

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics Theories



Bachelor Thesis

The Distribution of Income

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Thesis title

The distribution of income – from Pareto to Piketty

Objectives of thesis

The main objective of this thesis is to observe the impact of income distribution on the economic growth of EU countries with particular emphasis on the Czech Republic since the inception of its membership in the EU. The research also aims to examine whether the policy measures put in place by the Czech government can help reduce the gap between the rich and the poor and finally compare the income distribution pattern across the EU economic block.

Methodology

The methodology for the study will involve collection of secondary data from earlier studies through literature review. This will be followed by the analysis and interpretation of the said data with a view to making inferences and conclusion regarding the economic applicability of Pareto's and Piketty's principles.

The proposed extent of the thesis

30-40

Keywords

Pareto, Piketty, Inequalities, debt, money, Wealth, Income distribution, wages, Capital

Recommended information sources

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Declaration

I declare that I have worked on my bachelor thesis titled "Distribution of Income" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break copyrights of any their person.

In Prague on 13/03/2021

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Distribution of Income

Abstract

Countries in Europe and elsewhere have come up with a number of economic policies to bridge the income inequality gaps in their different countries. This area of study has attracted the interest of French economist, Piketty among others. This study examines the income inequality profile of six European Union (EU) countries, namely, Czech Republic, Austria, Germany, Slovakia, Poland and Hungary. Secondary data for the study was source from EUROSTAT for 2017 to 2019. The income inequality profile was determined using income by deciles and quintile share ratio. The results reveal that Germany recorded decrease income inequality over the three-year period, whereas the other countries including the Czech Republic experienced fluctuating income inequalities. It is recommended, that individual EU countries should adopt more sustainable fiscal and monetary policies to reduce the income inequality gaps.

Keywords: Income Inequality, Income distribution, Piketty, Income quintile share ratio, Income by deciles

Rozdělení Příjmů

Abstrakt

Evropské i ostatní státy navrhly několik ekonomických strategií k překlenutí nerovnosti příjmů jednotlivých zemí. Tato problematika zaujala francouzského ekonoma Piketta, stejně jako mnoho dalších. Tato studie zkoumá nerovnost příjmů šesti členských států Evropské Unie - České republiky, Rakouska, Německa, Slovenska, Polska a Maďarska. Sekundární data použitá pro tuto studii jsou čerpána z EUROSTAT od roku 2017 do roku 2019. Profily nerovností příjmů jsou určeny použitím škál decilů a kvantilů. Výsledky ukazují, že Německo zaznamenává snížení nerovnosti příjmů během sledované periody tří let, zatímco ostatní státy, včetně České republiky, zaznamenává její kolísání. Je doporučeno, aby země Evropské Unie adaptovali více udržitelné fiskální a monetární strategie pro snížení nerovnosti příjmů.

Klíčová slova: Nerovnost příjmů, Rozdělení příjmů, Piketty, škála příjmu v kvantilech, příjem v decilech

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1. Introduction

Inequality and equality have also been an issue in the world and is still an issue now. There is no economic debate that does not have inequality in some form or way in it. Economists over the years have been trying to find a way to make things 'fair' from Pareto in the past to Piketty now. As economists we are not saying everything should be shared equally to everyone because this will lead to underproduction and laziness.

Stiglitz believed that inequality is as a result of economic policies and that economic policies can help reduce the inequality as well, policies such as those which reduce severe inequality and develop more opportunity for the poor are required (Stiglitz, 2012).

Income inequality is a major issue in the 21st century with nations and regions trying to reduce this, this inequality could be as a result of sex, race, religion educational background etc. A lot of research has been devoted to income inequality and ways of closing this up, that is redistribution of the income to make it 'fair'. In recent years Piketty has been in the forefront of this endeavour (Piketty, 2014) (Piketty, 2015).

Inequality has been studied for years mainly because of the long-term socio-economic repercussions. There would be no incentive to work hard by the poor who feels there is no hope; this would perpetuate poverty and lead to social unrest later on. Ultimately leading to larger social cost for the economy (Dabla-Norris, et al., 2015). It is therefore imperative to continue to study the extent of income inequality across countries for authorities to evaluate the correctness or otherwise of their economic policies, which should be geared towards the common good of society.

2. Objectives and Methodology

2.1. Objectives

To determine the extent of personal income inequality in six selected EU countries including the Czech Republic over a three-year period, 2017 to 2019. The selected countries based on proximity to the Czech Republic are, Germany, Austria, Slovakia, Poland, and Hungary.

This is with a view to ascertain the personal income inequality gaps in these countries in line with the thoughts of Piketty.

2.2. Methodology

The theoretical aspect of the thesis explains in general inequality and its changes over time, income, and its types, it also explains the types of redistribution of inequality that is direct and fiscal.

The practical section of the thesis focuses on personal income inequality in the EU and 6 countries namely Czech Republic, Germany, Austria, Slovakia, Poland, and Hungary.

As part of the analysis population, gross domestic product (GDP) based on purchasing power parity (PPP), GDP per capita and unemployment rates were compared so as to show the general economic conditions of individual nations.

Two methods were adopted to show the disparity in personal income inequality they are distribution of income by deciles and income inequality according to income quintile share ratio (S80/S20).

In the distribution of income by deciles the incomes were divided in ten equal parts called the deciles. D1 is the lowest income decile and D10 the highest income decile, values are not shown in D10 as they are the topmost earners (no top limit) and are those who earn above D9. The lowest deciles D1 is used as the base value (base decile) and is used to show the level of wage inequality.

The second method used the S80/S20 which is the income quintile share ratio, in this method we simply find a ratio of the top 20 % to the bottom 20 % in terms of total income received.

The data used in this study were gotten from Eurostat and Statista official websites. Eurostat was founded in 1953 by the European Parliament, it is a directorate General of the European Commission. Eurostat headquarters is in Luxembourg (Eurostat, 2020). Statista was founded in Hamburg Germany in 2007, It is private company unlike Eurostat and its CEO is Friedrich Schwandt (Statista, 2020).

3. Literature Review

3.1. Definition of Income and Inequality

The Merriam-Webster dictionary defines income as a gain or recurrent benefit usually measured in money that derives from capital or labour (Merriam-Webster.com, 2020).

Income can be said to be the money or funds that people or organizations get as a by-product of either selling products or services, or by capital investments.

According to (Oancea, et al., 2018) total income can be represented largely as the sum of the labour income and of the capital income, and their ratio is a measure of the relative weights of the two components in the GDP (the labour–capital split).

Inequality can be said to be the contrasts between the economic conditions of different groups of persons or groups. Inequality is neither caused by extreme poverty nor extreme affluence but by the uneven distribution of income and opportunity among different groups of individuals in society. This uneven distribution can be as a result of different societal circumstances (Champernowne & Cowell, 1998).

3.0. Types of Income

Studies have been documented that there are three categories of income namely – wages, non-wages and capital (Piketty, 2015) (Oancea, et al., 2018).

Wages include wages, self-employment incomes (from farmers, merchants etc.). Non-wages which are pensions and other transfer incomes (family allowance unemployment insurance, welfare). The main contributors to the capital income are interest income, dividends, and income from real estate sale (Oancea, et al., 2018).

Piketty (2015) using France as a case study in 2000 determined the source of household incomes. He extrapolated from the data that nearly two-thirds of total household income were wages for labour. Social income (non-wages) accounts for another 30 percent of the total, and for more than two-thirds of retiree income. Finally, income from capital (income such as dividends, interest, and so on) accounts for roughly 5 percent of the total (Piketty, 2015).

3.1. Wage Inequality

Piketty believed that a worker's wage (cost of labour) is equal to their marginal productivity, this is, their specific contribution to the output of the firm or office for which they work and their productivity depends above all on their skill and on supply and demand for that skill in a given society (Piketty, 2014).

(Lemieux, 2008) opined that the wage inequality in the US at 1990s were as a result of two main reasons (1) inequality had been growing sharply in the 1980s (which was previously thought to be as a result of the recession of 1981-82) and (2) the primary factor behind the growth was the increase in the relative demand for skill. Lemieux also posited that growth in wage inequality is increasingly concentrated in the top end of the wage distribution. He gave the example that wages are an increasingly convex function of years of education. In other words, the wage gap between college post-graduates and college graduates has increased more than the wage gap between college graduates and high school graduates, which, in turn, increased more than the wage gap between high school graduates and high school dropout.

Using information gotten from two economists Claudia Goldin and Lawrence Katz, Piketty was able to make a conclusion that in the United States of America (USA) between the period of 1890-2005 that the wage gap between College and high school graduates was initially on the decline till the 1970s and begun to widen in the 1980s. He further stated that this led to the conclusion by Golden and Katz that the increase in wage inequality in the USA was due to a failure to invest in higher education (Piketty, 2014)

Using France in 2000 Piketty, compared wages across the ten deciles and percentiles. After which he calculated total wage inequality (P90/P10 ratio), that is, the ratio of the lower limit of the tenth decile to the upper limit of the first decile was 2,720/900 or roughly 3.0 to belong to the top- earning 10 percent, one had to make at least three times as much as the least well paid. This compared to Norway (2.0), Germany (2.5), Japan (2.8), United Kingdom (UK) (3.4), USA (4.5) (Piketty, 2015).

3.2. Income Inequality

Income inequality is the extent to which the distribution of income among individual households within an economy deviates from a perfectly equal distribution (Fadda & Tridico, 2016). Pareto inequality emerges from exponential growth that occurs for an exponentially distributed amount of time (Jones, 2015).

Jones used Age μ (experience or talent), death rate δ and Income to explain the exponential growth. He said that the Pareto exponent is increasing with the rate at which incomes grow with age (or experience or talent) and decreasing in the death rate. Which means the lower the death rate, the longer some lucky people in the economy can benefit from exponential growth and become richer, which widens Pareto inequality. Also, the more talented or experienced an individual is also widens inequality (Jones, 2015)

If the percentage of aggregate income received by the lower end of the income distribution is falling over time, it is an indication of rising income inequality. A rise in income inequality does not automatically mean stagnant real incomes for most households. During the Depression years, the USA had stagnant incomes for most households but falling income inequality. From 1947 through 1973 the nation had rapidly growing incomes for most households and had falling income inequality. In the decades leading up to the financial crash and Great Recession, the USA had stagnant income growth for most households and rising income inequality. The point is that rising income inequality and stagnant household income growth do not necessarily always occur together (Drennan, 2015).

The redistribution of income in order to reduce the inequality we have in any Economy has been a source of major political conflicts and the different point of views according to (Piketty, 2015) can be divided into the right-wing free market position and the left wing regulated market position.

Piketty further explained both positions, he said the right-wing free market position is in the long run, market forces, individual initiative, and productivity growth will be the determinants of the distribution of income and standard of living, in particular, of the least wealthy members of society. So, government efforts to redistribute wealth should be limited

and should rely on instruments that interfere as little as possible with the virtuous mechanisms of the market (Piketty, 2015). For example, it is not necessarily true that a slowdown in either per capita growth or population growth in the future will increase inequality. There are economic forces working in that direction in partial equilibrium (Jones, 2015). The left wings hold on to 19th century socialist theory that the only way to relieve the misery of the poorest members of the capitalist society is through social and political struggle, and that the redistributive efforts of government must penetrate to the very heart of the productive process (Piketty, 2015).

3.3. Unemployment Profile in the EU

For a person to be termed unemployed he or she must be of working age and are without work, he or she is available to work, and has taken specific steps to find work during the week the survey was taken (Stewart, 1950).

Unemployment rate is an indicator that measures the number of unemployed people as a percentage of the labour force and it is seasonally adjusted. The unemployment rates are more internationally comparable than estimates based on national definitions of unemployment (Organisation for Economic Co-operation and Development, 2021).

In 2010 the ways of unemployment assistance by the 27 EU countries could be divided into two main types that are unemployment assistance and social assistance (Esser, et al., 2013). In terms of unemployment assistance some went with a flat rate while others used income tested method (Esser, et al., 2013).

Fifteen countries provide specific unemployment assistance. In which ten used the income-tested method they are Austria, Czech Republic, Finland, France, Germany, Ireland, Malta, Portugal, Spain, and the United Kingdom, whereas Estonia, Greece, Hungary, the Netherlands, and Sweden made use of a flat rate. Some other EU countries made no distinction between social assistance and unemployment assistance they are Belgium, Bulgaria, Cyprus, Denmark, Latvia, Lithuania, Luxembourg, Norway, Poland, Romania, Slovakia, Slovenia, Switzerland (Esser, et al., 2013).

Table I- Unemployment Profile in the EU

	Unemployment assistance		Social assistance
	<i>Means-tested</i>	<i>Flat-rate</i>	
Austria	X		
Belgium			X
Bulgaria			X
Cyprus			X
Czech Republic	X		
Denmark			X
Estonia		X	
Finland	X		
France	X		
Germany	X		
Greece		X	
Hungary		X	
Ireland	X		
Italy			
Latvia			X
Lithuania			X
Luxembourg			X
Malta	X		
Netherlands		X	
Norway			X
Poland			X
Portugal	X		
Romania			X
Slovakia			X
Slovenia			X
Spain	X		
Sweden		X	
Switzerland			X
UK	X		

Source: MISSOC/European Commission.

(Esser, et al.,

2013)

3.4. Changes in inequality over time

According to Kuznets, inequality would generally be described by an inverted U curve. This would mean that inequality will increase initially then will hit a point where it will be stable and will later on go on a decrease, this prediction by Kuznets in 1955 was supported by studies in both the USA and UK by Williamson in the years 1980 and 1985 respectively. In the USA, for example, one finds that the share of total wealth owned by the wealthiest 10 percent rose from 50 percent in 1770 to a maximum of 70–80 percent in the late nineteenth century, before declining to about 50 percent (Piketty, 2015).

Contemporary studies on France and the USA show a strong decrease in inequality observed over the course of the 20 century and it is because of what Piketty called ‘natural economic process’ (Piketty, 2015).

In the late 1980s there was an inversion of the Kuznets curve which brought an end to the notion that there was a grand historical law governing the evolution of inequality. Inequality actually increased only in the US and UK, but wage inequality ceased to decrease everywhere in the 1980s (Piketty, 2015).

In the USA from 1979 to 2007 average income after transfers and taxes quadrupled for the top 1 percent of the distribution. The increases were much smaller for the middle 60 percent and bottom 20 percent of the distribution (Stone, et al., 2020).

(Cingano, 2014) states that the average income of the richest 10 % of the population in Organisation for Economic Co-operation and Development (OECD) countries is about 9.5 times that of the poorest 10 %. In the 1980s, this ratio was 7:1. This ratio varies widely across OECD countries. It is much lower than the OECD average in the Nordic and many Continental European countries, but reaches around 10 to 1 in Italy, Japan, Korea, Portugal and the UK, between 13 and 16 to 1 in Greece, Israel, Turkey and the USA, and between 27 and 30 to 1 in Mexico and Chile.

It is observed that income inequality like wage inequality, stopped to decrease in the 1980s and 1990s, and it increased significantly in western countries where wage inequality resumed its upward trend, putting to bed the previously accepted Kuznets inverted U curve (Piketty, 2015). However, Piketty (2015) stated that to interpret the evolution of income inequality as a simple mechanical consequence of the evolution of wage inequality, is wrong even though the latter is undeniably the main force at work. He opined that of nearly half of the increase in USA household income inequality between 1970 and 1990 was in fact due to increased combination of the incomes of members of the same household. That is high earners are increasingly likely to marry other high earners, whereas the lowest earners are often single women with children (Piketty, 2015).

3.5. Capital-labour Inequality.

A nation produces what it produces using a certain quantity of capital (machinery, infrastructure, etc.) and a certain quantity of labour (hours worked). The distribution of

income between capital and labour has always been, and is still an issue and what can government do to address these concerns? This question, and especially the role of the price system in determining the capital-labour split, has given rise to unusually hostile intellectual and political controversy, especially among economists (Piketty, 2015).

Inequality is thus described as a contrast between those who own capital, that is, the means of production, and those who do not and must therefore make do with what they can earn from their labour. The fundamental source of inequality is thus said to be the unequal ownership of Capital (Piketty, 2015).

In developed countries over the last decades more than 10 % points of the national income have been shifted from wages to profits (in the form of dividends and interest paid on capital) this has caused a major increase in inequality moving from labour to capital (Franzini & Pianta, 2015).

(Piketty, 2015) further explained the capital–labour split by saying if capital can be substituted for labour and vice versa, then the prices of capital and labour can play an essential part in influencing the quantities of each of the two factors of production used at the macroeconomic level. He continued by stating that in a market economy, firms will hire additional workers as long as doing so brings in more money than it costs, same is true for capital. The price of capital is measured by the costs (interest and dividends, depreciation, maintenance, etc.) that a firm incurs for using one additional unit of capital. He indicated that labour-intensive firms will grow more rapidly than capital-intensive firms if the price of labour is low compared with the price of capital, because consumer demand for labour-intensive goods will increase if their price is low (and contrariwise). That is to say the quantities of labour and capital utilized in a market economy, and levels of output and employment, would be dependent on the prices of capital and labour (Piketty, 2015).

Without any governmental redistribution, the capital-labour split will depend on the negotiating power of unions and the ability of the employer to appropriate a portion of the product: in short, on the relative power of capitalists and workers (Piketty, 2015).

The evolution of capitalism has been shaped mostly by the conflict between the logic of capital accumulation and workers efforts in establishing labour and social rights. The workers want the right to form unions, get higher wages from collective labour contracts. It also entails employment security, reduced working hours, safer workplace, welfare protection and workplace democracy, among others. In developed countries there has been a reversal in legislations since the 1980 leading to worse conditions for workers (Franzini & Pianta, 2015).

3.6. Redistribution in Inequality Assessment

In an International Monetary Fund (IMF) staff discussion note Ostry, Berg, Tsangarides defined redistribution as the difference between the market and net inequality series. They also explained the differences in distribution of market and net inequality in OECD (Organisation for Economic Co-operation and Development) and non-OECD countries, after which they noted three important points; the first being that global median inequality has held remarkably steady over the past half century. The second point was that this constancy hid some important differences across groups; market inequality had risen over the past three decades in the OECD and falling in developing countries. The last point was that the gap between market and net inequality was much more evident in industrial countries than in the developing world which reflected the former's more extensive tax and transfer systems (Ostry, et al., 2014).

(Piketty, 2015) stated that redistribution could be direct or fiscal, in direct redistribution one tries to redistribute capital income to labour by increasing workers' wages, thereby increasing the price of labour, firms will use less labour and more capital, so that the level of employment will decrease, and labour's share of total income will increase less than the initial wage increase might have led one to believe. While, fiscal redistribution involves taxation of the profits of firms (or capital income paid by firms to capital-owning households), and this will be used to finance a fiscal transfer or tax decrease to achieve the same redistribution of income to workers without increasing the labour costs of firms and thus without triggering a substitution of capital for labour deleterious to employment.

The essential difference between these two types of redistribution is that the contribution of firms is not calculated in the same way: direct redistribution requires firms to contribute to redistribution in proportion to the number of workers they employ, whereas fiscal redistribution requires firms to contribute only in proportion to their profits, no matter how much capital or labour they employ to produce those profits (Piketty, 2015).

In order to know if redistribution from capital to labour is detrimental, “elasticity of the supply of capital” is measured. For instance, let us say the rate of return on invested capital decreases by 1 percent, by how much does the supply of capital (that is, the quantity of savings that households decide to invest in firms) decrease? This is what elasticity of the supply of capital measures. Empirical estimates of this elasticity find in general that it is fairly close to zero, that is when the return on capital decreases, households attempt to preserve future income by saving more, and in practice this seems to balance or even outweigh the fact that a lower return on investment makes immediate consumption more attractive than future consumption out of savings. As long as the elasticity of capital supply is zero or close to it, that is, as long as the capital stock is relatively independent of the extent of redistribution, then fiscal redistribution permits, and social justice recommends, as extensive a distribution as possible between capital and labour. If the elasticity of substitution between capital and labour is significant, such ambitious redistribution cannot be achieved efficiently through direct means, which, as discussed earlier, tend to reduce the level of employment unnecessarily (Piketty, 2015).

3.7. Elasticity of Substitution

Elasticity of substitution between capital and labour is the degree of substitutability between capital and labour, Elasticity of substitution between capital and labour is the percentage change in the capital stock when the relative price of capital (ratio of rate of return to capital to wage rate) increases by 1 %. If elasticity of substitution between capital and labour is high (it means greater than 1), it is easy to substitute capital for labour as the relative productivity or the relative cost of these two factors changes. If elasticity of substitution is less than 1, the economy comes closer to the fixed proportions production function, meaning that institutional factors play a bigger role (Tarik & Mirakhor, 2019).

Piketty elucidated that in order to know that fiscal redistribution is truly superior to direct redistribution, we must ask two questions. Firstly, how much disparity is possible in the amounts of capital and labour used at the macroeconomic level? And secondly what influence do the prices of capital and labour have on the amounts of each (capital or labour) the economy uses? If capital-labour substitutability is low, direct distribution has the advantage of being simple and transparent (Piketty, 2015).

(Tarik & Mirakhor, 2019) states that elasticity of substitution brought more puzzle to the table. They said if there is sustained increase in capital stock to labour ratio (capital deepening) elasticity of substitution between capital and labour should be bigger than unity, this would also imply increase in wages. This can only happen if the elasticity of substitution between capital and labour is less than unity.

When it is imperative, to consider the optimal level of redistribution, whether by direct or fiscal means, the effect of redistribution on the future stock of capital in the economy must be borne in mind. A reduction in capital's share of income, whether it is due to higher taxes on capital or an increment in wages, may reduce the firm's ability to fund new investment and this lessens the incentives of households to save and invest their savings in firms. So it is traditionally believed that it is in the interest of workers not to reduce the income of capital, because any redistribution of income from capital to labour will always decrease the capital stock so much that the productivity of labour, and therefore wages, will also decrease, even if wages are supplemented by fiscal transfers (Piketty, 2015).

3.8. Inequality of labour Income

Capital income is usually thought to be very unequally distributed while labour income is not, the actual fact is that the large share of income inequality today (and probably for a long time in the past) is due to labour income inequality. Piketty used the example of the increase in labour income inequality being responsible for the reversal of the Kuznets curve that has taken place since the 1970s he elucidated that in the USA, the gap between the top and bottom 10 percent of the income distribution has increased by nearly 50 percent (Piketty, 2015).

The robust growth of aggregate income during the years, 1947 to 1973, was cut almost in half in the period, 1973–2007. At the same time, the share of income going to the top 10 percent rose from 32 to 46 percent. Slower growth plus a declining share for the bottom 90 per - cent meant that average real income of that group did not rise. Of course, it rose strongly for the top 10 percent (Drennan, 2015).

3.9. Theory of Human Capital

The simplest theory of wage inequality according to Piketty is, different workers contribute different amounts to the firm's outputs. He used the example of a computer specialist and an office worker, he explained that a computer specialist who develops a program for analysing a firm's customer records efficiently and quickly was worth more to the firm than an office worker who processes a certain number of files a day, and this explains why the firm will pay the computer specialist more. This is called the theory of human capital. The theory of human capital simply states that labour is not a homogeneous entity and that for various reasons different individuals are characterized by different endowments of human capital. Given some distribution of human capital within the population of workers and the demand for various goods and for the human capital needed to produce them (the demand for labour), then the laws of supply and demand determine the wages associated with each level of human capital and thus the distribution of labour income. The notion of human capital is therefore quite general, because it includes credentials such as diplomas, experience, and, more generally, individual characteristics that influence a worker's ability to participate in the production process for the demanded variety of goods and services (Piketty, 2015).

4. Practical Part

In the practical aspect of this study, income inequality is compared within selected countries within the European Union (EU) and also across six selected countries within the EU.

4.1. EU and the countries for this study

The countries selected are Czech Republic, Slovakia, Austria, Germany, Poland, and Hungary. These countries were picked due to their geographical proximity to the Czech Republic.

4.1.1. Brief information about the Countries

Table II-Brief information about countries

	Population	GDP (PPP) in million	GDP per capita (€)	Unemployment rate (%)
EU	447706209	€ 13,963,897.40	21050	6.7
Czech Republic	10693939	€ 223,950.30	17170	2.0
Austria	8901064	€ 397,575.30	25790	4.5
Germany	8901064	€ 3,449,050.00	25130	3.1
Hungary	9769526	€ 146,061.80	13690	3.7
Poland	37958138	€ 532,329.20	15610	3.3
Slovakia	5457893	€ 93,865.20	14650	5.56

(Eurostat, 2020) (Statista, 2021).

Sources-<https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do>,
<https://ec.europa.eu/eurostat/databrowser/view/TPS00001/bookmark/table?lang=en&bookmarkId=c0aa2b16-607c-4429-abb3-a4c8d74f7d1e>,
https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=une_rt_a&lang=en,
<https://www.statista.com/statistics/375276/unemployment-rate-in-slovakia/>.

Note: Population is at 2020, GDP, GDP per capita and unemployment rate are 2019

4.1.1.1. The EU (27 countries from 2020)

The EU has an estimated population of 447,706,209 as at 2020 (Eurostat, 2020). It has a GDP of 13,963,897,400,000 Euros in 2019 (Eurostat, 2020). The EU has a GDP per capita

of €21,050 as at 2019 (Eurostat, 2021) .The EU also has an unemployment rate of 6.7 % as at 2019 (Eurostat, 2020).

4.1.1.2. Czech Republic

The population of the Czech Republic is 10,720,111 (Czech Statistical Office, 2021) and 10,693,939 as at 2020 (Eurostat, 2020). The Czech Republic has a GDP of 223,950,300,000 Euros in 2019 (Eurostat, 2020). The Czech Republic has a GDP per capita of €17,170 as at 2019 (Eurostat, 2021) .The Czech Republic also has an unemployment rate of 2.0 % as at 2019 (Eurostat, 2020).

4.1.1.3. Germany

The Germany has an estimated population of 83,166,711 as at 2020 (Eurostat, 2020). It also has a GDP of 3,449,050,000,000 Euros in 2019 and 3,329,030,000,000 Euros in 2020 (Eurostat, 2020). In 2019 Germany had a GDP per capita of €25,130 as at 2019 (Eurostat, 2021). In 2019 Germany had the lowest unemployment rates in years of 3.1 % (Eurostat, 2020).

4.1.1.4. Austria

The Austria has an estimated population of 8,901,064 as at 2020 (Eurostat, 2020). It has a GDP of 397,575,300,000 Euros in 2019 (Eurostat, 2020). Austria had a GDP per capita of €25,790 at 2019 (Eurostat, 2021). Austria has an unemployment rate of 4.5 % as at 2019 (Eurostat, 2020).

4.1.1.5. Hungary

Hungary estimated population is 9,769,526 as at 2020 (Eurostat, 2020). It has a GDP of 146,061,800,000 Euros in 2019 (Eurostat, 2020). Hungary GDP per capita in 2019 was of €13,690 (Eurostat, 2021). An unemployment rate of 3.7 % as at 2019 which is also the lowest in years (Eurostat, 2020).

4.1.1.6. Poland

Poland population in 2020 was estimated to be 37,958,138 as at 2020 (Eurostat, 2020). Poland GDP is 532,329,200,000 Euros as of 2019 (Eurostat, 2020). The Polish GDP per capita of €15,610 at 2019 was its highest in 10 years (Eurostat, 2021) . 3.3% is the Polish unemployment rate as of 2019 (Eurostat, 2020).

4.1.1.7. Slovakia

Slovakia has an estimated population of 5,457,873 as of 2020 (Eurostat, 2020). It has a GDP of 93,865,200,000 Euros in 2019 (Eurostat, 2020). Slovakia has a GDP per capita of €14,650 as at 2019 (Eurostat, 2021) .Slovakia has an unemployment rate of 5.56 % as at 2019 and 5.1 % at 2020 (Statista, 2021).

4.2. Methods

In this study two methods are used to show income inequality in the selected countries and in the EU as a block. The data used in this study were gotten from Eurostat official website.

The methods adopted are distribution of income by deciles and income inequality according to income quintile share ratio (S80/S20).

4.2.1. Income inequality according to the distribution of income by deciles

Deciles are one of ten equal parts that a set of people or things is divided into, when you are comparing a particular feature relating to them (Cambridge Business English Dictionary, 2020).

The distribution adopted in this study is based on deciles. However, the data available did not indicate the last deciles (D10) as they are the highest earners or simply put those who earn higher than the D9, consequently the first 9 deciles are used for comparison in this study.

Also, for the purpose of this study D1 is the lowest income decile while D9 is the highest income decile as there are no topmost limit for D10.

To show the wage inequality in each country, the lowest deciles D1 is adopted as the base value and this is used to divide the other categories of deciles to arrive at appropriate deciles values.

4.2.1.1. Income Deciles Wideness

The difference between the lowest decile D1 and the highest decile D9 (in the case of this study) is the income decile widenness. This widenness is the measure of how far apart income inequality is.

4.2.1.2. Income Deciles Gap

The income decile gap in this study refers to the gap between subsequent income deciles in respect to the base value of D1. So, for example the income gap of D3 to D4 with respect to D1 in the EU for the year 2017 in the Table III is difference between 1.53 and 1.76.

4.2.2. Income inequality according to Income quintile share ratio (S80/S20)

The income quintile share ratio or the S80/S20 ratio is a way by which we measure the inequality within the income distribution. It is estimated as the ratio of total income received by the 20 % of the population with the highest income (the top quintile) to that received by the 20 % of the population with the lowest income (the bottom quintile) (Eurostat, 2018).

The S80/S20 shows us the gap between the top 20 % and the lowest 20 % in terms of income earned. This method divides income earners first into 5 groups as opposed to the deciles of the previous method, and then used the lowest fifth and top fifth.

4.2.2.1. Income Quintile Gap

The income decile gap in this study refers to the gap the income gap shown by the Income Quintile share ratio (S80/S20). Simply put as the income gap between the top fifth and the bottom fifth, it shows how much over the lowest fifth the highest fifth earn.

5. Results and Discussion

5.1. Distribution of income by deciles for each country in the study and the EU

Table III- distribution of income by deciles in the EU

	EU					
	2017		2018		2019	
D1	€ 8,151.00	1.00	€ 8,544.00	1.00	€ 8,734.00	1.00
D2	€ 10,553.00	1.29	€ 11,080.00	1.30	€ 11,301.00	1.29
D3	€ 12,484.00	1.53	€ 13,111.00	1.53	€ 13,355.00	1.53
D4	€ 14,347.00	1.76	€ 15,060.00	1.76	€ 15,340.00	1.76
D5	€ 16,251.00	1.99	€ 17,095.00	2.00	€ 17,322.00	1.98
D6	€ 18,353.00	2.25	€ 19,233.00	2.25	€ 19,476.00	2.23
D7	€ 20,858.00	2.56	€ 21,770.00	2.55	€ 22,044.00	2.52
D8	€ 24,200.00	2.97	€ 25,185.00	2.95	€ 25,470.00	2.92
D9	€ 30,058.00	3.69	€ 31,324.00	3.67	€ 31,611.00	3.62
D10	> €30,058.00		> €31,324.00		> €31,611.00	

(Eurostat, 2020)

Source- https://ec.europa.eu/eurostat/databrowser/view/ilc_di01/default/table?lang=en

The income deciles wideness in the EU is almost 4 folds. The income deciles wideness is relatively constant across the 3 years, what this shows is that the income inequality has not shown significant reduction across those three years even though income has been on the increase. The increase is uniform across board.

The income decile gap is also steady across the 3 years and also not showing any significant rise or drop which is an indication that the wage inequality is reducing homogeneously.

Table IV- distribution of income by deciles in the Czech Republic

	CZECHIA					
	2017		2018		2019	
D1	€ 5,080.00	1.00	€ 5,487.00	1.00	€ 5,963.00	1.00
D2	€ 6,058.00	1.19	€ 6,649.00	1.21	€ 7,204.00	1.21
D3	€ 6,802.00	1.34	€ 7,415.00	1.35	€ 8,139.00	1.36
D4	€ 7,522.00	1.48	€ 8,237.00	1.50	€ 9,057.00	1.52
D5	€ 8,282.00	1.63	€ 9,088.00	1.66	€ 9,995.00	1.68
D6	€ 9,149.00	1.80	€ 10,058.00	1.83	€ 11,074.00	1.86
D7	€ 10,209.00	2.01	€ 11,215.00	2.04	€ 12,356.00	2.07
D8	€ 11,652.00	2.29	€ 12,895.00	2.35	€ 14,153.00	2.37
D9	€ 14,237.00	2.80	€ 15,534.00	2.83	€ 17,037.00	2.86
D10	> €14,237.00		> €15,534.00		> €17,037.00	

(Eurostat, 2020)

Source- https://ec.europa.eu/eurostat/databrowser/view/ilc_di01/default/table?lang=en

The income deciles wideness in the case of Czech Republic by almost 3 folds, this shows that the inequality in the income in the Czech Republic is not as wide as in the EU in general and second only to Slovakia in terms of extent of the income deciles wideness. What can also be noticed in Table IV is an upward trend, signifying a gradual increase in the income gap thus leading to more inequality along the deciles.

Table V- distribution of income by deciles in Austria

	AUSTRIA					
	2017		2018		2019	
D1	€ 13,131.00	1.00	€ 13,286.00	1.00	€ 13,681.00	1.00
D2	€ 16,820.00	1.28	€ 16,867.00	1.27	€ 17,449.00	1.28
D3	€ 19,639.00	1.50	€ 19,916.00	1.50	€ 20,331.00	1.49
D4	€ 22,354.00	1.70	€ 22,586.00	1.70	€ 22,934.00	1.68
D5	€ 24,752.00	1.89	€ 25,176.00	1.89	€ 25,729.00	1.88
D6	€ 27,708.00	2.11	€ 28,130.00	2.12	€ 28,602.00	2.09
D7	€ 31,341.00	2.39	€ 31,445.00	2.37	€ 31,897.00	2.33
D8	€ 35,784.00	2.73	€ 35,948.00	2.71	€ 36,953.00	2.70
D9	€ 43,574.00	3.32	€ 44,421.00	3.34	€ 44,749.00	3.27
D10	> €43,574.00		> €44,421.00		> €44,749.00	

(Eurostat, 2020)

Source- https://ec.europa.eu/eurostat/databrowser/view/ilc_di01/default/table?lang=en

The income deciles wideness in the case of Austria is just over 3 folds, this is not as wide as in the EU in general and comes in 3 of 6 in comparison to the countries in this study in terms of extent of the income deciles wideness. What can also be noticed in Table V is the gradual decrease in the income gap (i.e., a downward trend) over the 3 years which signifies a decreasing inequality along the deciles for Austria.

Table VI- distribution of income by deciles in Germany

	GERMANY					
	2017		2018		2019	
D1	€ 11,215.00	1.00	€ 11,423.00	1.00	€ 12,174.00	1.00
D2	€ 14,422.00	1.29	€ 14,917.00	1.31	€ 15,612.00	1.28
D3	€ 16,927.00	1.51	€ 17,540.00	1.54	€ 18,271.00	1.50
D4	€ 19,318.00	1.72	€ 19,928.00	1.74	€ 20,881.00	1.72
D5	€ 21,920.00	1.95	€ 22,713.00	1.99	€ 23,515.00	1.93
D6	€ 24,593.00	2.19	€ 25,489.00	2.23	€ 26,313.00	2.16
D7	€ 28,067.00	2.50	€ 28,871.00	2.53	€ 29,625.00	2.43
D8	€ 32,537.00	2.90	€ 33,188.00	2.91	€ 33,976.00	2.79
D9	€ 40,084.00	3.57	€ 41,345.00	3.62	€ 41,874.00	3.44
D10	> €40,084.00		> €41,345.00		> €41,874.00	

(Eurostat, 2020)

Source- https://ec.europa.eu/eurostat/databrowser/view/ilc_di01/default/table?lang=en

The income deciles wideness in the case of Germany from Table VI above shows to be just above 3.5 folds, this is also not as wide as in the EU in general and comes in 2nd of 6 (second only to Poland) in comparison with the countries in this study in terms of extent of the income deciles wideness. Table V shows a gradual decrease in the income gap over the 3 years indicating a downward trend meaning that the income is getting less unequal along the deciles in Germany (similar to Austria).

Table VII- distribution of income by deciles in Hungary

	HUNGARY					
	2017		2018		2019	
D1	€ 2,794.00	1.00	€ 2,961.00	1.00	€ 3,293.00	1.00
D2	€ 3,393.00	1.21	€ 3,573.00	1.21	€ 3,888.00	1.18
D3	€ 3,885.00	1.39	€ 4,232.00	1.43	€ 4,597.00	1.40
D4	€ 4,395.00	1.57	€ 4,804.00	1.62	€ 5,192.00	1.58
D5	€ 4,988.00	1.79	€ 5,424.00	1.83	€ 5,852.00	1.78
D6	€ 5,621.00	2.01	€ 6,047.00	2.04	€ 6,530.00	1.98
D7	€ 6,325.00	2.26	€ 6,855.00	2.32	€ 7,349.00	2.23
D8	€ 7,325.00	2.62	€ 7,905.00	2.67	€ 8,590.00	2.61
D9	€ 8,998.00	3.22	€ 9,783.00	3.30	€ 10,514.00	3.19
D10	> €8,998.00		> €9,783.00		> €10,514.00	

(Eurostat, 2020)

Source- https://ec.europa.eu/eurostat/databrowser/view/ilc_di01/default/table?lang=en

Table VII above shows the income deciles wideness in the case of Hungary to be is just over 3folds, this is also not as wide as in the EU in general and comes in 4th of 6 (in comparison to the countries in this study in terms of extent of the income deciles wideness. What can be noticed in Hungary's deciles distribution, is initial rise in the income gap between 2017 and 2018 and later a drop from 2018 to 2019 this is due to the deceleration of the Hungarian economy by almost 3.4 % (due to lower household consumption and less investment growth) from 2018 till 2019 after an acceleration from 2017 till 2018 (Atradius, 2018) and (Commision Staff Working Document, 2019).

The income gap in each decile in 2017 is similar to those in 2019 so it can be concluded that inequality in income has not changed in Hungary from 2017 till 2019.

Table VIII- distribution of income by deciles in Poland

	POLAND					
	2017		2018		2019	
D1	€ 3,042.00	1.00	€ 3,403.00	1.00	€ 3,649.00	1.00
D2	€ 3,950.00	1.30	€ 4,359.00	1.28	€ 4,702.00	1.29
D3	€ 4,690.00	1.54	€ 5,142.00	1.51	€ 5,553.00	1.52
D4	€ 5,320.00	1.75	€ 5,841.00	1.72	€ 6,352.00	1.74
D5	€ 5,945.00	1.95	€ 6,574.00	1.93	€ 7,124.00	1.95
D6	€ 6,684.00	2.20	€ 7,344.00	2.16	€ 8,016.00	2.20
D7	€ 7,598.00	2.50	€ 8,347.00	2.45	€ 9,054.00	2.48
D8	€ 8,961.00	2.95	€ 9,582.00	2.82	€ 10,454.00	2.86
D9	€ 11,317.00	3.72	€ 12,023.00	3.53	€ 13,016.00	3.57
D10	> €11,317.00		> €12,023.00		> €13,016.00	

(Eurostat, 2020)

Source- https://ec.europa.eu/eurostat/databrowser/view/ilc_di01/default/table?lang=en

From Table VIII above the income deciles wideness in the case of Poland over the 3 years in the study has an average of 3.6-fold, this is just slightly below the EU average and the largest of the 6 countries in this study in terms of extent of the income deciles wideness. This is due to Poland trying to keep its most skilled labour force.

What can be noticed in the Polish data as shown in Table VII is the decrease in the income deciles wideness between 2017 and 2018 (which was due to the slowing down of the Polish GDP growth due to reduced economic activity in Europe and labour shortages in the domestic market as more people move to other European countries for better pay) and later the slight increase in 2018 to 2019.

What can also be noticed is that there was not much difference in the income gaps along the deciles until the 7th decile in the drop year (2017-2018) the major difference in the gaps were only in the 8th and 9th deciles.

Table IX- distribution of income by deciles in Slovakia

	SLOVAKIA					
	2017		2018		2019	
D1	€ 3,978.00	1.00	€ 4,376.00	1.00	€ 4,823.00	1.00
D2	€ 5,194.00	1.31	€ 5,552.00	1.27	€ 5,740.00	1.19
D3	€ 5,892.00	1.48	€ 6,311.00	1.44	€ 6,601.00	1.37
D4	€ 6,545.00	1.65	€ 6,982.00	1.60	€ 7,359.00	1.53
D5	€ 7,183.00	1.81	€ 7,462.00	1.71	€ 8,119.00	1.68
D6	€ 7,772.00	1.95	€ 8,382.00	1.92	€ 8,882.00	1.84
D7	€ 8,606.00	2.16	€ 9,163.00	2.09	€ 10,030.00	2.08
D8	€ 9,557.00	2.40	€ 10,144.00	2.32	€ 11,142.00	2.31
D9	€ 11,264.00	2.83	€ 11,556.00	2.64	€ 12,968.00	2.69
D10	> €11,264.00		> €11,556.00		> €12,968.00	

(Eurostat, 2020)

Source- https://ec.europa.eu/eurostat/databrowser/view/ilc_di01/default/table?lang=en

As shown from Table IX above, the income deciles wideness in the case of Slovakia has an average of 2.7 folds, this is a far cry from the EU average in general and least of all in 6 of the countries in this study in terms of extent of the income deciles wideness. What can be noticed from the data in the table VIII is the gradual decrease in the income gap over the 3 years and indicating a downward trend meaning that the income is getting less unequal along the deciles in Slovakia. The other thing to note is that the D9 had a little increase in 2018 to 2019.

5.1.1. Comparison between the selected countries and the EU block using distribution of income by deciles.

Table X- Comparing Inequality across the 6 countries and the EU.

Table X1

	EU			CZ		
	EU 17	EU 18	EU 19	CZ 17	CZ 18	CZ 19
D1	1.00	1.00	1.00	1.00	1.00	1.00
D2	1.29	1.30	1.29	1.19	1.21	1.21
D3	1.53	1.53	1.53	1.34	1.35	1.36
D4	1.76	1.76	1.76	1.48	1.50	1.52
D5	1.99	2.00	1.98	1.63	1.66	1.68
D6	2.25	2.25	2.23	1.80	1.83	1.86
D7	2.56	2.55	2.52	2.01	2.04	2.07
D8	2.97	2.95	2.92	2.29	2.35	2.37
D9	3.69	3.67	3.62	2.80	2.83	2.86
D10						

Table X2

	AT			DE		
	AT 17	AT 18	AT 19	DE 17	DE 18	DE 19
D1	1.00	1.00	1.00	1.00	1.00	1.00
D2	1.28	1.27	1.28	1.29	1.31	1.28
D3	1.50	1.50	1.49	1.51	1.54	1.50
D4	1.70	1.70	1.68	1.72	1.74	1.72
D5	1.89	1.89	1.88	1.95	1.99	1.93
D6	2.11	2.12	2.09	2.19	2.23	2.16
D7	2.39	2.37	2.33	2.50	2.53	2.43
D8	2.73	2.71	2.70	2.90	2.91	2.79
D9	3.32	3.34	3.27	3.57	3.62	3.44
D10						

Table X3

	HU			PL			SK		
	HU 17	HU 18	HU 19	PL 17	PL 18	PL 19	SK 17	SK 18	SK 19
D1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
D2	1.21	1.21	1.18	1.30	1.28	1.29	1.31	1.27	1.19
D3	1.39	1.43	1.40	1.54	1.51	1.52	1.48	1.44	1.37
D4	1.57	1.62	1.58	1.75	1.72	1.74	1.65	1.60	1.53
D5	1.79	1.83	1.78	1.95	1.93	1.95	1.81	1.71	1.68
D6	2.01	2.04	1.98	2.20	2.16	2.20	1.95	1.92	1.84
D7	2.26	2.32	2.23	2.50	2.45	2.48	2.16	2.09	2.08
D8	2.62	2.67	2.61	2.95	2.82	2.86	2.40	2.32	2.31
D9	3.22	3.30	3.19	3.72	3.53	3.57	2.83	2.64	2.69
D10									

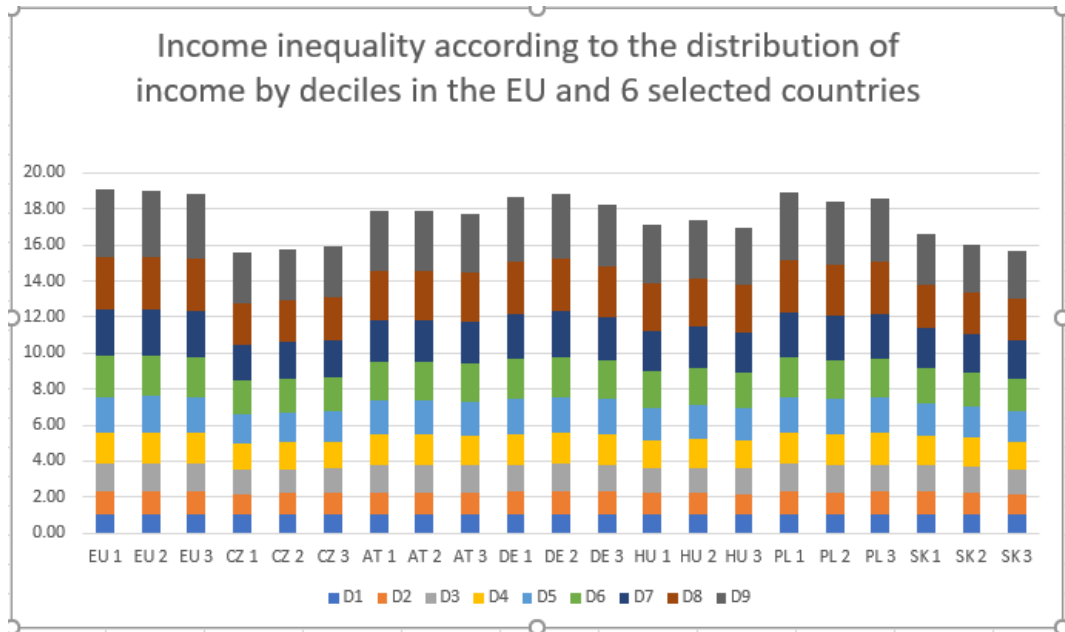
Source – from data gotten from (Eurostat, 2020)

https://ec.europa.eu/eurostat/databrowser/view/ilc_di01/default/table?lang=en

Table X above shows the comparison between the six selected countries and the EU block. It reveals a general fluctuating trend in income deciles across the countries.

Graphs 1 and 2 below show the inequalities in the selected countries vis a vis the EU Block using D1 as the base decile since income varies across countries due to varieties of factors such as cost of living among others.

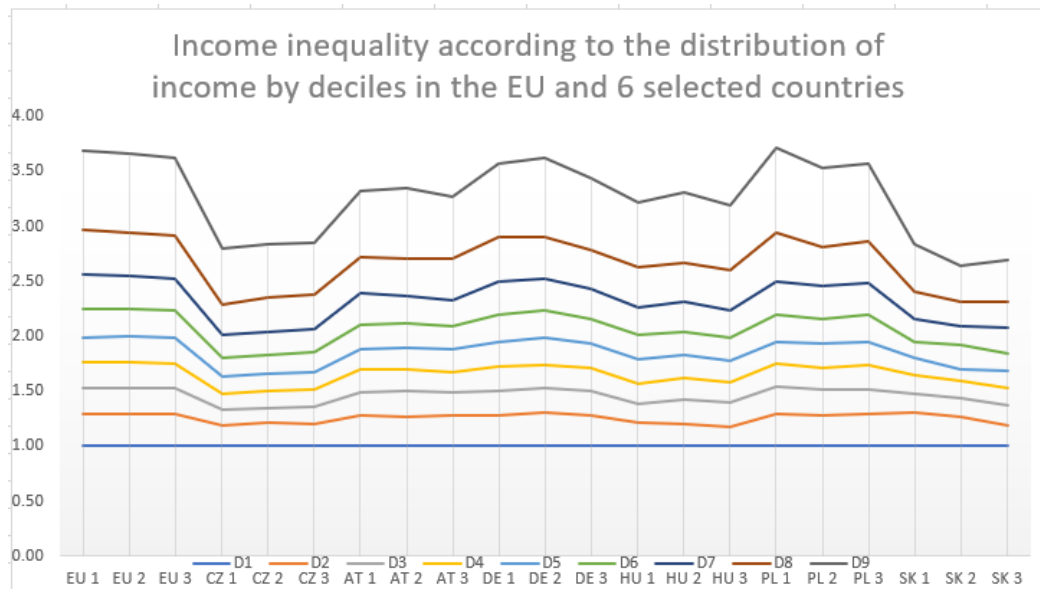
Graph 1-Income inequalities according to the distribution of income by deciles in the EU and 6 selected countries



(Eurostat, 2020)

Source- https://ec.europa.eu/eurostat/databrowser/view/ilc_di01/default/table?lang=en

Graph 2- Income inequality according to the distribution of income by deciles in the EU and 6 selected countries



(Eurostat, 2020)

Source- https://ec.europa.eu/eurostat/databrowser/view/ilc_di01/default/table?lang=en

Notes: 1, 2 and 3 stands for 2017, 2018 and 2019 respectively

As shown in Graphs 1 and 2, Slovakia has the least inequality in income in this study and Poland is at the other end of the scale. It is also worthy to note the closeness of the graph lines in Graph 1 from D1 to D6, the distance looks similar (income gap) but wider from D7 to D9 in all countries in the study, so we can make this conclusion that the income gap gets wider in a greater proportion as you move from D7 upward. These results are similar to those reported earlier by (Piketty, 2015) and (Stone, et al., 2020).

Why do some countries like Czech Republic and Slovakia have lower income deciles wideness and Poland and Hungary for instance have larger ones? Czech Republic has a larger GDP per capital than Poland and Hungary so the reason behind the wideness cannot be said to be lack of money to make the difference possible. The reasons may not be unconnected with policies put in place by the top earners, so they keep earning more.

5.2. Income inequality according to income quintile share ratio (S80/S20) for each country in the study and the EU block

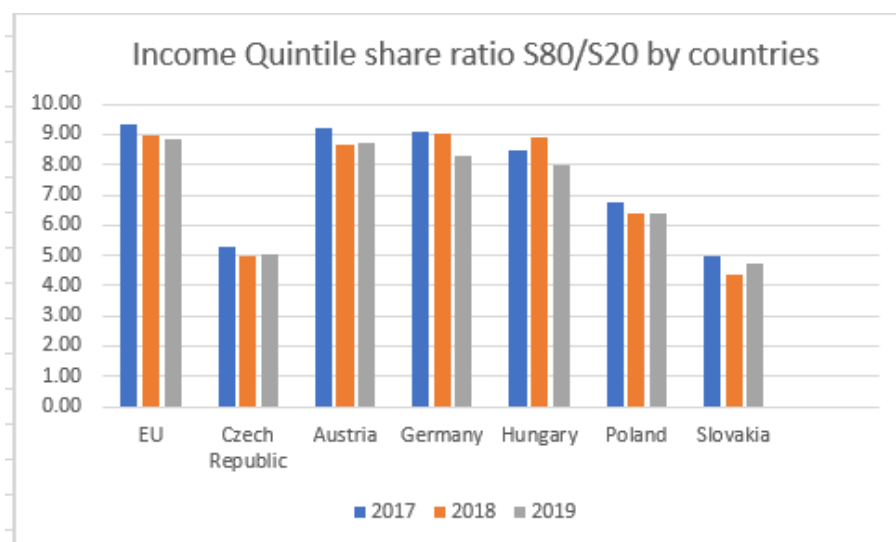
Table XI- Income inequality according to income quintile share ratio (S80/S20)

	2017	2018	2019
EU	9.32	8.97	8.86
Czech Republic	5.28	5.00	5.03
Austria	9.24	8.65	8.73
Germany	9.08	9.03	8.28
Hungary	8.48	8.89	7.99
Poland	6.74	6.37	6.40
Slovakia	5.00	4.35	4.72

(Eurostat, 2020)

Source- https://ec.europa.eu/eurostat/databrowser/view/ilc_di11c/settings_1/table?lang=en

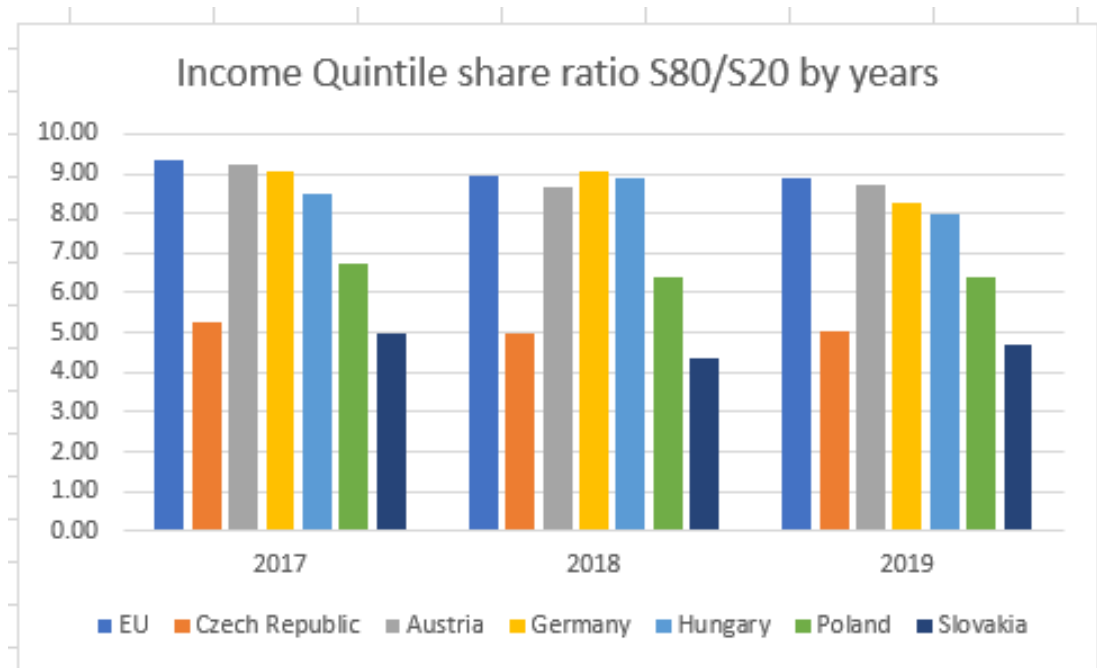
Graph 3-Income inequality according to income quintile share ratio (S80/S20) by countries



(Eurostat, 2020)

Source- https://ec.europa.eu/eurostat/databrowser/view/ilc_di11c/settings_1/table?lang=en

Graph 4-Income inequality according to income quintile share ratio (S80/S20) by year



(Eurostat, 2020)

Source- https://ec.europa.eu/eurostat/databrowser/view/ilc_di11c/settings_1/table?lang=en

As can be seen in Table XI Slovakia and Czech Republic are also the least in terms of inequality coming in 6th and 5th respectively. Austria comes in first this time around in terms of income inequality using the S80/S20 method but still below the EU average.

Table X reveals a general decrease and an increase in the income quintile gap in Czech Republic, Austria, Slovakia, and Poland. A straight up decline in Germany and in the EU in general and lastly only in Hungary an increase then a decrease.

The following are observations from Table X and Table XI-

- Poland which had the largest inequality in income gap between D1 and D9 do not have the largest gap on the S80/S20 Table and even fall below Hungary in this respect. What this explains is that although the income gap between D1 and D9 is massive the income quintile gap is not as big which could mean the income of the D10 not provided by Eurostat is not as high in relations to those of Germany, Austria, and Hungary.

- In the EU in general there is a decrease in both methods in terms of wage gaps
- Czech Republic on the other hand had a decrease and slight increase on the S80/S20 but a steady increase inequality income gap between D1 and D9. What this explains is that even though income earners on D9 have been having a slight increase in their earnings from 2017-2019 the income earners on D10 not listed definitely had a decline in 2018 and probably kept the same income gap between D1 and D10 in 2019 as those in D2 (1.21).
- In Austria, the S80/S20 shows a decrease and an increase which is inverse to the income gap between D1 and D9 (increase and a decrease). What can also be noticed is that the earners on D1 and D2 who are the lowest fifth had relatively similar pay (bar increases due to inflation and all usually seen year to year) so the changes in the S80/S20 were brought about by the highest fifth the D9 and the unstated D10.
- The German figures show that the income inequality is on a decline and can be seen on both Table XI as a decrease from 9.08 to 8.28 from 2017 to 2019 and on Table X from 3.57 to 3.44. What can also be noticed is the decrease is across all Deciles (from D2-D9 bar usual year to year increase because of inflation etc.), so the decrease in the S80/S20 simply shows the decrease in the top earners outweighs those of the lowest earners.
- The Hungarian figures are similar in interpretation to the German figures. The decrease in Table XI from 8.48 to 7.99 can equally be seen on Table X from 3.57 to 3.44.
- In Slovakia it is peculiar, because we can see in Table X that there is a decrease year on year on D2 earners from 1.31 to 1.27 to 1.19 and a decrease and slight increase in D9 from, 2.83 to 2.64 to 2.69, lastly in Table XI a substantial decrease and increase from 5.00 to 4.35 to 4.72 so we can make a conclusion that the S80/S20 changes are not only affected by the top earners as seen in the most other countries in the study but by both ends of the spectrum, the slight increase from the D9 and most definite increase D10 (from 2018 to 2019) plus the drop in D2 made the increase in the S80/S20.

6. Conclusion

From the foregoing, based on the two approaches (income by deciles and income quintile share ratio) employed in this study; Five of the selected countries namely Czech Republic, Germany, Austria, Slovakia, Poland, and Hungary have fluctuating income inequalities, whereas Germany's inequality ratio decreases consistently from 2017 up to 2019 same as the EU block. Generally, however, it has shown that there is a general decrease in the income inequality gaps of selected EU countries.

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