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Labour share and income inequalities in the European Union, taking into account the level of development of economies

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Abstract

Research background: The relationship between labour share and income inequality is a complex and multifaceted problem. Despite ongoing discussions among economists, there is

still no consensus on the direction of the relationship between labour share and income inequality.
Purpose of the article: The article aims to assess the impact of labour share on income inequality, which is measured in three ways: the Gini index of gross income, the Gini index of market incomes, and the Gini index of household disposable income.
Methods: Dynamic panel data models were applied to estimate the relationship between Gini coefficients and socio-economic indicators. The study investigated 25 European Union countries over the 2011–2021 period.
Findings & value added: Despite the long convergence process of the EU economies, there is still great diversity in the labour share, social inequalities, and the interplay between these factors. The added value of this research is the indication of labour share impact on three Gini measures covering a diverse income spectrum (from labour and capital). Based on the research findings, hypothesis 1, claiming that the more developed the national economy, the lower the share of employment income, favouring capital gains, is confirmed. Hypothesis 2 (as the share of income from work increases, the Gini coefficient of gross incomes decreases) must be rejected. There is no significant relationship between labour share and the studied Gini measures in 'old' EU countries. In 'new' EU members, there is a reverse relationship than assumed in hypothesis 2. The growth of the Gini coefficient was influenced by the rise in labour share, which can be attributed to the diversity in economic structures.

Introduction

The transformation in the capital-labour relationship within contemporary economies is a multifaceted outcome of the intricate interplay of political, economic, technological, and social factors. The complex dynamics of these processes, coupled with their complicated interconnections within a dynamically evolving socio-economic milieu, exert a discernible influence on the macroeconomic metrics that are widely acknowledged as pivotal parameters within these phenomena. Such metrics encompass the labour's portion of the national income and the degree of income disparity. The literature abounds with numerous investigations dedicated to unravelling the causative factors underpinning these phenomena and elucidating the intricate web of interrelationships that bind them (Reshef & Santoni, 2023; Dao *et al*., 2020)

The ongoing structural dynamics in the economies of the European Union (EU), coupled with the persistent forces of convergence and globalisation, are reshaping the operational landscape of these economies. The previously observed phenomena, including income inequality and the share of labour in the national income, remain relevant and pressing research inquiries. The accumulation of capital and distribution of national income between capital and labour are heavily influenced by the economic system

of a given economy. The lack of uniformity in these systems among EU Members leads to various income distributions among production factors and, as a result, varying levels of inequality.

The rationale for this phenomenon can be traced back to historical conditions. In the 1990s, nations that acceded to the European Union post-2004 underwent a profound transformation of their political systems, transitioning from ineffective socialist paradigms to market-oriented economies. The imperative to enhance the per capita income in these economies, relative to those with well-entrenched market structures, was paramount. These stragglers exhibited a distinct economic structure, notably characterised by a considerable reservoir of available capital and strides in technological development. Although convergence processes have mitigated disparities between these two groups of countries, distinctions persist. Thus, categorising EU member states into two distinct groups, the "original EU" and the "new" entrants, remains a justifiable classification.

While investigating the European Union's socioeconomic development, examining how labour share impacts income distribution is essential. The Organization for Economic Cooperation and Development (OECD, 2015, 2016) defines household income as the total income available to a household in a given year, including income from employment or self-employment, capital gains, and social transfers (net income). According to Gini's definition (1921), household income is distributed among household members, considering differences in household size (measured by the number of members).

Households' income can vary depending on the stage of economic development, the proportion of income coming from the capital, and the country's demographic structure. Rodrick (2007, 2016) claims that economic growth alone cannot reduce inequality and poverty. Countries with a high proportion of income from capital gains tend to have a lower share of income coming from labour, in contrast to less developed countries where most households rely on income from work. In developing countries, where agriculture's role is substantial in employment and GDP creation, a relatively high labour share in the national income can be expected.

Kuznets (1955) was the first to introduce the relationship between inequality and development, pointing out that growth is associated with transitioning from traditional to modern activities. However, migrating from less developed to industrialised areas might not necessarily result in decreased income inequality (Buechel *et al*., 2023). In countries with a low

level of development, where structural transformations of economies are observed, there may be an influx of workers to sectors of more developed economies. Thus, periodically, income inequality may increase (e.g. the flow of workers from industry to highly specialised services). The availability and degree of modern, innovative capital also play a role in this diversification (Baymul & Sen, 2020). Our study establishes the significance of labour share in income inequality. This approach is justifiable since the reduction in labour share is frequently linked with a rise in income inequality due to the concentration of capital resources rather than employment resources (OECD, 2015). As such, the labour share is closely related to economic development, affecting income inequality distribution.

Erauskin (2020); Atkinson *et al*. (2011); Petreski (2022); Hlasny and Verme (2021); Reshef and Santoni (2023) and Koyo 2021 researched the share of labour in national income in connection with income inequality. Their investigation shows that the relationship between the studied phenomena is differentiated by the selection of characteristics describing internal and external conditions, such as research period, economy development, structure and level of digitalisation, and place in the global value chain. The implemented public and social policy is also essential. The investigations mentioned above were systematically executed across diverse global economies, including but not limited to China, Japan, Canada, and Mexico. Notably, a research gap exists as no studies have yet been completed for the European Union. Thus, there is a need for further exploration in this context.

The EU economies have undergone a long convergence process, yet significant diversity continues in labour distribution and social inequalities. The study aims to investigate the impact of labour distribution on three Gini measures that span a diverse income spectrum encircling both labour and capital. The study covers the period of 2011–2021, assuming that the structures of EU economies have substantially converged, given their comparable institutional and legal systems and shared values. The unique aspect of our research is the consideration of various forms of income inequality beyond the conventional analysis of residents' gross income in similar studies.

The group of EU countries included in the study, despite differences in their level of development (digitalisation, structure and level of connections of global value chains), embodies a distinct and shared value system. This system finds expression, among other places, in the Agenda for Sus-

tainable Development and is reflected in each country's public and social policies.

In light of ongoing international research, it seems interesting to analyse the relationship between the share of labour in national income and income inequalities in a group of EU countries compared to the research results obtained for different economic systems in countries such as China, Mexico, and Canada. The chosen research timeframe holds particular interest, especially in the ongoing COVID-19 pandemic and the dynamic economic changes associated with environmental protection and digitalisation initiatives during this period.

This research paper is organised into six sections. The second section reviews the literature on labour share and income inequalities. The third section presents the data and methodology used in the study. The fourth section presents the research results. The fifth section discusses the findings, and the final section provides conclusions.

Literature review

A significant body of research is dedicated to the labour share in national income. The literature review indicates that this topic remains relevant, particularly in light of the spatial differentiation of social inequalities (Rodrigues & Jayadev, 2010; Atkinson *et al.,* 2011; Pariboni & Tridico, 2019; Petreski, 2022; Fontagne *et al*., 2023).

The research conducted by Bentolila and Saint-Paul (2003) and the work by Autor *et al.* (2023) elucidates the differential capital intensity of production, emphasising investments in capital as opposed to labour resources. Technological changes play an essential role in contemporary globalisation processes due to the progressive integration of global value chains (GVC). Moreover, technological changes directly or indirectly impact national labour markets by supplementing or replacing the existing workforce. It can also influence remuneration related to structural changes in labour markets resulting from the diversification of production processes requiring different levels of specialisation (from know-how to simple activities) depending on the production stage (Fontagne *et al*., 2023; Nikulin *et al*., 2021).

Countries that are relatively rich in capital participate to a greater extent in GVC connections, which is associated with superior involvement at a higher level of the supply chain within GVCs and an increase in capital

intensity. Participation in GVC is linked to the international vertical integration of upstream intermediate production and downstream assembly offshoring (Fontagne *et al*., 2023). Technological advancement at a given stage of the production process in a specific country affects the processes shaping labour market parameters, such as capital-labour relations, wages, income inequality, differentiating the share of labour in national income and the existing inequalities in individual countries.

Harrison (2005) and Soriano Mena (2023) posit that labour's bargaining force, associated with the intensifying globalisation, may play an essential role. Harrison (2005) indicates that financial openness, which allows for the flow of capital between countries (including foreign direct investment), may reduce the bargaining power of labour and lead to a more significant role for capital.

Autor (2020) and Autor *et al.* (2023) espouse the perspective that globalisation processes catalyse alterations in labour share. Their analysis suggests that companies, in pursuit of cost optimisation, relocate specific operational processes from high-wage countries to regions with more modest labour costs. This strategic manoeuvring may offer a reasonable explanation for the diminishing proportion of income derived from labour in advanced economies while concurrently fuelling an uphill trajectory in developing nations. In light of the observed problems regarding disruptions in supply chains resulting from the lockdowns during the COVID-19 pandemic, it is worth considering whether there will be significant changes in globalisation processes forced by the economic policies of individual countries or comparative benefits prevail (Brussevich *et al*., 2022; Lau *et al*., 2022, Popescu *et al*., 2022).

Research by Lee and Jayadev (2005) has found that from 1973 to 1995, a country's financial openness reduced the labour share of national income, regardless of its level of development. This effect persists even after the financial crises. However, when capital flow restrictions occur, labour share increases. Jayadev (2007) has also found that specific employment protection policies can affect the labour share. If such policies favour employment protection, the labour share is high, as wages or employment do not keep up with economic growth. It should be noted that when the labour share is constant, economic growth could have affected the wage increase or the reduction in employment (or both). Factors contributing to decreased labour share include sluggish wage growth and low employment flexibility.

Research by Checchi and Garcia-Penalosa (2010) supports the idea that state policies favouring employment protection, such as high unionisation and intense wage bargaining, may contribute to increased income inequality. A higher minimum wage and higher workers' protection contribute to increased labour costs due to labour substitution with capital and the risk of unemployment growth, leading to substituting labour with capital (Checchi & Garcia-Penalosa, 2010).

Piketty (2014) argued that the significant factors shaping income inequality are capital incomes (distributed more unevenly than income from work) and pro-social government policies. Some researchers have pointed out the challenges in measuring income from employment in family businesses and self-employment. For example, Stolarska (2018) highlighted the difficulties in defining self-employment, while Gollin (2002) has found that a country's level of development and the proportion of self-employed individuals significantly affect the labour share. Fields (2014) also examined the labour share, focusing on self-employment and informal work (the so-called grey economy) resulting from the lack of traditional employment opportunities. De Serres *et al.* (2002) and Autor *et al.* (2023) identified other factors that contribute to a decline in the labour share, such as (i) the movement of employees between different sectors of the economy, with a shift from high-labour-cost sectors to low-labour-cost sectors (ii) changes in the employment structure (decrease in the share of the self-employed in total employment), (iii) the changes in the relationship between employees' remuneration and the added value caused by employees' transition between sectors.

The labour share increases when there is a complementarity between capital and highly qualified labour. Arpaia *et al.* (2009) has found that economic growth increases the relative demand for skilled labour, contributing to a rise in the wage premium. However, when skilled labour is substituted with unskilled labour, an excess supply of skilled workers occurs, resulting in a decrease in their relative wages and a decline in the labour share. If capital and unskilled labour resources are highly substitutable, then the surplus of capital increases and its comparable price to the inexperienced labour resources decreases. Substituting unskilled workers with capital reduces the share of unskilled labour in national income.

The structural changes in the economy in the 20th century, such as the increasing demand for highly skilled and specialised workers, were driven by the need to adapt to the requirements resulting from innovative and

available capital (Saumik, 2018; Nicolau *et al*., 2022). On the other hand, the complementarity of capital and employee qualifications contributes to increased wage premiums for qualified workers. In such a situation, the demand for skilled labour and the relative wages will be higher, while the share of income from employment will decrease (Atkinson, 2015).

Erauskin (2020) finds a negative relationship between labour share and income inequality, meaning that income inequality increases as the labour share decreases. He suggests this relationship is due to tax and social welfare policies, globalisation and technological change. The study also finds that this relationship is more vital for developed countries than for developing countries.

The underlying determinant of disparities linked to the reduction in the labour portion of the national income lies in the amplified allocation of resources towards investments in automation and digitalisation, as highlighted by the Inter-agency Task Force on Financing for Development in 2021 (TED, 2022). Digital technologies and services are changing employment rules and competence requirements regarding employees' knowledge, skills and attitudes. The possibility of providing work using online job platforms is changing local and global labour markets (Chinoracký & Čorejová, 2019).

Research by Goldberg and Pavcnik (2007), Niño-Zarazúa *et al.* (2014), and Atkinson (2015) shows that income inequality has increased in most high-income and developing countries. The OECD report (2015) claims that income inequality and labour share have increased in most G20 nations in recent decades, with the most significant increases occurring in the United States and some European countries. Researchers and policymakers are increasingly motivated to understand the broader implications of escalating inequality and the potential consequences for societies and economies regarding social cohesion, economic stability and overall well-being. As a result, there is an urgent need to delve deeper into these dynamics to formulate informed policies and interventions that can address emerging challenges and support more equitable and sustainable economic development (Piketty, 2014; Piketty & Zucman, 2014). Atkinson (2009) also points to the inequalities resulting from the diversification of the income structure in terms of their origin, the same as Wildowicz-Szumarska (2022), Hlasny and Verme (2021) and Jianu *et al*. (2021).

Household income differentiation may arise not only from the attributes of individual employees and labour productivity, but also from factors

such as regional specificity and geographical location, which can facilitate the generation of new and highly specialised jobs that do not always necessitate advanced professional qualifications (Valdez & García-Fernandez, 2022). Therefore, we decided to consider the Gini indices for three different types of income, as these coefficients differ in the recognition of income from capital at the disposal of their owners and resulting from the level of available wealth in individual economies. This approach stems from the recognition that these metrics respond differentially to transformations in the labour market, a variance predicated upon their specific representations. The Gini coefficient thoroughly dissects income inequality in its fundamental state as applied to gross income. Conversely, the Gini coefficient, including market income, ventures into the domain of income inequality within the purview of market-oriented economic activities. This specialised metric effectively sidesteps the complexities introduced by the presence of taxes and governmental transfers. Furthermore, the Gini coefficient of households' disposable incomes captures the outcome of income distribution dynamics. This particular variant intricately accounts for the compounding effects of taxation and government transfers, presenting a panoramic and all-encompassing outlook on income inequality as experienced within households.

Including these three distinctive Gini coefficients is a pivotal methodological approach. It enables an incisive exploration into the comprehensive repercussions of governmental policies and the redistribution mechanisms upon the complex landscape of income inequality.

The conducted research is part of the discussion (Erauskin, 2020) related to the study of the relationship between the share of income from work and income inequality, e.g. in countries such as China, Canada, and Mexico. The author points out that the relationship between the abovementioned phenomena has not been evident over the last decades. Research from 1990–2015 shows a significant relationship between the share of labour in national income and income inequality measured by the Gini coefficient. A lower share of income from work is associated with a higher Gini coefficient. Erauskin (2020) believes that public policies of individual countries should promote active participation in the labour market, strengthening the human capital of low-income groups to prevent the increase in inequality. Additionally, considering the digital transformation, it is crucial to increase society's qualifications and digital skills, which will be used in the labour market. Hence, analysing the connections among the mentioned

phenomena in EU nations is valuable, considering disparities in available capital levels and distinct social policies. This examination extends to intra-country dynamics and comparisons with the countries studied by Erauskin (2020).

Referring to the above research results related to determining the relationship between the share of labour in national income and income inequality, the researchers formulated the following hypotheses:

H1: *The more developed the national economy, the lower the share of employment income, favouring capital gains*.

H2: *The Gini coefficient of gross income (GC) decreases as the labour share increases*.

To verify the hypotheses, the study delineates the chosen research period, specifies the subject and object of investigation, and elucidates the research methodology. These selections are detailed in the subsequent section.

Data and research methods

Our investigation focuses on assessing how the Gini coefficient is influenced by labour share, but control variables related to socio-economic situation were also used (see Table 1). The study covers 25 EU member states, excluding Cyprus, Croatia, and Malta due to data unavailability, and spans 2011–2021. The United Kingdom was incorporated into the research framework, notwithstanding its exit from the EU in 2020. This inclusion stems from the chosen research time frame, which spans 2011 to 2021. During this temporal span, the United Kingdom remained a full-fledged member of the EU for a substantial duration.

The literature offers a multitude of approaches to uneven income distribution quantification, e.g. the Gini coefficient, the Theil coefficient, the Atkinson coefficient, the Robin Hood index, entropy, or the Kolkata index. In our study, income inequality is quantified using the Gini Coefficient, which results from the data availability and the popularity and universality of this statistical measure of dispersion (Fontanari *et al.*, 2018; Shu & Xiong, 2018; Gencev, 2019).

The study used three variations of the Gini coefficient to measure income inequality: gross income, income including market incomes, and households' disposable income. This distinction was made because the relationship between labour share and different inequality measures may vary.

Our analysis has found that, in 2021, the Gini coefficient varied significantly among EU countries, ranging from 36.06% in Slovakia to 58.80 in France. From 2011 to 2021, only eight EU countries experienced a decreased income inequality, with the most significant declines in Poland and Slovakia. Sweden had one of the highest income inequality levels and the most significant increase in inequality among EU countries (Table 2).

In 2021, compared to 2011, the highest growth rate of GDP per capita (in 2021 international dollars, converted using purchasing power parities) was recorded in Lithuania (49.6%), Romania (47.7%), Latvia (43.5%), Poland (37.1%) and Estonia (36.7%). Only in Greece and Italy was a decrease in GDP per capita recorded (3% and -1.2 % respectively). The most significant reduction in labour share was recorded in Ireland, where the decline rate reached 39.4%. An over 10% decrease in the labour share was also observed in Cyprus (11.5%). The highest increase in the labour share was recorded in Lithuania (18.2%) and Latvia (12.2%). The research shows that in 2021, compared to 2011, 14 EU countries recorded a decrease in labour share. In 2021, the labour share exceeded 57% in seven examined countries.

Over the analysed period, significant changes in the labour force participation rate occurred. In 2021, the labour force participation rate exceeded 60% in 14 countries, while in 2011, such an increase was observed in 10 EU States. This indicator's highest level was observed in Sweden, i.e. 70.94%, while the lowest was recorded in Italy, i.e. 48.14%. In 2021, the most significant increase in the labour force participation rate compared to 2011 was registered in Malta, i.e., 11.3 percentage points, and in Croatia, a rise of 8.9 percentage points.

Increasing GDP per capita, labour force participation rate and productivity should reduce social inequality, particularly in the EU countries that implement pro-social macroeconomic policies. It is thus worth looking at the level of the Gini coefficient of equivalized household disposable income. In 16 EU countries, this ratio increased in 2021 compared to 2011. In 2021, the highest Gini index was recorded in France (58.8%). The Gini coefficient in France increased by more than 18% compared to 2011, while the labour force participation rate decreased by 0.3%; the GDP per capita in-

creased by 4.6%, and the labour share fell by 2.2 percentage points. In Poland, on the other hand, the labour share decreased by 9.5%, the labour force participation rate increased by 5.3 p.p., the GDP per capita increased by 103.7%, and the Gini index fell by 1.26 percentage points.

Verification of the research goal was carried out in two stages: in the first stage, the correlation between labour share and inequality expressed by the Gini coefficient was investigated. In most cases, the results indicated a weak negative correlation, i.e., a low percentage of employment income cooccurring with relatively significant income inequality.

Given the incorporation of both spatial and temporal data in our analysis, panel models emerged as a logical and fitting choice for estimation. Nevertheless, the statistical version models under examination did not align with the autocorrelation assumption, as indicated by the Durbin-Watson test results. Consequently, the conventional POOLS, Fixed Effects (FE), or Random Effects (RE) estimators were unsuitable for our analysis. To address this, we pivoted towards estimators more apt for dynamic panel models, specifically the Generalized Method of Moments (GMM) estimators.

A lagged dependent variable characterises dynamic panel data models among the regressors. A general form of such a model can be expressed as:

$$y_{it} = \alpha + \delta y_{it-1} + X'_{it}\beta + u_{it}, (i = 1, \dots, N), (t = 1, \dots, T) \quad (1)$$

where:

y_{it}	vector of the dependent variable,
α	constant term,
X'_{it}	matrix of independent variables,
δ, β	vectors of estimated parameters,
u_{it}	random error.

Applying the generalised method of moments (GMM) eliminates biased assessments and obtains consistent parameter estimates for endogenous explanatory variables (Bond *et al.*, 2001). In this case, classical static panel model estimation methods had to be abandoned (Baltagi, 2008).

To compare the labour share's impact on the increasing income disparities, standardised beta coefficients were calculated:

$$\tilde{\beta} = \beta \cdot \frac{S_x}{S_y}; \tag{2}$$

where:

$\tilde{\beta}$ standardised beta coefficient,
β regression coefficient,
S_x standard deviation of the explanatory variable,
S_y standard deviation of the dependent variable.

To estimate the models, we used various techniques, such as the first difference generalised method of moments (FDGMM) and the generalised system method of moments (SGMM). We also included other variables that can describe inequalities (Table 1). The models were estimated using a sample of 25 countries; thus, the number of observations is relatively limited, so we only included the first lag of the dependent variable. We obtained acceptable results using the single-stage GMM estimators. The validity of this approach was confirmed by the Sargan test, the Arellano-Bond autocorrelation test (Arellano & Bond, 1991; Balcerzak & Rogalska, 2016; Balcerzak *et al*., 2016) and the correctness of lagged dependent variables (Chong *et al*., 2009).

The econometric models were subject to separate estimation procedures for two distinct cohorts of the European Union (EU) member states: those classified as 'old EU countries,' which encompass the nations that attained EU membership before the year 2005, and their counterparts, the "new EU countries." This distinction is necessitated by the divergence in the structural compositions of their economies and the configurations of their labour markets.

Results

The estimation and verification results for the models obtained via the single-stage GMM method are presented in Table 3 and Table 4.

In the 'new' EU countries, the increase in the labour share contributed to the growth of GC and GM, while the effect on GD is statistically insignificant. The reason for the existing relationship is probably the reinvestment of income from highly specialised work (salary bonus) (Saumik, 2017; Atkinson, 2015; Atkinson & Jenkins, 2019) or obtaining non-wage profits.

Furthermore, it was imperative to accrue exceptional gains from the convergence process stemming from the influx of capital and technological

advancements into the nations that became part of the European Union post-2004, often called the "new EU countries." Notably, the infusion of financial resources originating from EU funding initiatives, such as structural and cohesion funds, played a pivotal role in the overarching objective of diminishing the developmental disparities across various regions within the European Union.

The observed slight increase in household income proves the great importance of labour share. In 'old' EU countries with a more stable economic system and a higher level of development, there was no statistically significant relationship between LS and the studied Gini measures. The reasons for this can be found in the flow of capital between countries (transfer of capital gains) from less developed countries to more developed countries and the influx of people with lower qualifications earning income from work.

In all three estimated models (Table 3 and Table 4), the Saragan test does not indicate rejection of the null hypothesis about instrument correctness, meaning that the assumption of the model is not violated. The Arellano-Bond test results for AR(1) and AR(2) show the occurrence of a first-order autocorrelation, which is an acceptable phenomenon, yet no second-order autocorrelation occurs. Therefore, the conditions for the method of moments have been met, and the model specifications are correct. Table 5 presents standardised beta parameters that directly compare the impact strength of statistically significant variables.

Discussion

Our research results confirm the view of Erauskin (2020) and Koyo (2021), who claimed that the relationship between labour income and income inequality is unclear. The study showed a difference between the old and new EU countries. Namely, in the case of 'new' countries, income inequality (GC and GM) increases with the increase in labour share, while the relationship is statistically insignificant for the old EU. In weaker economies ('new' EU), there is typically more competition for jobs, and this increased competition can lead to lower wages and benefits for workers. These groups of countries are differentiated by variations in technological advancement, digital technologies, and the extent and progress of processes integrated into global value chains (Fontagne *et al.*, 2023) as well as public

policy, social policy, and labour market policy (Nikulin *et al*., 2021). Countries that are relatively rich in capital participate more in GVC linkages associated with international vertical integration of upstream intermediate production and downstream assembly offshoring (Reshef & Santoni, 2023). Moreover, digital needs are changing employment rules and competence requirements (Chinoracký & Čorejová, 2019).

Equally imperative was the pursuit of substantial capital gains from the convergence process, driven by the influx of capital and technology into the nations that acceded to the European Union after 2004, commonly denoted as the "new EU countries."

Technological advancement at a given stage of the production process in a specific country affects the processes shaping labour market parameters, such as capital-labour relations, wages, income inequality, differentiating the share of labour in national income and the existing inequalities in individual countries.

Based on the research findings, hypothesis 1, assuming that the share of employment income is lower than the share of capital gains in countries with a higher development level, is confirmed. This is likely influenced by the factors mentioned earlier. Hypothesis 2 has not been confirmed. In the case of the so-called 'old' EU countries, there is no significant relationship between LS and the studied Gini measures (GD, GM, GC). However, there is a relationship in the so-called 'new' EU countries, but it reverses the assumption in hypothesis 2. The reasons for this phenomenon can be found in the diversity of economic structures (Baymul & Sen, 2020) and their level of development (Saumik, 2017). Unfortunately, the research results do not confirm the relationships Erauskin (2020) described for countries with different structures and in other research periods. It should be noted that the research conducted by the authors already covers the period of the COVID-19 pandemic, which limits the comparative benefits obtained within the flow of capital and the global value supply chain.

It should be remembered that the level of development and the ongoing processes of structural changes in EU economies may impact the diversification of income inequalities. Their marked increase is often observed in the initial stage of change. It should be emphasised that the flows of capital and labour resources between individual EU countries may lead to the drainage of specialist resources from countries with lower incomes to countries with higher incomes (Kuc-Czarnecka *et al.*, 2021). They can also narrow the technology gap between economies and reduce countries' incomes

due to the transfer of capital ownership income. It has also been shown that households' gross income inequalities are affected mainly by the impact of labour share. However, most researchers (Ayala *et al.*, 2019; Gil-Anala *et al.*, 2019; Zungu *et al.*, 2021) focused strictly on macroeconomic factors, ignoring the influence of the labour share on the national income. As for the control factors, such as government consumption (Madzinova, 2017), GDP per capita, and GDP growth (Afonso *et al*., 2008), the direction of their impact coincides with those obtained by other researchers.

It should be noted that dynamic panel models are a better tool for describing the relationship between labour share and uneven income distribution since the delayed dependent variable was statistically significant in all the estimated models.

Conclusions

Despite the ongoing expansion of GDP and social policies, there has been a rise in income inequality, measured by the Gini coefficient, since the end of the 20th century. One of the indicated factors was the share of labour in national income. Many researchers find the exploration of the links between labour's share in national income and income inequality intriguing, as evidenced by studies conducted by Erauskin (2020), Atkinson *et al*. (2011), Petreski (2022), and Hlasny and Verme (2021). The relationship between the above-mentioned phenomena needs to be clarified, as it depends not only on the research period but also on the development of the economy, its structure, level of digitalisation, place in the global value chain, and implemented social and public policy.

The observed variation in the economic development of EU nations — exemplified by Luxembourg's GDP per capita being three times higher than the EU average, while Bulgaria's GDP per capita is only 1/5 of the EU average — has led to the classification into two more homogeneous groups: the new EU countries (integrated with EU structures in 2004 or later) and the old EU countries. The research aimed to assess the impact of labour share on income inequality, measured in three ways: the Gini index of gross income, the Gini index of market income, and the Gini index of household disposable income. The study used dynamic panel data models for 25 European Union countries from 2011–2021.

It should be emphasised that this is one of the first studies on the relationship between labour share and income inequality in EU countries. The added value of this study also indicates the impact of the share of labour on three Gini measures covering a diverse spectrum of income (from labour and capital). In the 'new' EU countries, the increase in the labour share contributed to the rise of GC and GM, while the effect on GD is statistically insignificant. In 'old' EU countries with a more stable economic system and a higher level of development, there was no statistically significant relationship between LS and the studied Gini measures. The reasons for this can be found in the flow of capital between countries (transfer of capital gains) from less developed countries to more developed countries and the influx of people with lower qualifications earning income from work.

The selection of the research timeframe and the indicators for the investigated phenomena was influenced by constrained access to systematically presented measures in international statistical databases. This also constituted a limitation in selecting EU countries for the conducted research (excluding Cyprus, Croatia, and Malta). Changes in the group of EU countries during the adopted research period (Brexit) prompted the inclusion of Great Britain in the study due to this country's membership in the EU structures until 2020.

The findings of the research carry implications for public policies. In the case of new EU countries, there is a need to encourage professional activation, enhance the human capital of low-income groups, and upgrade the qualifications and skills of workers, particularly in digital domains. Additionally, fostering an environment supportive of research and development (R&D) activities, innovation, and economic competitiveness, along with increased investment outlays, can enhance these economies' positions in global value chains and mitigate income inequality.

The dynamic, multi-aspect nature of contemporary economic landscapes of modern economies' operating conditions resulting from digitalisation processes, environmental protection, global value chain, and military, social and political threats requires continuous research on phenomena occurring in economies. This contributes to further research in light of continuing income inequalities.

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Annex

Table 1. Variables used in the investigation

Variable name	Description	Source
	Dependent variables	
GC	Gini coefficient of gross incomes	World Bank
GD	Gini coefficient for households' disposable incomes	Eurostat
GM	Gini coefficient of market income	OECD
	Main independent variable	
LS	share of total labour compensation in GDP	TED
	Control variables	
REER	real effective exchange rate index (GDP deflator based – 2005)	World Bank
GDPg	growth of GDP, change in the natural log	TED
TFPg	growth of total factor productivity	TED
GDPpc	GDP per capita – in 2021 international dollars, converted using PPP	UNCTADstat
CON	general government final consumption expenditure as % of GDP	UNCTADstat
EM	employment in manufacturing as % of total employment	World Bank
ES	employment in services as % of total employment	World Bank
LP	labour productivity per hour worked in 2021 international dollars, converted using PPP	TED
AP	labour force participation rate (age 15+)	World Bank

Table 2. Selected macroeconomic variables in EU countries

ISO Code	Labour share (%)		Labour force participation (%)		GDP per capita (in 2021 int$ ppp)		Gini Coefficient (disposible income) (%)	
	2011	2021	2011	2021	2011	2021	2011	2021
AUT	54.26	55.75	60.36	61.15	57988.26	58807.91	47.6	47.5
BEL	59.89	56.63	53.20	54.49	52994.75	56817.54	47.1	47.4
BGR	47.75	51.25	52.51	55.26	20041.73	25200.73	48.1	54.0
CYP	56.49	49.97	63.80	63.83	34674.71	37722.70	42.3	46.0
CZE	53.19	54.88	58.26	59.83	37520.74	43922.89	44.1	44.1
DEU	58.93	61.67	60.09	60.55	54969.91	58428.27	55.5	56.0
DNK	55.92	54.53	63.05	62.54	56509.58	64127.84	50.8	49.2
ESP	59.45	58.95	59.68	57.77	40527.24	41847.87	48.8	50.1
EST	52.75	53.59	61.25	63.69	30804.62	42114.30	48.2	45.5
FIN	53.95	51.45	59.91	60.41	51451.43	53745.86	46.6	49.4
FRA	58.59	57.33	56.03	55.85	47316.79	49502.45	49.7	58.8
GBR	56.07	56.16	62.33	63.15	46564.82	50215.31	53.4	55.5
GRC	57.54	57.29	52.23	50.77	33366.58	32373.31	51.9	54.1
HRV	55.93	56.56	51.84	51.78	27595.29	34990.79	49.4	48.5
HUN	53.33	50.60	50.68	59.54	27884.24	37365.78	52.7	47.4
IRL	46.49	28.16	61.96	63.30	59586.25	67945.16	54.1	47.9
ITA	53.50	53.15	48.14	48.57	46449.13	45876.18	48.7	49.8
LTU	46.13	54.52	57.39	62.29	29467.10	44087.21	53.7	51.2
LUX	34.20	34.18	57.59	61.92	117191.0	122961.4	45.7	52.2
LVA	50.45	56.58	58.52	60.18	24191.69	34709.69	52.3	48.2
MLT	50.61	50.50	51.44	62.73	36623.08	49054.19	42.7	45.2
NLD	56.72	56.67	64.54	66.97	58042.03	62641.59	45.8	55.8

Table 2. Continued

ISO Code	Labour share (%)		Labour force participation (%)		GDP per capita (in 2021 int$ ppp)		Gini Coefficient (disposible income) (%)	
	2011	2021	2011	2021	2011	2021	2011	2021
NLD	56.72	56.67	64.54	66.97	58042.03	62641.59	45.8	55.8
POL	58.71	58.82	55.55	57.22	27123.00	37172.85	47.8	44.7
PRT	57.74	58.41	60.49	57.81	34299.52	36746.97	50.3	55.9
ROU	50.43	51.90	54.11	51.07	22705.21	33541.94	53.4	52.3
SVK	51.20	55.80	58.79	60.52	29412.79	35376.50	42.9	38.1
SVN	60.50	61.07	57.95	58.48	36781.92	43777.51	42.6	42.8
SWE	49.82	49.46	70.94	66.69	54543.52	59105.25	58.3	56.9

Table 3. Results of dynamic panel model estimation via the GMM – 'new' EU countries

Variable	New		
	(GC)	(GM)	(GD)
Gini(-1)	0.5203 (0.0010)	0.5933 (0.0013)	0.5234 (0.0003)
log_LS	0.2890 (0.0012)	0.1942 (0.0064)	0.0390 (0.6353)
GDPg	0.0024 (0.3459)	-0.0003 (0.8924)	0.0024 (0.0807)
TFPg	-0.0037 (0.4155)	-0.0015 (0.6039)	0.0001 (0.9572)
log_GDPpc	-0.2018 (0.2669)	-0.3054 (0.0111)	-0.2148 (0.0407)
log_CON	-0.2225 (0.0680)	-0.1588 (0.0003)	0.0087 (0.8489)
log_REER	0.0163 (0.8402)	0.0046 (0.9082)	-0.0475 (0.1359)
log_EM	-0.0848 (0.5053)	0.0192 (0.7982)	-0.0589 (0.4734)
log_ES	0.3338 (0.1604)	0.3247 (0.0622)	0.4595 (0.0420)
log_AP	0.2322 (0.5914)	0.6422 (0.0007)	0.1517 (0.1882)
log_LP	-0.0107 (0.8636)	0.1251 (0.3078)	-0.0168 (0.9093)
No. of inst.	105	105	125
Sargan's test	0.4195	0.2364	0.4945
AR(1)	0.0132	0.0164	0.0281
AR(2)	0.1318	0.2283	0.1524

Note: The p-value is shown in parentheses.

Table 4. Results of dynamic panel model estimation via the GMM – 'old' EU countries

Variable	Old		
	(GC)	(GM)	(GD)
Gini(-1)	0.3604 (<0.0001)	0.2713 (0.0160)	0,5197 (<0.0001)
log_LS	-0.0387 (0.6510)	0.1217 (0.1586)	0.0679 (0.3723)
GDPg	0.0019 (0.1247)	-0.0005 (0.7193)	0.0026 (0.0330)
TFPg	-0.0018 (0.3082)	-0.0004 (0.7235)	-0.0019 (0.1320)
log_GDPpc	-0.1417 (0.2199)	-0.1481 (0.1204)	-0.2941 (0.0248)
log_CON	0.0420 (0.4260)	0.0213 (0.5689)	0.0009 (0.9886)
log_REER	0.0160 (0.8499)	-0.0156 (0.7511)	0.1331 (0.1222)

Table 4. Continued

Variable	Old		
	(GC)	(GM)	(GD)
log_EM	-0.2067 (0.0793)	-0.1610 (0.0359)	-0.0769 (0.3388)
log_ES	-0.4647 (0.0912)	-0.1474 (0.3811)	0.3305 (0.2543)
log_AP	0.2833 (0.0443)	-0.2093 (0.1872)	0.2608 (0.1041)
log_LP	-0.0065 (0.9700)	0.2351 (0.0395)	0.0943 (0.6155)
No. of inst.	115	115	146
Sargan's test	0.1898	0.1092	0.7424
AR(1)	0.0033	0.0063	0.0076
AR(2)	0.3511	0.7774	0.7063

Note: The p-value is shown in parentheses.

Table 5. Standardised parameter assessments for the estimations obtained via the GMM

Variable	New			Old		
	(GC)	(GM)	(GD)	(GC)	(GM)	(GD)
Gini(-1)	0.5370	1.3727	0.8127	0.3354	0.3940	0.7081
LS	0.1690	0.1730	--- *	--- *	--- *	--- *
GDPg	--- *	--- *	0.00003	--- *	--- *	0.0004
TFPg	--- *	--- *	--- *	--- *	--- *	--- *
GDPpc	--- *	-0.4589	-0.2425	--- *	--- *	-0.4975
CON	-0.1774	-0.0872	--- *	--- *	--- *	--- *
REER	--- *	--- *	--- *	--- *	--- *	--- *
EM	--- *	--- *	--- *	-0.2483	-0.1593	--- *
ES	--- *	0.7066	1.1161	-1.3040	--- *	--- *
AP	--- *	0.4307	--- *	0.4070	--- *	--- *
LP	--- *	--- *	--- *	--- *	0.3464	--- *

Note: *statistically insignificant parameter (see Table 4).