

Income Inequality of Population in European Countries During COVID-19

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Abstract: The COVID-19 pandemic has serious economic and social consequences, including impacts on the socio-economic situation of households. In our contribution, we want to focus on the effects of the pandemic on the income inequality of the population of European countries and its causes. In the theoretical part, we present several studies that were created on the given issue, mainly at the international, but also at the national level from Slovakia, Czechia and other national states. We also clarify the difference in the results that the studies bring. In the analytical part, using indicators from the EU SILC surveys from the Eurostat database, we describe the development of the level and rate of income inequality in European countries in 2019-2021 (the last available data), which is last pre-pandemic and two pandemic years. We describe income inequality measured by the Gini coefficient and by median income. We describe the income level according to average income values. For comparison, we present data on income in euros vs. in PPS. The effects of the pandemic on the income inequality of European nations are very diverse, but common factors across European countries that had an impact on the development can be specified. We summarize these in the work. In conclusion, we point out, among other things, the importance of investigating the given issue, especially in the context of crisis developments or other turbulent changes in the European economic environment that await us prospectively.

Keywords: income inequality; Gini; equivalised disposable income; mean and median values; Europe

JEL Classification: D31; D33

1. Introduction

The COVID-19 pandemic is not only a health crisis, but it has also significantly affected the economic and social situation of countries and their populations. There are many researches devoted to various aspects of this pandemic, health, socio-economic and their interconnection and connections between them. In our contribution, we focus on the investigation of the impact of the COVID-19 pandemic on the income level and on the inequality of the income distribution of the population in the European area during pandemic years (later data from harmonized survey EU SILC are not available). We process knowledge from already existing research and studies on the given topic and systematize their results. In the analytical part of the work, we describe and compare the state and development in the years 2019 to 2021, using available data from harmonized European surveys on income and living conditions of the EU SILC, which are in the Eurostat database.

The available knowledge about the development of income inequality of the population in the times of COVID-19 is very diverse, sometimes even contradictory. How to explain it? This is due to the source of data with which the researches and studies based on them work, but also the way of analyzing and processing this data, the indicators used (considering their specificities and limitations), the way of their interpretation. The mutual comparability of research results is also limited due to the different socio-economic and demographic composition of individual countries, groups of countries or regions within countries (if we are talking about interregional differences within one country, which are also worth paying attention to). As for the factors affecting the income of the population during the COVID-19 and transmission channels, we have summarized them into the following groups:

1. changes caused by COVID-19 in the labor market (white vs. blue collars, high-educated – low educated, precarious work and some types of flexible working hours and working relationships, illegal workers), job loss, reduction of working hours with reduction of work income, etc. (for more details, see *The territorial impact of COVID-19: Managing the crisis across levels of government*, OECD, 2020),
2. the structure of the economy and employment in individual branches and sectors of the economy, including the types of professions performed (this also implies the nature of work and the ability to perform work during the lock down), (for more details, see the maps of the EU regions from the point of view of their exposure and sensitivity to the economic crisis due to covid-19 in: *Potential impacts of COVID-19 on regions and cities of the EU*, European Union, the Committee of the Regions, 2020),
3. gender-based differences in the labor market during covid-19 (including the need to care for children during lock downs) (Laurimäe, 2022),
4. differences between workers of different ages and their situation on the labor market at the time of COVID-19,
5. differences between workers of different nationalities (foreigners), ethnicity and race on the labor market at the time of COVID-19 (Işık, 2022),
6. digitization and its accessibility for all (especially in the case of online education),
7. social situation, including income, before the pandemic,
8. differences between the rural and urban population,
9. in an international comparison, different types of state restrictions in the time of COVID-19 and measures to help individuals and companies in the time of COVID-19 play a role.

In many studies, it is said that despite the fact that the short-term effects of COVID-19 on income inequality are mostly discussed, the long-term effects caused by COVID-19 are more fundamental/significant (long-term effects on the labor market, on the organization of work/the way work is performed, effects on the young generation, which was disadvantaged at the time of COVID-19, in terms of education or the labor market, impacts on low-skilled and low-income groups of the population, etc.).

Below in the diagram, the factors of the impact of COVID-19 on income inequality according to the above modified Eurofound study (2023) are summarized as follows:

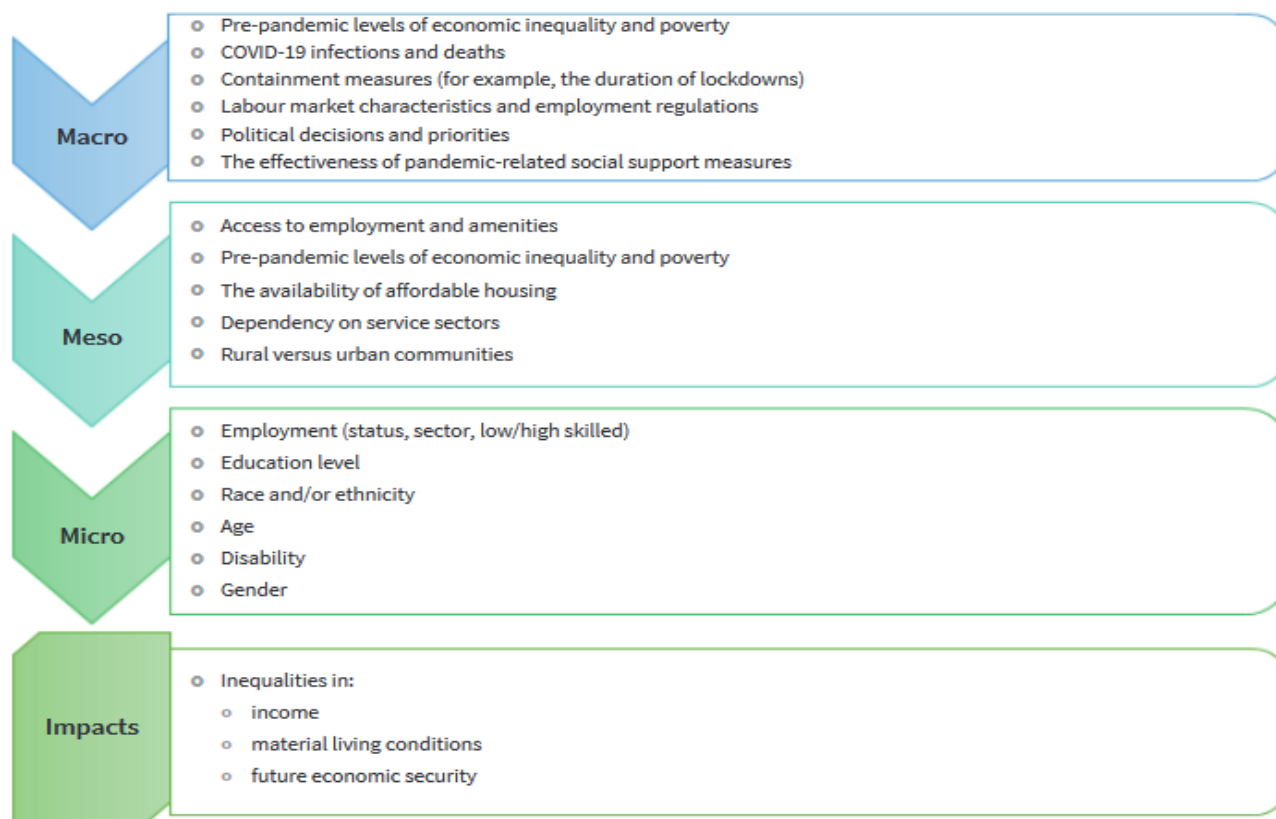


Figure 1. Macro-, meso- and microlevel factors in income inequality during the COVID-19 pandemic (Eurofound, 2023)

In Slovakia, several institutions and authors addressed the issue of the impact of COVID-19 on the income of the population. We will mention two institutions here: National Bank of Slovakia (NBS) and The Council for Budget Responsibility. NBS using knowledge from the last wave of HFCS (Household Finance and Consumption Survey, which is harmonized European survey of European Central Bank) detection. From the analysis of the obtained data on income inequality in the first mentioned study, it emerged that: *The main channel through which the pandemic affected households' economic and financial situation was the labour market. People faced shocks mainly in the form of job loss, business closure or temporary wage reduction. Wages were reduced for various reasons. Falling business sales may have translated into employees receiving less than 100% of their salary or into a decline in self-employment income. At the same time, wage reductions may or may not have been associated with a reduction in working hours. Hours may have been reduced by the employers (in response, for example, to reduced business operation) or for personal reasons (employees asking for reduced hours or leave to take care of children or relatives or because of their own illness or health problems).*

Based on analysis of real data from the EU SILC survey, with which the National Bank of Slovakia study worked: a quarter of households experienced a reduction in income. Since income reduction is highly correlated with a negative working life situation, this proportion was higher for specific subgroups mentioned above: self-employed households (48%), households aged 16-34 (38%) and 35-44 (35%), and households working in contact intensive services (36%) and manufacturing (33%).

The Council for Budget Responsibility (The Council for Budget Responsibility was formed in 2012 as an independent body set up to monitor and evaluate the fiscal performance of the Slovak Republic) analyzed the impact of the pandemic on the income of households in Slovakia categorized according to various characteristics, while working with anonymous data on household income from the Social Insurance Company. From its report we select: *In the most critical month of May 2020, the income of workers in Slovakia decreased year-on-year by 43%, which is a significant increase compared to 2019, when the reduction in income affected 26% of workers. Despite the negative economic development, the average disposable income of workers rose compared to last year. The shortfall in work income was compensated mainly by sickness benefits. The shortfall in work income was compensated to a higher extent for women than for men. From the point of view of age categories, the incomes of persons aged 26 to 40 were compensated the most. The pandemic did not affect the disposable income of persons outside the labor market. Their income increased by 5.4%. The disposable income of old-age pensioners increased by 1.4% in 2020.*

Unlike domestic sources (or foreign sources that map developments within one country), which mostly draw on real data on the income of the population at the time of the pandemic, international studies (due to the two- to three-year delay related to obtaining data from international harmonized surveys such as EU SICL or LFS) worked only with expert estimates or with simulations on microdata from the years before the pandemic. However, there are exceptions, for example, the COME-HERE database, surveyed by University of Luxembourg since the beginning of the pandemic.

If we would like to map Czech sources of literature dedicated to research on the effects of COVID-19 on income inequality: in the Czech Republic, the impact of COVID-19 on income inequality, especially with an emphasis on the regional dimension of this issue, is addressed, for example, in a study by the Research Institute of Labour and Social Sciences of Červenka, Beran and Bílková (2022) or in a study by Luxemburg Stiftung of Bittner (2020). The first of the mentioned studies decomposes and analyzes regional income inequality in the Czech Republic after the start of COVID-19 pandemic. Significant rise of wage concentration was identified; however, it was overruled by the effect of other income sources, resulting in decline on the total Gini index in 2020. This outcome can be attributed to activity of the public sector, however not to the social security system. The decline of inequality was achieved through discretionary policy (entrepreneurial compensation bonuses). To decrease the inequality by existing social security scheme, Czech government could augment assistance in material need, child allowance, foster care benefit or housing allowance.

The impact of COVID-19 on income inequalities is addressed by all major international institutions, such as the World Bank, OECD, European Union Institutions. The World inequality report 2022 maps income inequality and its evolution up to 2020 (Chancel et al., 2022, p. 55). From foreign and international research and studies devoted to the issue of the impacts of COVID-19 on income inequality, we will mention, for example, the works: Dauderstädt (2021a, 2021b, 2022a, 2022b), Ferreira (2021), Almeida et al. (2021), Astarita and Alcidí (2022), Waldenström (2021), Clark, d'Ambrosio, and Lepinteur (2021), Narayan et al. (2022), Darvas (2021), Palomino, Rodríguez, and Sebastian (2020). Large literature review on the issue is also provided by Stantcheva (2022), including a complex of economic-policy measures to prevent

unwanted inequalities. On page 7 in her paper we also find an overview of research on the development of Gini in the time of COVID-19 by various authors (including an indication of data sources and how to work with them in individual research studies).

Almeida et al. (2021) analysed the impact of the COVID-19 crisis on EU households' income. Additionally, and effect of discretionary fiscal policy measures taken by the EU Member States. They found that the COVID-19 pandemic is likely to affect significantly households' disposable income in the EU, with lower income households being more severely hit. Their results indicated that discretionary fiscal policy measures play a significant cushioning role, reducing the size of the income loss (from -9.3% to -4.3% for the average equivalised disposable income). Results of their study also show that the impact of the COVID-19 crisis was highly regressive, with the lowest deciles of the income distribution being more severely hit, and lead to a significant increase in poverty.

Authors used EUROMOD, the EU microsimulation model, to simulate and compare households' income, inequality and poverty indexes under each macroeconomic scenario and to estimate the overall impact of the crisis and the cushioning effect of discretionary fiscal measures. EUROMOD is a static tax-benefit microsimulation model covering in a comparable way all the EU Member States. The model enables consistent EU-wide tax-benefit and distributional analyses. Authors in this way overcome the methodological challenge posed by the lack of up-to-date survey data by reweighting the microdata underlying EUROMOD based on the European Union Statistics on Income and Living Conditions (EU-SILC).

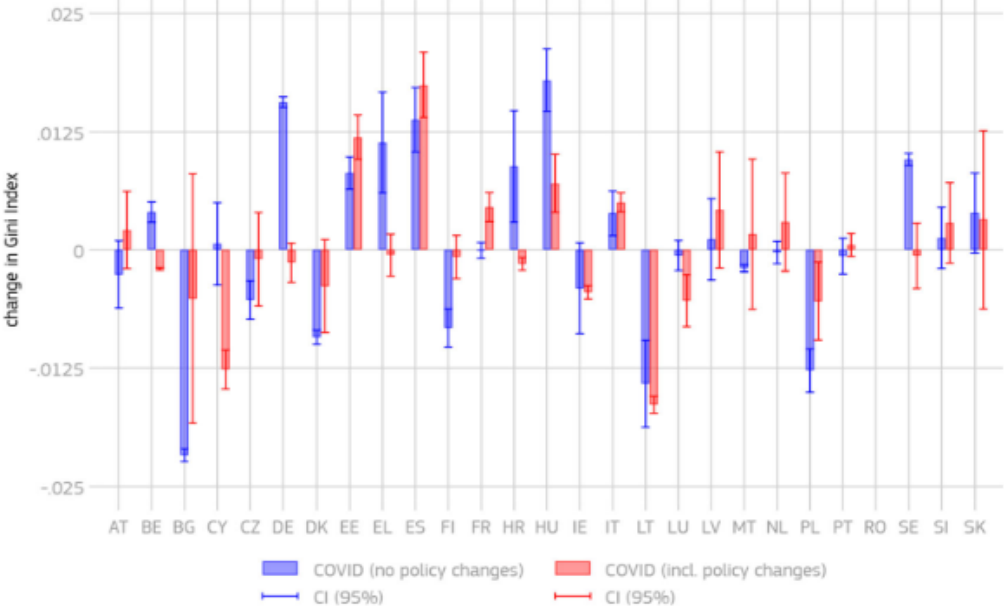


Figure 2. Impact of the COVID-19 crisis on inequality (Gini index) in EU countries, based on calculations using EUROMOD I2.0+ (Almeida et al., 2021)

On the evolution of inequality, Eurofound's document (Economic and social inequalities in Europe in the aftermath of the COVID-19 pandemic, 2023) states: *In 2020, the income quintile share ratio in the EU stood at 4.9, meaning that the total income held by the richest fifth of the population was 4.9 times greater than the total income held by the poorest fifth. This marks a decrease compared with 2019 (when the ratio was 5.0). While this seems to suggest that the pandemic has not*

significantly affected the trend of decreasing income inequality, it is important to note that COVID-19 interrupted the data collection activities on which these results are based, and some countries (e.g. Germany) introduced changes to the methodology. This means that 2020 data may not always be directly comparable to the data of previous years.

The trends in income inequality over time were also observed by estimating the Gini coefficient (Figure 2). In 2020, the EU27 Gini coefficient was 0.30. For reference, the highest Gini coefficient recorded globally was 0.62 in South Africa (2017, latest data; OECD, 2022) and the lowest Gini coefficient recorded was 0.21 in Slovakia (2020 data; Eurostat [ilc_di12]). The EU27 Gini coefficient was relatively stable during 2010–2020, but differences were measured at country level. For example, in Bulgaria, inequality steadily grew from 2010 to 2020 (the Gini coefficient increased from 0.3 to 0.4). Meanwhile, in Poland, the Gini index decreased from 0.31 in 2010 to 0.27 in 2020. In both countries, income inequality decreased during the pandemic. Similarly, to the income quintile share ratio, these results should be interpreted with caution owing to breaks in the time series (Figure 3).

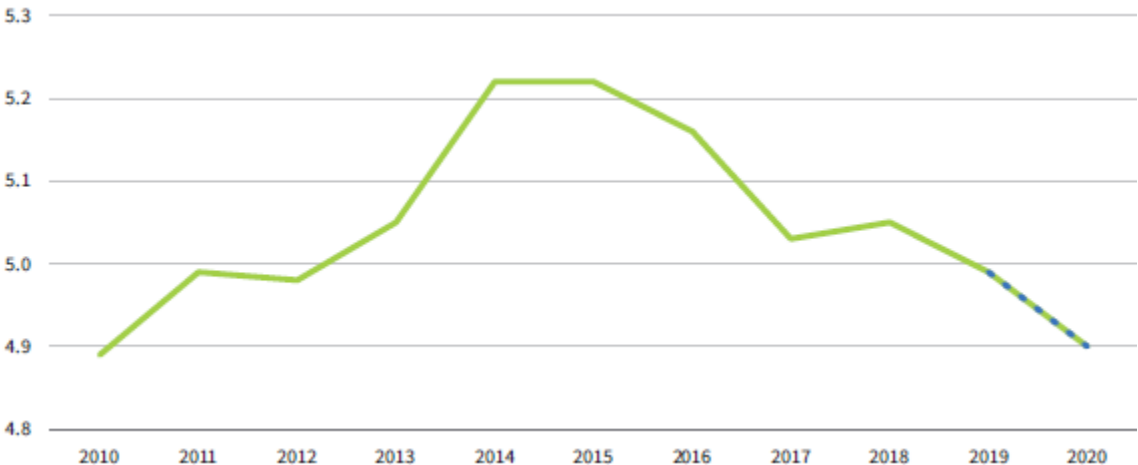


Figure 3. Income quintile share ratio (S80/S20) for equalized disposable income in EU27, with data from database EU SILC from Eurostat (Eurofound, 2023)

2. Methodology

The data source in our analysis of income level and income inequality distribution in European countries is the harmonized European survey on income and living conditions (EU SILC). For comparison, we have selected data from the last three years for which data from the EU SILC surveys are available (these are EU SILC surveys 2020, 2021 and 2022, the reference years of which are 2019, 2020 and 2021).

Using the tools of descriptive statistics, we summarize basic information about the distribution of equalized net income in the European countries, measured by the Gini coefficient, and subsequently also using descriptive statistics of equalized net incomes levels in Euros and in PPS (using the values of median and average equalized net incomes).

3. Results

Figure 4 shows the development of the inequality of the distribution of equivalent disposable income measured by the Gini coefficient. Fluctuating development of the value of the Gini coefficient prevails in European countries in the monitored years 2019-2021. While

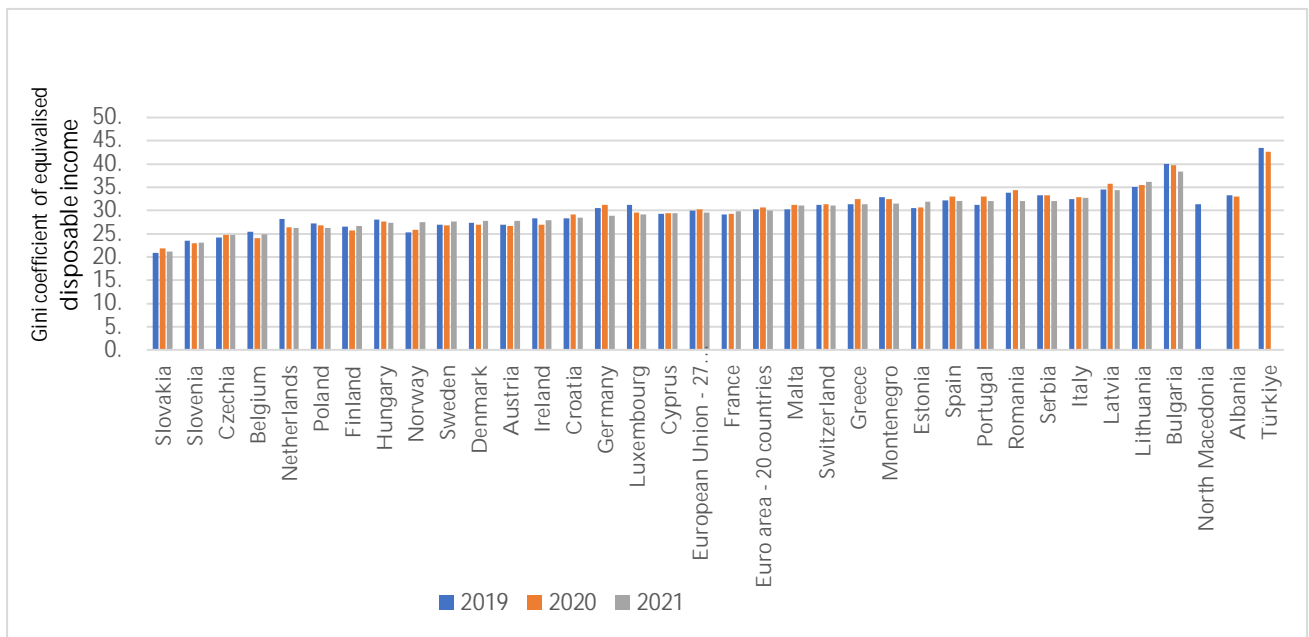


Figure 4. Gini coefficient of equivalised disposable income in EU countries in the years 2019-2021 (Eurostat, EU SILC Database)

the value of the Gini coefficient for all EU countries or the Eurozone is very balanced in the monitored period, in the case of individual countries we already observe larger inter-annual differences in the value of the Gini coefficient. In some European countries the value of the coefficient increased in the first year of the pandemic, and decreased in the second year (Germany, Greece, Spain, Croatia, Italy, Cyprus, Latvia, Malta, Portugal, Romania, Slovakia or Switzerland), in another group (Belgium, Denmark, Ireland, Slovenia, Finland, Sweden) is recorded a decrease in the Gini value in the first year of the pandemic, but its value increased in the second. France and Norway are among the countries with an increasing value of the Gini coefficient during the entire monitored period, on the other hand, Luxembourg, Hungary, Poland and Montenegro recorded decreasing values of the Gini coefficient during the monitored period.

Figure 5 contains basic descriptive statistics of income inequality in European countries measured by the Gini coefficient of equivalised disposable income for the year 2021. The median value of the Gini coefficient of 29.1 divides the set of countries studied into two halves, i.e. half of the countries from the studied set had Gini coefficient values equal to or higher than the mentioned value in 2021, the other half of the countries had values equal to or lower. The approximate value of the Gini coefficient was 29.4, minimum 21.2, maximum 38.4. The value of the Gini coefficient at the level of the upper quartile of the distribution was 32, in the case of the lower quartile it was 27.4.

Furthermore, we focused on researching the level of income measured by equivalised net income and its changes in individual countries and in the EU countries and Eurozone as a whole. On the x-axis in Figure 6, countries are ranked in ascending order by the size of this median equivalised net income in 2021 (based on EU SILC 2022 survey data). There is a prevailing trend of income level growth in individual countries between 2019 and 2021. On average, the level of income measured in this way is stable for EU and Eurozone countries.

Norway and Germany are exceptions, in which in the first year of the pandemic the level of average equivalised disposable income measured in euros fell, in the second year in Germany it remained unchanged compared to the previous year, in Norway it increased year-on-year (however, it did not reach the level of average equivalised disposable income in euros before the start of the pandemic).

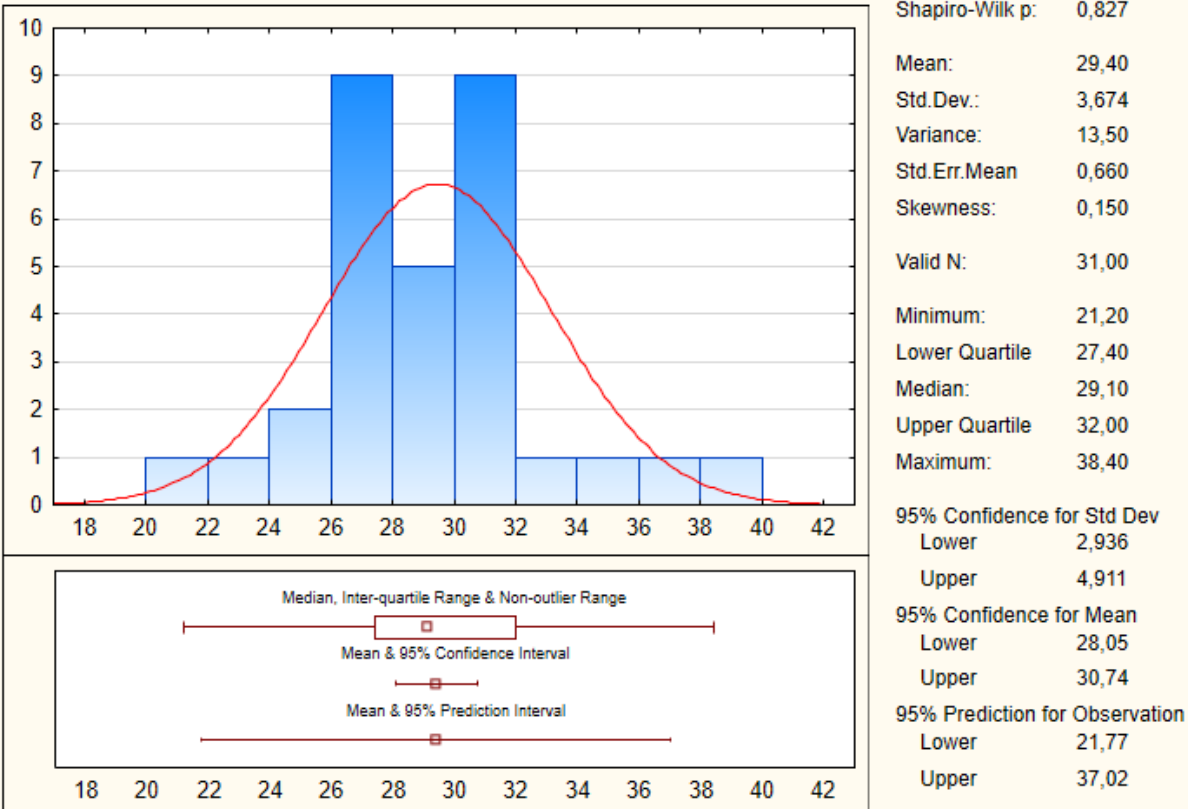


Figure 5. Descriptive statistics of income distribution in 2021 measured by Gini coefficient of equivalised disposable income (summary) in EU (Data source: Eurostat, EU SILC Database; software used: Statistica)

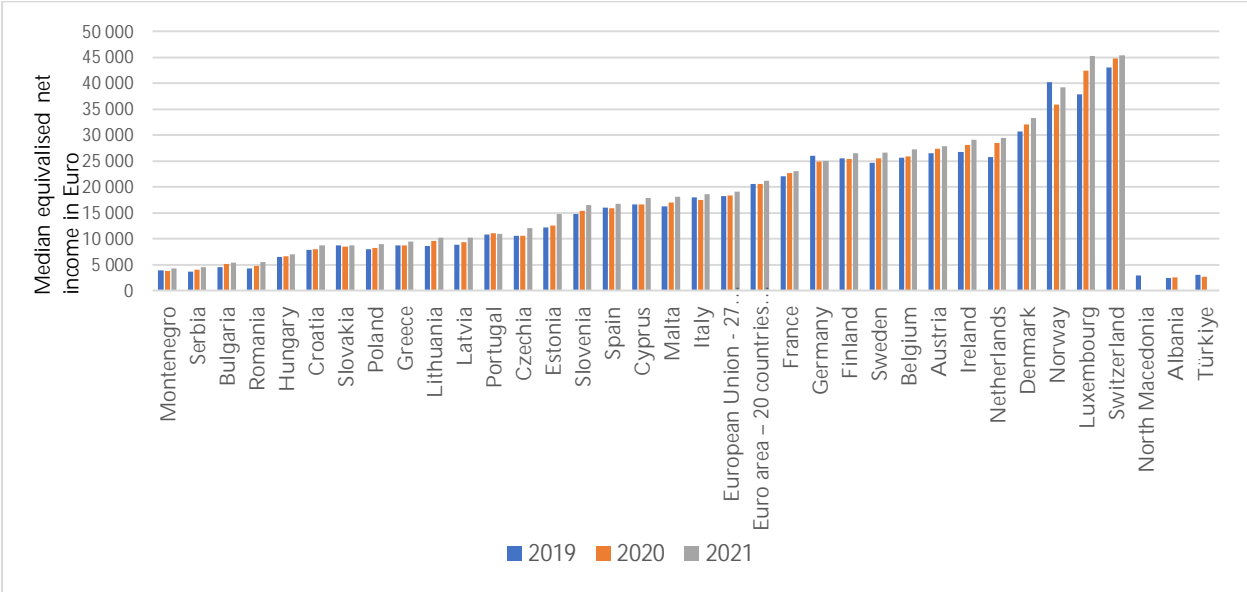


Figure 6. Median equivalised net income in Euro in EU countries in the years 2019-2021 (Eurostat, EU SILC Database)

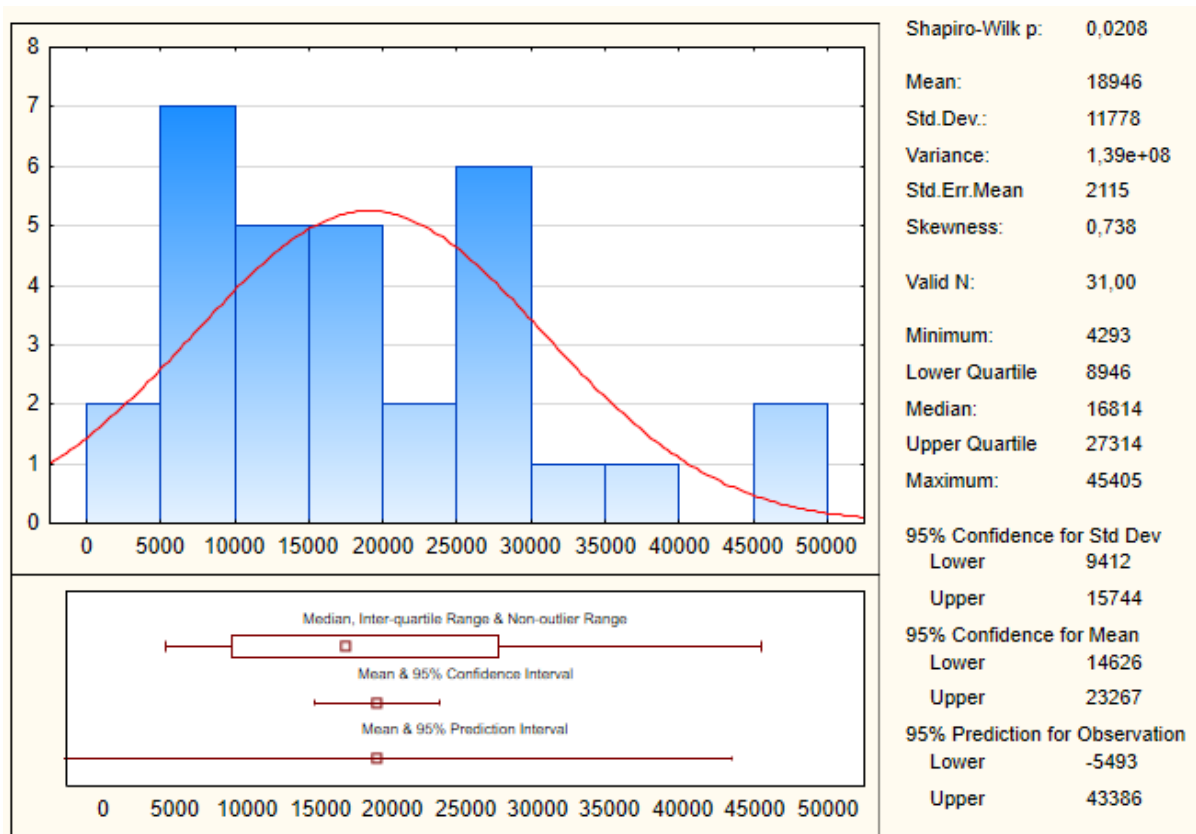


Figure 7. Descriptive statistics of income distribution in the year 2021 measured by median equalized net income in Euro (summary) in EU (Data source: Eurostat, EU SILC Database, software used: Statistica)

Norway, Montenegro, Slovakia and Germany are exceptions to the prevailing growing trend of average equalised net income in PPS (see Figure 8), because in the case of the first three mentioned countries, we observe a drop in average income in the first year of the pandemic and its subsequent increase in the second year. In Germany, on the other hand, from 2019 to 2021, there was a decrease in the level of income measured by the median equalised net income in PPS.

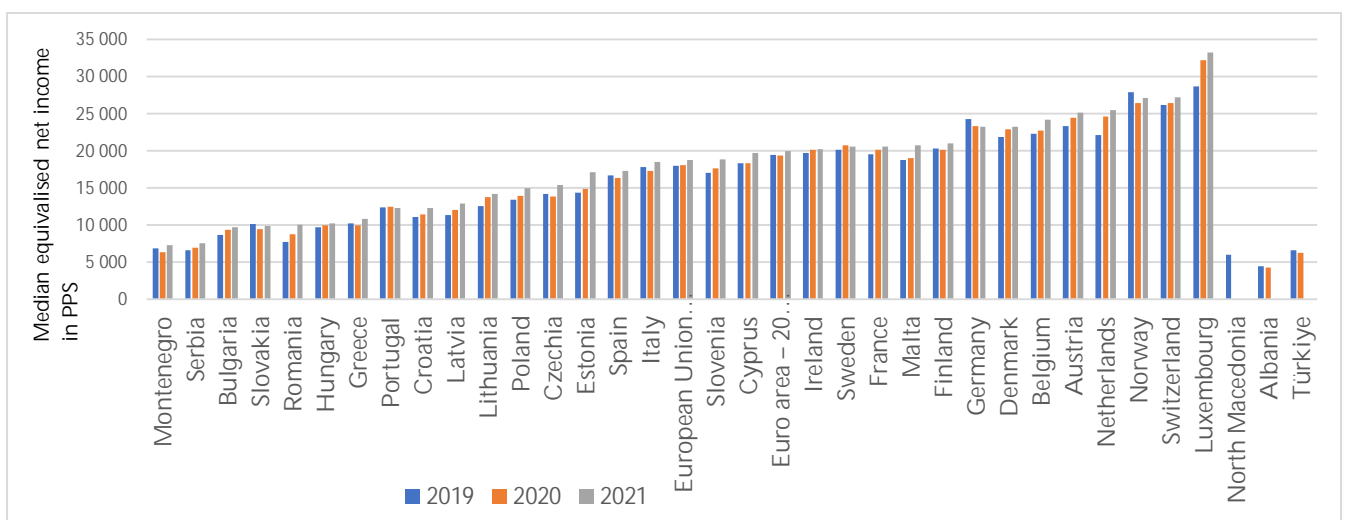


Figure 8. Median equalised net income in PPS in EU countries in the years 2019-2021 (Eurostat, EU SILC Database)

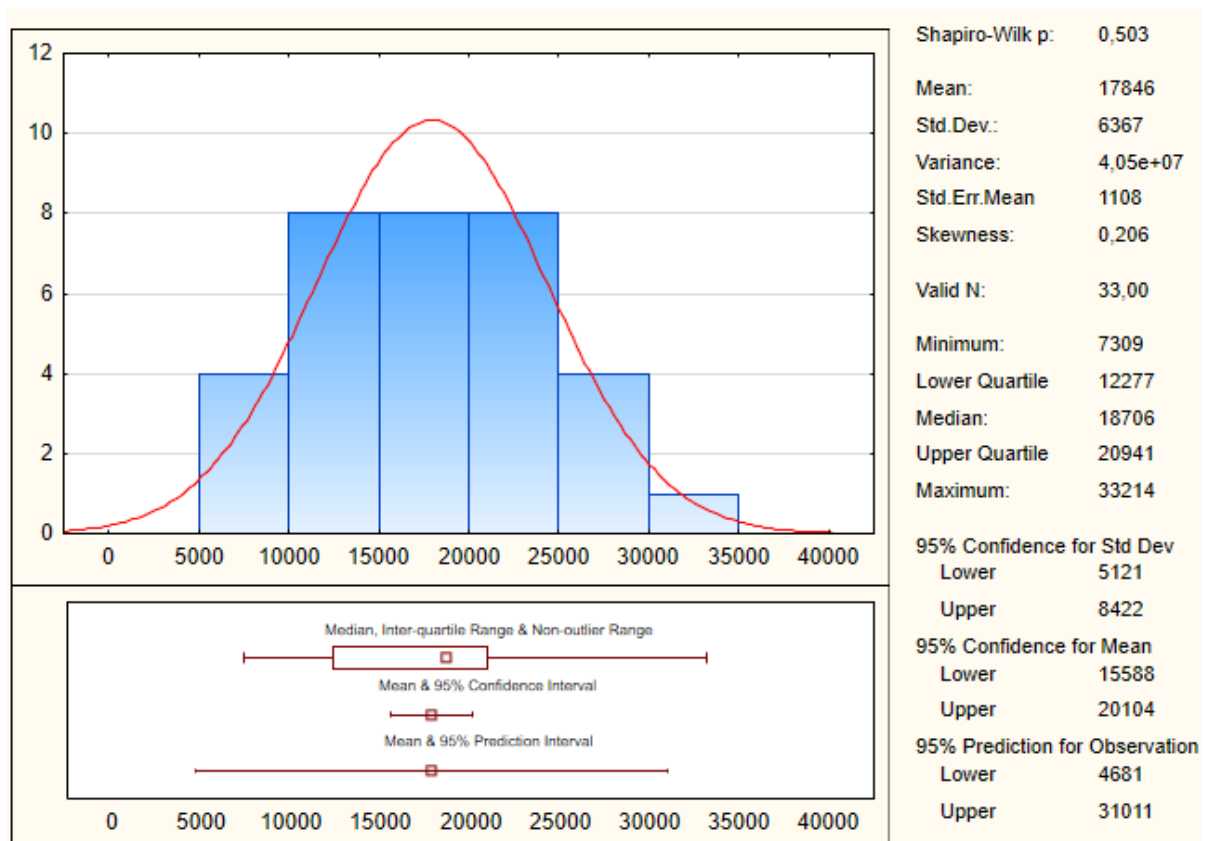


Figure 9. Descriptive statistics of income distribution in the year 2021 measured by median equivalised net income in PPS (summary) in EU (Data source: Eurostat, EU SILC Database, software used: Statistica)

When we consider the average (mean), not the median, equivalised net income values in euro, the range of values for individual countries in ascending order of 2021 values (from EU SILC 2022) looks as shown in the Figure 10. EU countries and Eurozone countries as a whole are somewhere in the middle of the scale. Serbia, Romania, Bulgaria, Hungary and Slovakia are at the top of the list. The Netherlands, Ireland, Denmark, Norway, Luxembourg and Switzerland are at the other end of the scale with the highest values.

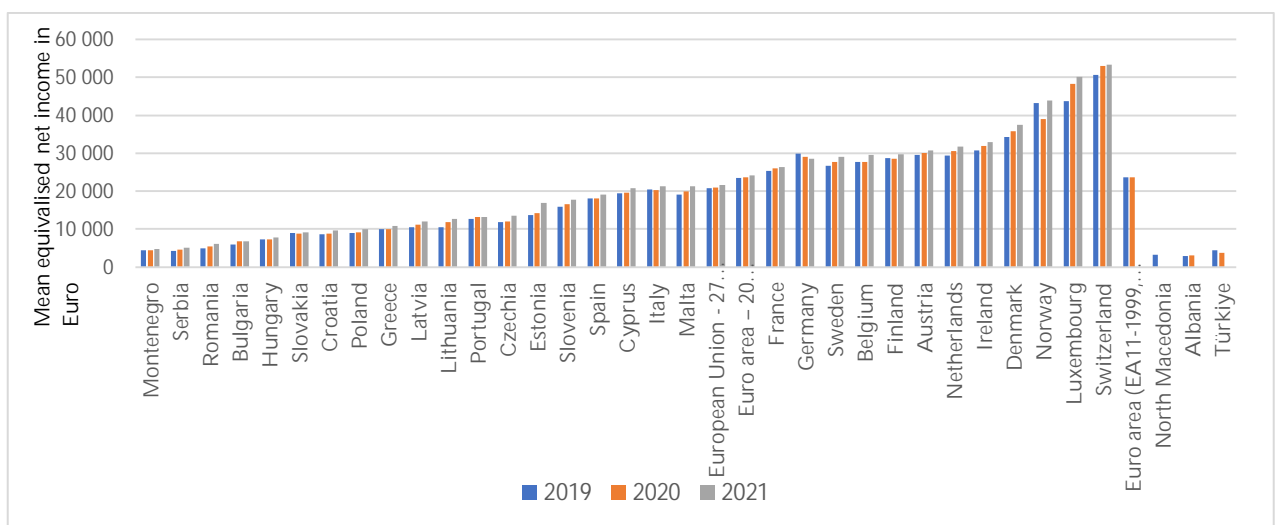


Figure 10. Mean equivalised net income in euro in EU countries in the years 2019-2021 (Eurostat, EU SILC Database)

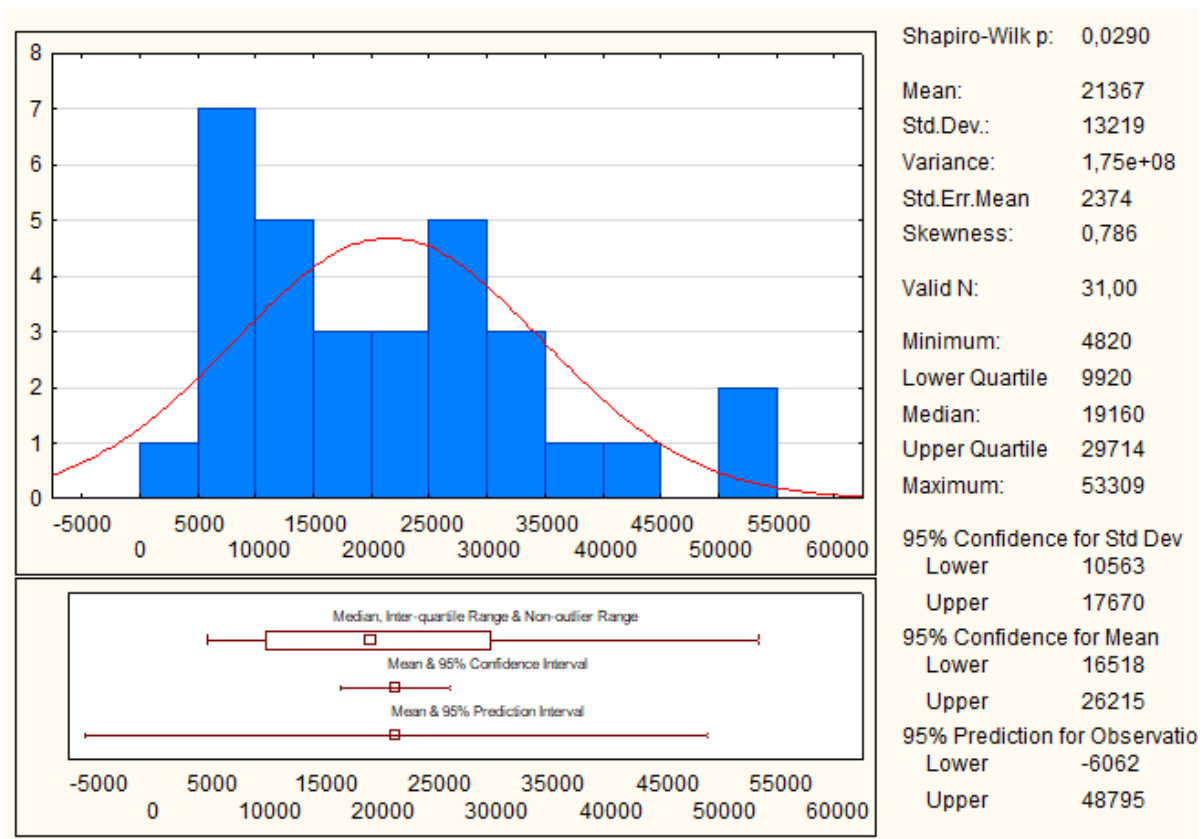


Figure 11. Descriptive statistics of income level in the year 2021 measured by average equivalised net income (in Euro) in EU (summary) (Data source: Eurostat, EU SILC Database, software used: Statistica)

Finally, a look at the ranking of countries by the level of average equivalised net income in PPS (Figure 12). Montenegro, Serbia, Slovakia, Romania, Hungary, Bulgaria and Greece reach the lowest levels of this indicator of the country's income level. The highest values of average equivalised net income in PPS were recorded in 2021 by Belgium, Denmark, Germany, the Netherlands, Austria, Norway, Switzerland and Luxembourg.

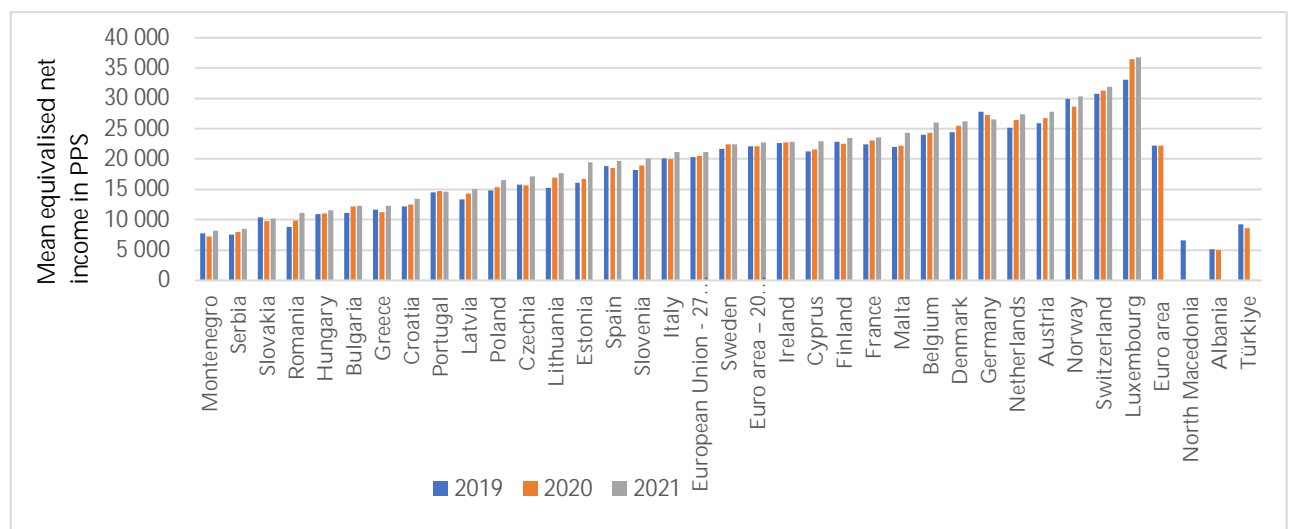


Figure 12. Mean equivalised net income in PPS in EU countries in the years 2019-2021 (Eurostat, EU SILC Database)

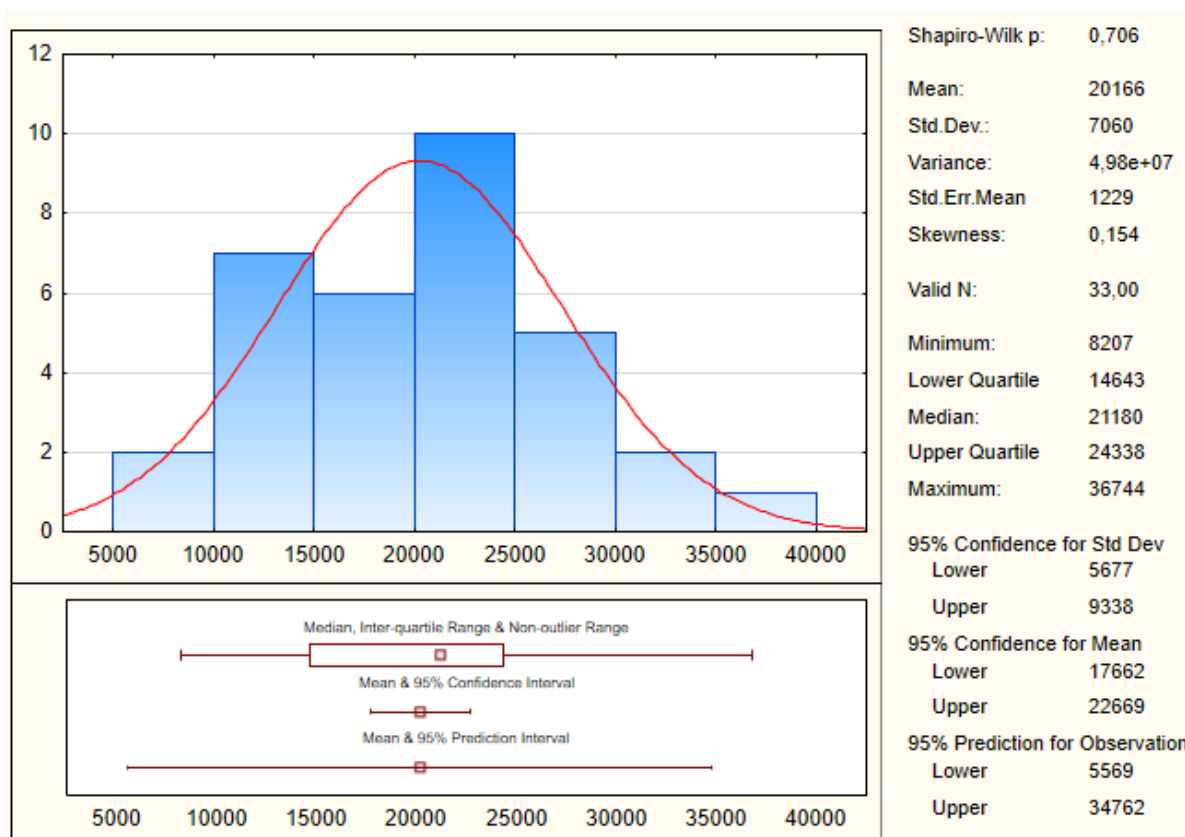


Figure 13. Descriptive statistics of income level in the year 2021 measured by average equivalised net income (in PPS) in EU (summary) (Data source: Eurostat, EU SILC Database, software used: Statistica)

In the case of average values of equivalised net income (both in euros and PPS), the trend of growth or stabilization of the income level prevails in the years 2019-2021. There are also exceptions (Germany with decreasing values of average equivalised net income in PPS, Sweden with decreasing values of average equivalised net income measured in Euros, Luxembourg with a fluctuating development of average equivalised net income measured in euros).

4. Discussion

We want to emphasize that the issue of the impact of COVID-19 on population income inequality has been devoted to a lot of research, many studies and publications. Some pursue an issue internationally; others focus on examining the issue within one or several countries. The diversity of results and conclusions on the intensity and nature of the effects of the pandemic on household incomes depends crucially on the data with which the studies work, their processing methods and the indicators by which their results are interpreted. Taking these facts into account, then comparable conclusions can be reached, some of which are also presented in our paper.

Why address income inequality? After the onset of the pandemic crisis and after recognizing the breadth and depth of its consequences, significantly differentiated within the population, another important reason why the issue is important and worthy of attention not only of researchers and politicians, but also entrepreneurs/employers and other stakeholders.

Other crises such as digitalization, robotization and other innovations affecting the world of work or other innovations in the socio-economic environment in developed and developing countries are also looming on the horizon, and their impacts on income inequality or on socio-economic inequality of the population (more broadly) can be expected to be very similar to those of the socio-economic impacts of the pandemic crisis.

5. Conclusions

Slovakia, as well as the V4 countries, have long been among the European countries with the lowest levels of inequality measured by the Gini coefficient or by average or median income values for the country as a whole. This can also be seen from the graphs in our analysis. The COVID-19 pandemic has not changed somehow significantly interstate ranking of countries in the ranking by the Gini coefficient values, nor has changed the ranking of countries by the income level of countries (measured by the values of average or median incomes). It is not even possible to identify a clear trend in the development of inequalities in European countries at the time of COVID-19. The comparative analysis of the data we carried out neither confirm a clear increasing trend of income inequality during COVID-19 nor decreasing trend of income level.

At this point, however, it is important to note that there are differences within countries in the impacts of COVID-19 on different population groups classified according to the demographic, socio-economic or geographical characteristics (not only urban vs. rural, but also economically developed vs. economically less developed regions, etc.). In our work (especially in its theoretical part), we pay attention to these factors of the impact of the COVID-19 pandemic on population income inequality, and it also appears in other works devoted to the issue, in which is stated that the COVID-19 pandemic did not affect the population as such but had differentiated impacts on different groups according to the categorizations already mentioned above. The differentiated impacts of the COVID-19 pandemic on income inequality of different population groups have been recorded in the world, in Europe and within Slovakia, which is also documented in our paper by mentioning existing research in this area in the world, in Europe and in Slovakia.

Conflict of interest: none.

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