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Selected micro- and macroeconomic conditions of wages, income and labor productivity in Poland and other European Union countries

Dariusz Fatula[1]

ABSTRACT

The aim of the article is to identify and compare key factors affecting the level of labor productivity, wages, and income in the economies of the EU countries. Among different determinants, the following were considered: overall price level; compensation of employees; participation of the self-employed and their mixed income in GDP; annual hours worked per employer; labor participation rate, particularly before retirement (age 55-64); part-time employment rate, and the contribution of investments.

Eurostat data and that of the OECD and the World Bank were used for calculations. The indicators of correlation and a grouping method were also applied. Four groups of countries with a similar level and impact of specific factors were distinguished.

The most important conclusion coming from the research is the strong correlation of the relative price level, remunerations and the average worked hours with the labor productivity. Their influence differs slightly in case of the work efficiency figure per employee and the work efficiency figure per one hour worked. Other variables such as the proportion of professionally active people, especially those at the age of preretirement (55-64 yrs. old); the high proportion of part-time workers or the level of capital expenditure have a lesser but relatively strong correlation with the labor productivity of both the employee and the worked hour.

Conclusions from the analysis may support the state policy in terms of forming minimum wages and indirect taxation influencing the overall price level and the level of investment in the economy. Such conclusions were formed as recommendations for countries with the lowest levels of work efficiency, remunerations and income. Restrictions to the application of this advice are political conditions, the employment structure in a given country and labor market elasticity.

KEY WORDS: labor productivity, the level of prices, wages

JEL Classification: D24, E24, F66

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Introduction

Increasing labor productivity is considered an important factor that affects the *economic growth* of a developing country. The definition of labor productivity as the relationship of the value of produced products to working time or the number of employees refers to the level of prices of products in the economy. In turn, the overall level of prices affect the level of wages in the economy, which again determines the productivity of labor. Excluding the impact of the costs of transport, taxes, incomplete exchange rate pass-through and pricing-to-market practices, the prices of tradable products should be equal everywhere in a common currency (The theory of the law of one price - LOOP). Prices of non-tradable goods and services should increase in poorer countries as the productivity of their tradable sector increases relative to richer countries (Harrod-Balassa-Samuelson theory - HBS). The level of prices is determined by the demand for goods and services resulting from household income and demand from abroad.

In every country, there are many different types of income and remuneration, which are a part of the overall income and may contain various components. The segment of households comprises a few subsectors, which also cause some difficulties. This variety impedes international comparisons despite attempts at harmonization in international statistics. Micro- and macroeconomic data collection is based on various methods. Microeconomic research studies are based mainly on polling or periodically keeping a record of income and expenses of households subjected to the research. Macroeconomic data result from aggregating financial cash flow and estimates of some rates in complementing or comparing them to categories obtained due to statements of business entities and public institutions. The analysis of some categories made only at the micro- and macroeconomic level may not give a full picture of the situation or indicate essential causes of a given phenomenon or its changes. Being a part of households' income, remunerations generally depend on the level of the economic growth of a given economy. The most often mentioned rate is GDP per person nominally or according to the parity of purchasing power. Price level and an exchange rate have a considerable impact on both categories. Demand and supply for the work and its performance are other essential factors. A process of decreasing the share of labor costs in GDP in most countries in the world is known and widely depicted in the literature (Harrison, 2005). As the main cause, researchers note higher growth in capital productivity rather than labor productivity (Gomme & Ruper, 2004), capital intensity of production (Bentolila, Saint-Paul, 2003), or differences in the overall price level (Pellényi, 2007).

The aim of the article is to identify and compare the key factors affecting the level of labor productivity, wages, and income in the economies of the EU countries. The methods used are the analysis of values and correlations between described indicators in the EU countries; a grouping method (Cluster analysis – Manhattan distance, Ward's method) was also applied.

Overview

Labor productivity is usually measured per worker or per hour worked (Ahmad et al., 2003; Jantoń-Drozdowska & Majewska, 2015; Kozioł, 2007; Zielińska-Głębocka, 2004; Zienkowski, 2000). Due to the differences in the overall price level in each country, the measurement of productivity for international comparisons should take into account purchasing parity power theory (Čihák & Holub, 2003). Lower prices give higher purchasing power in a country where currency exchange is underestimated due to various macroeconomic and political factors (Allington, Kattuman, & Waldmann, 2005; Égert, Halpern, & MacDonald, 2006; Engel & Rogers, 2004; Goldberg & Verboven 2004; Lutz, 2004). A strong relationship between the price level and the economic level in EU-25 countries is discussed in Spevacek, Vintrova, and Zdarek (2006, p. 15).

The alignment of wages and salaries in countries where the price level is different may be the result of workers' migration. The openness of both borders and labor markets for workers from other countries seems to be insufficient to close the gap, which is mainly caused by language barriers, minimum pay regulations and differences in the unemployment level. The level of wages and salaries in European countries is still far from being aligned despite the relatively large migration connected with the job search and leveling quality of products and services. The conditions then seem to lead to a sort of vicious circle, namely, the level of wages and salaries is dependent on productivity, which in

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countries with a lower development level without any external impulses increases slowly due to the low prices of products and services. Low productivity does not allow for raising the level of pay and prices on which the productivity itself largely depends. Entrepreneurs have a problem with the proper evaluation of the contribution of human capital to their company's results. People usually perceive revenues, costs, and profits or losses in the context of other values (Kahneman & Tversky, 1979; 2000). The role of remuneration in calculating human capital is discussed in Dobija (2003). The new impulse in the form of, e.g., minimum pay increase or a large decline in unemployment can trigger a process that in turn influences a quicker increase in mutually connected factors such as wages and salaries and the level of productivity. The alignment of pay in the economies of different currencies is presented by a model of (Harrod)-Balass-Samuelson. Simply put, this model shows that in economies with lower levels of development, a higher inflation and/or appreciation of the foreign exchange rate can occur alongside the increase of the labor productivity. The appearance of the effects stifles adaptive mechanisms, according to the model of Balass-Samuelson, which was examined by Konopczak (2013). However, general conclusions are not unambiguous, as 'the results achieved do not show a full mechanism of transmission in the model of Balass-Samuelson' (p.50) and 'the results of panel tests relating to cointegration compatibly present the existence of a long-term relation among relative prices, productivity, wages and salaries and margins…' In different economies, the absorption of Balass-Samuelson's effect may depend on the mobility of the workforce between sectors and employers' reluctance toward pay rises as a consequence of unemployment despite work efficiency and exchange rate policy realized by the Central Bank. Moreover, tradable commodities largely comprise the effect of labor costs not only in manufacturing the goods but also in transport service and retail and wholesale margins. G. Pellenyi's (2007, p. 11) extensive research conducted within the period of 10 years for 34 groups of products in 29 European countries shows that the process of convergence of prices and labor productivity in the EU, according to the model of Balass-Samuelson, should last several dozen years and even over a hundred years for some countries. Some other factors are responsible for the change in the price level. They are a structure of demand, adjustment of export prices to local markets, and the increase of prices regulated by the state (e.g., the subsidy to maintain and run households). One of the most crucial elements with an influence on prices and under the control of the state in European countries is the level of minimum wages and salaries. This has an impact on the price level of basically all products in a given country by the mechanism of costs in enterprises. The analysis of correlation shows that the labor productivity both per hour and per employee in relative units in euros in the studied countries (table 3) is the most correlated with various relative ratios of the price level in a country (from 0.92 for a general level of individual price consumption to ca. 0.97 for prices of services), GDP per capita (ca. 0.92) and GDP per capita according to purchasing power parity (ca. 0.86). Labor productivity per employee was negatively correlated with the geometric mean of investment expenditure to GDP (ca. -0.23)[1] in 1990-2015. The negative correlation was the consequence of the low level of productivity from which the Eastern European countries that joined the EU had started. They had to incur higher investment expenditures than Western European countries just to narrow the gap between each other in development. The negative correlation between the productivity level and the level of investment expenditure has been gradually vanishing, although it is positive individually and statistically essential for countries that joined the EU before 2004 (it is close to zero and not statistically important) and for countries that joined the EU after 2004 and later (ca. 0.35). A relatively high ratio of correlation between the productivity level and the price level in both groups of the countries has not vanished and equals approximately 0.54 for countries that joined the EU before 2004 and approximately 0.73 for countries that did so in 2004 and later. Investment expenditures influence the increase in the productivity to a certain extent However, after that point, the productivity depends more on other factors, e.g., the price level.

The high correlation ratio (0.95) between the price level and GDP per capita according to the purchasing power parity in 2004 for 25 EU countries was found by Spevacek et al. (2005). All correlations of price level with different ratios of GDP, income and labor efficiency show that a price can be considered here as an inde-

pendent variable forming other ratios for both the micro- and macroeconomic data. Naveeda and Ahmad's (2016) research is another confirmation of the importance of the price level for the convergence of labor productivity. The level of convergence for 19 countries including 259 regions was much higher (from 8% to 12% annually) for regions than for countries (ca. 1.5%) after the introduction of structural changes in 1991-2009. A better integration of regions within a given country rather than several countries can be accounted for by fewer differences in price, wage and salary levels between regions of a given country than between countries, particularly in Eastern and Western Europe.

Data and methodology

Household income may come from various sources. The main source of the income in most countries is the remuneration coming from the paid employment and then, sequentially, remuneration gained from the self-employment, social benefits, individual farming, and other income such as donations or capital profits. All the sources depend on the type of the household. Comparing all types of households according to different criteria would take too much space and due to its extensiveness, would obscure the general idea here of making comparisons. There is a total category for households in both domestic data and international statistics.

In that category, the annual income of a Polish household equaled € 6393 in 2015, which amounts to only 35% (from € 18474) of the average income for the entire EU with a total of 28 countries (table 1). The same income calculated according to the purchasing power parity for Poland equaled €11450, which is almost 62% of the average income in the EU with 28 countries[2]. Such a big change results from the low price level in Poland of approximately 52% of that of the entire EU (prices calculated for individual consumption).

Households in Norway, Switzerland, Luxembourg, Denmark, Sweden and Finland have the highest income. Households in Romania, Bulgaria, Hungary, Croatia and Poland (fourth to last place) have the lowest income. Taking into consideration the price level (including the purchasing power parity), Austria, France and Germany can also be added to the countries representing the highest income and Latvia, Greece, Lithuania and Slovakia to those of the lowest. Poland takes the eighth to last place. The order of the countries that have the lowest income largely coincide with the price level – the lowest level, starting from last place, is in Bulgaria, Romania, Poland, Hungary, Lithuania, the Czech Republic, Croatia, Slovenia and Latvia, whereas the highest is in Switzerland, Norway, Denmark, Luxembourg, Great Britain and Sweden. The price level correlation with the income in euro equals 0.96 and with the income according to the purchasing power parity, 0.91.

Disposable income includes all revenue gained by households (arising from remunerations, running one's own business, farming, and social benefits) after collectible taxes and premiums are deducted. Remunerations include only the part that an employee is given and from which all taxes and premiums are paid. Profit gained from one's own business (micro company) due to home regulations cannot be of the form of wage or salary and is termed mixed income. Apart from the remunerations, the total labor costs include liabilities arising from social benefits that must be paid by an employer directly to the state or to an appropriate institution. It is the total cost that the employer must incur for hiring employees. These categories in relationship to the GDP rate are shown in table 2.

The contribution of Polish households' disposable income to GDP is relatively high (86%). The revenue in the form of remunerations, profits from business activities and shares in capital go largely to households. Equality of the income distribution is indicated by i.s. Gini Index. Its value is between 0 and 1, whereas the lower value shows more equal income distribution. For Poland, it was approximately 0.31 in 2015, which amounts to the average for the entire EU and is lower than for Bulgaria, Romania, Lithuania (ca. 0.37), Great Britain, and Italy (ca. 0.32); it is similar to the one for Germany and higher than for Finland, Sweden and the Czech Republic (ca. 0.25).

The high level of contribution of disposable income may indicate a slight tendency to invest. Profits that go to households are intended for consumption instead of being reinvested. Households' savings ratio in Poland (Fatuła, 2013) in proportion to the income is one of the lowest in the EU and is equal to nearly 2%, against the European average ca.10%.

The contribution of wages and salaries to GDP (31.5%) in Poland, even with employers' contribu-

Table 1. Categories of the annual income in euros according to the purchasing power parity (EU28=1) of the household in the total category.

Country	In euro	In percentage euro average UE28=100%	In euro according to purchasing power parity (PPP)	In percentage euro according to PPP average UE28=100	Price level for individual consumption UE28=100%
European Union (28 countries)	18 479	100%	18 479	100%	100%
Austria	25 958	140%	24 310	132%	109%
Belgium	23 674	128%	21 779	118%	109%
Bulgaria	4 093	22%	8 454	46%	42%
Croatia	6 087	33%	9 212	50%	62%
Cyprus	16 944	92%	18 812	102%	88%
Czech Republic	8 345	45%	13 100	71%	59%
Denmark	31 518	171%	22 651	123%	137%
Estonia	9 480	51%	12 536	68%	71%
Finland	26 240	142%	21 455	116%	121%
France	24 998	135%	23 212	126%	105%
Greece	8 691	47%	10 173	55%	80%
Spain	15 408	83%	16 691	90%	91%
The Netherlands	23 513	127%	21 410	116%	112%
Ireland	22 936	124%	18 838	102%	125%
Iceland	25 796	140%	21 857	118%	129%
Lithuania	6 564	36%	10 455	57%	58%
Luxembourg	39 707	215%	32 969	178%	135%
Latvia	6 986	38%	9 698	52%	65%
Malta	15 170	82%	18 754	101%	81%
Germany	23 476	127%	23 132	125%	100%
Norway	44 517	241%	30 395	164%	148%
Poland	**6 393**	**35%**	**11 450**	**62%**	**52%**
Portugal	9 996	54%	12 226	66%	79%
Romania	2 675	14%	5 035	27%	47%
Slovakia	7 293	39%	10 755	58%	62%
Slovenia	13 211	71%	16 180	88%	79%
Switzerland	44 506	241%	30 024	162%	171%
Sweden	28 486	154%	22 686	123%	131%
Hungary	5 171	28%	8 987	49%	53%
Great Britain	24 936	135%	19 867	108%	132%
Italy	17 890	97%	17 380	94%	100%

Source: Adapted from "Mean and median income by household type - EU-SILC survey" by Eurostat (2017a). Retrieved from http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_di04&lang=en

Table 2. The contribution of the disposable income, wages and salaries, compensation of employees and the mixed income in GDP in 2015.

Country	Contribution of disposable income to GDP	Contribution of wages and salaries to GDP	Contribution of compensation of employees to GDP[3]	Contribution of mixed income to GDP
European Union (28 countries)	82.4%	37.7%	47.4%	8.8%
Austria	80.1%	39.6%	48.1%	7.2%
Belgium	80.3%	36.4%	50.5%	6.5%
Bulgaria	87.2%	34.7%	40.8%	10.3%
Croatia	84.1%	b.d.	b.d.	4.3%
Cyprus	81.0%	35.4%	44.1%	-
Czech Republic	70.6%	30.3%	39.9%	10.4%
Denmark	84.5%	48.8%	52.9%	8.0%
Estonia	83.0%	35.7%	48.0%	6.6%
Finland	80.4%	39.7%	49.0%	4.9%
France	80.7%	38.0%	52.1%	5.5%
Greece	81.3%	25.2%	33.5%	22.2%
Spain	81.1%	38.6%	49.0%	8.2%
Ireland	68.3%	28.2%	30.6%	4.2%
Iceland	81.9%	-	-	1.9%
Lithuania	88.5%	32.3%	41.3%	6.4%
Luxembourg	b.d.	40.8%	47.7%	3.9%
Latvia	76.7%	37.1%	43.4%	10.0%
Malta	16.8%	40.0%	43.9%	6.3%
Germany	83.0%	41.5%	50.7%	8.3%
Norway	86.8%	38.7%	47.9%	1.0%
Poland	**86.0%**	**31.5%**	**36.6%**	**20.9%**
Portugal	82.6%	33.6%	43.2%	10.9%
Romania	81.6%	27.2%	32.3%	15.2%
Slovakia	74.6%	29.5%	38.4%	18.8%
Slovenia	78.2%	42.0%	49.0%	9.5%
Switzerland	78.5%	50.5%	59.7%	11.1%
Sweden	83.4%	39.4%	47.4%	2.9%
Hungary	77.8%	34.1%	42.3%	7.9%
Great Britain	84.2%	41.2%	49.7%	6.6%
Italy	80.7%	29.1%	39.8%	15.8%

Source: Adapted from "GDP and main components (output, expenditure and income)" by Eurostat (2017b). Retrieved from http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_gdp&lang=en

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tions (36.6%), are also one of the lowest in the EU. The level of wages and salaries in GDP is approximately ten percentage points lower than in Germany and France, and when including employers' contributions, approximately a dozen percentage points lower. There are larger differences in terms of Scandinavia, particularly in Denmark, which has the largest contribution of the rates in GDP. Since 1993, a decreasing contribution of compensation for employees has been observed in the GDP of countries of both high and low levels of development. In the latter, the trend has even accelerated (Harison, 2002). Different reasons are mentioned, e.g., higher capital productivity than labor and globalization and the financialization of economies (Bentolila & Saint-Paul, 2003; Gollin, 2002; Guscina, 2006).

The decrease of the contribution of the labor costs to GDP in Poland occurred despite a fast increase in labor productivity. From 2001 to 2015, the average annual growth of labor productivity equaled ca. 3% and was the second highest in the EU just after Slovakia; the average growth of wages and salaries equaled 2.4%, and the increase of the total employment costs for employers was only near 1%. A partial explanation of these differences is the large contribution of mixed income to GDP. Mixed income is profit from self-employment activity that cannot be divided into or declared as formal wages and salaries in contrast to employees hired under employment contracts.

Table 2 shows that the contribution of mixed income to GDP equals almost 21% in Poland. The rate coincides with the contribution of the self-employed among all people who work. The highest rate of contribution of the self-employed in the EU among all people who work is in Greece, and that amounts to 33%. The income of the group in the Greek GDP is relatively lower and still equals ca. 22%.

Among all people who work, high rates of the self-employed are found in Romania (28%, and the income contribution of the group to GDP equals ca. 15%) and Bulgaria (27%, and the income contribution of the group to GDP equals ca. 10%). The lowest contribution of the self-employed is in Scandinavia: Sweden (5%, and the income contribution of the group to GDP equals ca. 3%), Norway (6%, and the income contribution of the group to GDP equals ca. 1%), and Denmark (7%, and the income contribution of the group to GDP equals ca. 8%). In Germany, the rates equal 10% and 8% for the rate of self-employment and the contribution to the GDP, respectively. A proportion of the self-employed among all people who work cannot be compared directly with their income contribution to GDP. More important is the type and range of the economic activity and the method and the amount of the paid taxes. However, if only the two rates were compared, it would be seen that self-employed Poles work effectively, generating relatively higher income than the Greeks, Bulgarians, Romanians and even Swedish people or Norwegians but similar to the Germans or Danish.

The high contribution of being self-employed may be considered as both an advantage and a disadvantage for the economy. The smallest enterprises are a real advantage, as they are flexible in terms of adaptability to the market's needs, innovativeness and employment. The high level of self-employment may sometimes be the result of pressing necessity. However, a high level of unemployment, employers' pressure to convert employment into contract limited in time or pressure on employees to do work as self-employed do not have to be conducive to the abovementioned companies' advantages. The connection of a self-employed person to only one trading partner (a previous employer); the lack of capital to develop a company; and low profits, which may be the income of a person who runs the microcompany, can instead be symptoms of a poorly functioning labor market. It should be noted that the highest level of self-employment within the EU countries is in Greece, which struggles with budgetary issues and high unemployment. The lowest level of self-employment is characteristic of wealthy Scandinavia, where wages and salaries are high, unemployment is relatively low, and social benefits are generous. There is no pressure then to set up a company if the labor market or unemployment benefits guarantee a high level of life.

High rates of return from the invested capital in companies in Poland show the possibility of increasing a very low contribution of wages and salaries to GDP. In 2015, the return rate for non-financial enterprises in Poland was equal to 31% and was, after Malta and Slovakia, the third highest in the EU. Enterprises in most developed countries of the EU gained much lower (several percent) return rates from the invested capital. High return rates from the invested capital that do not

translate into high levels of investment in enterprises show investors' and policymakers' concerns related to companies' development possibilities. The increase in wages' and salaries' contribution may encourage investments by the mechanism of the increased demand, which will be generated by employees channeling pay rises for the increase in consumption.

Results

Labor productivity per employee in Poland in 2015 in proportion to the European average (EU28=100) was slightly above 74% and was higher than the income per person according to the purchasing power parity. At the same time, the productivity per worked hour according to the purchasing power parity in proportion to the European average was lower than the income and equaled slightly over 59% (table 3). A conclusion that can be drawn here seems to be far too simple. Employees work for too many hours, which lowers the productivity per hour. The number of worked hours confirms the statement. Poland has one of the highest rates of worked hours per worker annually, which equals 1963 hrs. Only the Greeks work more: 2042 hrs. A statistical German worker works the least (1371 hrs.), a Dutch worker works 1419 hrs., a Norwegian worker 1424 hrs., and a Danish one 1457 hrs.. A correlation of the number of worked hours per worker annually for the countries presented in table 3 with the relative labor productivity per employee is -0.615 and per worked hour is -0.761. The number of worked hours in a week and the labor productivity (Goschin, Danciu, (2007, p. 812) received a negative correlation of -0.58 in different regions of individual EU countries. The seemingly simple explanation showing that longer working hours are ineffective should be corrected by a remark that in countries with a shorter number of worked hours, prices are higher (higher production value presented further on) and a larger proportion of people work part-time, which has an influence on lowering the average number of hours. In Poland, there are only ca. 7% part-time workers, whereas in Germany, almost 29%; in Denmark, there are 25% and in Norway, 24%. Similar conclusions were drawn by Spevacek et al. (2005, p. 18).

Another issue is the proportion of people working in specific age groups. In Poland, for example, only 68% people at the age of 15-64 are professionally active. In Germany, Denmark and Norway, it is 10%p higher, and in Sweden it is 82%. The situation is much worse at the age group of 55-64. In Poland, professional activity in that age group is 46%, in Sweden 75%, and in Norway over 72%, whereas in Germany and Denmark, it is 68%. In France, quite a low proportion of people at this age work – only 49%. Many factors are responsible for such big differences in professional activity, e.g., the possibility of finding a proper job, which is connected with the level of unemployment, the government's support in case of the necessity of retraining, conditions of the labor market and a pension system. An example is Sweden, where people can retire at the age of 61, but every extra year of work increases their potential pension by approximately 9%, which motivates people to be professionally active.

A low proportion of people working in Poland in groups of older workers increases productivity per employee at the expense of the productivity per hour. Less people work, but those who do work longer than the European average. This has its social consequences. Employed people who work more become tired and have less time for families or to rest or for social activity. However, professionally inactive people cannot take advantage of many products or services simply due to the low level or lack of income (e.g., modern financial and/or multimedia services). Moreover, they do not participate in social development and become frustrated; thus, they may develop problems related to returning to the labor market and consequently cause further social problems.

The value of the general productivity rate is closely connected with the level of wages and salaries, price levels of products, innovativeness, and quality of services. The quickest increase in productivity occurs in countries where the value of this rate is relatively low. For example, in 2010-2015, the highest productivity growth per worker occurred in Romania 20.4%p (percentage point), Latvia 13.3%p, Lithuania 12%p, Poland 12%p, and Ireland 29.5%p (such a record resulted from transferring companies form different countries to Ireland due to the lowering of taxes).

Productivity growth, among others, resulted from strengthening or already stable currencies (Baltic States), a price increase, growth of exports, an inflow of investments improving work equipment, and the enhancement of innovativeness (Poland and Romania).

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Table 3. Labor productivity rates (based on the purchasing power parity), the number of worked hours per employee in 2015, and fixed capital formation in GDP in 1990-2015

Country	Productivity per worked hour EU28=100	Productivity per employee unit EU28=100	Annual average of worked hours per employee	Geometric mean of gross fixe capital formation as percentage of GDP (1990-2015)
European Union (28 countries)	100	100	1715	-
Austria	117.1	115.5	1625	24.2
Belgium	135.0	128.6	1541	22.2
Bulgaria	44.0	44.5	1831	18.6
Croatia	61.1	68.7	1830	-
Cyprus	77.5	85.3	1795	20.8
Czech Republic	73.6	79.4	1779	28.2
Denmark	125.9	112.6	1457	20.2
Estonia	61.3	69.7	1852	28.4
Finland	106.3	107.0	1646	22.2
France	127.0	114.4	1482	21.5
Greece	68.3	85.3	2042	20.2
Spain	98.2	102.7	1691	24.2
The Netherlands	126.7	110.7	1419	21.2
Ireland	169.1	180.8	1820	21.4
Lithuania	63.2	72.2	1860	21.1
Luxembourg	179.5	167.0	1507	20.8
Latvia	54.8	64.3	1903	24.1
Malta	73.2	87.8	1766	21.4
Germany	126.8	106.6	1371	21.4
Norway	157.4	137.4	1424	21.7
Poland	**59.2**	**74.4**	**1963**	**19.8**
Portugal	68.5	78.7	1868	22.3
Romania	52.9	59.0	1840	22.9
Slovakia	76.9	82.8	1754	27.1
Slovenia	78.4	81.2	1676	24.2
Switzerland	124.3	121.3	1590	18.0
Sweden	114.4	113.2	1612	22.2
Hungary	65.0	69.8	1749	22.7
Great Britain	100.8	102.6	1676	17.5
Italy	100.6	106.5	1725	19.8

Source: Adapted from "GDP and main components (output, expenditure and income)" by Eurostat (2017b). Retrieved from http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_gdp&lang=en;
"Average annual hours actually worked per worker" by OECD (2017). Retrieved from http://stats.oecd.org/Index.aspx?DataSetCode=ANHRS; "Gross fixed capital formation (% of GDP)" by The World Bank (2017). Retrieved from http://data.worldbank.org/indicator/NE.GDI.FTOT.ZS?end=2015&locations=EU-AT-PL-DE&name_desc=true&start=2015&view=bar

Domestic currency tends to devaluate in relation to currencies of other countries that have a lower level of inflation. The process rarely occurs alone and without any other factors. Owing to the capital inflow, improvement in security (e.g., joining NATO and the EU) and the growth in exports, Polish PLN strengthened relative to the euro and US $ in 1999-2008 by over 50% despite the inflation, which equaled 45% in Poland at that time. Inflation in the euro zone was equal to ca. 20% during those 10 years. In the USA, it was slightly over 30%. Zloty appreciation occurred against the higher inflation in Poland and contributed to the income growth in Polish households relative to other European countries and the USA. Moreover, the real increase in income in the domestic currency occurred (the income was rising faster than inflation) in the period mentioned above.

The greatest differences in the labor productivity in European countries are noticed in services provided on the spot and for which prices are difficult to be aligned in the countries. These services are not a subject of foreign trade (non-tradable), and their influence on the price level is seen best in border areas of countries that have various price levels. For example, a simple haircut for a man in Poland costs approximately PLN 25 (around €5). In Germany, it costs approximately €25 (approximately PLN110), and in Denmark, it is approximately 350 Danish krone (approximately PLN 200, which is ca. €35). Many hairdressing salons in Poland, Germany and Denmark are similarly equipped in terms of technology (capital equipment), and experience, skills and other employee features do not differ much in the view of surveyed clients. The productivity of a Danish hairdresser will be then 7-8 times greater[4] than the Polish one's irrespective of colloquially understood labor input and the quality of it. Taking into account PPP, it is still above 4 times.

The alignment of Dane and Polish hairdressers' productivity is practically impossible only by better equipment of salons, organization, qualifications or work commitment. The factors can, at best, enhance the productivity of the Polish hairdresser by 10%, maybe 20% but not 4 to 8 times. The key here is the relative price level of hairdressing services connected with wages and salaries and the foreign exchange rate. Both the price level and salaries as well as, consequently, the income level are closely connected. Many factors have an influence in forming them in the domestic economy, e.g., innovativeness and the level of goods' processing, the quality of services, and the contribution of export and import to GDP. The level of wages and salaries depends largely on the demand and supply of work. In the case of considerable unemployment (determined by a baby boom affecting the labor market and a decline in exports due to an economic slump in other countries), there is no market pressure to increase pay in spite of profits gained by companies.

Legal regulations concerning salaries, mostly minimum pay, can be the sole external factor in relation to the market (Aaronson, Agarwal, & French, 2012). Its rise entails a pay rise in the entire economy; however, it can result in the negative occurrence of a decline in companies' competitiveness or even in their bankruptcy, tax evasion (Ruzik, 2007), hiring people without a contract or under fictitious conditions (e.g., people are employed under a part-time contract and obtain adequate salary for it, whereas the conducted work is full-time, which means that a part of the cash is not declared but paid under the table, etc.).

The remuneration level, which is the most essential element of the household's income, depends on many factors. They are as follows: labor productivity and labor costs, different situations in the labor market (unemployment connected with the work demand and its supply), price level, the level of occupational activity in age groups that are able to work, and the state's policy regarding taxes, social transfers, supporting occupational activity, innovativeness (Zienkowski, 2000). All the factors are connected with each other, and their total and coordinated change is practically impossible, i.e., due to political reasons. Taking into account the abovementioned factors considered within the countries, four main groups can be distinguished. The Ward method was used, as it uses the analysis of variance, as was the Manhattan distance, which suppresses the influence of large single differences (Statistica 12).

The first group concerns countries with the lowest income according to purchasing power parity, labor productivity per worked hour and person (45%-75% of average EU28) and the low price level (40%-70% of average EU28) but high number of worked hours annually per employee (1750-2050 hours). There are countries from Central and Eastern Europe, which existed within the socialist planned economy before

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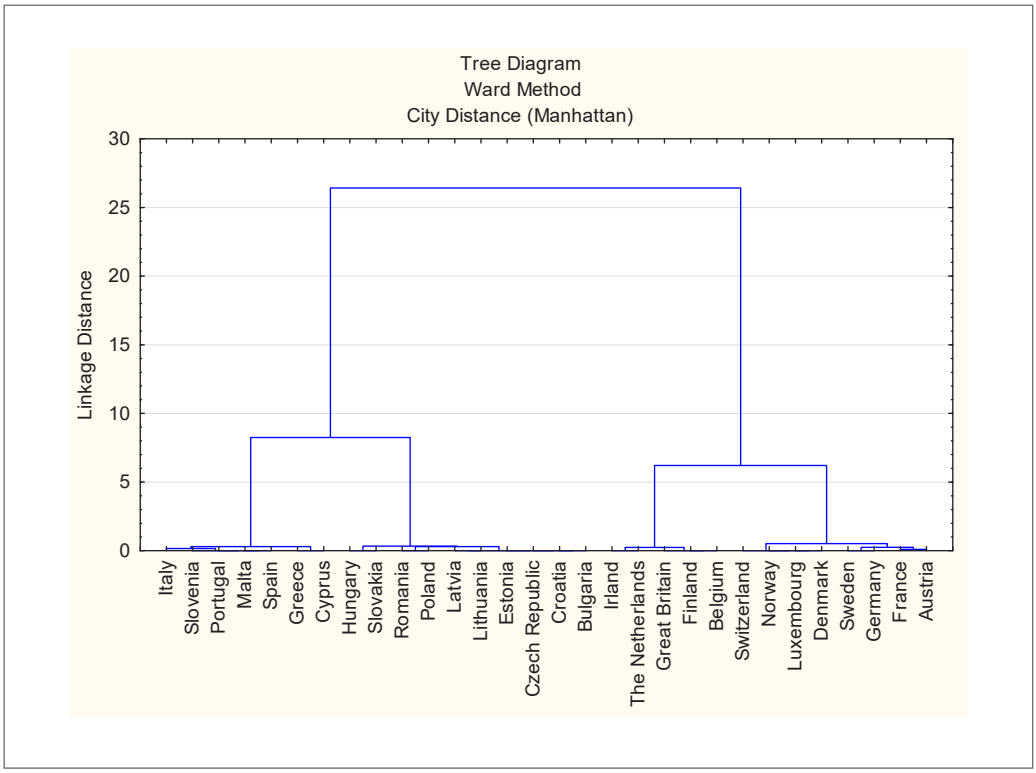

Figure 1. Cluster analysis (Manhattan distance, Ward's method) visualizing groups of countries due to differences in the data presented in the tables 1-3 (standardized to 100).
Source: Adapted from "Mean and median income by household type - EU-SILC survey" by Eurostat (2017c). Retrieved from http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_di04&lang=en; "Purchasing power parities (PPPs), price level indices and real expenditures for ESA 2010 aggregates" by Eurostat (2017d). Retrieved from http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_ppp_ind&lang=en; "GDP and main components (output, expenditure and income)" by Eurostat (2017b). Retrieved from http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_gdp&lang=en; "Average annual hours actually worked per worker" by OECD (2017). Retrieved from http://stats.oecd.org/Index.aspx?DataSetCode=ANHRS; "Gross fixed capital formation (% of GDP)" by The World Bank (2017). Retrieved from http://data.worldbank.org/indicator/NE.GDI.FTOT.ZS?end=2015&locations=EU-AT-PL-DE&name_desc=true&start=2015&view=bar

1989 (Bulgaria, Croatia, the Czech Republic, Estonia, Latvia, Lithuania, Poland, Romania, Slovakia, Hungary). It should be emphasized here that there is a far higher (from a couple percentage points to over 15%p for Poland) labor productivity per employee than per worked hour for almost all countries (apart from Bulgaria). This disparity proves that a vast part of the society at the productive age is occupationally inactive, and those who are employed work long to earn their living and support by taxes those who receive prere-

tirement allowances. In the economy, there are also unprofitable enterprises supported by the state, which lowers the total productivity and has the impact of lower wages and salaries and lower prices.

The second group comprises countries of the 'old EU', Portugal, Greece, Spain, Italy, and 'the new EU, Cyprus, Malta and Slovenia. The latter varies in the higher price level (75-100% of the average EU28). What is characteristic for the countries is the fact that there is higher productivity per employee (75%-95% of

the average EU28) than in the first group but similarly lower – approximately 10%p per work hour at equally high or a slightly lower number of work hours annually per employee (1650-1750) – than in the first group. Relative income per person in these countries is diversified according to the purchasing power parity. Despite higher prices influencing the higher productivity, Greece (55% of average EU28) and Portugal (66% of average EU28) have low income due to the foreign transfers (e.g., repayment of debts and drain of capital) but considerably higher ones than those of the first group: Slovenia (88% of average EU28), Spain (90% of average EU28), Italy (94% of average EU28), Malta and Cyprus approximately 101% EU28).

In the third group, there are countries with a relative income per person of 105%-120% of the average EU28. They are Ireland, Great Britain, the Netherlands, Finland, and Belgium. As was already mentioned, Ireland is a very specific example of very high labor productivity. This was because many companies moved there in 2015 due to the lowering of the CI Tax. The price level ranges from 109-132% of the EU average. Great Britain and Finland have labor productivity per person and hour at the level of 100-110% of the EU average, and the Netherlands and Belgium is higher, that is, 110-135% of EU average. It is worth mentioning that in the last two countries, in contrast with all countries in the group and all previously mentioned ones, there is relatively higher labor productivity per worked hour than per employee. In the Netherlands, it is 16%p, and in Belgium, it is over 6%p.

The wealthiest countries of the EU belong to the fourth group, Germany, France, Austria, Sweden, Denmark, Luxembourg, and countries not belonging to the EU but closely connected with it, Norway and Switzerland. In those countries, the relative income per person exceeds 120% of the EU average and productivity exceeds 110% of the EU average apart from Germany, where due to the relatively low price level (approximately 100% of the EU average) for those countries, the productivity per employee equals 'only' approximately 107% of the EU average. The highest price level is in Switzerland (over 170% of the EU average), Norway (almost 148% of the EU average), Denmark (137%), Luxembourg (135%) and Sweden (131%).

In all countries of the fourth EU group (just as in the examples of the Netherlands and Belgium and in contrast with countries of the first group through the third group), there is higher relative labor productivity per worked hour than per employee. The biggest difference is in Germany and Norway (approximately 20%p) compared with Denmark (approximately 13%p). This confirms the high occupational activity of people at different ages and above all, at the preretirement age 55-64 and a high proportion of people working part-time. In that group, there are the lowest number of worked hours per employee annually, which is the consequence of the large proportion of workers hired part time.

Discussion

Why does efficiency depend so much on prices? It results from the definition of the ratio, which is simply put a relationship of a sales value to worked hours or the number of employees. The sales value results from a product of both the quantity and sales' prices. If employees produce a larger amount of products but their prices drop, the efficiency may decline as well[5]. Moreover, assuming even that the prices are basic, the amount of the production growth (e.g., due to the enhancement of the effectiveness of management) at the fixity of some costs will lead to the increase of the entrepreneur's profit. However, it does not need to have an impact on the pay rise. If there is unemployment in the market, the labor supply exceeds the demand, and the entrepreneur does not feel the need to increase salaries. The intervention of so-called 'external forces' toward the demand and supply, e.g., the pressure of trade unions or legal regulations directed toward, e.g., pay rises, can lead to the increase in the contribution of salaries and the participation of employees in the productivity growth. It can be seen in the table 3 that there is a higher relative productivity per employee rather than per worked hour, which is connected with the lower price level (in post-communist countries, including Poland). In these countries, people work longer than in countries with a general higher labor productivity. More hours spent at work equal lower productivity per hour but higher productivity per employee. This, however, does not mean any pay rise, as the low occupational development of people at the productive age requires employer being charged high social insurance contributions instead of increasing salaries to those employed. Moreover, the higher demand than supply

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for work allows employers to keep the pay level low in spite of the productivity growth. The relative (for EU28=100) productivity growth according to the purchasing power parity is also higher by 12%p for a Polish worker than his/her relative income per person according to the purchasing power parity. In contrast, in Scandinavia and, e.g., Switzerland, the opposite is true – there is a higher level of relative productivity per hour in euros, but it is lower per employee. The high price level in Scandinavia and Switzerland allows for keeping the levels of productivity and pay high without the need to overwork. There is still, however, one questionable direction in the relationship and the assumption as to whether the productivity is an endogenous variable or an exogenous variable in terms of price and pay levels. There are other essential factors that influence the differences in labor productivity in the macroeconomic terms. They are as follows: the participation of occupational active people in age groups of 15-65 and the existence of unprofitable enterprises financed mostly by state subsidies. People who are occupationally inactive and unprofitable enterprises do not contribute to the added value, which is a crucial element of GDP. Occupationally inactive people are not taken into account during productivity counting but those actively working in unprofitable companies are, which lowers the productivity at the macro scale. It has an impact on the abovementioned difference between the productivity per employee and per hour in Western and Eastern Europe. In the latter, there are still subsidized, ineffective, state-owned enterprises (e.g., mines), and the proportion of occupationally inactive people at the productive age (living off e.g., annuities) is much higher than in Western Europe. It lowers the macroeconomic productivity of labor and affects wages and salaries conversely, which consequently causes the reluctance to take up a job.

Denmark's high-ranking place in international comparisons concerning labor productivity and GDP per capita and prices is significant. In Eurostat comparisons, the general price level in Denmark equals approximately 140% (table 1) of the European average price level, and the labor productivity per hour of employment approximately is 53 euro compared to the average 32 euro for EU 28. In Denmark, there are very high tax rates, both VAT (practically a flat rate equaled 25%) and income tax (rates dependent on income 40% and 60%, respectively), and the highest income contribution to GDP (approximately 49%, cf. table 2) in the EU. In Denmark, there is one of the highest proportions of occupationally active people at the age of 15-64 (ca 79%), including people at the age of 55-64 (68%) and state-owned enterprises are not subsidized by the state. All of it has an influence on the high labor productivity of the Danes at the macro scale and allows for keeping wages and salaries high.

The high quality of Danish services and products, which are competitive in the international market, help to keep prices and minimum wages and salaries high, in spite of no minimum wage level. High prices and pay give a high value of labor productivity rates per hour in the country according to the purchasing power parity (approximately 126%) and in euro (approximately 165%) but lower per employee (approximately 113%), which is one of the lowest amounts of worked hours annually (1457) in the EU. These factors mean that the Danish worker does not have to work hard to maintain a high level of productivity at the macro level.

A quick way to increase the labor productivity in the economy is the development of companies manufacturing innovative and expensive products. Sales per employee or work hour increases much faster at the moment of introducing an expensive product rather than in case of enhancing work organization at the workplace where cheap goods are manufactured. Capital investments in better equipment for the workplace for the production of cheap commodities usually increase quantity production, which consequently may lead to the drop in the price per unit.

The productivity growth may be the result of better quality or/and marketing effects (Piekarz, 2000). Branded products are generally far more expensive than no-name ones. For example, employees who make branded clothes that are later sold at higher prices will be more effective (in terms of productivity value per person or the unit of work time) than employees working in similar conditions and by means of similar equipment but producing cheap and no-name clothes. The work of the two groups may not differ at all. What happens is that some parts of goods coming from the same manufacturer vary only in a hangtag, label, badge or other signs but they have no physical importance in terms of usage or an increase in quality. The only addi-

tional element added is the marketing effect that hikes the price. The achievement of a marketing position on a market requires time, financial expenditure and the engagement of managers, but it does not have to mean a change in the activity and involvement of the lower rank personnel.

Conclusions and recommendations

Conclusions drawn from the conducted study toward countries (particularly from the first group) with relatively low income, remunerations and labor productivity are as follows:

- to activate and simplify the process of taking up a job by occupationally inactive people, essentially those at the preretirement age,
- to ease and popularize part-time work,
- to increase investments in innovativeness of economy,
- to support branding, which helps manufactured products and services sell more expensively,
- to build competitiveness based on the quality of products not a low price,
- to resign from subsidizing unprofitable enterprises that do not bring the added value,
- to increase minimum pay gradually by the influence on its contributions to GDP changes and price level,
- to lower income taxes (CIT, PIT) by attracting capital and a tendency of natural persons to start being self-employed within households (micro firms),
- to increase indirect taxes (VAT) in order to achieve a balance or a budget surplus. The tax contributes much to the budget's receipts, and its slight increase gives higher inflows instead of considerable income tax increases (CIT, PIT). This also has an impact on the price level, which results in higher productivity in the country and does not require lowering the competitiveness of exports.

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Endnotes

1 *World Bank data: for gross capital formation of GDP, the negative ratio with the productivity on the*

level ca. 0.2 remains for different periods, e.g., the last 10 years, i.e., 2006-2015.

2 *Based on the price level for individual consumption.*

3 *Compensation of employees = wages and salaries + employers' social contributions*

4 *Without having mentioned tax issues and insurance premiums*

5 *This decline may occur at a larger percentage price drop than the increase in production quantity*

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