

mgr Magdalena Kapela*

RELATION BETWEEN WORK EFFICIENCY AND LABOR COST IN POLAND

KOSZTY PRACY A WYDAJNOŚĆ PRACY W POLSCE

Abstract

The basic goal of this document is to research the changes in work efficiency level, as well as labor costs and evaluation of their relation in Poland in comparison to other EU countries. Research period embraced the years 2000–2016. Desired research objective was achieved with the use of review of the literature method, deduction, description and simple statistical and visualization technics (Eurostat, GUS). The analysis of changes and proportions between unit labor costs and labor productivity is essential element of labor market researches. Sustainable and monochromic growth of both factors is important if competitiveness's improvement ought to be due to technology development not to low-wages politic. Polish production is based on low and middle technology, and until now low labor costs. This system can turn out negative and embed unfavorable economy structure. The level of unit labor costs in Poland in comparison to European Union is low, so as the level of work productivity is. On the other hand the pace of labor productivity is high. Until now the pace of wage growth was lower than labor efficiency, and the balance between two variables was kept.

Keywords: labor costs, unit labor costs, work efficiency

JEL classification: J30, J38

* Politechnika Warszawska, Kolegium Nauk Społecznych i Ekonomicznych; Warsaw University of Technology, College of Economics and Social Sciences; magdalena.kapela@pw.edu.pl

Introduction

Over 45 years period of Poland functioning in closed economy conditions significantly weakened the level of its competitiveness in the international market. When, in 1989 the boards were opened, the influx of foreign goods revealed that cheap work force does not sufficiently compensate low productivity and broad technological gap. A lot of attention was dedicated to the matter of work efficiency factors and improvement¹.

Work efficiency is considered as a key factor for international competitiveness. International Monetary Found, World Bank, OECD and European Commotion based on collected data related to productivity create factors which form the base to create the rankings of the most competitive countries. One of them is work efficiency measured as a added value per labor cost unit. Relation of those two values is frequently indicated as an important factor influencing the attractiveness of economy. Low labor costs in combination with high productivity, constitute an incentive for investors. In Poland, the productivity changes rate has been for many years high, what in connection with maintaining low level of labor costs is to form the base to build a competitive advantage in the international market².

Maintaining low labor costs and the fear of real wage level growth, which were to threaten Polish economy seem to be, nevertheless, unjustified from the unit labor cost perspective.

Labor costs constitute a sum of gross wages (including deductions for personal income taxes and obligatory retirement, pension and illness contributions payable by the insured employee) as well as non-wage expenses related to acquiring, maintaining, redeployment and training of personnel³. Unit labor costs are the labor costs per production unit. With the increase of unit labor efficiency, the labor costs shall reduce. It is important to state that proportional labor cost growth in comparison to productivity increase, does not change the level of unit labor cost. Therefore, the fear of wages level increase is unjustified, if the growth rate of effectiveness grow is bigger the unit labor cost growth rate. Moreover, long-term low wages politics causes, not only the decrease of citizens life standard, purchasing power in the country and abroad, as well as the imported goods cost rise – including state-of-art technologies, but it may also lead to reduction in domestic demand⁴.

¹ L. Sawicki, *Kształtowanie wydajności pracy w Polsce na początku XXI wieku*, "Przedsiębiorstwo i Region" 2015, no. 7, p. 93.

² J. Wyrobek, *Zmiany wydajności pracy i kosztów pracy w Polsce a konkurencyjność gospodarki Polski*, "Zeszyt Nauk UEK" 2016, vol. 3(951), p. 99.

³ *Koszty pracy w gospodarce narodowej w 2015 roku*, GUS, Warsaw 2015, p. 13.

⁴ S. Storm, C.W.M. Naastepad, *Europe's Hunger Games: Income Distribution, Cost Competitiveness and Crisis*, "Cambridge Journal of Economics" 2014.

The basic goal of this document is to research the changes in work efficiency level, as well as labor costs and evaluation of their relation in Poland in comparison to other EU countries. Research period embraced the years 2000–2016. Desired research objective was achieved with the use of review of the literature method, deduction, description and simple statistical and visualization technics (Eurostat, GUS). Statistical conclusions from conducted analysis were presented in the summary.

Labor costs

Unit labor costs are sometimes defined as broadly understood international measurement of price competitiveness. They are defined as quotient of labor costs and number of working hours or quotient of labor costs and number of employed personnel. ULC represent direct relation between work efficiency and incurred cost necessary for production. The situation in which labor costs would grow faster than work efficiency would be dangerous. In this context, unit labor costs shall not be interpreted as economy competitiveness measurement, but rather as an important element of cost competitiveness, analyzed especially considering the work efficiency changes level. Labor costs level that are incurred per working hour in European Union countries are presented in Table 1.

Table 1. Unit labor costs in EU (in EUR/hour) between 2000–2016

Country/ Year	2000	2004	2008	2009	2010	2011	2012	2013	2014	2015	2016
Belgium	27.0	29.2	32.9	34.1	35.2	36.2	38.0	38.8	39.0	39.1	39.2
Bulgaria	1.3	1.6	2.6	2.9	3.1	3.3	3.4	3.6	3.8	4.1	4.4
Czech Republic	3.7	5.8	9.2	9.7	9.9	10.3	10.0	9.7	9.4	9.8	10.2
Denmark	27.0	29.6	34.6				39.4	39.9	40.6	41.2	42.0
Germany	24.6	26.8	27.9	28.7	29.0	29.8	30.5	30.9	31.4	32.2	33.0
Estonia	2.9	4.3	7.8	7.7	7.5	7.8	8.6	9.2	9.8	10.3	10.9
Ireland	19.7	25.5	28.9	29.7	28.9	28.6	29.8	29.8	29.8	30.0	30.4
Greece	11.7	15.3	16.7	16.6	16.7	15.8	15.7	14.5	14.5	14.1	14.2
Spain	14.3	16.5	19.4	20.3	20.4	20.7	21.1	21.2	21.1	21.2	21.3
France	:	28.2	31.2	31.6	32.5	33.4	34.3	34.4	34.7	35.1	35.6
Croatia	:	6.9	9.2	9.0	8.8	9.0	9.5	9.5	9.4	9.6	10.0
Italy	19.7	22.4	25.2	26.1	26.8	27.2	27.7	28.1	28.3	28.1	27.8
Cyprus	11.0	12.6	16.7	17.8	17.9	18.2	16.8	16.3	15.8	15.7	15.8

Table 1 (continue)

Latvia	2.2	2.7	6.0	5.8	5.5	5.8	5.9	6.2	6.6	7.1	7.5
Lithuania	2.6	3.2	5.9	5.6	5.4	5.5	5.9	6.2	6.5	6.8	7.3
Luxemburg	23.1	30.3	31.0	32.2	33.0	34.0	33.9	35.1	36.2	36.3	36.6
Hungary	3.6	5.9	7.8	7.7	7.6	8.0	7.4	7.7	7.7	7.9	8.3
Malta	7.9	9.6	11.4	11.6	12.3	12.9	11.8	12.3	12.8	13.2	13.2
The Netherlands	23.0	27.3	29.8	30.5	30.8	31.5	32.5	33.2	33.7	34.0	34.3
Austria	:	25.2	26.4				29.7	30.6	31.4	32.4	32.7
Poland	4.2	4.7	7.6	8.0	8.3	8.7	7.9	8.1	8.3	8.6	8.6
Portugal	11.1	11.3	12.2	12.6	12.7	12.5	13.3	13.3	13.2	13.4	13.7
Romania	1.5	1.9	4.2	4.7	4.7	4.9	4.1	4.4	4.6	4.9	5.5
Slovenia	10.9	11.2	13.9	14.4	14.6	14.8	15.6	15.3	15.6	15.8	16.2
Slovakia	2.0	4.1	7.3	7.6	7.8	8.1	8.9	9.2	9.7	10.0	10.4
Finland	22.1	24.4	27.1	28.3	28.8	29.6	31.3	32.0	32.5	33.0	33.2
Sweden	:	29.0	31.6	32.5	33.3	34.1	37.3	38.2	37.3	37.4	38.0
Great Britain	19.7	21.5	20.9	21.0	21.5	21.9	25.0	24.1	25.8	29.7	26.7

Source: own study based on: Eurostat, <http://ec.europa.eu/eurostat/web/labour-market/labour-costs/main-tables> [accessed: 16.06.2017].

Labor costs incurred per one working hour in European Union in 2016 amounted to 21 EUR/hour on average. Medium ULC in EU is from 15 to 30.5 EUR/hour, however, in new member states only 13.8 EUR/hour. Medium labor costs for Polish entrepreneurs for one working hour was 8.2 EUR. These are one of the lowest labor costs in all EU, with reservation that this is a result close to the mean value of the rest of the Eastern block countries, which is 8.2 EUR/hour. Lower labor costs can be noticed in such countries as Bulgaria, Romania, Lithuania, Latvia and Hungary. Such a low factor level in Poland is to be considered as an important element of cost advantage in the international arena. Labor costs change rate is presented in Table 2.

Table 2. ULC level changes in EU countries (EUR/hour) for 2004 = 100⁵

Country/Year	2000	2004	2008	2009	2010	2011	2012	2013	2014	2015	2016
Belgium	92.5	100.0	112.7	116.8	120.7	124.0	130.1	132.9	133.6	133.9	134.2
Bulgaria	81.3	100.0	162.5	179.9	193.4	208.1	212.5	225.0	237.5	256.3	275.0

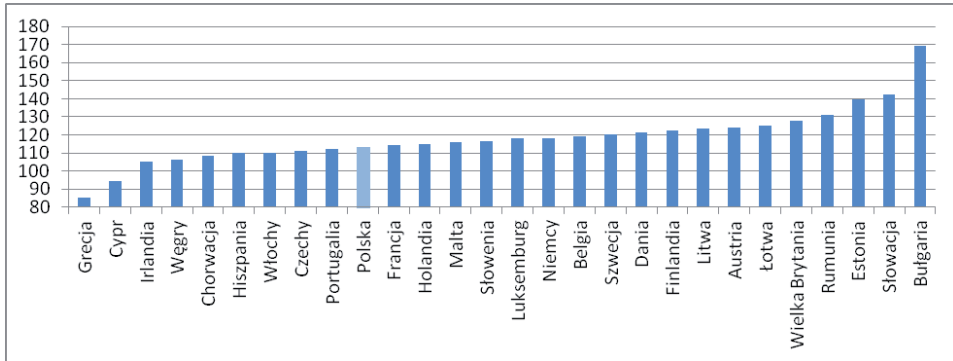
⁵ 2004 = 100 was assumed because of data gaps for the year 2000.

Czech Republic	63.8	100.0	158.6	166.9	171.5	177.5	172.4	167.2	162.1	169.0	175.9
Denmark	91.2	100.0	116.9	0.0	0.0	0.0	133.1	134.8	137.2	139.2	141.9
Germany	91.8	100.0	104.1	106.9	108.3	111.2	113.8	115.3	117.2	120.1	123.1
Estonia	67.4	100.0	181.4	178.1	174.9	182.3	200.0	214.0	227.9	239.5	253.5
Ireland	77.3	100.0	113.3	116.4	113.3	112.3	116.9	116.9	116.9	117.6	119.2
Greece	76.5	100.0	109.2	108.7	109.4	103.2	102.6	94.8	94.8	92.2	92.8
Spain	86.7	100.0	117.6	123.0	123.4	125.7	127.9	128.5	127.9	128.5	129.1
France	#ARG!	100.0	110.6	112.0	115.1	118.6	121.6	122.0	123.0	124.5	126.2
Croatia	#ARG!	100.0	133.3	129.9	127.5	131.0	137.7	137.7	136.2	139.1	144.9
Italy	87.9	100.0	112.5	116.3	119.6	121.3	123.7	125.4	126.3	125.4	124.1
Cyprus	87.3	100.0	132.5	141.0	141.9	144.6	133.3	129.4	125.4	124.6	125.4
Latvia	81.5	100.0	222.2	214.2	203.9	213.5	218.5	229.6	244.4	263.0	277.8
Lithuania	81.3	100.0	184.4	175.9	167.5	172.0	184.4	193.8	203.1	212.5	228.1
Luxemburg	76.2	100.0	102.3	106.4	109.1	112.2	111.9	115.8	119.5	119.8	120.8
Hungary	61.0	100.0	132.2	131.1	128.8	136.3	125.4	130.5	130.5	133.9	140.7
Malta	82.3	100.0	118.8	121.2	128.5	134.4	122.9	128.1	133.3	137.5	137.5
The Netherlands	84.2	100.0	109.2	111.9	112.9	115.3	119.0	121.6	123.4	124.5	125.6
Austria	#ARG!	100.0	104.8	0.0	0.0	0.0	117.9	121.4	124.6	128.6	129.8
Poland	89.4	100.0	161.7	170.9	176.4	184.3	168.1	172.3	176.6	183.0	183.0
Portugal	98.2	100.0	108.0	111.5	112.0	110.6	117.7	117.7	116.8	118.6	121.2
Romania	78.9	100.0	221.1	245.8	250.0	259.7	215.8	231.6	242.1	257.9	289.5
Slovenia	97.3	100.0	124.1	128.6	130.0	132.5	139.3	136.6	139.3	141.1	144.6
Slovakia	48.8	100.0	178.0	185.7	190.9	197.2	217.1	224.4	236.6	243.9	253.7
Finland	90.6	100.0	111.1	115.8	118.0	121.1	128.3	131.1	133.2	135.2	136.1
Sweden	#ARG!	100.0	109.0	112.2	114.7	117.7	128.6	131.7	128.6	129.0	131.0
Great Britain	91.6	100.0	97.2	97.7	100.1	101.8	116.3	112.1	120.0	138.1	124.2

Source: own study based on: Eurostat, <http://ec.europa.eu/eurostat/web/labour-market/labour-costs/main-tables>.

Change in labor costs level per hour within 12 years in Poland was one of the highest (over 80%). The biggest increase in unit labor costs level was reported in Romania, Slovakia, Latvia, Lithuania and Bulgaria. It has to be pointed out that the biggest leap took place in 2008 and since then changes in ULC level were not so violent. This is a result, among others, of a violent increase in average wage in 2007 and 2008 by almost 15%, however, already in 2009 the average wage level

was lower in comparison to the previous year by 30%⁶. That is why by adopting a 2008 as a base we can see that within the last eight years hourly labor costs increased in Poland by 13%. Medium growth in EU since 2008 was 18% and it emerges that changes in ULC level in Poland were smaller than in more than a half of member states (compare Graph 1).



Graph 1. Changes of hourly labor costs (EUR) in 2016 for 2008 = 100

Source: Own study based on: Eurostat, <http://ec.europa.eu/eurostat/web/labour-market/labour-costs/main-tables>.

In order to define what meaning for Polish economy had the unit labor costs change rate it has to be compared with work efficiency levels during the analyzed period. The major part of labor costs constitutes wages (in Poland over a 40% of gross wages are employer's and employees' burdens for social security contributions⁷). If wages are increasing but with lower rate than efficiency, it is considered that the economic growth is progressing correctly. Otherwise, under the pressure from market demand inflation occurs. Frequently, the consequence matter is omitted, when labor costs grow significantly slower than work productivity. Insufficient appreciation of employees, of their knowledge and competences, may constitute a serious error in building strategy of entrepreneurs' competitiveness advantage. Especially in the era when main factor for creation of new technologies and innovative products is exactly the human factor. Considering this issue, however, in macro scale, too low wages can, in a long run, contribute to drop in consumption demand. It is necessary to compare labor costs with its productivity.

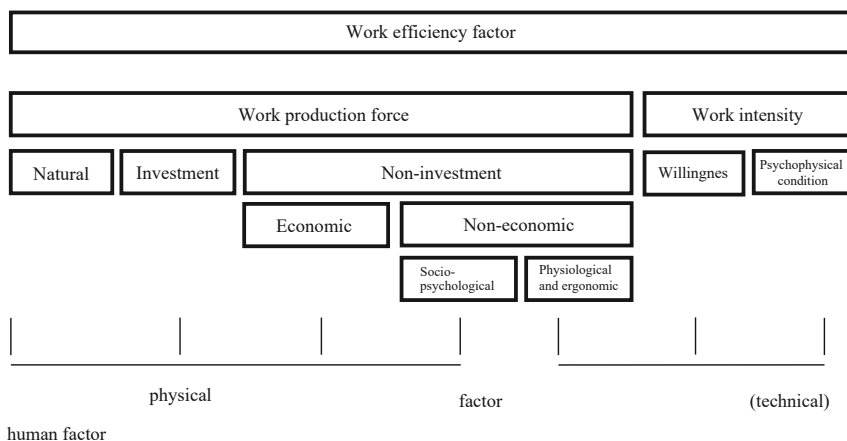
⁶ Own study based on: Eurostat, <http://ec.europa.eu/eurostat/web/labour-market/earnings>.

⁷ A. Krajewska, *Problemy opodatkowania pracy w Polsce*, "Polityka Społeczna" 2016, no. 4, p. 3.

Work efficiency

Archive researcher V. Struve when analyzing the Sumerian tables from Umma city located in the Middle Asia noticed that already in XXIII century BC labor costs and its efficiency were reported: “The writers annotated on the tables the numbers of employees, and further on they placed the product of this number and the 360 days of the year. As a result, they obtained the number of employees working per one day. This leads to the conclusion that Sumerian accountants applied the notion of work-day and summed up the work load in these units”⁸. From the scientific point of view, the first to write about the importance of economic efficiency was A. Smith: “Annual product of each nation cannot increase in its value in other way than by increase in number of productive employees or by increase in the production force”⁹. Nowadays, work efficiency is defined in two aspects: as a product of GDP and number of working hours or join number of employed personnel.

Changes in work efficiency depends on many factors, which are complementary but also substitutive (compare Graph 2). The human capital quality is considered as the most important. Knowledge and competence of the employee frequently decide on company’s success, that is why such a big emphasis is currently placed on education and growth of investment in research and development. The knowledge became to be a respected factor, on micro and macroeconomic level.



Graph 2. Work efficiency factors

Source: L. Sawicki, *Kształtowanie wydajności...*, p. 96.

⁸ V. Struve, *Some New Data on the Organisation of Labour and Social Structure in Somer During the IIIrd Dynasty of Ur in Ancient Mesopotamia*, Nauka, Moskwa 1969, as cited in: A. Mrówka, *Ekonomiczne znaczenie pracy w perspektywie historycznej*, “Nierówności Społeczne a Wzrost Gospodarczy” 2014, no. 38(2), p. 288.

⁹ A. Smith, *An inquiry into the nature and causes of the wealth of nations: Volume One*, 1776, MetaLibri, digital edition, 29th may 2007, p. 9.

Obviously, the human capital development cannot take place without the investment in technical area. They are complementary and factors describing work production force have at the same time the influence on work intensity level¹⁰.

First analyzed factor is work efficiency measured as GDP per one working hour in real prices (Table 3). Mean value for European Union in 2016 has increased by 28.7 EUR/hour. There is a significant difference in the level of efficiency between new member states and states of “old Union”: average work efficiency in EU 15 in 2016 was equal to 43 EUR/hour, however, in the rest of the states the medium was adopted to be 18.2 EUR/hour, so more than twice time lower (Table 1).

Table 3. Work efficiency per one working hour in real prices (EUR)

Country/ Year	2000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Belgium	42.6	45.0	45.4	45.8	46.2	46.0	45.3	45.9	45.8	45.7	45.9	46.4	46.7	:
Bulgaria	3.4	3.9	4.0	4.1	4.3	4.3	4.3	4.5	4.7	4.8	4.9	4.9	5.1	5.2
Czech Republic	9.3	11.1	11.7	12.4	13.0	13.0	12.8	13.0	13.3	13.2	13.1	13.5	14.1	14.0
Denmark	48.1	50.5	51.4	51.9	52.2	51.1	49.8	52.4	52.5	52.6	53.4	54.8	55.1	54.9
Germany	37.3	39.4	39.9	41.3	42.0	42.0	40.9	41.7	42.4	42.6	42.8	43.3	43.7	44.1
Estonia	7.0	8.7	9.2	9.7	10.3	10.0	10.3	10.9	10.8	11.2	11.4	11.6	11.5	11.7
Ireland	39.2	43.8	44.1	44.6	45.1	45.0	46.5	48.2	50.1	50.4	48.8	52.7	64.6	66.1
Greece	17.6	20.1	19.8	20.8	21.5	22.2	21.1	20.4	19.9	20.2	20.2	19.6	19.4	19.1
Spain	27.3	27.7	27.9	28.1	28.5	28.7	29.4	30.0	30.4	31.5	32.1	31.6	31.7	32.0
France	40.7	43.0	43.6	44.9	44.9	44.4	44.2	44.7	45.3	45.4	45.6	46.2	46.5	48.3
Croatia	:	:	:	:	:	:	:	:	:	:	:			
Italy	32.0	32.1	32.4	32.5	32.6	32.4	31.7	32.5	32.5	32.2	32.2	32.9	32.9	32.6
Cyprus	19.1	19.7	20.1	20.4	20.8	21.2	21.0	21.3	21.2	21.5	21.6	22.2	22.2	22.2
Latvia	4.2	5.5	5.9	6.3	7.9	7.3	7.2	7.6	7.9	8.2	8.4	8.5	8.7	8.9
Lithuania	5.6	7.5	7.7	8.2	8.7	8.8	8.3	9.4	10.1	10.3	10.6	10.8	10.7	10.6
Luxemburg	:	60.9	63.1	63.9	64.9	60.8	59.4	60.0	59.5	58.2	:	61.5	62.0	62.9
Hungary	8.4	10.3	10.7	11.1	11.1	11.3	10.9	11.0	11.0	11.3	11.5	11.2	11.3	11.2
Malta	13.7	16.0	15.3	15.5	15.4	15.4	14.6	15.2	14.2	14.5	:	16.6	17.2	16.9
The Netherlands	41.3	43.8	44.7	45.5	46.2	46.2	45.1	46.0	46.1	45.6	45.8	47.0	47.7	47.7
Austria	33.5	35.3	36.1	37.3	38.1	38.3	38.2	38.9	39.1	39.5	39.9	40.0	40.7	40.9
Poland	6.9	8.2	8.4	8.6	8.8	9.0	9.1	9.8	10.2	10.4	10.6	10.7	10.9	11.2

¹⁰ J. Jagas, *Wydajność pracy: uwarunkowania systemowe*, TiT, Opole 1995, p. 37.

Portugal	15.0	15.4	15.6	15.8	16.1	16.1	16.1	16.7	16.9	17.0	17.1	17.2	17.2	17.4
Romania	3.0	4.4	4.6	4.9	5.2	5.6	5.4	5.3	5.4	5.4	5.6	6.3	6.6	7.0
Slovenia	15.4	17.0	18.2	19.3	20.1	20.1	20.1	20.6	21.4	21.3	21.4	21.2	21.4	21.6
Slovakia	8.2	10.1	10.4	11.0	11.8	12.1	11.8	12.3	12.6	12.8	13.2	13.4	13.7	13.9
Finland	34.4	37.7	38.4	39.5	40.8	40.3	38.2	39.4	40.0	39.5	39.7	39.7	39.8	39.9
Sweden	37.0	41.5	42.7	44.0	44.1	43.3	42.3	44.0	44.4	44.9	45.5	45.1	46.2	46.6
Great Britain	34.7	38.1	38.9	39.7	40.8	40.3	39.3	39.8	40.0	39.3	39.2	39.8	40.4	40.2

Source: Eurostat, <http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do>.

Work efficiency in Poland in 2016 amounted to 11.2 EUR/hour. This is a value lower even from the average of new member states. Although it has to be considered that Poland is intensifying its actions aimed at improvement of work efficiency only since the opening of economy after long period of international isolation. It is therefore worth comparing the work efficiency levels in Poland with the rest of post-communist countries for which the average work efficiency from one working hour is 10.4 EUR. It is obvious that, the communist system contributed to exceptionally low work efficiency level which is hard to catch up. In this context, it has to be verified, how, till today, the rate of work efficiency was changing (Table 4).

Table 4. Work efficiency growth rate per one working hour in EUR (2000 = 100).

Country/ Year	2000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Belgium*	100.0	105.6	106.6	107.5	108.5	108.0	106.3	107.7	107.5	107.3	107.7	108.8	109.7	110.1
Bulgaria	100.0	114.7	117.6	120.6	126.5	126.5	126.5	132.4	138.2	141.2	144.1	144.8	149.4	153.9
Czech Republic	100.0	119.4	125.8	133.3	139.8	139.8	137.6	139.8	143.0	141.9	140.9	145.0	151.2	151.0
Denmark	100.0	105.0	106.9	107.9	108.5	106.2	103.5	108.9	109.1	109.4	111.0	114.0	114.5	114.2
Germany	100.0	105.6	107.0	110.7	112.6	112.6	109.7	111.8	113.7	114.2	114.7	116.2	117.1	118.2
Estonia	100.0	124.3	131.4	138.6	147.1	142.9	147.1	155.7	154.3	160.0	162.9	166.3	164.7	166.5
Ireland	100.0	111.7	112.5	113.8	115.1	114.8	118.6	123.0	127.8	128.6	124.5	134.5	164.9	168.7
Greece	100.0	114.2	112.5	118.2	122.2	126.1	119.9	115.9	113.1	114.8	114.8	111.4	110.0	108.5
Spain	100.0	101.5	102.2	102.9	104.4	105.1	107.7	109.9	111.4	115.4	117.6	115.6	116.0	117.1
France	100.0	105.7	107.1	110.3	110.3	109.1	108.6	109.8	111.3	111.5	112.0	113.5	114.3	118.7
Croatia	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Italy	100.0	100.3	101.3	101.6	101.9	101.3	99.1	101.6	101.6	100.6	100.6	102.9	102.7	101.9
Cyprus	100.0	103.1	105.2	106.8	108.9	111.0	109.9	111.5	111.0	112.6	113.1	116.1	116.0	116.2

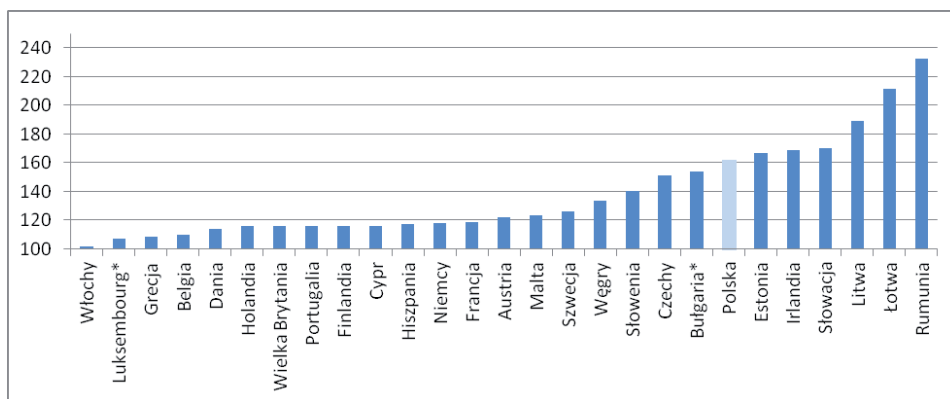
Table 4 (continue)

Latvia	100.0	131.0	140.5	150.0	188.1	173.8	171.4	181.0	188.1	195.2	200.0	201.6	207.6	211.7
Lithuania	100.0	133.9	137.5	146.4	155.4	157.1	148.2	167.9	180.4	183.9	189.3	192.5	190.7	188.8
Luxem- bourg*		:	:	:	:	:	:	:	:	:	:	:	:	107.1
Hungary	100.0	122.6	127.4	132.1	132.1	134.5	129.8	131.0	131.0	134.5	136.9	133.2	134.6	133.3
Malta	100.0	116.8	111.7	113.1	112.4	112.4	106.6	110.9	103.6	105.8	#ARG!	121.0	125.8	123.4
The Nether- lands	100.0	106.1	108.2	110.2	111.9	111.9	109.2	111.4	111.6	110.4	110.9	113.7	115.4	115.6
Austria	100.0	105.4	107.8	111.3	113.7	114.3	114.0	116.1	116.7	117.9	119.1	119.5	121.5	122.2
Poland	100.0	118.8	121.7	124.6	127.5	130.4	131.9	142.0	147.8	150.7	153.6	155.7	158.6	161.8
Portugal	100.0	102.7	104.0	105.3	107.3	107.3	107.3	111.3	112.7	113.3	114.0	114.3	114.5	115.8
Romania	100.0	146.7	153.3	163.3	173.3	186.7	180.0	176.7	180.0	180.0	186.7	211.1	220.3	232.3
Slovenia	100.0	110.4	118.2	125.3	130.5	130.5	130.5	133.8	139.0	138.3	139.0	137.9	139.1	140.2
Slovakia	100.0	123.2	126.8	134.1	143.9	147.6	143.9	150.0	153.7	156.1	161.0	163.4	167.0	169.8
Finland	100.0	109.6	111.6	114.8	118.6	117.2	111.0	114.5	116.3	114.8	115.4	115.3	115.7	116.0
Sweden	100.0	112.2	115.4	118.9	119.2	117.0	114.3	118.9	120.0	121.4	123.0	122.0	125.0	125.9
Great Britain	100.0	109.8	112.1	114.4	117.6	116.1	113.3	114.7	115.3	113.3	113.0	114.6	116.3	115.7

* Considering the lack of data, the factor value for Belgium was counted based on an extrapolation, and for Luxemburg 100 = 2002).

Source: own study based on: Eurostat, <http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do>.

On average, in comparison to 2000, work efficiency in European Union within 16 years increased by more than 40%. Nevertheless, the situation is quite opposite than in case of sole work efficiency, namely, the new member states reached a higher work efficiency growth rate (of 52%), especially post-communist countries (average growth of 67%). On this background, Poland with the result of 61% is at the forefront of the comparison (compare Graph 3).



Graph 3. Work efficiency growth in EU countries in 2016 (2000 = 100) in EUR/hour

Source: own study based on: Eurostat, <http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do>.

The highest work efficiency growth rate was reached by Romania and Latvia (over 100%). Another group of countries, in which the work efficiency level grew by more than a half is: Lithuania, Slovakia, Ireland, Estonia, Poland, Czech Republic and Bulgaria. The rest of EU countries is characterized by stable, similar work efficiency growth rate. Considering, however, nominal work efficiency level itself with the present growth rate in Poland (average annual growth rate was 3.9%), many years still will be needed to reach the level similar to the most productive European countries, such as Ireland, Denmark, The Netherlands, France, and Germany. What is needed is a stimulus to accelerate the changes.

Work efficiency growth rate brings economic benefits, but there still exists an employment reduction risk in a situation when work efficiency is not accompanied by sufficient demand for goods produced. In this context, it is worth considering the importance of wages levels growth rate which could adequately stimulate a domestic demand. Efficiency and labor costs growth rate should be sustainable, only then it does not generate inflationary pressures, and at the same time, motivates the employees to diligent work. Significant difference between efficiency and unit labor costs causes that economy attracts production of simple goods, based mainly on fiscal work for which the technology is less important. Fast work efficiency growth rate should, on the other hand, constitute an attractive investment for technologically advanced companies, which could benefit from the potential of highly productive employees.

Labor costs vs work efficiency in Poland

Assuming the year 2000 as a base, we can follow the rate in which the costs¹¹ and work efficiency (current prices) were changing in Poland (Table 5).

**Table 5. Hourly index of labor costs and work efficiency in real prices
(base year 2000 = 100).**

Year	Real ULC	Real work efficiency
2000	90.8	100.0
2004	108.1	118.8
2008	173.7	130.4
2009	184.8	131.9
2010	192.4	142.0
2011	197.8	147.8
2012	181.4	150.7
2013	191.1	153.6
2014	197.6	155.7
2015	206.6	158.6
2016	206.0	161.8

Source: Own study based on: <http://ec.europa.eu/eurostat/web>, and GUS – Annual goods and services price indexes from 1950, [accessed: 19.06.2017]

The leap in hourly labor costs in 2008 is clearly visible, and later on, the growth stabilization. Work efficiency over the sixteen years was characterized by a stable growth. To take a more careful look at the relation between both variables the 2008 was assumed for further analysis as a base (Table 6). However, by adapting, the year 2008 as a base, we will obtain the following data.

**Table 6. Hourly index of labor costs and work efficiency in real prices
(base year 2008 = 100)**

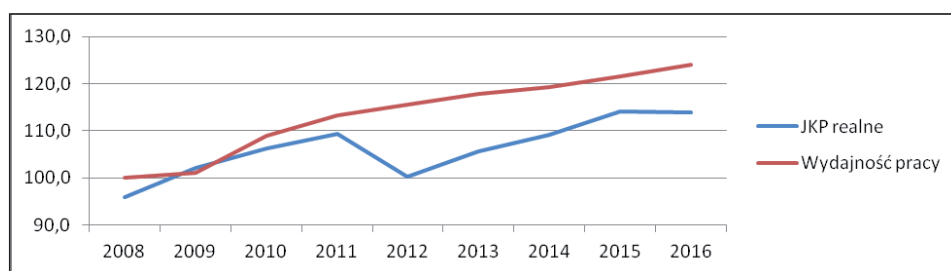
Year	Real ULC	Real work efficiency
2008	96.0	100.0
2009	102.1	101.1
2010	106.3	108.9
2011	109.3	113.3

¹¹ In order to unify the factors measures, changes in ULC were adjusted by annual GUS inflation rates.

2012	100.2	115.6
2013	105.6	117.8
2014	109.2	119.3
2015	114.2	121.6
2016	113.8	124.0

Source: Own study based on: <http://ec.europa.eu/eurostat/web>, and GUS – Annual goods and services price indexes from 1950 <https://stat.gov.pl/en/topics/prices-trade/price-indices/price-indices-of-consumer-goods-and-services/>, [accessed: 19.06.2017]

The above data show that the hourly labor costs growth rate is lower than work efficiency changes, however, trends are similar, see Graph 4.



Graph 4. ULC level and work efficiency change rate in Poland between 2008–2016 (2008 = 100)

Source: own study based on: <http://ec.europa.eu/eurostat/web>.

In comparison to the European Union, Poland has a high work efficiency growth rate and moderate unit labor costs growth rate. This is considered to be a favorable condition for international competitiveness development. However, analyzing the level of researched changes itself, it can be noticed that when labor costs indeed are one of the lowest in Europe, then the work efficiency itself (approx. 31 Euro/per one employee) still significantly diverge from leading EU states that reach four times bigger efficiency.

Unit labor costs measurement is especially useful for considering factors that have influence on their change. It is obvious, that the drop in ULC triggered by efficiency growth has a significant influence on work quality and wages level, compared to other factors. Nevertheless, too strong emphasis on wages or efficiency can cause the opposite effect than the one intended¹². As an example, intense and long-term emphasis on wages growth may endanger work efficiency due to reduced financial resources in innovation. On the other hand, intensified pressure on work efficiency, especially in developing countries may contribute

¹² B.V. Ark, E. Stuivenwold, G. Ypma, *Unit labor costs, productivity and international competitiveness*, University of Groningen, Groningen 2005, p. 9.

to the growth of grey market, mainly positions for unskilled employees. The competitiveness problem of Poland is that it is locked in to the lower and middle levels of technology¹³. Reducing the wage share is not going to solve that problem. Improvement of competitiveness requires sustainable strategy, aimed at creation of more efficient and better paid work places which will ensure long term stable growth¹⁴.

Conclusions

The level of unit labor costs in Poland in comparison to European Union is low, which is an important element of constructing international competitiveness in respect of price advantage. On the other hand, work efficiency is one of the lowest among member states. However, it is a positive factor, that work efficiency growth rate in Poland is high and each year it gradually grows. Growth rate of unit labor costs is moderate. To increase the competitiveness in international arena, and at the same time improvement of work places quality in Poland, it is important to analyze labor costs level not only in the context of their minimalizing, thus this can lead to creation of work places for unskilled employees and lock Poland in to low and middle levels of technology. It is highly important to attract investors, who act in state-of-art technologies branches and scientific excellence. That is why the proportional growth of unit labor costs and work efficiency, caused above all by changes in wages level is important form the adequate motivation of human capital point of view for further development and education, and thus an improvement of work. Additionally, adequate stimulation of demand without inflationary pressures is an important element of proper economic growth. Thus, the analysis of changes and proportions taking place between unit labor costs and work efficiency is a necessary element for the research on correct functioning of labor market. The main finding of paper is that in Poland sustainable relation between costs and productivity of labor should be maintained, but simultaneously more effort should be paid to accelerate work efficiency, but not by maintaining low-wages politic.

¹³ A. Kuźnar, *Udział Polski w globalnych łańcuchach wartości*, "Horyzonty Polski" 2017, vol. 8, no. 22, p. 50.

¹⁴ D. Taglioni, D. Winkler, *Making Global Value Chains Work for Development*, International Bank for Reconstruction and Development/The World Bank, Washington 2016, p. 169.

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Streszczenie

Celem podstawowym artykułu jest badanie zmian poziomu wydajności pracy i kosztów pracy oraz analiza i ocena tej relacji w Polsce na tle wybranych krajów Unii Europejskiej. Okres badawczy obejmował lata 2000–2016. Założony cel badawczy realizowano z wykorzystaniem metod studiów literatury przedmiotu, dedukcji, opisu oraz prostych technik statystycznych (Eurostat, GUS) i wizualizacji. Analiza zmian i proporcji zachodzących między jednostkowymi kosztami pracy a wydajnością pracy jest niezbędnym elementem badań nad prawidłowym funkcjonowaniem rynku pracy. Zrównoważony równoczesny wzrost obu czynników jest ważny, jeśli poprawa konkurencyjności gospodarki ma opierać się nie na polityce niskich płac, a na poprawie poziomu rozwoju technologicznego. Polska produkcja opiera się głównie na niskiej i średniej technologii, a dotychczasową konkurencyjność opierała na niskich kosztach pracy. Taki układ w dłuższej perspektywie może okazać się niekorzystny, gdyż może utrwaląć niekorzystną strukturę gospodarki. Poziom jednostkowych kosztów pracy Polski na tle Unii Europejskiej jest niski, podobnie jak poziom wydajności

pracy. Z drugiej strony tempo wzrostu wydajności jest wysokie. Dotychczas tempo wzrostu płac było niższe niż tempo wzrostu wydajności pracy, a równocześnie zachowana była względna równowaga między badanymi zmiennymi.

Słowa kluczowe: koszty pracy, jednostkowe koszty pracy, wydajność pracy, produktywność pracy

Numer klasyfikacji JEL: J30, J38