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Inequality, income shares and poverty: The practical meaning of Gini coefficients

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The global financial crisis has revived the debate on wage and income inequality, and led many to question the inequities that emerged in the preceding boom years. The Gini coefficient is a frequently cited statistic in these debates, as it is a convenient tool for summarizing the distribution of wages or, more generally, incomes in a single number. However, compared to statistics like the unemployment rate or the poverty headcount ratio, it is less easily understood. This policy brief offers a short guide to the Gini coefficient and shows which countries have low and which have high Gini coefficients, as well as what the different Gini coefficients typically imply for the incomes of the poor and the rich.

The so-called "Gini coefficient" (or Gini-Index) has become by far the most popular measure for inequality since it was first introduced by the Italian statistician Corrado Gini (1884-1965) almost a century ago. It summarizes the extent of inequality in a single figure. It can theoretically take any value between zero (perfect equality, i.e. everybody has the same income) and one (perfect inequality, i.e. all income goes to a single person).[1] Although calculating a Gini coefficient is straightforward (see Box 1), the existence of a number of methodological differences means that Gini coefficients from different sources may not indicate exactly the same thing and are thus not directly comparable.

The following two questions are useful to identify the most important differences:

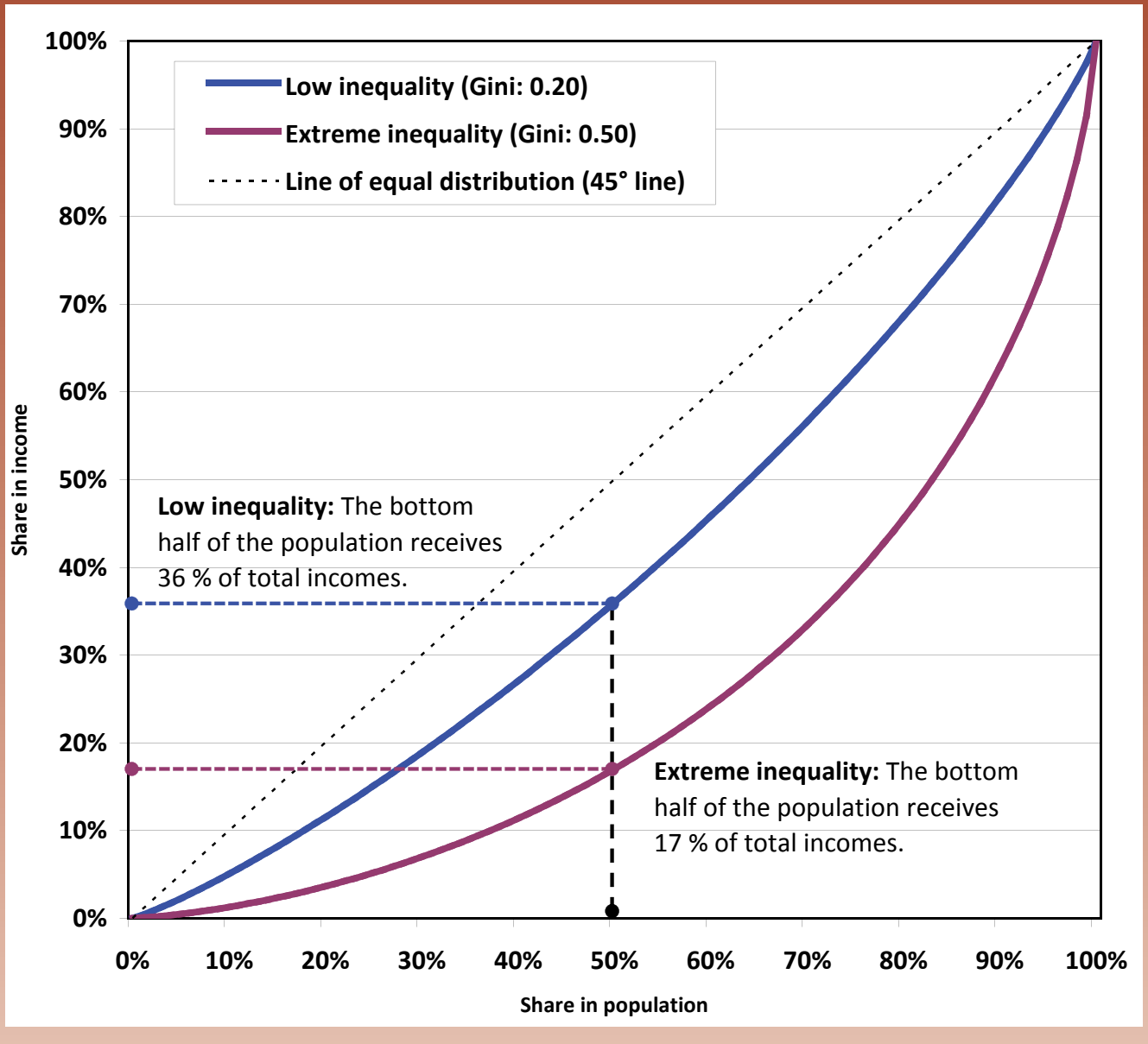
- *Inequality of what?* Although Gini coefficients are generally used to measure income inequality, some refer to market incomes (i.e. income before taxes and transfers) and others to disposable incomes (i.e. income after taxes and transfers). Sometimes it can be useful to calculate Gini coefficients for wages or earnings, thus excluding income from other sources. Moreover, Gini coefficients can also be based on consumption or expenditure data (rather than income) or, by drawing on tax records, for taxable income. They can also been calculated for other distributions, such as that of wealth or land holding.

- *Inequality among whom?* For most purposes, it is useful to measure inequality among all those living in a given country, though some data refer only to particular groups, such as wage employees, urban residents or taxpayers. Since a household's income also supports the well-being of children and other household members who have no income of their own, statisticians generally calculate a household's total income and then adjust it for household size. Based on the assumption that income is shared between all household members, they enter the calculation of the Gini coefficient with the same income. While this is a useful adjustment, it regrettably ignores inequality between household members.

These differences, as well as a number of other methodological nuances, can make it very difficult to compare inequality across time and between countries. Many multi-country studies struggle with this problem, and unfortunately there is no easy way to adjust for differences in underlying measurement concepts. To ensure comparability, the Gini coefficients listed in Table 1 all cover a country's entire population and refer to disposable incomes, based on the assumption that income is shared within households. Unfortunately, Gini coefficients for wages are far harder to obtain than those for total incomes.

Box 1: The Lorenz curve, income shares and the Gini coefficient

Graph 1: The Lorenz curve under the low inequality and extreme inequality scenarios



The Lorenz curve is a simple way to present a country's income distribution in a single line. Graph 1 shows a Lorenz curve for a typical country with low inequality (Gini 0.20, blue line) and for one with extreme inequality (Gini 0.50, red line). The horizontal axis indicates the cumulative share in population and the vertical axis represents the corresponding share in total income. In the low inequality scenario, the bottom 50 per cent of the population receive 36 per cent of total incomes, whereas in the high inequality scenario the income share is reduced to only 17 per cent. Thus, the further the Lorenz curve moves away from the line of equal distribution (the dotted line in the graph), the higher inequality becomes. The Gini coefficient makes use of this regularity by summarizing the position of the Lorenz curve: It is calculated as the area between the line of equal distribution and the Lorenz curve, divided by the total area below the line of equal distribution. In the example above, the red Lorenz curve divides the area below the line of equal distribution into two halves of the same size, and the corresponding Gini coefficient is thus 0.50; the area between the blue Lorenz curve and the line of equal distribution is only one-fifth of the total and the Gini coefficient therefore 0.20.

Variations in inequality across countries

Turning to a more detailed analysis of Table 1, it comes as no surprise that no country has a Gini coefficient close to zero or one, the theoretical limits of the measure. To find genuinely low levels of inequality, one has to resort to historical examples from the Slovak Republic (0.19), Sweden (0.20), the Czech Republic (0.21) and Finland (0.21) that all date back to the 1980s and early 1990s (inequality in these countries has since increased). At the other end of the scale, we find extreme inequality in Latin American countries, such as Bolivia, Chile, Ecuador and Nicaragua, that all record Gini coefficients above 0.55. Brazil stands out in the region as a country with a substantial decline in inequality over the past decade,[2] although with a Gini of 0.49 (2006), inequality has remained very high by international standards.

Particularly large increases in inequality occurred in several CIS countries during the transition period in the 1990s. Russia, Tajikistan and Uzbekistan now record very high income inequality with Gini coefficients between 0.43 and 0.50. Botswana (0.54) is also found in the group of countries with extreme inequality. It is the only African country with comparable data, since Gini coefficients in this region are typically based on consumption rather than disposable incomes. However, these consumption data show that high and extreme inequality is also prevalent in other sub-Saharan countries.

Table 1. Between low and extreme income inequality: Examples from around the world

Low inequality Gini ca. 0.20	Moderate inequality Gini ca. 0.25	High inequality Gini ca. 0.35	Extreme inequality Gini ca. 0.50
Slovak Republic (1992): 0.19 Sweden (1981): 0.20 Czech Republic (1992): 0.21 Finland (1987): 0.21	Slovenia (2008): 0.23* Slovak Republic (2008): 0.24* Sweden (2008): 0.24* Czech Republic (2008): 0.25* Denmark (2008): 0.25* Hungary (2008): 0.25* Norway (2008): 0.25* Austria (2008): 0.26* Finland (2008): 0.26* Iceland (2008): 0.27* Malta (2008): 0.27* Switzerland (2004): 0.27 Belarus (2006): 0.28** Belgium (2008): 0.28* Cyprus (2008): 0.28* France (2008): 0.28* Luxembourg (2008): 0.28* Netherlands (2008): 0.28* Romania (1997): 0.28 Croatia (2007): 0.29*	Germany (2008): 0.30* Ireland (2008): 0.30* Australia (2003): 0.31 Canada (2004): 0.31 Estonia (2008): 0.31* Italy (2008): 0.31* Republic of Korea (2006): 0.31 Spain (2008): 0.31* Taiwan, Province of China (2005): 0.31 Poland (2008): 0.32* Greece (2008): 0.33* Lithuania (2008): 0.34* United Kingdom (2008): 0.34* Bulgaria (2008): 0.36* Portugal (2008): 0.36* Israel (2005): 0.37 United States (2004): 0.37 Latvia (2008): 0.38* Macedonia, FYR (2006): 0.39** Moldova (2006): 0.39** Kyrgyzstan (2006): 0.40**	Russia (2000): 0.43 Uruguay (2004): 0.43 China (2003): 0.45** Turkey (2003): 0.45* Mexico (2004): 0.46 Venezuela (2000): 0.46** Tajikistan (1999): 0.47** Uzbekistan (2001): 0.48** Brazil (2006): 0.49 Colombia (2004) 0.51 Guatemala (2006): 0.51 Peru (2004): 0.51 Botswana (1994): 0.54** El Salvador (2000): 0.54** Ecuador (1999): 0.59** Chile (2000): 0.60** Bolivia (2000): 0.63**

Note: All Gini coefficients are based on national coverage of the entire population and refer to disposable incomes; the income sharing unit is households, and the unit of analysis persons. The Luxembourg Income Study uses an equivalence scale to adjust for household size. Entries marked with one asterisk (*) are from EU-SILC. Entries marked with two asterisk (**) are from the UNU-WIDER database. Although they are broadly comparable, there may be slight methodological differences to the data from the Luxembourg Income Study. Data are the latest available, plus some historical examples for low inequality.

Sources: 1. Luxembourg Income Study (LIS) Key Figures, http://www.lisproject.org/keyfigures.htm (accessed on 22 April 2010).
2. EU-SILC, Inequality of income distribution / Gini coefficient [ilc_sic2], update as of 19 May 2010, available at http://epp.eurostat.ec.europa.eu/portal/page/portal/employment_and_social_policy_indicators/omc_social_inclusion_and_social_protection/social_inclusion_strand.
3. UNU-WIDER World Income Inequality Database, Version 2.0c, May 2008, available at http://www.wider.unu.edu/research/Database/en_GB/database/.

Less extreme, but nevertheless high Gini coefficients of around 0.35 are found in a number of anglophone countries, such as Ireland, Australia, Canada, the United Kingdom and the United States; in the three Baltic states; and in several Southern European countries like Italy, Spain, Greece, Bulgaria and Portugal. By comparison, moderate levels of inequality (with Gini coefficients around 0.25) are found in the five Nordic countries and many other European countries (see Table 1).

Income distribution under different inequality scenarios

The significance of these differences becomes evident from Table 2. Here we see the typical distribution of incomes under different inequality scenarios: in a country with low inequality, the poorest 20 per cent of the population typically receive 11.5 per cent of the country's total income – compared to only 3.6 per cent in a country with extreme inequality. Conversely, the share of the richest 10 per cent of the population rises from 17.8 per cent in the low inequality scenario to 37.2 per cent in the case of extreme inequality.

This translates into large income gaps between population groups. Assuming that the per capita income is $10,000 and the Gini coefficient is 0.50 (i.e. a level typical for Latin America), the richest 10 per cent of the population would receive average incomes of $37,158 per year, but the poorest 20 per cent would have an annual income of only $1,814. They would be significantly better off if they lived in a country with low inequality (Gini 0.20) and the same income level. Here, the difference between the poorest group ($5,754 per year) and the richest 10 per cent ($17,793 per year) is far smaller. Even a shift from high to moderate inequality has a large impact on people's incomes: the average incomes of the bottom quintile would rise by 42.2 per cent (or from $3,450 to $4,907 in case of a country with a mean income of $10,000), and the average incomes of the bottom half would grow by 25.1 per cent (from $5,211 to $6,523).

Another approach is to look at the incomes of the "person in the middle", i.e. of someone who is neither particularly poor nor particularly rich. In technical terms, this is the median income – half of the population has incomes

Table 2. Gini coefficients, typical income shares and per capita incomes under four inequality scenarios

Inequality scenario:	Low inequality	Moderate inequality	High inequality	Extreme inequality
Gini coefficient:	0.20	0.25	0.35	0.50
Income shares of different groups in a country's total income :				
bottom 20 %	11.5 %	9.8 %	6.9 %	3.6 %
bottom 50 %	36.0 %	32.6 %	26.1 %	17.0 %
top 10 %	17.8 %	20.3 %	26.1 %	37.2 %
When a country's mean income is $10 000, the average per capita incomes of these groups are...				
bottom 20 %	$5,754	$4,907	$3,450	$1,814
bottom 50 %	$7,201	$6,523	$5,211	$3,401
top 10 %	$17,793	$20,301	$26,114	$37,158
... and the income of the 'person in the middle' is :				
Median	$9,378	$9,035	$8,139	$6,345

Note: All calculations refer to hypothetical cases, based on the assumption that income distribution is lognormal (see Lopez and Servén, 2006).
Source: ILO staff calculations.

below the median, and the other half above the median. Everything else being equal, the median income is lower when inequality is high. In the low inequality scenario, the "person in the middle" could expect an income of $9,378, which is close to the mean income of $10,000. However, even a shift to moderate inequality reduces the median income to $9,035, or by 3.7 per cent. It falls further to $8,139 under the high inequality scenario and to $6,345 under extreme inequality. In other words, even when overall per capita incomes are identical, the income of the "person in the middle" is almost a third lower when the Gini coefficient is around 0.50, rather than 0.20.

Why inequality matters in the fight against poverty

The impact of higher inequality on the incomes of those at the bottom of the distribution raises obvious questions about the connection between inequality and poverty. Some have argued that large shifts in inequality are rare, and one should thus focus on growth alone to eliminate poverty. However, this argument misses two important facts:

- *First, low inequality means that more of the gains from growth benefit the poor*. In the above scenarios with average incomes of $10,000, mean income would increase by $500 when growth in a given year is 5 per cent. However, with extreme inequality and unchanged distribution, the incomes of the poorest 20 per cent would grow by only $91, but those of the richest 10 per cent by $1,858. By contrast, when inequality is low, the poorest would see an income rise of $288, while the richest would still benefit from a generous $890. Thus, with lower inequality, growth will reduce poverty much faster (see van der Hoeven, 2000).
- *Second, even small progress towards lower inequality can have a large impact on poverty alleviation*. By one estimate, merely preventing the rise in inequality that many countries have experienced over the past decades would have reduced the number of people living in absolute poverty in 1998 to 900 million, compared to the actual 1.2 billion (Luebker, 2002). A move towards greater equity would have had an even bigger impact on poverty alleviation.

Therefore, it is now generally accepted that growth and equity both have a role to play in poverty alleviation. Since the prospects for growth have been eroded by the economic and financial crisis, many policy-makers are now putting renewed emphasis on greater equity as a way out of poverty. Rather than simply returning to the pre-crisis patterns of growth that were often inequitable, a medium-term strategy can be to raise the incomes of the poor at a faster rate than those of the rich, thus making growth an engine to reduce both poverty and inequality. Wage policies can be an important mechanism to achieve this goal, and the challenge for policy-makers and the social partners is to make use of tools, such as collective bargaining and minimum wage setting, that can make the recovery from the crisis more equitable than the period that preceded it.

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[1] Sometimes, the Gini coefficient is multiplied by 100 and then ranges between 0 and 100.

[2] According to the National Household Sample Survey, the Gini coefficient for monthly income from employment of employed persons decreased from 0.571 in 2001 to 0.528 in 2008 (see IBGE, 2009). Note that the Gini coefficient reported in Table 1 refers to the Gini coefficient for equivalized disposable household income and is lower than the corresponding figure published by the IBGE.

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