Analytical View on the Level and Changes in Labor Incomes in the Context of Sectoral Breakdown

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Abstract

The size of work income of Slovak households varies year-on-year, between sectors and between territorial units. However, regional and sectoral wage differences are different. Wage is always the result of a combination of several market and non-market factors. In the short term, wage reflects the value of the marginal product of labor, in the long run the decisive factor in the wage level is labor productivity. In the analysis performed in this study, it is monitored the sensitivity of the wage to changes in labor productivity in the conditions of the Slovak Republic. As sectoral employment and the labor market situation are considered to be important factors in the short term, in further analyzes we monitored the relationship between wages and industry performance indicators as well as labor market indicators in order to identify the decisive determinants of wages in the evaluated sectors. The current state and development in the explained and explanatory variables are quantified by a simple and multiple regression model, the results of which are supplemented by selected moment characteristics. Based on the results of the analyzes, we concluded that the certain group of monitored parameters have a positive impact on the sectoral nominal wage. The strength of their influence depends on whether they are low-capital service industries or manufacturing, usually technology-intensive industries. In addition, it is influenced by current economic trends, which we consider to limit the general validity of the conclusions of the analyses.

Keywords: wage; labor productivity; gross value added; employment; gross fixed capital; sectoral differences; Slovak Republic.

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1. Introduction

Here follows further instructions for authors. According to the statistics, the size of wages varies from region to region. In 2018, the average wage in Luxembourg was € 4,682 in Germany € 3,775, in the Czech Republic € 1,141, in Slovakia € 1,101. As wages are related to the overall price level, differences between countries are considered as objective [1]. There are also differences in the wages paid to the workforce in individual sectors. Salaries in the agricultural sector are about 82% of the national average, salaries in communications, insurance and banking reach 180% of the average wage [2]. If they express different labor productivity, they are acceptable. According to the economic theory, wage is a financial expression of the price of labor, and its value is determined by the value of the contribution of workforce to the value of the product. The size of wages and sectoral wage differences are not fixed. They change in size over time. Between 1993 and 2018, the value of the nominal average monthly wage in Slovakia increased from EUR 179.55 to EUR 925. Similar development was in the Czech Republic, where nominal wages increased from CZK 5,817 to CZK 31,885. Wages increased also in Poland, Germany, Austria and other countries [3]. In accordance with the findings of [4] and Daňová and his colleagues [5], the wage development was shown to be comparable with the development of the overall price level. The rise in the price level in the socio-economic system puts pressure on managed wage changes. In order to maintain the real value of wages, this relationship is important, particularly from the workforce point of view. However, priority should be given to changes in wages due to changes in labor productivity and to changes in the marginal product of this factor. Similarity of wage developments with changes in labor productivity was confirmed in the studies [6,7]. Reference [8,9] confirmed dependence between wage and changes in market factors. From published works, there is a clear diversity of views on wage determinants, regional and sectoral wage differences. The authors applied the approaches of classical, neoclassical and contemporary wage theories. Depending on the approach, as important determinants of wages are considered the contribution of the workforce to the value of the product [10], source options of companies also market factors, mainly supply and demand in the labor market [11], possibilities of labor migration between sectors or economic growth. Published findings indicate concurrently influence of several factors on wage size. The weight of these factors considered is questionable. In this study, we assume that the most objective determinant of wages is the size of the added value created. More precisely, its share per employee. In order to verify the veracity of this assumption and to determine the strength of the relationship between wage and its determinants, we analyze their interrelationships in a sectoral breakdown and identify factors that change their strength and character. With the intention of respecting the impact of the market environment, the analysis is extended to trend and market determinants of wages. Subsequently, we verify the multifactor influence of wages by a set of endogenous and exogenous variables. The material is logically divided into three parts. The theoretical part is based on research of published findings on wage determinants. In the analytical part, in order to answer the question of what are the factors of sectoral differences in average wage, we used the sectoral approach. To identify the impact of sectoral labor productivity on average wages, a comparative analysis of sectoral data of the Slovak economy was performed. The last section presents the main findings.

1.1. Literature Review

Determinants of wage size and their mechanism of action have long been of interest. Based on many analyzes,

the identified determinants can basically be divided into two groups: value-based determinants and a group of market determinants. The wage value determination is based on a comparison of the price of labor with the contribution of labor to the value of the product. Strict respect for the value dimension of wages in practice means a situation in which higher wages are in sectors with higher labor productivity, in regions with a high proportion of highly productive productions. Such an approach to wage determination is based primarily on neoclassical economics, according to which the objective criterion determining the wage size is labor productivity. Willingness of the company to pay the workforce depends on the contribution of the workforce to the value of the product. Inevitably, sectors with different labor productivity will also differ in wages. Wage differences that correspond to differences in sectoral labor productivity have been identified by [12], Melichová and his colleagues [6] and Myšková and his colleagues [7]. Neoclassical determination of wage size is based on the assumption that the company perceives wage as an expense incurred by hiring another employee. It means the comparison of the magnitude of that cost with the benefit gained from the employment of another employee, that is, with the additional product that that employee creates. In order to maximize profits, a company requires additional factors of production only if the marginal product of the factor of production does not fall to the level of the actual price of that factor. If this production factor is labor, it means the firm's interest in hiring another employee and paying him a wage, which is bounded from above by the monetary value of the marginal product of labor. The contribution of the frontier workforce to the value of the product varies between sectors [13,14,15]. Workers in different sectors receive different wages, corresponding to the value of the contribution of marginal worker of sector to the value of the product. According to the findings of [16], Reference [17,18], Xu and his colleagues [19], the marginal productivity of the labor factor affects wages only in the short term. In the long run, this relationship is disrupted. Wage development does not always correspond to changes in labor productivity. Reference [20,21] analyzed local and sectoral development of this relationship. They found that the regional disparities in labor productivity were the cause of the differences in regional wages. According to Ezcura and his colleagues [13] and Policardo and his colleagues [22] despite the narrowing labor productivity differences between countries, wage differences between these countries persist. One reason for breaking the link between the value of the marginal product and the wage over a longer period is the migration of labor from one sector to another. Migration of the workforce to the higher-wage sector will increase labor supply with unchanged demand. In terms of the effects of market forces, the effect will be to reduce the equilibrium wage in this sector. The increase in the scale of the production factor in the sector translates into an increase in the total product, but with a falling marginal product. Wage cuts in this sector may be counteracted by an increase in the sector's capital equipment, which increases labor productivity. Such a mechanism of wage development was noted by [23,4], who found that in the short and long term wages in addition to inflation were affected by foreign direct investment and human capital. The investments made result in labor productivity growth accompanied by wage growth. It can be concluded that the amount of wages is significantly limited by source options of companies, especially the capital of companies, production processes and technologies used. In comparison to the value approach to the understanding of wages, exist the opinions of authors, who consider several market factors to be decisive determinants. This approach is based on respecting the ability of market forces to correct the value of labor formed on the value principle by the influence of a set of endogenous and exogenous factors. Most often due to changes in labor supply, excess (or shortage) of free labor in this market, changes in the price level in the economy, growth assumptions of the sector due to capital investment, cyclical

development and the degree of development of economic system [8,9,24]. Demand and supply of labor and their changes play an important role in the group of these factors, as wages are always influenced by their interaction. Despite the fact that wage theories often forget on this fact, the absolute size of the supply is limited. It changes depending on the attractiveness of wages and the disposible wealth of the workforce. The demand for labor is derived from the demand for the products in which the labor is involved. Decreasing demand for products will reduce their market price and cause decreasing the wages even without decreasing labor productivity. Another example is the situation that results from an increase in labor productivity and a consequent increase in production in the sector. Increased supply of production will reduce prices in the sector, resulting in a decrease in incomes per worker, secondary as well as a decline in wages. Therefore, there will be only a time-limited link between sectoral labor productivity and wages [25]. This may later be adjusted by other endogenous factors, such as the limited supply of skilled labor [26,27]. At higher wage levels, this may also be adjusted by the pension effect of the increased wealth of the workforce [28,29] or for example, by the social pressure to lower agricultural production prices, which hinder wage growth in agriculture despite productivity gains. Based on the presented diversity of findings, wage pricing can be considered as a complicated multistage process that partially respects the value and market aspect of the problem. This is also supported by the opinion of the European Commission [30], which justify nominal wage growth in the post-crisis period by the complex effect of several factors - the rate of growth of gross wages and salaries in the country, the rate of unemployment and its change, the rate of inflation, the trend of productivity growth and the rate of real GDP growth per employed person. In the context of the foregoing, the diversity and abundance of factors identified can be described as causing differences in the impact of individual factors on wage size across sectors, over time, space and magnitude of impact.

2. Data and Methodology

In the analytical part of the study, the factors affecting the nominal wage were analyzed by sector. The aim was to find out the existence, nature and strength of the relationship between the sectoral nominal wage and the chosen factors of the wage. The selection of determining factors was subordinated to the objective of identifying objective reasons for nominal wage dynamics and labor market impacts. According to labor value theory, the nominal wage depends on the contribution of labor to the value of the product. That is, this contribution correlates positively with the amount of gross value added created by employees. The value of this contribution varies across sectors [30], it is influenced by the representation and productivity of other production factors. According to the System of National Accounts [31], this is illustrated by the data on gross fixed capital formation in the sector. Although gross fixed capital (GFC) is not a measure of total investment, as only the value of net additions to fixed assets is measured, it reduces the contribution of labor to the value of the product. The impact of the market mechanism on wage dynamics is explained by labor supply and demand. In order to take into account their size, the following factors are included in the set of independently variables: the registered number of employees, which quantifies the current use of labor and unemployment, which quantifies the current supply of free labor and also affects wage growth [32,33,34]. The result is a dependence of the size and changes in the nominal wage on the sector-specific influence of all these factors, which is expressed by the relationship:

$$w_i = (GVA_i, LP_i, E_i, GFC_i, GR_i, U)\} \qquad (1)$$

where: w_i – sectoral nominal wage, GVA_i – gross value added in the sector, LP_i - labor productivity in the sector, E_i - employment in the sector, GFC_i – gross fixed capital in the sector, GR_i - the growth rate of the sector, U_i - unemployment rate. The influence of the analyzed factors on the average wage is analyzed in two stages. In the first step, the correlation of the time series of the dependent variable and the selected independent variable is determined through a simple regression model (with different type of regression function). The dependent variable is the nominal wage of the employee in the sector, the independent variables are the individual factors mentioned above. Subsequently, for a group of factors for which the regression model proved to be significant, a multiple regression model between independent variables was used. The determinants of the nominal wage are estimated according to the versions of the following basic specification:

$$w_i = a_0 + a_1 \times LP_i + a_2 \times GVA_i + a_3 \times E_i + a_4 \times GFC_i + a_5 \times U_t + a_6 \times GR_i + e_i \qquad (2)$$

where: w_i – sectoral nominal wage, LP_i - labor productivity in the sector, GVA_i – gross value added in the sector, E_i - employment in the sector, GFC_i – gross fixed capital in the sector, U_i - unemployment rate, GR_i - the growth rate of the sector, a_i - regression coefficient, e_i- measurement error. The model thus specified expresses the assumption that changes in nominal wages are per partes the result of changes in labor productivity, value added and fixed capital formation and reflect inflation and real productivity growth. Based on this, we consider the set of considered independent variables to be sufficient to evaluate the causes of the change in wages. The explanatory power of the used regression models was verified by the coefficient of determination. The use of time series data in regression analysis makes it possible to quantify the degree of influence of independent variables on the change of the dependent variable. Data on gross earnings (including remuneration and compensation for overtime work), GVA, GFC, sectoral employment and unemployment for the period 2000-2019 were used to obtain time series of the dependent variable and the independent variables. In order to eliminate the impact of changes in the price level on the relationship between the dependent variable and the independent variables in the analyzes, data at constant prices are used. The classification criterion describing the sectoral structure was the valid classification of sectors according to the SK NACE nomenclature: A - Agriculture, B-E - Industry total, F - Construction, G-I - Trade, Transport, Storage, Accommodation, J - Information and Communication, K - Financial and Insurance Activities, L - Real Estate Activities, M-N - Scientific, Technical and Administrative Activities, O-Q - Public Administration, Education and Health, R-U - Arts, Entertainment and Other Activities. The identification of sectoral wage determinants was performed on the basis of publicly available data from the DATAcube and STATdat databases of Statistical Office of the Slovak Republic. In order to eliminate quarterly seasonality in employment and in the scope of economic activities, quarterly data were analyzed. The analyzes were processed in the MS-Excel and in the statistical program Gretl.

3. Results and Discussion

The analysis of data on the size and changes in gross nominal wages revealed significant sectoral differences in the entire period 2000 - 2019 (Figure 1). The significance of the differences is confirmed by the values of the coefficient of variation ($\bar{v}_w$=0.383). The reason for its high value in all monitored years is the highly above-

average nominal wage in the sections J ($\overline{w}_J$=1.76 $\overline{w}_{SK}$) and K ($\overline{w}_K$=1.78$\overline{w}_{SK}$) and at the same time the long-term below-average evaluation of employees in sections I ($\overline{w}_I$=0.59 $\overline{w}_{SK}$) and A ($\overline{w}_A$=0.75 $\overline{w}_{SK}$). Other sectors (except for sections F and R-U) showed less significant deviations of the sector wage from its median value. The trend of nominal wage development in the observed period has the character of growth in all monitored sectors. The largest absolute growth of wages in sections J and K is obvious. Given the high wage valuation in these sectors already in the year 2000, this statement does not correspond to the finding of the highest relative wage growth in sections of section B-E (193,32%).
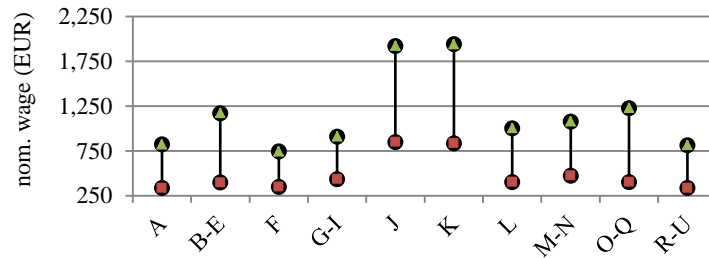

Figure 1: Changes in nominal wages in sectors in the period 2000 - 2019 (in EUR)

Sectoral differences in size and changes in nominal wages indicate its dependence on many factors. The diversity of published conclusions [4,6,7,12] confirmed not only the complex effect of several determinants of wages and its changes, but also differences in the structure of influencing factors and in the intensity of their impact on wage size. Daňová and his colleagues [5] identified the spatial diversity of wages caused by the location of the metropolis or significant economic settlement in the territory. The findings of the analysis also confirmed the impact of supply and demand on the labor market on the wage level and at the same time the weakened relationship between labor productivity and wages. For this purpose, the characteristics of time series of nominal wage and selected independent variables (determinants) were identified in the first step of the analyzes. Table 1 showed the variability of the determinants under consideration by sector.

Diversity is evident from monitoring the relationship between the main determinants of wages across sectors. Similarly, changes in the relationship between wage determinants are identified during the period under review. In the sector L, the values of the correlation coefficient identify the unequal development (growth) of GVA and labor productivity. In other sectors, the development of labor productivity practically copies the creation of GVA. The result is a negative correlation of trends in GVA and employment, evident in sectors with high labor productivity (B-E, G-I) as well as in low-productivity sectors in section A (Figure 2). This suggests that the sectoral wage has an objective basis in the value of the contribution of the labor force to the value of the final product and at the same time it is influenced by other factors. Both relationships can be characterized as sector-specific. An example is wage developments in low-wage sectors as a result of some form of wage policy, as well as a reduction in the contribution of the labor force to the value of the product as a result of innovation.

Table 1: Sectoral differences of the main determinants of wages

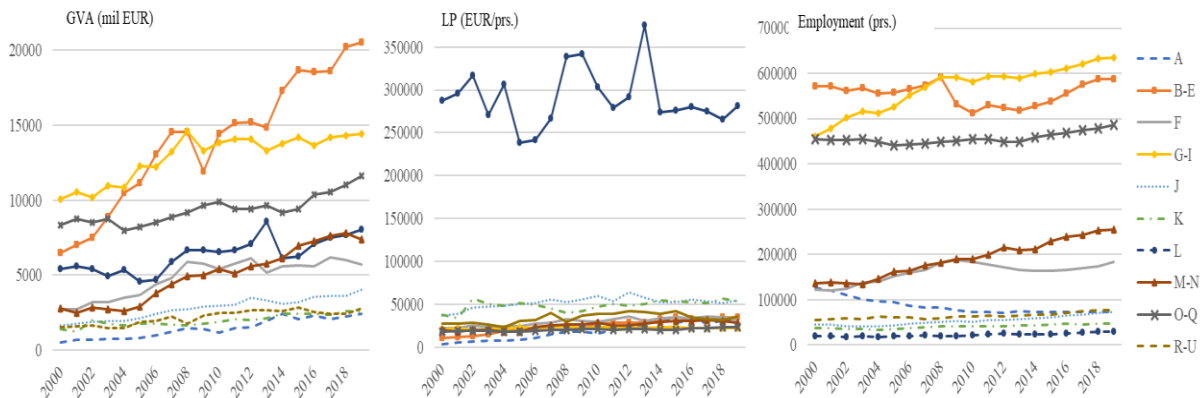| Indicator of development of determinant		Sector									
		A	B-E	F	G-I	J	K	L	M-N	O-Q	R-U
GVA (mil EUR)	aver	1451.1	13958.7	4865.6	12906.5	2802.1	1989.7	6347.0	4984.7	9371.5	487.7
Δ GVA (%)		9.9	6.7	4.3	2.0	4.0	2.2	3.1	5.3	1.7	7.1
LP (€/empl)	aver	18716.7	25206.4	29896.9	22679.5	52115.6	48954.3	290383.8	25338.0	20505.0	7498.1
Δ LP (%)		13.7	6.6	2.5	0.4	1.3	1.3	0.6	1.6	1.4	5.6
E (th.prs.)	aver	85.0	555.2	160.4	567.8	53,.2	40.5	21.9	190.4	456.4	63.9
Δ E (%)		-3.2	0.0	1.3	1.9	2.5	2.1	1.9	3.7	0.1	1.2
GFC (mil €)	aver	590.7	5675.4	331.7	2 803.0	831.5	277.7	2727.7	850.1	2296.4	226.4
Δ GFC (%)		15.1	4.8	14.8	3.0	6.8	2.1	2.2	14.8	5.0	12.9
UE (th.prs./%)	min	157.7/5.8									
	max	508.0/19.2									
Δ UE (%)	aver	13.27									

Figure 2: Sectoral variability in the development of gross value added, labor productivity and employment (2000-2019)

A reasonable expectation was the existence of a link between wages and gross value added and trends in its development. Expectations of a positive impact of GVA on sectoral wages were confirmed, with a significant positive impact of GVA on sectoral wages in all sectors. Its strength is quantified by the values of the regressor. From the interval of the detected values of the regressor (0.038 – 0.503) is evident the effect of factors influencing GVA production. The parallel observed trends in sectoral development in GVA creation showed significant year-on-year changes, which can be illustrated by the fact that the lowest value of the coefficient of variation was 74.93% (in the M-N sectors). As a result of the instability of developments in the sectors, there is no demand caused by the competitive increase in sectoral wages and the growth rate of the sector is not a significant factor that would affect the sector wage. After the decomposition of the GVA indicator, labor productivity and employment were identified as determinants of wages. Both cause wage changes. However,

their impact is different. Across all sectors, the labor productivity indicator still had a positive effect on wages. The nature of the relationship between employment and wages varied across the set. In the sectors A and B - E a negative correlation was found, in other sectors this relationship was directly proportional. Possible reasons for such a relationship are low wages and the seasonal nature of employment in sector A as well as changes in the structure of production resources caused by innovations and technological changes in B-E sectors. In this way, also studies of Magda and his colleagues [35] and [36] publish about this problem but on the example of European countries and OECD countries. Empirical findings of Magda and his colleagues [35] showed the existence of substantial differences in earnings across sectors in Eastern and Western European countries. Among high-wage sectors, we find the energy (coke, petroleum, gas, electricity and nuclear power), chemical, financial and computer industries. In contrast, it is in the traditional sectors (wood and cork industry, textile, clothing and leather industry, hotels and restaurants, and retailing) that wages are lowest. In the case of labor productivity, its greatest impact on wage changes was found in the R-U sectors. In other sectors, the relationship between labor productivity and nominal wages is quantified by regressor values in the range of 0.006 - 0.032, that signal the sectoral variability. It is caused on the one hand by objective assumptions of productivity across sectors, as well as by the weakening of the objective link between labor productivity and wages as a result of a socially oriented wage policy. This, in the case of sectors with wages at the level of minimum wages, is the cause of wage growth unrelated to changes in labor productivity. We found a phenomenon of variously strong relationship between productivity and wages is not unique. Similar findings in the context of the analysis of the impact of labor market policy on the profitability of agricultural enterprises is published in the studies of [37], Geeta and his colleagues [38,39]. The study of [9] confirmed that the higher labor productivity in manufacturing sectors has not been rewarded with higher salaries suggesting workers are underpaid. The firms where they work therefore have excess profits that can be used for investment or pay raises. Only the Timber and Metals divisions were found to not have wages and productivity cointegrated. The reason for the change in the relationship between labor productivity and wages, usually in sectors with high labor productivity, is technological growth driven by investment and innovation. This assumption is also indicated by the observed, across sectors, significantly different and time-varying GFC formation (Figure 3).
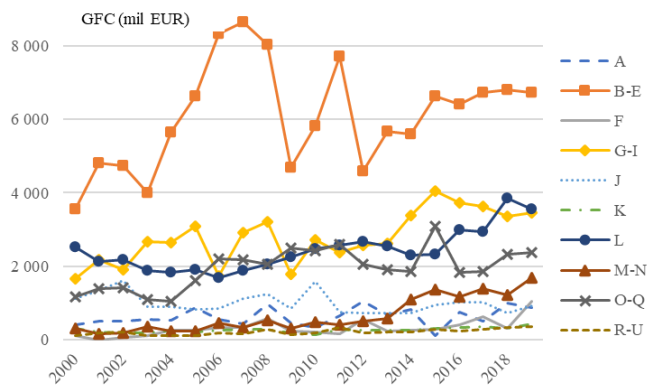

Figure 3: Sectoral variability in the development of gross fixed capital (2000-2019)

According to the results of the analysis, the differences in the impact of the GFC on sectoral wages are the effect of different GFC formation. In sectors with high resource intensity, a high share of capital resources, the value

of the contribution of labor to the value of the product is low. This was reflected in the high values of the regressor in the under-dimensioned industries A, J, M-N and R-U and at the same time in its low values in the more productive industries of sectors B-E (the contribution of the labor force to value added is reduced through investment and innovation). Reference [40] characterize this state as opportunistic to the traditional idea of the nature of the relationship between labor productivity and wages. However, they consider this to be the result of developments in the structure of resources used. Results of their research also indicate that wages in many sectors are also strongly influenced by institutional forces, such as worker formalization, labor unions, and minimum wage. Enforcement of a minimum wage-floor exhibited the largest impacts on sectors with high proportions of minimum wage employment. From the view of labor organization, in sectors with high levels of organization was exhibited a significantly positive association with wages. In contrast, in less-organized sectors were negatively associations with wages. Although the objective basis of wages is the value of the contribution of labor to the value of the product, it is not possible to abstract from the current market factors, such as availability or surplus of labor in labor markets and stability of development of the economic system. Already [41,32,42] cite the availability of labor as an important determinant of wage development. Similarly, Phillips [32] is of the opinion that the change in wages can be largely explained by the percentage of the unemployed labor force and its changes, and that he observes this relationship in the long run. Findings of [28] confirmed that the inflation rate, exportation, labor productivity and economic growth rate are the determinants of the labor supply. Indeed, the variables mentioned are closely associated with the wage variable that directly affects the labor supply. Because the people will make decisions on labor supply by considering the benefit that they gain at the end of working. Also, Reference [33] discussed wage dynamics and labor-market equilibrium. Equilibrium entails equality between the actual and expected rates of wage change. But at sufficiently small unemployment rates, equilibrium is impossible and under the adaptive expectations theory, an explosive hyperinflation will result. The absolute validity of these conclusions is the subject of discussion. E.g. Connolly [43], Reference [36], Mura and his colleagues [44], European Commission [45] found different strength of the relationship between the variables depending on the specific conditions of development of the assessed economies. This was also confirmed in this study. In all sectors, there is a very strong indirect correlation between wage and unemployment development ($r \leq -0.847$). According to the findings of the regression analysis, wages in the sections J and K react most elastically to changes in unemployment. The wages of sections A and F are the least elastic to unemployment. We associate this result with limited labor availability in sectors J and K and, on the other hand, with the seasonality of employment in sectors A and F. The differences between the sectors captured by the regression model did not prove to be significant. The presented analyses show that the selected factors, with the exception of the growth rate of the industry, i.e. gross value added, labor productivity, gross fixed capital formation and unemployment have a significant impact on sectoral wages. Each of these determinants appears to be partial, but the direction and strength of its impact on wages are different in each sector. Their common effect on wages, expressed by the regression model $w_i = a_0 + a_1 \times GVA_i + a_2 \times LP_i + a_3 \times E_i + a_4 \times GFC_i + a_5 \times UE + e_i$, was investigated by regression analysis procedures. The results of the analysis of their cumulative effect (shown in Table 2) partially correct the findings of the partial analyses.

Table 2: Influence of the selected set of factors on the average wage in sectors

	A	B-E	F	G-I	J	K	L	M-N	O-Q	R-U
$a_{GVA,i}$	-0.5538	0.1133	0.0347	0.1716	0.1081	-0.3029	-0.3945	-0.2351	0.0390	-0.6293
$a_{LP,i}$	0.0454	-0.0313	0.0056	-0.0805	0.0094	0.0245	0.0097	0.0562	0.0243	0.0412
$a_{E,i}$	0.0003	-0.0028	-0.0008	-0.0019	0.0163	0.0542	0.1319	0.0078	0.0015	0.0229
$a_{GFC,i}$	0.0552	-0.0747	0.0363	-0.0024	-0.1097	0.5368	-0.0465	0.0219	0.0253	0.2643
$a_{UE,i}$	-0.0005	-0.0007	-0.0002	-0.0002	0.0003	-0.0005	-0.0003	-0.0001	-0.0001	-0.0004
R^2	> 0.95									

It is clear that the concomitant action of determinants is a source of negation of the positive action of partial factors, e.g. in sectors B-E, F, G-I, where growing employment in the sector works against positive impact of rising labor productivity on wages. An alternative to this phenomenon is the simultaneous positive (e.g. concurrently positive impact of GVA, labor productivity and employment in sectors J, O-Q) or negative (e.g. the nature of the impact of labor productivity and sectoral employment in B-E, G-I) influence on the wage developments (Figure 4). The diversity of mutual relations and the resulting nature of influencing the wage development formulate the possibility of identifying the mechanism of their influence on wages and on the basis of the similarity of features to create:

- groups of sectors with the same mechanism, direction and degree of influence of independent variables on wage developments
- groups of factors whose effect on wage developments has the same direction of influence.
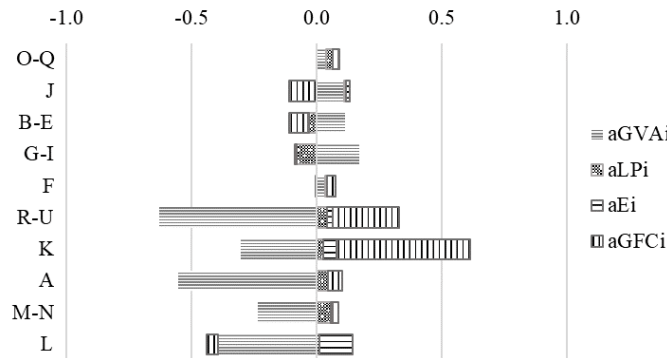

Figure 4: Sectoral diversity in the direction and extent of the impact of a set of determinants on wages

Across the whole set of sectors, a different effect of the pair of factors of labor productivity and employment is evident, against the background of the different influence of the factor of GFC formation (Figure 3). Such a view makes it possible to define specific groups of sectors:

- sectors O-Q, in which any positive change in the determinancing factors causes wage growth,
- sectors A, K, M-N and R-U, in which wage growth has a positive effect on the growth of labor productivity, employment and fixed capital formation. In this group, the formation of GFC appears to

be an important determinant of wage growth (the values of the aGFC regressor are high in comparison with its values in other sectors and in comparison with the quantified influence of other determinants),

- sectors B-E and G-I, where both the growth of E, but also the growth of LP has a negative impact on the development of wages.

Such a definition of sectors enables the practical implementation of findings into economic policy through labor market policy and through a set of tools motivating the economic activity of entities.

4. Conclusion

The aim was to find out the existence, nature and strength of the relationship between the sectoral nominal wage and the chosen factors of the wage Slovak households in the period 2000-2019. The analysis was performed in two steps. In the first step, we partially analyze and present the relationship between wages and a set of independent variables. In the second part, we estimate the coefficients that quantify the relationship between the nominal wage and a set of independent variables, for which the first part proved the connection with the size and changes in the nominal wage. The performed analysis revealed a significant impact of labor productivity, gross value added, employment, gross fixed capital and unemployment rate. The impact of growth of sector has not been shown to be a significant factor in wage changes in any of the sectors. There are demonstrable differences between sectors in the size and nature of the impact of these determinants:

- in the sectors of public administration, any positive change in the determining factors causes wage growth,
- in below-average capital and wage sectors with relatively low labor productivity, wage growth is positively influenced by growth in labor productivity, employment and fixed capital formation (only in this group, gross fixed capital formation appears to be an important determinant of wage growth),
- in technology intensive sectors B-E and in services (G-I sectors) both growth of employment and growth of labor productivity have a negative impact on the development of wages.

Despite the identified sectoral specifics, the decisive influence of two determinants can be observed across the whole set of sectors. In addition to the stated different impact of labor productivity across the whole set of sectors, the expected positive impact of unemployment was confirmed. The third, empirically observed determinant is the trends of economic growth, which we consider to limit the general validity of the conclusions of the analyses. It follows that none of the analyzed determinants can be classified as a generally positive factor effecting the value of wages in all sectors. However, knowledge of the nature and significance of their impact identifies groups of sectors to which the same instruments of national economic policy can be applied. We consider this to be important especially in the context of the empirical observations of the development of wage disparities characterized by the absolute and relative lagging of below-average wage sectors behind the national average and also in the context of the interests of the state arising from its social function.

5. Recommendations

This analysis was an examination of the usability of one or a group of macroeconomic indicators in forecasting the wage development in key sectors of the economic system. Although the analysis performed did not reveal such a generally applicable indicator, they yielded interesting findings. First of all, they revealed the difference in the sectoral impact of the assessed indicators depending on the trends of economic development in the whole economic system. Second, they revealed a difference in the relationship depending on whether they are low-capital service industries or manufacturing, usually technology-intensive industries. In the context of both findings, there is a need to carry out similar examinations in parallel in times of economic recession and expansion and to analyze how long the effects of economic development on wage developments persist. The limitation of the general validity of the conclusions is its implementation on the data of a specific economic system, characterized by specific parameters. In future research, therefore, we should aim to monitor the influence of national specifics on the strength and nature of the identified relationships. Comparisons across several economic systems will make it possible to reveal national specifics.

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