present benchmark version of the database uses 2005 Purchasing Power Parity (PPP) conversion factors to convert mean levels expressed in national currency units to common international currency units but other exchange rates may be used (and indeed the implications of doing so are very initially explored in this paper). National consumer price indices are used to undertake temporal translation into the base year for spatial comparisons. We use estimates of consumption or income levels from surveys wherever they are available. This is a consequential choice, since survey means are often discrepant from (and typically lower than national accounts means). Figure 1 shows the relation between GDP per capita and survey means for country-years in our dataset. It can be seen that generally survey-means are much lower than GDP per-capita but where they are not they are higher. Investigation of the data suggests that this is a phenomenon that crosses decades and world regions. For this reason among others, the estimates of the absolute level of income that we arrive at, as well as its distribution, must be viewed with the proverbial salt in hand.

The GCIP provides data on evolution of world consumption and income annually, by country and by quantile, and has broader temporal and geographical coverage than other comparable datasets. It is unique in providing separate estimates of consumption and income, which tend to be pooled in most datasets. The distributions using the two concepts might be markedly different, possibly leading to incorrect international and intra-nation comparisons across time. The GCIP also provides software tools for filling in missing data, enhancing data reliability by detecting extreme outliers, and generating consumption or income profiles for any aggregation of countries. These tools allow us to analyze evolution of material living standards for any chosen year by geographical regions or income groupings or other grouping of countries. The GCIP provides estimates of Lorenz curves for each year and calculates a 'synthetic population' that allows the analyst subsequently to calculate *any* poverty, inequality or inclusive growth measure. We attempt to document fully the assumptions and choices made in the database generation process. The database is constructed in a manner that is intended to make it

possible to adopt alternate assumptions and thus to test the sensitivity of the choices made, of which we demonstrate some examples in this paper.

As seen in Table 1, the GCIP presently contains survey data for 1280 country-years spanning the period of 1960-2012 for 134 countries. Most of the surveys are nationally representative (97% cover complete geographical area and 94% cover the entire population). Our data is largely drawn from the World Bank's Povcalnet database, from UNU WIDER's WIID database and from the LIS database but we adopt a 'union' approach drawing in principle from any available source.

The density of surveys varies drastically across the decades. The 1960's and 1970's have the lowest density of surveys with only 62 and 59 country-year observations from 35 and 38 countries respectively. This is largely because of paucity of household surveys, especially in the developing countries, during this period. Our choice of using only per-capita surveys also restricts the number of country-years as this period has several surveys where only total income is reported at household level with no adjustment for household size. The formerly communist countries also have sparse data on income or consumption distribution prior to 1990. Given this data limitation we advise caution in interpreting the results encompassing the earlier period.

To briefly summarize our key results, a few points may be noted. First global incomes have increased across the board over the last three decades. Median income doubled from $70 PPP to $144 PPP per month from 2000 to 2010 after much slower growth in the previous decade. Second, the global income distribution has become substantially more equal in the last three decades, and global poverty has declined extensively. Most of these improvements came in the period after 2000 and can be attributed to inter-country rather than intra-country effects: the very rapid growth of China and to a lesser extent of India during this phase. China's population has experienced an enormous advance that has shaped the world distribution as a whole and others' relative positions. Third, country experiences vary widely, and there is some evidence of 'inequality convergence' with previously more unequal countries becoming more equal over time and vice versa,

although the majority of the world's population lived in countries with rising inequality. Fourth, global 'welfare' estimated by any standard income-focused aggregative welfare function has increased substantially over the last fifty years with most of the change happening in the period since 2000.

## 2. Inequality

We begin by presenting an initial portrait of the distribution of global consumption and income over the last three decades using the GCID.

First, our database is able to reproduce the general finding (see Milanovic, 2012) that the last three decades have seen substantial increases in living standards for the world population considered as a whole, especially in the decade between 2000 and 2010. In 1990, half of the world's population had consumption levels of $54 (in 2005 PPP dollars) per month or $1.78 per day, or less. By 2000, this fraction had fallen to 42% and by 2010 fell further to 29%.

Table 2 provides snapshots of the distribution of global consumption and income distributions at four points in time, 1990, 2000, 2005 and 2010. During this period most countries have household surveys. The extraordinary growth rates experienced by a number of developing countries in the 2000s are evident in the fact that while the median income grew from $70 (in 2005 PPP dollars) in 1990 to $78 in 2000, by 2010, the median had almost doubled (to $144 PPP). In fact virtually all the increase occurred in the 2000s as opposed to the 1990s. To underline this, one may observe that the level of income at the $10^{th}$, $20^{th}$ and $75^{th}$ percentile, for example, *fell* between 1990 and 2000 before rising substantially in 2010. A high density of surveys even toward the end of the period gives some assurance to the results.

Figures 2 and 3 (Global Consumption Distribution and Global Income Distribution) show the evolution of the distribution of global consumption and income over a longer period of time. Note that the data before 1980 should be treated with extreme caution, since

there are only survey-based observations for around a fourth of the countries in the 1960s and 1970s. Whether one uses data before 1980 or not however, the figures show the gradual disappearance of the 'twin-peaks' phenomenon of slight bi-modality in the global distribution studied by, among others Quah, 1996, Milanovic, 2005, Weisbrod et al, 2007. The concern about the coming of a bi-polar (as opposed to merely unequal!) world has been dispatched by the rapid transition of a large number of individuals who were previously poor and their integration into a global 'middle class' (although the middle class is a complex notion which can be interpreted in many ways and thus should be employed with care). It is crucial to note that in these figures and similar ones that follow the scale is a logarithmic one in which given visual distances on the scale correspond to larger and larger differences in absolute income as one examines comparisons involving higher incomes. As a result, a global distribution that is very skewed to the left appears more even than it is and falsely symmetrical. The actual inequality in the world distribution is consequentially very substantially visually understated. In this sense, the distribution remains bipolar (with a small number of globally 'very rich' facing a very large number of poor and 'lower-middle-class') even as it has become uni-modal. Table 2 provides some summary statistics on the distribution of income and consumption across the benchmark years.

The remarkable impact of Asia's rise in the global economy over the last 25 years can be seen by examining the regional superposition graphs (Figures 4 and 5) for consumption in 1990 and in 2010. These show the contribution of each geographical region to the overall distribution of consumption as well as their individual distributions at two periods in time. The most striking development is perhaps the disappearance of pre-existing twin peaks in East Asia and the movement of most of its population to a higher level of consumption. As the figures show, the peak of the distribution in East Asia was at $30 PPP per month in 1990 but by 2010, the peak density of the distribution had come to be around $100 PPP per month. As is also clear, despite India's substantial GDP-per-capita growth in the period, compared to 1990, South Asia has fallen behind East Asia and the Pacific. The peak density of the distributions was roughly the same in 1990, but by 2010 the peak density in South Asia is at roughly half the level of East Asia. Another notable

feature of the data is a degree of convergence within Europe and Central Asia leading to a less skewed and more even distribution, perhaps due to increases in income in formerly planned economies.

As a result of the fast growth of the Chinese (and to a lesser extent Indian) economy, the world distribution of income and consumption is more equal in 2010 than it was in 1990. Table 3a provides estimates for global inter-personal income and consumption inequalities over the period for various inequality measures. In 1990 the global income Gini coefficient was 0.70 while the global Theil index was 0.94. In 2010, these had fallen to 0.65 and 0.80. Even if one were to exclude China, global inequality would be estimated to have fallen although only due to the interval between 2005 and 2010. Once again it is noteworthy that all the reduction in inequality occurred after the 2000s. In the period 1990 to 2000, there are either no substantial decreases, or else some increase in inequality, depending on the measure one utilizes. The 2000s are the decisive decade.

While the world distribution of income has grown more equal, the experience of within-country inequality has been more disparate. Figure 6 provides evidence of the change in the income Gini coefficient within country between 1980 and 2010. The size of each circle corresponds to the population of the country in question. Where observations are above the 45 degree line, countries have become more unequal, while countries have become less unequal if the observation lies below the line. There is some evidence of inequality convergence noted by Ravallion (2001), Dhongde (2013) among others as the line of best fit for the observations is flatter than the 45-degree line (the beta coefficient is 0.992 and significantly less than one). Roughly half of the countries show rising inequality, but about two-thirds of the population lives in countries with rising inequality (a difference mainly driven by China).

Figure 7 depicts the initial Gini coefficient and changes in the Gini coefficient between 1990 and 2010 for the fifteen fastest-growing countries with populations greater than ten million (all having annual per-capita income growth of at least three percent). Again, there is no general trend, except in so far as initially high inequality countries have falling

inequality and low-inequality countries show rising inequality during this period. It is interesting to note that many historically low-inequality western European countries show sharp increases in inequality.

One interesting point to note about the scatterplot on inequality convergence is the preponderance of Sub-Saharan African countries among those with high inequality both at the beginning and at the end of the period (higher than most Latin American countries, contrary to a prominent received 'fact' in economics). This is a result of the fact that we have standardized the concept of advantage so as to make estimates of inequality more comparable; while surveys in Sub-Saharan Africa typically are of consumption, those in Latin America are typically of income, which without adjustment leads to greater estimated inequality in the latter. The high-inequality of Sub-Saharan African countries (and the finding that it is among the highest in the world, and in particular higher than in Latin America) holds in our database for earlier decades as well.

Figure 8 provides a depiction of inequality within countries as measured by the income share of the top decile. We should note here that in every country this is a likely under-estimate due to the well-known problem of under-sampling of the very rich. This noted, a number of Sub-Saharan African nations dominate the map.

Figure 9 shows the total world inequality attributable to between and within country inequality (using an additively decomposable income inequality measure). Again, as a result of the growth of China and India, the importance of between-country inequality has fallen sharply in explaining global inequality. Within-country inequality now accounts for 43% of global inequality as opposed to 22% contribution it made in 1980. In fact, the between-country component of inequality is at its lowest ever in our sample. Some of this convergence is driven by the fast growth of India, China and other countries but it also has to do with the steady, even if relatively slower, growth of other developing countries (such as Brazil). The contribution of China in this regard is crucial. Without China, the between-country component of global interpersonal inequality would have fallen

marginally from 69 percent in 1990 to 66 percent in 2010 (as compared to falling more markedly from 70 percent to 57 percent with China).

Given the facts of global income inequality convergence and the fall in between country inequality over the last 50 years, it is perhaps not surprising to see, as we do in Figure 11 that global relative income inequality is at its lowest measured, whichever inequality measure we use. Even when one examines global absolute inequality (relative inequality as measured by any inequality measure such as the Gini or Theil times the mean), which gives consideration to absolute differences, the remarkable equalizing impact of Chinese and (to a much lesser extent) Indian growth in the recent past is visible. Figure 10 shows the trend in absolute inequality over the last 40 years. Unsurprisingly, given that it is what is known in the literature as a "leftist" measure that registers increasing inequality as long as the absolute income increase going to a poorer person is lower than that going to a richer person, over most of the period it shows rising inequality. Despite the very high bar for inequality reduction, there has been a fall in inequality during the last period of high overall developing country growth (2005 and 2010), if one uses the Theil measure or the Absolute Mean Log Deviation measure of inequality. (More sluggish developing country growth in the 2010-2015 period, not yet captured by our database, may eventually lead to a different story).

Of course, there are many complex and diverse experiences across regions in regard to growth and distribution in this period. In order to capture these variations, we undertake a regional decomposition of inequality trends (Figure 11). We use the World Bank's regional categories and assess the trends in income Gini coefficients for the resulting regions considered as a whole. A few striking conclusions emerge. First, the East Asia and Pacific has been one of the highest inequality regions in the world throughout the period (contrasting with the widely held 'stylized fact' that individual East Asian countries have had fairly low inequality as compared to other regions historically). This is because it contains populations at very different levels of development, from very poor Chinese or Indonesians for example, to Japanese (and more recently Koreans or Singaporeans) who enjoy levels of income of rich countries. However, even within this

disparate group, China's rapid income growth has meant that inequality has fallen since 1980 because of the impact of that income-growth on inter-country differences within the region. Meanwhile, at the other end of the spectrum, North America is much more homogenous as a region and overall inequality is correspondingly lower. However, rising inequality within the US in particular has meant that inequality has risen sharply since 1980. South Asia and Europe and Central Asia, are not as homogenous in incomes as North America, but are decidedly more homogenous than East Asia and the Pacific, Sub-Saharan Africa and Latin America. In South Asia and in Europe and Central Asia, the experience of the last 30 years has been one of increasing inequality within the regions (except for a small decrease after 2005). By contrast, in the initially high inequality regions of Latin America and in Sub-Saharan Africa, inequality has fallen or remained constant. Taken as a whole, we once again see the pattern of income inequality convergence noted previously, this time by regions: in 1980, Gini coefficients ranged from 0.35 (North America) to 0.75 (East Asia Pacific), but by 2010, the range had narrowed to 0.4 to 0.6. In Latin America, inequality rose between 1990 and 2000 before falling subsequently. The period between 1960 and 1990 was, moreover, a more dramatic period of inequality reduction for the region than the 2000s, which have been much vaunted as a time of decreasing inequality in Latin American countries. Observations of this kind underline the difference between changes in regional inequality (which are affected by inter-country differences in growth) and changes within countries. The two need not move together. A similar same pattern of regional inequality change is also witnessed when we look at other measures of relative inequality such as the mean log deviation (GE(0)), the Theil index (GE(1)), the mean-to-median ratio or the Palma ratio (Table 3b). Between 1990 and 2010, Latin America and the Caribbean, East Asia and Pacific, and Sub-Saharan Africa experienced sharp declines in all these measures, while South Asia and North America saw increases in these measures. A major contribution of the GCIP is to facilitate undertaking regional assessments of the kind undertaken here, which require lining up observations in time and integrating mean and distributional information.

### 3. Poverty

We turn now to describing the evolution of global poverty.  We use three different poverty lines: the $1.25 PPP and $2.50 PPP (2005) per capita per day consumption poverty lines stipulated by the World Bank (notwithstanding our reservations about the meaningfulness of these poverty lines) and the $4.16 PPP per capita per day consumption poverty line arrived at by the US Thrifty Food Plan (on the relevance of which to the present exercise, see e.g. Reddy and Pogge (2008)). The Thrifty Food Plan is developed by the U.S. Department of Agriculture (USDA) to assess the cost of achieving a nutritious diet at a minimal cost in the US (United States Department of Agriculture, 2007).  Since PPPs are used to capture purchasing power of currencies the minimal cost for a nutritious diet can serve as international food poverty line.  The use of general consumption PPPs is in this respect conservative, since PPPs for food tend to be higher, due to the tradable nature of many food commodities, which implies that using them instead would lead to higher local currency equivalents of an international poverty line. It must be remembered that the use of a set of PPPs along with an international poverty line implies an entire list of 'equivalent' poverty lines in countries, so both choices are consequential.  The data before 1980 must be treated with caution, since it contains many fewer actual surveys, which are also disproportionately in developed countries. This noted, the progress in poverty reduction since 1980 appears to have been substantial at least with the poverty lines used.  Table 4 depicts the headcount ratio of poverty in a world with and without China. We find, as do others, a sharp decline in poverty in China in the early 1980s, reflected in a thirteen percentage decline in world poverty between 1980 and 1990 at the $1.25 per day poverty line—the largest decadal decline in the sample. Thereafter while there have been substantial decreases in poverty through the 1990s (also driven by China) and in the 2000s, these have been smaller, and in 2010, about 16% of the world, one in six people, still have consumption levels that put them below the (already stringent) lower poverty line. In the world without China, there was also a decrease in poverty in the 1990s, but by a much more muted 4 percentage points. From 2000 to 2010 however poverty fell more quickly, by about seven percentage points.

Looking at slightly higher and perhaps more plausible poverty lines, however, gives pause to any triumphalist feeling. At the $2.50 PPP (2005) per day threshold, despite sharp declines in the last decade, poverty remains entrenched, and over 40 % of the world's population is poor by this measure, whether in the world with or without China, and overall poverty reduction since 1960 is not especially impressive.  Finally, at the $4.16 poverty threshold, while there have been small decreases in poverty over the last decade, these have been rather insignificant and nearly 60% of the world's population are poor by this metric.  Moreover, there has been barely any reduction in poverty since 1980, or for that mater since 1960.  The record of development over a half-century is from this perspective nothing much to celebrate.

In Figure 12 we decompose the poverty trends at the $1.25 PPP threshold for the different WB regions. East Asia and the Pacific shows the most dramatic decline in poverty, being the region with the initially highest headcount ratio as well as the one that has seen the sharpest declines. South Asia also saw apparent decreases, but these were smaller and came later. Sub-Saharan Africa has seen very small decreases in poverty by contrast. Finally, Latin America has also seen decreases in poverty at this level although largely in early decades, as a result of which 2010 poverty headcount ratios at the $1.25 threshold become very small (approaching North American levels). Taken together these trends give rise to a marked reduction in world poverty after 1980 and the slight rise in poverty in the Eastern European countries after 1990 has little discernible impact globally.

It is instructive, however to look at the headcount ratio at the $4.16 threshold over this period (Figure 13).  What is noteworthy here is the fact that over 80% of the populations in Sub-Saharan Africa and in South Asia remain poor by this metric. Only in East Asia and in Latin America has there been substantial progress in moving people above this line, by about 20 percentage points in both cases since 1990. Moreover, in both cases, most of the movement occurred after 2000, a fact that is reflected in Table 4 mentioned above. As a general matter, adopting higher poverty lines leads to lower rates of global poverty reduction with similar regional patterns.  Finally, Figure 14 gives a visual indication of the regions with the highest concentrations of poverty at the $2.50 PPP

poverty line. Since the databases we employ have been designed to facilitate make alternate assumptions, we intend to explore the implications of using different PPP concepts and other such variations in future estimates of poverty.

## 4. Aggregative 'Social Welfare'

Given the uneven nature of growth as well as the changes in inequality, how might we go about assessing whether the world taken as a whole has experienced economic welfare gains during the period in consideration and if so to what extent? A powerful tool in this regard is the adoption of the Generalized Lorenz Curve (GLC) which allows us effectively to rank distributions in terms of welfare. Shorrocks (1983) showed that for *any* welfare function that is Schur Concave (i.e responds negatively to regressive Pigou-Dalton Transfers and is therefore inequality averse) and that is positively responsive to income, a given distribution of income would provide more welfare than another distribution if its GLC were everywhere higher. Moreover, all such welfare functions would agree on the welfare ranking of two situations if and only if such 'dominance' is established. Figure 15 depicts the generalized Lorenz curve for the world distribution of income in four periods of time. Clearly, by any measure, compared to 1960, the welfare of the world had increased by 1990. Perhaps somewhat surprisingly however, there was no unambiguous welfare improvement between the 1990 and 2000 distributions of income, since the generalized Lorenz curves lie almost on top of each other. However, following that period, we see that by 2010, by any measure, global welfare had again increased. Assessment of the actual change in welfare in quantitative terms is also possible but requires the choice of a specific welfare function (or class of functions).

While the GLC provides a framework for welfare comparisons, using a growth incidence curve provides a more detailed depiction of the beneficiaries of growth across this period. Growth has been broadly 'inclusive' in the limited sense that it has taken place across percentiles of the world distribution, but it has been rather uneven across the different percentiles, and the temporal pattern of increases has also varied across percentiles, as shown in Figures 16 and 17. Between 1960 and 2010, the poorest experienced a greater

share of their cumulative growth, in particular of consumption, early in the period. However, we observe an interesting hump-shape, first depicted by Milanovic 2012, arising during the interval of the greatest dynamism (2000 to 2010 and 1990 to 2010). The middle-income groups – those between the $40^{th}$ and $60^{th}$ percentiles - saw their incomes rise rapidly in this period, while those in a rather higher income bracket ($80^{th}$ - $95^{th}$ percentiles) saw their incomes grow much more slowly, presumably mainly because the richer countries in which they disproportionately lived experienced lower growth. Of course, problems of estimation of top-incomes in household surveys provide an essential qualification to any such conclusion. (We are working on extending the GCIP to include estimates of data on top incomes from non-survey sources).

The importance of the Chinese experience in this transformation is once again seen to be critical since the Chinese population makes up the bulk of those in the forty to seventy percentile range in 2010. Another way to arrive at this conclusion is to look at the relative position of the population of several large countries over time. This is done in Figures 18 and 19. In 1990, all of the US population enjoyed incomes that would place them in the top quintile of the world income distribution while all the Chinese population had incomes that placed them below the fortieth percentile. By contrast about fifty percent of Nigerians were in the top half of the world income distribution. In 1990, the bottom of the country's distribution as estimated by household surveys had incomes that were higher than the top incomes in China. The Chinese percentile distribution was strictly below that of all the other countries depicted. By 2010, however, the Chinese percentile distribution dominated those of three of the other countries. China is now truly the 'Middle Kingdom' of the world as most of its population lie between the fortieth and seventieth percentile of the world distribution, although around thirty percent of the Chinese population is poorer. Nigeria is now in the position that China once was, dominated in relative terms by the other percentile distributions depicted here.

### 5. The Global 'Middle Class'

As noted above the middle class is a complex notion that has embedded in it various economic, social and political ideas. Without entering into a full investigation of the concept we present a preliminary analysis of the evolution of a middle income group across select countries. Provisionally, we define a member of the global middle class as anyone possessing consumption between a lower threshold level of consumption level for 2005 of $7.20 and a higher threshold of $21.60 2005 PPP. The lower threshold is based on adding to the Thrifty Food Plan based food poverty line ($4.16) a small quantity (just over $3 per day) for all other expenses. On this view, there are people who have incomes above the food poverty line who do not, however, qualify for middle class membership. We have assessed the realism of this quantity for the Indian setting, in which it is a modest standard indeed. In 2015 rupees it comprises an amount between 30,000 and 90,000 rupees per month for a family of four which may be a plausible amount to meet essential everyday requirements and to purchase a very modest quantity of discretionary goods and services in addition. A family in India just above the lower threshold could, we believe, afford a small quantity of branded clothing, a two-wheeled vehicle, two smart phones, private schooling at a very modest standard, and minimal expenses on recreation and entertainment. The assumed cost of the durable goods has been amortized over time. This exercise is based on our evaluative judgment and could certainly be undertaken otherwise.

Table 8 presents data on the percentage of population in various countries that are part of the middle class, thus defined, in 1990 and 2010. Most countries, among those selected, have seen an increase in the proportion of the population that is in the middle class as we have defined it or above it (which we could provisionally refer to as belonging to the 'upper class'). Chile has witnessed an increase in the proportion of the population belong to the upper class from eight percent in 1990 to twenty three percent in 2010, while in China the proportion of the population belonging to the global middle class rose to thirty one percent in 2010 from no one belonging to the global middle class in 1990 according to our survey-based data. In India it has gone up very modestly from four to eight percent. In Ghana, interestingly, the proportion has jumped from four to fifteen percent. This has led to seventeen percent of the world's population being part of the middle class

in 2010 from fourteen percent in 1990. The increase in the membership in the middle class in individual countries is therefore seen to be much more significant than it is worldwide.

### 6. Sensitivity of the Global Distribution to Alternate Methodological Choices

In constructing the databases and in the subsequent analysis we make several choices. These include: adopting a conversion factor for transforming means expressed in national currency units to a common unit which can then be used for cross-country comparisons, making decision on whether or not to standardize the distributions by estimating income from consumption (or vice versa), and using means from surveys or national accounts. Our benchmark analysis, on which the discussion above is based, uses 2005 ICP consumption PPP's calculated based on the EKS method to convert national currencies into common international currency units; we standardize the distributions and use means from surveys (all discussed further in the paper presenting an overview of the database, previously cited). In this section, we modify some of these choices and evaluate the impact. This is in keeping with our larger goal: that the GCIP should be flexible and permit alternate choices so that we might make choices deemed more warranted for specific purposes as well as better understand the robustness of specific conclusions.

We use 2005 market exchange rates and 2011 ICP consumption PPP's as alternate currency conversion factors in the analysis below. (An alternate way to employ market exchange rates would have been to use ones which shift from year to year along with consumer price indices of a single base country for the temporal translation, but this is not an approach we presently employ). We also construct an income database (Mixed Surveys with Income Preference or MSIP) in which we do not attempt to estimate income distributions from consumption surveys but rather pool the distributional information without prior adjustment of either the distributions or the means. There is income preference only in the sense that if we have both income and consumption surveys to chose from for a country-year we prefer income surveys, which is a preference that could

as well have been reversed. We again exclude China from some of the analysis to evaluate the country's impact on the world.

Figure 20 depicts the density function corresponding to the resulting alternate databases. The income database (GID) has a wider support than the consumption distribution (GCD) for the 2005 PPP base year, it seems because there are many poorer people in the world whose reported or estimated consumption appears to be significantly higher than their income. Whether this comparison arising from a 'snapshot' of the two distributions reflects a temporary phenomenon or one that is more durable, as well as its sources, might explored further. As we discuss further below, there is evidence that the gap has increased markedly since 1990.[6] Interestingly, the density of the income distribution arrived at without any standardization (i.e. by assuming that an income distribution is in relative terms exactly the same as a consumption distribution, when only information about the latter is available, but combining this with an estimate of the income mean) is almost identical to the consumption distribution. This may be because many populous regions in the world tend to have consumption surveys, in particular in South Asia and Africa and often in East Asia too, and thus provide much of the mass of the density functions in both cases. As expected, the exchange rate distribution is the most unequal; in particular it starts at lower income level than other distributions and runs to a slightly higher income level. This is expected as market exchange rates overstate what is needed to achieve a similar cost of living in poorer countries, thus underestimating the real purchasing power of incomes of households in these countries, with the extent of the discrepancy being inversely related to income of the country (the Balassa-Samuleson effect). Although we show the income distribution for the 2011 PPP base year on the same graph, it must be kept in mind that these are in different units (2011 international

---

[6] Those adhering to a 'lifecycle' view of the relation between consumption and income might expect that the latter must be lower than income at some point but that view may not appropriate in this case since it is likely that most life-cycle mobility must involve individuals moving within percentiles within their own countries, which in most cases occupy relatively stable roles in the global distribution or are moving up or down in a secular way. Consumption may be higher than current income because of hypothesized 'permanent income' (perhaps associated with anticipated future increases in income) and associated credit-based consumption. The finding may also be an artifact of survey methodology and/or our technique of estimating consumption from income, which attributes higher consumption shares to the poor than their income shares. For example, it might reflect drawing down of individual and collective wealth (such as natural resource stocks) that is not adequately identified in survey-based estimates of income.

dollars) that are not strictly comparable to the units in which the 2005 PPP base year distributions are expressed. Nevertheless, interpreted in terms of the perspective of the country with respect to which international dollars are normalized (the US), in which there was marginal domestic inflation in the period in question, it is clear that the distribution shows a shift to the right (i.e. rather higher incomes in the world, especially for the sections of the population in the middle of the distribution) as a result of the application of the 2011 PPPs.

The level of inequality as judged by different inequality measures varies across the alternate datasets (Table 5). The market exchange rate dataset unsurprisingly exhibits the highest level of inequality followed by the unstandardized dataset. Part of the increase in global inequality in the unstandardized dataset is a result of the increase in between-country inequality that comes from using it, as it leads to the use of lower mean estimates for poorer countries with consumption distributions (Table 6). The inequality between means from income surveys, predominantly done in the developed and upper middle-income countries, and means from consumption surveys in poorer countries is greater than in standardized means in the benchmark database.

Trends in global inequality over the past two decades are similar whichever dataset or measure we use. Global inequality appears to increase or remain unchanged between 1990 and 2000 and then to decline between 2000 and 2010. China has a major role to play in the moderate but decided global inequality decline in the period 1990-2010. Excluding China from the world results in ambiguous changes in global income inequality: in the 1990-2010 period the world Gini coefficient decreases very slightly, but the Theil index increases very slightly and the mean log deviation shows a somewhat more marked decrease.

The latest round of ICP data was collected in 2011 and a resulting report released in 2014 (World Bank (2014)). The PPP estimates from the 2011 round are quite different from ones based on extrapolations using the 2005 PPPs, perhaps in part due to methodological

changes, in part due to sampling variations, and in part due to real changes in the structure of the world economy between the two base years, which are reflected in PPPs that represent data collected in a given year. Most poor countries are estimated to be richer relative to developed countries when 2011 PPP are used than was estimated earlier based on 2005 PPPs. It is important to appreciate that this applies to comparisons between any pair of country-years in our space-time tableau and not merely to the base years in question. The PPPs for individual consumption by households (used in the benchmark version of GCIP) were revised downwards (on which see e.g. Deaton and Aten 2014). These changes would have a sizable impact on global between-country inequality and through that on overall global inter-personal inequality if the 2011 PPPs were used. Our estimates indicate that global between-country inequality in 2010 as estimated by the Gini coefficient was six points lower (0.49 vs 0.54) when using the 2011 PPPs for comparisons rather than the 2005 PPPs. Global inequality was also lower in 1990 and 2000 when using the 2011 PPPs.

Although global inequality has declined between 1990 and 2010, within-country inequality increased on average in the same period (Table 5). The population-weighted average Gini coefficient of countries increased in all three datasets. The weighted-average consumption Gini coefficient is 0.11 lower than the weighted-average income Gini coefficient. Making cross-country comparisons of inequality in the non-standardized dataset might lead to incorrect conclusions since the observed levels of inequality in a country with a consumption survey will tend to be lower than those for a country with an income survey. Indeed, as we showed previously considerable re-ranking can occur when one uses a consistent income Gini coefficient (obtained after standardization). We observe this in case of Latin American and Sub-Saharan countries that reverse positions as a result of this. Income Gini coefficients for Latin American countries are higher than consumption Gini coefficients for Sub-Saharan African countries, but Sub-Saharan African countries have higher income Gini coefficients after standardization than Latin American countries. The unweighted average Gini coefficient starts off higher than weighted average Gini coefficient in 1990, but declines more sharply and ends lower than the weighted-average Gini ceofficient in 2010. Smaller countries started with higher

levels of the Gini coefficient on average (particularly in Sub-Saharan Africa) and have had within-country inequality decline, but bigger more populous countries (particularly in Asia, most especially China) which count more in the weighted average Gini coefficient, have had the opposite.

The cumulative growth record across the percentiles in the global distribution depends on the dataset used to evaluate it (Figure 21). For each dataset considered (varying for example according to whether it is based on standardized surveys of a specific type, mixed surveys, or exchange rate concepts) there was a peak in growth rates between the fiftieth and sixtieth percentile, but the levels of cumulative growth vary tremendously by percentile. It can be seen that the most consequential choice is that between income and consumption based estimates, with income-based estimates, regardless of the exchange-rate concept, showing a bell-shaped growth incidence curve with much higher cumulative growth rates for the middle-sections of the world population. The high growth-rates of the middle sections of the population are, however, crucially dependent on the role of China, as can be seen by comparison with the growth incidence curve for income that strips it out. It is also noteworthy that there is slight non-monotonicity as one moves to the right, with the very highest percentiles in the world having somewhat higher cumulative growth rates than those immediately below them. These results could of course be further substantially influenced by the inclusion of top income information from non-survey sources -- an extension to the database we are working on. The growth-rates for consumption for the poorer sections of the world population also seem to have been generally considerably greater for consumption than for income over the time-period, suggesting that the magnitude of the excess of consumption over income observed of the relatively poor in recent years may have increased fairly recently.

## 7. Conclusion:

We have in this paper provided a broad overview of the changes in the world distribution of income and consumption over the last five decades. Using a more comprehensive and internally consistent database than previously available, we reproduce some patterns that

have emerged in other recent research and drew some new conclusions about the differing patterns in regional distributions and the sources of changes in global inequality and poverty as well the overall record of world development. The enormous importance of China for our conclusions in all of these areas of concern stands out. We have shown that while absolute poverty has declined by most measures, by comparison to a higher and plausible poverty line, poverty across the world has not changed significantly over three or even five decades. Collective global economic 'welfare' as assessed according to standard assumptions appears to have increased, but the major increase took place in the early 2000s, and may or may not be durable.

We gave some support to previous findings (for example the disappearance of the global 'twin peaks' and the appearance of a degree of 'inequality convergence') and identified new stylized facts (for example the fact that the Sub-Saharan African countries' inequality, when measured in a way so as to standardize these surveys with those from other countries, is among the very highest in the world, and in particular higher than in Latin America). Moreover, we show that much of our picture of what has happened to the world depends on choices with respect to the variable depicting individual advantage, the choice with respect to exchange rate (e.g. PPP of a given base year vs. market exchange rate). Each of these may be justified depending upon the purpose at hand, but has significant implications for our understanding of how the world's population, as a whole and in its parts, has been faring. We seek to enable multiple methods to be chosen from while understanding more fully what is implied by the choice among them. In the process, we hope to develop better knowledge of who got what, then and now.

## References:

Deaton, A, and B Aten (2014). "Trying to understand the PPPs in ICP 2011: why are the results so different?", available on
http://www.princeton.edu/~deaton/downloads/Deaton_Aten_Trying_to_understand_ICP_2011_V3_1.pdf

Dhongde, S. and M. Xing. (2013). "Cross-Country Convergence in Income Inequality," Working Papers 290, ECINEQ, Society for the Study of Economic Inequality.

Lahoti, R., A. Jayadev and S.G. Reddy (2014). "The Global Consumption and Income Project (GCIP): An Introduction and Preliminary Findings", SSRN working paper available on
http://ssrn.com/abstract=2480636

Lakner, C. and B. Milanovic (2013). "Global Income Distribution: from the Fall of the Berlin Wall to the Great Recession".,World Bank Working Paper No. 6719, December.

Lasswell, H. (1936), *Politics: Who Gets What, When. How*. New York: Whittlesey. House. 1936.

Milanovic, B. (2005). *Worlds Apart: Measuring International and Global Inequality*. Princeton, N.J.: Princeton University Press.

Milanovic, B. (2012). "Global Income Inequality by the Numbers in History and Now - an Overview", Washington, D.C.: World Bank, Development Research Group, Poverty and Inequality Team.

Nurkse , R.(1953). *Problems of Capital Formation in the Under-Developed Countries*. Oxford: Oxford University Press.

Quah, D.T. (1996). "Twin Peaks: Growth and Convergence in Models of Distribution Dynamics". *Economic Journal*, vol. 106(437), pages 1045-55, July.

Ravallion, M. (2003). "Inequality Convergence". *Economics Letters*, Elsevier, vol. 80(3), pages 351-356, September.

Reddy, S. and T. Pogge (2008), "How Not to Count the Poor", in Segal, P., S. Anand and J. E. Stiglitz ed., *Debates on the Measurement of Global Poverty*, Oxford: Oxford  University Press.

Shorrocks, A.F. (1983). "Ranking Income Distributions". *Economica* 50: 3-17.

United States Department of Agriculture (2007). "Thrifty Food Plan, 2006".
http://www.cnpp.usda.gov/sites/default/files/usda_food_plans_cost_of_food/TFP2006Report.pdf

World Bank (2014). "Summary of results and findings of the 2011 international comparisons program", International Comparison Program, http://siteresources.worldbank.org/ICPINT/Resources/270056-1183395201801/Summary-of-Results-and-Findings-of-the-2011-InternationalComparison-Program.pdf

Weisbrod, J., S. Vollmer, Sebastian and H. Holzmann (2007). "Perspectives on the World Income Distribution: Beyond Twin Peaks Towards Welfare Conclusions".

Table 1: Summary Statistics for Surveys in Global Consumption Database (GCD)

| | All Surveys (1960-2012) | 1960's | 1970's | 1980's | 1990's | 2000+ |
|---|---|---|---|---|---|---|
| # of country-year observations | 1281 | 62 | 59 | 175 | 415 | 570 |
| # of countries | 134 | 35 | 38 | 76 | 118 | 123 |
| % surveys with means data among surveys | 84 | 31 | 42 | 77 | 86 | 95 |
| # of countries with only 1 survey | 7 | 22 | 23 | 30 | 25 | |
| # of countries with 0 surveys of all countries in database | | 99 | 96 | 58 | 16 | 11 |
| # of countries with only 1 mean | 14 | 22 | 9 | 30 | 26 | 20 |
| **Countries by Income Group** | | | | | | |
| Low income | 26 | 5 | 3 | 9 | 21 | 25 |
| Lower middle income | 34 | 8 | 5 | 18 | 33 | 32 |
| Upper middle income | 37 | 12 | 15 | 23 | 32 | 33 |
| High Income | 37 | 10 | 15 | 26 | 32 | 33 |
| **Countries by Region** | | | | | | |
| East Asia & Pacific | 15 | 2 | 6 | 8 | 13 | 13 |
| Europe & Central Asia | 44 | 7 | 10 | 24 | 40 | 41 |
| Latin America & Caribbean | 24 | 12 | 9 | 19 | 21 | 21 |
| Middle East & North Africa | 10 | 3 | 4 | 6 | 9 | 9 |
| North America | 2 | 0 | 2 | 2 | 2 | 2 |
| South Asia | 5 | 3 | 3 | 5 | 5 | 5 |
| Sub-Saharan Africa | 34 | 8 | 4 | 12 | 28 | 32 |
| **Density of Surveys by Countries Income Group (# of surveys/# of countries in income grouping)** | | | | | | |
| Low income | 5.5 | 1.2 | 1.0 | 1.3 | 2.4 | 2.8 |
| Lower middle income | 9.7 | 2.6 | 1.8 | 2.2 | 3.3 | 4.4 |
| Upper middle income | 12.5 | 1.6 | 1.4 | 3.0 | 4.5 | 6.4 |
| High Income | 9.6 | 1.6 | 1.7 | 2.1 | 3.5 | 4.5 |
| **Density of Surveys by Countries Region Group (# of surveys/# of countries in region)** | | | | | | |
| East Asia & Pacific | 8.7 | 2.0 | 1.8 | 3.8 | 2.8 | 3.8 |
| Europe & Central Asia | 10.8 | 1.9 | 1.6 | 2.0 | 3.7 | 6.1 |
| Latin America & Caribbean | 15.0 | 1.5 | 1.6 | 2.8 | 5.8 | 7.3 |
| Middle East & North Africa | 6.2 | 1.3 | 1.3 | 1.7 | 2.6 | 2.2 |
| North America | 11.0 | 0.0 | 2.0 | 1.5 | 3.5 | 4.0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| South Asia | 14.0 | 4.7 | 1.7 | 2.2 | 2.8 | 3.4 |
| Sub-Saharan Africa | 5.0 | 1.1 | 1.0 | 1.7 | 2.3 | 2.3 |
| **Database Source (%)** | | | | | | |
| LIS | 12 | 3 | 15 | 14 | 11 | 13 |
| Povcalnet | 51 | 0 | 2 | 28 | 44 | 75 |
| WIID | 36 | 97 | 83 | 58 | 45 | 12 |
| % consumption Surveys | 47 | 18 | 13 | 32 | 49 | 58 |
| % with All Area Coverage | 98 | 94 | 95 | 92 | 98 | 100 |
| % with All Population Coverage | 92 | 60 | 58 | 86 | 97 | 98 |

Table 2: Global Consumption and Income Levels at Various Percentiles

| | Consumption | | | | Income | | | |
|---|---|---|---|---|---|---|---|---|
| Percentile | 1990 | 2000 | 2005 | 2010 | 1990 | 2000 | 2005 | 2010 |
| 10 | 20 | 23 | 27 | 30 | 20 | 16 | 17 | 24 |
| 25 | 30 | 36 | 43 | 49 | 33 | 32 | 38 | 50 |
| 50 | 54 | 67 | 83 | 99 | 70 | 78 | 112 | 144 |
| 75 | 195 | 182 | 222 | 274 | 253 | 237 | 356 | 421 |
| 90 | 657 | 698 | 748 | 773 | 768 | 814 | 890 | 987 |
| 100 | 1956 | 2331 | 2475 | 2599 | 3242 | 3867 | 4316 | 4329 |
| Mean | 215 | 232 | 258 | 281 | 273 | 296 | 344 | 382 |

Source: Authors' calculations.
Note: All numbers are in 2005 PPP $.

Table 3a: Relative Inequality Measures

| | Global Relative Inequality | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Consumption | | | | Income | | | |
| Inequality Measure | 1990 | 2000 | 2005 | 2010 | 1990 | 2000 | 2005 | 2010 |
| Gini | 0.68 | 0.68 | 0.66 | 0.64 | 0.70 | 0.71 | 0.68 | 0.65 |
| MLD - GE(0) | 0.96 | 0.92 | 0.86 | 0.81 | 1.04 | 1.11 | 1.06 | 0.94 |
| Theil - GE(1) | 0.88 | 0.88 | 0.83 | 0.77 | 0.94 | 1.00 | 0.89 | 0.80 |
| Palma Ratio | 10.45 | 9.68 | 8.88 | 8.05 | 12.56 | 14.67 | 13.31 | 10.40 |
| Mean/Median | 3.95 | 3.47 | 3.12 | 2.83 | 3.89 | 3.81 | 3.07 | 2.65 |

Source: Authors' calculations.

Table 3b: Regional Inequality Measures

| Regions | | Gini | MLD - GE(0) | Theil - GE(1) | Palma Ratio | Mean/Median | Absolute Gini | Absolute MLD | Absolute Theil |
|---|---|---|---|---|---|---|---|---|---|
| | | | Relative Measures | | | | Absolute Measures | | |
| South Asia | 1990 | 0.40 | 0.27 | 0.31 | 1.88 | 1.46 | 22 | 15 | 17 |
| | 2010 | 0.45 | 0.35 | 0.33 | 2.26 | 1.60 | 40 | 31 | 29 |
| North America | 1990 | 0.37 | 0.25 | 0.23 | 1.56 | 1.21 | 507 | 344 | 309 |
| | 2010 | 0.40 | 0.30 | 0.28 | 1.89 | 1.27 | 648 | 485 | 446 |
| Middle East & North Africa | 1990 | 0.51 | 0.45 | 0.50 | 3.35 | 1.87 | 101 | 88 | 98 |
| | 2010 | 0.52 | 0.48 | 0.53 | 3.68 | 1.86 | 137 | 126 | 138 |
| Latin America & Carribean | 1990 | 0.53 | 0.55 | 0.48 | 4.00 | 1.78 | 135 | 141 | 122 |
| | 2010 | 0.51 | 0.53 | 0.45 | 3.61 | 1.65 | 178 | 183 | 155 |
| East Asia & Pacific | 1990 | 0.68 | 0.86 | 0.95 | 8.83 | 3.07 | 107 | 136 | 151 |
| | 2010 | 0.59 | 0.77 | 0.63 | 6.30 | 2.09 | 227 | 296 | 244 |
| Europe & Central Asia | 1990 | 0.46 | 0.40 | 0.36 | 2.67 | 1.47 | 257 | 220 | 201 |
| | 2010 | 0.46 | 0.41 | 0.35 | 2.60 | 1.41 | 340 | 302 | 263 |
| Sub-Saharan Africa | 1990 | 0.67 | 0.95 | 0.90 | 10.47 | 2.79 | 72 | 102 | 96 |
| | 2010 | 0.58 | 0.64 | 0.65 | 5.19 | 1.99 | 44 | 48 | 49 |

Source: Authors' calculations.

Table 4: Consumption Poverty Estimates for Different Poverty Lines

| Year | World | | | World excluding China | | |
|---|---|---|---|---|---|---|
| | $1.25 | $2.50 | $4.16 | $1.25 | $2.50 | $4.16 |
| 1960 | 52 | 66 | 73 | 36 | 55 | 65 |
| 1970 | 49 | 64 | 71 | 32 | 52 | 61 |
| 1980 | 48 | 62 | 69 | 32 | 50 | 59 |
| 1990 | 35 | 59 | 69 | 28 | 50 | 60 |
| 2000 | 26 | 54 | 68 | 24 | 50 | 62 |
| 2005 | 20 | 47 | 62 | 21 | 46 | 60 |
| 2010 | 16 | 41 | 57 | 17 | 43 | 57 |

Source: Authors' calculations.
Note: All poverty lines are expressed in 2005 PPP $ per capita per day.

Table 5: Global Relative Inequality for Various Global Distributions

| | Gini | | | MLD - GE(0) | | | Theil - GE(1) | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2010 | 1990 | 2000 | 2010 | 1990 | 2000 | 2010 |
| GCD | 0.68 | 0.68 | 0.64 | 0.96 | 0.92 | 0.81 | 0.88 | 0.88 | 0.77 |
| GID | 0.70 | 0.71 | 0.65 | 1.04 | 1.11 | 0.94 | 0.94 | 1.00 | 0.80 |
| GID No Standardization | 0.71 | 0.72 | 0.68 | 1.09 | 1.08 | 0.94 | 0.99 | 1.04 | 0.91 |
| GID Excl. China | 0.68 | 0.71 | 0.68 | 1.04 | 1.15 | 1.02 | 0.86 | 0.97 | 0.88 |
| GID Exchange Rate | 0.79 | 0.80 | 0.76 | 1.59 | 1.69 | 1.43 | 1.30 | 1.39 | 1.19 |
| GID 2011 PPP | 0.67 | 0.68 | 0.62 | 0.91 | 0.98 | 0.82 | 0.85 | 0.90 | 0.71 |

Table 6: Within-country Inequality for Various Global Distributions

|  | Weighted average of country Gini | | | Un-weighted average of country Gini | | |
|---|---|---|---|---|---|---|
| year | GCD | GID | GID without standardization | GCD | GID | GID without standardization |
| 1990 | 0.33 | 0.42 | 0.36 | 0.37 | 0.44 | 0.41 |
| 2000 | 0.36 | 0.47 | 0.41 | 0.36 | 0.45 | 0.41 |
| 2010 | 0.35 | 0.46 | 0.38 | 0.34 | 0.45 | 0.39 |

Table 7: Between-country Inequality for Various Global Distributions

|  | Gini | | | MLD - GE(0) | | | Theil - GE(1) | | |
|---|---|---|---|---|---|---|---|---|---|
|  | 1990 | 2000 | 2010 | 1990 | 2000 | 2010 | 1990 | 2000 | 2010 |
| GCD 2005 PPP | 0.63 | 0.61 | 0.57 | 0.77 | 0.70 | 0.59 | 0.73 | 0.73 | 0.61 |
| GID 2005 PPP | 0.62 | 0.62 | 0.54 | 0.73 | 0.72 | 0.53 | 0.70 | 0.74 | 0.52 |
| GID Excl. China 2005 PPP | 0.60 | 0.63 | 0.59 | 0.73 | 0.80 | 0.67 | 0.62 | 0.72 | 0.63 |
| GID No Standardization 2005 PPP | 0.65 | 0.65 | 0.61 | 0.87 | 0.82 | 0.69 | 0.80 | 0.82 | 0.70 |
| GID 2005 Exchange Rate | 0.82 | 0.80 | 0.74 | 1.67 | 1.56 | 1.23 | 2.25 | 1.87 | 1.47 |
| GID 2011 PPP | 0.57 | 0.57 | 0.49 | 0.60 | 0.59 | 0.42 | 0.60 | 0.63 | 0.42 |

Table 8: Percentage of country's population in different classes

|  | 1990 | | | 2010 | | |
|---|---|---|---|---|---|---|
|  | Below Middle Class | Middle Class | Above Middle Class | Below Middle Class | Middle Class | Above Middle Class |
| Brazil | 54 | 31 | 15 | 35 | 46 | 19 |
| Chile | 62 | 31 | 8 | 23 | 54 | 23 |
| China | 100 | 0 | 0 | 65 | 31 | 4 |
| Ghana | 96 | 4 | 0 | 85 | 15 | 0 |
| Hungary | 19 | 65 | 15 | 23 | 58 | 19 |
| India | 96 | 4 | 0 | 92 | 8 | 0 |
| Indonesia | 100 | 0 | 0 | 85 | 15 | 0 |
| Korea, Rep. | 0 | 42 | 58 | 0 | 38 | 62 |
| Malaysia | 23 | 58 | 19 | 0 | 35 | 65 |
| Mexico | 62 | 31 | 8 | 42 | 42 | 15 |
| Nigeria | 62 | 27 | 12 | 42 | 38 | 19 |
| United States | 100 | 0 | 0 | 96 | 4 | 0 |
| Vietnam | 0 | 19 | 81 | 0 | 12 | 88 |
| **World** | 73 | 14 | 13 | 71 | 17 | 12 |

Note: Middle class is defined as anyone with a consumption level between $4.2 - $16.9 2005 PPP per capita per day.

Figure 1: Survey Means and GDP Per Capita for Survey Years from 1960 to 2012
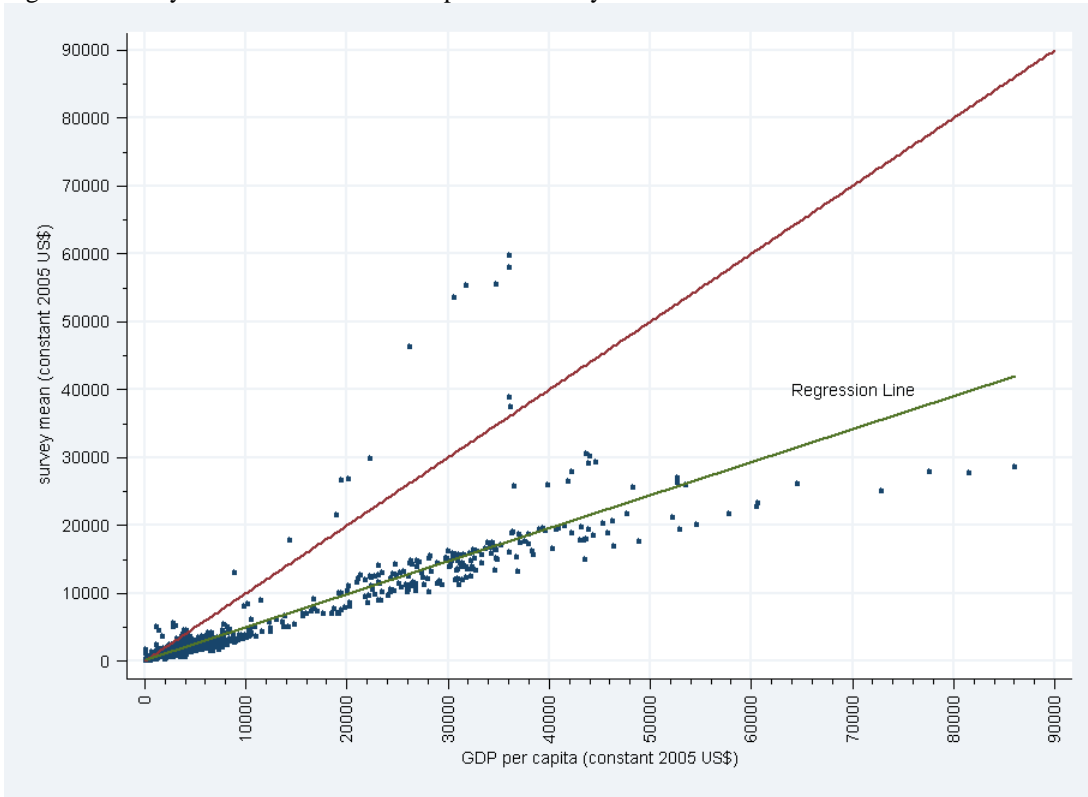


Figure 2: Global Consumption Distribution
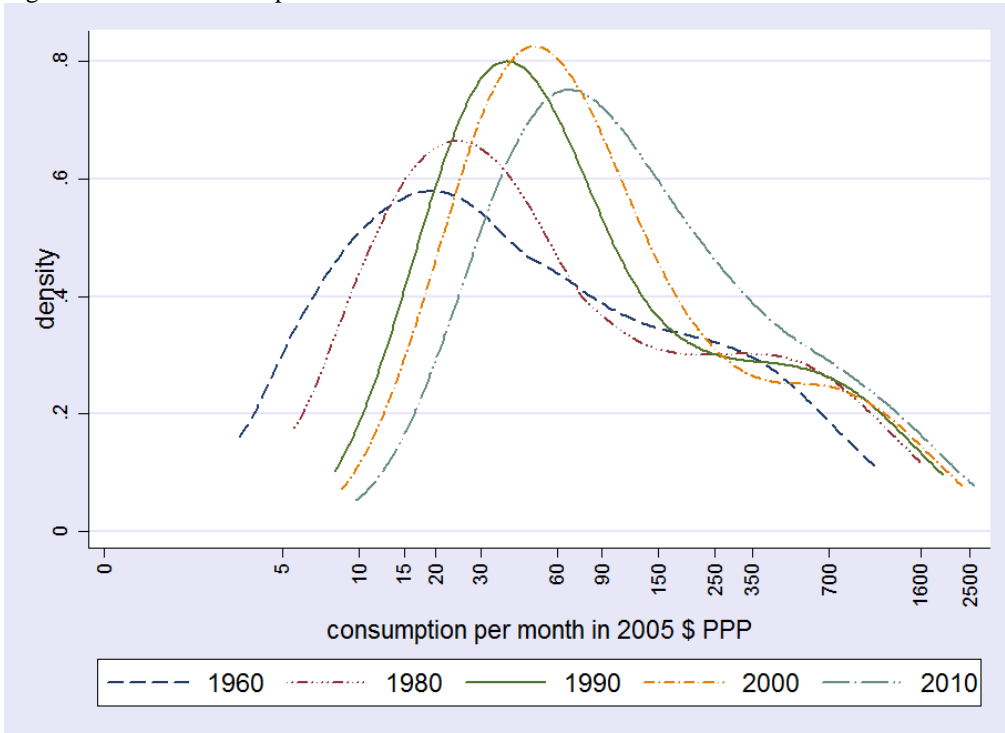


Note: kernel=epanechnikov, stata default bin size.

Figure 3: Global Income Distribution
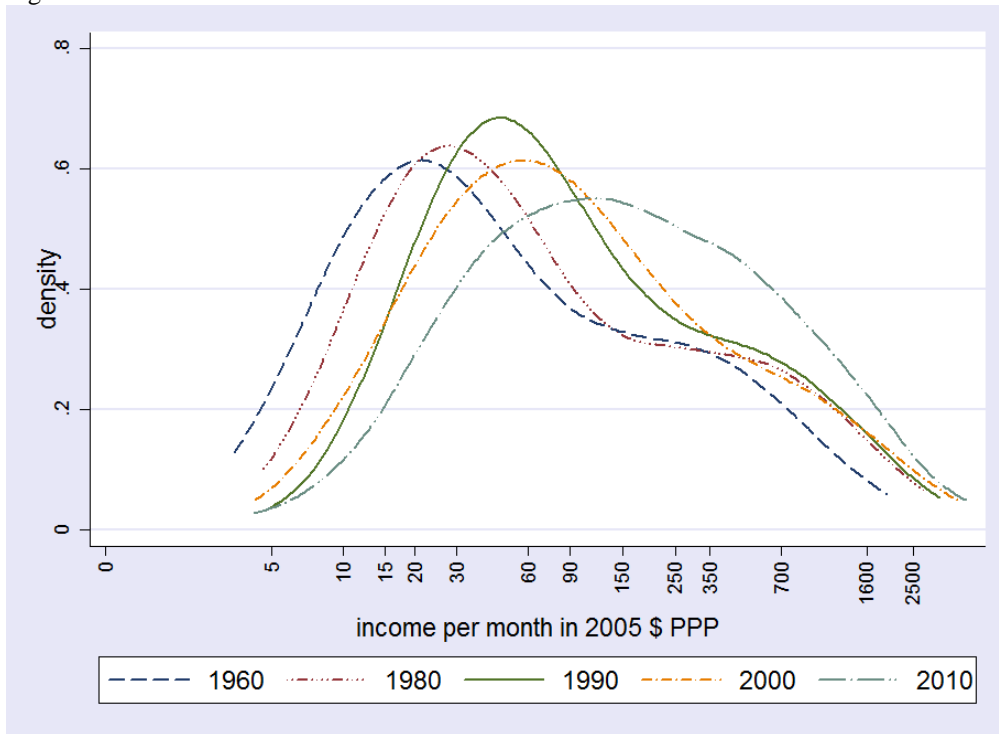


Note: kernel=epanechnikov, stata default bin size.

Figure 4: Regional Superposition Consumption Density for 1990
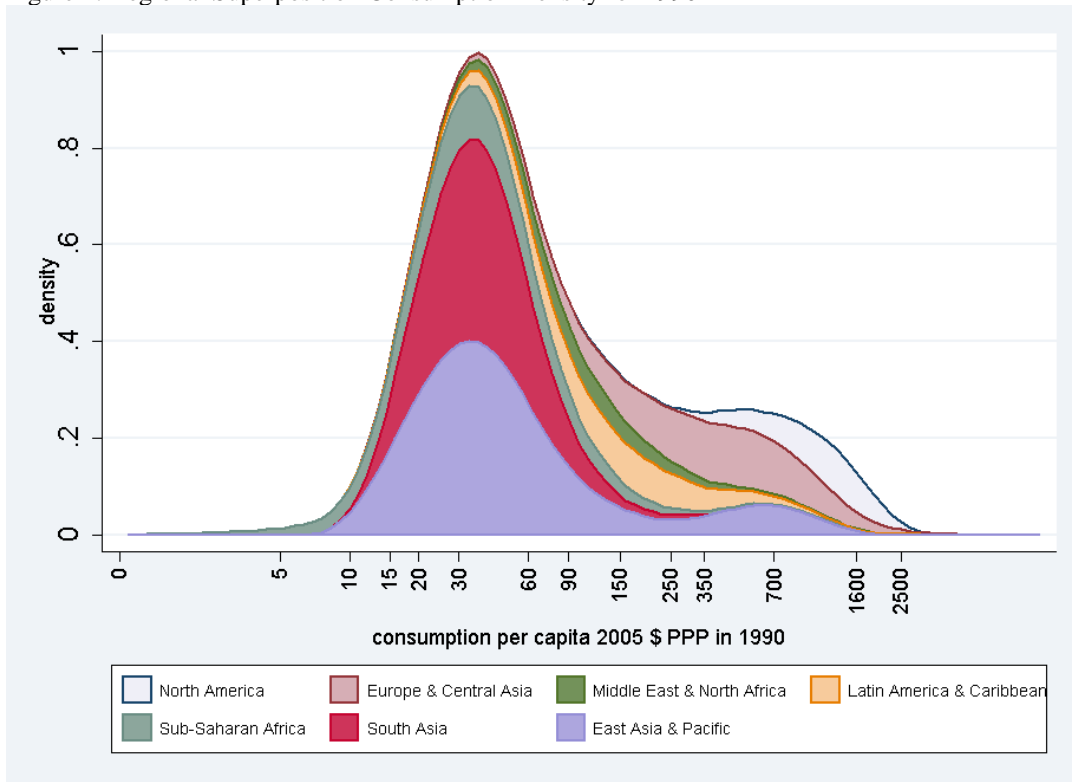
Figure 5: Regional Superposition Consumption Density for 2010
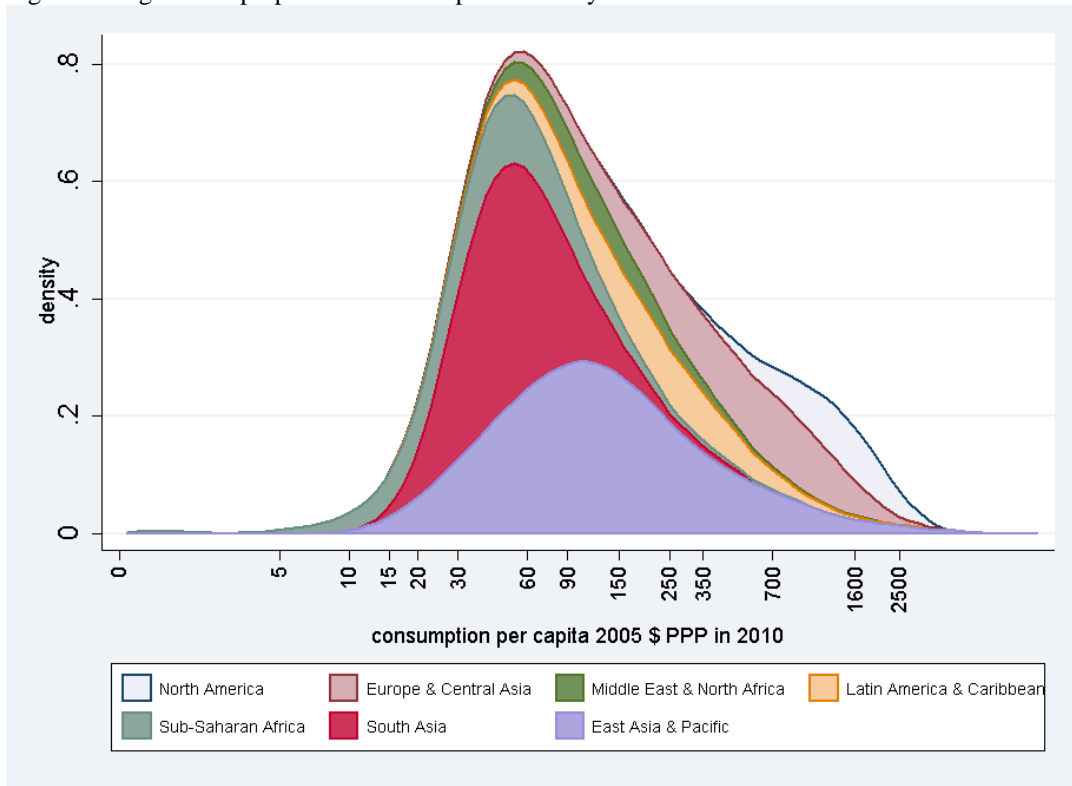


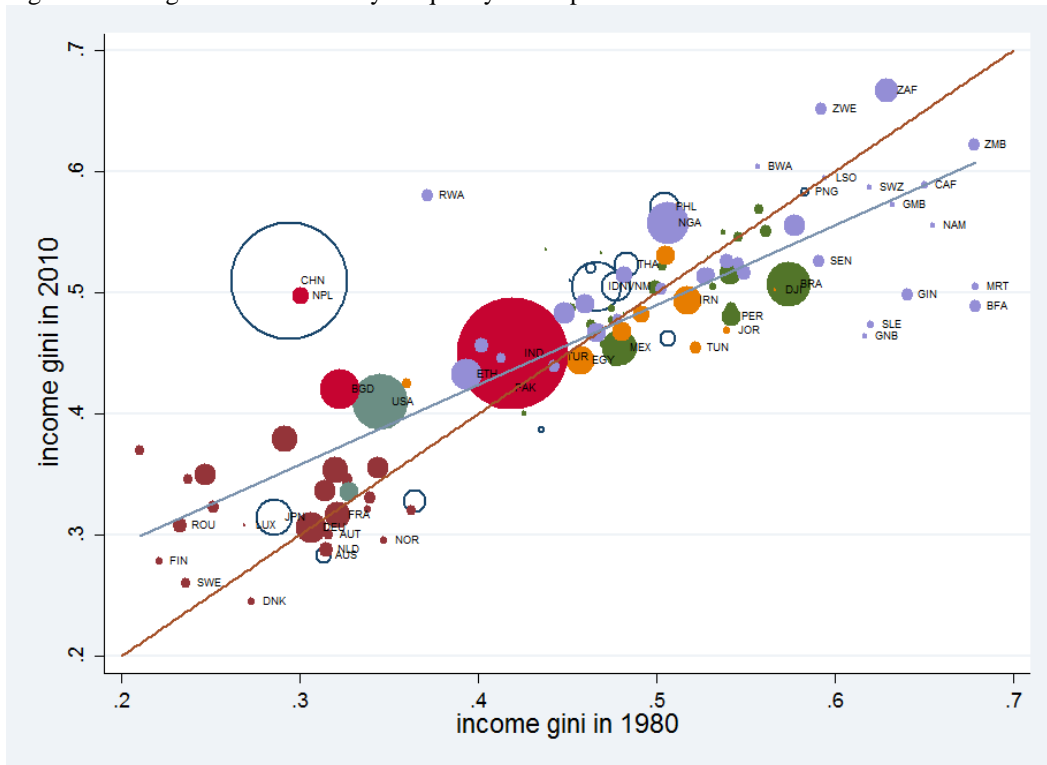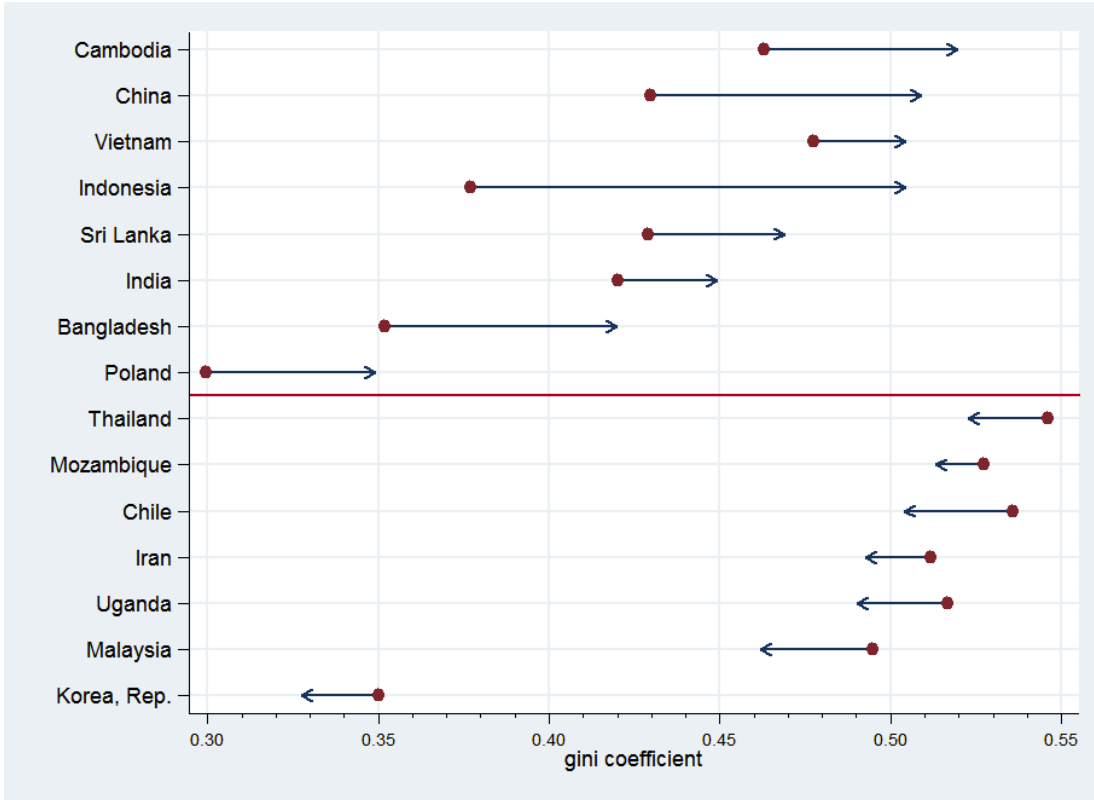Figure 6: Change in within-country inequality in the period 1980-2010.

Figure 7: Change in Gini Coefficient between 1990 and 2010 for the Fastest Growing Countries



Note: Countries in the list are the top 15 fastest growing countries by GDP per capita during 1990-2009 period with population greater than 10 million.

Figure 8: Income Share of the Top 10% in 2010
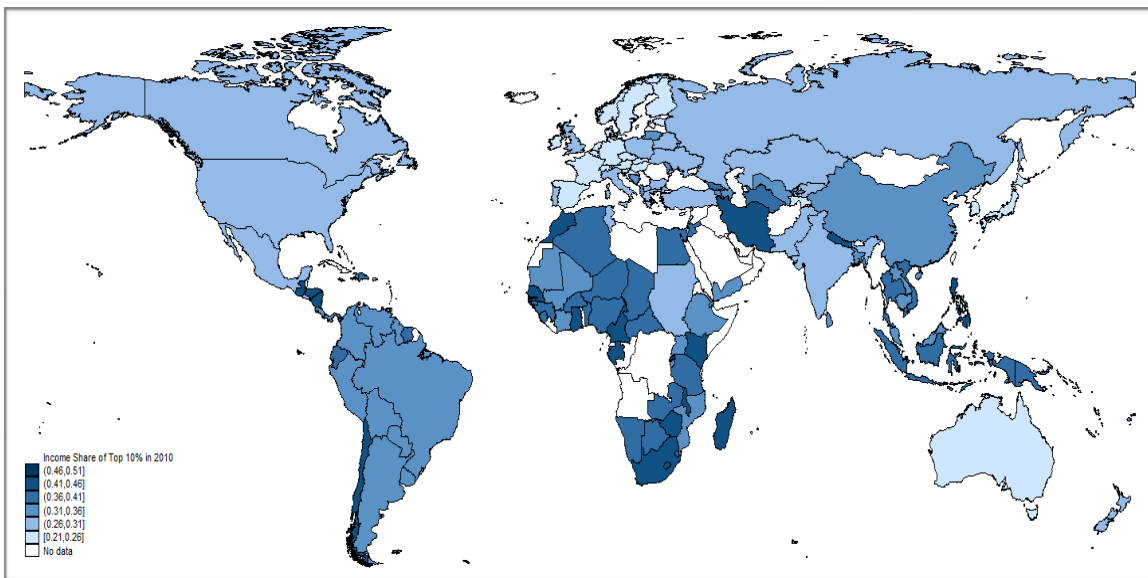
Figure 9: Decomposition of Global Income Inequality into within and between country components.



Note: Inequality measure is Mean Log Deviation - GE(0
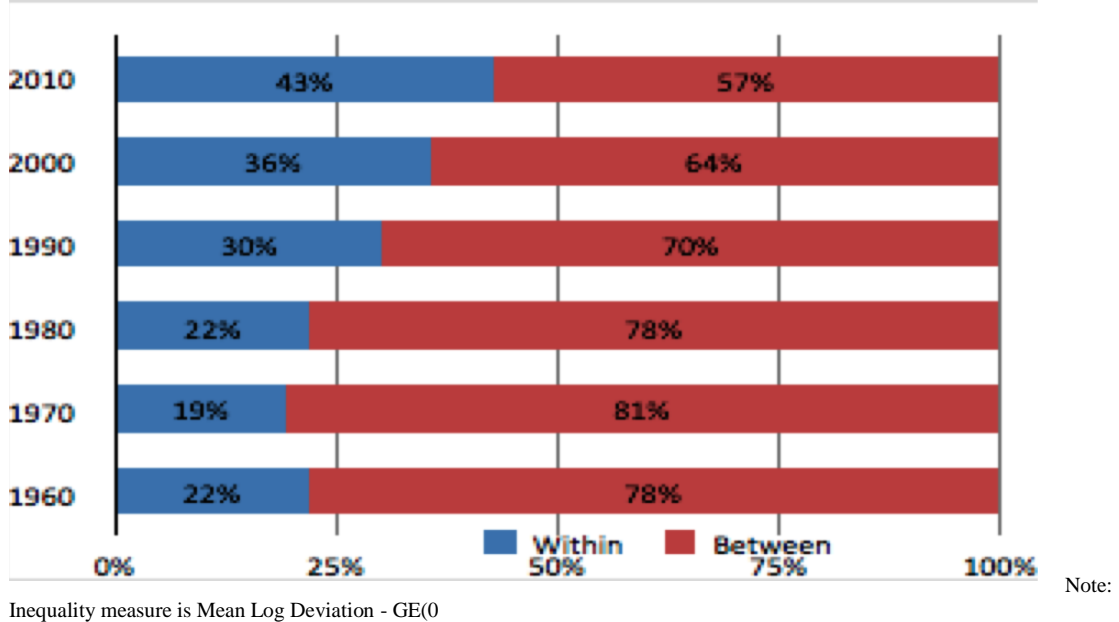
Figure 10: Global Absolute Income Inequality
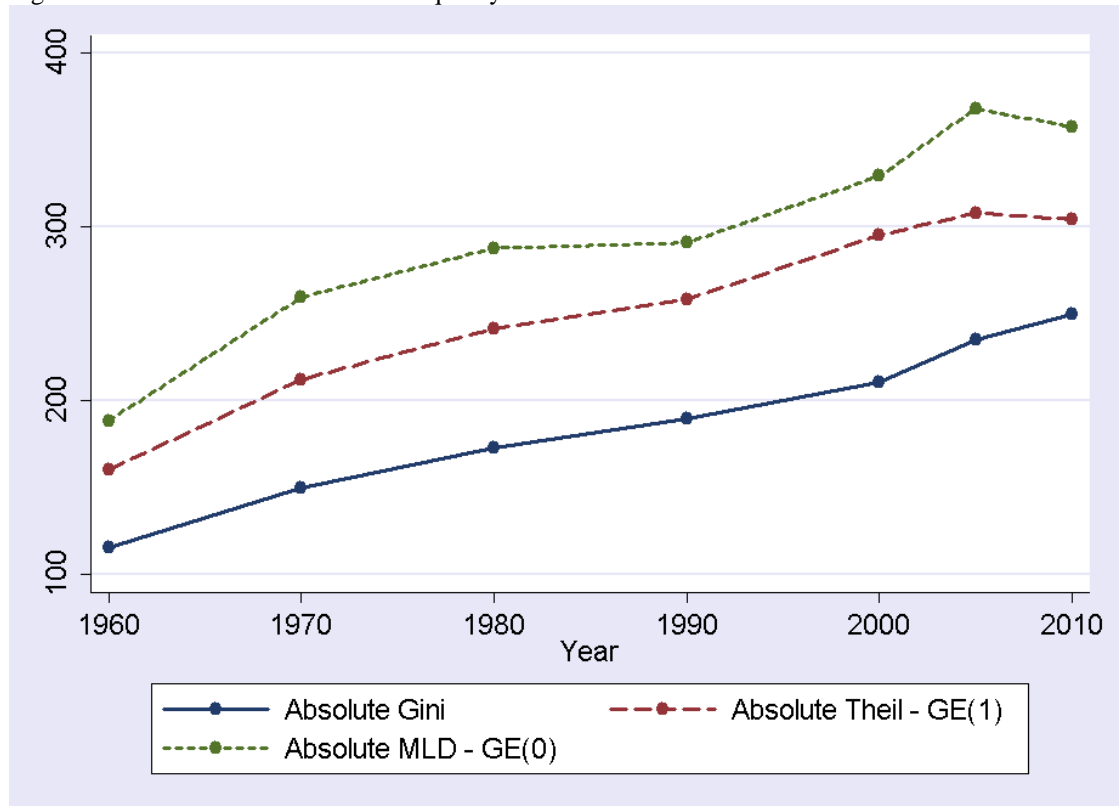


Figure 11: Regional Relative Income Inequality
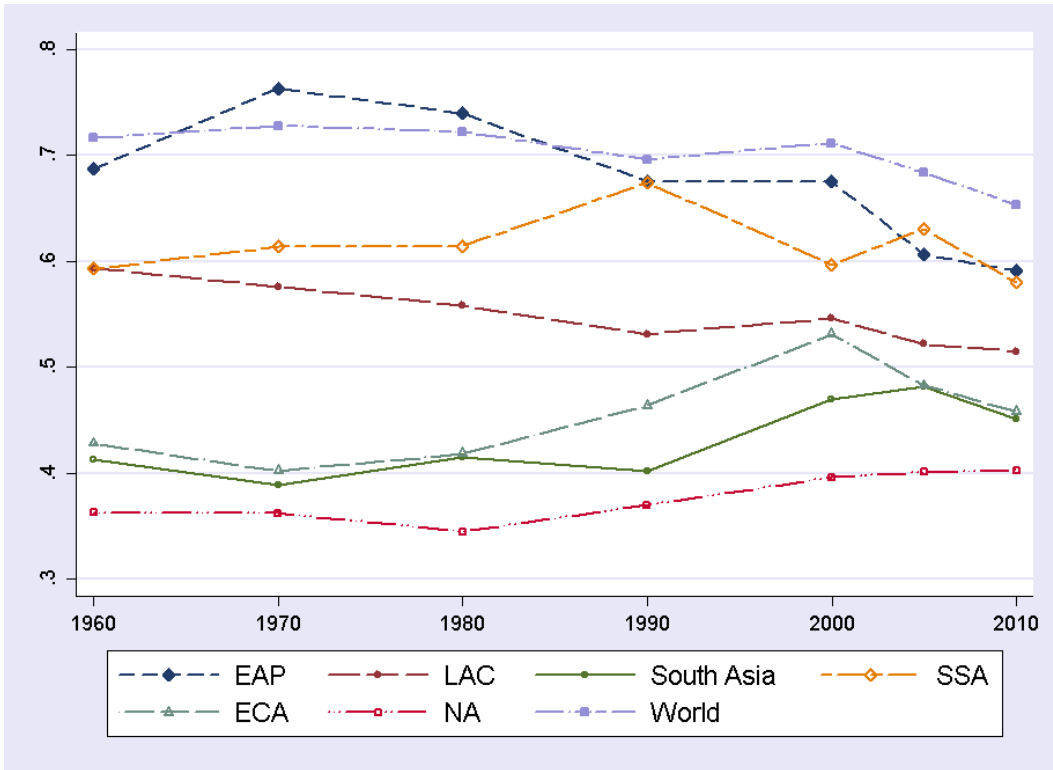
Figure 12: Percentage of Population Below Consumption of 2005 PPP $1.25/day in each Region
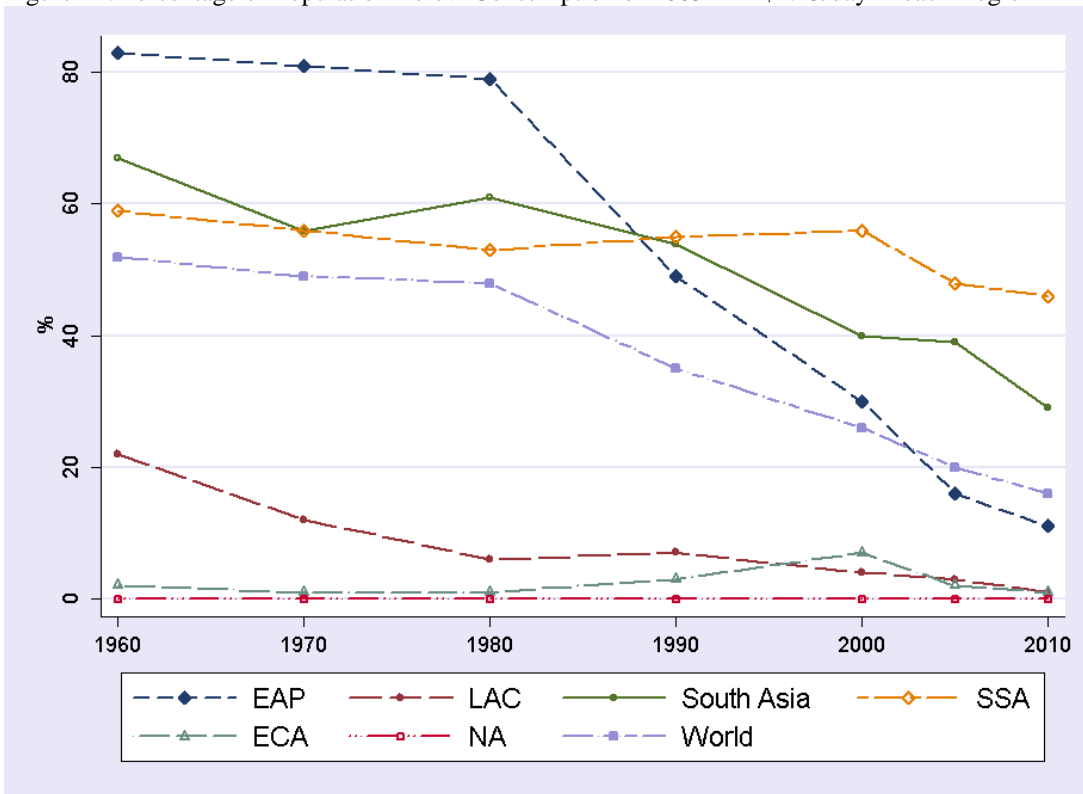


Figure 13: Percentage of Population Below Consumption of 2005 PPP $4.16/day in each Region
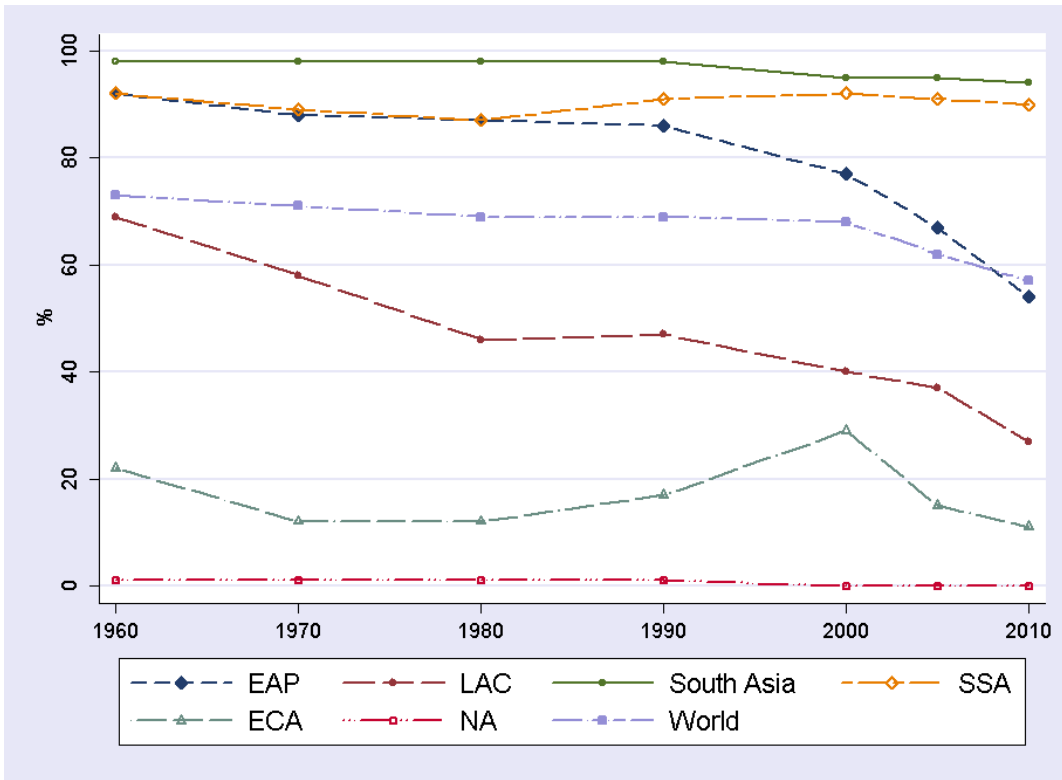
Figure 14: Percentage of Population in each Country Below Consumption of 2005 PPP $2.5/day
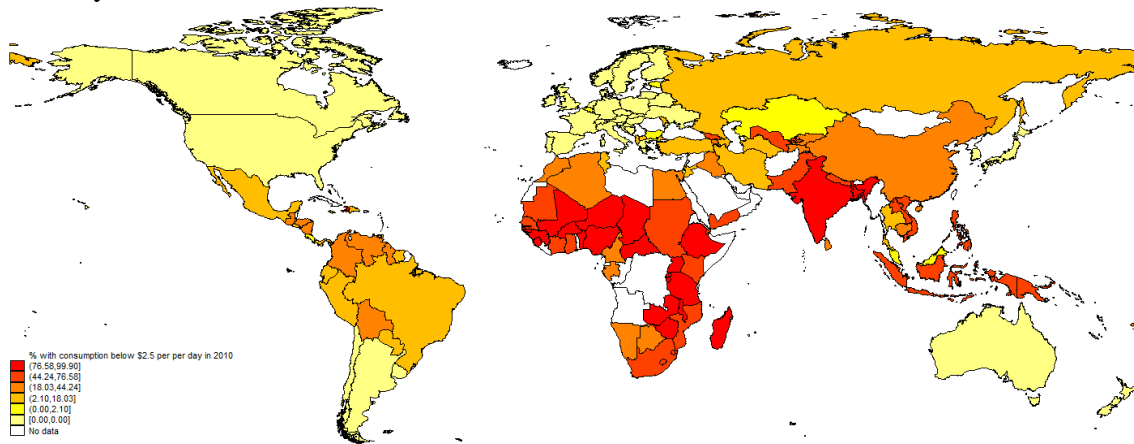


Figure 15: Global Income Generalized Lorenz Curve
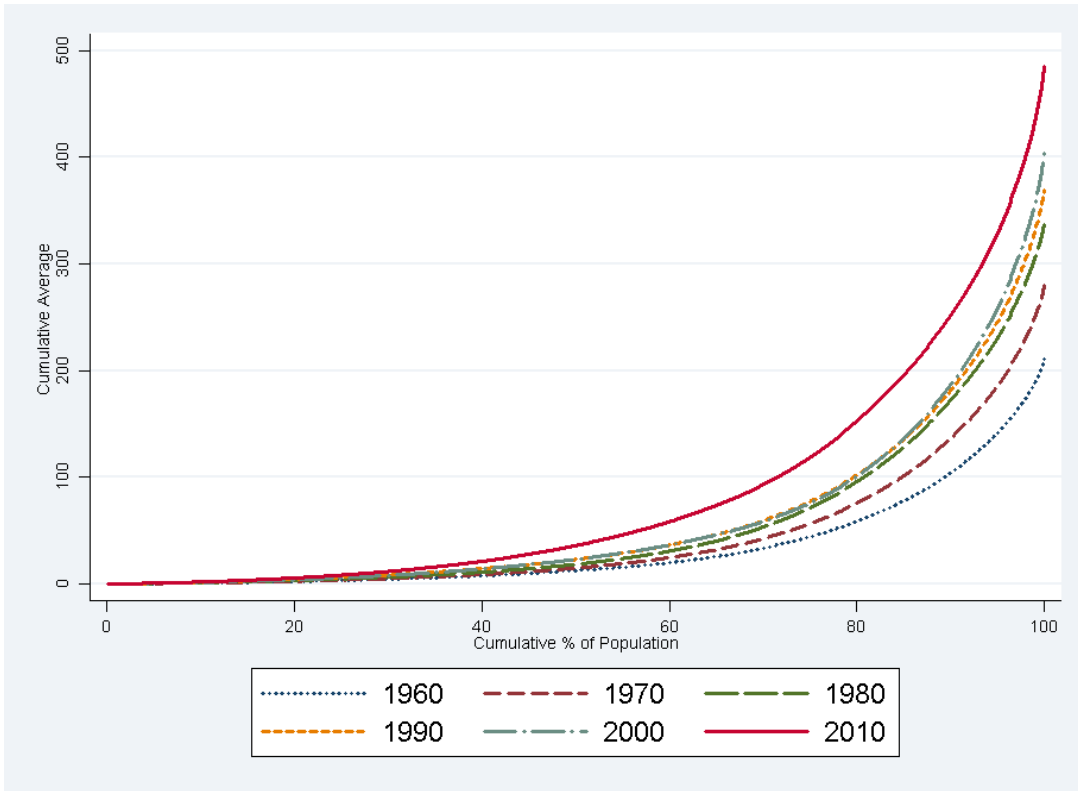
Figure 16: Global Consumption Growth Incidence Curve
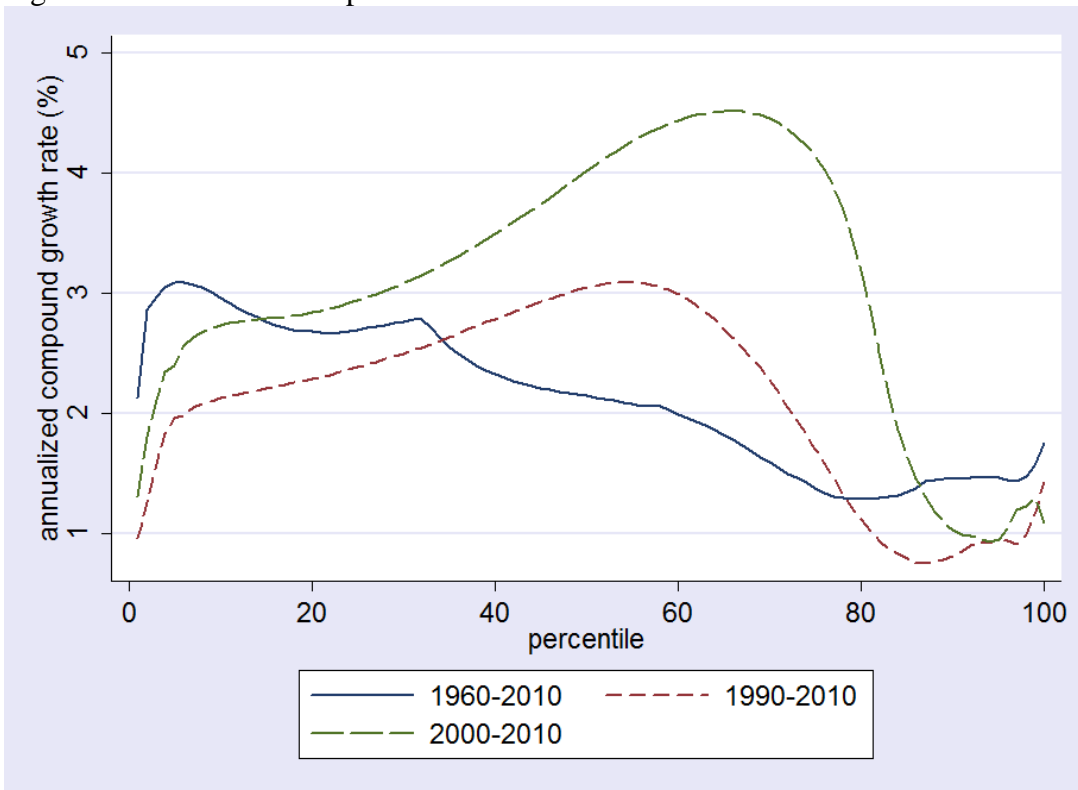


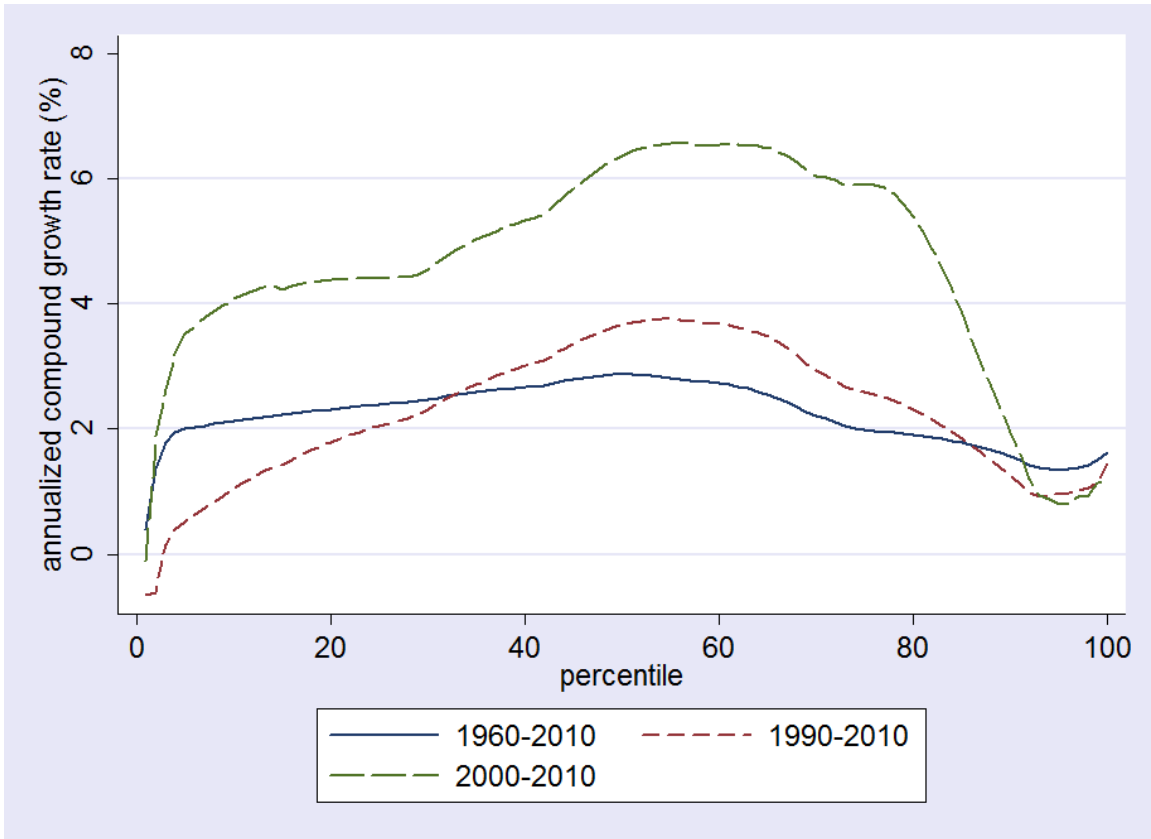Figure 17: Global Income Growth Incidence Curve
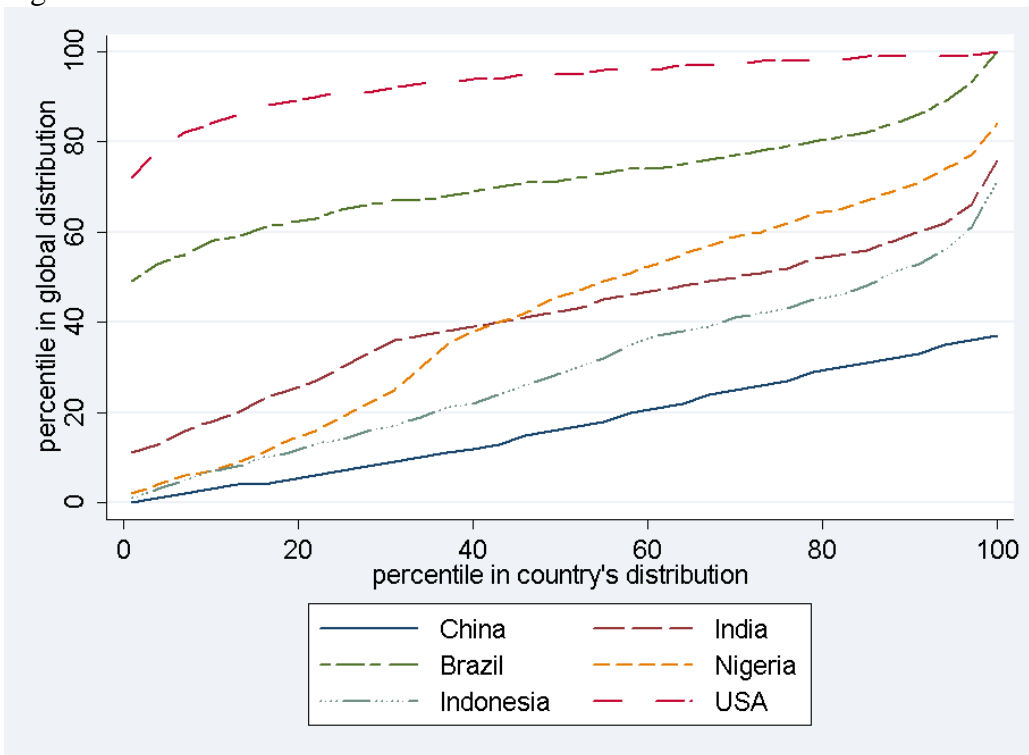
Figure 18: Relative Position of Select Countries in 1990

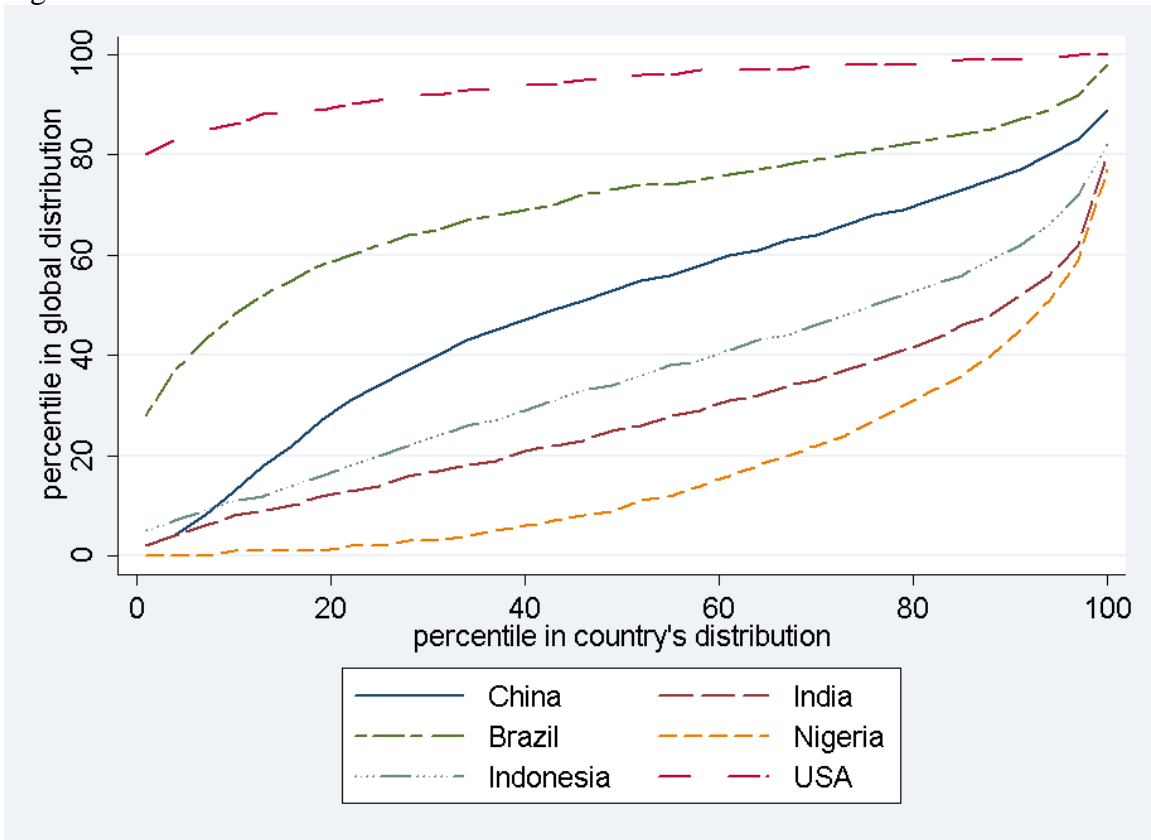Figure 19: Relative Position of Countries in 2010



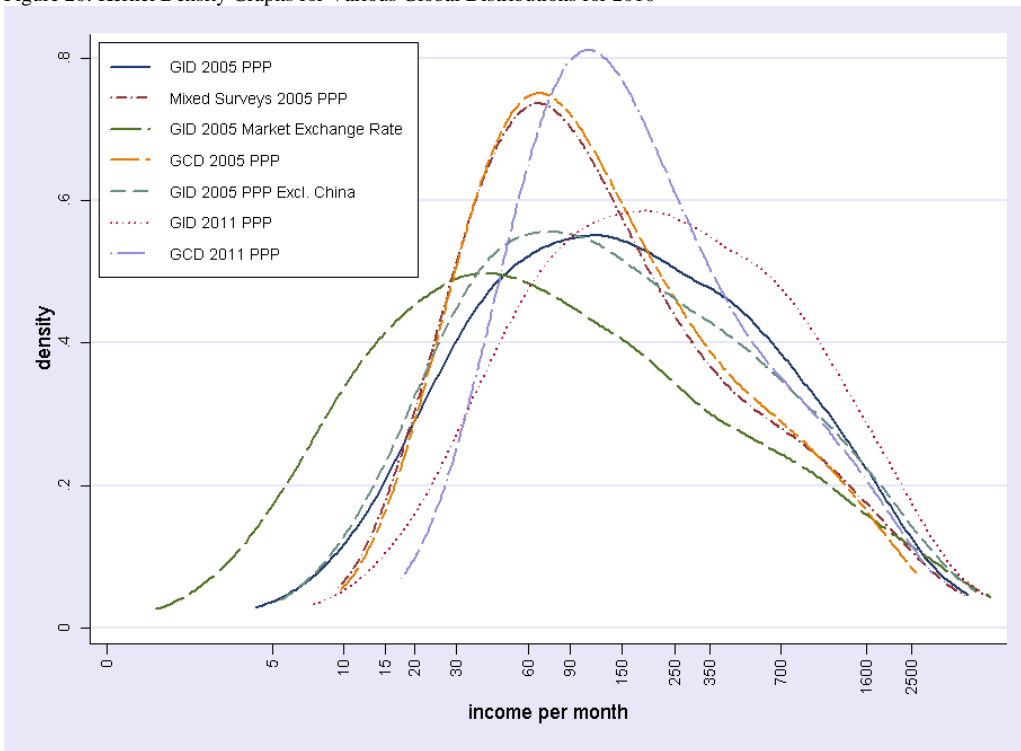Figure 20: Kernel Density Graphs for Various Global Distributions for 2010

Figure 21: Global Growth Incidence Curves for Various Global Distributions for 1990-2010