EJSM Vol. 17, 1/2016, ISSN: 2450-8535 | www.wnus.edu.pl/pl/ejsm | DOI: 10.18276/ejsm.2016.17/1-02 | 13–20

SERVICE BRANCHES AS ACTIVITIES DECREASING WAGE INEQUALITY WITHIN EUROPEAN UNION

Magdalena Cyrek

Rzeszów University, POLAND
e-mail: mcyrek@univ.rzeszow.pl

Received 15 January 2016
Accepted 1 March 2016

JEL classification O11, O14, O47, I31, F15

Keywords wage inequality, convergence, service sector, branches

Abstract

The analysis in the paper is focused on a problem of differences in a level of wages and salaries between EU countries in a sectoral dimension. We try to diagnose a scale of the differentiation and direction of changes within the period of 2004–2013.

In a search for the reasons of wage inequality between countries we pay our attention to structural differences in remunerations. We try to specify which branches are the most and which are the least diversified across EU countries in terms of a level of wages and salaries. As modern development is connected with servicisation of economies we try to specify a character of a service sector considering its ability to equalise remunerations. We verify a hypothesis if the branches that constitute the service sector are those characterised by the lowest level of wage inequality across EU countries.

Structure of the paper leads us from a diagnosis of a relative wage level across branches into assessment of wage inequality in different branches across EU countries. In conclusion we confirm the initial thesis and point out at information and communication as well as financial and insurance activities as the ones with the lowest wage inequality.

Introduction

Growing economic literature focuses on problems of income inequality. At a level of cross-countries comparisons it is strictly connected with an issue of convergence processes resulting in more equal distribution of welfare across nations. However, the consensus about the relationships between an economic growth or development and a level of inequality as well as about main drivers influencing the relationships has not been still

achieved. Some empirical findings are also ambiguous. That justifies some additional attempts to specify a level of inequality and its changes in European Union (EU) countries and to identify modern patterns of the observed differentiation.

A level of income inequality is strongly related to a level of wage inequality, as wages constitute about three quarters of household income (OECD, 2015, p. 136) and are six-seven times higher than capital incomes (Piketty, 2015, p. 14). In the past 25 years wage inequality was increasing across most OECD countries contributing to the increase in income inequality (OECD, 2015, p. 136). On the other hand, inequality between countries seems to be narrowed, mainly within the convergence groups, while inequality within countries is growing and thus a global level of inequality is at a higher level than few decades ago (Kołodko, 2008, p. 151; 2014, pp. 26, 34). Therefore, it is worth to search for reasons for such tendencies.

Some attempts to explain the changes in inequality are focused on structural changes in a process of economic development, which are directly connected with technological impact on economy. They are shaped by some early achievements of economic research, mainly by the Kuznets' inversed U curve (see Kuznets, 1966). In consistency with this structural attitude, we can claim that character of economic growth, specified by its structural composition, influence inequality.

As C. Paunov points out structural changes connected with the transition towards modern sectors may cause temporary increases in inequality. In the early stages the transition process will involve only a small part of the entire population. Those with limited access to the education and financial markets are excluded. In the next phases of changes income inequality declines as more workers leave the traditional sector and adopt the most recent technologies. However, a condition to minimise inequality is connected with interactions among sectors. Spillovers from the leading sector could be taken up by the rest of the economy or the concentration of resources could further depress performance in other sectors. Thus, to simultaneously stimulate growth and reduce inequality it is necessary to support not only the "islands of excellence" but focus on those sectors that favour wider diffusion of knowledge (Paunov, 2013, pp. 7, 14, 25, 28).

OECD Report proves that changes in a character of job constitute a main reason of growth in a wage inequality. They are specified by polarization of jobs connected by transition from routine jobs into non-routine manual and abstract ones. Most of this shift is not connected with movement of labour between sectors but is observed within sectors. Generally it is driven by a knowledge-based economy development, servicisation and ICT development and supports skill-biased/task-biased technological change hypothesis (OECD, 2015, pp. 136, 147, 199).

Discussion about the structural conditions for minimal inequality creates a background to the analysis taken up in this paper. We decided to research an issue of wage inequality at a level of EU countries. The aim of our research is to assess a scale of wage disparities in EU in a sectoral dimension and its changes in time. Moreover, as modern structural transitions are named as servicisation, we try to specify a scale of wage differentiation between EU countries observed in service branches in comparisons to the other branches. Thus we verify a hypothesis if decline in inequalities takes place because of the growth of service branches or not. Potentially positive verification leads us to the necessity to specify the branches.

Method

To assess a level of wage differentiation between EU countries we calculated Gini coefficient, which is the most commonly used measure of inequality. The indicator can be calculated basing on formula (see: Foster, Seth, Lokshin, Sajaia, 2013, p. 94; Jabkowski, 2009, p. 26–41):

$$I_{Gini}(x) = \frac{1}{2N^2 \times \overline{x}} \sum_{n=1}^{N} \sum_{n'=1}^{N} |x_n - x_{n'}|,$$

where: x_n – value of variable for unit n, n = 1, …, N; $\overline{x}$ – average x value for N units.

The coefficient can adopt a value in a range from 0 to 1. The lower is the value the more egalitarian is the distribution, while the value 1 means that only one researched unit gets all and the others get nothing.

We adopted Gini coefficient to analyse international wage distribution, although its basic use is connected with income distribution between individuals/households. However, as wages constitute a main component of personal income it was reasonable to focus our attention on this aspect of distribution. Additionally, to get a general look at international differences in wages it is enough to compare average values for countries.

To reflect the level of wages in each EU country we used data about gross wages and salaries at current prices in euro and divided it by employment (domestic concept) in persons. In such a way we avoided disturbance in data about wages caused by a scale of each economy and we analysed a variable which could reflect an average wage per worker.

We calculated Gini coefficient basing on general data for each EU country. These data cover all NACE activities and reflect a total value for each economy. As availability of data was limited to 27 EU countries (without Croatia), we calculated Gini coefficient for 27 units (N = 27). The calculations respond to a period of 2004–2013 years. Because of additional lack in data for 2013 year for Poland we calculated Gini coefficient in 2013 year concerning only 26 EU countries (N = 26). Thus the results for the last year of the analysis are not directly comparable with the previous period.

In the next step we have taken a sectoral approach to the analysis. We calculated Gini coefficient for 10 branch aggregates specified by Eurostat as:

- Agriculture, forestry and fishing – section A of NACE Rev. 2.
- Industry (except construction) – sections B–E.
- Construction – section F.
- Wholesale and retail trade, transport, accommodation and food service activities – sections G–I.
- Information and communication – section J.
- Financial and insurance activities – section K.
- Real estate activities – section L.
- Professional, scientific and technical activities; administrative and support service activities – sections M–N.
- Public administration, defence, education, human health and social work activities – sections O–Q.
- Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies – sections R–U.

This aggregation allows to analyse branches revealing some typical general features, however, it does not assume they are fully internally homogenous. Analysis of 10 branch aggregates results from a compromise between complexity of detailed research of each section and general information achieved from research of wider aggregates such as three economic sectors (agriculture – industry – services).

Taking sectoral approach we separately calculated Gini basing on data describing an average wage (gross wages and salaries per worker) in the specified branch in 27 EU countries (26 in 2013 year). Thus we gained 10 branch Gini indicators for each year of the analysis.

In our analysis we used data extracted from Eurostat database (www1; www2). They concern aggregates of national accounts. The availability of data seriously limited both period of the analysis as well as its geographical extension. However, it was possible to analyse important changes in sectoral distribution of wages between EU countries in a period after EU enlargement in 2004 year. Thus we were able to make some general conclusions about integration process and a role of sectoral structure of the economy in it.

Relative level of remunerations in branches across EU

Characteristics of each kind of economic activity strongly influence wages of employees. As each branch sets different requirements for workers, concerning their knowledge, professional abilities as well as personal features and creates different opportunities, taking into consideration capital equipment, elasticity of time schedule, length of contract and so on it is obvious that wages and salaries differ across branches. Apart from it, the relative level of remuneration depends on general tendencies in demand for goods produced in different branches and reflects economic scarcity of the products. A growing demand usually results in an increase in wages and salaries of workers employed in a field of consumers' interest. Considering these relationships we can indicate branches with the most attractive perspectives by assessing a relative level of remunerations. In table 1 we presented the average wages and salaries in each branch in relation to the average wages and salaries in total (all branches). We calculated them as a simple average for 27 EU countries (26 in 2013 year).

Table 1. Average wages and salaries in 10 branches as per cent of total average wages and salaries in EU in 2004–2013

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
A	25.65	26.23	26.81	27.70	27.89	27.95	28.82	29.61	30.02	31.21
B–E	117.86	118.31	118.71	118.45	117.50	116.04	117.90	118.99	119.70	120.58
F	92.28	92.07	92.25	92.50	91.45	90.74	90.42	91.10	90.33	89.75
G–I	85.16	85.41	85.23	85.64	85.91	85.50	85.63	85.93	85.96	86.30
J	156.31	155.55	153.94	152.98	152.14	152.49	152.48	151.93	151.92	151.33
K	178.91	182.30	187.56	189.26	183.31	180.89	182.69	180.33	181.00	181.37
L	92.79	92.85	91.48	92.64	92.41	87.42	87.54	86.87	87.10	85.50
M–N	93.63	92.67	92.84	93.23	93.66	93.12	93.02	93.32	93.30	92.22
O–Q	119.54	119.10	118.33	117.11	118.90	120.45	118.57	117.07	115.97	115.41
R–U	68.23	67.75	66.91	66.87	66.44	67.43	67.24	67.15	66.63	65.19

Source: own calculation based on Eurostat data (www1; www2).

As data in Table 1 indicate, we can find the highest level of remuneration in financial and insurance activities. In the whole period wages and salaries in this branch were at about 180% of average level in EU economies, proving the attractiveness of these kind of activities for workers and existence of possibilities of getting extraordinary profits by engaging in the branch. The next branch: information and communication is not lagging behind and gets about 150% of the average level. Thus, these two kinds of activities revealed to be the best fields of employment concerning financial dimension. They are both of immaterial, service character. Their development is a characteristic feature for a knowledge-based economy and they are directly connected with a modern technological and organizational progress. However, many authors point out some threats connected with development of financial services as in a process of "destructive creation" the speculative economy dominates the real economy (see Bhagwati, 2008). This process may increase inequality and make them more exclusive.

In a group of branches with remunerations over the average level were also industry and social services. The latter is strongly influenced by public interventionism as many of these activities are under direct control of a state (e.g. defence) or gets financial support from a "welfare state" (e.g. human health). However, we must stress that these activities are usually responsible for creation and maintaining of human capital and, on the other hand, are basing on human capital engagement. Whereas the former: a modern industry is a branch with a high physical capital equipment and relatively low labour-intensity. This results in high marginal productivity of employees and thus relatively high level of remunerations.

On the other hand, we can point out at agriculture, forestry and fishing as a branch with the lowest remunerations. Their level achieves only about 30% of the average. It reflects poor dynamics of demand for the branch products (in general) as well as some efficiency problems connected e.g. with poor capital (physical and human) equipment or unfavorable size structure of farms. Far below the average level of remunerations were also wages and salaries in sections R–U (other services), not reaching 70% of the average. However, this branch has a very low share in economic activity and additionally is not purely market driven.

Moreover, in a group of branches with wages and salaries below the average level were: real estate activities; trade, transport, accommodation and food service; construction and, amazingly, professional services. The poor results of the last branch could be connected with heterogeneity of the aggregate, covering either services with high human capital engagement and innovative results of activity as well as services basing on manual work of unqualified workers as e.g. cleaning services.

Generally, we can conclude that the highest remunerations go along with high dynamics of the branch and its high capital (human and/or physical) intensity. In contrary, the lowest remunerations are typical for traditional activities basing on manual work and characterised by poor dynamics of demand.

Branch approach to wage distribution across EU countries

Comparison of wage differentiation across countries is also possible by adopting some measure of entropy instead of using a relative level of remunerations. We present in Table 2 the general wage inequality concerning all kinds of activities (A–U) as well as wage inequality in 10 specified branch aggregates measured by Gini coefficient. We have also included in Table 2 some approximations of time tendencies in wage distribution using linear function of trends described by parameters a (trend slope), b (intercept) and indicator R^2.

Table 2. Wage inequality across EU countries in branch aggregates in EU in 2004–2013 measured by Gini coefficient and parameters of its linear tendency

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	a	b	R^2
A–U	0.3700	0.3602	0.3524	0.3382	0.3205	0.3297	0.3282	0.3294	0.3334	0.3256	–0.0044	0.3629	0.6497
A	0.4479	0.4342	0.4257	0.4118	0.3957	0.3932	0.3918	0.3945	0.3998	0.3882	–0.0060	0.4415	0.7761
B–E	0.3871	0.3773	0.3704	0.3547	0.3376	0.3460	0.3417	0.3439	0.3467	0.3378	–0.0050	0.3817	0.7262
F	0.3988	0.3856	0.3730	0.3598	0.3438	0.3569	0.3546	0.3552	0.3615	0.3621	–0.0036	0.3848	0.4408
G–I	0.3577	0.3470	0.3386	0.3228	0.3101	0.3194	0.3182	0.3203	0.3258	0.3178	–0.0037	0.3479	0.5411
J	0.3355	0.3226	0.3161	0.3025	0.2847	0.2880	0.2864	0.2844	0.2886	0.2770	–0.0059	0.3308	0.8162
K	0.3250	0.3151	0.3110	0.3030	0.2757	0.2908	0.2927	0.2905	0.2908	0.2912	–0.0036	0.3183	0.5467
L	0.3661	0.3690	0.3630	0.3415	0.3213	0.3336	0.3344	0.3353	0.3393	0.3503	–0.0030	0.3620	0.3246
M–N	0.3440	0.3355	0.3250	0.3071	0.2946	0.3089	0.3067	0.3092	0.3142	0.3158	–0.0028	0.3317	0.3379
O–Q	0.3402	0.3285	0.3239	0.3125	0.2942	0.3004	0.2997	0.3026	0.3074	0.2944	–0.0042	0.3370	0.6706
R–U	0.3566	0.3464	0.3377	0.3206	0.3084	0.3239	0.3256	0.3264	0.3318	0.3343	–0.0020	0.3422	0.1972

Source: own calculation based on Eurostat data (www1; www2).

The data in Table 2 allow us to indicate some general features of wage distribution across EU countries and their changes in the analysed period. Firstly, we can observe a real convergence of wages within EU as Gini coefficient is decreasing in time (compare a negative sign of *a* parameter) although the process is not very dynamic (low level of the slopes comparing to Gini values). It is true independently if we consider all activities (A–U sections NACE) or any of the specified branches. Integration means that employees across all EU countries will earn more and more similar amount of money. However, the differences are still serious as the Gini is above 30%.

Moreover, the crises noticeably disturbed the decreasing tendency of wage inequality. Wages were strongly converging till 2008 year and then the Gini coefficient were stabilised at a level of 32–33%. We can observe the similar pattern in each of the branch aggregates. Strong wage convergence took place till 2008 year and after the initial economic shock level of wages in different economies started to adjust to the new conditions in a different way. It resulted in diversified directions of Gini changes in different branches. The most serious wage divergence since 2008 year concerned construction (section F) reflecting influence of the crisis on the investment sphere which differed across countries. We can additionally observe a noticeable growth of wage inequality in the last years in some service spheres such as: real estate (L), professional and supporting services (M–N) and the other services (R–U). The rest of activities experienced more stabilised wage distribution in years of the crisis.

Comparing all branch aggregates we can assume that the most serious wage inequality characterises traditional sectors such as agriculture, construction, industry and real estate activities. These branches faced the highest Gini coefficient either at the beginning or at the end of the analysed period. Especially agriculture appeared to be the most diversified field of economic activity across EU countries, probably expressing apart from diversified culture of farming also unequal distribution of privileges and state support for farmers.

Moreover, it is worth stressing that among the most diversified branches only one was of a service character. Even though service activities, as generally immaterial and non-transportable, are perceived as more receptive to local wage conditions, they were able to adjust to the common market conditions and offer more similar wages and salaries for their employees. It was possible because of the labour movement in forms of either migration of workers as well as buying trips of consumers or ICT development.

We can point at the most modern or public kind of activities as the ones with the lowest wage differentiation across EU countries. Information and communication, finance and social services were the branches with the lowest Gini coefficient in both 2004 and 2013 year. It suggests that the branches with the most dynamic growth of value added and featured by technological progress transfer their products/potential internationally and thus equal the payment conditions for employees. It could be connected with both: features of the employees with a high level of human capital and geographic mobility as well as a character of the final product with a high ability to be transferred across borders. It also confirms a smoothening role of a state participation in the economy, which took a form of a welfare state in majority of the EU countries.

Agriculture, information and communication, industry and social services were the branches with the most noticeable decrease in a wage inequality in the analysed period. It is suggested by value of the *a* parameter and the change in points of value of the Gini coefficient between year 2004 and 2013. There is probably no pattern in the dynamic of wage inequality changes across branches, as between the above mentioned we can find those with the highest and with the lowest level of wage inequality, those of both the modern and traditional character and additionally branches which are market-driven as well as state-driven.

Conclusions

Summing up, EU creates common area where employees may earn more and more similar amount of money independently in which country they work. However, as integration is not finished, we can still observe essential wage inequalities between member states. Moreover, convergence of remuneration strongly slowed down in a period of crisis. This negative influence is typical for all branches.

The most equal distribution of wages across EU countries characterises service branches, while in traditional sectors, such as agriculture, construction and even industry they are at higher level. The conducted research supports the initial hypothesis that development of service sector may minimise cross-country wage disparities. This statement seems to be in contradiction to classical theory that treats services as non-tradable sector and thus as one revealing the highest differentiation of prices and wages. However, nowadays we must take into consideration both: heterogeneity of service sector and technological influence on a way in which services are delivered. Cross-border service provision becomes possible because of ICT usage by producers and consumers. This results in more equal prices and remunerations of such services. Moreover, labour and capital movement that is less and less limited within EU may equalise wages and salaries. Thus, the most mobile group of workers may take advantage of higher remuneration in other countries. We can expect that wages of these workers would smooth across countries.

General conclusion about lower wage inequality within service sector is strengthened by comparisons of specified kinds of activity. Within service branches wage inequality is the smallest in the most modern, dynamically developing fields such as information and communication as well as financial and insurance activities. Usage of ICT to serve them and spatial mobility of skilled employees engaged in these branches could explain such pattern.

Public services such as public administration, defence, education, human health and social work activities constitute another field of service activity with relatively low wage differences across EU countries. It proves that state participation in the economy may smoothen disparities across countries. Market mechanism is not the only one to equalise remunerations. In fact sometimes it is not sufficient enough to minimise wage differentiation.

Moreover, real estate activities are characterised by the highest level of wage inequality between service branches. It may be influenced by their strong relation to specified location of properties and thus relatively low

susceptibility to international competition. This additionally supports the view that openness to international movement of final goods as well as factors of production creates conditions to limit wage inequality.

Although complexity of service sector makes it difficult to generalise about its influence on wage inequality, we can expect that differences between EU countries will decrease along with service development. Nevertheless, there is still a lot of place to discuss the character of each branch development in terms of its results for the real economy and inequality.

References

Bhagwati, J.N. (2008). We need to guard against destructive creation. *Financial Times*, October 16.

Foster, J., Seth, S., Lokshin, M. & Sajaia, Z. (2013). *A Unified Approach to Measuring Poverty and Inequality. Theory and Practice*. Washington, DC: The World Bank. DOI: 10.1596/978-0-8213-8461-9.

Jabkowski, P. (2009). Miary nierówności społecznych – podstawy metodologiczne. In: K. Podemski (ed.), *Spór o społeczne znaczenie społecznych nierówności* (pp. 26–41). Uniwersytet im. Adama Mickiewicza w Poznaniu, Seria Socjologia nr 65. Poznań: Wydawnictwo Naukowe UAM.

Kołodko, G.W. (2014). Społeczne i przestrzenne aspekty zróżnicowania dochodów we współczesnym świecie. *Nierówności Społeczne a Wzrost Gospodarczy*, *39* (3).

Kołodko, G.W. (2008). *Wędrujący świat*. Warszawa: Prószyński i S-ka.

Kuznets, S. (1966). *Modern Economic Growth. Rate, Structure and Spread*. New Haven and London: Yale University Press.

OECD (2015). *In It Together: Why Less Inequality Benefits All*. Paris: OECD Publishing, http://dx.doi.org/10.1787/9789264235120-en.

Paunov, C. (2013). Innovation and Inclusive Development: A Discussion of the Main Policy Issues. *OECD Science, Technology and Industry Working Papers*, 2013/01, OECD Publishing, http://dx.doi.org/10.1787/5k4dd1rvsnjj-en.

Piketty, Th. (2015). *Ekonomia nierówności*. Warszawa: Wydawnictwo Krytyki Politycznej.

www1: Eurostat, National Accounts by 10 branches – aggregates at current prices [nama_nace10_c]. Available: http://ec.europa.eu/eurostat/data/database (July 23, 2015).

www2: Eurostat, National Accounts by 10 branches – employment data [nama_nace10_e]. Available: http://ec.europa.eu/eurostat/data/database (July 23, 2015).

Cite this article as: Cyrek, M. (2016). Service branches as activities decreasing wage inequality within European Union. *European Journal of Service Management*, *17* (1), 13–20. DOI: 10.18276/ejsm.2016.17/1-02.