Unequal exchange and increasing global inequality. Effects of trade value transfers on world income distribution over 1995–2019

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Andrea Ricci[1]

Abstract

The growth in international trade between countries at very different levels of development has been one of the major drivers of economic globalization. This phenomenon is linked to the new international division of labor in which an emerging Periphery, hosting the offshoring and outsourcing of world manufacturing, is placed between a developed Center and a still backward poor Periphery. After an analysis of the world income distribution in the last 25 years, by estimating relative and absolute indices of global inequality among 175 countries grouped in 16 homogeneous regions, the role of unequal exchange is investigated on the basis of an original reconstruction of Marx's international law of value. The counterfactual empirical analysis shows that that value transfers in trade represent a significant source of revenue for the Center diverted from the Peripheries, thereby increasing world income gaps. The effect of international trade on global inequality should therefore be considered in redefining post-pandemic international economic rules.

Keywords: Global inequality; Unequal Exchange; International Trade; Uneven Development; Economic Globalization.

JEL classification: F14; F54; F63; O15; O19.

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1. Introduction

As part of the theme of uneven development, the unequal exchange approach focuses on the mechanisms of value transfer implicit in trade relations between countries at different levels of development in a capitalist world economy. In this theoretical framework, the value drain suffered by the countries of the Periphery is a key mechanism for reproducing underdevelopment, as it diverts fundamental resources away from the capital accumulation required to boost economic modernization, for the exclusive benefit of the more developed countries of the Center. Moreover, in addition to its dynamic effects on economic growth, unequal exchange affects the distribution of world income at any given time. This latter is the subject matter of the following analysis, which addresses the impact of unequal exchange on global inequality over the last 25 years.

Section 2 presents an overview of global social inequality, arising from the functional distribution of income within countries, during the age of globalization (1995-2019) characterized by a new international division of labor and the related growth in international trade. Statistical evidence shows a significant redistribution of income from labor to capital and from poorer to richer citizens, which increased the indices of interpersonal inequality within each country as well as globally.

The picture emerging from the geographic distribution of income between countries is rather more complex. Section 3 discusses the different facets of global spatial inequality over the period 1995-2019, concerning relative and absolute dimensions and demographic weighting, on the basis of an aggregation of 175 countries into 16 geographically and economically homogeneous regions, in turn pooled into three large groups (Center, Emerging Periphery and Poor Periphery). Various indices of global spatial inequality are calculated both analytical, as the individual income variability relative to the world average, and synthetic, as the relative and absolute global Gini index and its factorial decomposition to compute the contribution within and between groups.

Next we proceed with a counterfactual analysis to determine the impact of unequal exchange on global spatial inequality. Before that, however, section 4 outlines the theoretical underpinnings, based on an original reconstruction of Marx's international law of value, in which unequal exchange arises even under conditions of perfect competition and is reflected in the currency hierarchy structuring the world market. Section 5, drawing on Ricci's (2021b) estimations of value transfers in the world economy, explores the impact of unequal exchange

on the per capita income of different regions and the Gini index of global inequality over 1995-2019.

The findings suggest that unequal exchange plays a substantial role in determining per capita income, positively for the central recipient regions and negatively for the peripheral donor regions. Moreover, the Lorenz curve resulting from the counterfactual test indicates that unequal exchange reduces social welfare globally, and not just for the countries on which it burdens, thereby providing a rationale for interventionist economic policies to correct the distortions of free trade. Finally, section 6 presents some concluding remarks.

2. The new international division of labor and global social inequality

Over the past quarter century, the world economy underwent a radical restructuring process that simultaneously affected both the spheres of global production and global circulation of commodities. On the production side, the former industrial organizational model, once vertically integrated within the internal hierarchical structure of multinational firms, has now been replaced by a more flexible configuration, labelled " the global factory"[2], that increasingly uses horizontal and decentralized market relations to attain the final form of the product. On the commercial side, these structural changes in production led to a huge expansion in international trade well above the growth in world gross domestic product, driven by intermediate and semi-finished goods.

This reorganization of the world economy has been made possible by profound changes in the technological pattern and the economic policy regime. The rapid spreading of new information and communication technologies allowed the remote and instantaneous coordination of productions located at great spatial distance, thus enabling multinational firms to opt for the most cost-efficient location for each stage of production without losing control over the entire workflow. As a result, intricate global production chains emerged in which the final value of the commodity is the outcome of working processes performed in several different regions of the world[3]. At the same time, the neo-liberal paradigm of the "Washington Consensus"[4], which became dominant after the end of the Cold War, led to a broad international

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[2] See Buckley (2009).

[3] For a recent empirical analysis of Global Value Chains, with particular emphasis on trade and technology, see World Bank (2020). An extensive critical survey is Antràs and Chor (2021). Ricci (2021a) presents an account of unequal exchange within Global Value Chains.

[4] This framing, coined by Williamson (1990), was proposed as a universal model of economic development.

deregulation of real, financial and labor markets. The birth in 1995 of the World Trade Organization, institutionally tasked with promoting unconditional free trade through supranational sanctioning powers, symbolically represents the start of this new phase of capitalist economic globalization.

Such structural and political transformations had a strong impact on the geographical pattern of world production. The former dualism between industrially advanced central economies and backward peripheral economies with a predominantly agricultural and extractive vocation has been replaced by a more complex international division of labor. In this new industrial configuration, a large part of material production, especially manufacturing, is localized in a selected group of peripheral countries, while the central countries specialize in the more profitable upstream and downstream intangible stages, such as conception, research & development, design, financial and strategic control, and marketing. With rare exceptions, peripheral industrialization followed a patchwork territorial pattern, clustered in a few territorial enclaves quite separated from the rest of the country in terms of legislation, taxation and social security. Consequently, in several peripheral countries, manufacturing growth has not been self-centered, depending on subordinate integration to the global market and the variable relocation choices of multinational firms[5]. The most notable exception is China which adopted its own peculiar model of integration into the global economy, consisting of a predominant role of the State in terms of public ownership and planning of strategic industries, with strict banking and financial regulation, alongside a broad openness to foreign direct investment by multinational capital[6]. A new geography of development has thus arisen, in which an emerging Periphery, formed by the countries hosting the offshoring and outsourcing of world manufacturing, is placed between a developed Center and a still backward poor Periphery[7].

What effects did this structural transformation of world production have on global inequality? Global inequality, defined as inequality in the distribution of income among the citizens of the world, can be broken down into two components, social and spatial[8]. The first component results from interpersonal income inequality measured through household surveys with individuals as units of observation. It corresponds to Milanović's (2005) Concept 3 of world inequality, which is largely affected by the functional distribution of income among social classes

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[5] See Arrighi, Silver and Brewer (2003).
[6] See Herrera (2014).
[7] On the tripartite structure of the world economy, see Mahutga and Smith (2011).
[8] See Milanović (2016)

within each country. The second component concerns per capita income inequality between countries as measured by national accounts, either unweighted (Concept 1) or weighted (Concept 2) by the respective demographic size. In what follows, we will deal with the spatial component of global inequality, but not without briefly considering the social aspect.

From the point of view of the functional distribution, neo-liberal globalization has been marked by a consistent increase in the share of capital income, in both forms of industrial profit and financial rent, at the expense of the wage share in all countries regardless of their level of economic development. According to ILO (2019), in the period 2004-2017 the worldwide share of labor income fell from 53.7% to 51.4% with a homogeneous decreasing trend in all continents. Other studies confirm that since the early 1990s the world labor share declined continuously, partly as a consequence of the increasing international openness of national economies[9]. Moreover, within the labor share, there has been a polarization towards the top level, with a reduction in the relative income of the poor and middle strata of the working population[10]. From ILO estimates, in fact, the share of the richest quintile of workers grew by 2.2%, reaching 53.5% of the total in 2017 at the expense of all other poorer quintiles. These developments have revived, in new forms, an old question debated throughout the last century concerning the formation of an aristocracy of labor, formed by the elite strata of the working class allied with capital in the exploitation of the remaining large mass of labor force[11]. While in the past the division between privileged and poor workers was between the working classes of the motherland and the colonies, now it would occur within each country, regardless of whether it belongs to the Center or to the Periphery of the world.

As a result, the concentration of income and wealth has become more pronounced, as evidenced by the increase in the share of global income of the richest 1% from 17.1% in 1980 to 19.3% in 2019[12]. Further confirmation is that over the period 1980-2016, the top 1% captured 27% of global real income growth, while the bottom 50% captured only 12%[13]. In view of these consistent data, there is therefore almost unanimous agreement that global social inequality

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[9] See Guerriero (2019) and Doan and Wan (2017).
[10] Both of these trends emerge clearly from Piketty's (2017) pioneering historical account. See also Franzini and Pianta (2016).
[11] Originally formulated by Lenin (2010), the thesis of the aristocracy of labor was adopted by Emmanuel (1972) as the main cause of unequal exchange. On the current debate see Cope (2012) and Kerswell (2019).
[12] See World Inequality Database, https://wid.world/data/ (data extracted June 2, 2021).
[13] See Alvaredo et al. (2019, p. 13).

increased during the age of globalization, as a result of a skewed redistribution of income from labor to capital and from poor and middle class to rich workers.

3. Global spatial inequality and economic globalization

While global social inequality, or Concept 3 of world inequality, increased during neo-liberal globalization, the picture appears more complex for global spatial inequality as measured by Concept 1 by comparing average levels of GDP per capita. An issue arising in this case is that nations of dramatically different demographic size are placed on the same footing. To mitigate this problem we use aggregation of countries into homogeneous regions in accordance with World Bank's classification criteria.

Table 1 shows the ratio between regional and world average GDP per capita in current dollars over the period 1995-2019, both in absolute terms and as cumulative change[14]. This indicator reflects individual variability relative to the world average, so that the measure of inequality is independent of the unit of income denomination, and shows the relative redistribution of world per capita income from areas with a negative sign to those with a positive sign[15]. The data refer to 175 countries grouped in 16 regions geographically and economically homogeneous shown in Appendix 1. In turn, the regions are assigned to one of the following three macro-groups according to the level of GDP per capita at the end of the period: Poor Periphery including regions with less than half the world average, which accounts for 52.2% of the world's population; Emerging Periphery including regions between half and twice the world average, which accounts for 34.3% of the world's population; Center including regions with more than twice the world average, which accounts for 13.5% of the world's population. The period under consideration is divided into two successive sub-periods of equal amplitude with the Great Recession as watershed. The first sub-period (1995-2007) refers to the phase of expansive globalization that goes from the birth of the WTO until the outbreak of the great financial crisis; the second sub-period (2008-2019) refers to the phase of stagnant globalization from the great financial crisis until the eve of the subsequent pandemic crisis.

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[14] We use the market exchange rate, rather than the purchasing power parity, because our analysis addresses the market power of different countries in the global economy, rather than the levels of individual real consumption within national economies. On the selection of global inequality indicators see Anand and Segal (2008).

[15] This indicator follows Krtscha 's (1994) criterion of inequality measure.

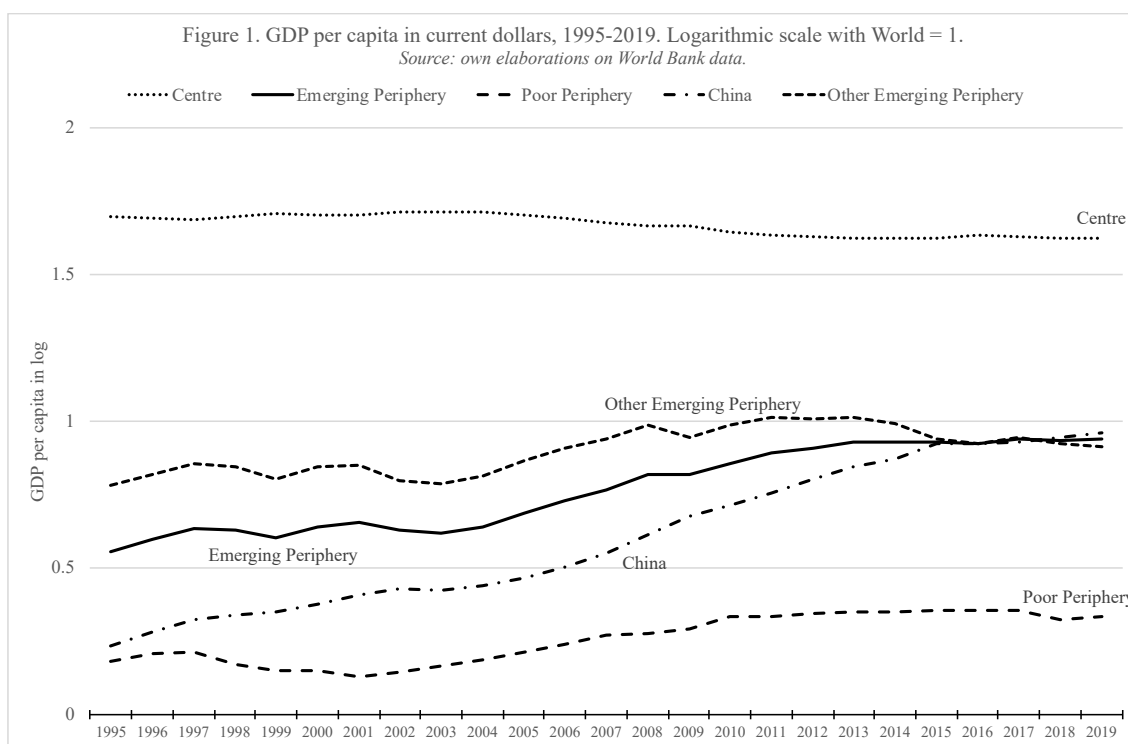Table 1. GDP per capita in current dollars, 1995-2019. World = 100.
Source: own elaborations on World Bank data.

		Year			Cumulative % change		
Group	Region	1995	2007	2019	95-19	95-07	08-19
Center	North America	511.4	545.4	546.2	**6.8**	*6.6*	*0.2*
	EMU	432.1	441.2	335.3	**-22.4**	*2.1*	*-24.0*
	West Europe	498.1	617.0	423.7	**-14.9**	*23.9*	*-31.3*
	East Asia	638.6	365.4	335.6	**-47.5**	*-42.8*	*-8.2*
	Oceania	293.2	377.2	343.8	**17.2**	*28.6*	*-8.9*
Emerging Periphery	China	17.2	35.5	91.4	**432.2**	*106.9*	*157.2*
	Russia	33.1	90.0	80.0	**141.3**	*171.7*	*-11.2*
	East Europe	52.7	118.3	120.3	**128.4**	*124.6*	*1.7*
	South America	81.7	74.8	70.1	**-14.1**	*-8.4*	*-6.3*
	Central America	57.5	83.8	72.3	**25.8**	*45.7*	*-13.7*
	Middle East	63.7	95.5	96.9	**52.0**	*49.8*	*1.5*
Poor Periphery	South Asia	7.5	11.3	17.6	**133.9**	*50.2*	*55.7*
	Southeast Asia	27.0	27.8	36.2	**34.1**	*3.1*	*30.0*
	Central Asia	31.7	54.6	42.7	**34.4**	*72.0*	*-21.8*
	North Africa	27.1	32.6	28.9	**6.6**	*20.1*	*-11.2*
	S. Sahara Africa	14.5	14.9	13.5	**-7.1**	*2.2*	*-9.1*
	World	100.0	100.0	100.0	**0.0**	*0.0*	*0.0*

Over the entire period, five regions worsened their relative position, three of which belong to the Center (EMU, West Europe and East Asia) and one each to the Emerging Periphery (South America) and the Poor Periphery (Sub-Saharan Africa). Among the other improving eleven regions, the extraordinary performance of China stands out, which at the end of the period has almost reached the average world per capita income starting from an initial level of less than one-fifth. Far behind the Chinese record, three regions more than doubled their relative per capita income, Russia and Eastern Europe, which at the beginning were still suffering from the collapse of their previous planned economy, and South Asia, which started from extremely low income levels. Among the remaining regions, it is worth noting the strengthening of North America within the group of wealthy central regions, and of the other Asian regions within the peripheral groups. Finally, the mediocre performance of the two African regions highlights the ongoing exclusion of this continent, the poorest in the world, from the circuits of appropriation and distribution of world wealth. Moving on to the analysis of the two sub-periods, in the first expansionary phase only two regions (East Asia and South America) lost ground, while after the outbreak of the crisis the peripheral Asian regions alone continued to improve their position in front of decline or stagnation of all the others. The Great Recession, therefore, marked a structural break in global economic dynamics, particularly emphasizing the weakness of

European economies and the progressive shift of the world's economic barycenter from the Atlantic to the Pacific area. In terms of global inequality, the immediate impression is of a reduction in the gaps in relative average per capita income over the 25 years considered. Nonetheless, these gaps remain very large, as indicated by the ratio between the per capita incomes of the richest and poorest regions of the planet which, in 2019, is greater than 40[16], i.e., a sub-Saharan African citizen on average earns in one year the same income that a North American citizen earns in nine days.

Figure 1 shows trends in relative GDP per capita, expressed as a logarithmic scale with the world average equal to one[17], for the three groups of regions over 1995-2019. In addition, the figure for the Emerging Periphery is decomposed to capture the specific contribution of China versus the rest of the group.

Figure 1. GDP per capita in current dollars, 1995-2019. Logarithmic scale with World = 1.
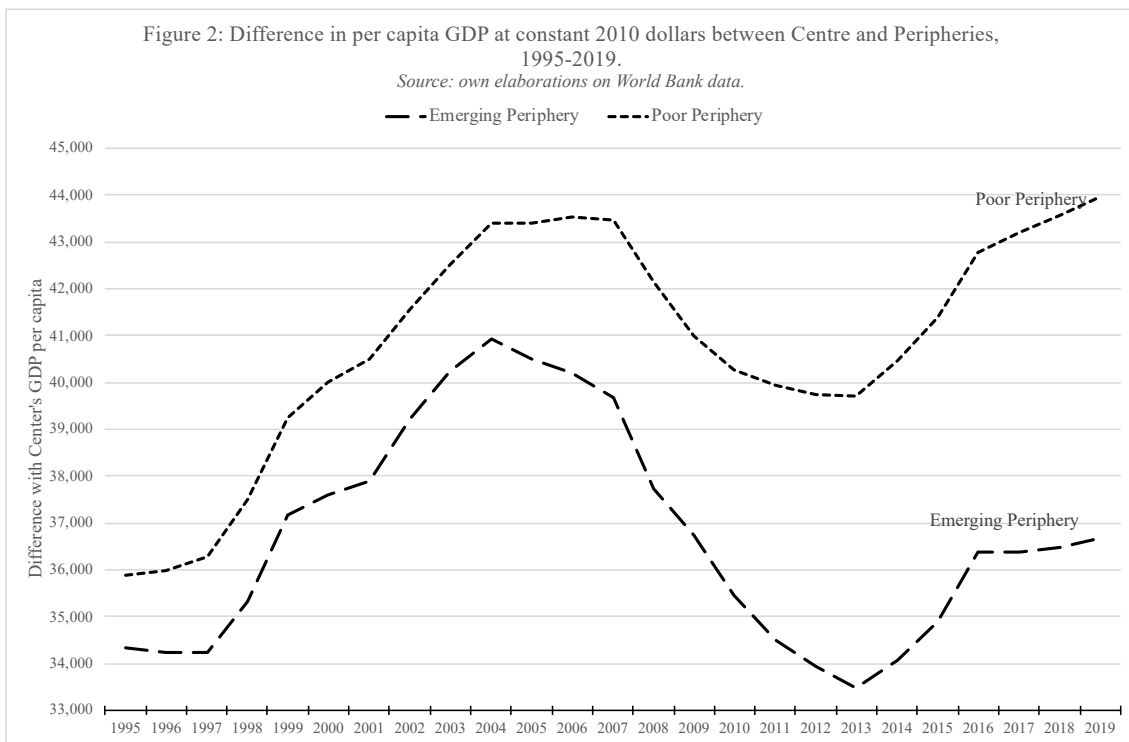*Source: own elaborations on World Bank data.*

The indications resulting from the semi-logarithmic plot in Figure 1 for each of the three groups are as follows. The Center maintains almost intact the advantage of its per capita income over

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[16] In 1995, it was 35.8.
[17] In the logarithmic scale, increments are exponential, e.g., the increase of one unit corresponds to a factor of 10 in the linear scale.

the world average, with only a very slight downward trend spread throughout the whole period. The Poor Periphery shows a rather modest growth in relative per capita GDP from an initial 15.1% to a final 21.5% of the world average. Finally, the progress of the Emerging Periphery is largely attributable to the particular trajectory of China, which had a per capita income aligned to Poor Periphery at the beginning and higher than Emerging Periphery at the end. By contrast, the rest of the Emerging Periphery, after an initial convergence towards the world average, shows a divergent trend in the second half of the period following the reorganization of the global system after the great financial crisis.

Hence, the initial perception on the narrowing of global spatial inequality is reduced, as also confirmed by absolute, rather than relative, per capita income gaps. Figure 2 shows the absolute differences between the average per capita GDP of the Center and those of the two Peripheries measured in constant dollars at 2010 basis.

Figure 2: Difference in per capita GDP at constant 2010 dollars between Centre and Peripheries, 1995-2019.
Source: own elaborations on World Bank data.

As can be seen, the absolute income gap for both Peripheries has an up-and-down pattern, with an initial phase of rapid increase followed first by a decline in the years at the turn of the financial crisis, and then a subsequent rebound beginning in 2013, which is particularly pronounced for the poor Periphery. In any case, for both the peripheral groups, the final absolute difference is

greater than the initial one in 1995. Thus, if on the one hand globalization led to a slow and uneven convergence of relative income levels, on the other hand absolute income inequality between the richer and poorer regions has by no means stopped growing.

So far we have analyzed Concept 1 of world inequality, albeit by strongly mitigating its distortions through geographic and economic regional aggregation. However, in order to take full account of the demographic dimension and thus move on to Concept 2, a more synthetic indicator is required, allowing for an aggregate quantification of distributional asymmetry. In this regard, one of the most widely used measures of socio-economic inequality is the Gini index which compares the cumulative proportion of the population with the cumulative proportion of income, and ranges between 0 in the case of perfect equality and 1 in the case of maximum concentration of distribution. Another significant feature is that it can be decomposed into between-group and within-group contributions to inequality[18].

Figure 3. Gini index decomposition of world GDP distribution, current dollars 1995-2019.
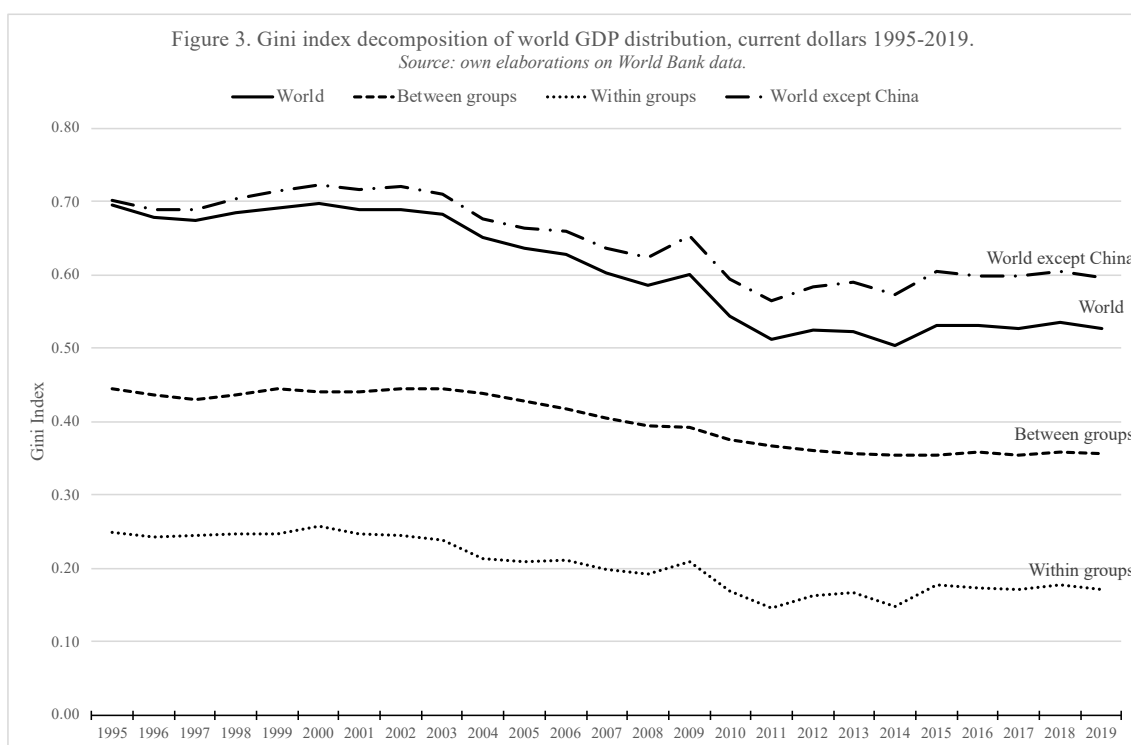*Source: own elaborations on World Bank data.*

Figure 3 shows the trend of the relative Gini index of the distribution of world income between regions over the period 1995-2019, calculated on the basis of the regional GDP in current dollars

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[18] On the properties of the Gini index see Cowell (2011)..

weighted by population[19]. The first two lines starting from the top refer to the total value of the world Gini index. The solid line indicates the Gini index for all 16 regions of the world economy, while the dotted line refers to the Gini index excluding China. From their difference, it is possible to discern China's specific contribution to the world index of inequality. Over the whole period, the world Gini index fell from 0.69 to 0.53, indicating a clear reduction in total dispersion of average incomes among the 16 regions. Despite this progress, however, the world income distribution remains very unequal, given that according to the World Bank only eight countries, all in Sub-Saharan Africa, have a national Gini index higher than the world economy in 2019[20]. Furthermore, looking at the Gini index excluding China, the reduction is more modest stopping at 0.60 in 2019, indicating that almost half of the global reduction is explained by the exceptional and unique performance of the Chinese economy[21]. The other two lines in Figure 3 show the decomposition of the world's Gini index into inequality between groups (Center, Emerging Periphery, and Poor Periphery) and within groups[22]. More than two-thirds of the world's inequality is explained by differences in average income between groups, and the weight of this component tends to increase over time. Approximately half of the reduction in the world Gini index is attributable to convergence of average incomes among regions of the same group, rather than between different groups. The decomposition therefore reduces the scope of the income convergence displayed by the total Gini index. Finally, looking at the time trend, the entire reduction is concentrated in a short time span from 2004 to 2011, after which global inequality tends to increase again. In particular, the greatest reduction of six points in a single year occurred in 2009, the year of the great global recession that most severely affected the central regions. In light of the following trend, this accelerated reduction may be interpreted as

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[19] An estimate of the Gini index corresponding to Concept 3 of global social inequality is 0.71 for 2008, see Lakner and Milanovic (2016).
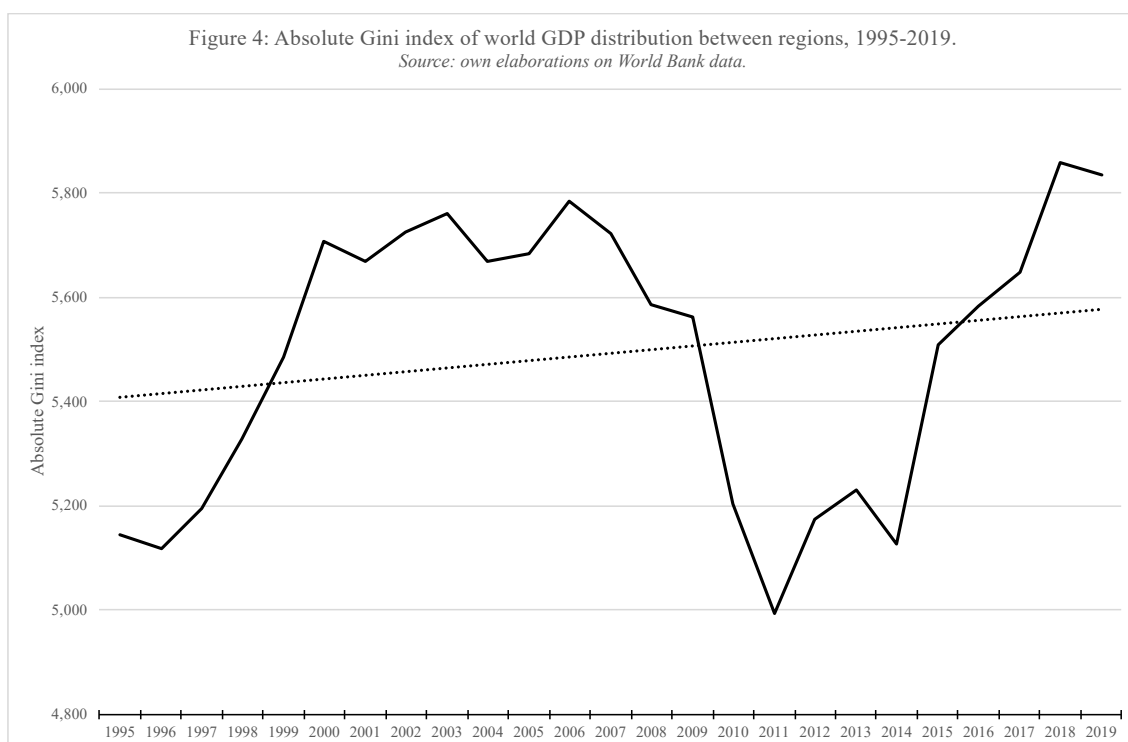
[20] See https://data.worldbank.org/indicator/SI.POV.GINI?most_recent_value_desc=true, (data extracted June 8, 2021) The most unequal country is South Africa with a Gini index of 0.63 followed by Namibia with 0.59. Among the rich countries of the Center, the highest inequality is in the United States with a Gini index of 0.41.

[21] Our estimations are in line with those of United Nations (2013) which estimate a 2010 Gini index of 0.53 and 0.58 for the world as a whole and for the world excluding China, respectively. Basically similar results are provided by Milanovic (2012). Unlike both of these estimates, which have individual countries as the unit of observation, ours consider regions as the base unit. Moreover, our estimation uses data expressed in current dollars, not in purchasing power parity (PPP), because we want to investigate the relative position of citizens of different regions in the world market, rather than within individual national markets.

[22] In our case, a full decomposition with no residuals is feasible because the three subgroups do not overlap, see Lambert and Aronson (1993).

the immediate aftermath of the bursting of the global financial bubble, after which the world economic system began to restore the previous established hierarchies.

So far we have analyzed the relative Gini index, which considers inequality to be unchanged when there are equiproportional increases in income. While commonly used, this is however an extreme definition of the concept of inequality, since it disregards changes in absolute income levels. To give a more complete picture of trends in global spatial inequality that also accounts for absolute income gaps, Figure 4 shows the absolute Gini index, defined as the relative Gini index multiplied by the average world level of per capita income in current dollars[23]. As the trend line shows, in absolute terms the global index of spatial inequality has increased over the period, with a short reversal in the years immediately before and after 2008, and in recent years it is significantly higher than at the outset.

Figure 4: Absolute Gini index of world GDP distribution between regions, 1995-2019.
Source: own elaborations on World Bank data.

To summarize, the dynamics of global spatial inequality during the years of capitalist globalization is characterized by an uneven process of convergence of relative income levels, driven by the spectacular growth of China, which to a large extent occurs within, rather than between, the three groups (Center, Emerging Periphery and Poor Periphery) resulting from the

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[23] The absolute measure of the Gini index is proposed by Niño-Zarazúa, Roope and Tarp (2017).

new international division of labor. Three distinct periods can be identified in terms of temporal dynamics. The first phase of expansive globalization up to the early 2000s is marked by a widening of relative global inequality, which in the second phase at the turn of the 2008 financial crisis tends to decrease rapidly. This trend is reversed in the third and final phase from the beginning of the new decade when relative global inequality widens again following the economic stabilization after the Great Recession. In absolute terms, however, global inequality as measured by absolute per capita income gaps between different regions grows uninterruptedly throughout the whole 1995-2019 period.

4. International law of value and unequal exchange

In principle, international trade has no direct effect on the world distribution of income when the value of exported commodities produced by each country corresponds exactly to the value realized from their sale on the world market. In this case the terms of trade, defined as the ratio between the prices of imported and exported goods of equal value, are in equilibrium and equal to one, regardless of how value is conceived whether in terms of labor cost of production, as in classical political economy, or utility cost of consumption, as in neoclassical economics. Obviously, in a dynamic real economy the actual terms of trade only exceptionally are in perfect equilibrium because new and unforeseen phenomena occur, continuously altering the pre-existing static situation. What is important to define a state of balance, however, is that the deviations of the terms of trade are not systematic and permanent in time but oscillate randomly around the equilibrium.

Neoclassical economics assumes that in competitive markets the adjustment mechanism automatically leads the international economy towards the equilibrium. In such a situation, long-run nominal exchange rates should ensure the purchasing power parity of the different national currencies, such that real exchange rates, defined as the ratio of national price levels expressed in a common currency, fluctuate close to unity[24]. Given these premises, neoclassical theory concludes that the international exchanges are always equivalent even when they occur between countries with a very different level of economic development. Consequently, free trade would not directly alter in any way the world distribution of income and would always be

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[24] A weaker version states that changes in equilibrium exchange rates correspond to changes in relative price levels so that relative purchasing power parity applies. The theoretical consequences, however, are substantially the same as the absolute version.

mutually beneficial, allowing countries to specialize in the production of those goods that make greater use of the productive factors with which they are naturally endowed. The neoclassical trade theory, however, is at odds with the long-established persistent divergence of exchange rates from purchasing power parity, evident in systematically higher price levels in high-income countries than in lower-income countries, a phenomenon known in the literature as the "Penn effect". Despite the attempts made by loosening its rigid basic assumptions, neoclassical economics has not yet succeeded in providing a coherent explanation for this empirical evidence, and this undermines the credibility of the doctrine of free trade as a universal recipe for economic policy, limiting its validity only to trade between countries with similar levels of development[25].

The harmonious neoclassical view of international economic relations is challenged by the theory of unequal exchange which, on the basis of diverse theoretical and methodological premises[26], argues on the contrary that free trade exacerbates development gaps and determines a regressive redistribution of world income through value transfers from poor to rich countries implicit in international market transactions. In this approach, international exchanges are not equivalent because of a systematic divergence between the value produced and the value captured by different countries on the world market, which results in a persistent imbalance of the terms of trade to the exclusive benefit of rich economies at the expense of poor ones[27]. In this theoretical context, therefore, free trade is a mechanism of reproduction of uneven economic development, and as such should be rejected by developing countries to promote interventionist trade policies aimed at counteracting the imbalances spontaneously generated by market forces in the international arena.

The hypothesis of unequal exchange faced great criticism from neoclassical as well as heterodox views, mainly concerning the use of *ad hoc* extra-economic arguments of a historical, political or sociological nature to justify monopolistic conditions in goods, labor or capital

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[25] On the "Penn effect" see Summers and Heston (1991). On the attempts to account for the "Penn effect" in standard and non-standard trade theories see Ricci (2021b, pp. 136-42).

[26] There are two main modern theoretical approaches to unequal exchange, both with diversified positions within them, one structuralist, associated with the leading figures of Lewis, Prebisch and Singer, and the other Marxist, with Emmanuel and Amin as important protagonists. See Ricci (2021b, chap. 2) for an outline of the debate on unequal exchange in the history of economic thought. A detailed review is Brolin (2007).

[27] In particular, Amin (1976) pointed out that in the determination of unequal exchange, what really matters are the double factorial terms of trade, defined as the ratio between the relative prices and the relative labor productivities.

markets as the ultimate cause of unequal exchange. In fact, without a coherent theoretical foundation irrespective of any particular market competitive condition, free trade advocates have an easy time in dismissing unequal exchange as an exceptional and transitory circumstance that confirms, rather than contradicts, the general free market rule in promoting maximum efficiency and distributive equity.

Recently, I have proposed (Ricci 2016, 2019, 2021a and 2021b) a general theoretical model, based on an original reconstruction of Marx's theory of international value[28], which entails unequal exchange even in situations of perfect competition in all markets. In this framework, transfers of value from less developed countries to more developed ones represent a normal and physiological occurrence, inherent in the international market exchanges of a global capitalist economy. Among the salient features of this approach is the derivation of a unit of universal labor through the reduction of national labor units to a common world measure with equivalent value-creating power and normal labor intensity. The unit of labor measures the magnitude of the exchange value in the sphere of commodity production - the labor expression of value - while the same magnitude in the sphere of commodity circulation - the monetary expression of value or price - is in turn measured by a corresponding monetary unit. The commodity exchange is equivalent when the ratio between the units of labor used in production coincides with the ratio between the monetary units realized in circulation. In such a case, the value produced in the labor process is equal to the value captured in trade, and the monetary expression of labor time is identical for both parties, seller and buyer. According to Marx, in a closed economy there are two cases in which exchange is not equivalent. The first, transient in nature, consists of the competitive advantage of the most productive firms within a given industry. The second, of a permanent and structural nature, concerns the equalization of the rate of profit between industries with different organic composition of capital through the formation of prices of production. In addition to these two cases, there is a third one, only hinted at by Marx, resulting from the essential modifications undergone by the law of value at the international level.

In the world market, the value produced by a unit of universal labor is the same regardless of the country in which it works, and equally identical is its monetary expression in terms of the currency used for international payments, whether gold or a national fiat money such as the

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[28] Marx planned to devote the last three books of Capital to international trade, the state, and the world economy, but did not complete the project. However, several remarks on the peculiarities of the international law of value are scattered in the course of his work.

dollar. Unlike the national market, however, labor productivity acts as labor intensity in defining the monetary expression of labor time of each individual country in the world market. In the world economy, in fact, the differences between individual national value and the international social value of commodities, resulting from national labor productivities different from the world average, persist over time, and are not short-term imbalances disappearing in the long run as a result of competition, as within the national economy.

This difference between the national and the international case arises because the competition between capitals leading to the formation of the social value of commodities takes place in the sphere of circulation, thus involving the monetary expression of value. While in the domestic market the monetary unit is the same for all national firms, in the world market instead there are different monetary units, each corresponding to a particular national unit of labor. In this context, the continuous reproduction of the capitalist cycle requires that the value realized in international money, by selling commodities on the world market, needs to be converted into national currency with which wages and taxes are paid. This happens whether the world medium of payment is gold bullion, as was the case at the time of the Gold Standard, or any of the national currencies, as is the case today with the dollar. The articulation of the global economy into a plurality of nation-states, which is the distinguishing feature that differentiates the world market from the domestic market, makes this additional operation - otherwise superfluous at the national level - an inescapable necessity for capital. And this is made possible by the mutual convertibility of the different national currencies through the exchange rate system. Therefore, while in the national economy the price coincides immediately with the national monetary expression of value, in the world economy the international monetary expression of value, or international price, is given by the combination of two elements, the national price and the exchange rate. Accordingly, in a perfectly competitive world economy under equilibrium conditions, the national monetary expression of value should result from the combination of international price and exchange rate.

To ensure equivalence in the international monetary expression of labor time between countries, the real exchange rates should correspond to the reciprocal conversion ratio between the national labor units and the universal labor unit. Only in this way, in fact, can the monetary expression of a universal unit of labor be the same for all countries, since the same international price, arising under perfect competition on the world market, is converted into national prices that are equivalent to each other in terms of universal labor units. For this to happen,

competition should progressively align social value of commodities with the individual value of the most efficient capitals, as happens within the national market. However, when the individual national value of commodities and their international social value differ because of different national labor productivities, what actually occurs is that the competition between national capitals on the world market determines the adjustment of the real exchange rate, rather than the price of commodities as is the case of competition between national firms on the national market. In a system of flexible exchange rates, the adjustment of the real exchange rate occurs through changes in the nominal exchange rate, while in a system of fixed exchange rates it occurs through changes in national price levels induced by changes in the domestic money supply.

This essential modification of the international law of value reflects on the non-equivalent monetary expressions of the value produced by each country in the world market. Consequently, the free and spontaneous operation of perfectly competitive markets leads to the systematic and persistent real overvaluation of the currencies of more productive countries, and vice versa real undervaluation of the currencies of less productive countries, thus determining the misalignment of real exchange rates shown by the "Penn effect". As a result, the international terms of trade tend to be unbalanced in favor of capitalistically more developed countries with higher labor productivity, and against capitalistically less developed countries with lower labor productivity. Through the operation of the international law of value, therefore, a global monetary hierarchy emerges that gives rise to a sort of "currency rent" for the former.

This situation leads to the establishment of a mechanism of unequal exchange, in which international trade is the vehicle for implicit transfers of value from poorer countries to richer ones, even in the presence of perfectly competitive markets. In the global economy, unequal exchange is the result of two factors, one of a structural nature and the other of a concrete-historical nature. On the one hand, the mutual relationship between the two special commodities existing in capitalism, labor power, whose use value consists in the creation of value, and money, whose use value consists in the transformation of value into capital. On the other hand, the existence of a plurality of nation-states, each with its own peculiar historical path and sovereign prerogatives. In the presence of pre-existing uneven levels of economic development, the spontaneous establishment of the mechanism of unequal exchange

contributes to a cumulative and circular process of reproduction of global inequalities between countries.

5. Unequal exchange and global inequality

The other major transformation of the world economy over the last 25 years, linked to the new international division of labor resulting from the reorganization of global production, is the growth in international trade. Over the last half-century, the share of exports of goods and services in world GDP has tripled from 13.5% in 1970 to 30.5% in 2019, and most of this increase has occurred since the mid-1990s[29]. In this section we investigate the direct static effects of unequal exchange on the geographical distribution of the value annually produced in the world economy, all other things being equal. Therefore, the indirect dynamic effects of the international openness of national economies on domestic economic growth, deriving from the transformations induced on the specialization of aggregate supply or on the size and composition of aggregate demand, are not taken into consideration.
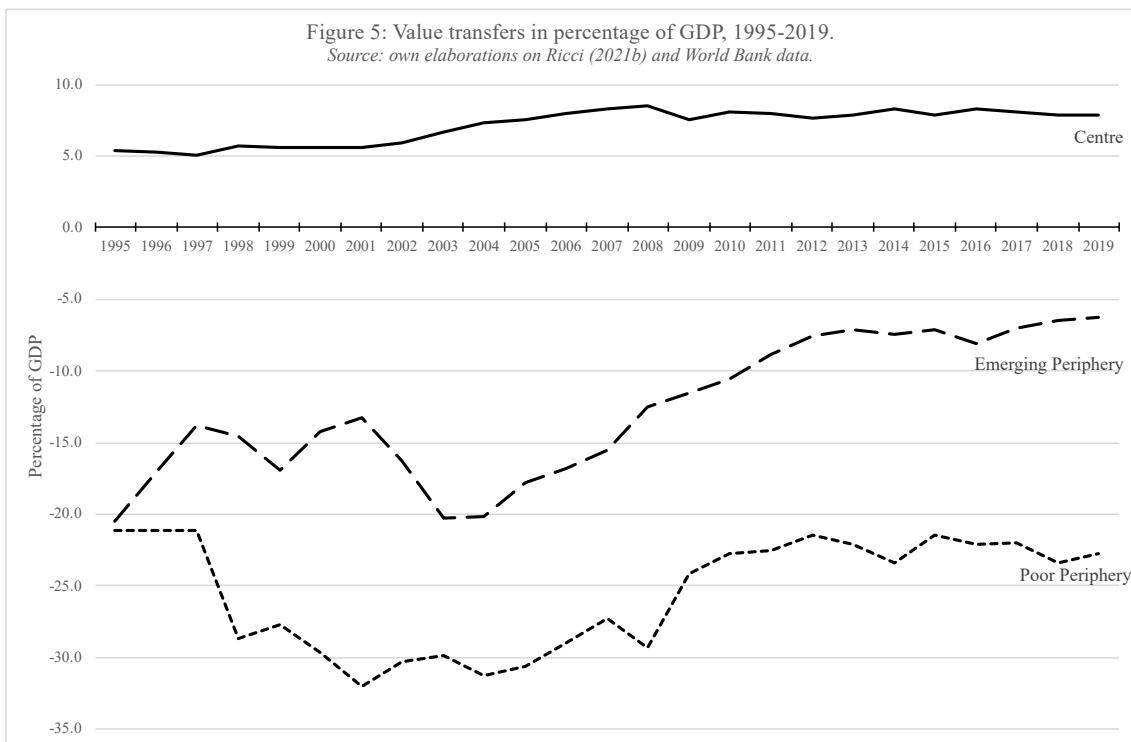
On the basis of the theoretical framework outlined in the previous section, Ricci (2021b) provides an estimation of the value transfers in the world economy, shown in Appendix 2 for the period of interest, implied by trade among the 175 countries under consideration, which we will use to investigate the contribution of unequal exchange on global income inequality. Value transfers are calculated on the basis of aggregate exports expressed in value added, thus allowing the evaluation of the country's particular contribution in each intermediate stage of production to the value realized with the final sale of the commodities[30]. In all years, value transfers flow from low-income peripheral regions to high-income central regions, and their growth in nominal terms is substantial, rising from $1,334 billion in 1995 to $3,924 billion in 2019, while in relative terms their global amount fluctuates around 5% of global GDP. But more significant is to consider the relative share of value transfers on the GDP of the three groups of regions as shown in Figure 5.

For the central regions as a whole, value inflows to GDP increased significantly over 1995-2019, rising from an initial 5.4% to 7.8% in the last year, indicating the substantial and growing importance of unequal exchange for the more capitalistically developed economies. In turn, the

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[29] Source World Bank, see https://data.worldbank.org/indicator/NE.EXP.GNFS.ZS?end=2019&start=1960.
[30] Ricci (2019), on the other hand, presents an estimate of unequal exchange calculated from a sector-by-sector decomposition of gross total exports for 40 countries.

two peripheral groups, starting from a similar situation with considerable outflows of value around 20% of GDP in 1995, subsequently exhibit a divergent trend. Since the early 2000s the regions of the Emerging Periphery show a rapid reduction in value outflows up to 6.3% of GDP in 2019. By contrast, the regions of the Poor Periphery suffered a drastic deterioration in the 1990s, followed by a period of partial reduction of value outflows which, however, in 2019 were still higher at 22.8% of GDP than at the outset. This evolution is the result of the new international division of labor marked by the rapid economic growth of some emerging countries, China in particular, and at the same time the economic marginalization and decline of large areas of the poorer periphery, such as Africa. The economies of the Center, on the other hand, partially offset the negative impact on income resulting from lower economic growth, following the relocation of manufacturing and the financial crisis, by relying more on their "currency rent" in the world market.

Figure 5: Value transfers in percentage of GDP, 1995-2019.
Source: own elaborations on Ricci (2021b) and World Bank data.

Unequal exchange can in fact be considered as a tribute paid by citizens of poorer countries to those of richer countries hidden in imports and exports of goods and services. To assess the effect of unequal exchange on global inequality, Table 2 shows the annual per capita value

transfers at the beginning, middle and end of the period, and their average weight on the per capita income of the 16 regions of the world economy.

Among the central regions, the absolute and relative figures for the two European regions are impressive, as value transfers account on average for more than 10 percent of their per capita income, growing further since the 2008 financial crisis. More starkly, in 2019 for Western Europe and the European Monetary Union, per capita value inflows amounted, respectively, to 4.4 and 3.1 times the average annual per capita income of a citizen of Sub-Saharan Africa equal to 1.567 dollars. As far as the other three central regions, North America and East Asia maintained stable value inflows of around 4% and 6%, respectively, of their per capita income throughout the period, while Oceania experienced a sharp increase in the second phase following the financial crisis.

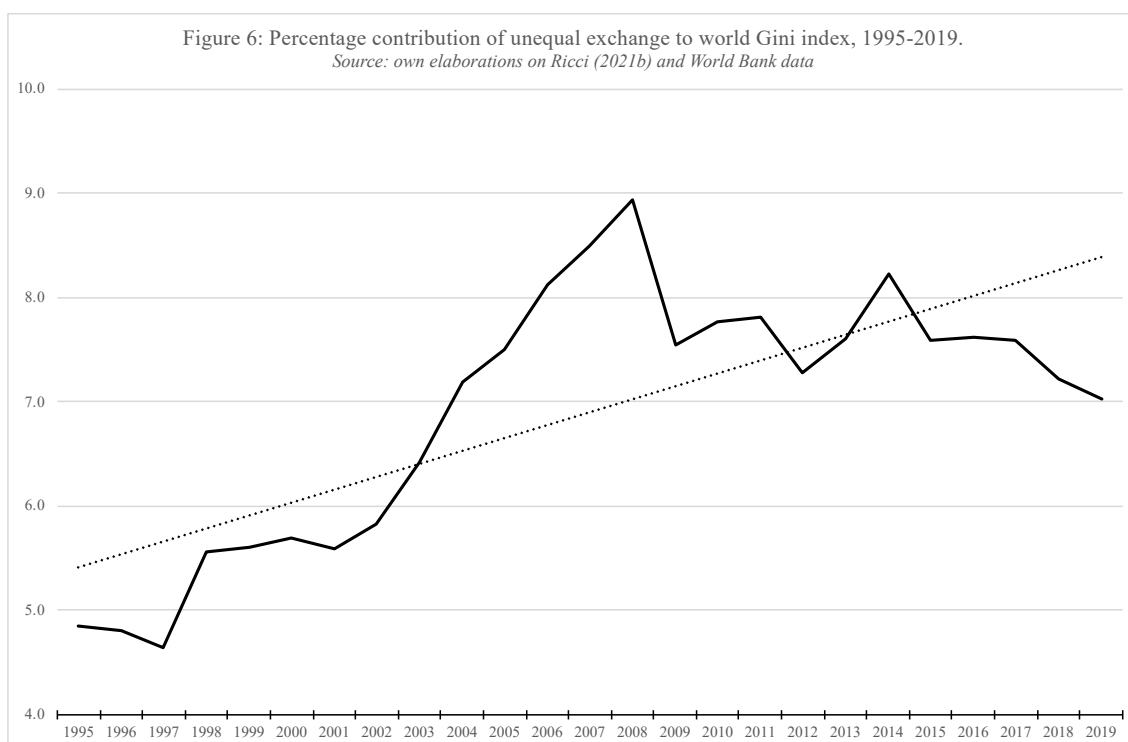Table 2. Per capita unequal exchange, 1995-2019.
Source: own elaborations on World Bank and Ricci (2021b) data.

Annual per capita transfers	in current dollars			in % of per capita GDP		
	1995	2007	2019	*95-19*	*95-07*	*07-19*
North America	761	1,965	2,680	***3.9***	*3.7*	*4.1*
EMU	1,720	4,939	4,836	***10.3***	*8.5*	*12.2*
West Europe	2,429	7,531	6,921	***12.7***	*10.6*	*14.8*
East Asia	1,984	1,766	2,540	***5.8***	*5.9*	*5.7*
Oceania	526	2,626	3,638	***7.1***	*4.5*	*9.8*
China	-196	-810	-426	***-14.1***	*-19.0*	*-10.0*
Russia	-767	-1,108	-1,850	***-29.7***	*-40.9*	*-17.2*
East Europe	-901	-615	-1,309	***-14.7***	*-18.9*	*-9.9*
South America	-269	-472	-490	***-6.1***	*-8.4*	*-3.9*
Central America	-471	-379	-454	***-11.9***	*-13.6*	*-9.8*
Middle East	-1,443	-1,502	-950	***-18.9***	*-24.8*	*-12.8*
South Asia	-77	-220	-351	***-21.5***	*-20.2*	*-23.0*
Southeast Asia	-463	-1,350	-1,631	***-46.8***	*-53.9*	*-40.3*
Central Asia	-272	-380	-924	***-11.9***	*-13.6*	*-9.8*
North Africa	-426	-1,099	-1,034	***-30.7***	*-31.6*	*-30.4*
S. Sahara Africa	-65	-120	-132	***-10.0***	*-11.6*	*-8.3*

Turning to the peripheral regions, Southeast Asia stands out, with an average outflow of value due to unequal exchange approximating half of the per capita income over the entire period, although the temporal dynamics show a progressive improvement. Then comes North Africa with a constant outflow of value equal to almost a third of per capita income. By contrast, the overall average figures for Russia and Eastern Europe are strongly affected by the real

plundering of resources by Western capitalist countries in the 1990s, immediately after the collapse of the Soviet bloc. For all other peripheral regions, the outflow of value is between ten and twenty percent of per capita income, except for South America where the weight of unequal exchange appears substantially lower, particularly in the last period when some important countries had progressive governments less inclined towards neoliberal policies. Finally, it should be noted the positive performance of China, which in the last decade succeeded in rapidly reducing the outflow of value, up to 4% of per capita income in 2019.
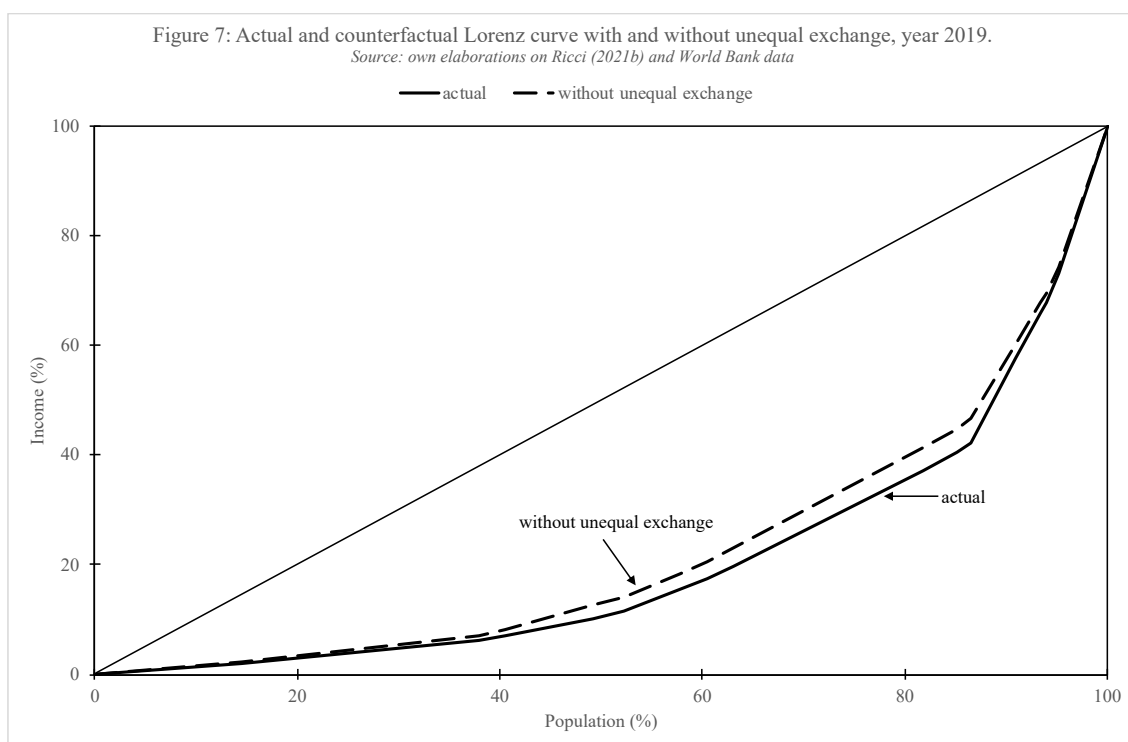
The data discussed above clearly indicate that at the level of individual regions, value transfers resulting from unequal exchange substantially affect the level of average per capita income, positively for the central regions and negatively for the peripheral regions. To measure the impact of unequal exchange on overall global inequality, I computed a counterfactual Gini index assuming a scenario of the world economy in the absence of value transfers leaving all other things unchanged. Figure 6 shows the difference in percentage terms of the actual and counterfactual Gini indices.

Figure 6: Percentage contribution of unequal exchange to world Gini index, 1995-2019.
Source: own elaborations on Ricci (2021b) and World Bank data

As can be seen, unequal exchange is a non-negligible factor in making the world income distribution more unequal. Moreover, in the age of globalization its contribution to the global

Gini index increased overall from 4.8% in 1995 to 7% in 2019, with a peak close to 9% reached in 2008 when with the outbreak of the financial crisis there was a rapid fall followed by a stabilization in the last decade.

One of the main reasons that make the relative Gini index so popular as an indicator of inequality concerns the possibility of deriving the Lorenz curve, represented in a graph with the cumulative percentage of population and income on the vertical and horizontal axis, respectively. The Lorenz curve coincides with the bisector of the quadrant in the case of perfect equality, in which every individual receives the same income, and, conversely, with the broken line formed by the horizontal axis and the right vertical axis in the case of perfect inequality, in which a single individual receives the whole income. So the farther the Lorenz curve lies from the bisector of the quadrant, the more unequal the distribution of income.

Figure 7: Actual and counterfactual Lorenz curve with and without unequal exchange, year 2019.
Source: own elaborations on Ricci (2021b) and World Bank data

The Lorenz curve is a widely used tool in the theory of social welfare because it allows to evaluate the redistributive effects of policy measures in terms of total social utility[31]. Assuming identical social utility functions for all individuals and provided the Lorenz curves of two

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[31] See Kakwani (1980) on the Lorenz curve in the theory of social welfare applied to the world income distribution.

alternative distributions do not intersect, the more egalitarian distribution is always welfare-superior, and progressive measures of redistribution from the richest to the poorest improve total social welfare, while regressive measures from the poorest to the richest worsen it. As can be seen in Figure 7, this is exactly the case for the actual world income distribution in the year 2019 compared with the counterfactual one without unequal exchange. Thus, we can conclude that unequal exchange substantially increases global inequality and worsens global social welfare.

4. Some final remarks.

Over the past quarter century, capitalist globalization produced radical transformations in the international division of labor, the organization of production, and the world circulation of commodities. All this altered the previous framework of global inequality. At the social level, in both the more developed and less developed countries, there has been a significant redistribution of income from labor to capital and from the poorest to the richest citizens, supported by the dominant neoliberal policies, which aggravated the already wide global interpersonal inequalities in social and economic conditions. Besides, at the spatial level, in the face of an uneven and moderate reduction in relative inequality particularly in the years straddling the 2008 crisis, mainly driven by the exceptional performance of China, global absolute inequality increased, with a widening per capita income gap between the rich regions of the Center and the regions of the Poor Periphery, where the absolute majority of the world's population lives.

In this new scenario, the unequal exchange implicit in international trade played an important and increasing role in determining global inequality. Transfers of value, resulting from the difference between the value produced and the value captured on the world market by different countries, constitute a structural feature of the global capitalist economy, even in perfectly competitive conditions, and they benefit rich countries with higher labor productivity to the detriment of poor countries with lower labor productivity. This mechanism, inherent to the international law of value of a global capitalist economy, reflects in the constitution of a global monetary pyramid with the currencies of the more developed countries at the top and the currencies of the less developed countries at the bottom, which gives rise to a systematic and permanent alteration of the terms of trade to the advantage of the former and to the disadvantage of the latter. In the world economy, the fundamental level of social exploitation,

resulting from the appropriation by capital of the surplus value produced by workers in the sphere of production, is thus joined by another secondary level of spatial exploitation, resulting from the appropriation by the more developed capitalist countries of a portion of value of the less developed countries in the sphere of commodity circulation. It follows that free trade, far from being a universally valid policy for maximizing global social welfare, is actually a mechanism of economic domination that benefits the rich nations of the Center and harms the poor nations of the Periphery. Although with different degrees of intensity, our analysis showed that unequal exchange is a heavy burden for the peripheral economies and, on the contrary, a substantial premium for the central economies in determining the average per capita income of their citizens.

Two complementary conclusions can be drawn. Since it involves transfers of value from the poorest to the richest, unequal exchange worsens global social welfare, not just for individual countries or regions. Consequently, trade or fiscal policy measures aimed at correcting the regressive effects of unequal exchange on the world income distribution improve social welfare globally, not just for individual countries that experience value drainage. There is, therefore, a full rationale for interventionist national and regional economic policies in the Periphery, aimed at rebalancing through fiscal and commercial measures the unfavorable terms of trade generated by the free and spontaneous functioning of the global market. However, even more effective and efficient would be a global intervention to reduce the regressive consequences of unbalanced trade on the world distribution of income, such as a hypothetical tax on global trade charged to rich countries whose receipts would be allocated to supplement the income of the poorest citizens of the Periphery, along the lines of that proposed by Tobin (1978) on international financial transactions. It would therefore be desirable that the issue of unequal exchange, and the distortions in allocative efficiency and distributive equity that it entails, should find a place on the international agenda of post-pandemic reconstruction of the global economy.

Appendix 1: Country's classification in geographical regions

North Africa: Algeria, Egypt, Libya, Morocco, Tunisia.

Sub-Saharan Africa: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African, Chad, Congo Dem. , Congo Republic of , Côte d'Ivoire, Djibouti, Eritrea, Ethiopia, Gabon, Gambia, The, Ghana, Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, São Tomé, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe

Oceania: Australia, Fiji, New Zealand, Papua New Guinea, Samoa, Vanuatu.

China: China, Hong Kong SAR, Macao SAR, Taiwan[32].

East Asia: Japan, South Korea, Singapore.

South Asia: Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka.

Southeast Asia: Brunei Darussalam, Cambodia, Indonesia, Lao People's, Malaysia, Myanmar, Philippines, Thailand, Vietnam.

Central Asia and the Caucasus: Afghanistan, Azerbaijan, Armenia, Georgia, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, Turkey, Uzbekistan, Mongolia.

Western Europe: Denmark, Iceland, Norway, San Marino, Sweden, Switzerland, United Kingdom.

Eastern Europe: Albania, Bosnia, Bulgaria, Croatia, Czech Republic, Hungary, Macedonia, Montenegro, Poland, Romania, Serbia.

Russia and CSI: Moldova, Russia, Ukraine, Belarus.

EMU: Austria, Belgium, Cyprus, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Spain, Latvia, Lithuania, Estonia, Slovak Republic, Slovenia.

Middle East: Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab, United Arab, Yemen.

Central America and Caribbean: Bahamas, Antigua, Aruba, Barbados, Belize, Costa Rica, Dominican Rep., El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Trinidad and Tobago.

North America: Canada, United States.

South America: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela.

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[32] For Taiwan's data the source is International Monetary Fund.

Appendix 2. Value transfers in trade: annual flows, 1995-2019. Billions of dollars.

Source: Ricci (2021) on UNCTAD-EORA, World Bank, IMF and ILO data.

Year	North America	EMU	West Europe	East Asia	Oceania	China	Russia	East Europe	South America	Central America	Middle East	South Asia	South East Asia	Central Asia	North Africa	Sub Sahara Africa	World net transfers
1995	225	546	203	345	15	-242	-163	-101	-87	-68	-217	-96	-223	-43	-56	-38	1,334
1996	249	538	209	302	21	-228	-123	-104	-95	-69	-196	-105	-248	-46	-61	-43	1,319
1997	297	449	218	241	22	-205	-125	-102	-77	-52	-157	-103	-267	-44	-57	-38	1,228
1998	350	555	245	219	13	-223	-165	-79	-59	-46	-179	-105	-397	-37	-52	-39	1,382
1999	382	518	249	283	16	-242	-243	-89	-82	-38	-153	-110	-328	-44	-56	-64	1,447
2000	465	377	249	360	13	-257	-220	-102	-73	-21	-121	-127	-367	-45	-64	-67	1,465
2001	478	414	244	298	9	-246	-203	-87	-80	-6	-129	-125	-377	-53	-65	-71	1,443
2002	485	533	282	286	15	-290	-193	-76	-128	-7	-202	-137	-357	-54	-81	-76	1,600
2003	476	852	351	330	30	-437	-228	-79	-173	-35	-267	-161	-427	-58	-103	-71	2,039
2004	523	1,044	450	389	45	-584	-244	-78	-197	-48	-284	-209	-553	-61	-122	-71	2,451
2005	576	1,174	474	382	60	-719	-228	-71	-177	-43	-273	-249	-641	-62	-133	-71	2,666
2006	654	1,325	559	362	65	-904	-220	-82	-170	-48	-271	-291	-684	-68	-151	-76	2,965
2007	657	1,643	667	320	87	-1,092	-224	-66	-179	-66	-296	-339	-769	-71	-176	-96	3,374
2008	625	1,921	698	308	105	-1,128	-215	-37	-168	-82	-271	-484	-882	-74	-193	-123	3,657
2009	573	1,576	524	311	79	-798	-262	-66	-149	-94	-271	-372	-700	-73	-179	-99	3,063
2010	670	1,536	632	443	140	-965	-257	-110	-97	-97	-278	-469	-749	-82	-208	-109	3,421
2011	648	1,583	700	490	183	-1,023	-219	-118	-76	-107	-261	-579	-848	-92	-177	-104	3,604
2012	697	1,353	692	497	183	-826	-175	-160	-77	-106	-287	-608	-834	-82	-163	-104	3,422
2013	731	1,610	725	314	176	-762	-173	-147	-166	-87	-298	-675	-892	-78	-160	-118	3,556
2014	796	1,756	835	308	180	-726	-295	-156	-198	-90	-305	-688	-1,023	-99	-161	-135	3,875
2015	881	1,339	768	319	154	-360	-503	-171	-133	-86	-348	-559	-889	-107	-171	-134	3,461
2016	922	1,487	746	423	167	-488	-521	-170	-89	-118	-406	-577	-892	-140	-185	-159	3,745
2017	942	1,539	721	397	180	-599	-397	-163	-48	-121	-372	-573	-969	-172	-226	-139	3,778
2018	912	1,701	683	448	151	-624	-368	-119	-176	-111	-275	-613	-1,064	-205	-204	-137	3,894
2019	980	1,657	673	466	147	-609	-372	-137	-209	-93	-239	-632	-1,068	-214	-205	-146	3,924

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