



UNIVERSITÀ POLITECNICA DELLE MARCHE  
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MASTER'S DEGREE IN INTERNATIONAL ECONOMICS AND BUSINESS

Economic Inequality: a micro to macro perspective through the analysis of the functional and personal distribution of income.

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Dedicated to those who did not believe in it.

Economic Inequality: a micro to macro perspective through the analysis of the functional and personal distribution of income.



## Abstract

The study aims to analyse income inequality through its two main components. The functional distribution and personal distribution of income. The study focuses on income and wealth inequality globally. Distribution data are analysed, and determinants are processed. We then move on to the study of the functional analysis of income and therefore the analysis of the factors of production. Updated methodologies and data are presented. The result is that the two distributions are related and inequality in recent years is growing in both its nuances. The determinants identified are globalisation, technology, the premium for the most capacity-intensive professions, the fall in the unionisation rate and access to the global value chain.

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## INTRODUCTION

Inequality is a particularly important issue in economic policy. The recent pandemic has only laid bare the critical issues that already exist globally. In this regard, while waiting for the data to come out about the tragedy of the moment, I thought it useful to study in more detail the general state of economic inequality. To do this, I limited my time to pre-pandemic data and focused on income and wealth inequality. In the last decade, the debate has taken on a great deal thanks to the contribution of some academics. This has allowed the creation of new databases that are increasingly complete and up to date. I have decided to follow the debate and update the data in order to have up-to-date conclusions. However, the study sought to address two aspects of economic inequality: personal distribution and the functional distribution of income. Two aspects often taken separately but which are linked and interact. We are talking about an aspect related to macroeconomics for the former and for the second instead related to the microeconomy.

The decision to study these two phenomena comes as the poorest sections of the global population receive little and have virtually nothing. This part of the economic discussion fascinated me more than others during my academic career and I wanted to set up even more. What they receive, if they receive something, it comes from work, often in inhumane and poorly paid conditions. As we go up in the distribution, we see people who are always poor but who live in developed countries and who,

if they receive something other than subsidies, receive it by working. For these categories, the purchasing power of wages has remained constant if not lower in recent years. Going up again in the distribution there is the middle class that globally is changing more than the other categories. In developed countries this class is losing in terms of wealth and work, while in other countries as China and India is gaining. Going up again and again we see that instead the richest categories receive more and more both from work and from their capital and possessions. Wealth creates wealth. All of this, over time, does not seem to improve but rather deteriorate further. Some global factors are increasing these experiences. So, I decided to focus on these topics and better understand what forces are at stake and what effects they produce. This analysis can then be useful in taking the opportunity to deepen further and to create corrective economic policy actions.

The document proceeds as follows: in chapter one is presented and summarized the bibliography on personal inequality, also mentioning some of the reference writings. This allowed to present the phenomenon and show the strengths and weaknesses of the different positions. In the second chapter, however, data and evidence has been produced on the theme of personal inequality. Referring to the techniques used by the economy, it is presented some inequality indexes such as the GINI index and this has been done by analysing the global dimension based on geographical subgroups of interest. The analysis continues presenting data on

income and capital inequality using the ratio between the two quantities. In the third chapter we dealt with the functional distribution of income starting from bibliography and economic theory, presenting the research methodology. We took care of explaining on time the quantities that affect this specific analysis and then the focus is shifted to the labour share of income. In the fourth chapter using the methods presented before we extrapolated and analysed data on the distribution of income between work and other components. We presented an analysis that made it clear what the levels are, what the trends are, what are the determinants analysing its components. Finally, once all the data has been produced, we were able to compare the two inequalities and report them.

## **CHAPTER 1 – RECENT DEBATE OF ECONOMIC INEQUALITY**

After the Publication of Piketty`s book “Capital in the 21<sup>st</sup> Century”, even the Nobel prize Paul Krugman said, “Piketty has transformed our economic discourse; we’ll never talk about wealth and inequality the same way we used to.”

### **INCOME AND WEALTH INEQUALITY**

The French Economist in his “Capital in the 21<sup>st</sup> Century” used data from long time ago to most recent days also making prediction for the next century about the economic inequality at the global level. The book is a result of over 15 years of research devoted essentially to understand the historical dynamics of wealth and income. The author grouped the societies in history, based on four socio-economic categories. At the beginning of the story, around the 11<sup>th</sup> century, there was a feudal society that lasted until the French Revolution, the characteristic was that the rich paid hardly any taxes and the working people instead brought the entire tax weight. Later in the time, all evolved toward the Rentier Society. This society was characterized by the dominant control of scarce rent-generating asset where the work for the richer were practically absent. This society lasted until the WWII



where a new one took place: Social-Democratic Society. A new welfare system has been created and a more shared prosperity began. Something changed around the 80`s where a Neo-Rentier Society started again.

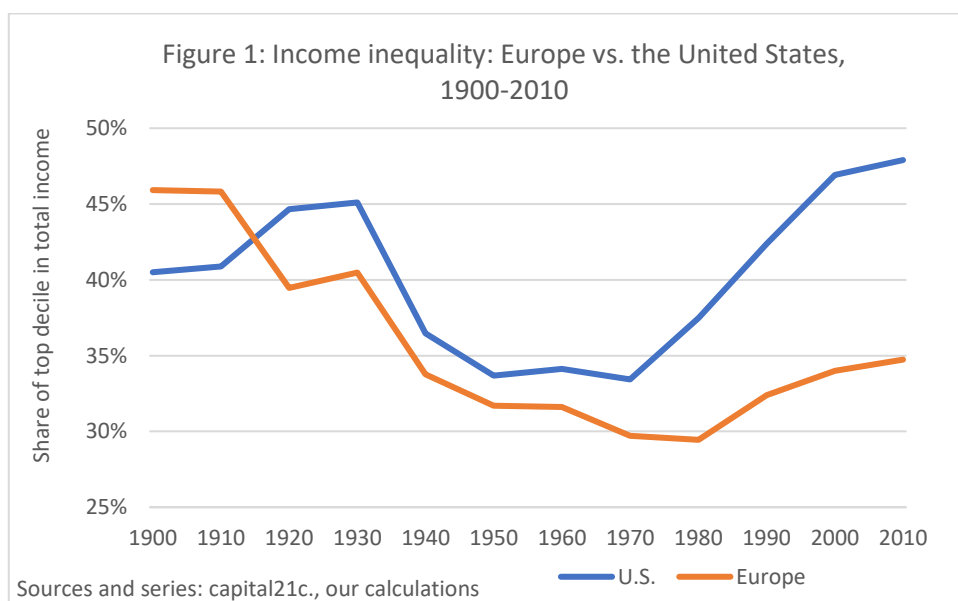
Under Piketty view, the period between the WWII and the 80`s was the only one in which a sustained change in the economic inequality happened. The richer and the poorer started to converge. This could have happened for the socio-political and post bellical environment that was essentially accompanied by a sustained economic growth shared among the individuals and by a higher taxation for the richer. After the 80`s instead, the top marginal tax rate started to decrease, and some new factors broke the scene. A faster and more powerful technological change and the globalization process above other causes. Those epochal changes were managed by a new form of liberism and capitalism. A Reaganian trickle down economy and a Thatcherian conservatorism were settled and that, permeated the modern society.

Piketty presented a massive amount of data in a recent and continuously evolving database, the WID<sup>1</sup> from which he presented some feature of our society.

The most important point that he shows in the book and in most of his research is the role played by the income and wealth in society and especially their evolution over time.

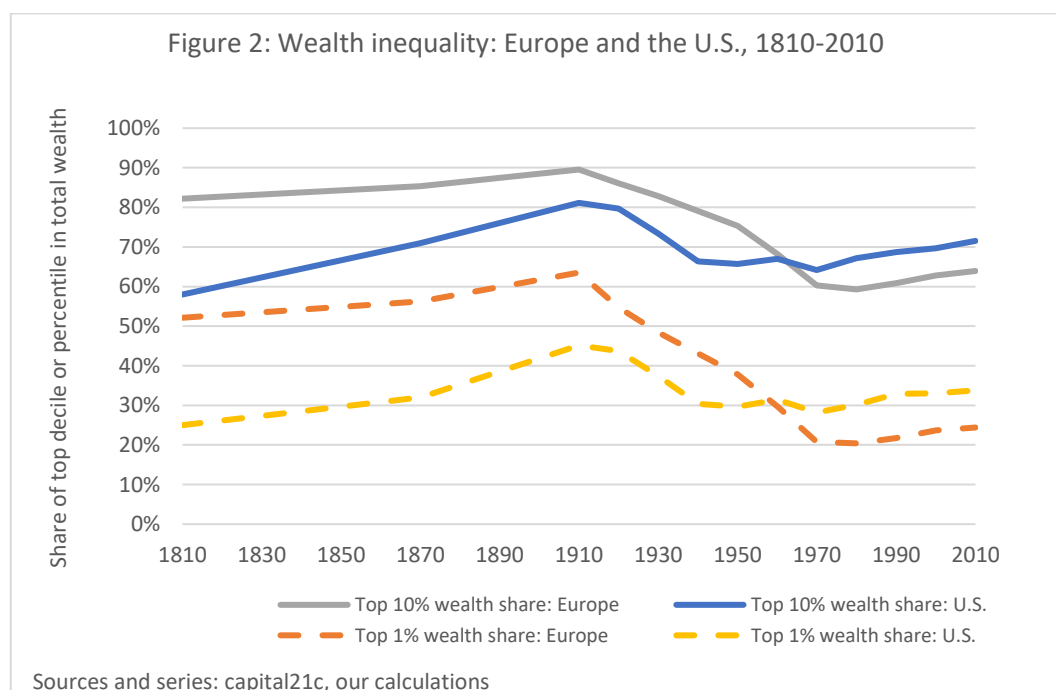
Three facts about the inequality are standing out:

- The income inequality is increasing
- The wealth inequality is increasing
- The Capital / Income Ratio is increasing



<sup>1</sup> World Income Database. Initially was created as The World Top Income Database (WTID) in January 2011 thanks to the contribution of hundreds of researchers from all over the world. The database includes different sources of data even within the same country to have a better view of the complexity and heterogeneity of them.

Particularly concerning is the effect on the advanced economies, among which we can count many European countries but also the United States of America. Looking at the graph (*Figure 1*) about the income inequality in those countries, it is now clearly visible the downturn through the WWII until the 80's, where a new wave of increasing inequality is shown with a major effect in US. A U-shape curve is visible. Passing to the wealth inequality, the situation it is similar even though it is in different magnitude.

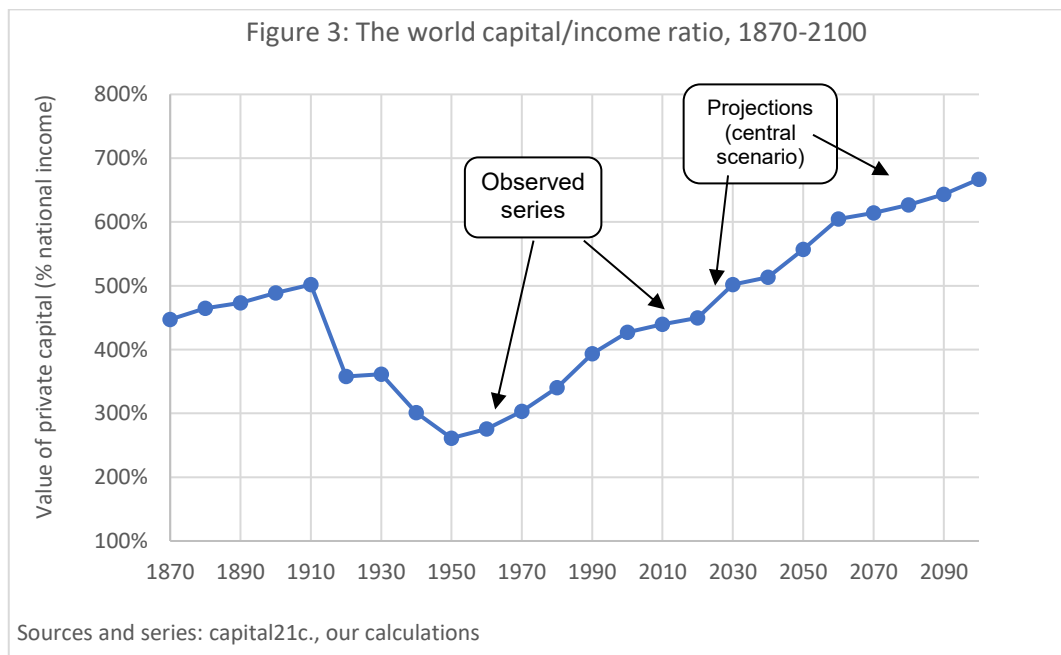


In the graph (*Figure 2*) the turning points, where the trend starts to change, are pretty the same. It is clearly visible, the first turning point, around the beginning of the WWI, when the wealth inequality started to decrease. The second point instead,



when the wealth inequality trend turned, is around the 70's/80's for both the US and the Europe as a whole.

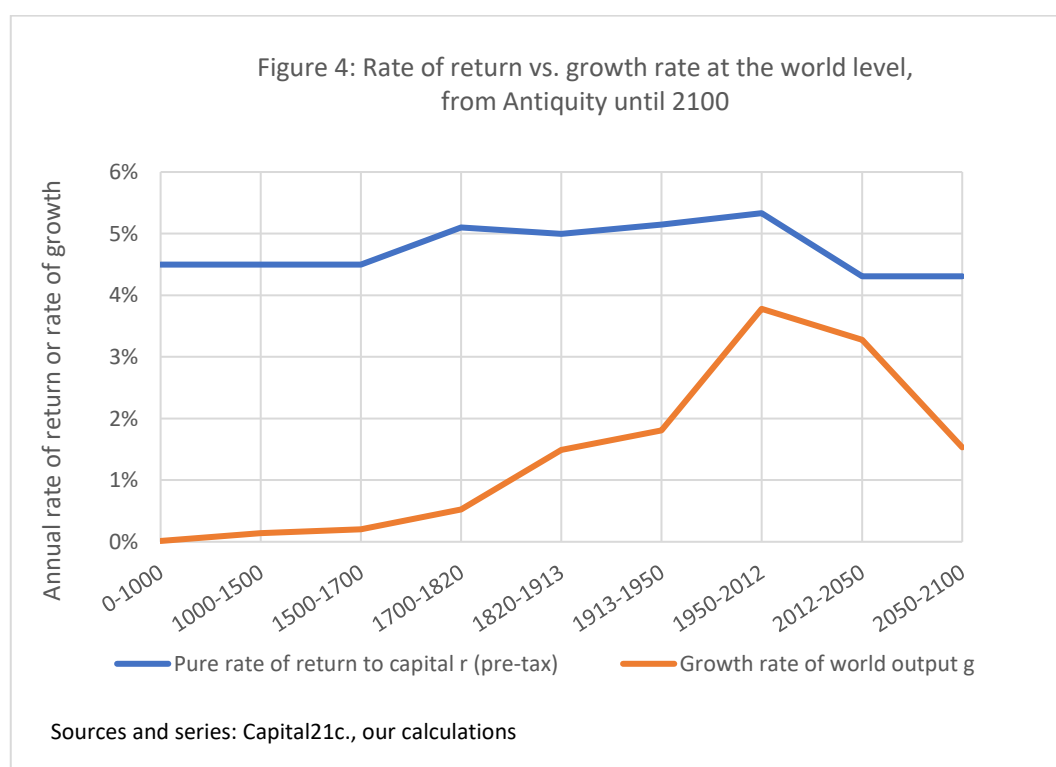
The graph about wealth it is then focused to the top decile and percentile. In this case the 90<sup>th</sup> and the 99<sup>th</sup> percentile are treated as a residual. Looking at the graph, the US top 10% and 1% around the 70's, outweighed the Europe equals in terms of their own relative share. The author, to let better grasp those concepts, thinks it is useful to look at the ratio between income and wealth. (*Figure 3*)



This index is crucial to understand the magnitude of the capital in a given society. The income in fact this time is used as a comparison size. About the wealth he sustains that, as happened in the far past, the richer are accumulating more and more wealth. About the wealth another important point of the discussion is the actual role

of the inherited wealth that is coming back as importance and as a relative share of the overall wealth. Whilst we trust in our more egalitarian society in which there are equal opportunities and in which people are self-made, for example the Silicon Valley generation, is still true that a big part of the wealthy people are instead inheritor. This is the point that the author wants to make and that will produce a new generation of *rentiers*. Piketty argued those points above many others, supporting his findings by a tremendous amount of data.

The last important point that the author argues in his book, regards the mechanism laying under the accumulation and the following concentration of such wealth.



He states that are crucial the measurement of  $r$  and  $g$ , respectively the rate of return of capital and the economy's growth rate. He then presents the dynamic of  $r - g$ . He shows (*Figure 4*) that  $r$  is in fact bigger than  $g$ . The argument is that the capital has tended over time to grow faster than the overall economy. If this happens, logically follows that that wealth grows faster than output and income. The counterintuitive reasoning is that, if one observes when the opposite was true, when  $r > g$  was diminishing, right after the second world war, the effect on the accumulation of wealth was showing an opposite effect. In the book Piketty mentions also that in history some shocks tended to give equilibrium, those shocks, destroyed capital and allowed to bring much higher taxes, this argument has been also reinforced later (Bengtsson et al. 2020).

His predictions for the future are, however, quite optimistic. As in history, in fact, it has happened several times there has always been a point where the situation has become unsustainable and something has broken, or other great external shocks have occurred. This could see later as a presage to the current pandemic crises. Towards the future Piketty himself reserves hope although in the long run. In the short term, however, he believes that things can only get worse and that a global and coordinated intervention is necessary. In the end, in the attempt to suggest some policies, he expresses the need for a global wealth tax and a greater marginal taxation for the richest. He suggests that this tax could start from 0.1% to 2% for

high fortunes above 5 billion euros. What he means in the last section, that one dedicated to the solution, is to provoke as himself describes this solution as “utopian”.

## **INCOME INEQUALITY BY OTHER AUTHORS**

The book has had countless criticisms. At the same time, however, many academics sensitive to the topics treated, welcomed the work. This allowed, as by the author's own admission, to publicly deepen certain topics. The debate that has taken place has laid bare the fragilities of our modern capitalist system, according to Piketty himself. An affirmation undoubtedly of Marxian memory.

At this point I continue to illustrate the thinking of other modern economists, the protagonists of the modern discussion about inequality.

Among the books and articles that add material to the discussion abrupted that one of former World Bank Economist, Brank Milanovich, with his “Global Inequality, a new approach for the age of globalization” that showed many other evidence about the inequality. He states that the top 1%, "the global plutocrats" are accumulating wealth while in advanced economies lower middle incomes are losing ground.

The author is well known to the public for his famous “elephant curve” (*figure 5*) that presents the differential growth in terms of income for the different percentile of global population. The curve has been lately updated and improved by new data and by the contribution of new critics without changing the result so much (Kharas and Seidel 2018).

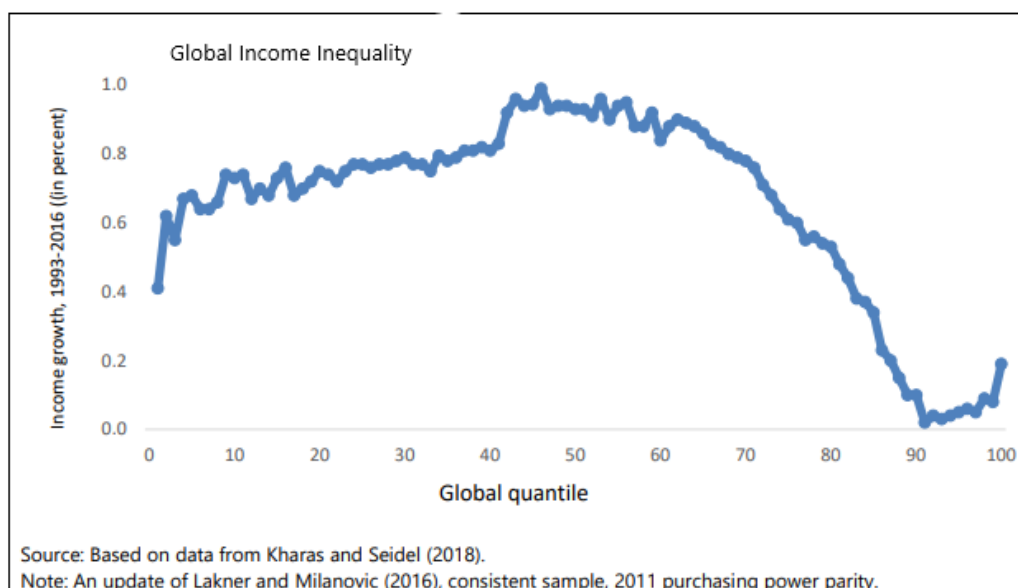


Figure 5: The elephant curve of income growth for each percentile, global level

As the primary cause of this phenomenon, the author puts globalization and poor management at the head. In his opinion this extremely delicate process should have been governed better. Not everything, however, is to be considered evil.

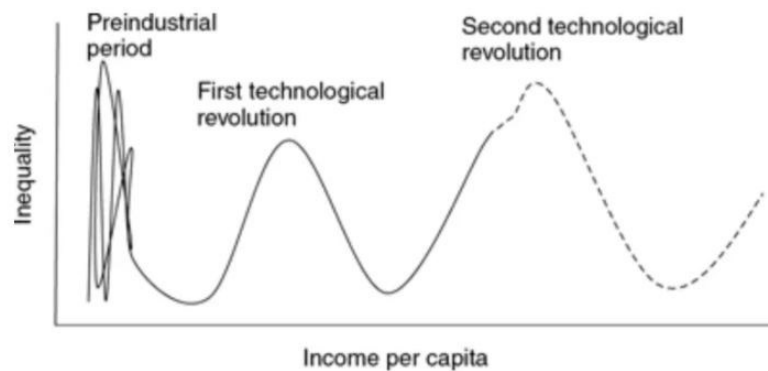
In fact, a huge step forward has been the emergence of a new global middle class, coming from areas of the world that four decades ago were in absolute poverty. These areas are particularly concentrated in Asia and are better identified with China, India and in less extent with Thailand, Vietnam, and Indonesia. This new class is called The New Global Middle Class.

Those who suffered a loss in this picture are the people of the Old Middle Class, those who belong between the 80th percentile and the 95th percentile of the global

income distribution scale, many of which belong to advanced economies. Those people have seen their income stagnate.

One might think then that there has been a kind of great redistribution between the old and the new middle class. The data, however, doesn't go in that direction. In fact, expressed numerically 44% of global income growth between 1988 to 2008 went to the world's richest 5%, and some 19% of that income growth went to the top 1%.

A this point it is useful to recall the work on Simon Kuznets that in the 1950 exposed the hypothesis of the inverted U shape curve, called in his honour Kuznets curve. During the process of development of an economy, market forces first will increase and then will decrease the economic inequality.



Expected pattern of changes in inequality versus income per capita | From *Global Inequality: A New Approach for the Age of Globalization*

*Figure 6: Kuznetz waves*

Milanovich challenged this view, as other authors did as well. He argues that today we should better speak of “Kuznets waves”. (*Figure 6*)

In this case it's no more the case of an economy passing through a single curve of inequality during his development process, but through a series of waves caused by a multitude of factors and shocks that can reshape profoundly the society. Kuznets observed, in the formulation of his theory, what happened during the two World Wars and the subsequent development of public welfare system. Today instead, Milanovich and other economists, have seen other significant facts as the globalization first and the technological process then, alongside with institutional and social forces.

Among the contributions to the recent debate on economic inequality there is also the Stiglitz's interesting book, “The price of inequality” (Stiglitz 2012). Here the Nobel Prize winner focuses especially on the American economy which, more than any other, brings with it the problem of increasing inequality. This exacerbate example is used by the author to highlight some peculiar feature that help to understand the bigger picture. The author then extends the analysis to other advanced economies and adds contributions to the debate.

He acts a bit like a myth buster. He writes as many Americans think that their economy enjoys the positive effects of deregulations and less government, brought



by President Ronald Reagan in the 1980s. In fact, US economy has performed poorly since then. The concentration of income among the richest earners has grown since those years. The U.S. economy has continued to grow but not for all citizens. Many have been left aside and some special cases stand out, such as that of entire lost districts. Think to the emblematic cities of Detroit and Flint that today share the fate of virtually deserted city whose poverty levels are alarming.

As the author writes: *"Much of the inequality that exists today is a result of government policy, both what the government does and what it does not do"*. In this regard, he adds that the top marginal tax rate has declined to 35% in the administration of President George W. Bush, well below 70% compared to President Jimmy Carter. Another problem is represented by shelter and loopholes that minimize corporate income taxes. The author continues mentioning as an important factor, the reduction in tax rates on capital gains. All of it, in the end, radically lower taxation on those people on the highest incomes. To this must be added the phenomenon of tax havens and some corporate architectures that have exacerbated the problem even more. Stiglitz's major contributions, however, concern two main aspects. The phenomenon of rent-seeking, and the macroeconomic policies pursued by global financial institutions. The fact of rent-seeking has grown in recent years in all economies and represents a distortion of economic activity. This definition in fact considers rent no longer only in its most

basic form, as that of a landowner who receives his compensation for using its land, but in a much broader way. In this case, all those more modern forms of return such as monopolies, licensing, quotas, and natural resources must be added. This peculiar economic behaviour has the great flaw of not bringing wealth to society. It doesn't add new value to society. This problem, in a general context, means that there is a flow between the economically weakest groups, that have nothing, towards the richer groups that, in addition to having countless flows, accumulate other capital that generates further flows. This creates an inefficient allocation of resources and correcting *"the large gaps between private rewards and social returns that characterize a rent-seeking economy"* it would help to reduce the problem of inequality.

The common concern of the three authors about the increasing role of inequality it is also shared by other scholars such as Reich (2020) and Zucman (2015). The theme is that the growing inequality, the enriching of the rich, the conceiving of money, inevitably leads to the concentration of power and that can undermine growth and more generally the democratic resilience of Western countries. A capitalism that devours itself.

## CRITICISM

At this point, it is important to remember how Piketty's work has been much criticized as well as praised. Often the cultural background of economists, and not only this, is strongly conditioned by one's own thought and sometimes by one's own ideology. In fact, many critics have grasped the merits, while others, like many aspects of Piketty's own work, are full of assumptions, sometimes a little too forced. We can distinguish between criticisms in two types, data, and methodology. As far as the data is concerned, many authors have criticized it, especially for the breadth of the time window in which it operates. Among them one of the most important comes from Chris Giles<sup>2</sup>, a FT Economics editor. He found some errors in the data presented almost accusing the author of doing so by purpose. In doing so, he insinuated the idea that the conclusions drawn by Piketty were also wrong and being artifacts. Giles refers to a famous case of (Reinhart & Rogoff 2010) who is being supported by (Herndon et al. 2013).<sup>3</sup>

Among the criticisms related to the methodology instead, one that has obtained a lot of consensus is that relating to the treatment of the depreciation of capital. This

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<sup>2</sup> An article published on 29 May 2014 titled: "Piketty, Chris Giles and wealth inequality: it's all about the discontinuities. [Piketty, Chris Giles and wealth inequality: it's all about the discontinuities | UK news | The Guardian](#)

<sup>3</sup> A graduate student found how two Professors, Reinhart and Rogoff produced their finding using some wrong data. In this famous case, the findings published in the American Economic Review, were discussed by Congress, and then used as a milestone for the austerity strategy of the European Union to the response of the Great Recession.

criticism is also made by (Rognlie 2015)<sup>4</sup>, but also by more illustrious colleagues such as (Summers 2014)<sup>5</sup> and (Bridgman 2014).

Another important point about the critiques to Piketty is the way in which he uses almost in the same way *Capital and Wealth*. He justifies his view when defines capital as the market value of “*the sum total of nonhuman assets that can be owned and exchanged in a market*”.

According to the methodological critics, some others have been moved.

A simple model can't account for the way in which wealth and income co-evolved over 200 years and that Capitalism per se hasn't a fundamental tendency to centralize and accrue wealth. All these critiques anyway are rejected by the major part from Krugman and Milanovich among others, essentially because even if some errors could have been made and some data or assumption, resulted too strong, the fundamental result it's not changing so much.

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<sup>4</sup> The young graduate student became famous for his critics about the Piketty's book. He wrote: “*In light of this, he tries to support his view with facts from recent macro data, but most of references from the data seem to miss the key influences (e.g., the housing sector) and don't hold it very well.*”

<sup>5</sup> The author emphasize that the real interest rate affects the rental rate more than the gross rental rate in a proportional way.

## **CHAPTER 2 – PERSONAL DISTRIBUTION OF INCOME – LATEST EVIDENCE**

In recent years the discussion about the economic inequality, as seen in the first chapter, gained a much more prominent position in the economic discussion. The inequality is then the result of the very last connection between the economic system, the production process and the individuals. The economic inequality is generated through the uneven personal distribution of income. We use mainly the income rather than other measurable quantity because can be seen as a proxy for economic welfare but also as a command over other resource. The importance of the income lays on the fact that it is a flow concepts, instead the other measure of economic inequality, wealth, represent a photograph of the stock of the heritage situation of individuals. This is the explanation why the income has an important role and especially its distribution among individual. It acts like a tap between the economy and the households.

In the previous chapter we have seen that the income from factor of production is unevenly distributed and it is interesting to see if the same it is still valid for the personal income.

To measure the inequality, we need first to define it. Speaking of economics, population and distribution, the inequality is a property of a variable's distribution and it is typically summarized by one or more statistics.

The statistic most used is the Gini coefficient, or Gini index, that is a measure of statistical dispersion for a given distribution. In economics it is used to measure the degree of inequality both for income and for wealth. Despite this index is widely used can hide some feature, in fact, two close Gini's coefficients can result from distributions with quite different top decile to median ratios or with the bottom decile with median ratios as well. To have a clearer picture sometimes it is used the graphical representation through the Lorenz curve that provide a better picture of the income or wealth distribution among the percentiles of the same distribution.

Recent data show us that at global level the economic inequality has slightly diminished, but decomposing between the two components, among and within countries we can see how the inequality has diminished in its first component. Among countries instead, inequality has risen, especially in the richest countries.

To have a clear picture of the two distribution, all relies on the availability of data and the elaboration of indexes. This is particularly difficult at global level, so producing reliable and comparable statistics is not so straightforward. Several databases, from which extrapolate data, exist and the more used are The World Bank's PovcalNet, the OECD Income Distribution Database, the Luxembourg

Income study (LIS), the United Nation`s “the World Income Inequality Database” WIID and the World Inequality Database. They differ from one another due to estimation techniques and the type of data collected. So, having wide representation of global data is particularly challenging.

Some of them collect specific sources, as the household surveys, that have many limitations. These consist in interview and give information about income wealth, demographics aspect, but also socio-economic as the racial, educational or gender dimensions. The problem is that they base the data exclusively on self-reported information.

Another source of data relies on fiscal data. This is also a self-reported information but, in most cases, there are some rules and law that should push individuals to give a fair representation. It`s not every time the case.

The best way to overcome these drawbacks, is to combine the sources of data. Mostly, administrative and surveys data. Even when combined the sources the biggest issue is represented by the extreme values, the richest and poorest. The first group has been usually less interviewed and less represented by tax data due to the tax evasion and offshoring. The second group instead is less represented as well due to the social exclusion and the ghosting from the economic system.

## **INCOME INEQUALITY**

In the introduction of the chapter, I explained the difficulties and the challenges to produce data about income inequality, and consequently to produce accurate measures. At this point, it could be useful to rely on different datasets to have better idea of the phenomenon and to explore different methodologies as well, to obtain more consistent findings. Sala-i-Martin (2002) exploring the literature and reviewing methodologies presented some findings. He relied on data from Deninger and Squire (DS) extended by the WDI of the World Bank and explained academically the use and properties of indexes and estimators. He produced a study from 1970 to 2000 extending backwards to the 19<sup>th</sup> century with the help of the Bourguignon-Morrisson dataset. According to him, the poverty rates and headcounts<sup>6</sup> have declined. This decline has been followed by the income inequality, that declined as well. Showing it decomposed, the most accountable part is the across country component, that declined to almost 70%. The “disturbing component”, is that within country. Another contribution, that later presented similar conclusions, is given by Milanovich (2012) that proposed a new way to interpret the income inequality, through the class and location of the individuals.

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<sup>6</sup> Two different concepts to address the issue of the poverty. The former is about the ratio and the latter the absolute value.



Later, the work of a bigger group of researchers, summarised in the World Inequality Report (2018) and in the *wid.world*, presented consistent findings. More completed and comparable data are available from 1980, in this period a larger number of countries provided data and since then a raising income inequality took place. These new findings challenge the work of many previous scholars, given the massive amount of data and the digital instrument to analyse them. (Figure 7)

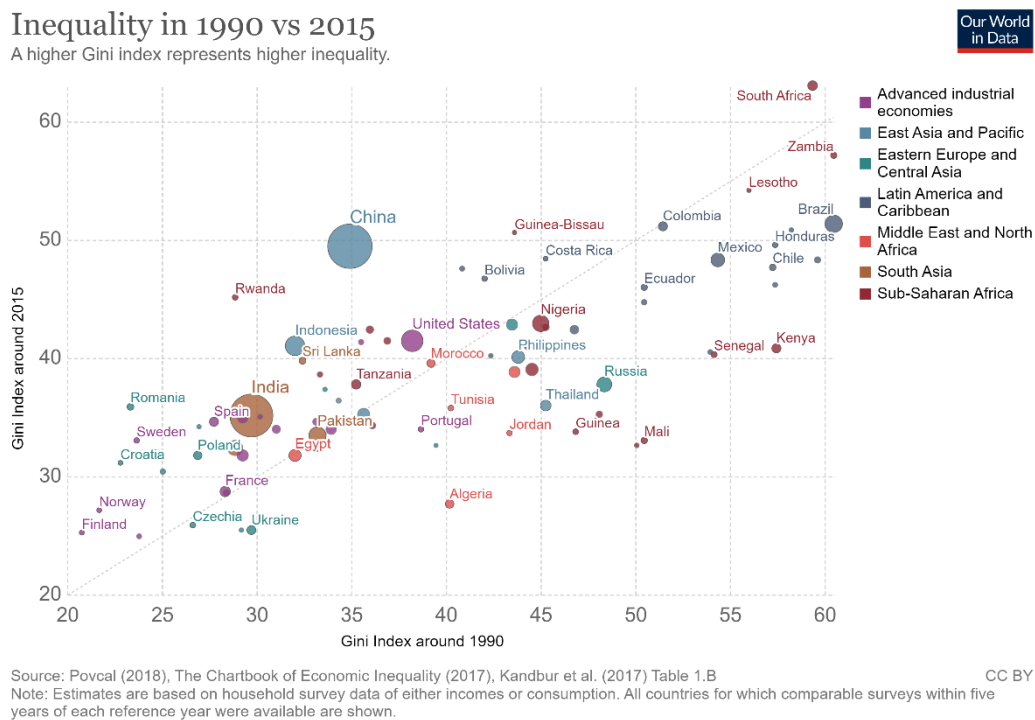


Figure 7: Income inequality between 1990 and 2015, world level

A static representation is given by this chart that shows the GINI index for different countries, resulting from a good sample. They represent countries from different part of the world and are those with the biggest share of population. The chart is

based on World Bank data and cover 83 countries, about 85% of the global population. On the horizontal axis we have the Gini index around the 1990 and in the vertical the index for the 2015. Countries in the upper part are those with higher Gini in 2015 and those in the far right, have the highest value for 1990. The feature of this chart is the 45-degree line the cut in the middle giving an element of the temporal dynamic. So, those countries below the line faced a fall in the Gini index and those above saw an increase. Only 22 countries are showed in the chart. that have the top income share around both the years considered.

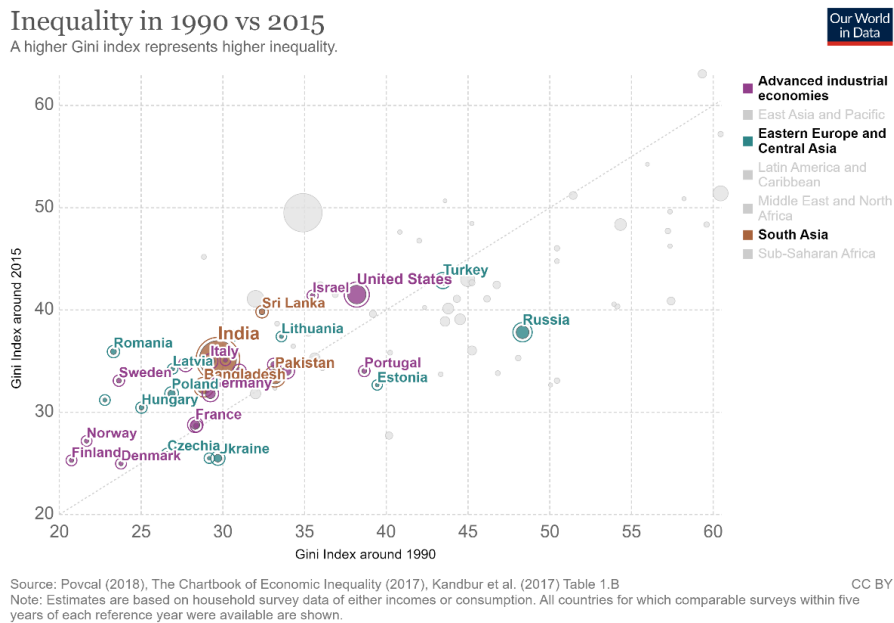


Figure 8: Inequality 1990-2015 for Advanced economies, Eastern Europe, Central and South Asia

This chart (Figure 8) shows that there is no definitive patterns in every country but rather than policies can make differences in the good and in the bad way.

Advanced economies saw a rise in inequality for most of them even though have lower level than other groups. Some Eastern countries showed an increase in inequality, mostly due to their transition from socialist regimes.

In almost all Latin American and Caribbean countries the inequality has declined. Their overall level anyway is clearly larger than the previous group considered. The same is for the Middle East, North Africa, East Asia and Pacific and Sub-Saharan countries. (Figure 9)

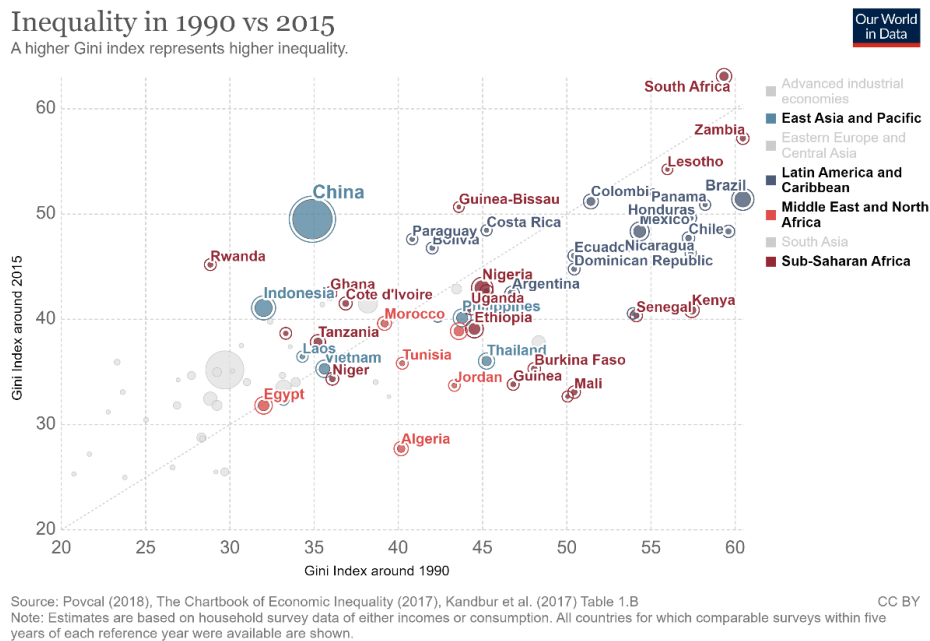


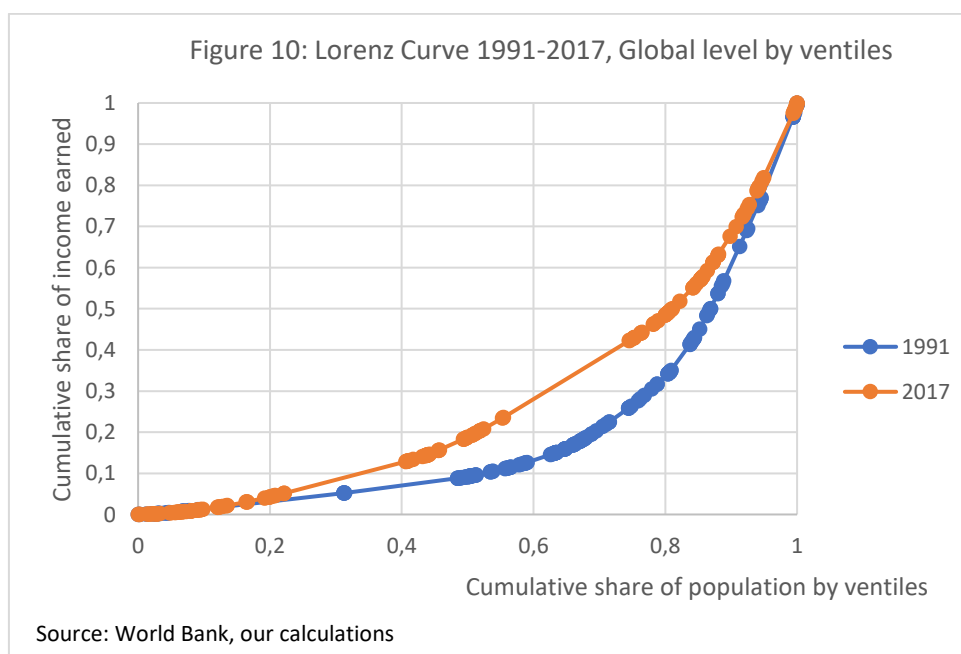
Figure 9: Inequality 1990-2015 for East Asia and Pacific, Latin America and Caribbean, Middle East and North Africa, Sub-Saharan Africa.

Across countries, the overall Gini is slightly fallen.

As stated before however, the Gini index, even if weighted by country population, gives just a first idea of what is going on.

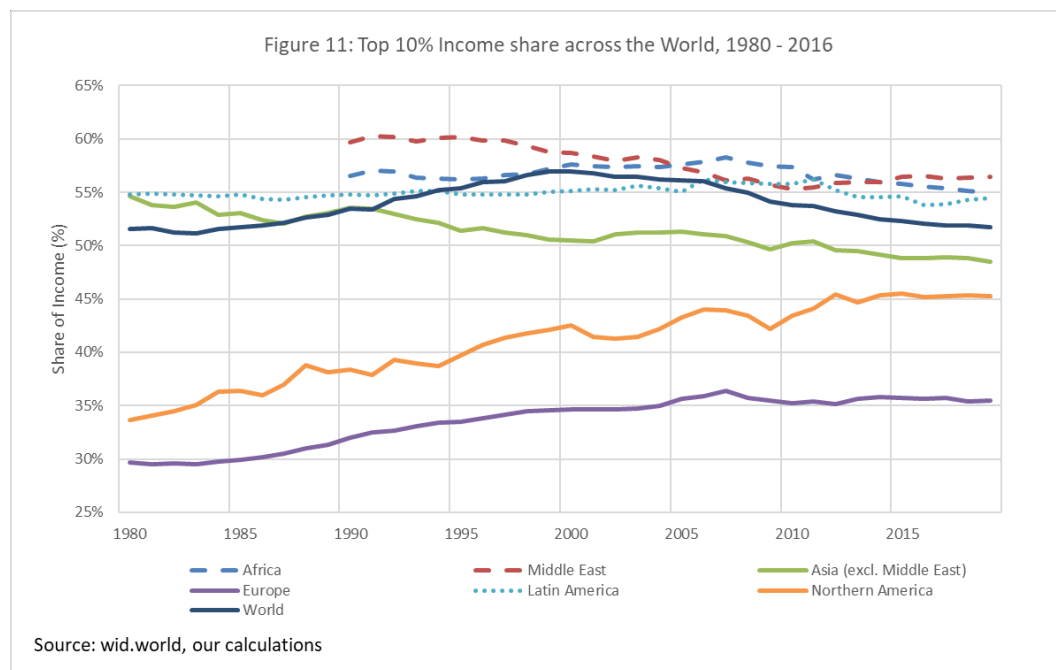
Another good visual representation at global level could be given by the construction of the Lorenz curve, at two points in time, to show the evolution.

As can be seen from the chart from 1991 to 2017, (*Figure 10*) the global level of inequality as diminished. This time the sample cover over 165 countries and it is based on calculation done on the income distribution of quintiles. The Lorenz curve in fact is based on the concept that more the curve is close to the 45-degree line, more it shows equality between the subjects of distribution. The opposite, when the curve is more crushed on the under and right axis, shows a bigger inequality.



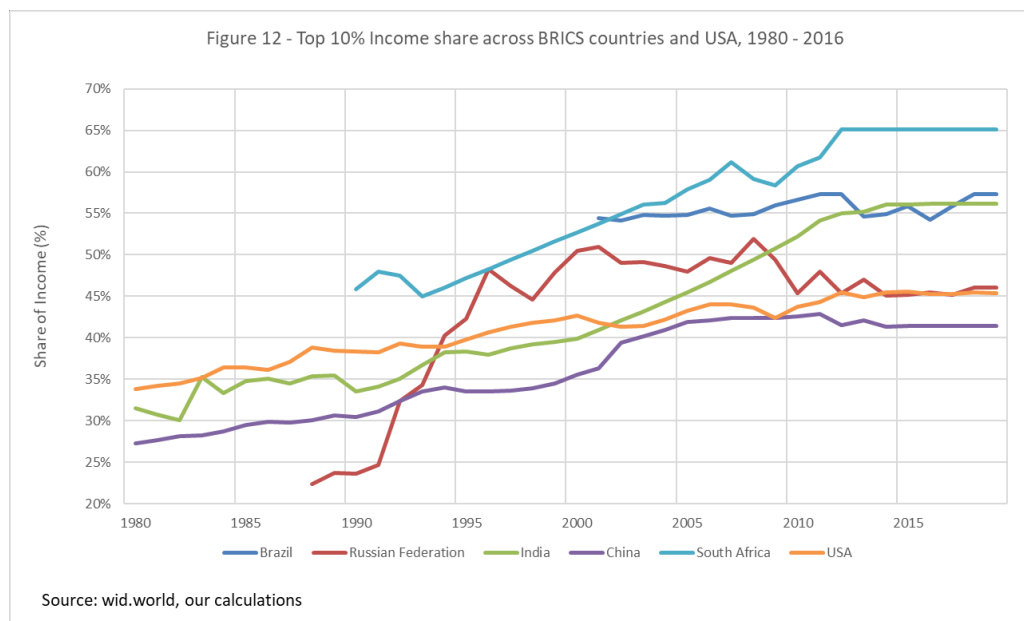
Back to the dynamics, after having seen some visual representation of the data, income inequality has increased rapidly in North America and Asia and more moderately in Europe. Conversely shows a convergence and even a decline in the Middle East and Africa.

A valid argument for the distribution of personal income, is represented by the ratio between the top individuals in the top and those in the bottom of the distribution. This is another way to represent the income inequality. In fact, the top 10% received the most, relative to the other groups, practically everywhere. The new fact is the magnitude of this ratio. This index helps a lot in the process to explain the dynamic over time. (Figure 11)



Specifically, I displayed the evolution of the top 10% income share at global level. While the world shows a steady picture, around 51.6%, North America and Europe show respectively an increase of 35% and 19% in 36 years. Notable to say is that Europe represents the continent with the lower concentration of income among the top category, followed by The North America. Asia (excluding middle East) and Middles East show a decline of -11% and -5 % reaching 48% and 56%, respectively the first below and the second above the global level. Africa concentration level is declining by a little 2.8% but is still above the World level.

If we observe instead the country level, in this case the BRICS<sup>7</sup> and USA, we observe that at country level, considering those countries with the largest



<sup>7</sup> Brazil, Russia, India, China, South Africa

population, the situation is even more remarkable. (Figure 12)

Brazil has fewer data available but shows a pretty steady state around 56% while other countries display an increase of different magnitude. A dramatic increase is showed by Russia that from its 21%, more than doubled, reaching 46%, slightly above the US level. South Africa is the worst performer with a level of 65%. China, India and USA followed a similar path with an increase of respectively 52%, 78% and 34%.

These two graphs give us an insight of what is going on in terms of the top 10% at world region level considering the emerging countries and the USA as benchmark. One of the reasons because the distribution of income is increasing in the top decile, is that this group captured most of the economic growth.

**Share of global growth captured by income groups, 1980-2016**

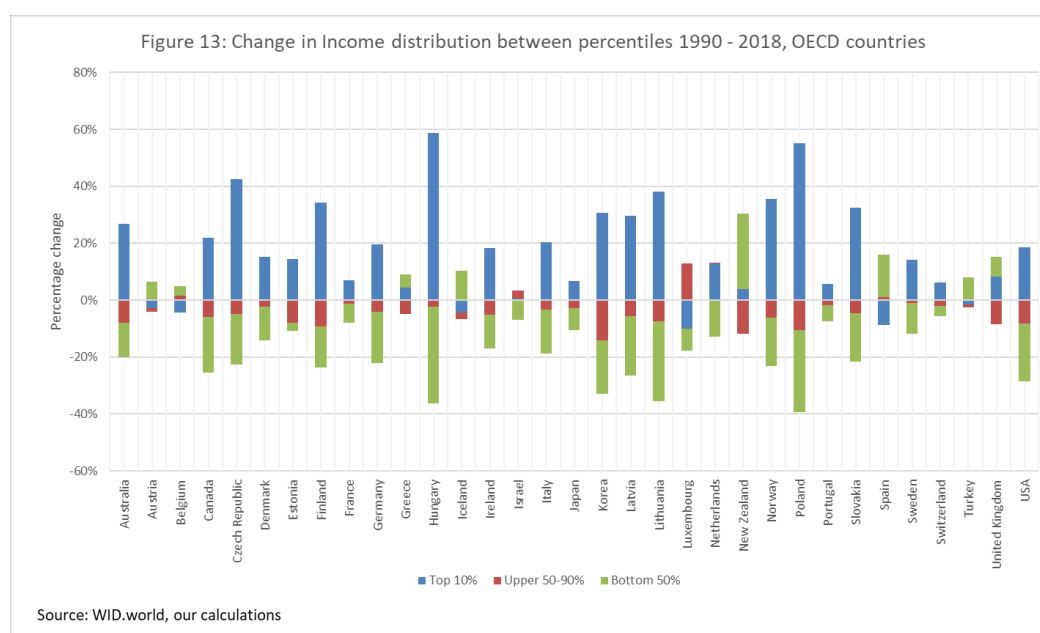
Income group	China	Europe	India	Russia	US-Canada	World
<b>Full Population</b>	100%	100%	100%	100%	100%	100%
<b>Bottom 50%</b>	13%	14%	11%	-24%	2%	12%
<b>Middle 40%</b>	43%	38%	23%	7%	32%	31%
<b>Top 10%</b>	43%	48%	66%	117%	67%	57%
Top 1%	15%	18%	28%	69%	35%	27%
Top 0.1%	7%	7%	12%	41%	18%	13%
Top 0.01%	4%	3%	5%	20%	9%	7%
Top 0.001%	2%	1%	3%	10%	4%	4%

Table 1: Share of the income groups in countries and the share of growth that they captured. Source wid.world.

As presented in the table 1, things become clearer. The table shows the period between 1980 and 2016, by percentiles groups, of what amount has been captured

of the economic growth. These estimate from the WID (2018) is calculated using 2016 PPP €.

The data tell us that the top 10% captured around half of the economic growth and in some cases even more as Russia. In this country the top decile not only captured the growth, but even eroded the share of the bottom 50% of the population. US-Canada follows the Russia with a 67% and an almost flat 2%. The bottom 50% barely maintained their income levels during the last forty years. Another story that comes from the numbers is that most of the gain within the top 10% went to the top 1%.



The graph (*figure 13*) is a way to see the movement in the income distribution divided by three income groups: the top 10%, the bottom 50% and the residual 40%.



The sample that I choose is the OECD countries less Chile, Colombia and Mexico that lacks data for 1990. The figure shows that on average the top 10% improved their income by a 17% while the bottom 50% left on average 9%. The residual 40% on average faced a loss on average of 4% and this means that on average among the OECD countries between 1990 and 2018 only the top 10% improved their position in the distribution.

## **WEALTH INEQUALITY**

Before, I presented data about the income inequality, and it is useful to repeat that the income represents a flow concept of all the income produced and distributed in a given country in a given year. Now it is the time to breakdown the concept of national wealth that represent the stock concept instead. Wealth represents the sum of all assets accumulated. National wealth can be decomposed in public and private. This decomposition is particularly important because this distinction, needs to be fitted to the socio-political condition of a given country. For example, the role of the private property in Russia between today and during the Soviet Union.

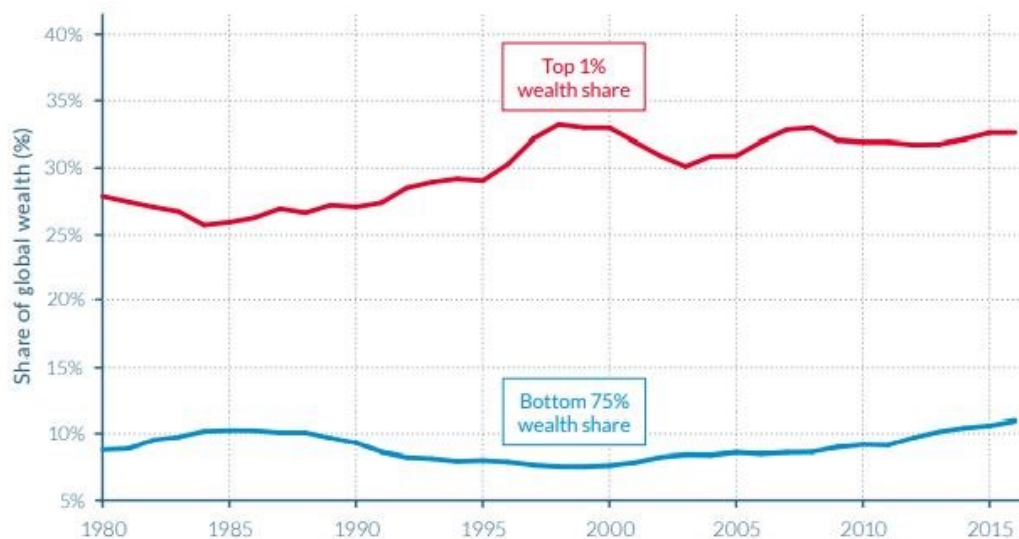
Beside this very last concept, the wealth can be related to the income, creating a ratio: wealth/income ratio, that is a good index that helps in capture dynamics useful to further analyse macroeconomic components. If it is true the accounting nature of wealth and income, the ratio, can show some feature of accumulation, saving propensity and investments. Important information about economies.

Private wealth is that one that is more of interest for this study. It must be stressed however that for wealth is much more difficult to be precise than for income. For the top of the distribution the modern society, despite living in the data economy, we miss so much. This is particularly true for emerging countries and for big fortunes that hide in offshore system.

The problem with wealth is then that it is even more difficult to find data for the top group of the global distribution. Those individuals are considered apolides and live globally. Surveys data and tax data abundantly underestimate those fortunes. To have a clearer picture in absolute terms rather than relative, to the entire global distribution, particular sources are used. Interesting is the Wealth-X database and the relative report that have more reliable data than national governments.

It could be an idea to start the discussion about wealth at global level describing the super-rich of the world, the billionaires. In 2018 the global population was of 7.650 billion of people and among them 2,825 were billionaires. A population that in 2019 grew by 8.5%, while their combined wealth was boosted by 10.3% reaching 9.4 trillion dollars. According to IMF (2020) in 2019 the global real GDP growth rose by 2.9%. The richest are those that created their fortunes from the Technology sector followed by Insurance, Business services, healthcare and real estate.

As noted before data on wealth should be taken with care but for countries like United States and those from Europe are more reliable, even if still suffering from the problems already described. In this case a good database to use is the wid.world that combine household's wealth surveys and administrative fiscal data, combined also with wealth rankings data. Estimation methods are used as capitalization method and estate multiplier. Data presented by these databases are consistent with those of Forbes, Wealth-X and Credit-Suisse.



Source: WID.world (2017). See [wir2018.wid.world](#) for data series and notes.

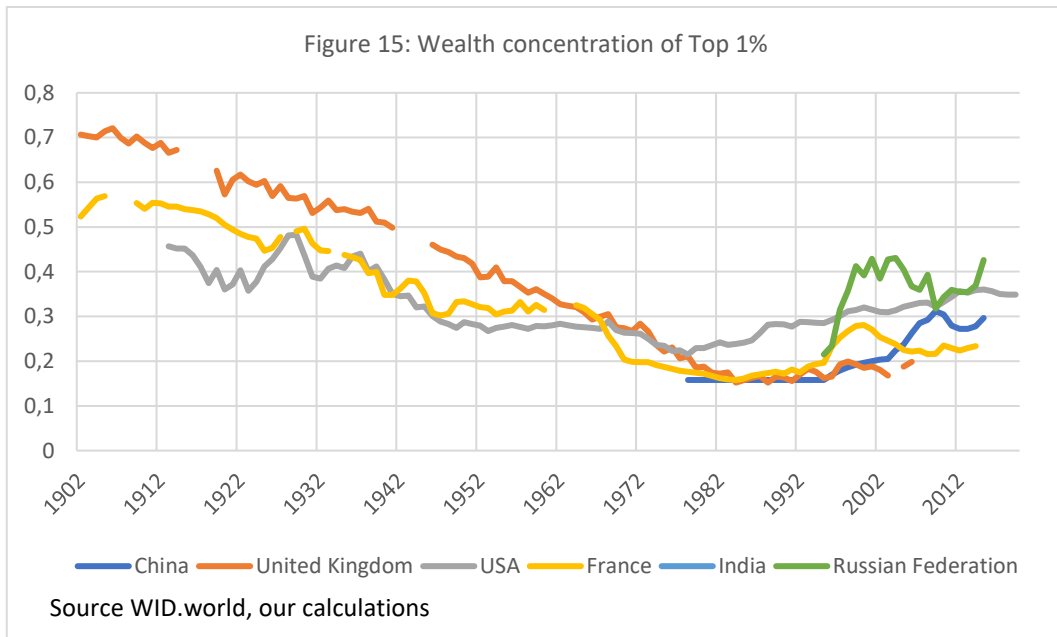
In 2016, 33% of global wealth was owned by the Top 1%. The evolution of global wealth groups from 1980 to 2017 is represented by China, Europe and the US.

Figure 14: Share of Global wealth (USA, Europe and China) by groups, Top 1% and Bottom 75%.

In the graph (figure 14) we can observe the level of wealth concentration between the top 1% and the bottom 75%. The sample used for this analysis consider data form China, United States, France, and UK. The sample is reduced due to the availability of data. Sources are multiple and several estimation methods are used. The purpose of this graph is to give insights on the phenomenon even if not precise. The wealth of the top 1% shows an upward trend with more than 30% of the total wealth. The bottom 75% show some recovery from the 80s but is still extremely far. This figure push for more insights.

Looking now at the countries considered (Figure 15), two of them are the first and the second economies for GDP and one is the largest in term of population, then

USA and China, accompanied by India, Russia, and United Kingdom, for which we have less data. France represents a good source of information because Piketty and his team studied deeply and estimated wealth and income levels for that country.



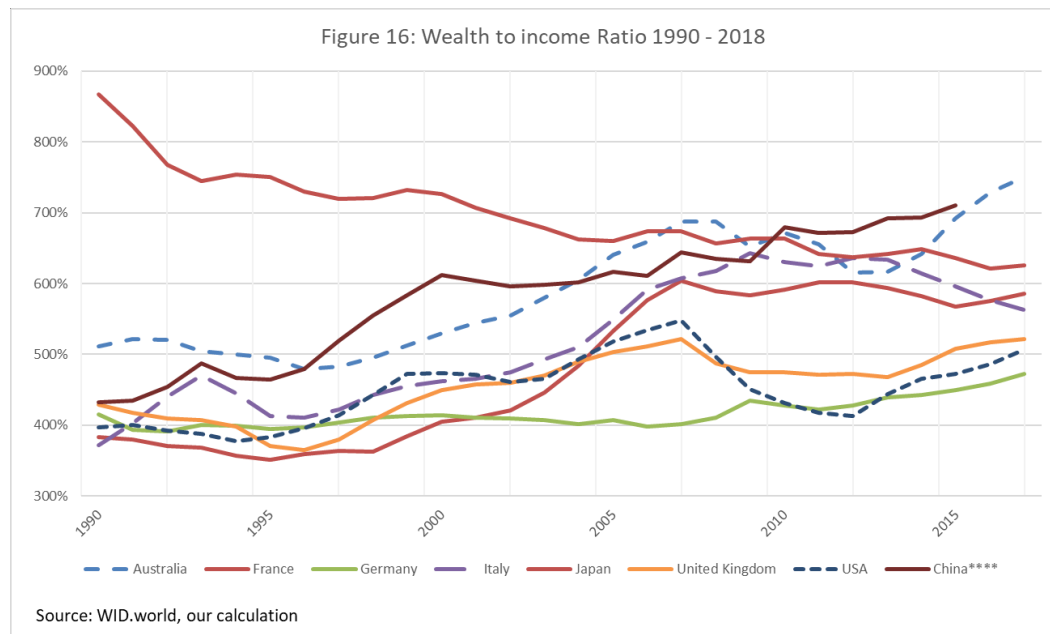
The time span that I choose is particularly long, to show the evolution over time and to clearly see a breaking point around the 80s.

At the beginning of the twentieth century in UK, France and USA the Top 1% controlled about the half of the total wealth. A decline started until the 1980 and then a new increase can be appreciated. For India, China and Russia we have less data, but from the 80s a similar pattern to the previous tris is observed. It is possible that a similar pattern before the 80s have been followed even for the second tris. It will need further analysis.

What we observe is the result of some forces. These themes gained more importance in the recent years and several authors found some explanations.

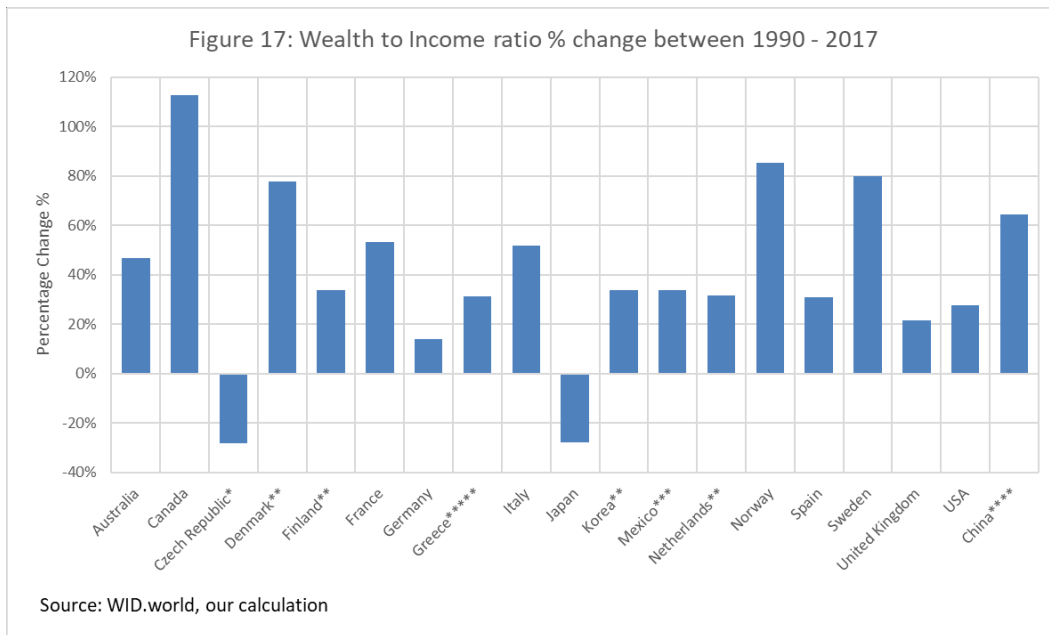
These dynamics are driven by global and national forces. Inheritance as driver for increasing wealth concentration over time is studied by (Piketty 2014), Ohlsson et al. (2014). Others have proposed that the main responsible is the taxation, transfers and wage distribution Kaymak and Poschke (2016). New evidence gives an important weight on the asset price dynamics. In this case the interplay and the value of house prices and the change in the equity account, due to the effect of the wealth concentration Kuhn et al. (2018). Following this study, other authors as (Stiglitz 2012) found an important role played by the financial sector. Thus, the large flow of money issued by central banks and consequent low interest rates, contribute to create bubbles without even reaching the to increase the inflation as in the EU. On the same line, another component that has been argued in the literature has been the role of governments, not only in the taxation, but in the special treatment that gave to banks and financial institutions. Since the bubble of 2007 many financial institutions have been bailed out with taxes and government debts funds. This created the phenomenon of the privatization of the profit and the public responsibility about the losses.

A last consideration about the personal income distribution, the inequality and the concertation can be made summarizing income and wealth in one index: wealth to income ratio.



In the graph (*Figure 16*) is presented an image of the evolution of the the wealth income ratio fot eight of the biggest economies, for the last thirty years. Almost in all economies an increaase can be appreciated, even if at different magnitude. Notable is the behaviuor of the Japan, that goes in a different direction showing a decline. A further analysis is important to understand the drivers for the decline to have counterfactual ideas about policies to adopt. From the main idea, a useful analysis can be made presenting data about the percentage change of the index for

more countries. The sample chosen, represent most of the OECD countries, accounting for more than 88% of the total population.



The graph (*Figure 17*) shows that in Canada the ratio more than doubled, reaching 565%. The increase in terms of magnitude is followed by Norway, Sweden and Denmark, all North European countries that have a ratio of roughly 500%. China and Australia increased by 60% and 40%, those are the countries with the highest ratio of respectively, 700% and 750%.



## CHAPTER 3 - FUNCTIONAL DISTRIBUTION OF INCOME

The previous chapter was useful in understanding the mainstream economic debate on the issue of economic inequality. Many concepts and data have been presented but to understand them better it is useful to look now at the economic theory and literature. We have to tidy up some concepts and explain others to get a clearer view of the phenomena.

The authors gave their vision about the economic inequality and supported it by the data found and analysed. Some important points can be analysed. The purpose of this treatment is to come to understand what the mechanisms behind the above concepts are and therefore arrive at the core of the discussion: the distribution of income, what are its determinants and the inequality in its distribution.

The first distinction to be made is between the personal distribution and functional distribution of income.

- We'll refer to *personal income* as the part of the total income that is distributed or better, earned by the different individuals in a society. This is much a statistical concept being that the unit individuals could be easily changed with household and other statistical units.

- Now it is interesting to see how this income is distributed among those units and why. Here, the theory of distribution comes into help. The answer is that the *factor distribution of income* among individuals relates to who owns what. This means that is determinant to understand who is in control of different factors of production, which are them and how they generate different incomes.

The importance of the two-distribution other than in themselves lays on the link between them. The functional distribution is much more a macro problem whereas the personal distribution is instead more a micro problem in economics terms.

We have observed during the last 30 years during the globalization process, an overall growth. Despite the intensity of the growth and the fact that in some advanced countries this growth has continued in a slower pace, we have seen it. But what we could say about the growth of every different economic group in the society? We could answer on the field of perception, when governments state the positive economic performance, many could not see the effect, many during the globalization didn't improve their economic position. Hence, the importance between the two distribution. In some advanced countries those improvements, that the economic growth generated, went to the upper decile of the income distribution.

The real wage growth, at the same pace of the overall economic growth, went just to few better-off individuals. (Decker Gordon 2005).

Back to the micro and macro distinction of the phenomenon we need to add the concept of income, here split in its two different sides.

- Personal Income
- National Income

The two concepts will be important for the analysis that will follow and for the distribution.

## THE ECONOMY OF FACTOR`S OF PRODUCTION

The functional distribution of income attains to the distribution among the factors of production. Therefore, is useful to understand which are the factors of production. The economic theory starts with three of them: land, labour and capital. The modern economic theory attempts to make them four and sometimes even five. We can safely add in fact the human capital under which we could sum some other categories such as the entrepreneurship, social capital etc. (Krugman, Wells 2013). The mainstream debate today focuses much more on the labour and capital and their share on the total income.

At this point it is useful to see what the economic theory produced so far about the argument.

The first recognised attempt to define the functional distribution of income is by David Ricardo (1917) *“the produce of the earth—all that is derived from its surface by the united application of labour, machinery and capital, is divided among three classes of the community, namely, the proprietor of the land, the owner of the stock or capital necessary for its cultivation, and the labourers by whose industry it is cultivated. . . . To determine the laws which regulate this distribution is the principal problem in Political Economy.”*. Ricardo shared the view of Adam Smith, that later became the Classical school of economics. For Ricardo then, after paying the rent, the rest was divided by wages and profits in a constant fraction. This view

challenged even the Malthus` principle of population for which the labour share will grow with population faster than profits, leading the society to squeeze between workers and owners.

This view was reviewed later by the new school, the neoclassical or marginalist. This new view solved some problem and the basic idea behind that every agent based on the production process receives a compensation according on their contribution. This could be summarised by the idea of Clark 1899 *“It is the purpose of this work to show that the distribution of income to society is controlled by a natural law, and that this law, if it worked without friction, would give to every agent of production the amount of wealth which that agent creates”*.

The contribution made from classical and neoclassical theory led to some important points: the fact that every agent will be paid based on its own contribution, the integration with the production theory and a new generalised form, giving some mathematical explanation.

Historically thought, we have encountered a sort of hierarchy of factors of production being the labour and capital the most important, leaving the rent a residual part. We later will try to challenge this view.

## Factors of production

It is a time to better analyse these factors of production:

- *Labour* as factor is effort produced by an individual working to make a product or a service to the market. This could be a very broad definition that will include any sort of work for which that individual receives a compensation for.
- *Capital* as a factor of production is represented by all made goods that can be used in the production process. Usually it refers to machinery, raw materials, vehicles, tools etc.

The capital above described is intended to be physical capital. Another distinction that can be easily done is about the paper aspect of capital that includes things like shares and bonds. Firms with this use to raise finance to acquire physical capital that later will be used in the production process. In this case this “capital” it’s not accounted as factor of production.

Further specification to do is between:

- a. Factor’s price: the income generated from selling it
- b. Factor’s services: the income generated by using (return) and income from hiring the factor (rental)

A particular case is devoted for money and for the distinction between personal and private capital.

- *Land* is a peculiar factor of production. It can take various form and include also natural resources such as air, soil, water etc. All of those can be used in the production process such as for agricultural purpose but also the case of commercial real estate. It important to mention the importance of land in the production process for classical economist for which land was responsible for the generation of economic value. Land has some fundamental characteristic:
  - It is fixed as quantity
  - It is perfectly inelastic
  - It is passive because cannon produce anything on its own.
  
- *Human Capital* as factor of production includes the quality embedded in individuals, peculiar skills, abilities, experience, talent etc. This new factor of production is closely related to this historic moment, the information society, in which has grown a net distinction between a merely labour to a more sophisticated form of it, derived by the potential of the humankind as a single and as a society.

## The Factor's Demand

Once explained the factors of production it is worth to continue mentioning how they are allocated among producers and so, Factor Market and Factor Prices.

In one sense factor markets are similar to the goods and services market but some features that makes them special stand out:

**Resource allocation:** Factor price allocate resources among firms and industries.

In a dynamic economy, where several components change over time, as technology or product demand, the efficient allocation of resources request for continuing shift of resources from one to another. In this sense factor pricing is a major determinant in producing those shifts.

**Minimization of costs:** Firms must produce the output maximizing their own profit with the most efficient combination of resources. Here, factor prices represent the cost for the firms.

**Income Determination:** Factor markets are those where most of the people get the major share of their income, the next largest is the government transfers.

**Economic Policy:** As stated above, the second largest source of income is the government transfers. To determine the extent of the government intervention through taxes, transfers, subsidies etcetera, the same government needs to evaluate the effect on the personal income.



Now, discussing the factor's demand it is worth to mention that it is a derived demand. It means that the demand it is not original but derives from the demand of the product or service that the resource helps to produce. This leads to the next consideration and so, the strength of the factor demand derived by:

- *the productivity of the factor* itself in creating the product or services and here is still valid the rule of diminishing marginal returns.
- *the price* of the good and service that helps to produce. Here we introduce the concept of the **marginal revenue product (MRP)**, *the change in total revenue resulting from the use of each additional until of the resource.*

The concept of the MRP represents the factor's demand in which on the horizontal axis we have the quantity of resource demanded and in the vertical axis we have the price.

Now, what will determine the factor's demand? Following the logic just present it will derive from three determinants: 1) the product demand, 2) its productivity, but also from 3) the prices of other factors. The premise for analysing the effect on demand of the factors of production in reality to the various determinants will be, all other things equal.

- 1) Being the factor's **demand** derived; its own demand will follow directly the original demand of the products.

- 2) Generally speaking, an increase in the **productivity** of the resource will increase its demand and conversely the opposite is still true. The productivity of any factors can be influenced by many factors:
- a) *Technological change*: Think at the effect of technological improved capital used by labour force.
  - b) *Quality of the factor*: as the improvement in the quality of the labour for example. In this sense think to an improvement in labour that will require a more skilled worker: this will increase its marginal productivity.
  - c) *Quantities of other resources*: think to a greater amount of land and capital for a firm that will require more workers.

The considerations above help to explain the different level of productivity between advanced and emerging countries. This explains in part also why the real wages for the different group of countries.

- 3) **Changes in prices of factor** of productions may influence the prices of others. The example that will be useful later will be that the fall in the price of capital could affect demand for labour. The direction and magnitude of this influence depends on the degree of substitutableness or complementarity of the two factors involved.

a) *Substitute factor*. Following the case above stated, suppose that a firm produce a service that can be produced by labour of machine in the same way. Here, a fall in the price of capital occur and so the effect on the demand of labour will be the net effect between the substitution effect and output effect. The former will decrease the demand for labour for a very simple reason while the latter is instead little more articulated. The lower capital cost will lower the overall cost of the production and so the firm would like to produce more output. This will lead to an increase in the demand for all the factor used in the production process.

So, the net change of labour will depend on the relative sizes of the two effects.

b) *Complementary factor*. Certain products and services in the production process utilize factor in fixed proportion. Let us think of an engineer who uses software to design. If the price of the same software or computer were to decrease considerably, a positive effect on both inputs would be created. In fact, a reduction in the cost of production, as in the previous case, would lead to an increase in production, bringing a positive effect in general. An increase in capital and consequently in labour.

Now that the determinants for the effects on demand for factors have been listed, it is useful to understand the optimal combination of resources.

As for other economics matters the questions to assess to optimal quantity are essentially two: What combination will minimize costs for a specific level of output and what combination will maximize profit?

To understand the following concept, it is necessary to examine the scenario in which the factor market is competitive and in which each company is too small to influence the cost of the factor (Price taker).

**Minimize the cost:** the cost of any output is minimized when the ratios of marginal product to price of the last units of resources used are the same for each factor involved. In this case considering  $P_L$  as labour price,  $P_K$  as capital price,  $MPL$  and  $MPK$  as their respective marginal productivity will write:

$$\frac{MPL}{P_L} = \frac{MPK}{P_K}$$

**Profit Maximization:** To maximize profit, a firm should use additional unit of factor until the additional unit will add more to the firm's total revenue than it adds to the firm's total cost. As for the previous MRP:

$$MRP = \frac{\Delta Total Revenue}{\Delta unit in factor quantity}$$

The same apply for the cost and then, the amount that each additional unit of a factor adds to the firm`s total cost is **called marginal resource cost (MRC)**:

$$MRC = \frac{\Delta Total Factor Cost}{\Delta unit in factor quantity}$$

Then, we can introduce the condition that in competitive factors` market the marginal resource cost (MRC) is equal to the resource (factor) price. Thus, our profit-maximizing equation is:

$$MRP (factor) = P (factor)$$

This condition obviously must hold for every variable and therefore a firm will achieve its profit-maximizing combination of resources when each factor is hired to the point at which its marginal revenue product equals its factor price. Considering as before the case of just two factors, Labour and Capital we have:

$$MRP_L = P_L \quad \text{and} \quad MRP_K = P_K$$

All that being said it is time to introduce the concept of elasticity. In this sense we mean the elasticity of factor`s demand. This concept can be split in two: the first measures the extent to which producers change the quantity of a resource they utilize when its price varies.

The second instead measures the elasticity of factor`s demand in respect to other factors. It will be then smaller, the greater the challenge to substitute the factor with

another one. This second concept is the elasticity of substitution between factor of production and it is the one that will be more important for our analysis.

The concept was introduced by Hicks (1932) and Robinson (1933). They developed this theory almost simultaneously but independently. Ironically, one might argue that Hicks and Robinson indeed were good substitutes for the production of knowledge.

Before to proceed we need to introduce the concept of the Cobb-Douglas<sup>8</sup> production function. We define the most standard form of production of a single good with two factors the function:

$$Y = ( K^\alpha L^\beta )$$

Where Y is the output and  $\alpha$  and  $\beta$  are the output elasticities respectively of K and L<sup>9</sup>. Now, we are ready to explain the elasticity of substitution between labour and capital. As it has been synthesized by Klump et al. (2012), it plays an important role in economics. We can define it mathematically as:

$$-\frac{\partial \ln \left( \frac{K}{L} \right)}{\partial \ln \left( \frac{MPK}{MPL} \right)}$$

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<sup>8</sup> The Cobb-Douglas production function is a particular form of the production function. It represents the relationship between inputs and the amount of output that can be produced by them. Developed by Charles Cobb and Paul Douglas during 1927-1947.

<sup>9</sup> A particular for with only two inputs: Capital and Labour.

As previously stated, the condition of competitive factor's market must hold. The elasticity of substitution hence simply measures how the quantities of factors change in response to change in their relative costs.

In the case of basic Cobb Douglas production function, the elasticity of substitution is equal to 1 and it means that changes in the relative cost of capital and labour are fully offset by changes in relative quantities of K and L.

It is worth to mention now a variable of the Cobb Douglas that takes the name of constant-elasticity-of-substitution:

$$Y = A \left( \alpha K^{1-\frac{1}{\rho}} + (1 - \alpha) L^{1-\frac{1}{\rho}} \right)^{\frac{\rho}{\rho-1}}$$

In which A denotes the Total Factor Productivity<sup>10</sup>,  $\alpha$ <sup>11</sup> the capital intensity and  $\rho$  the elasticity of substitution. Considering now that:

$$\frac{MPK}{MPL} = \left( \frac{K}{L} \right)^{-\frac{1}{\rho}}$$

And, by definition, the elasticity of substitution is exactly  $\rho$ . So, when  $\rho = 1$ , the constant-elasticity of substitution is reduced to the Cobb-Douglas production function.<sup>12</sup>

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<sup>10</sup> This enhanced production function has the Total Factor Productivity, or A, as a residual, and is dependent on estimates of other components.

<sup>11</sup> Under the assumption of constant return to scale  $\alpha + \beta = 1$ . So, it is frequently used the notation  $(1-\alpha)$  to indicate  $\beta$  as in the previous equation of the basic form of the Cobb-Douglas production function.

<sup>12</sup> In this case enhanced by Total Factor productivity and simplified by the notation  $\beta = 1-\alpha$ .

$$Y = A ( K^\alpha L^{1-\alpha} )$$

### The Marginal Productivity Theory of Income distribution

As we have seen so far, each perfectly competitive producer in a perfectly competitive factor market maximizes profit by hiring labour up to the point at which its value of the marginal product is equal to the price. The same logic will apply for all the other factors. Each factor will have its own price:

- Wage for Labor
- Profit for Capital
- Rent for Land

In equilibrium condition each employer will employ labour up to the point where the value of the marginal product is equal to the wage rate and also that the marginal product of labour will be the same for all employers. The theory that each factor is paid the value of output generated by the last unit employed in the factor market as a whole is known as the **marginal productivity theory of income distribution**. In other words, workers are paid according to value of the labour that they contribute to production. Similarly to be fair, owners of other resources receive income based on the value of the resources they supply in the production process. In the marginal



productivity theory of income distribution, income is distributed according to contribution to society's output. Although this is a well-established theory, obviously it is clear that it's not so simple, eventually it's almost never true. Some objections, or better, some limitations are evident as the case of the inequality. At this regard the theory gives some explanation to wage differences:

- 1) *Talent*: an individual with some extra capability in doing his own profession (in the case of labour) will produce higher value of marginal product. This will translate in higher compensation. The extreme case anyway exists and is the case of the "superstar" or "winner takes all". The example is evident in sport in which very few individual earn the major share of the total compensation.
- 2) *Human capital differences*: this is the most common case in which an higher capability individual will generate a higher value of the marginal product through his higher level of productivity and at the end will earn more than a lower capable individual in the same field.
- 3) *Compensating differentials*: all other being equal some jobs even in the same field and requiring the same skills may be present some dangerous or peculiar conditions and this could originate some differential among the same kind of jobs.

These explanations presented above anyway will not cover the clear limitations of the marginal productivity theory of income distribution.

1) **Inequality.** Aside from their individual capabilities of mental and physical attributes, the problem is related in the opportunity to improve their own productivity through the access to education and skill enhancement programs. Ownership of property constitutes another limitation to that theory; cause is totally unequal. Many owners of land and capital resources obtain their endowment by inheritance rather than their own productive effort. Other factor contribute to the presented inequality:

- a. Sex
- b. Social group
- c. Geographic area
- d. Opportunity

2) **Market imperfections.** The theory lays on the assumptions of competitive markets. Not all factors markets are competitive. In some cases as the labour market, some employers exploit their wage-setting power or even some employers trough the labour unions or other associations pull up their wages without match their productivity level.

The question is now if the marginal productivity theory still works, it's not perfect but still it gives a good approximation and it must be emphasized that the factor distribution of income is not morally justified.

## FACTORS COMPENSATION

So far, we presented the theory behind the factor of production. Now we will analyse better the compensation for each factor. Summing up we can distinguish between human capital and physical capital, in one side then, we have labour and human capital and the other side we have capital and rent.

### Wages

Wage is the price paid from the employer in exchange for labour. Inside the concept of wage, that can take the form of direct payments, we need to add also some other forms as for example royalties and fringe benefit. Wages are usually, if not stated conversely, measured at hourly basis. The wage rate is the price paid per unit of labour service. An important distinction to do about wages is the difference between nominal and real wages that will be useful.

- *Nominal wage* is the amount of money received per hour, day or year, in other terms the current money values.
- *Real wage* is the quantity expressed in goods and services that a worker can obtain with the nominal wage. In other term the real wage reveals the purchasing power of nominal wage, it takes into account the inflation and changes in relative prices.

As already presented above wages may differ even within the same industry and within the same country due to differences. It is useful to mention that wages differ also among nations, occupations and individuals. Wage rates are higher in some countries as Germany and United States and lower in other countries as Brazil or India. Like for the prices then, can be calculated also a general level of wages that include a wide range of different wage rates.

Along this discussion we need to introduce an important determinant for wages. It is the productivity. The demand for labour depends on its productivity. There is a close long-run relationship between output per hour per worker and real hourly compensation. The economic theory says that when workers produce more real output, more real income is distributed among them. In real also suppliers of capital, land and other factors receive a share of the gain in the output. Real wages therefore not always rise in the same proportion of productivity.

Before we made the assumption of perfectly competitive market to explain how the wage rate is settled. All the counterparts are in such a way price taker. In the real world anyway some market imperfections occur. A good way to explain this concept is proceeding by extremes.

When a firm is the only employer for a certain type of labour, this particular set is named Monopsony. When, instead there are just a few employers this is the case of Oligopsony, that is then more common. In these situations, the employers have

strong market power. The counterpart to the side of workers is the case when a single union bargains on behalf of all the workers for a certain type of occupation. Here there a monopoly or oligopoly.

It is now important to say that from 1960s, union membership has not kept pace with the growth in the labour force. Some occupations then are more like to have a higher unionization rate such as in the government sector or in manufacturing. Conversely the unionization rate is lower for sectors as finance and retail.

This further distinction will be useful later to understand the importance in the bargaining process and in the participation to the unions.

One of the reasons for the decline of unionism is the structural change in the economy. From manufactory to services. Another reason is that management has massively opposed unions, subcontracted work to non-union suppliers and shifted production in low-wage nations. In the other side some non-unions firms has improved the salary condition though fringe benefits and wages treatment reduced the demand for unionism.

### Profit

Profit is the compensation for the capital factor. The definition of profit in economics is quite broad. It could be tackled by several ways carrying different shade of meaning.

We could start from the accounting perspective, in this sense the profit is the residual from total revenues after paying costs such as, materials, capital, labour etc. Economists give a narrower definition. The former definition takes into account just the explicit costs but in economics we need to add also the implicit ones. Those relates to all the opportunity costs.

Economic profit is a concepts usually related to entrepreneurship, is what determine and motivate the effort of them in the act of production of goods and services. It is then the compensation for their risk taking.

For the purpose of our study, it is worth to mention biggest sources of economic profit, that is generated as a compensation for bearing an uninsurable risk:

- Create new popular products;
- Create a strong market position in terms of power and share.
- Reduce the production costs under the competitor's level.

The points above can lead to some extra case, but still present, of superstar firm, monopoly and firms with strong market power and market share.

Our economy tough is more complex than this apparently simple representation. Economic profit are in fact widely distributed to the public, relay beyond the “entrepreneurs”. The structure of corporate business allows individuals and not to

participate in the ownership and even in the decision process. Most of these people participate for their own profit, well beyond the stricter concept of the firm.

A brief comment it's about interest. It is the price for the use of money. Money however it's not neither a resource nor a factor. It's not extensively important for our purpose.

### Rent

In economics rent has a very peculiar meaning from the common jargon. It is rent the price paid for the use of land and other natural resources. The rent like other factor is rewarded through demand and supply curves. What is really different is the fact that the supply is inelastic. By logic it is easy to see, the land and natural resources endowment is fixed. Although this feature, a little elasticity can be found, there is in fact space for improvement. The question could be if consider those improvement as capital invested on lands. this characteristic is the starting point for continuing the reflection.

Considering the supply of land as fixed, we can then imply that the determinant for the demand is only accounted on the demand. This lead to consider the supply as passive. The price then is driven by its productivity and the combination with other factors. Some example as highly explanatory. Think at a site of gold digging, a land



in Las Vegas or in the centre of Manhattan. Land has clearly a very different level of productivity.

## **FACTORS COMPOSITION**

This sequence of definitions has been important to understand better the elements that constitute the functional distribution of income.

National income is the sum of the total income generated by a country from its residents in a given year. This analysis attains at the division of the national income between its factor of production, in this case labour and capital.

One of the major contribution in the economic debate regarding the factor shares, and its importance for the growth, has been given by Karldor (1957). He stated the six famous “stylized facts”. He used them to summarize the result of the analysis of growth form the economist in that time.

- 1. Labor productivity has grown at a sustained rate.*
- 2. Capital per worker has also grown at a sustained rate.*
- 3. The real interest rate or return on capital has been stable.*
- 4. The ratio of capital to output has also been stable.*
- 5. Capital and labor have captured stable shares of national income.*
- 6. Among the fast-growing countries of the world, there is an appreciable variation in the rate of growth “of the order of 2–5 percent.”*

Until 1980s, this view was largely accepted as facts of modern economic growth. In the past decades however, several empirical evidence have challenged these facts, even if adjusted to business cycles. Kaldor recognized that even large variations would take place, but it is now evident a downward trend in many countries for which data are available.

The labour income share is the portion of the national value added that is paid in compensation to workers while the capital share of income is the share of national income that goes to capital.

These quantities gained major interest for the negative consequences that a declining labour share of income has in terms of personal distribution of income. Improvements in macroeconomic performance variables and indexes, such as the overall growth, don't translate automatically in improvement of households' income.

Atkinson (2009) treats extensively the relation of the two macro and micro distribution and the importance of the study of their link and interactions.

As I have pointed out extensively in the first chapter several authors described the role of the capital share in the increasing of inequality (B. Milanovic 2016; Piketty 2014; Stiglitz 2012). The worst consequence can be also found in the collateral effect on the macroeconomic variables and social structure as a whole (Stiglitz 2012).

Before to look to data and findings, it is important at that point to point out some methodological issue in the calculation of the factors share of income.

Several studies have tackled this problem, worth to mention IMF (2017), ILO (2019). The difficulty is that operating on a global level several challenges are encountered. First of all, and most importantly the availability of data and secondly the comparability of those data.

The first problem could be examined by two different perspective.

- The availability of data in the stricter sense. The data collecting process, especially for developed countries, started in massive way from late 80'.
- The other side of the problem regards the methodology of collecting those data, or better the measurement system.

There are main issues in calculating the factor income share: which source of data best describe what we need? The two approach most used in this sense are Household surveys or administrative-tax data. About this particular issue a big contribution has been given by the huge work of Piketty and Saez (2014). They affirm in fact that tax data underestimate high incomes, pointing out a bigger role for household surveys and other sources from particular organization as Wealth-X

and Forbes. Some recent study however showed consistency between these two kinds of measurements. Case of Belgium, Eurostat (2014)

### Labour share of income

The measurement of labour share of income (LIS) is one of the most interest in the study of the factor distribution. It's is considered in fact important to assess the economic inequality. Households do not receive neither a fixed quantity of them nor just one. In reality, and it is especially valid for last decades, the personal income is composite. However, the individuals at the bottom of the income distribution are considered to receive if nothing (except from government transfers), just the labour factor. This is the reason why the study of the LIS is important.

A proof of its growing importance is that it entered also as an indicator in the United Nations Sustainable Developments Goals<sup>13</sup>.

Now assessed the value, it remains to give a proper estimation, it could be not so straightforward. And is also been pointed out how difficult can be to have a proper estimation (Gollin 2002). The next challenge attains on how to estimate the component of the labour share from those components that could affect its calculation: the self-employed and impact of capital.

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<sup>13</sup> The NSDG are a call for actions by all UN countries. Promote prosperity while protecting the planet. There are 17 goals under the project.

### The self employment Adjustment

In the literature we find several papers on this argument, important are those of (Elsby et al. 2013)(ILO n.d.)(Piketty & Saez 2014). A raw measure of LIS can be found in several database. The starting point is the national account data where an unadjusted LIS is broadly:

$$LIS_U = \frac{\textit{Compensation of Employees}}{\textit{Gross Domestic Product}}$$

Here could be pointed out some specifications about the numerator and the denominator. Compensation of employees, as said before in the study, is the total remuneration paid by employers to employees in return for their work. Under this deflection should be accounted also the social contribution paid by the employers on behalf of the government. What is excluded then, is the compensation for the self-employed.

The denominator is the GDP and there are several reasons for this, it is worth to mention the wide availability of this data, better to use in its PPP form for a proper comparability at global level. This is used by (Cho et al. 2017; ILO n.d.) but (Bridgman 2014) that add the concept of depreciation of capital.

Back to the numerator it is now time to mention how to adjust the LIS with self-employed. The problem lays on the fact that those who works for themselves, with

their own enterprise, will receive payment for at least two factor, labour and capital in their forms of wages and profit. (Gollin 2002) states how this specification it is particularly important for middle- and low-income countries. Some estimations show how in those countries the prevalence of self-employment is higher than in high income countries. This is not good news cause those countries are those with less data.

Under the SNA<sup>14</sup> we can refer to the mixed income, that is the magnitude accrued from production of unincorporated enterprises owned by households. The same institutional proxy that the biggest part of mixed income come from the remuneration for labour.

At this point the literature provide two approaches to account for the adjusted LIS.

- The first one with a mixed income on the numerator:

$$LIS_1 = \frac{\textit{Compensation of Employees} + \gamma \cdot \textit{Mixed Income}}{\textit{GrossDomestic Product}}$$

Where  $\gamma$  is the weight to adjust the mixed income and then the overall measure.

- The other approach is instead to adjust the GDP:

$$LIS_2 = \frac{\textit{Compensation of Employees}}{\textit{GrossDomestic Product} - \textit{Mixed Income}}$$

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<sup>14</sup> System of National Accounts

- A particular case is when the labour share of the mixed income is the same as in the employee sector and then we'll have:

$$\gamma = \frac{\text{Compensation of Employees}}{\text{GDP} - \text{Mixed Income}}$$

The problem at this point lays only on the choice of  $\gamma$ . This is not the end of the story because few problems are still arising. The mixed income is still hard to be measure in a very consistent way, even under the common framework of the SNA. Many countries in fact are reporting the self-employed under different accounts. Another source of problem touches the extremely delicate case of the underground business activities.

- A third adjustment can be done substituting the mixed income with the share of the self-employed:

$$LIS_3 = \frac{\text{Compensation of Employees}}{\text{GDP}} \cdot \frac{\text{Share of Employees} + \gamma \cdot \text{Share of Self employed}}{\text{Share of Employees}}$$

This latter version considers, on average, that the self-employed earn the same labour income share as the one paid in compensation to employees.

It can be argued that there are some limitation, but still, this method is used as a starting point for many countries and international organizations as IMF, ILO and



European Commission. Every institution later makes its own adjustment based on the country data. The third approach LIS<sub>3</sub> it can be considered the rule of thumb.

### The Capital Adjustment

Other than for the self-employment, another important adjustment is discussed in the literature, that of the capital depreciation. (Bridgman 2014; Karabarbounis & Neiman 2013a) add to the discussion an important contribution. The role of depreciation of capital if taken out from the account in the calculation of LIS, produce a less steep decline of the latter. The logic behind that is that the depreciation can't be consumed so it is neither labour nor capital. Considering this, the modern times are constituted of more technological intense capital like computers and IT but, most of all, this kind of capital has higher depreciation rate. Another contribution is that this capital, is even less priced and this leads firms to buy more equipment and then depreciate more. This combination leads to increase both capital and depreciation share of output. Formalizing:

$$LIS_4 = \frac{\text{Compensation of Employees}}{GDP - \text{depreciation}} \cdot \frac{\text{Share of Employees} + \gamma \cdot \text{Share of Self employed}}{\text{Share of Employees}}$$

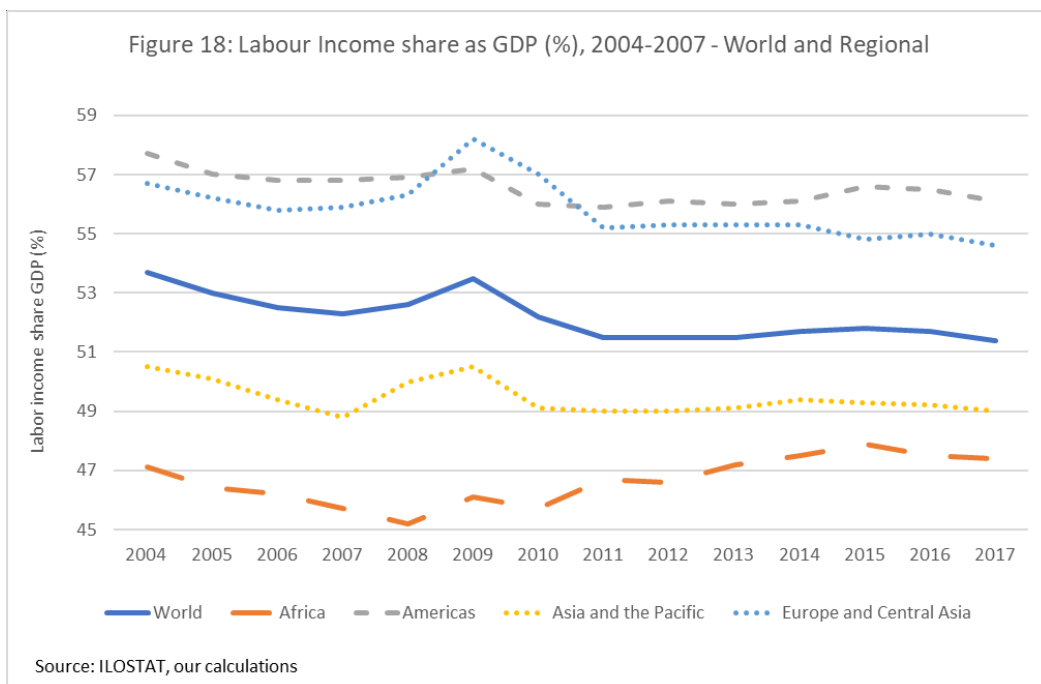
## CHAPTER 4 - INEQUALITY OF FACTOR DISTRIBUTION OF INCOME

### Labour Income Share

The global labour income share is in downward trend, something started to happen around the 80's with a global decline occurring within the large majority of countries and industries.

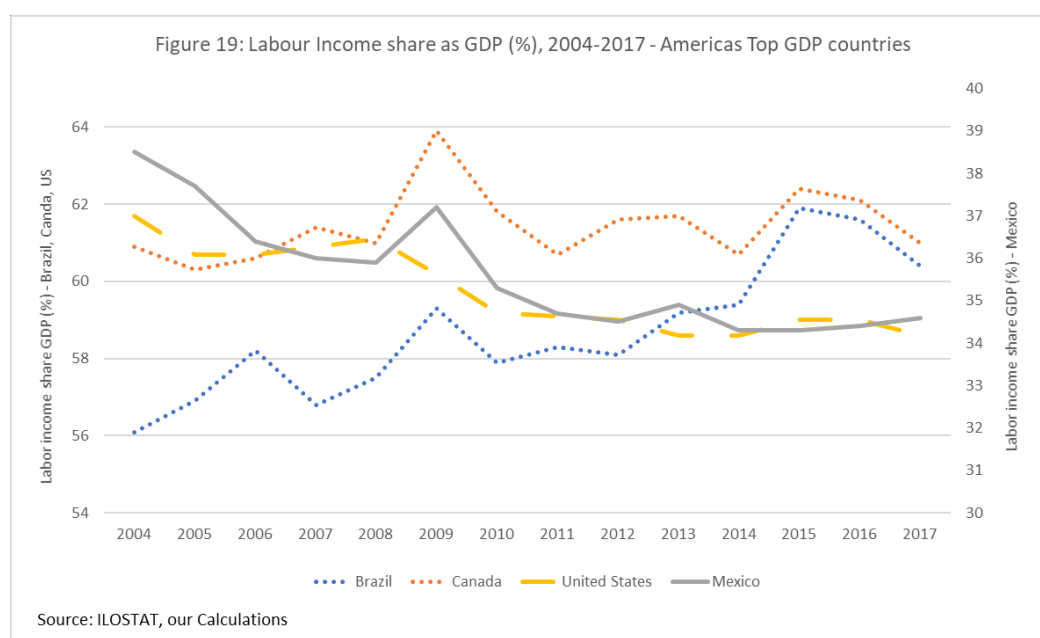
Recent data show the trend at global level, from 2004 to 2017. (ILO n.d.)

According to the (*Figure 18*), the decline is mostly driven by Europe and Americas.



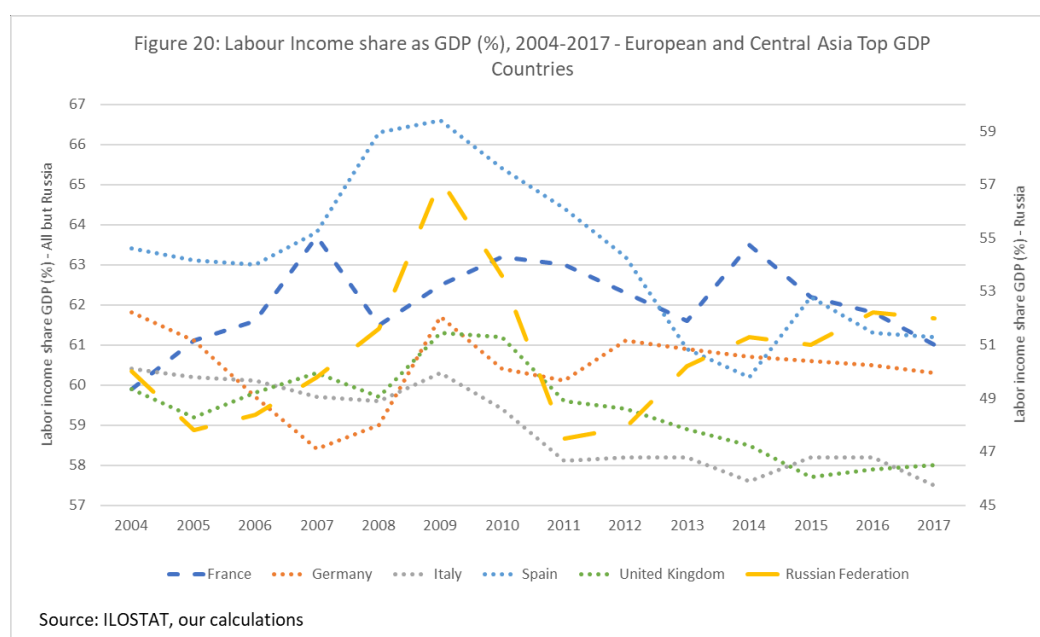
At global level the LIS as percentage of GDP decreased from 53.7% to 51.4%. Both Asia and America lost 1.5% while Europe and Central Asia left behind Almost 2%. Africa instead increased its level by 0.3%.

Looking better to the Americas top GDP countries (*Figure 19*), restricting the sample to Unites States, Canada, Mexico and Brazil, since 2004, the share of income of the United Stated declined by three percentage points, from 61.7% to 58.6%. Mexico also declined but more than the US by four percentage points, down to 34.6 % and it is showed in the second vertical axis. A different pattern is presented by Canada that its LIS remained pretty constant, despite the countercyclical effect of the financial crisis. Its level is around 61% and surpassed the LIS of US during the time period.



Surprisingly Brazil showed a different trend from other economies with its upward trend. Brazilian LIS increased by 4.3 percentage points, very close to the Canada level.

A valid consideration can be done also for European top GDP countries, ranked by their GDP: Germany, United Kingdom, France, Italy, Russia and Spain. (Figure 20)



Here it is more evident the countercyclical increase between 2007 and 2010.

Russia is the only country in the sample that shows an increase in the LIS, it is presented using the right axis' having a different scale of percentage. Its labour share increased by two percentage point, from 50% to 52%. The France also increased the percentage level more modestly, by 1.1 % reaching 61%. All the other countries shared the left vertical axis and also a same decrease trend. The worst

performer is Italy marking a minus 2.9% followed by the Spain that started with the highest level. United Kingdom and Germany instead decreased respectively by 1.9% and 1.5%.

Following the same procedure is possible to highlight the behaviour of some Asian and Pacific countries, picking them from the largest in terms of GDP. (Figure 21)



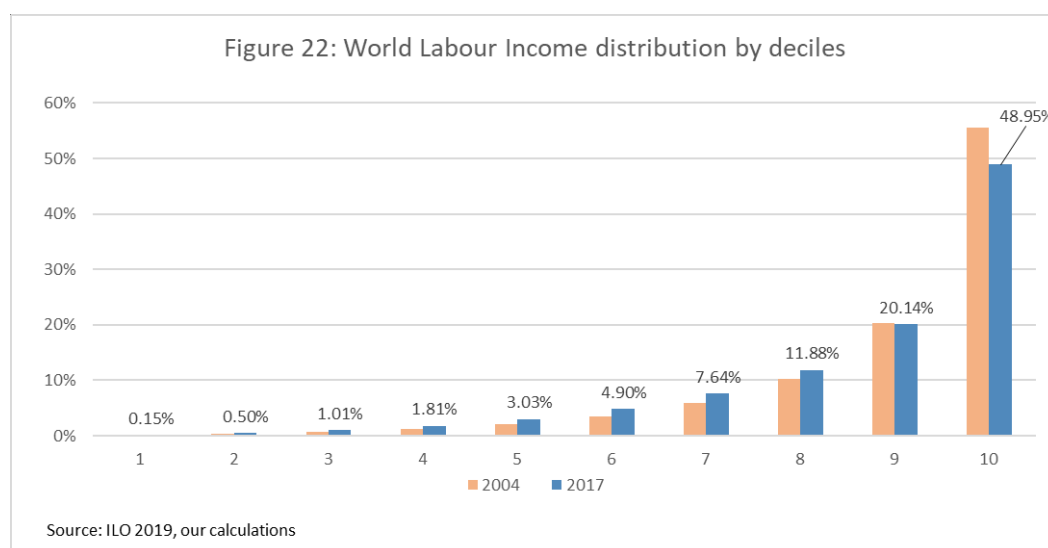
I choose to present China, India, Japan, Korea and Australia, essentially those countries who are member of OECD plus China and India.

The trend of the India is particularly dramatic, showing a decrease of almost 10 percentage points. Australia follows with a minus 2.7%. Japan is almost stable, and China instead show an increase, a plus 1.4% reaching 51.3%, almost close to the

level of Russia, but still far beyond the level of United States and most of other Western European countries.

### *Distribution*

Globally in the 2018, 58% of the WAP<sup>15</sup> were employed, in numbers almost 3.3 billion workers. For many of them, wages represented the main source of income. It becomes now interesting to observe how the LIS is distributed, and the result as expected is that the labour income is unevenly shared.



The graph (*Figure 22*) tells us that the top 10% earned in the 2017 48.95% of all labour income where the bottom 10% just 0.15%. Also, the bottom 50%, cumulatively represents only the 6.5% of the total. Another important insight tells

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<sup>15</sup> Working Age Population.

us that the ratio between the top 10% and the rest of the distribution cumulated it is almost 1:1.

Converting the data from the percentages to PPP US \$<sup>16</sup>, the bottom decile earns monthly, an average of 22 \$ whereas the top 10% earns monthly an average of 7.475 \$. The ratio between them is therefore 339 times. This number should remind us another indicator very close to it, the ratio between the wage of the top company CEOs and their own average workers, which roughly 300 times<sup>17</sup>.

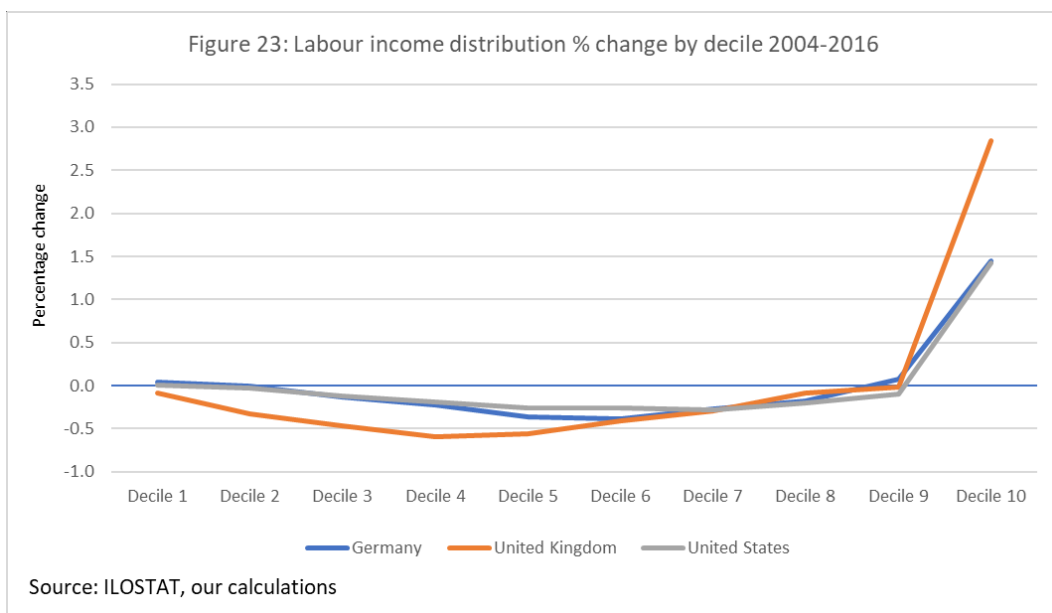
The distributions by deciles follows almost an exponential curve. Another fascinating index can be represented by a Kutznez Ratio, composed by considering the top 10 of the distribution divided by the bottom 50%, obtaining 7.5, obviously shorter than the previous but still indicative of the magnitude of the phenomenon. It is important to mention that from 2004 to 2017 some improvements have been made at intra-distribution level; the top decile has left 6.6% but this hasn't gone to the bottom ventile at all. As we know in fact most of the effect has been due to the China and India economic development that interested from the third to the sixth decile of the distribution, leaving in practically the same condition the first two deciles, in practice, most of the African continent and some other extremely poor countries. As a matter of fact, the countries with the most unequal distribution are

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<sup>16</sup> Purchasing Power Parity.

<sup>17</sup> Education Policy Institute of 2019 about the gap between the salary of the top US company CEO's and their average worker.

Congo DR, Cote d'Ivoire, Liberia, Niger and Uganda. Another curious remark can be made, among other, for Germany, United States and the United Kingdom in which the evolution of the labour income distribution between 2004 and 2016 shows losses for middle and lower-middle class and large gains for the top, following a so-called Hockey-stick pattern. (Figure 23)



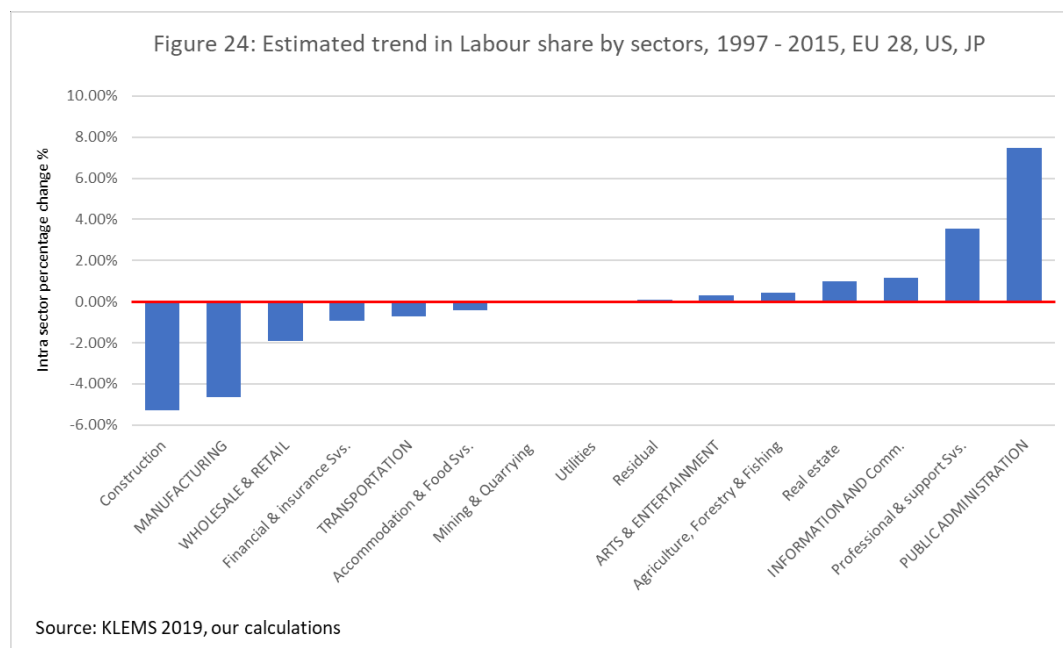
From the graph above it is evident how for those selected countries, three of the most developed economies in the OECD, almost all deciles but the top one experienced a decline in the income share.



### Industries analysis

An analysis of the evolution of the labour income share can be perpetrated at industry level. Following the work of IMF (2017). This is an interesting analysis to understand other than at country level, how the LIS has evolved across industries. To do so, I used as in the relevant literature data from the KLEMS 2019, that cover all EU28 Member States and add also comparable data for Norway, Japan and US. I choose this database because it adheres to the definition of LIS discussed so far and let this analysis be consistent with all the work done. The KLEM classification divides the economy in 14 economic sectors. As presented in the graph (*Figure 24*) there are fourteen sectors identified, some of them with the Capital letter, aggregated sectors, and other with lower letters that identify not aggregate data. There is another sector that is instead a residual. In this sense we calculated these values subtracting the sum of the output of all industries to the total gross value added of a country. This idea gives the possibility to understand both the quantity of the non-accounted component of the output produced by industries and also to calculate more precisely the other values. The choose of this database lays also on the fact that is consistent with other indexes of industries categorizations as for example the QUALI, EU SES and EU SILC. The same database take data for the

US from the BEA<sup>18</sup> and the BLS<sup>19</sup>. The data are present for the years 1995 to 2017. I choose just data from 1997 to 2015 to have data for all the countries considered. Presenting the data what we found is that for the countries considered, the sector that has lost the largest proportion in term of LIS has the Construction sector that left -5.30%. The construction sector is followed by the manufacturing sector that include many industries as Food & beverages, Textiles, Chemicals, Computer & electronics etc.



The primary sector as Mining and Quarrying and Agriculture, forestry and fishing has maintained his position with a slightly growth. Some sector instead has gained

<sup>18</sup> Bureau of Economic Analysis

<sup>19</sup> Bureau of Labour Statistics

position and value. Real estate, information and communication grew by a respective 1% and 1.2%. The real winner in terms of growth of LIS has been the Professional and support sector and the public administration, that register a +3.5% and a 7.5%. It is worth to mention that the public administration is aggregate and include several subsectors as Defence and social security, Education and Health. This study gives a deeper understanding of the evolution of the LIS and gives insights and new ideas for further and more precise studies to identify in the sectors that more of them lost the most such as the Construction and manufacturing. One probable explanation according also to other studies for example (Autor & Salomons 2018; Autor & Dorn 2013) is that these are more labour intensive sectors with a high automation and robotization rate.

Table 2: Industries division KLEM 19

Sort_ID	indnr	code	desc
1	Agg	TOT	TOTAL ECONOMY (A-U)
2	*Agg	TOT_IND	TOTAL INDUSTRIES (A-S)
3	*Agg	MARKT	MARKET ECONOMY (all industries excluding L, O, P, Q, T, and U)
4	1	A	Agriculture, forestry and fishing
5	2	B	Mining and quarrying
6	Agg	C	TOTAL MANUFACTURING
7	3	...10-12	...Food products, beverages and tobacco
8	4	...13-15	...Textiles, wearing apparel, leather and related products
9	5	...16-18	...Wood and paper products; printing and reproduction of recorded media
10	6	...19	...Coke and refined petroleum products
11	7	...20	...Chemicals and chemical products
12	8	...21	...Basic pharmaceutical products and pharmaceutical preparations
13	9	...22-23	...Rubber and plastics products, and other non-metallic mineral products
14	10	...24-25	...Basic metals and fabricated metal products, except machinery and equipment
15	11	...26	...Computer, electronic and optical products
16	12	...27	...Electrical equipment
17	13	...28	...Machinery and equipment n.e.c.
18	14	...29-30	...Transport equipment
19	15	...31-33	...Other manufacturing; repair and installation of machinery and equipment
20	16	...D	...Electricity, gas, steam and air conditioning supply
21	17	...E	...Water supply, sewerage, waste management and remediation activities
22	18	F	Construction
23	Agg	G	WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES
24	19	...45	...Wholesale and retail trade and repair of motor vehicles and motorcycles
25	20	...46	...Wholesale trade, except of motor vehicles and motorcycles
26	21	...47	...Retail trade, except of motor vehicles and motorcycles
27	Agg	H	TRANSPORTATION AND STORAGE
28	22	...49	...Land transport and transport via pipelines
29	23	...50	...Water transport
30	24	...51	...Air transport
31	25	...52	...Warehousing and support activities for transportation
32	26	...53	...Postal and courier activities
33	27	I	Accommodation and food service activities
34	Agg	J	INFORMATION AND COMMUNICATION
35	28	...58-60	...Publishing, audio-visual and broadcasting activities
36	29	...61	...Telecommunications
37	30	...62-63	...IT and other information services
38	31	K	Financial and insurance activities
39	32	L	Real estate activities
40	33	M-N	Professional, scientific, technical, administrative and support service activities
41	Agg	O-Q	PUBLIC ADMINISTRATION, DEFENCE, EDUCATION, HUMAN HEALTH AND SOCIAL WORK ACTIVITIES
42	34	O	Public administration and defence; compulsory social security
43	35	P	Education
44	36	Q	Health and social work
45	*Agg	R-S	ARTS, ENTERTAINMENT, RECREATION; OTHER SERVICES AND SERVICE ACTIVITIES, etc.
46	37	R	Arts, entertainment and recreation
47	38	S	Other service activities
48	39	T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
49	40	U	Activities of extraterritorial organizations and bodies
991	*Agg	C20_C21	...Chemicals; basic pharmaceutical products
992	*Agg	C26_C27	...Computer, electronic, optical products; electrical equipment
993	*Agg	D_E	Electricity, gas, steam; water supply, sewerage, waste management

Note: \*denotes aggregates not defined by Eurostat.

### *Why is declining?*

In the section before we used the biggest source of data, from International Labour Organization. These data limited the analysis to a limited period, 2004-2017. In this sense it is sacrificed the time span in order to obtain more completed data. Broadening the view to a longer time period we use other data, most of them focus mostly on the most advanced countries, that collected more data during time.

The labour share of income is declining since 1980 in those most advanced countries, recent data show anyway that also emerging countries are following the same pattern, exception for the poorest countries. Most importantly, future data are likely to show an even worse situation after the aftermath of the ongoing pandemic crises.<sup>20</sup>

As explained by data the decline of the labour share is a global phenomenon. It can be analysed however by different perspective. This means to focus both at country level and at industry level.

At cross-sectoral level, we could look if it has been a shift between sectors. To better understand this point we might imagine the evolution of the agricultural sector in the last century. In this sense hundred years ago the labour intensity of that sector was higher and then fall dramatically, essentially thanks to the advent of more

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<sup>20</sup> A theory of the two pandemics of Robert Reich.

technological solutions and more productive.<sup>21</sup> The other explanation, the shift between sector could be made instead thinking at the effect of the industrialization, that drained workers from the fields and employed them into factoring, shifting from agriculture to manufacture.

The last consideration can be made looking at the micro level, or firm level. In this sense we have to take into consideration the evolution of the task within companies.

From the side of countries, we can use the countries-based distinction of the World Bank. So, differentiating countries in Advanced economies, from now on AE, and Emerging market and developing countries, from now on EMDE.

The other distinction attain the cross sectoral level and we can use the work of Alvarez-Cuadrado, Long, and Poschke (2015) and by Yoko Oishi (2018). These allow us to make cross sectoral distinction, for the former between Manufacturing vs Services and for the latter between Primary, Secondary and Tertiary sectors.

The last category in which this phenomenon has evolved attain on the different level of skills of workers. In this case we can make the differentiation between low skilled, medium skilled and high skilled jobs.

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<sup>21</sup> Introduction of the tractor that replaces the ox-drawn plough.

These three distinctions based on country, cross-sector level and workers-skill will represent a useful differentiation to assess the impact, that will help us to understand better the evolution of LIS and its determinants.

This differentiation it is particularly useful for the analysis. First because give us different perspective of the effects of the analysis based on the different point of view. Second because this differentiation gives an important contribution toward the implementation for some tailored solution to address the impact of this phenomenon extremely complex.

It is critical to understand how the possible explanations of the LIS declining, operate with different intensity in a such heterogeneous economic environment in which different economic agents act. It is anyway true that, behind the different explanations presented below, they are all linked one another. So, the right mindset in which read the flowing explanations it is an holistic one. Rather than consider one determinant as separated by others, it is useful to consider how they are linked. For stylistic needs different drivers will be presented in separate sections, but it is a pure formal convention. All the explanations are deeply linked.

## Main Drivers and most recognised

### *Globalization*

Since the fall of the Berlin Wall, in 1989, has been clear that the world started to change. As showed by different studies from 80's we observed the downturn of the labour income share, it remained to assess if there is a causal effect of the globalization on the functional distribution of factors. Countries started a process of fast and deep integration with a turning point with the access of the China in the WTO in 2001. A massive new variable in the global scenario as a workforce and as market. This pushed high pressure on manufacturing countries as noted also by Gutiérrez & Philippon (2017).

The effect of this driver could be distinguished for AE ad for EMDE. For the first group in fact the effect of globalization resulted in a boost of trade. This openness gave the opportunity to firms and especially for big corporations to exploit the possibility given by the fall of political blocks and a sensible lowering of tariffs. This allowed to have firstly gained market share and secondly the possibility of lowering the cost of production by off-shoring towards countries with lower labour cost, (Elsby et al. 2015). The result was a shift from more labour-intensive activities, delegated to emerging countries, to more capital-intensive activities.

Another effect of the Globalization attains the financial integration, as stated above, this allowed much more mobility of capitals to capital-scarce countries. This



resulted on lowering the cost of capital in that countries. Lower cost of capital in one side, had a positive effect of capital deepening for EMDE, but in the other side has induced a greater substitution of labour with capital. The latter is the explanation because also EMDE faced an overall decline in labour share, but in lesser extent. These countries had their advantage in lowering labour cost, but the major number of jobs were based on routinized task. This peculiarity combining with a lower cost of capital resulted in slow but still substitution of low skilled jobs by less costly machineries. For EMDE globalization seems to be the major driver for the declining of LIS, due also to the participation on global value chain that had the effect of raise the capital intensity on the production process, Mai Chi et al, (2017 IMF)

#### *Technological advancement*

The impact of technological change had a big role as well in the downturn of LIS. From an historic point of view, technology have a dual effect: in one hand increase the productivity of workers and in the other hand accelerate the evolution of jobs. With the evolution of job, we should take into account each the short-run effect, usually more destabilizing, and the following long-run effect that puts all back in equilibrium.

In the last 35 year the rate of technological advancement has increased dramatically.

The advent of the ICT, AI and robotics have exacerbated the natural process of the evolution of jobs.

For our analysis is useful to focus on how the technology affected the LIS and again we need to come back to the country-based differentiation.

For AE the effect of Technological change represented a more important factor in respect of EMDE in shifting the LIS. This fact could be explained by the decline in the relative price of investment goods. Resulting in shifting firms from labour to capital, Karabarbounis & Neiman (2013a). Think to some of the technology that we use today as the most basic PC and the world of the Information Technology. For the former, is well known how during last 30 years, first the dimension and second the price has declined. For the latter we can imagine on how some technologies had practically lowered if not cancelled some costs. Think at the e-mail and new software that has innovated and speeded some processes.

Another factor that technological progress has affected attain at the exposure of some jobs to routine. In this case think at the classical example of the bank teller. A medium skilled worker with a medium salary. Practically the evolution of tech have changed his job, Das & Hilgenstock (2018).

These two components of tech change have affected more AE, just for the fact that EMDE were at early or medium stages of developing process and less exposed to routinized tasks.

All that being said is demonstrated among the AE, by the heterogeneity of the effect of tech on different economies, still advanced. However, on average this driver accounts for half the decrease of LIS in AE. For this group of countries so the Tech driver seems to be the major responsible.

The two-driver presented above represent the two major driver for the LIS. These two components represent with broad consensus in the economics and among academics, the main causes that explain the evolution of LIS. Recent studies anyway found new hypothesis with strong argumentation and robust analysis. It is worth to mention again how Globalization and Technological progress are interrelated and how the same reason could be applied for all the other explanations.

#### *Market concentration and firms' behaviour*

The behaviour of firms has been largely documented in its role to influence the labour share of income. Autor et al. (2017) suggest that market concentration has increased for a small number of firms. Possible explanation for this has been found on the diffusion of new competitive platforms, the proliferation of information intensive goods that have high fixed and low-marginal costs, or even in increasing competition, due to rising international integration of products market. New

technologies have also gave the strength in exploiting new models of productions for which there are high berries in entry.

To reach this conclusion, for each US firms but also for twelve of the most representative economies of OECD, have been analysed data at sector level. The analysis of manufacturing, sales, finance, services, utilities, retail and wholesale sectors, show an upwards trend in concentration. This led to higher mark-ups for those firms lowering the competition. These firms, where concentration has risen the most, show the sharpest fall in the labour share. This conclusion has added another level of firms that exploit even more their market power. The superstar firm. (Autor et al. 2020) presented the Superstar effect by which, an even smaller group of firms, in one side, accrue their market share and power by competitive advantage and, in the other side put in place some anticompetitive practices. This ultimately led to negative effects on LIS through a negative relationship between a firm`s market share and its labour share. Rising in concentration and falling LIS then should move together, both in aggregate industry level and in between industries. About the anti-completive practices also Barkai (2016) document how those superstar firms prevent potential competitors from entering the market through lobbying the regulators. Putting high barriers let them to have higher power until monopolist position that will give rents and therefore lowering the labour share.

The rise of the market power and the effects and the macroeconomics effects that ultimately affect the labour share is documented also by De Loecker et al. (2017). In their analysis is set clear how those firms that can command the price above marginal cost will product less output, lowering consumer welfare and ultimately leading to shifts in factors` demand.

#### *Institutional driver*

If there are evidences about the rising in market power and in market share from firms it could be interesting to look at the effects on labour market. Before we analysed the effects of the market power on the labour share of income through the macroeconomic process. Now, the literature suggests that another factor, the decline in worker power and the unionization intensity could have played also a major role. Stansbury and Summers (2020) pointed the double role of the bargaining power as driver of the declining labour share. In one side they co-caused the raise in market power with all the effects already stated above. In the other side led to a more frequent “ruthless” management practice. Income has been redistributed from workers to capital owners leading to a fall in the labour share.

A institutional driver also the role of government policies and labour legislation contributed to the bargaining power hypothesis. In the last 30 years in most of

advanced countries new legislations about labour have took place that push towards more flexibility e and less protection.

### Capital share of Income

The capital share of income is accounted as a residual part of factor income share.

Following the discussion above, by logic, if there is a declining in the labours share of income it means that as an effect has been an increase in the capital share.

The capital share of income is though increasing, and this view is supported by several authors. Piketty and Zucman (2014) shared the view of the accumulation of capital, (Karabarbounis & Neiman 2013a) focused more on the price of investment goods that fall in recent years and this led to more investment and the in more capital income. These two main points of view are share by others but even if present different conclusion the result for them it is pretty the same. The equilibrium between labour and capital share has changed over time.

(Bengtsson et al. 2020) presented some explanation for what determined the capital share but under a long run perspective. They followed a distinction that separates proximate, or short-run factors, from fundamental causes.

As for the labour share the institutional factors are important is the evolution of the capital share. Politics and policies, made by left parties, and unionization represent central determinants. In this sense they have a negative effect on the capital share

as are linked with more government spending, higher marginal taxation and more bargain towards a higher wage setting and more weight for workers.

### The Role of the Rent

The discussion so far attained labour and capital factors. We need to bring in the discussion also the rest. It has been described in a previous section but with the latest information can be drawn a much clearer picture of the distribution of factors' income. So far, I presented literature and economics about the factors' share about labour and capital as a residual. Well in the discussion we need to add the concept of land and the rest. Rognlie (2015) and Stiglitz (2015) introduced the importance of this variable in the distribution of income with their critiques to Piketty view of accumulation of wealth and in the missing clear distinction between capital and wealth. Land as we know attain land itself but also natural resource and even the land the allow capital to accrue its value or vice versa. The economic theory even before those last authors (Hotelling 1931) predicted that the price of natural resource should increase over time due to their own scarcity. This is caused also by the essential allocation of them over time, think about the fossil fuels under which a rising cost could help even to switch to cleaner solutions. The price of land should increase also in the absence of their increasing scarcity relative to labour and capital.

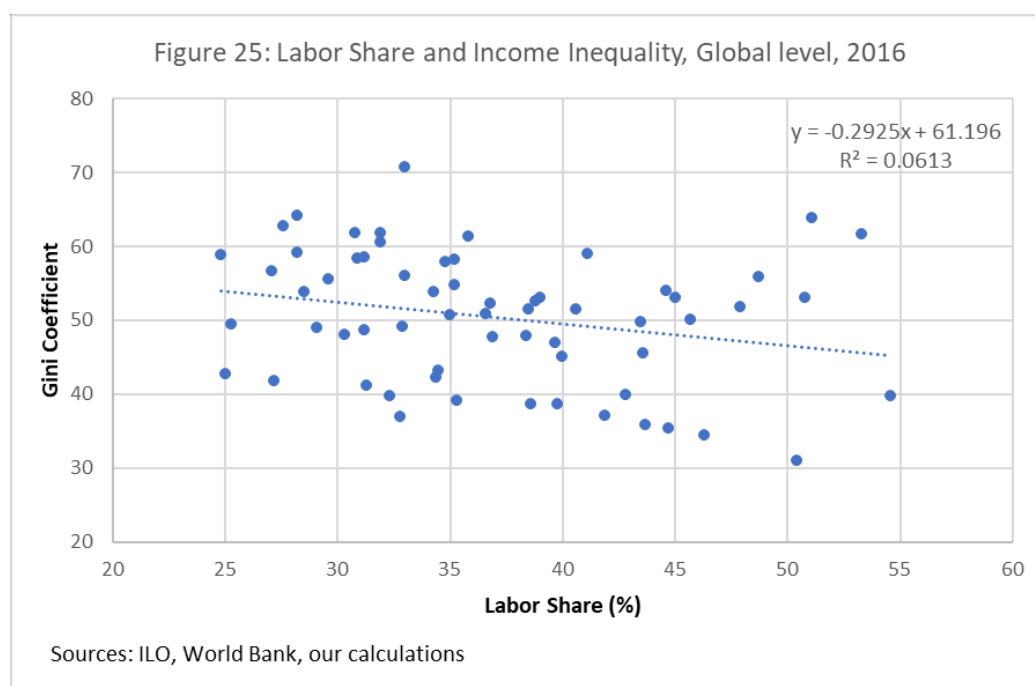
Something its occurring rather just a simple increasing price, it could be called Exploitation Rents.

To better understand this last point, we can refresh the memory to the Gilded Age, where in the 19th and 20th centuries few rich capitalists as Rockefeller and Carnegie based their own fortune on monopoly capitalism. This lasted until monopoly breakers took place in the US congress in the 30s. Today, new forms of capitalism are growing and are more difficult to broke. The globalized world exploits the lack of coordination of singles governments. This is true for many different sectors, sales, technology, housing, finance etcetera. The economic evidence of the rent exploitation theory lays on the marginalist theory. The case in support is that huge increase in compensation in not justified by their increase in productivity.



## RELATIONSHIP BETWEEN THE TWO DISTRIBUTIONS

So far, I discussed the nature of the distributions of income. Their economic meaning and the literature produced so far. I presented also latest data from the most completed sources and I analysed the feature of the two distribution. Atkinson (2009) brings back the importance of the relationship between the two distributions. Following Abdih and Danninger (2017) I analysed the correlation between the income inequality measured with the Gini index and Labour Income Share. The sample is composed by 67 countries that represents half of the global population and 69% of the world GDP. The year considered is the 2016. (Table 3)



This is the year for which the most data are accounted for the two distribution. The source of data is the ILOSTAT database for the labour income share and the World Bank WID for the GINI.

As can be see form the graph (*Figure 25*), the data shows a negative correlation between the GINI coefficient and the labour share.

Table 3: Data of GINI and Labour Income Share for 63 countries, 2016

2016						
Country Name	Population	Tot pop %	GDP	Tot GDP %	Gini	LIS
Albania	2876101	0.039%	36089108511	0.031%	33.7	53.3
Argentina	43590368	0.587%	1.01084E+12	0.860%	42	60.1
Armenia	2936146	0.040%	33187468758	0.028%	32.5	46.6
Austria	8736668	0.118%	4.68199E+11	0.398%	30.8	61.8
Bangladesh	157970840	2.128%	6.19293E+11	0.527%	32.4	42.4
Belarus	9501534	0.128%	1.69342E+11	0.144%	25.3	49.5
Belgium	11331422	0.153%	5.66646E+11	0.482%	27.6	62.7
Bolivia	11031813	0.149%	90489007926	0.077%	44.6	54
Brazil	206163058	2.777%	2.97832E+12	2.533%	53.3	61.6
Bulgaria	7127822	0.096%	1.46101E+11	0.124%	40.6	51.4
China	1378665000	18.570%	1.85952E+13	15.817%	38.5	51.5
Colombia	48175048	0.649%	6.90702E+11	0.588%	50.8	53.1
Costa Rica	4899345	0.066%	91089316437	0.077%	48.7	55.8
Croatia	4174349	0.056%	1.06359E+11	0.090%	30.9	58.3
Cyprus	1170187	0.016%	30993595379	0.026%	32.9	49.2
Denmark	5728010	0.077%	3.11271E+11	0.265%	28.2	59.1
Dominican Republic	10397743	0.140%	1.68096E+11	0.143%	45.7	50.1
Ecuador	16491115	0.222%	1.90499E+11	0.162%	45	53
El Salvador	6356143	0.086%	52817198695	0.045%	40	45
Estonia	1315790	0.018%	42378216126	0.036%	31.2	58.5
Eswatini	1113984	0.015%	9269579626	0.008%	54.6	39.7
Finland	5495303	0.074%	2.53364E+11	0.216%	27.1	56.6
France	66724104	0.899%	2.93015E+12	2.492%	31.9	61.8

2016						
Country Name	Population	Tot pop %	GDP	Tot GDP %	Gini	LIS
Germany	82348669	1.109%	4.29024E+12	3.649%	31.9	60.5
Ghana	28481946	0.384%	1.34552E+11	0.114%	43.5	49.7
Greece	10775971	0.145%	3.02961E+11	0.258%	35	50.7
Honduras	9270795	0.125%	50021631004	0.043%	51.1	63.8
Hungary	9814023	0.132%	2.79912E+11	0.238%	30.3	48.1
Indonesia	261554226	3.523%	2.75448E+12	2.343%	38.6	38.6
Ireland	4755335	0.064%	3.47304E+11	0.295%	32.8	36.9
Israel	8546000	0.115%	3.2793E+11	0.279%	39	53
Italy	60627498	0.817%	2.48801E+12	2.116%	35.2	58.2
Kazakhstan	17794055	0.240%	4.30809E+11	0.366%	27.2	41.8
Latvia	1959537	0.026%	53919310514	0.046%	34.3	53.8
Liberia	4586788	0.062%	6955202194	0.006%	35.3	39.1
Lithuania	2868231	0.039%	91746520516	0.078%	38.4	47.8
Luxembourg	582014	0.008%	66089784851	0.056%	33	56
Malawi	17205289	0.232%	17628557559	0.015%	44.7	35.4
Maldives	475513	0.006%	8361350069	0.007%	31.3	41.1
Malta	455356	0.006%	18568271705	0.016%	29.1	49
Mexico	123333376	1.661%	2.42142E+12	2.060%	46.3	34.4
Mongolia	3056359	0.041%	33437836058	0.028%	32.3	39.8
Netherlands	17030314	0.229%	9.21362E+11	0.784%	28.2	64.2
North Macedonia	2080745	0.028%	31985122234	0.027%	34.5	43.2
Norway	5234519	0.071%	3.24594E+11	0.276%	28.5	53.8
Panama	4037078	0.054%	1.18439E+11	0.101%	50.4	30.9
Paraguay	6777872	0.091%	82404016358	0.070%	47.9	51.8
Peru	30926032	0.417%	3.83597E+11	0.326%	43.6	45.6
Poland	37970087	0.511%	1.09255E+12	0.929%	31.2	48.6
Portugal	10325452	0.139%	3.29252E+11	0.280%	35.2	54.7
Romania	19702267	0.265%	4.96286E+11	0.422%	34.4	42.3
Russian Federation	144342396	1.944%	3.75031E+12	3.190%	36.8	52.2
Rwanda	11668818	0.157%	22760357451	0.019%	43.7	35.8
Serbia	7058322	0.095%	1.13847E+11	0.097%	38.8	52.6
Slovenia	2065042	0.028%	72307561070	0.062%	24.8	58.8
Spain	46484062	0.626%	1.79069E+12	1.523%	35.8	61.3
Sri Lanka	21203000	0.286%	2.60531E+11	0.222%	39.8	38.7
Sweden	9923085	0.134%	5.17153E+11	0.440%	29.6	55.5
Switzerland	8373338	0.113%	5.57418E+11	0.474%	33	70.8
Thailand	68971331	0.929%	1.15856E+12	0.985%	36.9	47.7
Turkey	79821724	1.075%	2.12303E+12	1.806%	41.9	37
Uganda	39647506	0.534%	82272496518	0.070%	42.8	39.9
Ukraine	45004674	0.606%	4.92212E+11	0.419%	25	42.7
United Kingdom	65611593	0.884%	2.97646E+12	2.532%	34.8	57.9
United States	322941311	4.350%	1.90675E+13	16.219%	41.1	59
Uruguay	3424132	0.046%	71434828370	0.061%	39.7	46.9
Share of tot Population %		49.497%		68.558%	share of tot GDP %	

## CONCLUSIONS

The aim of this study was to deepen the role between the functional distribution of income and the personal distribution of income. The literature on their interactions is quite recent and methods of settling their mutual proxies are still in development. At my choice, however, it was to tidy up the literature and analyse the latest available data. To this end, a qualitative and quantitative analysis was carried out on the inequality of the two distributions. The data show that at the distribution level the two aspects of income are positively correlated, albeit still weakly. This, however, provides an important boost in the need to deepen the issue and develop new methods. At the level of the two individual distributions, this study has made the studies already produced by the literature more up to date. As for the personal distribution of income, income and wealth inequality is still growing and there seems to be no signs of recession in any of the big economies. Seven years after the publication of Piketty's book, the direction still seems to be the same. This study wanted to emphasize much more the aspect of functional distribution. In this respect, has been summarized on the one hand the theory and on the other hand has been made a review of the state of the art of the subject regarding the methodology for calculating labour income share. At global level, but also between states and between economic sectors, it is showed that the share of income that is going to work is fallen. On the contrary, it seems that the share of income going to the

residual part, in this case capital has increased. It is necessary to be careful at this point to consider the part that goes to capital and make the further distinction between capital in the strict sense, and the land. The latter seems to acquire an ever-increasing importance that in the future could acquire an increasingly decisive role in the distribution of income. This led us to list the factors that most influenced this inequality in distribution that are both political, social and economic. In this respect, one recommendation that could be made is to continue to study the effects of technology and all that it entails in the world of work in the near and distant future. Some important studies have been done and it is important to take appropriate and imminent measures also in the face of the pandemic that is accelerating all these processes of digitization and automation.

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