A note on North–South inequality, 1960–1995

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Abstract

We examine trends in intercountry income inequality during the period 1960–1995. Our database is a sample of 133 countries from the Penn World Tables and our measure of inequality is the Theil index. We find that intercountry income inequality remained roughly constant during the period under study. Our main contribution to the existing literature is to divide the sample into North – developed countries – and South – developing countries. We find that North–South inequality remained more or less constant. Intra–North inequality also did not change much while intra–South inequality increased, then declined.

1. Introduction

There is a large and growing interest in income inequality. Most of the work in this area examines the evolution of income inequality within particular countries over time or compares the income inequality of different countries. In this note, we look at trends in the intercountry distribution of income instead. More specifically, we investigate empirically the issue of whether the global distribution of income has become more equal or unequal during the period 1960–1995. Greater equality would lend support to the convergence hypothesis, which predicts that poor countries will catch up with rich countries over time. We use data from the Penn World Tables version 5.6. Our measure of inequality is the Theil index.

Our main contribution to the existing literature on convergence and international inequality is to divide the sample into the North – developed

countries – and the South – developing countries in order to examine the evolution of global income inequality in greater detail. This division is significant because it is one of the most tangible and persistent divisions of the international community today.

Mere casual observation reveals a vast and persistent gap in living standards separating the world's economically more advanced regions – North America, Western Europe, Japan and Australia/New Zealand – from the world's less advanced regions – Asia other than Japan, Middle East, Africa and Latin America. At the same time, there has been a great deal of diversity in the economic performance of developing countries. Some countries of the South have grown rapidly while others have stagnated. To a lesser extent, this is also true for the countries of the North.

One of the most attractive features of the Theil index is its decomposability. We make use of this feature to examine the evolution of inequality between the North and the South. We also take a look at inequality among the countries of the South and inequality among the countries of the North for the period under study. In sum, we investigate trends in North–South inequality as well as its components.

2. Literature review

Let us now examine the existing empirical literature on international convergence. Romer (1989), Barro (1991), Barro and Sala-i-Martin (1992) and Parente and Prescott (1993) have addressed the question of whether poor countries have been catching up with rich countries over time. They all fail to find evidence of a catch-up. That is, the actual pattern of economic growth across countries does not indicate economic convergence among the countries of the world. In a comprehensive survey of the literature on growth and convergence, de la Fuente (1997) points out that greater inequality among all countries, along with greater equality among industrialized countries, appear to be empirical regularities or stylized facts of the post-war era.

The most obvious way to test for economic convergence is to plot rates of economic growth against initial levels of per capita income and check for any discernible pattern. Romer (1989) and Barro (1991) do this but do not find any systematic pattern. More formally, Sala-i-Martin (1990a, 1990b) estimates an equation based on the economy moving along its optimal path towards its steady-state per capita growth rate and finds that the initial level of income is statistically insignificant as a determinant of the rate of economic growth.

Yet another way to test for convergence is to examine whether intercountry income inequality has been falling, as we do in this paper. The work of Levy and Chowdhury (1994, 1995) and Theil (1989) represents earlier efforts in this direction. Levy and Chowdhury uncover three distinct phases in the evolution of intercountry income inequality – strong divergence during 1960–1968, slow convergence during 1969–1983 and stagnation during 1984–1990. On the other hand, Theil finds that intercountry income inequality rose substantially among a sample of 116 non–communist countries during 1960–1985.

3. Data and methodology

Our primary data set is the Penn World Tables version 5.6 (henceforth PWT). Summers and Heston (1991) provide a detailed explanation of this database. PWT is useful because all the economic variables are expressed in a common set of prices and in a common currency. The development of this database has made possible more meaningful international comparisons of economic variables. In particular, PWT allows for more accurate international comparisons of incomes because incomes are estimated on the basis of purchasing power parity (PPP) rather than exchange rates.

The primary advantage of using PPP per capita incomes instead of per capita incomes converted on the basis of exchange rates is that the former takes into consideration differences in cost of living among countries whereas the latter does not. Those differences, in turn, are due to differences in the cost of non-traded goods such as haircuts, which tend to be significantly cheaper in poorer countries. For example, haircuts are cheaper in India than in Germany and housing is cheaper in China than in Japan when actual exchange rates are used to compare prices. The fundamental idea behind PPP is to adjust for the fact that a dollar goes further (purchases more) in poor countries than in rich countries.

Another problem with using exchange rate-converted per capita GDP is that a country's currency may depreciate sharply leading to implausibly large falls in income. For example, during the Asian crisis, converting Indonesia's GDP into U.S. dollars would suggest that the country's real output of goods and services fell by more than half in one year, which was clearly not the case.[1]

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[1] Be that as it may, we make some calculations of the Theil index for exchange rate-based GDP data. These are available upon request. Although the values of the Theil index are different for exchange rate-based data and PPP-based data, their movements over time are broadly similar.

Our sample consists of 133 countries and territories. We divide the sample into the North and the South. The North consists of all members of the OECD other than South Korea, Mexico, Turkey, Poland, Hungary and the Czech Republic. Thus the North consists of the US, Canada, Japan, Australia, New Zealand and 18 West European states. Our sample covers over 98% of the global population. Availability of data is the main criterion for our sample selection. Two countries with large populations, Vietnam and North Korea, are excluded from the analysis due to lack of data. The variables of interest are the population (POP in PWT) and per capita income (RGDPC in PWT). We examine annual data over the 1960–1995 period. As with our sample of countries, data availability is the central criterion for choosing our sample period.

Table1

Shares of Global Population and Global Income

Year	South Population	North Population	South Income	North Income
1960	0.7925	0.2075	0.3981	0.6019
1965	0.7969	0.2031	0.3858	0.6142
1970	0.8105	0.1895	0.4062	0.5938
1975	0.8198	0.1802	0.4393	0.5607
1980	0.8290	0.1710	0.4573	0.5427
1985	0.8382	0.1618	0.4707	0.5293
1990	0.8470	0.1530	0.4686	0.5314
1995	0.8539	0.1461	0.4821	0.5179

Source: Calculated from Penn World Tables data by the author.

The second and third columns in Table 1 show the trends in the shares of the global population living in developing countries and developed countries respectively. The share of the South rises steadily from 79.25% to 85.39%. The fourth and fifth columns show the shares of the global income accruing to developing countries and developed countries respectively. The share of the South in global income increases steadily from 39.81% to 48.21%.

Our measure of inequality is the Theil index. The main reason for this choice is that it can be straightforwardly decomposed between and within groups. In particular, as noted earlier, we are interested in not just overall global inequality but North–South inequality, intra–South inequality and intra–North inequality as well. The Theil index implies

that global income inequality is the weighted sum of the logarithms of the countries' ratios of income share to population share, where the weights are the countries' income shares. The index is zero when income is distributed equally between all countries, and reaches its maximum value of log N when there are N countries and all income accrues to one country. Theil (1967), Bourguignon (1979), Shorrocks (1980), Foster (1983), Summers, Kravis and Heston (1984) and Cower (1995) provide further details about the properties of the Theil index.

In the context of international income distribution, we can write the Theil index as

$$J = \sum_{i=1}^{133} y_i \log(y_t / p_i) \tag{1}$$

where y_i is the share of country i in total world income and p_i is the share of country i in total world population.

As noted earlier, (1) is additively decomposable. Let R_1 be the North region, which consists of all developed countries, and R_2 be the South region, which consists of all developing countries, respectively. Let P_G and Y_G be the population and income shares of region R_G. Then the extension of (1) to regions is

$$J_R = \sum_{G=1}^{2} Y_G \log(Y_G / P_G) \tag{2}$$

which measures inequality between North and South, while

$$J_G \sum_{i \in R_G} (y_i / Y_G) \log\left[(y_i / Y_G)/(p_i / P_G)\right] \tag{3}$$

measures the inequality among the countries of each region. The additive decomposition of the Theil index then becomes

$$J = J_R + \underline{J} \quad \text{where} \quad \underline{J} = \sum_{G=1}^{2} Y_G J_G \tag{4}$$

Therefore, total inequality among the 133 countries in our sample equals North–South inequality plus the weighted average of intra–North and intra–South inequality, where the weights are the income shares of each region.

Table 2
Intercountry Income Inequality, 1960–1995

(1) Year	(2) Total Intercountry Inequality	(3) North-South Inequality	(4) Weighted Intra-regional Inequality	(5) (3) as a percentage of (2)	(6) Intra-North Inequality	(7) Intra-South Inequality
1960	0.5117	0.3668	0.1449	71.7	0.0884	0.2304
1961	0.5258	0.3733	0.1525	71.0	0.0757	0.2703
1962	0.5420	0.3827	0.1593	70.6	0.0733	0.2831
1963	0.5365	0.3894	0.1471	72.6	0.0676	0.2718
1964	0.5355	0.3900	0.1455	72.8	0.0633	0.2733
1965	0.5479	0.3995	0.1484	72.9	0.0638	0.2795
1966	0.5552	0.4027	0.1525	72.5	0.0622	0.2930
1967	0.5617	0.4069	0.1548	72.4	0.0557	0.3087
1968	0.5739	0.4119	0.1620	71.8	0.0505	0.3344
1969	0.5641	0.4070	0.1571	72.2	0.0438	0.3166
1970	0.5448	0.3976	0.1472	73.0	0.0366	0.3088
1971	0.5446	0.3927	0.1519	72.1	0.0356	0.3186
1972	0.5588	0.4008	0.1580	71.7	0.0340	0.3369
1973	0.5664	0.4021	0.1643	71.0	0.0320	0.3534
1974	0.5559	0.3822	0.1737	68.8	0.0295	0.3684
1975	0.5367	0.3625	0.1742	67.5	0.0279	0.3610
1976	0.5514	0.3676	0.1838	66.7	0.0282	0.3824
1977	0.5477	0.3644	0.1833	66.5	0.0294	0.3762
1978	0.5443	0.3649	0.1794	67.0	0.0307	0.3637
1979	0.5468	0.3660	0.1808	66.9	0.0289	0.3677
1980	0.5294	0.3546	0.1748	67.0	0.0253	0.3520
1981	0.5287	0.3539	0.1748	66.9	0.0266	0.3481
1982	0.5192	0.3476	0.1716	67.0	0.0219	0.3426
1983	0.5168	0.3507	0.1661	67.9	0.0230	0.3288
1984	0.5209	0.3564	0.1645	68.4	0.0266	0.3216
1985	0.5133	0.3559	0.1574	69.3	0.0260	0.3053
1986	0.5184	0.3599	0.1585	69.4	0.0251	0.3080
1987	0.5244	0.3655	0.1589	69.7	0.0238	0.3107
1988	0.5265	0.3703	0.1562	70.3	0.0224	0.3094
1989	0.5293	0.3746	0.1547	70.8	0.0207	0.3036
1990	0.5320	0.3842	0.1478	72.2	0.0179	0.2951
1991	0.5257	0.3825	0.1432	72.8	0.0155	0.2860
1992	0.5202	0.3804	0.1398	73.1	0.0162	0.2760
1993	0.5146	0.3813	0.1333	74.1	0.0158	0.2620
1994	0.5094	0.3811	0.1283	74.8	0.0153	0.2511
1995	0.5046	0.3796	0.1250	75.2	0.0150	0.2432

*Source*: Calculated from Penn World Tables by the author.

4. Results

Using our sample of 133 countries from the Penn World Tables, we computed the measures shown in equations (1) to (4) for North and South and for each year from 1960 to 1995. The results of our computations are shown in Table 2. Figure 1 reproduces columns 2, 3 and 4 in Table 2.

Column 2 contains J defined in (1) – it shows that total intercountry inequality remained more or less constant during the period under study, falling from 0.5117 in 1960 to 0.5046 in 1995. Other than an increase between 1960 and 1968, there does not appear to be any discernible pattern in the evolution of total intercountry inequality. Columns 3 and 4 contain the North–South inequality J_R and weighted intra–regional inequality $\underline{J}$. North–South inequality rises from 0.3668 in 1960 to 0.3796 in 1995. This represents a modest increase of only 3.49%. There seems to be three distinct phases in the evolution of North–South inequality. It rises from 0.3668 to 0.4119 between 1960 and 1968, falls from 0.4119 to 0.3476 between 1968 and 1982, and rises from 0.3476 to 0.3796 between 1982 and 1995. It is quite clear from Column 5 that the North–South inequality outweighs the weighted average of intra–North inequality and intra–South inequality as a source of intercountry inequality.

Figure 1

Total Intercountry Inequality and its Two Components
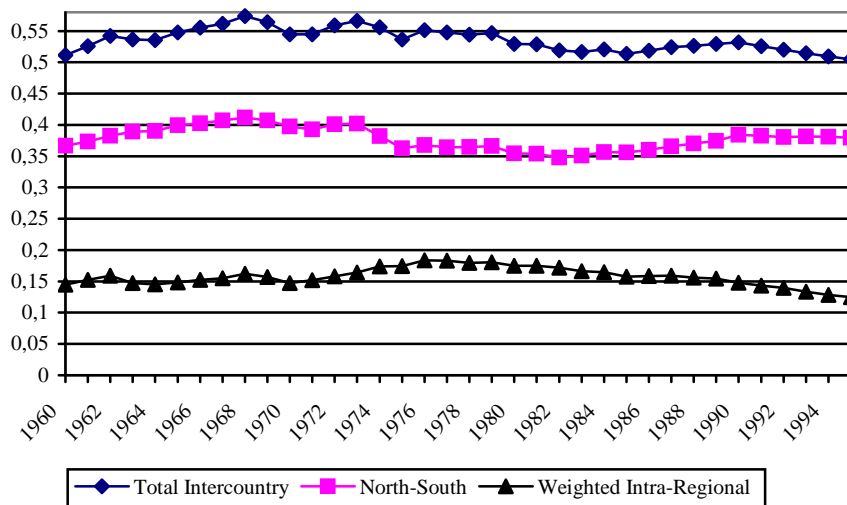
Columns 6 and 7 in Table 2, reproduced in Figure 2, show that intra–South inequality did not change much whereas intra–North inequality fell steadily for the sample period as a whole.

However, there appear to be two distinct periods in the evolution of intra–South inequality; it rises from 0.2304 in 1960 to 0.3824 in 1976, before declining from 0.3824 to 0.2432 between 1976 and 1995.

Figure 2

Intra–North Inequality and Intra–South Inequality
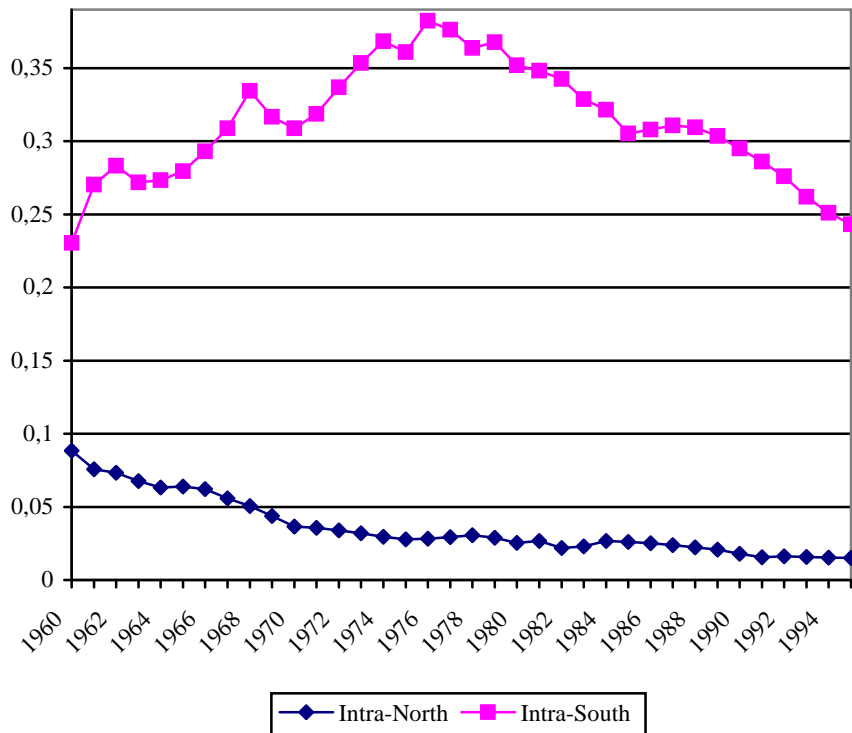
5. Conclusion

The main purpose of this note was to examine the evolution of intercountry inequality for the 1960–1995 period. We find that intercountry inequality barely changed during this period, falling from 0.5117 in 1960 to 0.5046 in 1995. This represents a very modest fall of 1.39%. This evidence against intercountry economic convergence is similar to the findings of most of the previous studies in this field.

We find that North–South inequality does not change perceptibly during the entire sample period although there are three distinct phases in its evolution – a rise between 1960 and 1968, a fall between 1968 and 1982 and a rise between 1982 and 1995. We also find that North–South inequality outweighs the weighted sum of the intra–North inequality and intra–South inequality as a source of total intercountry inequality. Intra–South inequality appears to have hardly changed during the entire sample

period, although there appear to be two distinct phases in its evolution. Finally, intra–North inequality seems to fall significantly and steadily during the period under study.

Although our central purpose is to examine trends in inequality rather than to explain them, we will venture some possible explanations for the trends that we find. The rise in North-South inequality for the 1960-1968 period is probably due to the fast growth enjoyed by most developed economies during this period. The slowdown in the growth of developed economies, along with acceleration of growth in developing countries, may account for the fall in inequality during 1968-1982. A sharp slowdown of growth in many developing countries, captured by the Latin American debt crisis in the 1980s, could explain the increase in inequality in 1982-1995.

The increase and fall in intra-South inequality, with the turning point occurring in the mid-1970s, may be due to the poor performance of China and India until the mid-1970s and their improved performance since then, particularly China's. Finally, increasing economic integration within the EU and the consequent catch-up by poorer Western European economies could explain the fall in intra-North inequality.

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Özet

Kuzey-Güney eşitsizliği, 1960-1995

1960-1995 döneminde ülkeler arasında gelir eşitsizliğindeki değişme eğilimleri incelenmektedir. Veri tabanamız Penn Dünya Tablolarından aldığımız 133 ülkeyi içeren bir örnektir ve eşitsizlik ölçümüz Theil endeksidir. İncelenen dönemde ülkeler arası gelir dağılım eşitsizliğinin aşağı yukarı sabit kaldığını saptadık. Mevcut literature katkımız, örneği gelişmiş (Kuzey) ve az gelişmiş (Güney) ülke gruplarına ayırmamızdadır. Kuzey ile Güney arasındaki gelir eşitsizliğinin hemen hemen sabit kaldığını, Kuzey ülkeleri arasındaki eşitsizliğin de çok değişmediğini, buna mukabil Güney ülkeleri arası eşitsizliğin bir süre arttıktan sonra azaldığını tespit ettik.