

Labour Productivity, Wages, and Inflation: Evidence from Selected Central and South-East European Countries

Abstract

The relationship between inflation, worker wages, and labour productivity growth has been a widely discussed topic among academics in recent decades. Labour productivity is a critical component for maintaining and improving the competitiveness of national economies and establishing sustainable economic growth. The increase in labour productivity serves as the foundation for increasing workers' wages, thereby enhancing their purchasing power and overall well-being. However, empirical data from Southeast European countries indicate that labour productivity growth rates have been insufficient to enable catch-up with their Western European counterparts. Additionally, these countries have experienced significant inflation rates in recent years, resulting in a notable decline in real wages for workers. Therefore, the gap between labour productivity and workers' wages has not only failed to diminish but has, in fact, widened over the past few decades.

The primary objective of this paper is to examine the interrelationships among labour productivity, workers' wages, and inflation in Central and Southeast European countries, specifically the Balkan EU countries, Balkan non-EU countries, and the Visegrád group of countries. The findings reveal a short-term causality among inflation, labour productivity, and the statutory minimum wage in these three groups of countries. Furthermore, there is evidence of a bidirectional causal relationship running from the minimum wage and inflation to labour productivity, and vice versa, in the short term. Additionally, the introduction of a minimum wage shock significantly influences the future values of labour productivity and inflation. The adverse effects of an externally induced increase in the statutory minimum wage are particularly noticeable in Western Balkan non-EU countries.

Keywords: Transition economies, Labour productivity, Inflation

Emek Verimliliği, Ücretler ve Enflasyon: Orta ve Güney-Doğu Avrupa'dan Bazı Seçilmiş Ülkelerden Bulgular

Özet

Enflasyon, işçi ücretleri, ve emek verimliliğindeki artış arasındaki ilişki son on yıllarda akademik çevrelerde geniş ölçüde tartışılmıştır. Emek verimliliği, ulusal ekonomilerin rekabet güçlerini korumak hatta arttırmak için ve sürdürülebilir bir ekonomik büyüme sağlamak için gereken en kritik bileşendir. Emek verimliliğindeki artış, işçi ücretlerindeki artışların temeli görevini görmektedir, böylece de emeğin satın alma gücünü artırarak onların genel refah düzeylerini yükseltmektedir. Ancak, emek verimliliğindeki artış oranlarına ait ampirik veriler, Güney-Doğu Avrupa ülkelerinin muadilleri olan Batı Avrupa ülkelerine yetişmek konusunda yetersiz kaldığını göstermektedir. Buna ilaveten, bu ülkeler son yıllarda önemli derecede yüksek enflasyon tecrübe etmişlerdir, bu da işçilerin reel ücret seviyelerinde dikkat çekici bir azalmaya yol açmıştır. Dolayısıyla, emek verimliliği ve işçi ücretleri arasındaki fark azalmak yerine, aksine son birkaç on yılda artmıştır.

Bu makalenin esas hedefi, emek verimliliği, işçi ücretleri ve enflasyon arasındaki karşılıklı ilişkileri, Orta ve Güney-Doğu Avrupa ülkeleri, özellikle Avrupa Birliğine dahil olan Balkan ülkeleri, Avrupa Birliğine dahil olmayan Balkan ülkeleri, ve Visegrád grubu ülkeler için incelemektir. Analiz bulguları, bu üç grup ülke için enflasyon, emek verimliliği ve resmi asgari ücret arasında bir kısa-dönem nedensellik ilişkisinin varlığını ortaya çıkarmıştır. Ayrıca, kısa-dönemde, asgari ücret ve enflasyondan gelecek emek verimliliğine doğru, ve tam tersi yönde olmak üzere, iki-taraflı bir nedensellik ilişkisine ait kanıt saptanmıştır. Bunlara ilaveten, bir asgari ücret uygulamaya başlanması şoku, emek verimliliği ve enflasyona ait gelecekteki seviyeleri önemli ölçüde etkilemektedir. Dışsal bir şekilde uygulanan bir resmi asgari ücret artışının olumsuz etkileri, özellikle Avrupa Birliğine dahil olmayan Balkan ülkelerinde göze çarpmaktadır.

Anahtar kelimeler: Geçiş ekonomileri, Emek verimliliği, Enflasyon

Prof. Dr. Trajko Slaveski (Ss. Cyril and Methodius University, Skopje, Macedonia)

ORCID: 0000-0003-0268-4760

E-mail: slaveski@eccf.ukim.edu.mk

Kristijan Kozheski (Ss. Cyril and Methodius University, Skopje, Macedonia)

ORCID: 0000-0002-8182-1219

E-mail: kozeski@eccf.ukim.edu.mk

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1 Introduction

Labour productivity represents a fundamental basis for establishing sustainable economic growth and development, as well as improving the standard of living of citizens in an economy. The increase in labour productivity has a significant role in establishing and improving international competitiveness, as well as long-term and sustainable economic growth. As Paul Krugman states: “Productivity isn’t everything, but in the long run it is almost everything. A country’s ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker” (Krugman, 1994). Hence, a large part of the economic measures and policies are aimed at creating an optimal business and economic environment in order to create opportunities for improving the productivity of the economy. Economic measures and policies aimed at creating an optimal macroeconomic environment are the initial basis for increased capital investments, as well as investments in human capital that will further contribute to the establishment of long-term and sustainable rates of growth of workers’ wages and labour productivity. Hence, one of the main objectives of the monetary policy is to establish price stability and maintain a low level of inflation. Price stability is the basis for increased investments by firms, increased consumption of the population, which creates the basic prerequisites for increased economic activity. Some economists claim that high inflation rates create market distortions that lead to inefficient allocation of resources, which will further reduce labour productivity. They emphasize that inflation creates distortions that lead to inefficient resource allocation and consequently leading to a discouragement of capital formation (Feldstein, 1982). Such assumptions impose the need for inflation targeting central banks and governments aiming to improve the competitiveness of their economy closely follow movements in labour productivity and the factors affecting productivity must be in the focus of economic policies.

In the last few years, as a result of the COVID-19 pandemic, problems in supply chains, high energy and food prices have contributed to a significant increase in inflation in almost all countries in Europe, with which inflation has again become relevant among economic policy makers. The low inflation rates that prevailed before 2020, and represented the basic factors for stability and predictability, represent one of the main reasons for the reduction of economic activity, both among businesses and among households. In the case of Southeast European Countries, the data show that the increase in labour productivity is not sufficient to enable catch-up with Western European Countries. Insufficient rates of labour productivity growth, coupled with pronounced inflation rates in recent years, have resulted in a notable reduction in workers’ wages in Southeast European Countries. Therefore, the gap between labour productivity and workers’ wages has not only failed to diminish but has, in fact, become more pronounced over the past few decades. The empirical findings from studies conducted on developed nations underscore the absence of a consistent relationship between inflation, labour productivity, and workers’ wages. However, research on Southeast European countries in this context remains limited. In the case of developed economies, the outcomes reveal a significant detrimental effect of inflation on the dynamics of labour productivity, suggesting that higher levels of inflation lead to a decrease in labour productivity. Consequently, policymakers must exercise caution in formulating monetary and fiscal policies when inflationary pressures surpass the rate of labour productivity growth. Under such circumstances, the implementation of restrictive policies becomes imperative, albeit at the expense of potentially diminishing the long-term growth prospects of economies. The primary objective of this research is to examine the interrelationships between labour productivity, statutory minimum wage, and inflation within Central and Southeast European Countries. To facilitate this analysis, the countries under examination are categorized into three groups: Balkan EU countries, Balkan non-EU countries, and the Visegrád group of countries. Moreover, this study employs VAR analysis in addition to examining the trends of labour productivity, inflation, and statutory minimum wage. By employing the Granger Causality test within the VAR framework, the study aims to explore the short-term relationships among labour productivity, inflation, and statutory minimum wage. The analysis also incorporates the application of impulse-response function to examine the effects of exogenously elevated statutory minimum wage on the trajectory of labour productivity and inflation.

The structure of the paper is organized as follows: following the introduction, a concise review of the theoretical and relevant empirical literature analysing the interrelationship among inflation, labour productivity, and workers’ wages is provided. Subsequently, an overview of the trends of the variables within distinct country groups is presented, followed by an explanation of the research methodology employed and the presentation of empirical findings. The paper concludes with a final section offering concluding remarks.

2 Theoretical and Empirical Literature Review

2.1 Theoretical Review

From a macroeconomic perspective, the connection between productivity shifts and fluctuations in wages and inflation has been well-established in both theoretical and empirical literature. The theoretical literature elucidates various channels that explain the relationship between labour productivity, wages, and inflation (Akerlof 1984; Snowdon and Vane 2005).

The theory emphasizes the fact that high inflation rates have a negative impact on labour productivity, primarily as a result of reducing the purchasing power of workers and disrupting price signals that lead to reduced efficiency of economic activities. Additionally, the theoretical foundation supporting the correlation between labour productivity and wages highlights that an increase in wages has a positive influence on labour productivity. This is due to the higher costs associated with job loss and labour, on one hand, while also impacting the additional motivation of workers. However, various theoretical frameworks propose distinct postulates regarding the influence and causality between labour productivity and workers' wages. Efficiency wage theory posits that causality runs from real wages to productivity, assuming that higher wages result in increased productivity. On the other hand, marginal productivity theory begins with the observation that the growth in labour productivity significantly impacts the increase in real wages (Akerlof 1984; Snowden and Vane 2005).

When it comes to the relationship between labour productivity and inflation, there are typically two theoretical approaches to elucidate this relationship. Within the theoretical perspectives, two contrasting views emerge regarding the causality between labour productivity and inflation. The conventional theoretical view posits a causal relationship that runs from productivity to inflation, suggesting that changes in productivity have a direct influence on inflationary dynamics. On the other hand, an alternative theoretical view argues for a causal flow from inflation to labour productivity, suggesting that changes in inflation levels can impact productivity outcomes. The basic theoretical view posits causality from productivity to inflation emphasizes the notion that improvements in productivity lead to lower inflationary pressures. As productivity increases, firms are able to produce more output with same resources, resulting in a downward effect on prices. This is known as the “cost-push” perspective, where enhanced productivity reduces production costs, thereby lowering prices and dampening inflation. In contrast, the alternative theoretical view argues for causality from inflation to productivity. According to this perspective, changes in inflation levels can affect productivity outcomes. One mechanism through which this relationship is theorized to operate is via the impact of inflation on real wages. Higher inflation erodes the purchasing power of wages, which can lead to lower labour incentives and reduced productivity levels. In this “demand-pull” perspective, inflationary pressures exert a negative influence on productivity (Akerlof 1984; Snowden and Vane 2005).

2.2 Review of Empirical Literature

Prior to delving into the findings of the relevant empirical studies pertinent to this analysis, it is important to note that empirical research has yielded mixed results regarding the interrelationship between labour productivity, inflation, and workers' wages. The relationship among these variables is complex and can be influenced by several factors, including institutional factors, market structures, and political interventions. Furthermore, the causality between labour productivity, inflation, and wages may involve bidirectional feedback loops, wherein changes in one variable dynamically impact the others.

As mentioned above in the text, part of the empirical research that focuses on the relationship between inflation, wages and labour productivity has been inconclusive. Numerous studies have endeavoured to establish a correlation between average inflation rates, labour productivity and wages among different countries. However, the findings from these studies are inconclusive and often contingent upon the incorporation of supplementary variables. In the case of the United States, research shows that there is a strong and inverse causal relationship between labour productivity and inflation. The research comes to the conclusion that the effectiveness of measures to reduce inflation simultaneously contributes to an additional increase in labour productivity (Rudebusch & Wilcox, 1994). A significant part of the empirical research that analyses the relationship between labour productivity, level of inflation and wages is focused on the highly developed countries of Europe. However, there is a small number of empirical research that analyses the interrelationship among labour productivity, wages and inflation on the example of developing countries from Europe. Part of this empirical research that focuses on the relationship between labour productivity, inflation and wages in the countries of Southeast Europe shows that the examination of short-run dynamic outcomes provides evidence suggesting a negative impact of inflation on labour productivity. However, the effect of wages on labour productivity remains less conclusive, lacking a definitive and straightforward relationship. The findings suggest that inflationary pressures can impede labour productivity levels, potentially due to their adverse effects on the purchasing power of wages (Hondroyannis & Papapetrou, 1997). Empirical research that focuses on the relationship between labour productivity and wages of workers in the case of developed countries, on average, shows that there is a positive and strong relationship between productivity and real wages, while there is a negative relationship between productivity and inflation (Kumar, Webber, & Perry, 2012).

Extensive empirical analyses have been conducted to examine the interrelationship between labour productivity and worker's pay, particularly in highly developed countries like the United States (M. Feldstein 2008; Karabarbounis and Neiman 2014; Pasimeni 2018; Nikulin 2015). Most of the empirical analyzes come to the conclusion that there is a growing gap between pay for typical workers and labour productivity. Furthermore, the authors state that this labour productivity-worker's pay is not just a niche problem in the labour market. Labour earnings constitute the predominant source of income for the middle-income families in the USA economy and those in the bottom fifth. Profound failures in the labour market hence have a huge impact for nearly all households,

except those reliant on capital income (in the top 1 and 0.1%). The authors state that the entire gap between labour productivity and worker's pay growth in income accruing somewhere in the economy besides the paychecks of typical workers. Most of the income gap between productivity and pay has been concentrated in the hands of highly paid managers and capital owners. Although the increase in transfer income from government programs has partially mitigated the impact of the growing disparity, its growth has been slower since the post 1979 period. Moreover, transfer incomes represent a smaller portion of typical household incomes compared to labour earnings, making it necessary for a substantial increase in transfers to fully offset the near stagnation of pay (Bivens & Mishel, 2015). Other empirical analyses examine the basic assumption that productivity growth is the source of growth in real income per capita, as well as whether the intensive increase in labour productivity affects the reduction of inflation. The results point to the conclusion that over the period 1966-2001, as well as over 1997-2001, only the top 10% of the income distribution enjoyed a growth rate of real wage and salary income equal to or above the average rate of economy-wide productivity growth. Growth in median real wage and salary income barely grew at all while average wage and salary income kept pace with productivity growth, because half of income gains went to the top 10 percent of the income distribution, leaving little left over for the bottom 90 percent. Also, the findings of the paper show that an acceleration or deceleration of the productivity growth trend alters the inflation rate by at least one-for-one in the opposite direction (Becker & Gordon, 2005).

Part of the empirical research done on the example of developing economies that focuses on the relationship between wages, labour productivity and inflation comes to the conclusion that labour productivity growth substantially exceeds real wage growth and thus underpins a relatively large decrease in inflation. The results show that the alignment between consumer price inflation and nominal wage inflation in emerging market economies (EMEs) over the past decade highlights the significance of considering wage dynamics in the analysis of inflation within these markets. The findings indicate that countries experiencing higher average annual inflation during the 2000-2008 period also tended to exhibit greater annual wage growth. Moreover, the relationship between inflation and wage growth has shown variation over time. Specifically, during the years 2000-2003, a 1 percentage point increase in inflation corresponded to a 1 percentage point increase in wage growth, whereas during the years 2004-2008, the sensitivity of this relationship increased slightly, with a 1 percentage point increase in inflation associated with a 1.2 percentage point increase in wage growth. These findings emphasize the importance of analysing the interplay between inflation and wages in EMEs and recognizing the evolving nature of this relationship over time (Mihaljek & Saxena, 2010).

The interrelationship between wages and labour productivity is also analyzed on the example of European East and West countries (Trenovski, Gligoric, Kozheski, & Merdzan, 2023). This empirical study elucidates those distinct relationships observed between labour productivity and worker's compensation in both highly developed Western European Union (EU) countries and Eastern EU countries. In Western EU countries, characterized by elevated levels of labour productivity and technological advancement, an escalation in labour productivity corresponds to a relatively lower increase in workers' compensation. Conversely, the Eastern EU countries exhibit diverse relationships and varying degrees of causality between labour productivity and labour compensation. Specifically, Central-East EU countries manifest a more positive relationship, whereby real workers' compensation exhibits a stronger correlation with labour productivity. In contrast, the Southeast Europe (Balkan) countries demonstrate a unique pattern in which an increase in workers' compensation leads to additional reduction in labour productivity. The findings of this study contribute to our understanding of the complex dynamics between productivity and compensation. Furthermore, they provide valuable insights for policymakers aiming to establish more efficient mechanisms for the distribution of national income. By comprehending the intricate relationships between productivity and compensation, policymakers can devise strategies to stimulate economic growth, enhance the well-being of workers, and achieve a more equitable allocation of resources (Trenovski, Gligoric, Kozheski, & Merdzan, 2023). The effect of changes in labour productivity and workers' compensation is analyzed at the level of individual company. In the empirical analyses, the authors analyse the effects of training of workers and their impact on the increase in labour productivity, as well as the extent to which the effects of labour productivity are transferred to workers in the form of higher labour compensation. It has been concluded that labour productivity has increased by 23% for the entire period of analysis, while workers' compensation has increased by 12% during that period. Thus, the participation of workers in labour distribution is decreasing more and more as labour productivity increases (Konings & Vanormelingen, 2010).

Empirical studies that focus on the case of Turkey, which in the previous period was characterized by significantly high inflation rates, come to the conclusion that high inflation and high interest rates negatively affected the productivity growth by distorting price signals and firms' investment plans (Yilmaz, 2012). Several empirical studies have established a correlation between the expansion of the wage gap and the persistent decline in workers' bargaining power, alongside various structural challenges, such as elevated unemployment rates, substantial tax impositions on wages, and the substantial presence of an informal sector (Bildirici and Alp 2012; Elgin and Kuzubas 2012).

3 Data and Methodology

The central question of our analysis is to determine the interrelationship between statutory minimum wage, inflation, and labour productivity in the case of selected Central and South-East European Countries. The analysis is based on data from the period 2012-2022 sourced from the Database of the World Bank and the European Commission. The variables under analysis include labour productivity, inflation rate, and statutory minimum wage. The countries are divided into three homogeneous groups: Balkan EU countries, Balkan non-EU countries, and Visegrád countries. The VAR methodology is often used for analysing the interrelationships, and the transmissions of the shock between variables by using the Impulse-response function. All this is done without the need to include a lot of restrictions in the model and enables the data to manifest the mutual dynamic and transmissions among the variables in the model (Petrevski, Trenovski, & Tashevska, 2019). In the VAR model all variables are treated as endogenous and dependent in both a static and dynamic sense and the panel VAR models have the same structure as the basic VAR models, although the cross-section component adds a new dimension to the model (Canova and Ciccarelli 2013; (Zekeriya 2015). The panel VAR model has the same structure as the basic VAR model with addition of the cross-section effects by countries, thus the VAR model is as follows:

$$AX_t = \beta_0 + \beta_1 X_{t-1} + u_t \quad (1)$$

Where X_t represents a vector dependent on its own lagged values and the structural shock of u_t which are mutual independent. However, the panel VAR model is different from the basic VAR model because of the cross – section component, in the case we use data for 12 countries divided into three groups of three different VAR models. Thus, the panel VAR equation (Dees & Guntner, 2014) is as follows:

$$Y_{i,t} = v_i + A_{j,i} Y_{t-1} + \dots + A_{j,i} Y_{t-1} + e_{i,t} \quad i=1, \dots, N \quad (2)$$

where, $y_{i,t}$ represents a $(K \times 1)$ vector of endogenous variables for $i=1, \dots, N$; $Y_t = (y_{1,t}, y_{2,t}, \dots, y_{N,t})$ represents a $(N \times K \times 1)$ vector of $y_{i,t}$; v_i is a vector of the coefficients of the intercept; $A_{j,i}$, $j=1, \dots, p$, $i=1, \dots, N$ is a $(K \times N \times K)$ matrix of the slope coefficients; and $e_{i,t}$ is a $(K \times 1)$ standard errors vector.

It should be noted that we should be extremely careful when interpreting and interpreting the results. The relationship between the variables that are the subject of analysis, and especially between labour productivity and inflation, may be the result of their long-term connection, but also if there are distinctly high cyclical movements in the analyzed period, they may have a significant impact on the trend of productivity and inflation.

4 Analysis of the Trend and Correlation of Inflation, Statutory Minimum Wage, and Labour Productivity

The examination of inflation rates in the countries under analysis reveals that during the specified period, inflation poses no concern for monetary policy. In other words, price stability has been successfully attained. However, starting from 2020, as a result of the negative effects that arose as a consequence of the COVID-19 pandemic, inflation is again becoming a global problem that is also becoming a major challenge for economic policymakers. Additionally, in the post-COVID-19 period, Southeast European countries experienced double-digit inflation rates due to a significant surge in demand, as well as supply-side shocks primarily caused by disruptions and issues in supply chains. Furthermore, the rise in energy prices resulting from the military conflict between Russia and Ukraine also contributed to this inflationary trend (See Table 1A in Annex). High inflation represents a threat to both the smooth operations of businesses and households. Economic theory categorizes the observed inflationary tendencies in nearly all European countries as either demand-pull inflation, arising from increased aggregate demand, or cost-push inflation, resulting from rising prices of production inputs. Therefore, it can be concluded that the high inflation rates in 2020 primarily stem from the shock of global energy and food prices, serving as the main drivers of inflationary surges in Central and South-East European countries. When analysing the average inflation rates for the period 2012-2022 in the examined countries, it is evident that Serbia experiences the highest inflation rate at 4%, followed by Hungary at 3.6%, Romania at 3.4%, and the Czech Republic at 3.2%. In contrast, the inflation rate in Western Balkan countries (excluding Serbia) averaged below 3%, while Bosnia and Herzegovina recorded an average inflation rate of 1.5% (See Figure 1).

In an environment characterized by increasing inflation, workers respond by exerting upward pressure on wages, setting the stage for what is commonly referred to as the “wage-price inflationary spiral”. Specifically, as inflation rises, real incomes decline due to failure of nominal wages to keep pace with the mounting inflationary pressures. In an attempt to protect their economic well-being, workers engage in negotiations for higher wages, often leveraging the strength of collective bargaining or union representation. Also, within the realm of theoretical literature, there is a widely accepted understanding that inflation can have a detrimental impact on the growth in labour productivity (Freeman & Yerger, 2000). If the increase in wages surpasses the growth in labour productivity, that leads to growth of labour cost. The concept of the “wage-price” inflationary spiral entails a reciprocal relationship between wages and prices. The likelihood of an economy experiencing such a spiral is influenced, to a certain extent, by macroeconomic conditions, particularly the state of the labour market. The bargaining power of workers is amplified when labour demand is robust and labour supply is limited. Conversely, companies possess

greater negotiating power and ability to determine labour prices in a scenario characterized by higher aggregate demand. Moreover, it is important to acknowledge that policies pertaining to the automatic indexation of wages, whereby wages are adjusted in line with the cost of living, also contribute to the acceleration of the wage-price inflationary spiral. Additionally, the structure of the economy plays a role in shaping this spiral, particularly in relation to the level of market power held by companies operating in specific industries. Thus, companies with a significant market share can more easily raise product prices in response to growing wages, unlike companies for which such price increases would lead to a substantial decline in sales revenues.

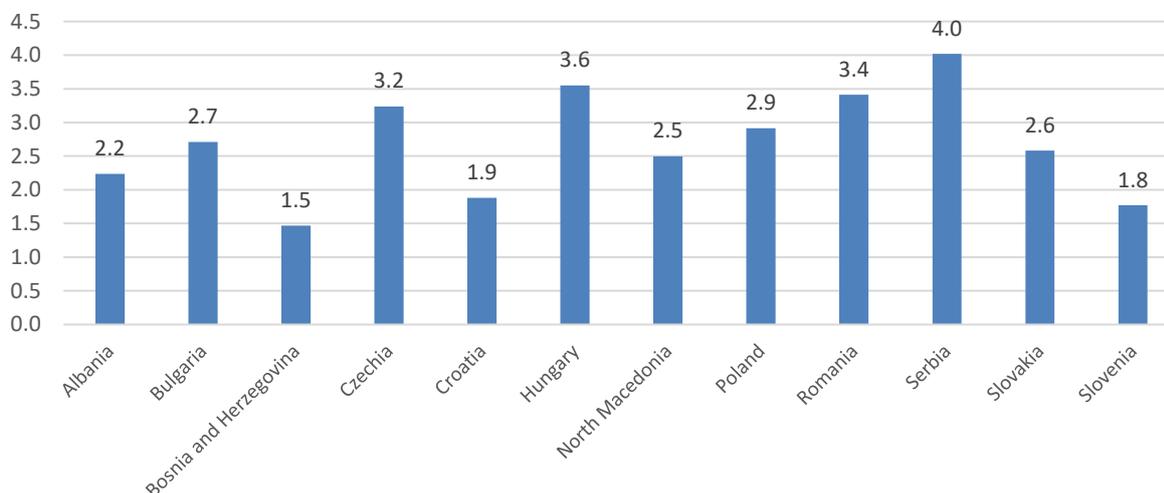


Figure 1. Inflation rate, average 2012-2022 by countries *Source:* Author's calculations based on WDI data.

Due to the elevated inflation rates in recent times and in order to improve the living standards of workers, Southeast European countries, particularly the non-EU countries in the Western Balkans, have substantially raised their statutory minimum wage. In addition to various theories and hypotheses concerning the impact of a legally established minimum wage on the labour market, particularly employment, it is worth noting that over the past few decades, almost every country worldwide has enacted minimum wage regulations either by the law or collective agreements.

The economic framework posits a positive correlation between wages and productivity, suggesting that growth in productivity should be reflected in wage growth to some extent. Nevertheless, alongside the positive impact of augmenting the income of specific social groups, it is important to acknowledge the discernible negative consequences of this approach. Notably, there has been a decline in industry employment over the past few quarters, supported by official statistical data indicating a decrease in competitiveness resulting from rising production costs. The increase in wages contrasts with the concurrent decline in productivity during this upward trend. As anticipated, in line with empirical studies, the burden of the minimum wage increase will predominantly fall on domestic consumers, manifesting through escalated retail prices (Harasztosi & Linder, 2019). Hence, in many countries, there exists a significant disparity between the growth rates of productivity and minimum wages. Despite the general expectation that this relationship should hold universally, empirical evidence reveals contrasting outcomes due to the influence of various endogenous and exogenous factors inherent to different economic structures (Trenovski B. , Kozheski, Tashevskaa, & Peovski, 2021) . Wage rigidity, particularly in the downward direction, is a prevalent phenomenon in modern economies. The determination of minimum wage is often influenced by labour unions, although developing economies typically lack strong and well-organized unions.

The statutory minimum wage in the selected countries of Central and South-Eastern Europe shows significant differences. Figure 2 shows the statutory minimum wage as a proportion of average monthly earnings in 2021. It is noteworthy that the percentage of the statutory minimum wage in relation to average monthly earnings varies between 40.5% and 62%. The lowest proportion of the statutory minimum wage in relation to the average wage is observed in Hungary at 40.5%, whereas the highest proportion is observed in North Macedonia at 62%. The data reveals that the statutory minimum wage constitutes less than 50% of average monthly earnings in Hungary, Czechia, Bulgaria, Slovakia, Croatia, Serbia, and Romania. On the other hand, in Poland, Bosnia and Herzegovina, Albania, Slovenia, and North Macedonia, the proportion of the statutory minimum wage in relation to average monthly earnings exceeds 50%. The optimal level of the statutory minimum wage primarily relies on the labour market structure, encompassing the distribution of employees and wages within a national economy. The European Commission advocates an adequate minimum wage of 60% of the median wage (Roth, Seidel, & Ahlfeldt, 2022). Nevertheless, the considerable heterogeneity in the minimum wage across member states is a consequence of labour market conditions, worker mobility, and other indicators that impact the equilibrium of the labour market.

It is important to highlight that the proportion of the statutory minimum wage is notably high in North Macedonia, surpassing Hungary by approximately 22 percentage points, which holds the lowest level of statutory minimum wage among the analyzed countries. However, it is crucial to acknowledge the variation in the coverage of workers included under the statutory minimum wage, which is specific to each national labour market. At the European Union level, the coverage of workers receiving the minimum wage ranges from 5% to 8%, while in certain developing countries (such as North Macedonia, for instance), it extends to around 20%.

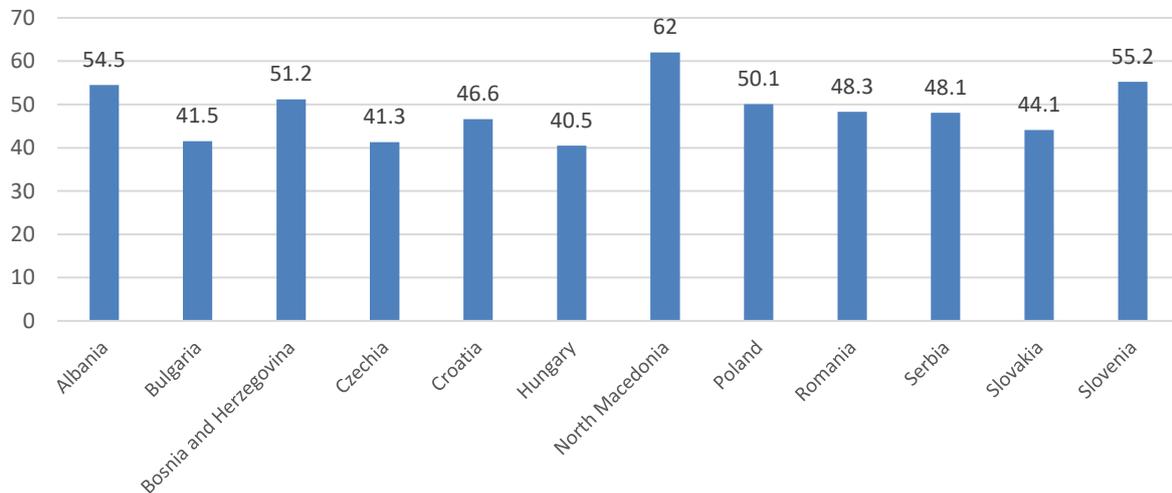


Figure 2. Monthly minimum wage as a proportion of average monthly earnings 2021 (in %) **Source:** Author's calculations based on European Commission Database

Nonetheless, the rise in wages does not guarantee an automatic escalation in the prices of final products, nor does it necessarily lead to a higher level of inflation. Within this context, economists emphasize the importance of labour productivity movement, regarding it as a crucial variable for mitigating inflationary pressures that may arise from nominal wage increases. Besides the fact that the increase in inflation stems from numerous exogenous and endogenous economic and non-economic factors, empirical studies highlight a robust correlation between the growth rate of labour productivity and the inflation rate (Hondroyiannis and Papapetrou, 1998; Kumar, Webber and Perry 2012; Mahadevan and Asafu-Adjaye 2006). Economists contend that the expansion of labour productivity can counterbalance the growth in nominal wages, effectively curbing the rise in unit labour costs that would otherwise result in higher prices for end products. When the percentage increase in nominal wages matches the percentage increase in labour productivity, the cost per unit of labour remains unchanged. Conversely, if nominal wage growth outpaces below-average labour productivity growth, it leads to an increase in the cost per unit of labour, and vice versa. Therefore, it can be inferred that alongside various administrative and non-economic measures aimed at reducing or restraining inflation (such as price freezes, wage freezes, margin limitations, etc.), the growth in labour productivity serves as a market mechanism to prevent excessive inflation, primarily arising from nominal wage increases.

The disparities in labour productivity growth are illustrated in Figure 3, which displays the average annual growth rate of output per worker for the period 2012-2022. Among the Western Balkan non-EU countries, the average annual growth rates of labour productivity are as follows: Albania with 1.83%, Bosnia and Herzegovina with 1.17%, Serbia with 0.29%. Notably, North Macedonia is the only country where there is a decline in the average annual growth rate of labour productivity, reaching -0.05%. On the other hand, within the Visegrád country group, the data show that the highest average annual growth rate for the period 2012-2022 of output per worker is observed in Poland 1.95%, the Czech Republic 1.51%, while the increase in labour productivity in Slovakia and Hungary is below 1%. As for the Western Balkan EU countries, Romania is characterized by the highest average annual growth rate of labour productivity of 4.35%, Slovenia with 1.89%, Croatia with 1.64% and Bulgaria with 1.51% (See Figure 3). When examining the labour productivity growth indices for the period 2012-2021, variations in the movement of labour productivity become apparent across the three groups of countries. In comparison to 2012, labour productivity in Serbia, Slovakia, and North Macedonia has remained relatively stagnant, ranging between 100 and 103 index points. This indicates that there has been minimal growth in labour productivity in these countries over the past decade (See Table 2A in Annex). Conversely, Romania has experienced notable growth in labour productivity, with a labour productivity index of 153 in 2021. This signifies a substantial increase of 53 index points compared to 2012. Additionally, significant growth in labour productivity is observed in Poland, recording a growth of 21 index points, as well as Croatia with 18 index points, Bulgaria and the Czech Republic both with 16 index points (See Table 2A in Annex).

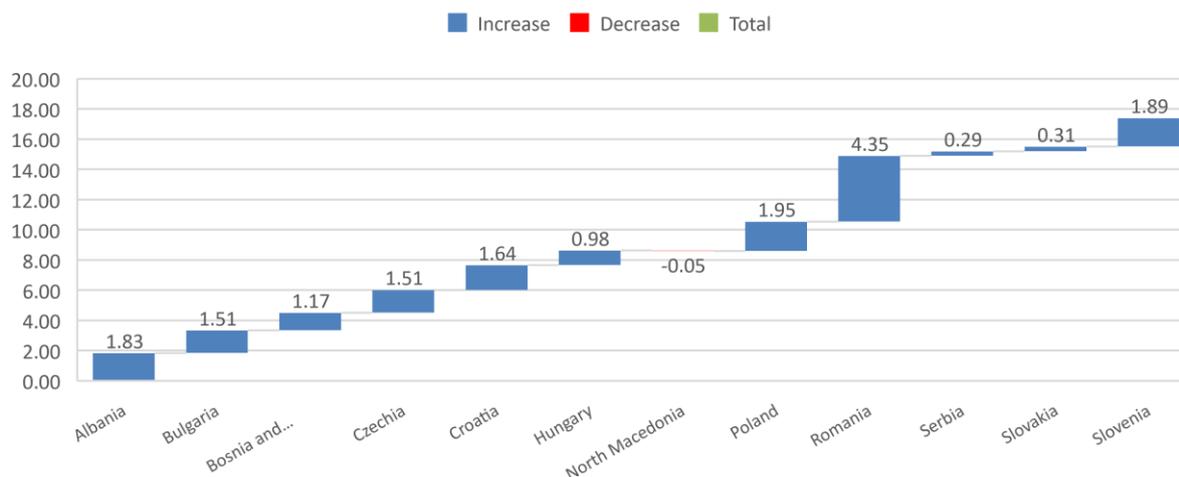


Figure 3. Average annual growth rate for the period 2012-2022 output per worker (GDP constant 2015 USD) (in percent) **Source:** Authors calculations based on ILO data.

It is important to highlight that the low level of labour productivity in the Balkan non-EU countries primarily stems from the significant presence of certain sectors in the economy that traditionally exhibit low productivity growth and low value added. These sectors include agriculture, the service sector, and retail trade. Furthermore, due to the inadequate interconnection between individual sectors of the economy, the increase in labour productivity within specific sectors does not effectively disseminate across other sectors of the economy (Trenovski, Kozheski and Merdzan, 2022). Moreover, the utilization of information and communication technology (ICT) has significantly enhanced the productivity and output of individuals and organizations that employ these technological advancements. It is widely acknowledged that the ICT sector plays a pivotal role in augmenting productivity and fostering economic progress within a particular nation. Consequently, promoting greater adoption of ICT by business entities at large would consequently yield an increase in labour productivity across various industries (Trpeski, Trenovski, G., & Kozheski, 2021). Nevertheless, the extent to which labour productivity improvements in one sector transfer to other sectors is primarily determined by the level of interconnection within individual economies.

In the Balkan non-EU countries, the issue of low labour productivity levels stems from a combination of partial economic measures and policies, weak state institutions, deficiencies in investment policies, and inadequate business regulation (World Bank Group and WIIW, 2019). Conversely, when examining the trend of labour productivity at the national level, empirical research indicates a phenomenon in the Republic of North Macedonia where there is a simultaneous increase in employment and a decrease in labour productivity. This suggests the employment of unproductive workers, which contradicts fundamental theoretical postulates (Trenovski and Kozeski, 2020). Furthermore, the downward trend in labour productivity witnessed in certain Balkan non-EU countries is accompanied by an above-average increase in workers' wages, leading to the emergence of a phenomenon known as "reverse decoupling" between labour productivity and workers' wages (Trenovski, Tashevska, Kozheski, & Merdzan, 2019).

High disparities in labour productivity levels among different groups of countries can be attributed to various factors. The literature suggests several potential factors that influence labour productivity, including: (1) the quality of the labour force, (2) the quantity of capital goods employed, and (3) the efficiency with which labour, capital, and other inputs are combined in the production of final goods and services (McConnell, Brue, & Macpherson, 2003). Certainly, in addition to the mentioned factors, the quality of the workforce plays a pivotal role in enhancing labour productivity. The quality of the workforce depends on several aspects, such as education and training, health and well-being, and the age and gender composition. Therefore, the employability of a productive and skilled young workforce is of utmost significance for boosting labour productivity in these countries (Bojadjeva, Cvetanoska, Kozheski, Mujcinovic, & Gasparovic, 2022). In this context workforce with higher levels of education and training is capable of generating greater output compared to a workforce with lower educational attainment and inadequate training. The improvement in labour quality subsequently triggers a self-reinforcing cycle characterized by increased real wages. Specifically, the augmented earnings enable workers to enhance their health and education, thereby facilitating further enhancements in labour quality and productivity. Significant differences in labour productivity levels can be observed among different groups of countries based on the data from 2022, as depicted in Figure 4. In 2022, the Balkan non-EU countries exhibit the lowest level of labour productivity, with no significant differences observed among individual countries within this group. Conversely, there are no notable disparities in labour productivity between the Balkan EU countries and the Visegrád Group

countries. The only notable exception is Slovenia, which stands out with the highest level of labour productivity compared to all other countries. On the other hand, Bulgaria stands out with lower labour productivity levels, deviating from the average labour productivity within these two groups of countries and aligning more closely with the Western Balkan non-EU countries (See Figure 4).

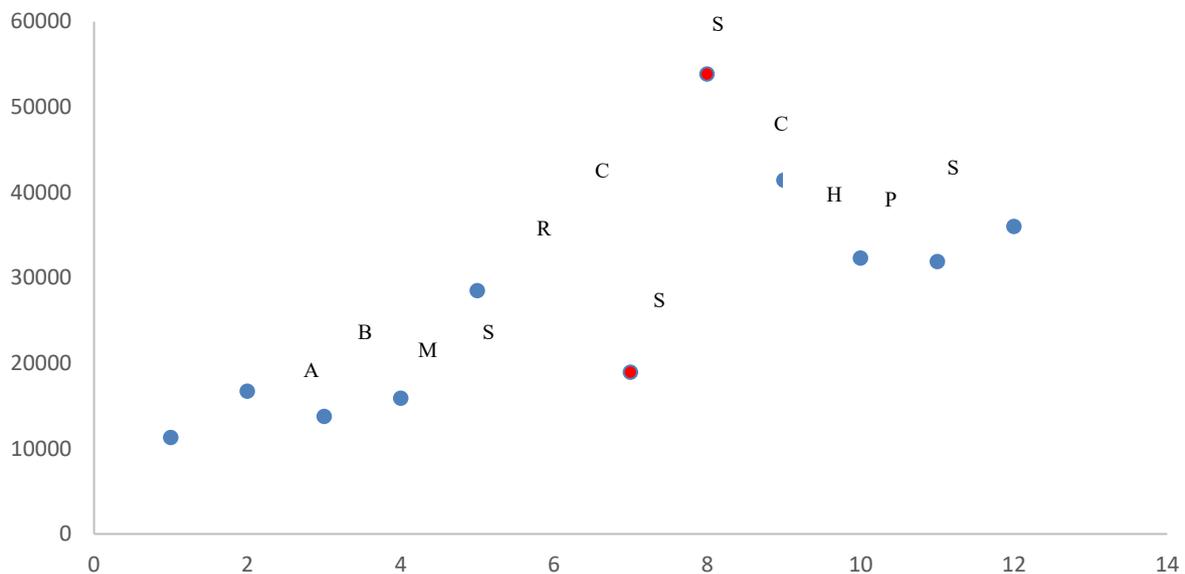


Figure 4. Labour productivity in 2022 (GDP constant 2015 USD) **Source:** Authors calculations based on ILO data.

Based on the average labour productivity data for the period 2012-2021, the labour productivity in Balkan non-EU countries stands at an average of 13,767 USD, with the lowest value recorded at 9,442 USD and the highest value at 16,739 USD. On the other hand, the labour productivity in Balkan EU countries is 30,326 USD, with the lowest value observed at 16,175 USD and the highest value at 53,861 USD. Consequently, it can be inferred that labour productivity in Balkan EU countries is, on average, 2.2 times higher compared to Balkan non-EU countries. The average labour productivity in the Visegrád countries is 33,700 USD (See Table 3A).

When considering the inflation trends in these countries, it can be observed that, on average, the Western Balkan EU countries experience an inflation rate of 2.44% for the period 2012-2021. However, apart from the average, there have been instances of deflation reaching -1.54% in certain years, while in 2022, some of these countries recorded inflation as high as 15%. In the Balkan non-EU countries, the average inflation rate for the period 2012-2021 is 2.55%, with a notable 14% inflation rate in 2022. A similar trend is observed in the inflation rates of the Visegrád group countries, where the average inflation is slightly higher compared to other countries, standing at 3.07% (See Table 3A). The average statutory minimum wage in Balkan EU countries for the period 2012-2022 is 524 USD. However, significant differences are observed both within the analyzed period and among individual countries. The minimum value recorded for the statutory minimum wage is 171 USD, while the maximum value reaches 1211 USD. In Balkan non-EU countries, the average minimum wage is 270 USD, also exhibiting notable variations within the analyzed period and among individual countries. In the Visegrád group countries, the average statutory minimum wage stands at 507 USD.

Analysing the correlation between these variables reveals certain connections, warranting further analysis of short-term causality between labour productivity, inflation, and the statutory minimum wage. In the case of Western Balkan EU countries, the correlation between inflation and labour productivity shows an inverse relationship. Conversely, there is a positive correlation between the statutory minimum wage and inflation, as well as between labour productivity and the statutory minimum wage. In Western Balkan non-EU countries, a positive correlation is observed between all variables. Notably, a statistically significant positive correlation is evident between inflation and the statutory minimum wage, as well as between labour productivity and the statutory minimum wage. A similar trend is observed in the Visegrád group countries, characterized by a pronounced and statistically significant correlation between inflation and the statutory minimum wage, as well as between labour productivity and the statutory minimum wage.

5 Empirical Analysis – Results from Granger Causality Test

In order to investigate the causal relationship between productivity, inflation, and the statutory minimum wage, the analysis utilized the Granger Causality test. It is essential to acknowledge that while the Granger Causality test reveals a degree of causality among the variables, its ability to determine whether inflation and the minimum wage

are the fundamental drivers of productivity fluctuations is limited. The test primarily assesses the predictive power of current inflation and minimum wage levels in forecasting future changes in labour productivity.

The Granger Causality test was conducted on three distinct groups of countries: the Visegrád country group, Western Balkan EU countries, and Western Balkan non-EU countries. The results of the Granger Causality test for the Visegrád group indicate the presence of short-term causality between inflation, labour productivity, and the statutory minimum wage. Specifically, the values of the statutory minimum wage and labour productivity significantly influence the prediction of future inflation values. Additionally, the individual values of the statutory minimum wage have a notable impact on predicting future labour productivity values, suggesting a short-term causality between the statutory minimum wage and labour productivity. This relationship is also observed between inflation and the future values of the statutory minimum wage, indicating that an increase in inflation affects the determination of future statutory minimum wage values (See Table 1).

The results of the Granger Causality test conducted on the Western Balkan EU countries demonstrate the presence of short-term causality between the statutory minimum wage, labour productivity, and the level of inflation. Labour productivity and the statutory minimum wage collectively and significantly influence the determination of future inflation values. Furthermore, the past values of labour productivity individually and significantly impact the prediction of future inflation values in these countries. However, the values of inflation and the statutory minimum wage exhibit statistically insignificant influence on the determination of future labour productivity values. This implies that the short-term causality of inflation and the statutory minimum wage, as predictors of labour productivity in this group of countries, is not statistically significant. Conversely, if the statutory minimum wage is considered as the dependent variable, with inflation and labour productivity analyzed as predictors of its future values, the results indicate statistically significant causality with both individual and joint influences.

During the development of the Granger Causality test, specifically the VAR model, for the case of the Western Balkan non-EU countries, labour productivity was excluded after conducting stability tests on the VAR model. Consequently, the Granger causality between the statutory minimum wage and inflation is examined. The findings reveal a short-term interdependence between the values of the statutory minimum wage and the level of inflation. In other words, the past values of the statutory minimum wage exert a statistically significant influence as predictors of future inflation levels. It is evident that this concept of causality differs significantly from the notion of logical causality. From this, it can be concluded that the presence of Granger causality between inflation, labour productivity, and statutory minimum wage raises the question of whether it reflects an underlying structural relationship or simply emerges as a result of short-term co-movements among these variables.

VAR Granger Causality/Block Exogeneity Wald Tests									
Sample: 2012 2022									
Included observations: 36									
Visegrád country group			Western Balkan EU countries			Western Balkan non-EU countries			
Dependent variable: Inflation									
Excluded	Chi-sq	df	Prob.	Chi-sq	df	Prob.	Chi-sq	df	Prob.
Labour Productivity	2.228264	2	0.3282	8.080230	2	0.0176	/	/	/
Minimum Wage	11.80009	2	0.0027	4.491340	2	0.1059	8.358597	2	0.0153
All	11.98203	4	0.0175	8.570618	4	0.0728	8.358597	2	0.0153
Dependent variable: Labour Productivity									
Excluded	Chi-sq	df	Prob.	Chi-sq	df	Prob.	Chi-sq	df	Prob.
Inflation	3.621963	2	0.1635	1.559464	2	0.4585	/	/	/
Minimum Wage	7.623895	2	0.0221	3.985277	2	0.1363	/	/	/
All	10.67488	4	0.0305	5.109207	4	0.2763	/	/	/
Dependent variable: Minimum Wage									
Excluded	Chi-sq	df	Prob.	Chi-sq	df	Prob.	Chi-sq	df	Prob.
Inflation	8.415977	2	0.0149	5.937561	2	0.0514	3.959240	2	0.1381
Labour Productivity	1.422887	2	0.4909	7.041609	2	0.0296	/	/	/
All	9.782215	4	0.0443	9.163512	4	0.0571	3.959240	2	0.1381

Table 1 Results from Granger Causality test Source: Authors calculations

6 Results from Impulse-Response Function

The impulse-response function results illustrate the dynamic response of variables in the VAR system to shocks over time. Each plot depicts the response of one variable to a unit shock in another variable, assuming all other variables remain constant. Therefore, the following sections present the movement trends of labour productivity and inflation resulting from an exogenous shock in the statutory minimum wage, for each of the three groups of countries.

The trend of inflation and labour productivity in the Visegrád group of countries is depicted in Figure 5. The results indicate that an exogenous shock, such as an increase in the statutory minimum wage, leads to a slight decrease in the inflation rate during the first three years, followed by a significant increase in inflation thereafter. Additionally, the increase in the statutory minimum wage results in a notable decline in labour productivity. The reduction in labour productivity intensifies with a certain time delay and reaches its peak in the third year.

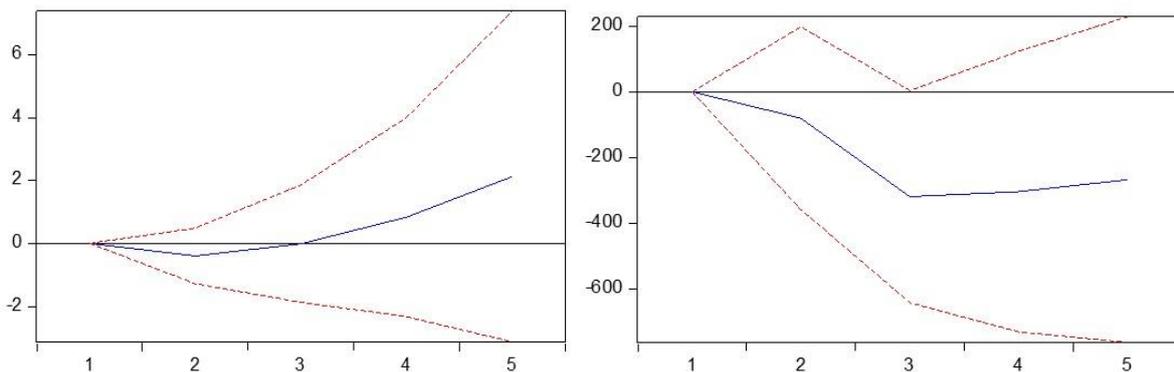


Figure 5. Visegrád group of countries- Results from Impulse – Response function - Response of Inflation (I) and Labour productivity (II) to minimum wage. **Source:** Authors calculations

The impulse-response function results for the Western Balkan EU countries reveal that a shock to the statutory minimum wage triggers an increase in both inflation and labour productivity. Specifically, the increase in the statutory minimum wage leads to a significant rise in inflation over the next five years. The impact on inflation intensifies starting from the fourth year, reaching its maximum increase. Additionally, the increase in the statutory minimum wage results in an increase in labour productivity. Although there is an initial decline in labour productivity in the first year following the shock, subsequent periods show a recovery and positive growth rates in labour productivity.

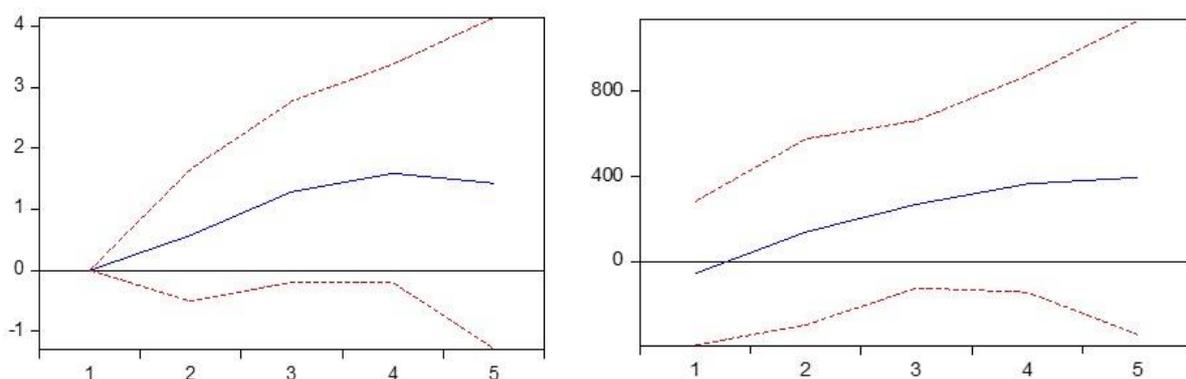


Figure 6. Western Balkan EU countries - Response of Inflation (I) and Labour productivity (II) to minimum wage. **Source:** Authors calculations

The impulse-response function analysis conducted on the Western Balkan non-EU countries focuses on the relationship between an exogenous shock in the statutory minimum wage and the response of inflation. The results indicate that the increase in the statutory minimum wage, while not immediately impacting inflation in the first year, contributes to its rise with a certain time delay. From the second year onward, there is an adjustment in the prices of final goods and services due to the increased production costs, leading to a significant and sustained increase in inflation in subsequent periods.

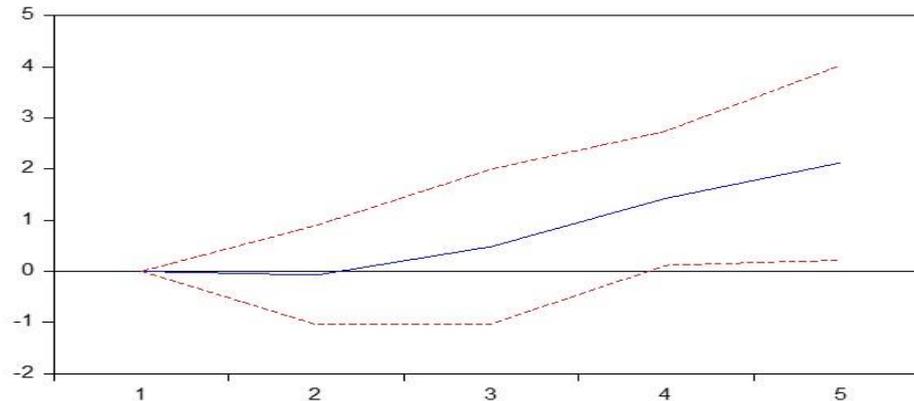


Figure 7. Western Balkan non-EU countries Response of Inflation to minimum wage. Source: Authors calculations

7 Conclusion

The economic systems of the analyzed countries experienced a shift from a period of price stability to high inflation rates in the second half of 2021. These high inflation rates, coupled with a certain decrease in economic activity, can be attributed to shocks on both the supply and demand sides. On the supply side, the significant increase in prices of electricity, petroleum products, and food has contributed to the high inflation rates. While the military conflict in Ukraine has played a role in influencing energy prices, it is important to note that the increase in energy prices was observed even prior to the emergence of the conflict. Therefore, it is reasonable to emphasize that price hikes are also influenced by challenges and restrictions stemming from the COVID-19 pandemic, such as supply chain disruptions, increased transportation costs, and shortages of essential raw materials for industrial production. Examining the average inflation rates in the analyzed countries for the period 2012-2022, it can be observed that Serbia had the highest average inflation rate of 4%, followed by Hungary with 3.6%, Romania with 3.4%, and the Czech Republic with 3.2%. The average inflation rates in the Western Balkan countries, with the exception of Serbia, remained below 3%, while Bosnia and Herzegovina had an average inflation rate of 1.5%.

In the analyzed period, the countries of South-Eastern Europe, particularly the Western Balkan non-EU countries, experienced a notable increase in the statutory minimum wage. The findings reveal that the proportion of the statutory minimum wage in relation to average monthly earnings varied between 40.5% and 62%. Among the countries analyzed, Hungary had the lowest share of the statutory minimum wage in the average wage at 40.5%, while North Macedonia had the highest share at 62%.

The findings indicate that in Hungary, Czechia, Bulgaria, Slovakia, Croatia, Serbia, and Romania, the statutory minimum wage constitutes less than 50% of the average monthly earnings. Conversely, in Poland, Bosnia and Herzegovina, Albania, Slovenia, and North Macedonia, the share of the statutory minimum wage as a proportion of average monthly earnings surpasses 50%. It is worth noting that North Macedonia stands out with a significantly higher share, approximately 22 percentage points above Hungary, which has the lowest level of statutory minimum wage among the analyzed countries.

Determining the optimal level of the statutory minimum wage primarily depends on the labour market structure, including the distribution of employees and wages within a national economy. The European Commission advocates for an adequate minimum wage set at 60% of the median wage. The substantial increase in the statutory minimum wage has a positive impact on enhancing the standard of living for workers. However, the extensive coverage of minimum wage workers also has implications for the functioning and condition of the labour market.

The analysis of labour productivity reveals significant disparities among the analyzed groups of countries. Within the Western Balkan non-EU countries, the average annual growth rates of labour productivity vary as follows: Albania with 1.83%, Bosnia and Herzegovina with 1.17%, Serbia with 0.29%, and North Macedonia experiencing a decrease of -0.05% in the average annual growth rate. In the Visegrád country group, Poland exhibits the highest average annual growth rate of output per worker at 1.95%, followed by Czechia with 1.51%, while Slovakia and Hungary show growth rates below 1%. Regarding the Western Balkan EU countries, Romania demonstrates the highest increase in the average annual growth rate of labour productivity at 4.35%, followed by Slovenia with 1.89%, Croatia with 1.64%, and Bulgaria with 1.51%.

Examining the labour productivity growth indices for the period 2012-2021, it can be observed that compared to 2012, labour productivity in Serbia, Slovakia, and North Macedonia ranges from 100 to 103 index points, indicating a slight increase in labour productivity over the past 10 years in these countries. Romania's labour productivity index in 2021 stands at 153, representing a growth of 53 index points compared to 2012. Noteworthy growth in labour productivity is also observed in Poland with 21 index points, Croatia with 18 index points, and

Bulgaria and the Czech Republic with 16 index points. The relatively low level of labour productivity in Balkan non-EU countries primarily stems from the high representation of sectors with traditionally low productivity growth and low value added, such as agriculture, the services sector, and retail trade. Additionally, insufficient interconnectedness between sectors impedes the effective spread of labour productivity growth from one sector to another within the economy.

The results of the Granger causality test indicate the presence of short-term causality between inflation, labour productivity, and the statutory minimum wage in the three groups of countries. Specifically, in the Visegrád country group, the data demonstrate that the values of the statutory minimum wage and labour productivity exert a statistically significant influence on predicting future inflation levels. Moreover, individual values of the statutory minimum wage significantly impact the prediction of future labour productivity values, suggesting a short-term causality between the statutory minimum wage and labour productivity. These findings lead to the conclusion that an increase in the statutory minimum wage within the Visegrád group of countries contributes to the growth of labour productivity while also significantly influencing future inflation levels in these countries.

On the example of Western Balkan EU countries, the results reveal the presence of short-term causality among the statutory minimum wage, labour productivity, and inflation levels. Labour productivity and the statutory minimum wage exert a statistically significant, shared influence on determining future inflation values. Additionally, when considering the statutory minimum wage as the dependent variable and analysing inflation and labour productivity as predictors of future values, the results indicate significant causality, both individually and jointly. Turning to Western Balkan non-EU countries, the findings demonstrate a short-term interdependence between the statutory minimum wage and inflation levels. Specifically, the past values of the statutory minimum wage exert a statistically significant influence as a predictor of future inflation levels.

The results of the impulse-response function applied to the Visegrád countries indicate that an exogenous shock in the statutory minimum wage leads to a slight decline in the inflation rate during the first three years, followed by a significant increase thereafter. Simultaneously, the increase in the statutory minimum wage contributes to a notable decrease in labour productivity, which intensifies over time and reaches its maximum by the third year.

On the example of Western Balkan EU countries, the results of the impulse-response function demonstrate that a shock in the statutory minimum wage leads to a substantial increase in both inflation and labour productivity. Specifically, the increase in the statutory minimum wage results in a significant rise in inflation over the subsequent five years. The intensity of this inflationary response gradually increases and reaches its peak in the fourth year. In terms of labour productivity, the findings indicate that although the exogenous increase in the minimum wage initially causes a decrease in labour productivity in the first year, it subsequently contributes to an improvement in labour productivity during the following period. The results of the impulse-response function, focusing on the relationship between inflation and the statutory minimum wage in the Western Balkan non-EU countries, indicate that an exogenous increase in the minimum wage leads to inflationary effects, albeit with a time delay. While the initial increase in the minimum wage does not result in a substantial inflationary impact in the first year, adjustments in the prices of final goods and services occur from the second year onwards due to higher production costs. Consequently, this leads to a significant and persistent increase in inflation in subsequent periods.

Structural weaknesses in the labour market and wage growth without a corresponding increase in labour productivity, along with inflationary expectations, pose risks that can further disrupt the labour market situation. The high inflation rates observed, particularly in the Western Balkan countries, stem from underlying structural issues and measures implemented in the labour market. The low efficiency and effectiveness exhibited by the average worker in these countries, coupled with rising wages, have exerted significant pressure on product prices. Consequently, the results suggest that the increase in inflation is partially attributed to wage hikes occurring at a time when real labour productivity is declining. In contrast, Western European countries have pursued a more cautious approach to salary increases, aiming to avoid activating a wage-price spiral. Additionally, the countries of Southeastern Europe, especially the Western Balkan countries, face an unfavourable market structure, with a few dominant firms wielding considerable market power. This enables them to exert control over market prices, particularly by limiting the supply of their products. High inflation rates, although exhibiting a declining trend, are expected to persist in the near future, both in highly developed countries and in developing countries in Europe. However, it is evident that developing countries will experience higher inflation rates compared to highly developed countries. It is projected that pre-2020 levels of inflation, that is, inflation rates before the COVID-19 period, will be reached after 2025. Consequently, economic measures and policies in the upcoming period will prioritize the establishment of stable and low inflation levels, alongside intensified productivity growth.

Future research endeavours could delve deeper into understanding the nuanced impact of specific policies on labour productivity, particularly in the context of diverse economic structures. Additionally, exploring regional variations and addressing any limitations, such as data constraints, would contribute to a more comprehensive understanding of the dynamics at play.

Building on our findings, practical policy recommendations emerge. Policymakers should consider tailoring minimum wage adjustments to the unique economic conditions of each country, balancing the need for wage

growth with strategies to enhance labour productivity. Addressing structural weaknesses in the labour market may involve targeted investments, educational initiatives, and regulatory reforms to create a more resilient and efficient workforce. In the face of ongoing challenges, our research underscores the importance of adopting measures that promote sustainable economic development. Striking a delicate balance between wage growth and productivity improvements will be crucial for navigating the complexities of the evolving economic landscape in Central and South-East European countries.

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Appendix

Year	Albania	Bulgaria	Bosnia and Herzegovina	Czechia	Croatia	Hungary	North Macedonia	Poland	Romania	Serbia	Slovakia	Slovenia
2012	2.0	3.0	2.1	3.3	3.4	5.7	3.3	3.6	3.3	7.3	3.6	2.6
2013	1.9	0.9	-0.1	1.4	2.2	1.7	2.8	1.0	4.0	7.7	1.4	1.8
2014	1.6	-1.4	-0.9	0.3	-0.2	-0.2	-0.3	0.1	1.1	2.1	-0.1	0.2
2015	1.9	-0.1	-1.0	0.3	-0.5	-0.1	-0.3	-0.9	-0.6	1.4	-0.3	-0.5
2016	1.3	-0.8	-1.6	0.7	-1.1	0.4	-0.2	-0.7	-1.5	1.1	-0.5	-0.1
2017	2.0	2.1	0.8	2.5	1.1	2.3	1.4	2.1	1.3	3.1	1.3	1.4
2018	2.0	2.8	1.4	2.1	1.5	2.9	1.5	1.8	4.6	2.0	2.5	1.7
2019	1.4	3.1	0.6	2.8	0.8	3.3	0.8	2.2	3.8	1.8	2.7	1.6
2020	1.6	1.7	-1.1	3.2	0.2	3.3	1.2	3.4	2.6	1.6	1.9	-0.1
2021	2.0	3.3	2.0	3.8	2.6	5.1	3.2	5.1	5.1	4.1	3.1	1.9
2022	6.7	15.3	14.0	15.1	10.8	14.6	14.2	14.4	13.8	12.0	12.8	8.8

Table A1. Inflation rate (Consumer price, %) 2012-2022. **Source:** World Development Indicators

Year	Albania	Bulgaria	Bosnia and Herzegovina	Czechia	Croatia	Hungary	North Macedonia	Poland	Romania	Serbia	Slovakia	Slovenia
2012	100	100	100	100	100	100	100	100	100	100	100	100
2013	113	100	104	99	103	100	98	101	105	99	101	101
2014	115	99	104	100	100	99	100	103	108	93	102	102
2015	111	101	109	105	101	100	102	106	112	94	105	104
2016	109	105	110	105	104	99	102	107	119	91	104	108
2017	108	103	108	109	105	101	101	110	124	90	105	107
2018	108	106	111	111	107	105	101	115	129	93	108	109

2019	108	107	109	115	109	109	99	121	134	95	110	113
2020	112	107	107	111	102	106	94	118	132	94	107	109
2021	117	113	109	115	112	109	98	124	152	100	108	116
2022	120	116	112	116	118	110	100	121	153	103	103	121

Table A2. Output per worker (GDP constant 2015 US \$) -- ILO modelled estimates, 2012=100. **Source:** Authors calculations

Country Group	Balkan EU countries	Balkan non-EU countries	Visegrád Countries
Variables			
Inflation			
Mean	2.44	2.55	3.07
Std. Dev.	3.6	3.5	3.9
Min	-1.54	-1.58	-0.87
Max	15.33	14.2	15.1
Labour Productivity			
Mean	30326	13767	33700
Std. Dev.	12160	2135	4362
Min	16175	9442	26306
Max	53861	16739	41472
Minimum Wage			
Mean	524	270	507
Std. Dev.	309	70	99
Min	171	175	374
Max	1211	433	736
Correlation Coefficient / (P-Value)			
Inflation/Labour Productivity	-0.0327 (0.8329)	0.095 (0.5395)	0.1709 (0.2674)
Inflation/Minimum Wage	0.056761 (0.7144)	0.4593 (0.0017)	0.5907 (0.0000)
Labour Productivity/Minimum Wage	0.9518 (0.0000)	0.2544 (0.0956)	0.292 (0.0544)

Table A3. Results of econometric analysis. **Source:** Authors calculations