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Trade, Poverty, Inequality and Gender*

By

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Learning Objectives

- This module examines the impact of international trade in goods and services on poverty and income distribution.
- It summarizes the indicators used by economists to measure openness, trade liberalization, poverty and inequality.
- It then studies the theories establishing various connections between trade, poverty and inequality and then presents the available evidence.
- The module also examines the diverse effects that trade and trade policy have on the socioeconomic status of various groups in society --by region, location, gender, etc.-- looking as well at the different experiences around the world.
- Policies are examined that complement trade policies in reducing poverty and inequality.

Executive Summary

- The recent period of increased international trade and globalization coincides with a significant reduction of world poverty. The percentage of the world population living in households with consumption per person below \$1 a day dropped from 40.1 percent in 1981 to 28.7 percent in 1990 and then to 18.1 percent in 2004. This represents a cut in half of poverty rates and has meant a reduction in the number of poor in the world from 1,470,000 in 1981 to 969,480 in 2004.
- The drop in world poverty since the 1980s coincides with the rise of globalization and appears to be consistent with a negative impact of increased trade on poverty. Furthermore, the two economies that have seen some of the sharpest increases in openness, China and India, are also the two economies where poverty has dropped the most. To cap off all of this, the region that has been the slowest to drop trade barriers, sub-Saharan Africa, is also the region where poverty failed to drop during the period.
- Research carried out for specific countries, using multivariate analyses of the effects of trade liberalization on poverty are mixed. However, there are a number of careful country studies documenting reductions in poverty as a result of trade liberalization.
- Although the data show a sharp drop of extreme poverty during the period of globalization since the 1970s, as measured by the \$1 a day threshold, many of those who moved above the poverty line barely did so. The impact of trade on poverty using a \$2 a day threshold income level is much less significant, dropping from 67 percent in 1981 to 47.6 percent in 2004. And this result is moved mostly by the huge drop in poverty in China (from 88.1 percent in 1981 to 34.9 percent in 2004). Once China is removed from the analysis, poverty drops but not in very sharp terms.

- Most of the estimates available suggest that the recent expansion of international trade in the world has been associated with a period of increased inequality. This inequality is displayed in both greater within-country inequality and higher cross-country inequality.
- Gini coefficients are used to measure inequality. This index ranges from 0 to 100, with higher values indicating increased inequality. The world Gini coefficient rose but only slightly, from 66.8 in 1970 to 68.3 in 1999. This rise was spearheaded by the increased inequality in developing countries in Europe and Central Asia, where the Gini coefficient rose from 30.1 to 44.2 between 1980 and 1999.
- The rise of inequality in the world during the recent period of globalization is inconsistent with what the benchmark theory of international trade says should have happened in developing countries. According to this theory, referred-to as the Stolper-Samuelson theory, the impact of trade on income distribution is determined by noting that, as a developing country shifts to manufacture and export the unskilled labor-intensive products that it has a comparative advantage in producing, the impact will be to raise the demand for unskilled workers and increase the relative wages of these workers. Similarly, as production of goods and services that are intensive in the use of skilled labor and physical capital contract due to competition from imports, the demand for human and physical capital will decline. This will induce a relative drop in the wages of skilled workers and in the price of physical capital in developing countries. Since unskilled workers are usually poor while the owners of both physical and human capital tend to be richer, the impact of international trade and globalization in the Stolper-Samuelson theory is to improve income distribution in developing countries. This has not happened.
- The increasing inequality and declining poverty associated with globalization can be reconciled by noting that there is widespread evidence indicating that trade leads to greater economic growth. And economic growth is associated with a reduction of poverty.
- The mechanism through which trade liberalization increases growth is by stimulating innovation and technological change. But most of the technical change affiliated with trade has been skill-biased. If the technical change is skill-biased, it will tend to increase the demand for skilled labor at the expense of unskilled labor. Such a shift in demand would then have the effect of raising the wages of skilled labor relative to unskilled workers. Since skilled labor has substantially higher wages than unskilled workers, the result would be an increase of inequality.
- The experience of globalizing countries since the 1980s shows that increased trade has been associated with skill biased technical change in these economies. This partly explains the increased inequality associated with trade liberalization. It also explains the poverty-reduction effect of trade because technical change is connected to greater long-run growth and, consequently, with reduced poverty.

- In a number of countries, other phenomena may be at hand in explaining the rise of inequality. In some countries, for example, sectors intensive in the use of unskilled labor are heavily protected from foreign competition. These sectors produce agricultural goods considered essential for local food security, or they could be manufacturing industries whose workers have been successful in lobbying for protection. But the Stolper-Samuelson theory itself would then suggest that trade liberalization in this context would lead to a rise in the skill premium, as employment and wages of unskilled workers in the previously-protected sector decline. Evidence of this phenomenon has been documented for Colombia, Brazil, Mexico, and Morocco, among others.
- Trade can have divergent economic effects on men and women. These effects can be positive or negative and may increase or decrease gender inequities. As a result, there is no discernable, systematic pattern of change in poverty or inequality on the basis of gender since the 1980s, whether at the theory level or in the empirical evidence available.
- Although female workforce participation in export sectors may have spearheaded improvements in the standard of living of women in some countries, the fact is that in other countries trade may have hurt. In agricultural sectors, for example, the evidence available is that trade has been associated with a deterioration of the relative economic situation of many women.
- Trade liberalization can be expected to have serious regional effects. At the theory level, the Heckscher-Ohlin framework clearly suggests that trade liberalization induces major reallocations of production activity in a country, leading to the decline of import-competing industries and the expansion of export industries. If the import-competing industries are in poor, rural areas and exports are in richer, urban locations, then trade will widen the gap between urban and rural areas. But the opposite will happen if the exporting regions are also poor.
- Consider the case of countries that have increased their international trade on the basis of the exploitation of natural resources. Have these countries become richer? Have poverty rates dropped? Surprisingly, despite the wealth associated with the exploitation and export of natural resources, countries that have greater trade in natural resources are not richer nor do they have lower poverty rates, holding other things equal. They have also generated greater inequality.
- In order for openness and globalization to be clearly associated with a reduction of poverty and inequality, the process of trade liberalization must be accompanied by a set of complementary policies. These policies vary across the various sectors of the economy and include, among many others, earmarking the revenues obtained from natural resource exports for social investments, engaging in land reform and agricultural sector diversification policies, controlling corruption and improving public sector governance, adopting tax-subsidy policies to stimulate investment and promote exports, and establishing research and development funds and other mechanisms to facilitate entrepreneurship, product development, and technical change.

1. Introduction

The surge of international trade flows in the last 20 years is well-known and is the backbone of globalization. But how has globalization affected inequality in the world? How have developing countries been affected: has poverty declined or increased in the world as a result of trade flows? There are widely divergent opinions on this subject.

A number of prominent economists have argued that trade reduces poverty and inequality. Economists affiliated with the World Bank and other international organizations have researched the issue extensively and conclude that increased international trade has reduced both poverty and inequality. For instance, David Dollar and Aart Kray, conclude in a wide-ranging study of the links between trade, poverty and inequality: “We provide evidence that, contrary to popular beliefs, increased trade has strongly encouraged growth and poverty reduction and has contributed to narrowing the gaps between rich and poor worldwide” [Dollar and Kray (2002)]. Similarly, Andrew Berg and Anne Krueger argue that “changes in average per capita income are the main determinant of changes in poverty...[and] the story that emerges is overwhelmingly that openness contributes greatly to higher productivity and income per capita and, similarly, that opening to trade contributes to growth” [Berg and Krueger (2002)]. And the economist Jagdish N. Bhagwati, at Columbia University, has argued that: “when we have moved away from the anti-globalization rhetoric and looked at the fears, even convictions, dispassionately with the available empirical evidence, we can conclude that globalization (in shape of trade and...equity investments as well) helps, not harms the cause of poverty reduction in poor countries...globalization cannot be plausibly argued to have increased poverty in the poor nations or to have widened world inequality. The evidence points in just the opposite direction” [Bhagwati (2004), p. 66].

But critics of globalization have contradicted these claims, strongly arguing that there is no evidence that trade reduces poverty or inequality. For instance, Robert Hunter Wade, a well-known political scientist concludes that: ““globalization has been rising while poverty and income inequality have not been falling” [Wade (2004)]. And “my reading of the evidence suggests that none of the...alternative measures [of inequality] clearly shows that world income distribution has become more equal over the past twenty years” [Wade (2002)]. In another study, Christian E. Weller, Robert E. Scott and Adam S. Hersh review the research and conclude that despite the increased trade observed over the last 20 years, “the empirical evidence suggests that reductions in poverty and income inequality remain elusive in most parts of the world, and, moreover, that greater integration of deregulated trade and capital flows over the last two decades has likely undermined efforts to raise living standards for the world's poor. ..While many social, political, and economic factors contribute to poverty, the evidence shows that unregulated capital and trade flows contribute to rising inequality and impede progress in poverty reduction” [Weller, Scott and Hersh (2001)].

Who is right? What does the evidence show? This module examines the impact of international trade in goods and services on poverty and income distribution. It studies the theories establishing various connections between trade, poverty and inequality and then presents the available evidence. Poverty and inequality vary among various groups in an economy, depending on regional location, urban versus rural residence, gender, etc. The module examines the diverse effects that trade and trade policy have on the socioeconomic status of the various groups in society, looking as well at the different experiences around the world. Since in order to determine empirical linkages and connections one needs to utilize the appropriate indicators, the module discusses the various measures or trade and trade liberalization, poverty and inequality.

2. The Impact of Trade on Poverty and Income Distribution: Theory

The impact of international trade is examined by looking at what happens to an economy that is closed and suddenly opens its borders to international trade in goods and services. Historically, transportation and communications costs were a major barrier to trade. But these barriers have been gradually eliminated and it is government-imposed trade barriers that have emerged as the most significant block to international trade. The move from a closed economy to an open economy is therefore, in most cases, a move to eliminate tariffs and customs duties, quotas, licensing requirements, and other government policies restricting trade.

The benchmark framework used in international trade theory is the Heckscher-Ohlin model. What does this model say about the effects of trade liberalization on income distribution and poverty? The theory begins by postulating that when domestic markets are opened to international trade, countries will export those goods and services in which they have a relative comparative advantage in producing. And, according to this approach, comparative advantage is determined by the relative abundance of inputs or factors of production in the economy.

Consider, for example, the case of a developing country that is considering liberalizing its international trade. Developing countries have abundant endowments of unskilled labor and they can produce cheaply goods and services that require the intensive use of unskilled labor. As a result, when trade is liberalized, these are the goods and services that will be exported to the rest of the world. On the other hand, goods and services that require intensive use of physical and human capital will be relatively costly to produce in a poor country and, with an opening to trade, they will be imported from high-income countries.

The impact on income distribution is determined by noting that, as a developing country

shifts to manufacture and export unskilled labor-intensive products, the impact will be to raise the demand for unskilled workers and increase the relative wages of these workers. Similarly, as production of goods and services that are intensive in the use of skilled labor and physical capital contract due to competition from imports, the demand for human and physical capital will decline. This will induce a relative drop in the wages of skilled workers and in the price of physical capital in developing countries. Since unskilled workers are usually poor while the owners of both physical and human capital tend to be richer, the impact of international trade and globalization in the Heckscher-Ohlin framework is to reduce poverty and improve income distribution in developing countries.

In high-income economies, trade is expected to have the opposite impact. According to the theory, trade liberalization will lead to a rise in the exports of skilled-intensive, high-tech products in these countries, raising the demand for --and the wages of-- the skilled workers used in these sectors. At the same time, trade liberalization will lead to a flood of cheap imports of textiles, shoes and other products that use unskilled labor. Sectors that manufactured these goods in high-income countries will collapse, leading to a reduction in the employment --and salaries-- of unskilled workers. In addition, since exports tend to be relatively capital-intensive in these economies, the rate of return to capital will increase. The impact is to sharpen income inequalities.

So, summarizing, at the theory level, the elimination of tariffs and other barriers to trade in developing countries should raise the prices or wages received by factors of production that are relatively abundant in those countries (such as unskilled workers) and lower the prices or wages of factors of production that are relatively scarce (such as skilled workers and physical capital), thus increasing inequality. The opposite happens in high-income economies. This

conclusion has become known as the *Stolper-Samuelson theorem* [see Stolper and Samuelson (1941)].

Of course, the Hecksher-Ohlin framework is a simple one and it has been analyzed in more comprehensive theoretical frameworks over the years [see Bhagwati, Srinivasan and Panagariya (1998)]. There are many nuances introduced by this research. However, the Stolper-Samuelson theory remains the benchmark that economists use in identifying the effects of international trade on income distribution.

Are the predictions of the Stolper-Samuelson theorem correct? What is the evidence on the impact of trade liberalization? How has it affected income distribution and poverty in developing nations? The next sections examine this issue in detail.

3. Measuring Trade Liberalization, Poverty and income Distribution

In order to examine how the liberalization of international trade has led to changes in poverty and income distribution, one must first be able to determine the extent to which a country or countries have opened or liberalized their domestic markets to international trade, and, secondly, one must be able to measure changes in poverty and income distribution over time.

A. Measuring International Trade, Protectionism and Trade Liberalization

The simplest measure of openness to international trade of a country is the volume of that trade, as represented by the value of exports and imports of goods and services. However, since the volume of exports and imports is also determined by the size of an economy, most trade indices

adjust for size. One way is to divide the value of exports and imports by some measure of the size of the economy. The most popular is the so-called *trade index*, which is equal to the sum of the value of exports and imports of an economy expressed as a percentage of Gross Domestic Product (GDP).

The trade index, as defined, has risen enormously over the last 50 years, increasing from 24 percent in 1960 to 39 percent in 1980 and to 48 percent in 2005. In some countries, the increase has been remarkable. For instance, in South Korea, the increase has been from 16 percent in 1960 to 84 percent in 2005, in China from 5 percent in 1970 to 65 percent in 2005, in Mexico from 20 percent in 1960 to 61 percent in 2005, and in Nigeria from 26 percent in 1960 to 88 percent in 2005. These figures do reflect the sharp increase in the globalization of trade flows in recent decades.

Although the trade index measures well the extent to which a country is trading with the rest of the world, it does have some problems as a measure of openness and of the extent to which a country has liberalized its international trade. To understand the problem, Table 1 shows the values of the trade index for a selected sample of countries for 2005. Surprisingly, the index is comparatively small for some countries that are considered to be very open economies, with limited barriers to trade, such as the United States and Japan. Indeed, the United States had a value of exports and imports as a percentage of GDP equal to 24 percent in 2005 and for Japan it was equal to 22 percent, about half the average for the world and much below that of other countries in Table 1.

[Table 1 about here]

The main explanation for why the U.S. and Japan have such a low value of the trade index can also be detected by looking at the economies with the highest trade index values in

Table 1: Luxembourg (271 percent), Puerto Rico (181 percent), the United Arab Emirates (148 percent) and Fiji (141 percent). These are all small economies. And the reason for why the U.S. and Japan have low values of the trade index is partly connected to the size of the U.S. and Japanese economies. A bigger economy has diverse regions and tends to have greater internal trade when compared to other, smaller economies. This does not mean that the larger economy is less open when compared to smaller economies. It just says that the larger economy trades more within its borders than across borders, something small economies cannot do.

An alternative to using the volume of trade and the trade index as measures of the openness of an economy is to actually measure directly the barriers to trade a country has in place. Countries with high impediments to trade are then more closed to the rest of the world.

One of the most popular barriers to trade is in the form of tariffs or customs duties. The *tariff rate* is the value of the customs duties imposed on a unit of an imported product expressed as a percentage of the price of that product. Table 2 shows average tariff rates in a selected group of countries for 1900 and 2000. For this indicator, both the United States and Japan appear as relatively open economies, with comparatively low average tariff rates. The Table also shows the clear trend towards trade liberalization almost everywhere in the world in the 1990s.

[Table 2 about here]

But tariff rates are limited as a measure of barriers to trade. Customs duties are only one of many restrictions imposed on exports and imports of goods and services. There are also non-tariff barriers to trade, including quotas on imports, subsidies to domestic producers competing with foreign suppliers, license requirements, etc. Consider, for example, the subsidies given by some high-income countries to their agricultural producers. The United States provides each year over \$50 billion in subsidies to agricultural producers, the European Union close to \$100 billion to its farm industry, and Japan over \$50 billion. Given that these subsidies are not in the form of

customs duties, the tariff rates above do not reflect them. In addition, countries that control tightly their foreign exchange markets often have undervalued exchange rates that make foreign goods and services comparatively expensive compared to domestic products. This fixing of exchange rates can serve to protect domestic industries and it constitutes a barrier to trade. Governments can also intervene directly in the trade arena by nationalizing industries that are major exporting industries. This is often the case of minerals, oil, natural gas and other natural resources. Since nationalized industries can be subsidized through internal government mechanisms, this is another way of erecting barriers to foreign imports.

Economists Jeffrey Sachs and Andrew Warner have calculated one of the most comprehensive indexes of openness that includes some of the key ways in which countries impose barriers to trade. This so-called *Sachs-Warner index* defines an economy to be open if:

1. Average tariff rates are less than 40 percent.
2. Non-tariff barriers cover less than 40 percent of trade.
3. Any black market premium on the exchange rate is less than 20%.
4. Government has no monopoly of major exports.
5. The government is not a centrally-planned socialist economy.

Sachs and Warner (1996) compiled data for 93 countries and calculated whether these economies were open or not in the period of 1970 to 1990. In a more recent and comprehensive paper, Wacziarg and Horn (2005) extended the series up to 2000 and added countries excluded by Sachs and Warner in their original paper, expanding the sample to 141 countries.

Figure 1 shows the proportion of countries catalogued as open by the Sachs-Warner approach and the share of the world population accounted for by open economies. The diagram shows clearly the increased trade liberalization the world has seen, especially since the 1980s. According to the data, less than 30 percent of all economies were open economies in the period of 1970-89, while in the period of 1990-98 more than 70 percent of all countries were open.

[Figure 1 about here]

Although the Sachs-Warner index is not without its shortcomings [see, for example,

Rodrik and Rodriguez (2000)], it remains the most widely-used measure of openness of an economy.

B. Measuring Poverty

Poverty refers to a situation of scarcity or need on then part of a household, family or person.

Whether someone is cataloged as poor or not is determined by social criteria of what constitutes living at or below a very basic, level of subsistence. These criteria may vary over time, historically, in a given country, and different countries may have different criteria about what constitutes being poor.

Although poverty has many dimensions, everyone would agree that the economic dimension is essential: the poor are those who have the lowest consumption or income in society. For measurement purposes, most experts and statistical agencies adopt concepts of poverty that establish thresholds of income, consumption, or other indicators, below which a person or a household is said to be in poverty. More than one threshold may be established, with a lower income or consumption level used to measure extreme poverty. The World Bank, for example, has adopted two thresholds for a person to be poor: two dollars a day (\$2.15 to be precise) and one dollar a day (\$1.18 to be precise). The one dollar a day figure really reflects extreme poverty and is based on estimates of the cost needed for a person to consume the minimum amount of food required to live with a minimum level of nutrition and health. The two dollars a day figure allows a greater consumption, satisfying some basic needs above the bare minimum sufficient to merely survive.

Usually, poverty is measured by estimating the income or consumption available to a household. People in the household are poor if the per-capita income or consumption in the

household lies below the poverty line. The number of people found to be under the poverty threshold is the estimate of the poor in a country. The percentage of the poor in the population is the *headcount poverty rate* or simply the *absolute poverty rate*. Poverty rates are adjusted for inflation, to take into account changes in the cost of living over time. Many governments also adjust poverty rates in a household depending on the composition of adults and children.

How the number of poor people in a country --and the poverty rate-- are calculated can be described diagrammatically by showing the income distribution of a country. The distribution of income shows the variation in income received by different households or persons in a country, in a ranking from the lowest to the highest levels of income. A diagrammatic representation of this distribution of income can be obtained by counting the number of people that receive each level of income and then plotting the results of this calculation in a diagram, from the lowest income levels to the highest in the economy.

Figure 2 shows the distribution of income for China, plotted for four decades, from 1970 to 2000. The horizontal axis measures income of a person per year and the vertical distance at any point along the various distributions represent the number of people receiving that income level, in thousands. As can be seen, the income distribution in China shifts towards higher income levels substantially over time. This is reflected in the rising value of the mode of the distribution. The mode shows the value of income that has the largest frequency or number of people. For 1970, the mode in China was \$750 a year while in 2000 it was \$2,400.

Also shown in Figure 2 is the value of income in China corresponding to the \$1 a day international poverty level established by the World Bank. Clearly, over time, the proportion of the population living under that poverty line has declined sharply. This is diagrammatically represented by the portion of the distribution in Figure 1 that lies to the left of the poverty line. In

addition, another phenomenon that can be seen clearly is that the distribution of income also becomes more spread-out as time passes. In 1970, income distribution was quite compact ranging within a limited set of income, but by 2000, the ranges of income prevailing in the country were much wider. This issue will be examined in detail later.

[Figure 2 about here]

How does one compare poverty rates across countries? This is not an easy measurement task. Most critically, one needs to adjust the poverty income threshold levels in different countries for cost of living differences. The \$1 a day international standard used by the World Bank, for example, is adjusted country-by-country, in order to convert it to the local purchasing power of the domestic currency. Of course, the so-called PPP indices that adjust for cost of living differences are difficult to compute since different people consume different baskets of goods across countries, among other problems. In any case, the calculation of these conversion indices has become more sophisticated over time and their inaccuracies have diminished.

A second measurement issue is whether to use consumption or income to measure poverty. Strictly speaking, consumption is a more direct indicator of the standard of living and the needs of a person than income is. Income can be used to satisfy consumption needs but it can also be used for other purposes, such as savings, gambling, paying-off debts, etc. For example, a family that earns income above the poverty level may have consumption that lies well below the poverty threshold if it needs to make substantial payments on existing debts. Income is also more volatile than consumption and it may not provide an accurate measure of the well-being of a person or household at any given moment in time. If, for instance, income is measured after harvesting time in a rural area, it will overestimate the average consumption levels of people in that area during the whole year.

On the other hand, measuring consumption is much more complex than measuring income. Sources of information for income levels can be more broadly obtained from national sources. Government authorities invest heavily to collect such data from individuals and households, whether through tax returns or surveys connected to national income accounts. Consumption data often can only be obtained from household surveys that are extremely costly to carry out and sometimes are unavailable for rural or isolated regions of a country. In addition, household surveys may be hampered by the systematic refusal of certain groups to participate in them. In many countries, for example, wealthy households are reluctant to be inspected by the detailed questions in these surveys and often refuse participation. With richer households not participating, the surveys have a tendency to over-estimate poverty rates [Deaton (2003)].

Over time, the World Bank --through its Living Standards Measurement Surveys (LSMS)-- and many national authorities around the world have invested heavily in implementing household surveys designed to measure poverty. Most industrialized countries have had such data for many years. As a result, estimates of poverty rates using household surveys are now available for a wide array of countries.

Table 3 shows the latest World Bank estimates of world poverty [Chen and Ravallion (2007)]. In 2004, there were 969.5 million people living in households that had consumption per-capita of less than \$1 a day, equivalent to an 18.1 percent poverty rate. With a threshold of \$2 a day, the world poverty rate was much higher, equal to 51.6 percent in 2004, which means that 2.5 billion people were living under the poverty line. The highest poverty rates are in South Asia and in Sub-Saharan Africa, where 77 percent of those living on less than \$1 a day were located and 64 percent of those with less than \$2 a day.

[Table 3 about here]

Despite the wide availability of data on poverty at the present time, one needs to understand that there are enormous conceptual and measurement issues involved in these calculations. Note for instance that poverty is a relative concept and different countries may adopt different poverty thresholds. In the United States, for example, the U.S. government considered the poverty threshold for a family consisting of two adults with one child to be \$13,410 in 2000, which implies a per-capita income of \$4,470 a year, significantly above the \$393 or \$786 annual poverty thresholds assumed by the World Bank. The standard of what constitutes a minimum set of resources for survival purposes is a societal concept and rises with the average wealth of the community. By adopting a common international poverty standard (\$1 a day or \$2 a day), one is ignoring the problems associated with assessing poverty among different cultures and societies [see Reddy and Pogge (2005) and Ravallion (2006) for a discussion of these issues]

C. Measuring Inequality

Poverty is concerned with who is at the bottom of the distribution of income or consumption. Inequality is a measure of the disparity between those who are at the top of the distribution and those at the bottom. Let us consider the case of a specific country and examine various measures of inequality.

Within-Country Inequality

As noted earlier, the distribution of income shows the variation in income received by households or persons in a country, in a ranking from low to high levels of income. A common

presentation of these data is to separate the population into equal groups of people (five, ten or more) and then calculate the total share of the country's income received by each group. For instance, if the distribution is separated into five groups or quintiles, then this presentation of the distribution of income would show the percentage of total income in the country received by the bottom 20 percent of the households in the country (those with the lowest income), the percentage received by the second lowest 20 percent of the population, the percentage received by the middle 20 percent, the percentage received by the fourth quintile, and the share received by the highest 20 percent. Note that if there is absolute equality in the country, then all five quintiles would receive an equal share of the income pie, equal of course to 20 percent.

Table 4 displays the income distribution by quintiles for a selected sample of countries. As can be seen, Brazil's income distribution in 2003 was such that the bottom or poorest 20 percent of the population received only 3 percent of the country's income while the richest 20 percent of the population received 62 percent of all income. By contrast, in a country like Finland, the bottom 20 percent of the population received 10 percent of all income while the richest 20 percent had 37 percent of income. Clearly, Finland represents a more equal distribution of income than Brazil. But how can we develop an index of inequality?

[Table 4 about here]

The simplest indicator of inequality is the *disparity ratio* between what the top and bottom groups in the population receive in income. If the distribution is separated into quintiles, this index would be equal to the percentage of total income obtained by the top 20 percent divided by the percentage of total income obtained by the bottom 20 percent. If the country has absolute equality, this index is equal to one, while the more unequal the distribution is in favoring the rich, the higher the value of the index.

The last column of Table 4 displays the disparity ratio for the selected countries. Brazil had a ratio equal to 20.7, showing that the top 20 percent of the population in that country received about 21 times a greater share of income than the bottom 20 percent. This can be compared to the most equalitarian country in the table, which is Finland, where the top 20 percent received only 3.7 times the share of income of the bottom 20 percent.

The disparity index involves a simple calculation, but it is only a measure of the income gap between the top and bottom of the distribution, it does not consider at all the middle of that distribution. A more complex index that involves the whole distribution in the calculation of inequality is called the *Gini* coefficient. The value of this index ranges from 0 for complete equality to 100 for complete inequality, with a higher value of the coefficient implying a more unequal distribution of income. Since the calculation of the Gini coefficient is complex, we relegate to Appendix A to show how it is calculated and its relationship to the concept of a Lorenz curve, which provides a diagrammatic representation of the extent of inequality.

Table 5 presents Gini coefficients for a set of countries. The highest value is for Brazil (58), with Honduras (54), India (54) and Mexico (50) following. The lowest values are for Sweden (25) and Finland (27). Despite the greater sophistication of the calculation, the relative inequality results provided by the Gini coefficient are close to those provided by the disparity index.

[Table 5 about here]

Multi-Country and World Inequality

Up to this point the discussion has been about measuring inequality within a country. Indeed, the Gini coefficients presented in Table 5 show a measure of the disparities that exist

within countries. But what if we wanted to examine the disparities that exist among people in different countries? In this case, one needs first to convert incomes in various countries to a common denominator, say dollars adjusted for cost of living differences (referred-to as international dollars), just as was discussed earlier in reference to comparing poverty rates. One then joins together the various income distributions in different countries into a joint distribution. Using this multi-country distribution, one can then calculate an overall Gini coefficient or other indicator of inequality for the various countries under consideration. One could do this calculation regionally as well as for the whole world.

Table 6 shows the estimation of global inequality for 1999. The table presents Gini coefficients for the world overall as well as for the countries in the Organization for Economic Cooperation and Development (OECD) –which are mostly high-income countries-- and for developing countries, by region. In 1999, the region with the greatest inequality was sub-Saharan Africa, which had a Gini coefficient equal to 66.4. The region with the lowest inequality was the OECD, with a Gini coefficient equal to 36.7, followed by South Asia, with a Gini equal to 37.3.

[Table 6 about here]

Overall, the world was much more unequal than any countries or regions. The Gini coefficient for the world in 1999 was equal to 68.3, which sharply exceeds the Gini for most countries or regions of the world. Of course, this is to be expected from a visual inspection of Figure 3, which shows the world distribution of income as well as that of several regions and countries. As can be seen from that figure, the income distribution for regions lies well within the range of the income distribution of the world. In a sense, the disparity between someone in the lowest quintile and highest income quintiles in the United States is not that big compared with

the disparity between the lowest income quintile in Nepal or Burkina Faso and the highest quintile in Switzerland or Singapore.

[Figure 3 about here]

World inequality is a mixture of the inequality that exists within countries and the inequality present among various countries. If, for example, everyone in a country had the same income per-capita, then disparities in income among different countries in the world would be determined solely by the distribution of average per-capita income across countries. On the other hand, if every country in the world had the same average income per-capita, then the world distribution of income would be determined by differences in the distribution of income within each country.

One can decompose empirically the joint income distribution for several countries into a component that is connected to *within-country inequality* and a second component that relates to *cross-country inequality*, as represented by the differences in mean per-capita income across countries. In fact, one can calculate a Gini coefficient that reflects overall inequality among a group of countries and decompose this Gini coefficient into a part that reflects within-income inequality and a second one that measures cross-country inequality. Estimates available of this decomposition show that most of the world inequality is due to between-country inequality. In 1998, for example, 82.8 percent of the world income inequality was due to between-country inequality [Milanovic (2005), p. 112].

3. Empirical Evidence on Trade, Inequality and Poverty

Having discussed indicators of trade and trade liberalization, poverty and inequality, this section presents the evidence on the connection between these variables. The simplest relationship that can be drawn between increased trade on the one hand and poverty and inequality on the other is to look at a simple correlation between the two. Since as established in the previous section, trade has increased so sharply in the last 20 years, the question is then: how have poverty and income distribution changed during this time period?

A. Globalization and Poverty

Has the increased globalization since 1980 been associated with a reduction or an increase in poverty? Table 6 shows the behavior over time of the poverty rate among developing countries for both the \$1 and \$2 a day thresholds, as computed by the World Bank.

Let us look first at the data on extreme poverty, measured as people with consumption below the \$1 a day level [Chen and Ravallion (2007)]. The table depicts a sharp overall reduction in extreme world poverty rates, from 40.1 percent in 1981 to 28.7 percent in 1990 and then to 18.1 percent in 2004. This represents a cut in half of poverty rates and has meant a reduction in the number of poor in the world from 1,470,000 in 1981 to 969,480 in 2004. But despite this overall result, it is important to differentiate among countries and regions. A major reason why absolute poverty declined in the world between 1981 and 2004 is because of the success of China and India in cutting their poverty rates. As Table 6 shows, the poverty rate in China declined from 63.8 percent in 1981 to 9.9 percent in 2004 and in India from 51.8 percent

in 1981 to 34.3 percent in 2004. But even excluding these countries from the calculation, world poverty still dropped, from 24.1 percent in 1981 to 15.8 percent in 2004. On the other hand, poverty in Sub-Saharan Africa did not change to any significant extent in the period between 1981 and 2004 and, in fact, there was an increase in poverty between 1981 and 1990.

[Table 6 about here]

These results are generally shared by a number of other authors that have looked at the changes in poverty in recent decades. Sala-i-Martin (2006), for example, calculates poverty rates based on a measurement of income –not consumption—levels. As a result, he obtains lower poverty rates than the results obtained by the World Bank. But the conclusion as to the changes over time is unequivocal: “The...finding is that global poverty rates (defined as the fraction of the world distribution of income below a certain poverty line) declined significantly over the last three decades. ..The spectacular reduction of worldwide poverty hides the uneven performance of various regions in the world. East and South Asia account for a large fraction of the success. Africa, on the other hand, seems to have moved in the opposite direction” [Sala-i-Martin (2006), pp. 389,392].

The drop in world poverty since the 1980s coincides with the rise of globalization and appears to be consistent with a negative impact of increased trade on poverty. Furthermore, the two economies that have seen some of the sharpest increases in openness, China and India, are also the two economies where poverty has dropped the most. Figure 4 shows the behavior of poverty and trade in China. The figure shows poverty rates and the trade index (volume of export and imports as a percentage of GDP) from 1980 to 2000. As can be seen, as trade has risen, poverty has declined sharply.

[Figure 4 about here]

To cap off all of this, the region that has been the slowest to drop trade barriers, sub-Saharan Africa, is also the region where poverty failed to drop during the period. Indeed, using the Sachs-Warner method, less than 50 percent of all sub-Saharan African countries were considered open in 2000, and many of those that were open had liberalized their international trade only in the 1990s. From Nigeria to Zimbabwe, sub-Saharan Africa remains a relatively closed environment in terms of international trade. It is also the region of the world where poverty is the highest and rising.

But despite the clear, simple negative correlation between trade on poverty, there are a number of important caveats. First of all, globalization is not the only major economic change occurring in the world since the 1970s. Most economies have undergone economic reforms that vary from neo-liberal experiments with laissez faire deregulation and free-market economics to social-liberal policies that have led to the implementation of land reform and a wide array of anti-poverty programs. In order to examine the specific impact of trade on poverty, one needs to hold constant the effects of these other changes.

Consider the case of China, used earlier as an example of the impact of increased trade in reducing poverty. As can be seen in Figure 6, the most dramatic drop in poverty in China occurred in the early 1980s. This change was spearheaded by a drop in the rural poverty rate, which fell from 76 percent in 1980 to 23 percent in 1985. During those years, however, trade in China was only beginning to expand and it was not the main force linked to reduced rural poverty. Instead, during those years China was already implementing a comprehensive land reform project that allowed greater diversity in the use of land, a move that led to sharp increases in agricultural productivity and output. There were also agricultural sector reforms that resulted in the growth of local agricultural markets, which also stimulated production and income in rural

areas. Ravallion (2004) has argued that these reforms –more than trade—were behind the reduced poverty in China in the 1980s.

Research carried out using multivariate analyses of the effects of trade liberalization on poverty are mixed [see, for example, the survey by Harrison (2007)]. However, there are a number of careful studies documenting reductions in poverty with trade liberalization. Consider the case of Mexico, which engaged in drastic elimination of trade barriers in the 1980s and early 1990s. In a recent paper, Hanson (2007) examines the impact of trade liberalization on poverty in Mexico. He separates regions of Mexico that had greater exposure to globalization and trade from those that had less exposure. He finds those Mexican states with high exposure to globalization had greater income growth and reduced poverty. And although Mexico implemented a number of other policies (such as privatization) during the period of trade liberalization, Hanson still concludes: “A brief review of Mexico’s other policy reforms during the 1990’s does not suggest any obvious reason why they should account for the observed increase in relative incomes in states with high-exposure to globalization. Still, it is important to be cautious about ascribing shifts in regional relative incomes to specific policy changes. In the end, we can only say that I find suggestive evidence that globalization has increased relative incomes in Mexican states that are more exposed to global markets” [Hanson (2007)]. Similar results are found by Wei (2002) for China, and Porto (2004) for Argentina’s trade liberalization under Mercosur.

A second issue to consider is that although the data show a sharp drop of extreme poverty during the period of globalization since the 1970s, as measured by the \$1 a day threshold, many of those who moved above the poverty line barely did so, suggesting that the impact of trade on less-stringent measures of poverty may not have been as significant. Table 6 also presents

figures for poverty rates using the \$2 a day threshold income level. As can be seen, the data do show again that poverty has dropped sharply, from 67 percent in 1981 to 47.6 percent in 2004. Note, however, that this result is moved mostly by the huge drop in poverty in China (from 88.1 percent in 1981 to 34.9 percent in 2004). Once China is removed from the analysis, poverty drops but not in very sharp terms. In fact, even India does not show a substantial poverty reduction, with a decline of the poverty rate from 88.9 percent in 1980 to 80.4 percent in 2004. In sub-Saharan Africa, poverty remains above 70 percent in both 1981 and 2004, and in Europe and Central Asia, poverty doubles, from 4.6 percent in 1981 to 9.8 percent in 2004. All of this leads to the fact that –using the \$2 a day poverty level—the number of poor people did not drop at all between 1981 and 2004, remaining at over 2 billion people during the time period.

The much more modest results regarding changes in poverty between 1981 and 2004 when measured using the \$2 a day measure suggest that although extreme poverty has dropped sharply during the period of increased globalization, a substantial amount of poverty remains and many of those who abandoned extreme levels of poverty remain at income levels that are just above poverty. Their economic situation thus remains fragile.

B. Trade and Income Inequality: The Failure of the Stolper-Samuelson Theory

In contrast to the drop of poverty noted in the last section, most of the estimates available suggest that the recent expansion of international trade in the world has been associated with a period of increased inequality. This inequality is displayed in both greater within-country inequality and higher cross-country inequality.

Figure 5 shows some examples of increased within-country inequality. The figure displays the changes in the distribution of income occurring between 1970 and 2000 for the USSR/Former Soviet Union, Nigeria and the United States. As can be seen, in all of these countries, the distribution of income is more spread-out as time passes between 1970 and 2000. It is an experience that most other countries of the world have experienced also (see the case of China depicted by Figure 2).

[Figure 5 about here]

But the rise of cross-country inequality has not been the only trend in world inequality. In addition, cross-country inequality has risen as well. Figure 6 depicts the changes in cross-country inequality in the world between 1950 and 2000. It plots the Gini coefficient for the distribution of income across countries (based on the dispersion of GNP per capita across various countries in the world). As can be seen, there was an increase in cross-country inequality in the 1950s, a drop in the 1960s and 1970s and then a sustained increase ever since.

[Figure 6 about here]

Table 8 presents the calculation of Gini coefficients for the world and its various regions for the period of 1970 to 1999. The estimates in Table 8 show that the world Gini coefficient rose but only slightly from 66.8 in 1970 to 68.3 in 1999. This rise was spearheaded by the increased inequality in developing countries in Europe and Central Asia, where the Gini coefficient rose from 30.1 to 44.2 between 1980 and 1999. Other estimates of world inequality show similar results: a comparatively high degree of inequality has been sustained in the world in the last 30 years and it has risen sharply in some regions and countries.

[Table 8 about here]

These findings appear to be consistent with the Stolper-Samuelson theory discussed earlier but only for industrialized countries. The theory predicts that in high-income countries, globalization will generate inequality by stimulating production in sectors that are intensive in physical and human capital, raising the wages of skilled workers and the profits of capital owners, groups that already are relatively wealthy.

But it must be understood that increased international trade is not the only change that may explain the growth of inequality in high-income countries. In a number of OECD countries, for example, there has been a retrenchment from government income redistribution programs and social safety net policies that protected workers and low-income populations. In the United States, spending on public assistance programs as a fraction of GDP has declined sharply since the 1980s. There has also been a reduction in the real value of minimum wages. And the progressivity of the tax system has declined as well. These and other policies have had a tendency to increase inequality. Furthermore, there have been major technological developments sweeping through the economies of high-income countries ever since the early 1980s, when the development and growth of computers, the information sector, electronics and telecommunications drastically altered the economic landscape, leading to expanding exports of these goods and services. These technological developments have increased the demand for skilled workers and could be the main reason for the rising inequality in high-income countries. Finally, another possible major factor is the expansion of immigration. Those countries that have attracted a large fraction of unskilled workers may have seen the wages of low-income, unskilled workers drop as a result of immigration..

Given the various phenomena occurring simultaneously, in order to determine the impact of international trade on inequality one needs to utilize a multivariate framework where a variety

of factors are tested as possible determinants of inequality. The goal is to determine which one(s) are the most significant. Studies of high-income economies that have used such an approach find that, although trade may explain some of the rising inequality, for most countries the role played by trade has not been that significant [see Lawrence and Slaughter (1993), Machin et. al. (1996), Johnson and Stafford (1999), and Katz and Autor (1999)]. Instead, they almost uniformly agree that it has been the wave of technological changes sweeping through high-income countries, not rising trade, that explains the increased inequality. This is an issue that will be discussed in more detail in a later section.

Turning now to the evidence on developing countries: the rise of inequality since the 1980s in many of these countries contradicts the results of the benchmark theory of international trade examined earlier. According to the Stolper-Samuelson theory, in low-income countries globalization should have increased the demand for unskilled workers (their relatively abundant factor of production) raising their relative wages and inducing a drop of income inequality. But this has not generally happened. There are two possible interpretations of this result. First, is it possible that trade liberalization has had some additional economic impacts that the Stolper-Samuelson theory missed? Secondly, is it possible that there is another economic force that has emerged since the 1980s that has counteracted the effects of trade as indicated by the benchmark theory of trade? The answer to both of these questions is yes, as the next sections discuss.

4. Trade, Growth and Poverty

The mechanisms through which trade liberalization affects an economy are many and complex. In addition to the effects that trade liberalization may yield directly on the distribution of income,

as identified earlier, the theoretical literature in this field has also discussed extensively how trade may accelerate economic growth.

First of all, the Heckscher-Ohlin framework itself suggests that the opening of an economy to international trade should provide a short-run spurt to economic growth. The reason is that the specialization of the economy according to its comparative advantage makes it relatively more productive, resulting in a real income gain [Bhagwati, Panagariya and Srinivasan (1998), chapters 18 and 19]. This is, however, a short-run gain on income. It happens immediately after the trade liberalization and it gradually disappears as an independent effect on income growth.

But there are other effects of trade on long-run growth. Since the research of MIT's Robert Solow in the 1950s, economists have understood that technological change and innovation are intimately connected to economic growth. How does trade liberalization affect technical change? One theory is that the increased competition and rivalry generated by the foreign competition forces domestic firms to increase their innovative efforts. As Porter (1998) concludes:

"Competitive advantage emerges from pressure, challenge, and adversity, rarely from an easy life. Pressure and adversity are powerful motivators for change and innovation... Complacency and an inward focus often explain why nations lose competitive advantage. Lack of pressure and challenge means that firms fail to look constantly for and interpret new buyer needs, new technologies, and new processes... Protection, in its various forms, insulate domestic firms from the pressure of international competition"

A second theory linking trade and technical change suggests that trade liberalization allows domestic producers to sell new products to an increasing foreign consumption base, providing an incentive for the creation and design of new consumer and durable goods for sale domestically and abroad [see Romer (1990) and Rivera-Batiz and Romer (1992)]. This approach emphasizes that a significant fraction of international trade does not occur along the lines of traditional comparative advantage but rather involves the sale and purchase of differentiated

products within the same industry, sometimes called intra-industry trade. Trade liberalization provides incentives for intra-industry trade to flourish, providing the incentives for domestic producers and entrepreneurs to innovate, generating economic growth in the process.

Although not without its detractors, the balance of the evidence provides support for the positive effects of international trade liberalization on economic growth. The early research by Sachs and Warner (1995a) and Edwards (1994) carries out a multivariate analysis where international trade --measured through the indices discussed earlier—is included as one of the variables explaining economic growth. The openness index turns out to be positively connected to growth in the period of 1970 to 1990 and the results are statistically significant.

While Sachs and Warner (1995a) and other studies used a cross-section of countries to examine the association between openness and long-run growth, Wacziarg and Horn (2004) used time-series data, to determine whether trade liberalization in a country increased economic growth after the liberalization when compared to the situation before. Figure 7 shows the results for the sample of countries available. As can be seen, the economic growth before the period of trade liberalization, T , is on average substantially higher than that prevailing before the liberalization, perhaps as much as 2 percentage points higher on average.

[Figure 7 about here]

Additional support for the positive association of trade liberalization and economic growth is provided by Dollar and Kraay (2001). These authors catalog developing countries into two groups: globalizers and non-globalizers. Globalizers are developing countries that have had an increase in the trade index (trade to GDP ratio) after 1980 while non-globalizers are developing countries that have had a decline in that ratio. They find the globalizers had also

much lower barriers to trade than the non-globalizers. They then examine the economic growth experience between 1980 and 1999 of the globalizers and non-globalizers.

Figure 8 shows their results. As can be seen, the globalizers have had rising growth rates, from 1.8 percent per year in the 1970s to 2.5 percent in the 1980s and 5.1 percent in the 1990s. By contrast, the growth rates of the non-globalizers actually declined from 2.6 percent per year in the 1970s to -0.1 percent in the 1980s and -1.1 percent in the 1990s. High-income countries had also a slowdown of their growth rates, but these still remained positive throughout the time periods examined. Dollar and Kraay summarize their results as: “what we have in the 1990s is an important group of countries (the globalizing countries) growing faster than the rich countries and hence gradually catching up, while the nonglobalizing part of the developing world is falling further and further behind.” [Dollar and Kraay (2001), p. 3].

[Figure 8 about here]

Having established the theory and evidence supporting a significantly positive link between trade liberalization and economic growth, the second stage is to connect increased economic growth to lower poverty and to increased inequality. Let us look at the evidence on the connections between growth and poverty.

Dollar and Kraay (2001) examine the simple connection between growth and poverty, finding a strong negative relationship between the two. Figure 9 presents their results: overall growth of income per-capita spills-over into growth of income per-capita of the poor, thus reducing poverty. This result has been shared by other studies, which control for other variables. As Rodrik (2000) concludes: “Is growth good for the poor? Generally yes. All developing countries that have experienced sustained high growth over the last few decades have reduced their absolute poverty levels.”

[Figure 9 about here]

The discussion in this section suggests that trade can reduce poverty through its effects on technical change and growth. But this result must be qualified in a number of ways. First of all, if trade liberalization does act to foster technological progress and economic growth, there are reasons to suspect that these changes –while reducing poverty—may at the same time act to generate inequality. The next section examines this issue.

5. Trade, Technical Change and the Rising Wages of Skilled Workers

If trade liberalization fosters economic growth by inducing the adoption of new technologies and accelerating the process of innovation in developing countries, what impact would such a process have on income distribution? This section seeks to answer this question.

At the theory level, the answer depends on the nature of the technological change that occurs as a result of trade. If the technical change is what economists call skill-biased technical change, it will tend to increase the demand for skilled labor at the expense of unskilled labor. Such a shift in demand would then have the effect of raising the wages of skilled labor relative to unskilled workers. Since skilled labor has substantially higher wages than unskilled workers, the result would be an increase of inequality.

The suspicion that technical change has generally been skill-biased in recent years is strong because the evidence from studies in the United States and other high-income countries is that technological change has been connected to a sharp increase in the wages of skilled workers and in the rate of return to education in the United States since the early 1980s. Figure 10 depicts

this trend, showing the ratio in the wages of workers who have a college degree or more (including professional degrees) relative to workers who had only a high school diploma in the United States between 1967 and the late 1990s. As can be seen, beginning in the early 1980s, this ratio begins climbing systematically. The trend continues to the present time, although in recent years the demand for workers at the very lowest levels and at the very highest levels of the educational distribution may be increasing relative to workers in the middle, thus still maintaining the rising trend in inequality but now also leading to a polarization of the labor market [see Autor, Katz and Kearney (2006)].

[Figure 10 about here]

As was mentioned in an earlier section, a number of hypotheses have been postulated to explain these changes, including de-unionization, the collapse in the real value of minimum wages, and increased immigration, among others [see Borjas, Freeman and Katz (1992), and Bernard and Bradford Jensen, 2000)]. But the evidence suggests that it was skill-biased technical change what increased the relative demand for highly-educated workers [Katz and Autor (1999), and Acemoglu (2002)]. The clearest indication that technological change and the rising demand for skills in the U.S. economy are connected is the fact that the introduction of computers in the early 1980s coincides almost precisely with the beginning of the increase in the demand for skilled workers in the U.S. labor market. Indeed, research on the issue shows that the growing use of computers in the workplace has been closely linked to the rising demand for more-educated labor and the relatively higher pay of these workers (see, for instance, Krueger, 1993, and Levy and Murnane, 2004).

For the United States, and other high-income countries, the creation of the personal computer and the technological changes associated with a new generation of electronics, information and communications equipment and products was an outcome of decades of research and development efforts. Although increased trade and globalization may have added to the

benefits of these technical changes, as the new technologies and products were sold and adopted around the world, the causality goes from greater innovation to more trade, not the other way around. Trade, therefore, did not start the trends described earlier in the United States.

But for those countries in the rest of the world that proceeded to adopt the new, more productive technologies based on computers, electronics and informatics, trade was intimately connected to this process. Globalization and trade facilitated the transmission of the new technologies to developing countries. This is not a new development since economists have examined now for decades the process of transmission and adoption of new technologies from high-income to developing countries and how trade stimulates this transmission [Vernon(1969) and (1979), Krugman (1979)]. What has been different in recent years, however, is that the new technologies appear to have systematically increased the relative demand for skilled labor in developing countries as well as in the high-income economies. Hence, trade, by inducing technological change, may have spurred growth and reduced overall poverty in many developing countries, but it also may have contributed to increased labor market inequalities.

What evidence is there that trade has resulted in increased wage inequality in developing countries? Early studies showing the impact of increased trade on the relative wages of skilled and unskilled workers in the East Asian miracle economies did not find any skill bias. Instead, the increased trade was linked to a reduction in wage inequality. Following the Stolper-Samuelson conclusions, wages in South Korea and other East Asian miracle countries rose more sharply among unskilled workers, leading to wage contraction and maintaining what was already a relatively equitable distribution of income in these economies. The Gini coefficient in South Korea, for example, has been estimated at 34.4 in 1965 and 32.3 in 1990 [see Ahn (1997) and Adelman (1997)].

But the experience of globalizing countries since the 1980s has been different. There is widespread evidence that increased trade has been associated with skill bias in these countries. Among the first studies on this issue, Robbins (1994) found that the returns to education and the relative salaries of skilled workers rose sharply in Chile after trade liberalization. Similarly,

Robbins and Gindling (1999) looked at the impact of trade on relative wages in Costa Rica, finding again that skilled wages rose relative to those of unskilled workers. In Mexico, Hanson and Harrison (1999) found as well an increase in the wages of skilled workers, a result that is also obtained by Feliciano (2001). And Cragg and Epelbaum (1996) conclude that the skilled wage premium in Mexico rose by 68 percent between 1987 and 1993, after trade liberalization. In Colombia, Attanasio, Goldberg and Pavcnik (2004) find a 20 percent increase in the skilled wage premium between 1990 and 1998, following trade liberalization in that country. They conclude that their analysis “relating the *change* in the share of skilled workers in each sector to the *change* in tariff protection over the 1984-1998 period show that the increase in demand for skilled workers was largest in those sectors that experienced the largest tariff cuts (e.g., textiles and apparel). This provides some support for the theory that skilled-biased technological change was itself an endogenous response to trade liberalization.”

For Brazil, Green et al. (2001) find an increase in the rate of return to education after trade liberalization. Arbache (2004) examines this increased wage inequality and tests whether the evidence is consistent with skill-biased technical change. He concludes: Our findings are consistent with theories which imply that trade liberalization unleashes a period of intensified competition and technical innovation that is complementary with high-level skilled labour. Trade and technology are thus intimately linked as sources of change in wages in the case of developing countries” [Arbache (2004)].

Although the association of increased trade with skill-biased technical change partly explains the increased inequality associated with trade liberalization in a number of countries, other phenomena may be at hand as well. In some countries, for example, sectors intensive in the use of unskilled labor are heavily protected from foreign competition. These sectors produce agricultural goods considered essential for local food security, or they could be manufacturing industries whose workers have been successful in lobbying for protection. But the Stolper-Samuelson theory itself would then suggest that trade liberalization in this context would lead to a rise in the skill premium, as employment and wages of unskilled workers in the previously-

protected sector decline. Evidence of this phenomenon has been documented for Colombia [see Attanasio, Goldberg and Pavcnik (2004)], Mexico (Hanson and Harrison (1999)), Morocco [Currie and Harrison (1997)], and Brazil [Pavcnik, Blom, Goldberg and Schady (2004)]. Within this context, trade liberalization leads to greater inequality.

6. Trade and Inequality on the Basis of Gender

Trade can have divergent economic effects on men and women. These effects can be positive or negative and may increase or decrease gender inequities. As a result, there is no discernable, systematic pattern of change in the poverty or inequality on the basis of gender, whether at the theory level or in the empirical evidence available.

Consider labor force participation rates, that is, the proportion of the economically active population (the working age population) that is in the labor force, whether employed or seeking employment. This is a significant indicator because labor force participation allows persons to earn income and it thus reflects earnings potential. Among unmarried persons, labor force participation is essential in ensuring economic survival in periods of economic stress. Among married persons, the ability to earn is a significant factor in reducing dependence on other household members and may increase individual power to shift household resources in its favor. All of these would be connected with increased economic welfare.

Overall, the labor force participation rates of men and women have not changed much in the developing world during the recent period of globalization between 1980 and 2005. The labor force participation rate of women aged 25 to 64 in developing countries has actually slightly declined, from 59 percent in 1980 to 57 percent in 2005. Among men, labor force

participation rates have also slightly declined, from 87 percent to 84 percent. In high-income economies, on the other hand, the labor force participation rates of women have risen from 53 percent in 1980 to 64 percent in 2005, compared to declining labor force participation rates among men, from 84 percent in 1980 to 80 percent in 2005.

But the overall relative stability of labor force participation rates in the developing world does not mean that major changes have not occurred in some countries. In fact, since 1980 there has been a massive entry of women into the labor force in a variety of countries. Consider the data presented in Table 9, which shows male and female labor force participation rates in Brazil, Colombia, Mexico, India and China. In the case of Colombia, for example, labor force participation rates of women increased from 26 percent in 1980 to 66 percent in 2005 while for men they have been relatively stable. In Mexico, the increase in female labor force participation rate was from 31 percent in 1980 to 43 percent in 2005 and in Brazil from 41 percent to 61 percent.

[Table 9 about here]

In these countries, the rising female labor force participation rates reflect a variety of forces, including domestic economic forces, such as the expansion of the service sector, increased educational attainment, legislative changes, etc. Globalization, however, has been a force as well. Women have been a major source of employment in the export-oriented assembly plants that have sprouted in many developing nations as a result of trade and investment liberalization policies. From electronics firms in Mexico and Central America to textiles, clothing and footwear producers in Asia, women now constitute a large share of the labor force in the export-oriented sectors of a number of developing countries. Table 10 shows the percentage of the total labor force in export processing zones in a variety of developing countries

in 2003. In Cape Verde, for example, 88 percent of the workforce in the zones was female, in Kenya it was 60 percent, in Pakistan 82 percent, in Pakistan 82 percent and in Mexico 60 percent.

[Table 10 about here]

The rise of female employment as a result of the expansion of export activities in developing countries has reduced gender inequities. As Tran-Nguyen and Beviglia Zampetti (2004) conclude:

“Clearly, trade expansion has brought benefits to women, in terms of increases in income-earning opportunities. For most women employed in export-oriented industries, this represents a significant improvement as compared with their earlier situation as unpaid family workers, or poorly paid workers in the informal sector or rural areas. Furthermore, employment in the trade-related formal sector gives women a higher status, more autonomy and some decision-making powers within their households. Women workers have reported an enhancement of their self-esteem and they appreciate the expanded social opportunities and life choices that wage employment brings... This also sets in train a greater change in gender relations, by shifting parents’ perceptions of girls as a liability towards viewing them as potential income earners and contributors to the household. Attitudes and incentives for educating girls are improved as a result.”

Despite these gains, the expansion of the female labor force in the export sector of developing countries has not been associated with a reduction in the wage gap between men and women. Worldwide, the higher earnings of men relative to women has been a persistent characteristic of labor markets. Trade does not appear to have any systematic impact on reducing these pay gaps [Oostendorp (2004)]. Indeed, many of the employment opportunities offered in export processing zones are relatively unskilled, offering low wages often under straining working conditions. Opportunities for upward mobility are thus limited. The main impact appears to be long-term, as the savings obtained through employment in these industries allow workers to move later to other sectors of employment, or to seek greater educational attainment, either for themselves or their children.

As noted earlier, there is no systematic, impact of trade in reducing gender inequities. Although female participation in export sectors may have spearheaded improvements in the standard of living of women in some countries, the fact is that in other countries trade may have hurt. In agricultural sectors, for example, the evidence available is that trade has been associated with a deterioration of the relative economic situation of women. Women constitute a significant portion of the agricultural work force, equal to 50 percent worldwide and 60 to 80 percent of the labor force in the food crops sector. In Asia, in countries such as Bangladesh, Bhutan, Cambodia and others, the percentage of women in the agricultural labor force ranges from 60 to 98 percent. But the impact of trade liberalization on the agricultural sector is complex, sometimes displacing the small-scale, import-competing producers where many women are employed. Only in cases where women are employed in non-traditional agricultural export sectors, such as the flower industry, has there been a clear-cut, positive impact observed on the relative socioeconomic status of women [see Standing (1999) and Fontana and Wood (2000)].

7. Regional Effects of Globalization

Trade liberalization can be expected to have serious regional effects and these effects may leave certain regions with lower income and higher poverty. At the theory level, the Heckscher-Ohlin framework clearly suggests that trade liberalization induces major reallocations of production activity in a country, leading to the decline of import-competing industries and the expansion of export industries. If the import-competing industries are in poor, rural areas and exports are in richer, urban locations, then trade will widen the gap between urban and rural areas. But the opposite will happen if the exporting regions are also poor.

In a number of developing countries, exports of agricultural goods dominate the trade pattern. How trade affects the agricultural sector and rural dwellers depends on the exact nature of the protectionism present before liberalization.

In a number of countries, agricultural exports are heavily taxed and the revenues used to finance domestic government, whose expenditures then fall heavily in urban areas. In addition, prices of food exports are often controlled by the government, which helps the urban poor have a supply of relatively cheaper food, but which hurts the income opportunities of agricultural producers in rural areas. These policies in effect constitute an income redistribution scheme, transferring resources from the relatively poor to the relatively rich. As a consequence, if trade liberalization was to occur and export taxes were to be eliminated, incomes in poor, rural areas would increase and those in wealthier, urban areas decline, reducing inequality. Sahn, Doresh and Young (1996) present evidence that this appears to be the case in a number of African economies. As they note [Sahn et. al. (1996), p. 737]:

“The agricultural sector remains at the heart of most African economies. Most of the labor force still is engaged as agricultural workers, agriculture is generally the most important sector in GDP, the share of private consumption that is devoted to food is generally over 50%, and with the exception of countries with a particularly important primary product export (such as bauxite in Guinea), the share of exports from agricultural products is extremely high. The poor are even more dependant on agriculture and food markets than the population in general...[T]his is because Africa’s poor are concentrated in rural areas and their incomes derive to a large extent from agriculture directly, or indirectly as agricultural wage laborers, and nonwage workers engaged in processing and marketing of agricultural products. Moreover, expenditures on food comprise a larger share of total consumption by both the urban and rural poor than for higher income groups...Policies that discriminate against agriculture, including distorted food markets, have been major contributors to the economic crisis in Africa.”

But there are other, completely different situations. In many cases, agricultural producers compete with foreign producers and are part of import-competing industries. In these cases, governments tend to shield domestic producers from global competition. The reasons for

agricultural protectionism are varied and include concerns over dependence on foreign countries for food imports, retaliation for agricultural subsidies and other protections offered by foreign countries to their own agricultural sectors, and the influence of lobbying from producer organizations. Whatever is the reason, tariffs and other barriers to trade proliferate in the agricultural sector, in both developing countries and in high-income countries. As an example, in India, the average tariff rate on agricultural products was 112 percent in 2000, and in Brazil it was 37 percent. In Colombia, the following were some of the average tariffs for various agricultural products: 69.7 percent for rice, 84.5 percent for processed sugar, 72 percent for raw sugar, 70.2 percent for corn, 39.6 percent for soy, 34 percent for wheat, and 41.6 percent for soy oil.

In this context, trade liberalization acts to lower the relative prices of agricultural products, which hurts domestic agricultural producers, forcing many to quit their activities, and reducing income in rural areas. Trade liberalization does have a positive impact on the urban poor since it allows a drop in the prices of food staples, a change that sharply increases the real income of poor urban consumers. In addition, the stimulus provided to manufacturing exports by the trade liberalization also acts to generate greater employment opportunities in urban—often coastal—areas, further aggravating the economic collapse of rural areas, which see their population dwindle in response to rural-urban migration. Most of these changes act to increase income gaps between rural and urban areas and increase rural poverty as well.

Evidence on the deleterious effects of trade on regional poverty and income distribution exist for a variety of countries. Ravallion (2004) documents the impacts of trade on regional poverty and inequality in Morocco and China. In Mexico, the North American Free Trade Agreement (NAFTA) of 1995 had a major impact on a number of agricultural sectors, such as

corn, where a flood of imports from the United States led to a sharp drop of production and employment. Value added by Mexican agriculture dropped from \$32 billion in 1993 to \$25 billion in 2003 and employment in rural agriculture dropped from 8.1 million to 6.8 million during the same time period [Hufbauer and Schott (2005), p. 289].

In the case of China, income gaps between rural and urban areas and between coastal and inland areas have widened since the mid-1980s, as trade has accelerated [see Kanbur and Zhang (2003) and Angang, Linlin and Zhixiao (2005)]. Figure 11 shows the ratio of average disposable income per capita and consumption per-capita between urban and rural residents in China, from 1978 to 2001. As can be seen, the ratio drops between 1978 and 1985, a result mostly of the land reform and pro-market reforms of that period. However, between 1985 and 2001, rural-urban inequality has shot upwards, precisely when trade has exploded.

[Figure 11 about here]

Furthermore, in China, inequality has also increased between the coastal areas, where the majority of trade-related industrialization has been established and many inland areas, which have not benefited as much from trade and growth. This is a pattern that holds more generally, around the world. As trade expands, areas that have a geographical advantage for trade, due to their coastal location or along rivers or other central locations, will grow faster than regions not so favored by nature. But as growth and trade increase, the advantages of locating near these foci rises, leading to an agglomeration of economic activity around them. Locations that are not favored by this process are gradually left-behind, unless active development policies are implemented to revive their economies.

As was seen earlier, trade is generally associated with a long-run, overall reduction of poverty. But this section makes clear that trade can lead to dramatic, structural changes in an

economy that can themselves generate sharp regional inequalities. The adjustment costs associated with trade are well-recognized and some countries –such as the United States-- provide assistance to workers and industries negatively affected by trade liberalization. But most do not. The lack of such policies undermines the process of trade liberalization which can only be legitimized by arguing that the benefits of trade more than offset the costs and that, therefore, the winners can compensate the losers for their losses, still leaving an overall, positive impact on society. This point has been made forcefully recently by Stiglitz and Charlton (2005). They argue that since the adjustment costs of trade are more significant in developing countries, the World Trade Organization as well as the rich nations should seek to set-up a trade adjustment fund that can be used to assist those communities in developing countries that can be shown to have been adversely affected by trade liberalization.

8. Governance and the Impact of Trade on Poverty and Inequality

Previous sections have shown that trade can reduce poverty through its impact on growth. But there is an important caveat to this result. The evidence also tends to show that the growth benefits of trade are limited in countries with poor public sector governance.

Consider the case of countries that have increased their international trade on the basis of the exploitation of natural resources. Have these countries become richer? Have poverty rates dropped as a result of this type of trade? Surprisingly, despite the wealth associated with the exploitation and export of natural resources, countries that have greater trade in natural resources are not richer nor are they lower poverty rates, holding other things equal.

Consider the case of Nigeria, one of the largest oil exporters in the world today. Oil reserves were discovered in Nigeria in 1965 and the sum of oil revenues received by that country since that time has been over \$400 billion. What has been the economic growth of Nigeria? In 1970, the GDP per-capita was \$1,113 but by 2000 it was \$1,084, where the figures are adjusted for inflation. There was, therefore, no growth in Nigeria between 1970 and 2000. And poverty? In 1970, the poverty rate in Nigeria (using the \$1 a day measure) was 36 percent but by 2000 it was almost twice as high: 70 percent. In 2000, there were 90 million people in Nigeria living in households that had consumption below that of the poverty line, compared to 19 million in 1970.

Cross-country evidence of a lack of a positive association of increased trade in natural resource products and economic growth has been provided by Sachs and Warner (1995) in an analysis that is multivariate and thus considers the various possible factors connected to economic growth. In fact, their analysis indicates that countries that have a greater ratio of natural resource exports as a fraction of GDP also tend to have *lower* growth rates, holding other things constant. This connection has become known as the “natural resource curse.”

What explains the lack of impact of natural resource exports on growth and poverty? One possible explanation is that as countries pull resources into the exploitation of natural resources, they withdraw resources from other sectors, including manufacturing, which may have provided the bulk of exports in the past. As a consequence, there is a crowding-out effect, with natural resource output crowding-out manufacturing output, leaving no net impact on GDP and even a net reduction in employment and rising poverty. This type of effect has been called *Dutch disease* and originated in the case of natural gas exploitation in the Netherlands, which --as typical in so many other countries-- failed to generate sustained economic growth.

A second explanation links with the earlier discussion on technical change. As noted at that point, one of the key determinants of economic growth is technological change. But increased specialization in exporting natural resources may in fact act to constrain technical change in an economy. The rewards for working in the natural resource industry are high and therefore a significant portion of a country's talent may end-up employed in this industry. But the natural resources sector is not itself one that leads to great innovations or that will stimulate entrepreneurship in the economy. Since trade in new goods and services is one of the main engines of economic growth, countries specializing in the production of natural resources may in fact face lower economic growth in the long-run.

The fact that international trade may promote specialization in the export of goods that may be dynamically weak, with few possibilities for future technological change, is an issue that extends further than just natural resources. In a recent paper, Rodrik (2006) argues that the important question to ask in developing countries is not "how much to export" but "what you export." Rodrik argues that one of the reasons China has been so successful in its export-led growth is the fact that the technological sophistication of its export industries is very high compared to those of other developing countries.

But for the case of Nigeria and many other countries, there is another culprit behind the lack of impact of natural resource exports on economic growth: poor public sector governance. As Sala-i-Martin and Subramanian (2003) conclude: "Stunted institutional development – including corruption, weak governance, rent-seeking, plunder, etc.– is a problem intrinsic to most countries that own certain natural resources, such as oil or minerals." Poor public sector governance has been found by a number of studies to be essential in undermining the process of economic growth and in allowing trade and growth to raise poverty and inequality [see Rivera-

Batiz (2002), Kaufmann et. al. (2003), Svensson (2005), and Rodrik and Subramanian (2005)]. An analysis of the history and political economy of the specific institutions that disrupt growth and promote inequality and poverty has been a matter of recent research [see Acemoglu and Robinson (2002) and Acemoglu et. al. (2006)].

At the same time, the evidence suggest that countries with high quality of public sector governance can introduce institutions that reduce or ameliorate the rent-seeking and corruption that is often associated with the exploitation and export of natural resources. Scandinavian countries such as Norway and Finland have discovered massive reserves of natural resources. Nonetheless, the governments of these countries have been able to effectively manage the revenues obtained from the exploitation of these natural resources. Part of the strategy has been to pre-empt possible corruption arising from the natural resource revenues by earmarking or assigning a share of those revenues directly to finance social programs, such as education and health. In that case of Indonesia, for example, revenues from oil exports were directed towards a massive program of investment in education. More recently, in Chile, the administration of President Ricardo Lagos imposed a tax on copper production in order to finance a Competitiveness Innovation Fund (Fondo de Innovación para la Competitividad). This Fund currently receives more than 100 million dollars every year and is financing a variety of technology projects in both the public and private sectors, including funds allocated to universities for these purposes. So, through the use of innovative government policies, trade in natural resources can indeed have positive effects. This is in fact the point developed by Stiglitz (2005).

The significance of governance also emerges in the fact that, for openness and trade to generate sustained economic growth, domestic investment rates must be sufficiently high for a

country to generate the funds required to develop new export industries. The evidence available suggests that, from South Korea to China, government policies to stimulate investment have been essential in allowing trade liberalization to generate growth and reduce poverty [see Rodrik (1995) and Wacziarg and Horn (2004)].

It can be concluded that in order for openness and globalization to be clearly associated with a reduction of poverty and inequality, the process of trade liberalization must be accompanied by a set of complementary policies. These policies vary across the various sectors of the economy and include, among many others, earmarking the revenues obtained from natural resource exports for social investments, engaging in land reform and agricultural sector diversification policies, controlling corruption and improving public sector governance, adopting tax-subsidy policies to stimulate investment and promote exports, and establishing research and development funds and other mechanisms to facilitate entrepreneurship, product development, and technical change. In the absence of these policies, trade liberalization may not lead to any significant impact on economic growth, equality and poverty reduction.

References

- Acemoglu, D. (2002) 'Technical Change, Inequality and the Labor Market,' *Journal of Economic Literature*, 40: 7-72.
- Acemoglu, D., S. Johnson and J. Robinson (2006) "Understanding Prosperity and Poverty: Geography, Institutions and the Reversal of Poverty" in A.V. Banerjee, R. Benabou and D. Mookherjee, eds., *Understanding Poverty* (New York: Oxford University Press).
- Adelman, Irma (1997) "Social Development in Korea, 1953-1993," in Sa Dong-Se, K.S. Kim and D. H. Perkins, eds., *The Korean Economy 1945-1995: Performance and Vision for the 21st Century* (Seoul, Korea: Korea Development Institute).
- Aghion, Philippe and Jeffrey Williamson (1998) *Growth, Inequality and Globalization* (Cambridge: Cambridge University Press).
- Ahn, Kookshin (1997) "Trends in and Determinants of Income Distribution in Korea," *Journal of Economic Development*, Vol. 22 (2): 27-56.
- Aisbett, Emma (2007) "Why are the Critics so Convinced that Globalization is so Bad for the Poor? In Anne Harrison, ed., *Globalization and Poverty* (Chicago: University of Chicago Press).
- Angang, Hu, Hu Linlin and Chang Zhixiao (2005) "China's Economic Growth and Poverty Reduction" (Beijing: Tsinghua University).
- Arbache, Jorge Saba, Andy Dickerson and Francis Green (2004) "Trade Liberalization and Wages in Developing Countries," *Economic Journal* (February): F73-F96.
- Ashraf, Nava, Margaret McMillan and Alix Zwane (2007), "My Policies or Yours: Have OECD Agricultural Policies Affected Incomes in Developing Countries?" in Ann Harrison, ed., *Globalization and Poverty* (Chicago: University of Chicago Press).
- Attanasio, Orazio, Pinelopi Goldberg and Nina Pavcnik. 2004. "Trade Reforms and Wage Inequality in Colombia." *Journal of Development Economics*, 74: 331-366.
- Autor, D., L. Katz and M. Kearney (2006) 'The Polarization of the U.S. Labor Market,' Working Paper No. 11986 (Cambridge, Mass.: National Bureau of Economic Research).
- Bardhan, Pranab (2006) "The Global Economy and the Poor," in A.V. Banerjee, R. Benabou and D. Mookherjee, eds., *Understanding Poverty* (New York: Oxford University Press).
- Barrow, Lisa and Cecilia Rouse (2005) "Does College Still Pay?," *The Economists' Voice*, Vol. 2, No. 4, 2005.

Berik, Gunseli, Yana van der Meulen Rodgers and Joseph Zveglic (2003) "Does Trade Promote Gender Wage Equity? Evidence from East Asia," Working Paper No. 373 (New York: The Levy Economics Institute).

Besley, Timothy and Robin Burgess, "Halving Global Poverty," *Journal of Economic Perspectives*, Vol. 17, No. 3, Summer 2003, pp. 3-22.

Bernard, A. and J. Bradford Jensen (2000) 'Understanding Increasing and Decreasing Wage Inequality,' in R.C. Feenstra, ed., *The Impact of International Trade on Wages* (Chicago: University of Chicago Press).

Bhagwati, Jagdish N. (2004) *In Defense of Globalization* (New York: Oxford University Press).

Bhagwati, Jagdish N., Arvind Panagariya and T.N. Srinivasan (1998) *Lectures on International Trade*, Second Edition (Cambridge, Mass.: The MIT Press).

Bourguignon, Francois and Christian Morrison (2002) "The Size Distribution of Income among World Citizens: 1820-1990," *American Economic Review* 92 (September): 727-44.

Burtless, Gary (1995), "International Trade and the Rise in Earnings Inequality," *Journal of Economic Literature* 33: 800-816.

Bussolo, Maurizio, Jann Lay and Dominique van der Mensbrugghe (2006) "Structural Change and Poverty reduction in Brazil: The Impact of the Doha Round," Policy Research Working paper No. 3833 (Washington, D.C.: The World Bank).

Chen, Shaohua and Martin Ravallion (2004) "How Have the World's Poor Fared Since the Early 1980s?," *World Bank Research Observer*, Vol. 19: 191-169.

Chen, Shaohua and Martin Ravallion (2007) "Absolute Poverty Measures for the Developing World, 1981-2004," Development Research Group Working Paper (Washington, D.C.: The World Bank).

Cline, William R. (1997) *Trade and Income Distribution* (Washington, D.C.: Institute for International Economics).

Coudouel, Aline, J.S. Hentschel and Quentin Wodon (2003) "Poverty Measurement and Analysis (Washington, D.C.: The World Bank).

Cragg, Michael I. and Mario Epelbaum. 1996. "The Premium for Skills in LDCs: Evidence from Mexico." *Journal of Development Economics* 51(1): 99-116.

Currie, Janet and Ann E. Harrison (1997) "Sharing the Costs: The Impact of Trade Reform on Capital and Labor in Morocco," *Journal of Labor Economics* 15 (3): S44-S71.

- Deaton, Angus (2003) "Measuring Poverty in a Growing World, Working paper No. 9822 (Cambridge, Mass.: National Bureau of Economic Research).
- Dervis, Kernal, Jaime de Melo and Sherman Robinson (1982) *General Equilibrium Models for Development Policy* (Cambridge: Cambridge University Press).
- Dikhanov, Yuri (2005) "Trends in Global Income Distribution: 1970-2000 and Scenarios for 2015," Human Development Report Occasional Paper (New York: United Nations).
- Dikhanov, Yuri and Michael Ward (2001) "Evolution of the Global Distribution of Income in 1970-99," Working paper, Economic Commission for Latin America and the Caribbean (Santiago, Chile: United Nations).
- Dollar, David and Aart Kraay (2002) "Growth is Good for the Poor." *Journal of Economic Growth* 7(3): 195-225.
- Dollar, David and Aart Kraay (2004) "Trade, Growth and Poverty," *Economic Journal*, 114(493): F22-49.
- Edwards, Sebastian (1993) "Openness, Trade Liberalization, and Growth in Developing Countries," *Journal of Economic Literature* 31 (September): 1358-94.
- Feliciano, Zadia (2001) "Workers and Trade Liberalization: The Impact of Trade Reforms in Mexico on Wages and Employment." *Industrial and Labor Relations Review*, 55(1): 95-115.
- Fields, Gary (2001) *Distribution and Development: A New Look at the Developing World* (Cambridge: The MIT Press).
- Fields, Gary (1980) *Poverty, Inequality and Development* (Cambridge: Cambridge University Press).
- Fernandez-Kelly, Maria Patricia and Saskia Sassen (1995) "Recasting Women in the Global Economy: Internationalization and Changing Definitions of Gender," in C. Bose and E. Acosta-Belen, eds., *Women in the Latin American Development Process* (Philadelphia, Pa.: Temple University Press) 99-124.
- Fontana, M. and A. Wood (2000) "Modeling the Effects of Trade on Women, at Work and at Home", *World Development*, 28(7):.1173-90.
- Freeman, Richard B. (1995), "Are your Wages set in Beijing?" *Journal of Economic Perspectives* 9 (3): 15-32.
- Galiani, Sebastian and Pablo Sanguinetti (2002) "The Impact of Trade Liberalization on Wage Inequality: Evidence from Argentina," mimeo. (Buenos Aires: Universidad Di Tella).

Galiani, Sebastian and Guido Porto (2006) "Trends in Tariff Reforms and Trends in Wage Inequality," Policy Research Working Paper No. 3905 (Washington, D.C.: The World Bank).

Goldberg, P. and Nina Pavcnik (2005) "Trade, Wages, and the Political Economy of Trade Protection: Evidence from the Colombian Trade Reforms," *Journal of International Economics* 66 (1): 75-106.

Goldberg, P. and Nina Pavcnik (2004) "Trade, Inequality, and Poverty: What Do We Know? Evidence from Recent Trade Liberalization Episodes in Developing Countries." Working Paper No. 10593 (Cambridge: National Bureau of Economic Research).

Green, F., Dickerson, A. and Arbache, J.S. (2001) "A Picture of Wage Inequality and the Allocation of Labour through a Period of Trade Liberalisation: the Case of Brazil", *World Development*, vol. 29,1923–39.

Hanson (2007) "Globalization, Labor Income and Poverty in Mexico" in Ann Harrison, ed., *Globalization and Poverty* (Chicago: University of Chicago Press).

Hanson, Gordon and Ann Harrison (1999) "Trade and Wage Inequality in Mexico." *Industrial and Labor Relations Review*, 52(2): 271—288.

Harrison, Ann (2006) "Globalization and Poverty," Working Paper No. 12347 (Cambridge: National Bureau of Economic research).

Harrison, Ann and Gordon Hanson (1999) "Who Gains From Trade Reform? Some Remaining Puzzles." *Journal of Development Economics*, 59(1): 125-154.

Hanushek, E. and D. Kimko (2000) 'Schooling, Labor Force Quality and the Growth of Nations' *American Economic Review*, 60: 1184-1208.

Hertel, T. W., W. A. Masters, and A. Elbehri (1998) "The Uruguay Round and Africa: A Global, General Equilibrium Analysis," *Journal of African Economies* 7(2): 208-234

Hufbauer, Gary and Jeffrey Schott (2005) *NAFTA Revisited: Achievements and Challenges* (Washington, D.C.: Institute of International Economics).

Iradian, Garbis (2005) "Inequality, Poverty and growth: Cross-Country Evidence," Working Paper No. WP/05/28 (Washington, D.C.: International Monetary Fund).

Johnson, George and Frank Stafford (1999) "The Labor Market Implications of International Trade," in O. Ashenfelter and D. Card (eds.), *Handbook of Labor Economics* (Amsterdam: North Holland) Vol. 3: 2215-2288.

Kanbur, Ravi and Xiaobo Zhang (2003) "Fifty Years of Regional Inequality in China: A Journey through Central Planning, Reform and Openness," World Institute for Development Economics Research (New York: United Nations).

Katz, Lawrence and D. Autor (1999) 'Changes in the Wage Structure and Earnings Inequality,' in O. Ashenfelter and D. Card (eds.), *Handbook of Labor Economics* (Amsterdam: North Holland) Vol. 3A: 1463-1555.

Kaufmann, Daniel, Aart Kraay and Massimo Mastruzzi (2003) "Governance Matters: Governance Indicators for 1996-2002" (Washington, D.C.: The World Bank).

Krueger, A. (1993) 'How Computers Have Changed the Wage Structure: Evidence from Microdata 1984-1989,' *Quarterly Journal of Economics*, 102: 33-60.

Krugman, Paul (1979) "A Model of Innovation, Technology Transfer and the Distribution of World Income," *Journal of Political Economy* 87: 253-266.

Lachler, Ulrich (1999) "Education and Earnings Inequality in Mexico," Policy Research Working Paper, (Washington, D.C.: The World Bank).

Lambert, Peter J. (1993) *The Distribution and Redistribution of Income: A Mathematical Analysis* (Manchester, U.K.: Manchester University Press).

Lankes, Hans Peter (2002) "Market Access for Developing Countries," *Finance and Development*, Vol. 39, No. 3.

Lawrence, Robert Z. and Matthew J. Slaughter (1993), "International Trade and American Wages in the 1980's: Giant Sucking Sound or Small Hiccup?" *Brookings Papers on Economic Activity*, 2: 161-226.

Leamer, Edward E. (1998) "In Search of Stolper-Samuelson Linkages between International Trade and Lower Wages," in S.M. Collins, ed., *Imports, Exports and the American Worker* (Washington, D.C.: The Brookings Institution Press).

Lederman, Daniel, W. Maloney and L. Serven (2005) *Lessons from NAFTA for Latin America and the Caribbean* (Stanford, Ca.: Stanford University Press).

Levy, F. and R. Murnane (2004) *The New Division of Labor: How Computers are Creating the Next Job Market* (Princeton: Princeton University Press).

Levy, S. and S. van-Wijnbergen (1995) "Transition Problems in Economic Reform: Agriculture in the North American Free Trade Agreement," *American Economic Review*, 85(4): 738-54.

Lindert, Peter H. and Jeffrey G. Williamson (2003) "Does Globalization Make the World More Unequal?," in Michael D. Bordo, Alan M. Taylor and Jeffrey Williamson, eds., *Globalization in Historical Perspective* (Chicago: University of Chicago Press).

Lovely, Mary E. and J. David Richardson (2000) "Trade Flows and Wage Premiums: Does Who or What Matter?," in Robert C. Feenstra, ed., *The Impact of International Trade on Wages*

(Chicago: University of Chicago Press).

Machin, Stephen, Annette Ryan and John Van Reenen (1996), "Technology and Changes in Skill Structure: Evidence from an International Panel of Industries", Discussion paper no. 4, Centre for Economic Performance (London: London School of Economics).

Milanovic, Branko (2002) "Can we Discern the Effect of Globalization on Income Distribution?," Policy Research Working Paper (Washington, D.C.: The World Bank).

Milanovic, Branko (2005) *Worlds Apart: Measuring International and Global Inequality* (Princeton, NJ: Princeton University Press).

Milanovic, Branko and Lyn Squire (2005) "Does Trade Liberalization Increase Wage Inequality?: Some Empirical Evidence," Policy Research Working Paper No. 3571 (Washington, D.C.: The World Bank).

Morley, Samuel A. (1995) *Poverty and Inequality in Latin America: The Impact of Adjustment and recovery in the 1980s* (Baltimore, Md: Johns Hopkins University Press).

Murphy, Kevin and Finis Welch (2000) "Relative Wages in the 1990s," paper presented at the American Economic Association Meetings.

Oostendorp, Remco H. (2004) "Globalization and the Gender Wage Gap," Policy Research Working Paper No. 3256 (Washington, D.C.: The World Bank).

Pavcnik, Nina (2000) "What Explains Skills Upgrading in Developing Countries? Working Paper No. 7846 (Cambridge: National Bureau of Economic Research).

Pavcnik, Nina, A. Blom, P.K. Goldberg, and N. Schady (2004) "Trade Policy and Industry Wage Structure: Evidence from Brazil," *World Bank Economic Review*.

Perry, Guillermo and Marcelo Olarreaga (2006) "Trade Liberalization, Poverty and Inequality in Latin America" (Washington, D.C.: The World Bank).

Porter, Michael (1998) *The Competitive Advantage of Nations* (New York: The Free Press).

Porto, G. (2004) "Market Access and Poverty in Argentina" (Washington, D.C.: World Bank).

Psacharopoulos, George (1994) "Returns to Investment in Education: A Global Update," *World Development*, Vol. 22, No. 9: 1325-1343.

Psacharopoulos, George and Harry Anthony Patrinos (1994) *Indigenous People and Poverty in Latin America* (Washington , D.C.: The World Bank).

Psacharopoulos, George and Harry Anthony Patrinos (2004) "Returns to Investment in Education: A Further Update," *Education Economics*.

- Rama, Martin (2003) "Globalization and the Labor Market." *World Bank Research Observer*, 18(2): 159-186.
- Ravallion, Martin (2006) "How Not to Count the Poor: A Reply to Reddy and Pogge" (Washington, D.C.: The World Bank).
- Reddy, Sanjay G. and Thomas W. Pogge (2005) "How Not to Count the Poor," working paper (New York: Barnard College, Columbia University).
- Revenge, Ana L. (1997) "Employment and wage effects of trade liberalization: The case of Mexican Manufacturing," *Journal of Labor Economics* 15, pp. S20-43.
- Richardson, J. David (1995), "Income Inequality and Trade: How to Think, what to Conclude", *Journal of Economic Perspectives* 9 (3): 33-55.
- Rivera-Batiz, Francisco L. (1996) "The Economics of Technological Progress and Endogenous Growth in Open Economies," in Georg Koopmann and Hans Eckart Scharrer, eds., *The Economics of High-Technology Cooperation and Competition in Global Markets*, (Baden-Baden, Germany: Nomos Verlagsgesellschaft) 31-63.
- Rivera-Batiz, Francisco L. (2000) "Foreign Direct Investment in Latin America: Current Trends and Future Prospects," in United Nations, *Interregional Cooperation in Trade and Investment: Asia-Latin America* (Bangkok: United Nations Economic and Social Commission for Asia) 161-191.
- Rivera-Batiz, Francisco L. (2002) "Democracy, Governance and Economic Growth: Theory and Evidence," *Review of Development Economics*, Vol. 6, No. 2: 225-247.
- Rivera-Batiz, Luis A. and Paul Romer (1991) "Economic Integration and Endogenous Growth," *Quarterly Journal of Economics*, Vol. 106 No. 2: 531-555.
- Robbins, Donald J. (1995). "Trade liberalization and earnings dispersion--Evidence from Chile," Mimeo. (Cambridge: Harvard University Institute for International Development).
- Robbins, Donald J. (1996). "Evidence on Trade and Wages in the Developing World," Technical Paper No. 119 (Paris: OECD).
- Robbins, Donald J. and T. H. Gindling (1999) "Trade Liberalization and the Relative Wages for More-Skilled Workers in Costa Rica," *Review of Development Economics*, Vol. 3, 140-54.
- Rodrik, Dani (1995) "Getting Interventions Right: How South Korea and Taiwan Grew Rich," *Economic Policy*.
- Rodrik, Dani (2000) "Growth and Poverty reduction: What are the Real Questions?," mimeo., JFK School of Government (Cambridge, Mass.: Harvard University)

Rodrik, Dani (2002) *Has Globalization Gone Too Far?* (Washington, D.C.: Institute of International Economics).

Rodrik, Dani (2006) "What's So Special About China's Exports?," Working Paper, John F. Kennedy School of Government (Cambridge, Mass.: Harvard University)..

Rodrik, Dani and Francisco Rodríguez (2001), Trade Policy and Economic Growth: A Skeptics Guide to the Cross-National Evidence, in Ben Bernanke and Kenneth Rogoff, eds., *NBER Macroeconomics Annual 2000*, Cambridge (MA): MIT Press, 261-324.

Rodrik, Dani and Arvind Subramanian, "From Hindu Growth to Productivity Surge: The Mystery of the Indian Growth Transition," *IMF Staff Papers*, Vol. 52, No. 2: 193-228.

Rodrik, Dani, M. McMillan and K. Horn Welch (2002) "When Economic Reform Goes Wrong: Cashews in Mozambique," mimeo., John F. Kennedy School of Government, (Cambridge, Mass.: Harvard University).

Rodrik, Dani and Arvind Subramanian (2005) "From Hindu Growth to Productivity Surge: The Mystery of the Indian Growth Transition," *IMF Staff Papers*, Vol. 52, No. 2: 193-228.

Romer, Paul M., (1990) "Endogenous Technological Change," *Journal of Political Economy*, Vol. 98: S71-S102.

Ryoo, Jai-Kyung, Young-Sook Nam, "Changing Rates of Return to Education over Time: A Korean Case Study," *Economics of Education Review*, Vol. 12, No. 1, 1993, 71-80.

Sachs, Jeffrey D. and Andrew M. Warner (1995a) "Economic Reform and the Process of Global Integration," *Brookings Papers on Economic Activity*, pp. 1-118.

Sachs, Jeffrey D. and Andrew M. Warner (1995) "Natural Resource Abundance and Economic Growth," Working Paper No. 5398 (Cambridge, Mass.: National Bureau of Economic Research).

Sahn, David E., Paul Dorosh and Stephen Younger (1996) "Exchange Rate, Fiscal and Agricultural Policies in Africa: Does Adjustment Hurt the Poor?," *World Development* 24 (4): 719-747.

Sala-i-Martin, Xavier (2006) "The World Distribution of Income: Falling Poverty and...Convergence. Period." *Quarterly Journal of Economics*, 351-397.

Sala-i-Martin, Xavier and Arvind Subramanian (2003) "Addressing the Natural Resource Curse: An Illustration from Nigeria," Working Paper WP/03/139 (Washington, D.C.: International Monetary Fund).

Solow, Robert M. (1957) "Technical Progress and Productivity Change," *Review of Economics and Statistics*, Vol. 39: 312-320.

- Standing, G. (1999) "Global feminization through flexible labor: a theme revisited", *World Development*, 27(3), pp. 583-602.
- Stiglitz, Joseph E. (2002) *Globalization and its Discontents* (New York: W.W. Norton and Company).
- Stiglitz, Joseph E. and Andrew Charlton (2005) *Fair Trade for All: How Trade can Promote Development* (New York: Oxford University Press).
- Stiglitz, Joseph E. (2005) "Making Natural Resources into a Blessing Rather Than a Curse," In Svetlana Tsalikad and Anya Schiffrin, eds., *Covering Oil*, Open Society Institute, New York, 2005, 13-20.
- Stolper, Wolfgang and Paul A. Samuelson (1941) "Protection and Real Wages," *Review of Economic Studies* 9: 58-73.
- Svensson, Jakob (2005) "Eight Questions about Corruption," *Journal of Economic Perspectives*, Vol. 19, No. 3: 19-42.
- Topalova, Petia (2005) "Trade Liberalization, Poverty and Inequality: Evidence from Indian Districts," Working Paper No. 11614 (Cambridge: National Bureau of Economic Research).
- Tran-Nguyen, Anh-Nga and America Beviglia-Zampetti (2004) *Trade and Gender: Opportunities and Challenges for Developing Countries* (New York: United Nations).
- Tzannatos, A. (1999) "Women and Labor Market Changes in the Global Economy: Growth Helps: Inequalities Hurt and Public Policy Matters", *World Development*, 27(3): 551-69.
- Vernon, Raymond (1966) "International Trade and International Investment in the Product Cycle", *Quarterly Journal of Economics* 80 (2).
- Vernon, Raymond (1979), "The product cycle hypothesis in a new international environment", *Oxford Bulletin of Economics and Statistics* 41: 255-267.
- Wacziarg, Romain and Karen Horn Welch (2004) "Trade Liberalization and Growth: New Evidence," Working Paper No. 7, Center on Development, Democracy and the Rule of Law, Stanford Institute for International Studies (Stanford, Ca.: Stanford University).
- Wei, Shang-Jin (2002) "Is Globalization Good for the Poor in China?," *Finance and Development*, Vol. 39, No. 3.
- Williamson, Jeffrey (1998) "Real Wages and Relative Factor Prices in the Third World 1820-1940: Latin America, Discussion Paper No. 1853 (Cambridge: Harvard Institute of Economic Research).

Winters, Alan L., N. McCulloch and A. McKay (2004) "Trade Liberalization and Poverty: The Evidence So Far," *Journal of Economic Literature*, 42 (1): 72-115.

World Bank (2006) *Equity and Development: 2006 World Development Report* (New York: Oxford University Press).

World Bank (2007) *World Development Indicators* (Washington, D.C.: The World Bank).

Zhang, Junsen and Yaohui Zhao (1999) "The Economic Returns to Schooling in Urban China, 1988-1999," (Washington, D.C.: The World Bank).

Table 1. International Trade Index, Selected Countries

Country	Trade Index
Singapore	295%
Luxembourg	271
Hong Kong	293
Aruba	190
Puerto Rico	181
Fiji	141
Canada	73
Kenya	56
Bangladesh	39
Brazil	38
United States	24
Japan	22

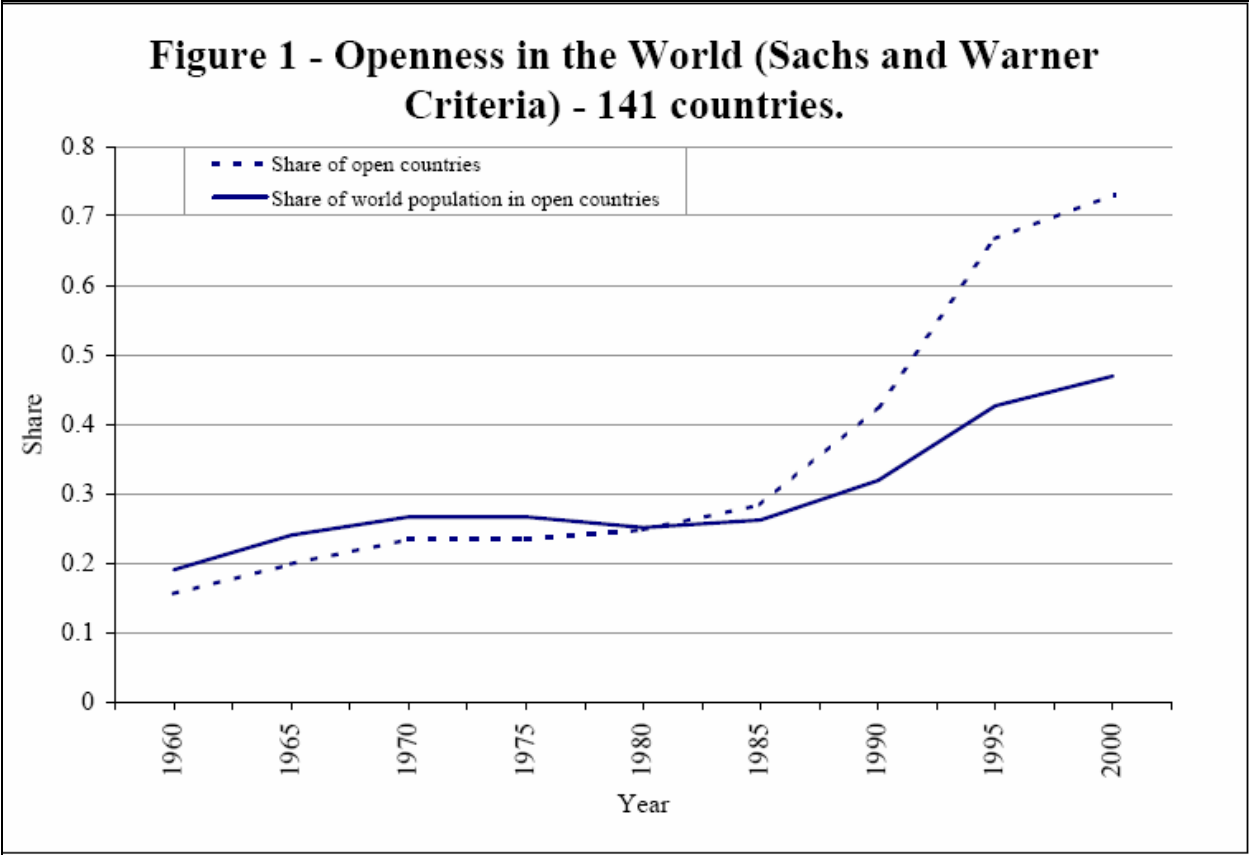
Source: World Bank (2007).

Trade index = Sum of the Value of Export and Imports of goods and Services divided by Gross Domestic Product.

Table 2. Tariff Rates for Selected Countries

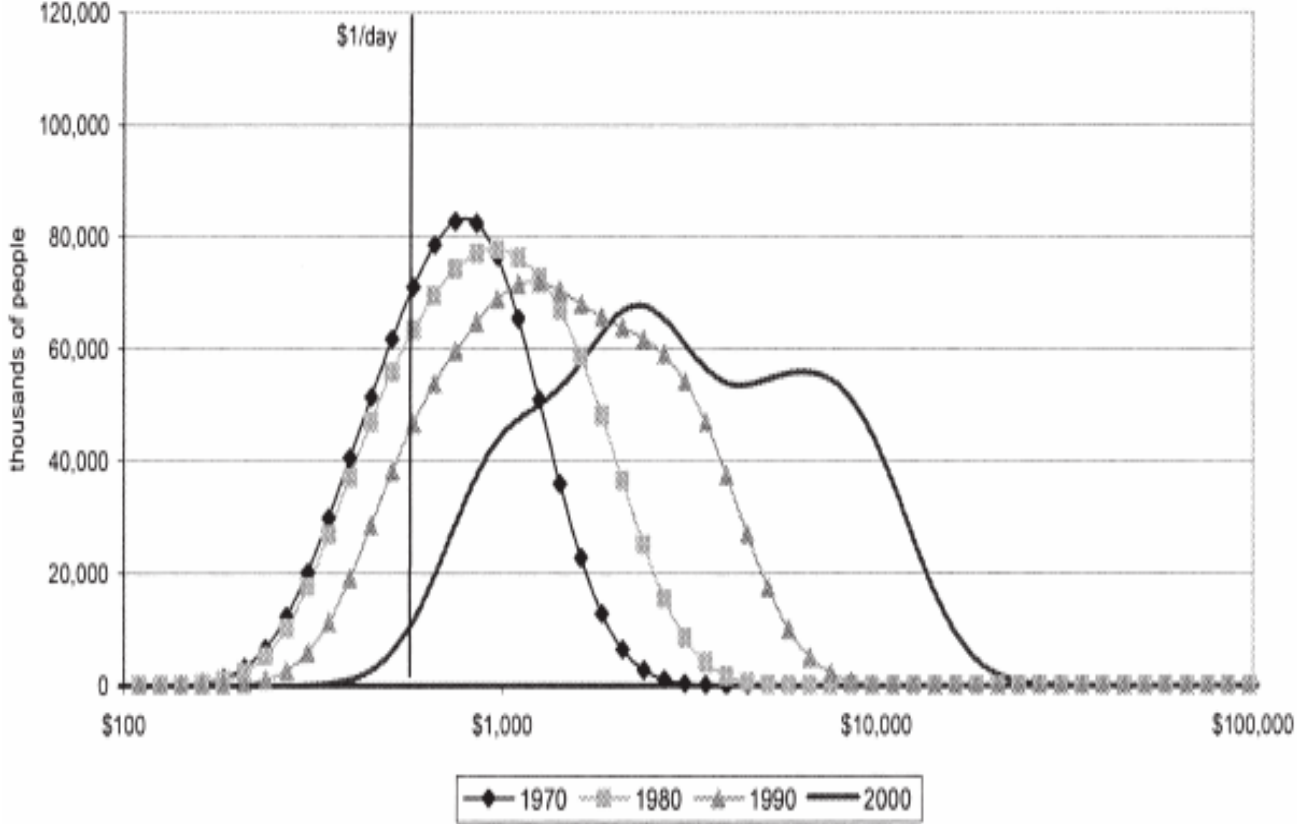
Country	Average Tariff Rate	
	1990	2000
Bangladesh	106.6%	21.3%
Pakistan	50.9	41.7
India	79.0	28.5
Brazil	42.2	14.4
United States	5.6	4.0
European Union	4.1	1.8
Japan	4.0	2.1
Switzerland	0.0	0.0
Singapore	0.6	0.0
Hong Kong, China	0.0	0.0

Source: World Bank (2006).



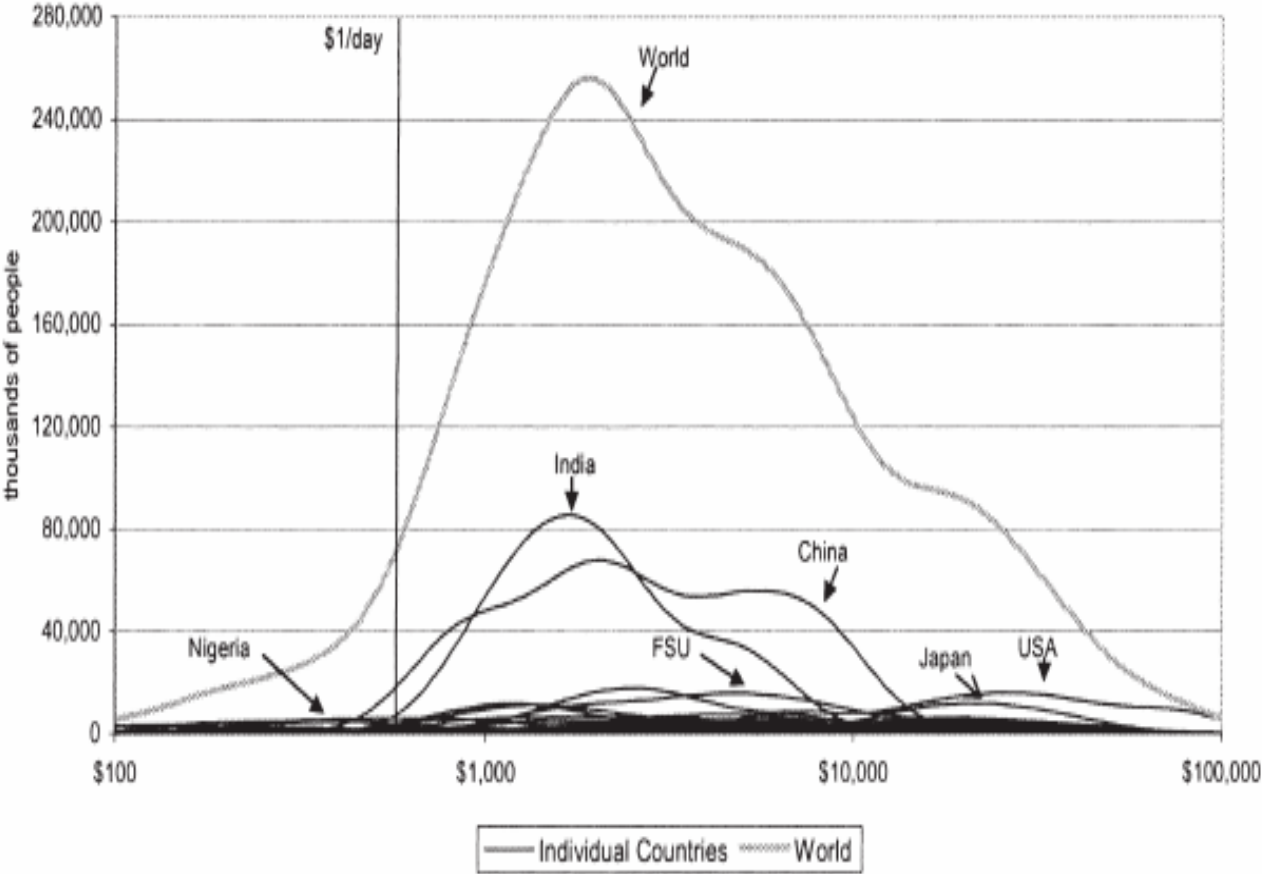
Source: Wacziarg and Horn (2003).

Figure 2. The Distribution of Income in China, 1970-2000



Source: Sala-i-Martin (2006).

Figure 3. The Distribution of Income in the World and Selected Countries, 2000



Source: Sala-i-Martin (2006).

Table 3. Poverty Rates in the World, 2004

Region	Poverty Rate of \$1 a Day	Number of People In Poverty at Below \$1 a Day	Poverty Rate \$2 a Day	Number of People In Poverty at Below \$2 a Day
Overall World	18.1%	969.4	47.6%	2,548.0
East Asia and Pacific	9.1	169.1	36.6	683.8
Europe and Central Asia	9.9	4.4	9.8	46.2
Latin America and The Caribbean	0.9	47.0	22.2	120.6
Middle East and North Africa	1.5	4.4	19.7	59.3
South Asia	30.8	446.2	77.1	1,115.8
Sub Saharan Africa	41.1	298.3	72.0	522.3

Source: Chen and Ravallion (2007).

Table 4. The Distribution of Income, Selected Countries

Country	Poorest Quintile (A)	Second Lowest Quintile	Third Lowest Quintile	Fourth Lowest Quintile	Richest Quintile (B)	Disparity Index (B/A)
Brazil (2003)	3%	6%	11%	18%	62%	20.7
China (2001)	5	9	14	22	50	10.0
Finland (2000)	10	14	17	22	37	3.7
Honduras (2003)	3	7	12	20	58	19.3
India (2000)	9	12	16	21	43	4.8
Jordan (2003)	7	11	15	21	46	6.6
Mexico (2002)	4	8	13	20	55	13.7
Russia (2002)	6	10	15	22	47	7.8
Sweden (2000)	9	14	18	23	37	4.1
S. Korea (1998)	8	14	18	23	37	4.6
Uganda (1999)	6	10	14	20	50	8.3
U.S.A. (2000)	5	11	16	22	46	9.2

Source: World Bank (2007).

Table 5. Gini Coefficients

	Gini Coefficient
Brazil (2003)	58%
China (2001)	45
Finland (2000)	27
Honduras (2003)	54
India (2000)	54
Jordan (2003)	39
Mexico (2002)	50
Russia (2002)	40
S. Korea (1998)	32
Sweden	25
Uganda (1999)	43
U.S.A. (2000)	41

Source: World Bank (2007).

Table 6. Estimates of World Inequality, 1999

Region	Gini Coefficient in 1999
World	68.3
OECD Countries	36.7
Latin America and The Caribbean	55.7
East Asia and Pacific	49.4
South Asia	37.3
Sub-Saharan Africa	66.4
Europe and Central Asia	44.2

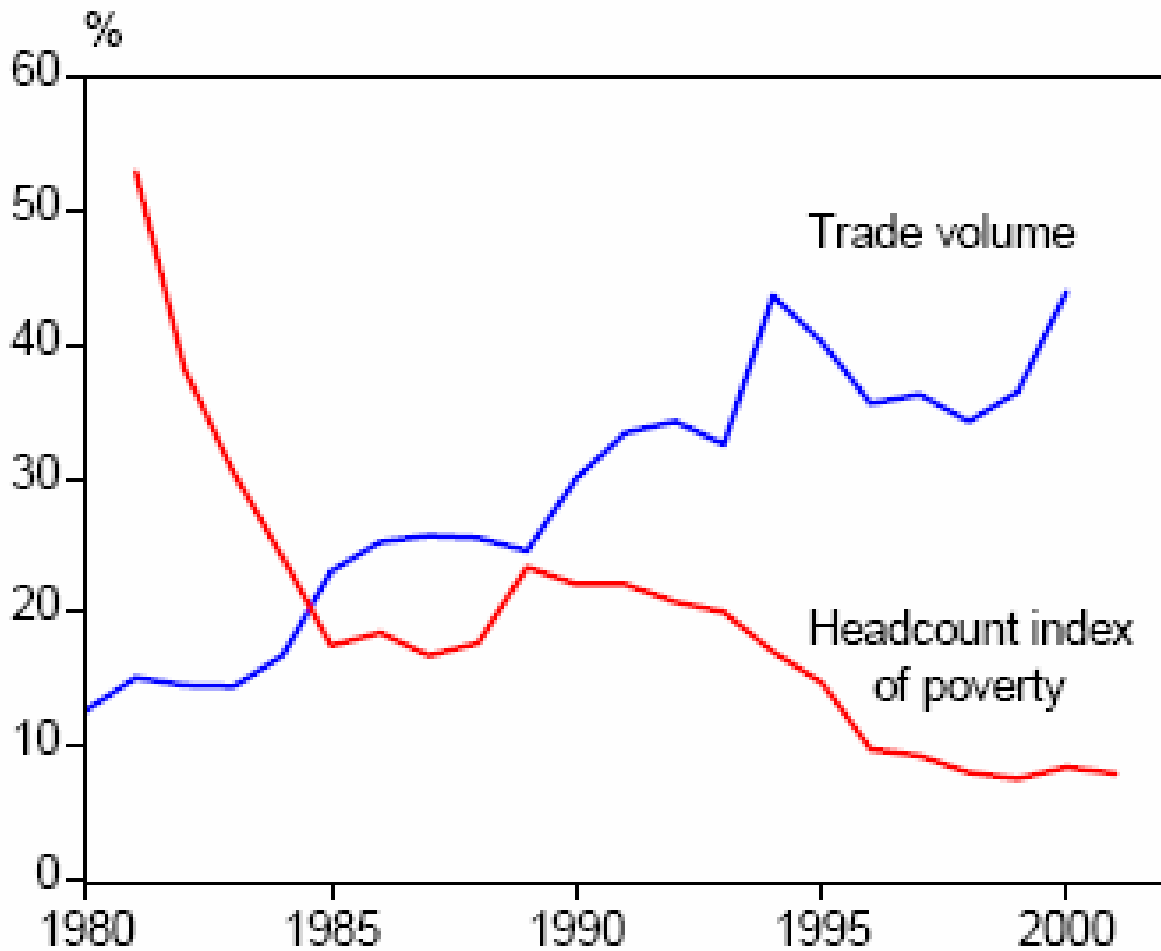
Source: Dikhanov and Ward (2001).

Table 7. The Drop in Global Poverty, 1981-2004

Country/ Region	1% Poverty Rates			1981	1990	2004
	1981	1990	2004			
Overall	40.1%	28.8%	18.1%	67.0	60.8	47.6
Excluding China and India	24.1	20.9	15.8	48.3	46.2	43.5
China	63.8	33.0	9.9	88.1	72.2	34.9
India	51.8	44.3	34.3	88.9	86.3	80.4
East Asia Pacific	57.7	29.8	9.0	84.8	69.7	36.6
Europe Central Asia	0.7	0.5	0.9	4.6	4.3	9.8
Latin America Caribbean	10.8	10.2	8.6	28.5	26.3	22.2
South Asia	49.6	43.0	30.8	88.5	85.6	77.1
Sub- Saharan Africa	42.3	46.7	41.1	74.5	77.1	72.0

Source: Chen and Ravallion (2007)

Figure 4. The Simple Relationship between Trade and Poverty in China

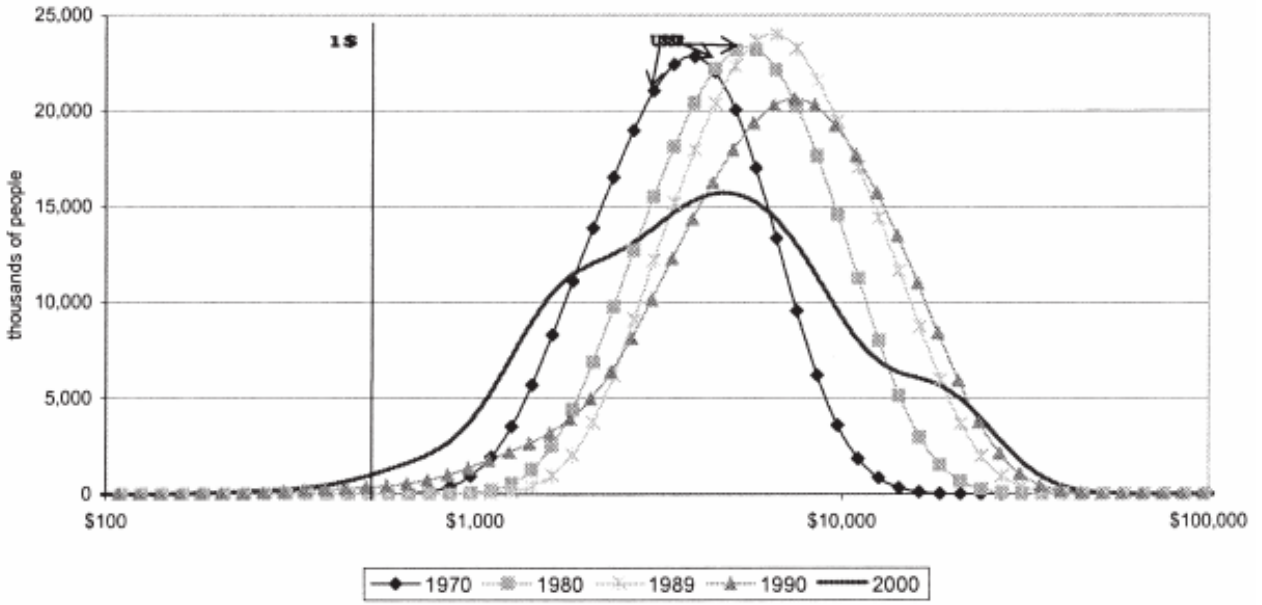


Trade volume is the value of export and imports as a percentage of GDP. The Headcount index of poverty is the percentage of the population living in households with consumption below \$1 a day.

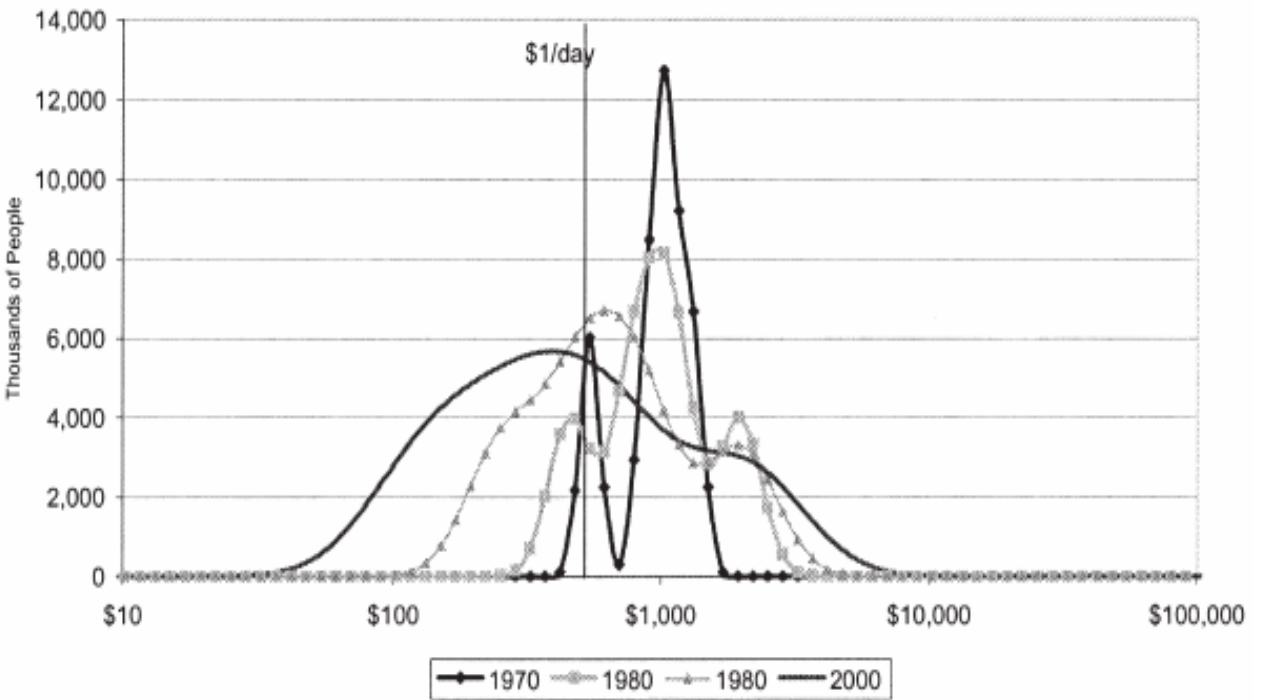
Source: Ravallion (2004), p. 37.

Figure 5. The Increase of Within-Country Inequality, 1970-2000

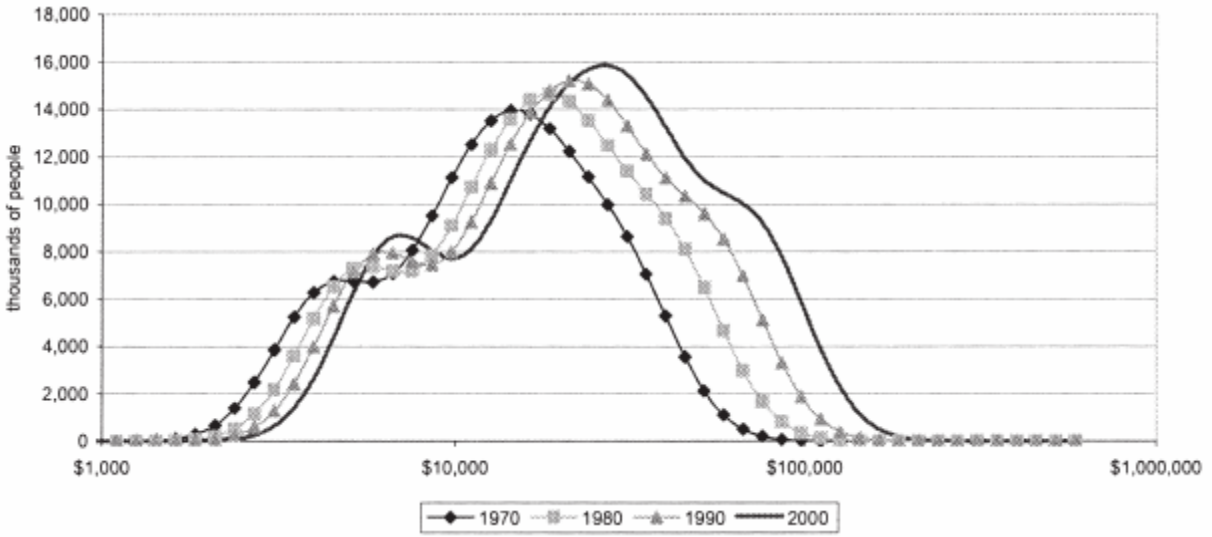
A. USSR and Former Soviet Union



B. Nigeria

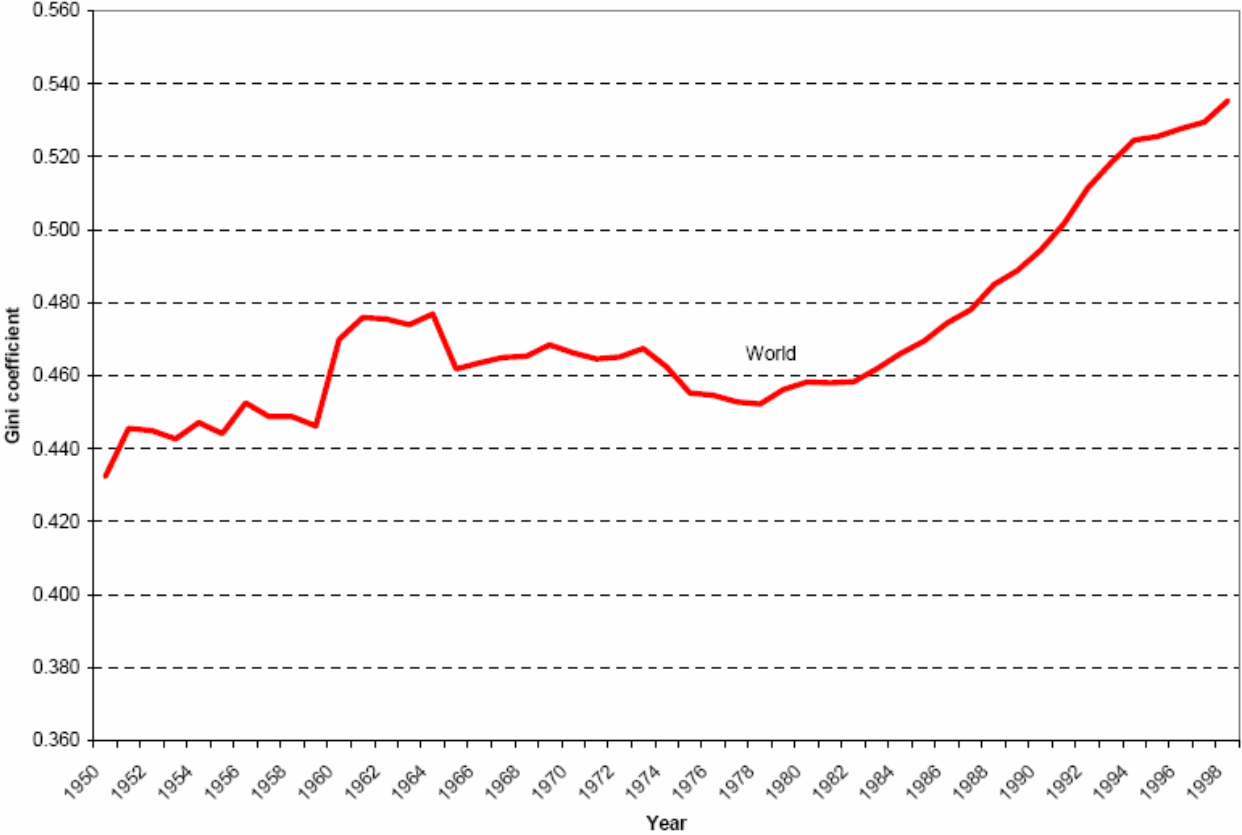


C. United States



Source: Sala-i-Martin (2006).

Figure 6. The Increase in Cross-Country Inequality since the Early 1980s



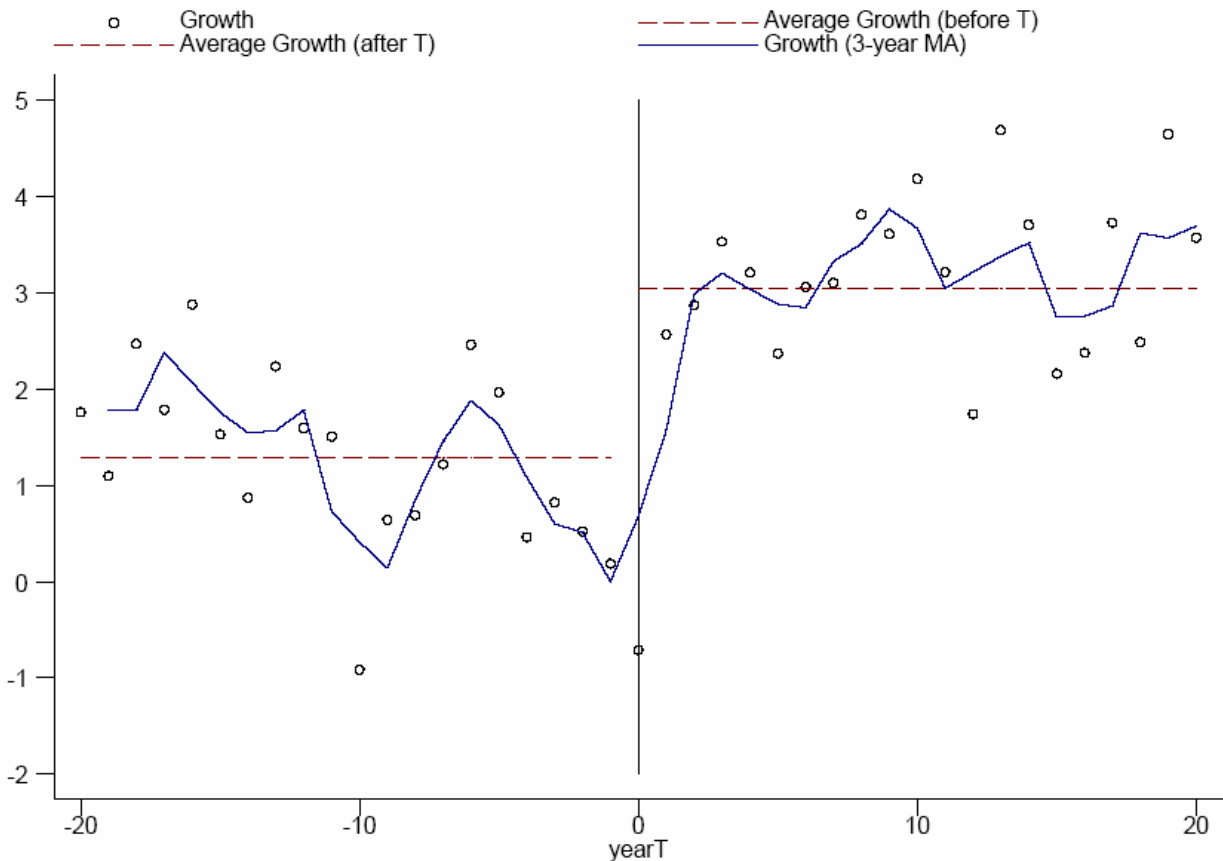
Source: Milanovic (2005)

Table 8. The Rise of Global Inequality, 1970-2000

Gini Coefficient	1970	1980	1990	1999
World	66.8	68.2	68.6	68.3
OECD Countries	35.2	33.9	35.3	36.7
Latin America and The Caribbean	56.1	55.7	55.2	55.7
East Asia and Pacific	44.4	50.1	48.5	49.4
South Asia	38.0	38.4	38.1	37.3
Sub-Saharan Africa	64.9	63.1	65.1	66.4
Europe and Central Asia	29.8	30.1	30.7	44.2

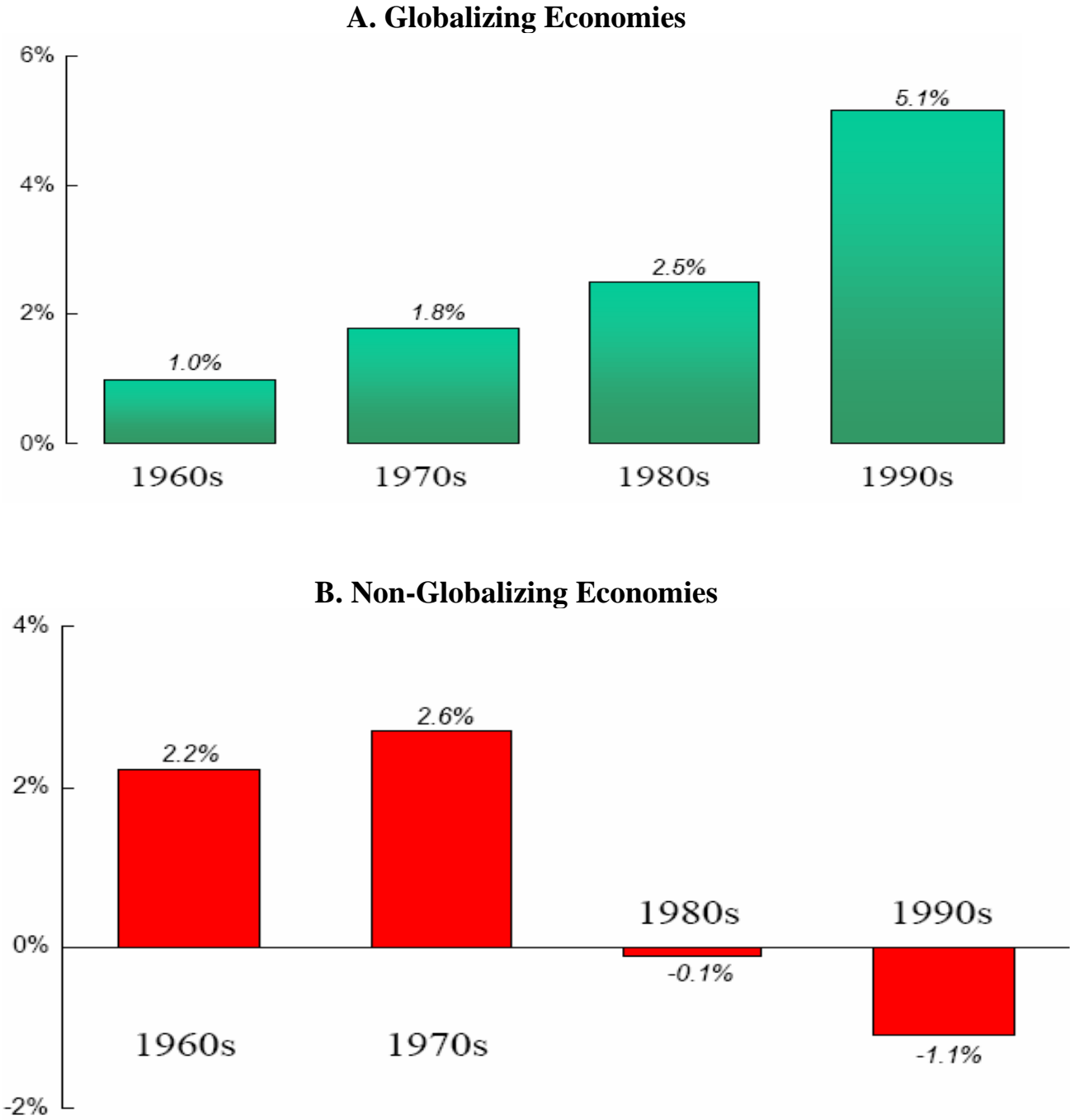
Source: Dikhanov and Ward (2001).

Figure 7. The Impact of Trade Liberalization on Economic Growth



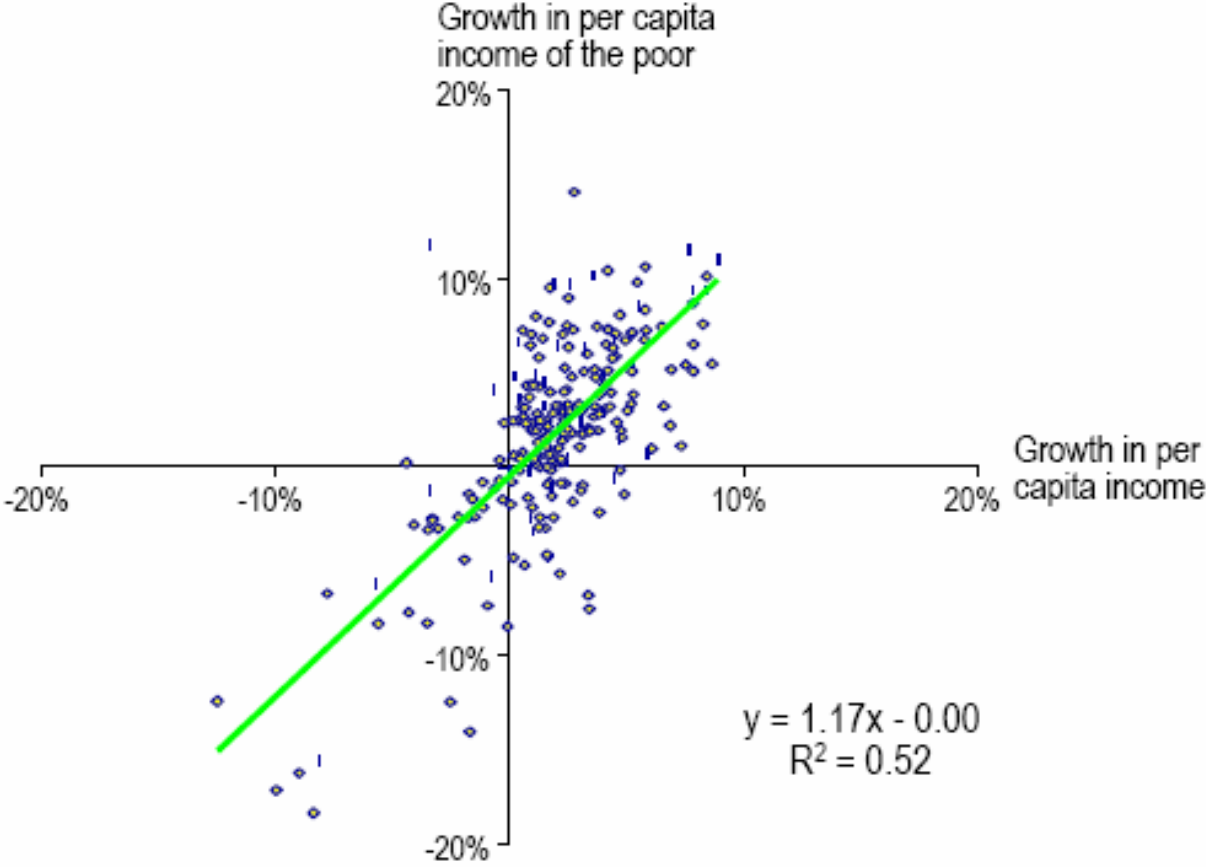
Source: Wacziarg and Horn (2004)

Figure 8. The Link between Globalizing Economies and Economic Growth



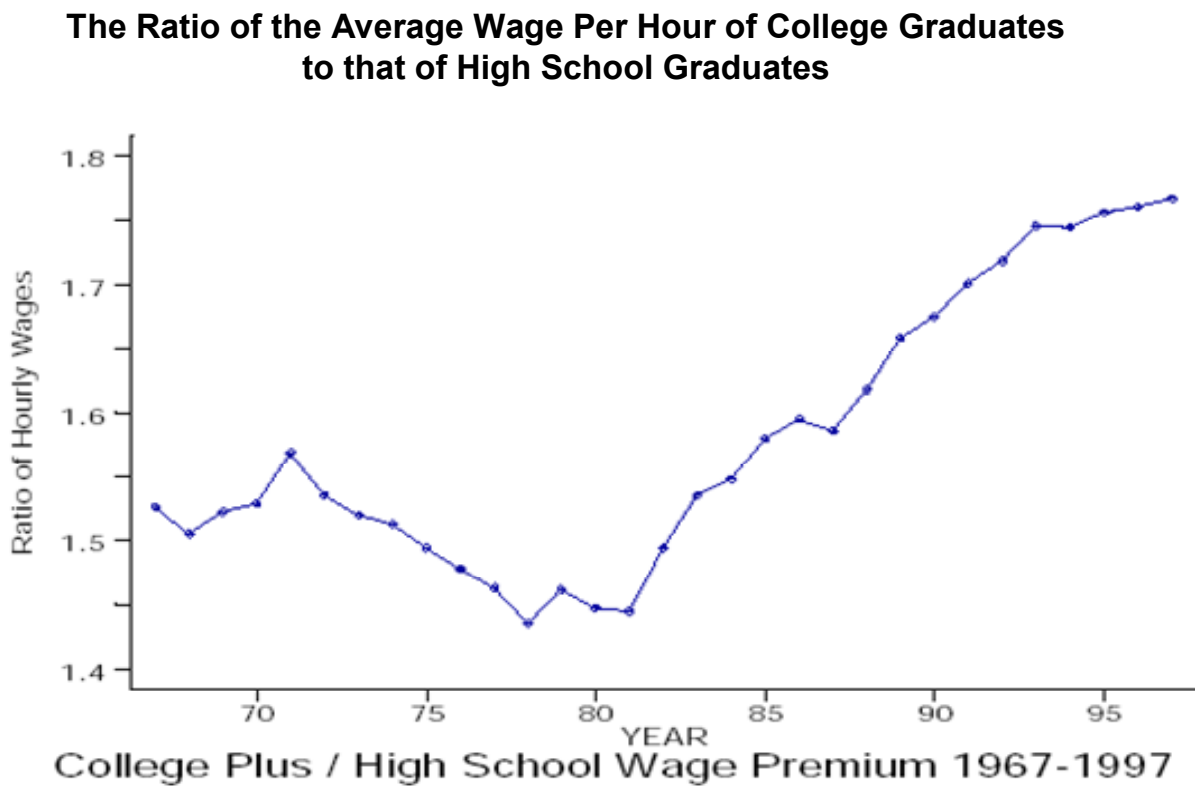
Source: Dollar and Kraay (2001)

Figure 9. Growth is Good for the Poor



Source: Dollar and Kraay (2001)

Figure 10. The Rising Relative Wages of Skilled Workers in the United States



Source: Murphy and Welch (2000).

Table 10. Changes in Labor Force participation Rates, Selected Countries

Country	Labor Force Participation Rates (%)					
	1980		1990		2005	
	Male	Female	Male	Female	Male	Female
High-Income Countries	53%	84%	59%	82%	64%	80%
Developing Countries	59	87	59	86	57	84
Brazil	41	89	52	89	61	84
Colombia	26	83	49	85	66	85
India	47	88	40	87	36	84
Mexico	31	84	36	85	43	83

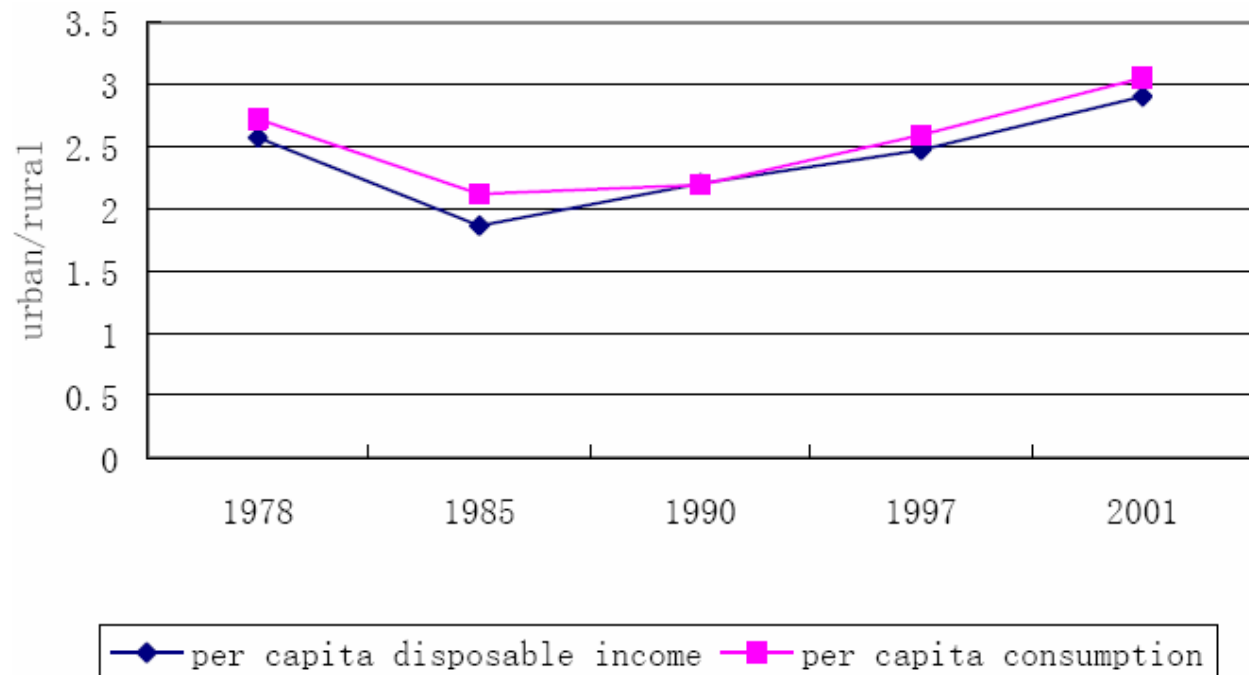
Source: World Bank (2007).

Table 11. Women's Share of Total Employment in Some Export Processing Zones in Developing Countries

Country	Total employment (2003)	Female employment (% share)	Main sectors of production	Zone exports as % of total exports
Africa				
Cape Verde	11 41	88		
Kenya	27 148	60	Apparel/garments, pharmaceuticals, tea processing	80
Malawi	29 000	51	Textiles, cotton	
Mauritius	83 609	66	Textiles/garments, food processing, footwear, jewellery, medical/optical/photographic equipment	77
Asia				
Bangladesh	2 121 000	62	Textiles/garments, food processing, leather, pharmaceuticals	60
China	30 000 000	...	High-tech electronics, IT industry, pharmaceuticals	88
Korea, Republic of	39 000	70		
Malaysia	322 000	54	High-tech electronics, food processing, services, IT industry, pharmaceuticals	83
Pakistan	410 540	82	Electronics, chemicals, toys, precision mechanics, yarn processing/garments, leather, food processing, plastic	...
Philippines	820 960	74	High-tech electronics, textiles, leather	87
Sri Lanka	461 033	78	Textiles/garments, rubber products	33
Latin America and the Caribbean				
Dominican Republic	181 130	53	Textiles, services	80
Guatemala	69 200	70	Services	...
Honduras	106 457	67		...
Jamaica	20 000	90	Garments, electronics	...
Mexico	1 906 064	60	Plastics, machine spare parts, packaging material, electronic components, wire, metal stamping, steel, chemicals, apparel, wood products	83
Nicaragua	40 000	90	Textiles	

Source: Tran-Nguyen and Beviglia Zempetti (2004).

Figure 12. Urban-Rural Inequality in China, 1978-2001



Source: Angang et. al. (2005), p. 24.

Appendix A. Measuring Inequality

Inequality is concerned with the disparities that exist in the distribution of income—or other indicators—in a country or in a set of countries. It is also concerned with the extent to which income is concentrated in the hands of a few individuals or households. This appendix shows how to calculate the Gini coefficient, one of the most popular indicators of inequality.

The first step is to describe the income distribution of the country. One way is to rank all households by income, from the poorest to the richest and then split them into groups. We split them into five groups (five quintiles), so that each group has 20 percent of the population of households in the country. Table A-1 shows three possible cases of the distribution of income: Two of them are hypothetical and one is real. The first column presents the hypothetical case of a country where the distribution of income is perfectly equal. In this case everybody in the population has the same income and as Figure A-1 shows, this means that each quintile then receives the same share of the total income in the economy (20 percent).

The second case is that of a hypothetical country that has perfect inequality, meaning that only a few incredibly rich families have all the income, with everybody else with zero income. This is shown by column 2 of Table A-1 and illustrated in Figure A-1. In this case, the bottom 20 percent of the population receives 0 percent of income, and the same holds as well for the second quintile, the middle quintile and the fourth quintile. Only the top 20 percent of the population (the fifth quintile) receives income and, given the inequality in the country, this group receives 100 percent of the income.

The third case illustrated is an actual one and is the case of Nigeria in 2003. The third column of Table A-1 and Figure A-1 show this case. As can be seen, in Nigeria in 2003, the bottom 20 percent of the households received only 5 percent of all income generated in the country, the second poorest 20 percent received 10 percent of all income, the middle quintile received 14 percent of all income, the fourth quintile received 22 percent, and the richest 20 percent received 49 percent of the income in the country.

Obviously, one would consider Nigeria a relatively unequal country in terms of income. But how unequal and how would it compare to Mexico or Zimbabwe or the United States? Economists have developed an indicator of inequality called the Gini coefficient that can be used to compare the extent of inequality in different countries.

To compute the Gini coefficient, one needs first to compute the cumulative distribution of income of a country. The cumulative distribution of income can be easily derived from the data already discussed in Table A-1. The calculations are presented in Table A-2. The cumulative distribution of income shows the accumulated percentage of income of a country received by the accumulated percentage of the population, as we add households from poor to rich. For instance, let us consider first the case of Nigeria, for which the results are in the third column of Table A-2. In Nigeria, the poorest 20 percent of the population received 5 percent of all the income generated in the country in 2003 and the second poorest 20 percent received 10 percent of all income. This means that the poorest 40 percent of the population received 15 percent of all income. Similarly, the third quintile received 14 percent of income so that the bottom 60 percent of the population (the three lowest quintiles together) received 15 plus 14 or 29 percent of the total income in the country. And since the fourth quintile received 22 percent of income, the cumulative income received by the bottom 80 percent of the population in terms of income was 51 percent of all income. Of course, when one adds the remaining quintile, the top 20 percent of the population, which had 49 percent of all income, one obtains the truism that 100 percent of the population get 100 percent of the income in the economy.

There are two other cases shown in Table A-2. For the perfect equality case, the cumulative distribution of income involves adding 20 percent of income as one adds quintiles, so it goes from 0% to 20% to 40 to 60%, then 80% and 100%. For perfect inequality, since none of the first four quintiles received any income, the cumulative income received by the bottom 20 percent is zero, the bottom 40 percent is also zero, and all the way up to the bottom 80 percent. Only when the richest quintile is added (the top 20 percent) does the cumulative distribution of income rises from 0 percent to 100 percent.

The cumulative distribution of income can be shown diagrammatically by what is referred-to as a Lorenz curve. The diagram has a horizontal axis showing the cumulative distribuion of the households in a country and a vertical axis showing the cumulative distribution of income. Figure A-2 shows the Lorenz curve for all three cases presented in Table A-2. For the case of perfect equality, note that all the points in the Lorenz curve lie along the diagonal of the box constructed in Figure A-2. The reason is that, for this case, 0 percent of the population has 0 percent of income, 20 percent of the population has 20 percent of income and so on. In the case of perfect inequality, on the other hand, the Lorenz curve is a right-angle that lies along the horizontal axis first and then rises along the vertical axis. The reason is that, as the cumulative distribution of the population rises from 0 percent to 20 percent and up to 80 percent, the cumulative distribution of income is maintained at zero. Only when the richest families are incorporated, when one adds the top 20 percent, does the cumulative distribution of income then shots-up to 100 percent. The Lorenz curve for the case of Nigeria lies in-between these two cases, as illustrated in Figure A-2.

The concept behind the use of the Gini coefficient as a measure of inequality can be illustrated diagrammatically. Figure A-5 shows a typical Lorenz curve, together with the two hypothetical cases of perfect equality (along the diagonal) and perfect inequality (the right-angle line along the axes). There are two areas defined by the Lorenz curve for the country illustrated: the area between the Lorenz curve for the country and the perfect equality Lorenz curve, which is described as area A, and the area between the Lorenz curve of the country and the perfect inequality Lorenz curve, defined as area B. The Gini coefficient, G, is defined as the value:

$$G = \frac{A}{A+B} \times 100$$

Note that the value of the Gini coefficient ranges from 0 to 100. A value of 0 is obtained when the country has perfect equality in its income distribution. In this case, the country has a Lorenz curve that is equal to the perfect equality Lorenz curve, which means that the value of area A is

equal to zero, in which case the value of G is 0. On the other hand, a value of 100 is reached when the country has perfect inequality in the distribution of income. In that case, the perfect inequality Lorenz curve (along the axis) is equal to the country's Lorenz curve, and the value of the area B is zero, which means that $G = 100$.

One can carry out a mental exercise to see that, as a country's distribution of income becomes more equal, its Lorenz curve will approach the perfect equality Lorenz curve and the Gini coefficient will decline in value towards zero. Similarly, as inequality rises, the Gini coefficient will tend to increase towards 100.

Table A-1

Three Cases of Income Distribution

Population Group	Share of Total Income in Country		
	Perfect Equality	Perfect Inequality	Nigeria (2003)
Poorest 20% of all households	20%	0%	5%
Second lowest 20%	20%	0%	10%
Third lowest 20%	20%	0%	14%
Fourth lowest or second highest 20%	20%	0%	22%
Richest 20% of all households	20%	100%	49%
All households in the country	100%	100%	100%

Figure A-1

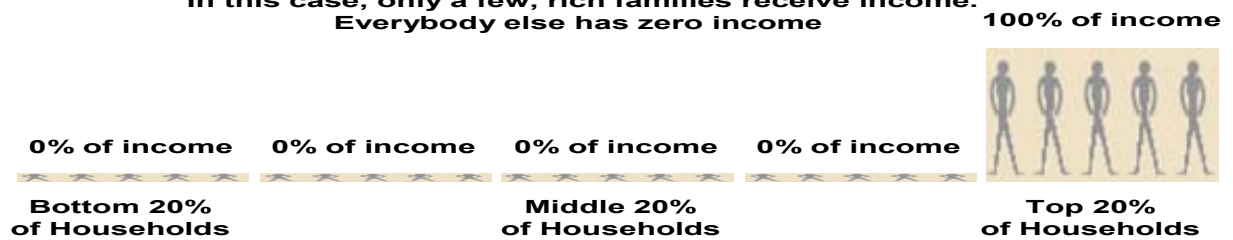
Case 1: The distribution of income in a perfectly equal society.

With perfect equality, all households are equally tall.



Case 2: The distribution of income in a perfectly unequal society.

**In this case, only a few, rich families receive income.
Everybody else has zero income**



Case 3: The distribution of income in Nigeria, 2003.

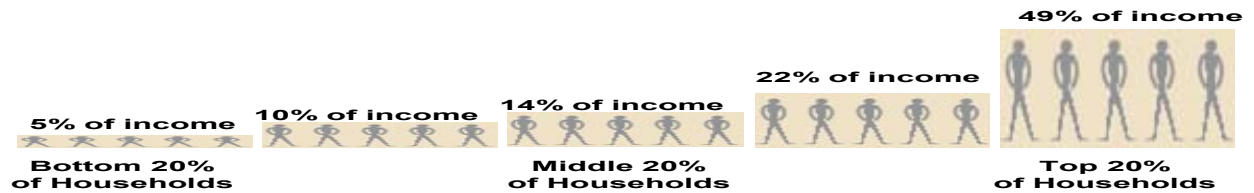


Table A-2

The Cumulative Distribution of Income

Population Group	Share of Total Income in Country		
	Perfect Equality	Perfect Inequality	Nigeria (2003)
Poorest 20% of all households	20%	0%	5%
Poorest 40% of all households	40%	0%	15%
Poorest 60% of all households	60%	0%	29%
Poorest 80% of all households	80%	0%	51%
All households in the country	100%	100%	100%

Figure A-2

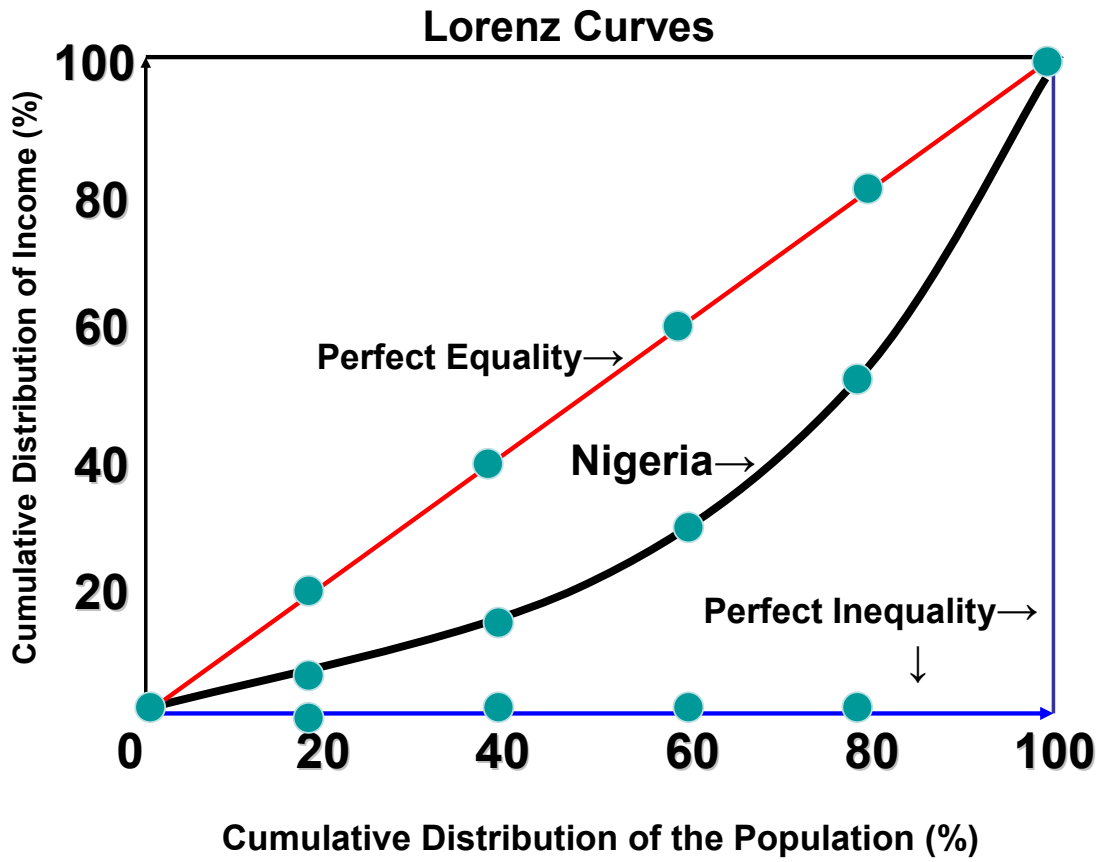


Figure A-3

