

# Analysis of the relation of remuneration with the effectiveness of business operations of enterprises—sectorial and sectional views

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**Abstract:** This article deals with the issue of linking remuneration with the effectiveness of business operations. The aim of the study was to determine the strength and direction of the relation between remuneration and the effectiveness of economic activity, taking into account its various measures as well as sectorial and sectional division of the Polish economy. For this purpose, data from the Central Statistical Office for the years 2005–2017 was used for values classified as total, public and private sector in addition to PKD (Polish Classification of Activities) sections. To determine the relation in the study, Pearson’s correlation coefficient was used, which was estimated for the relation of remuneration between work efficiency (based on revenues from total activity and net financial result) and profitability (assets, equity, revenues from total activity). Three of the four hypotheses were verified as negative. First, the remuneration was not always related to the effectiveness of business operations. Secondly, the increase in the efficiency of business operations was not always accompanied by an increase in wages. Thirdly, the salary was not always the strongest link to labour productivity. The only positively verified hypothesis was the one which assumed sectorial and sectional differentiation of the relation between remuneration and individual measures of effectiveness of business activity.

**Key words:** remuneration, work efficiency, profitability

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## 1. Introduction

Salary is one of the basic economic concepts. It is of great importance to business entities, employees and national governments. Setting its value is a challenge that is most often thrown at the managerial staff. In the conditions of a global, highly competitive economy, it is necessary for the remuneration to take into account the financial capabilities of paying agents as well as the needs of employees. Therefore, the most popular, but not always applied way of remunerating employees is to make the remuneration dependant on the achieved effects of an economic activity. It assumes the unanimous di-

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rection of the results' dynamics and the remuneration. Managers, when determining the basis used to set remuneration, have a wide range of different types of company's achievements. For this purpose, performance indicators are the most frequently used, which due to the sectorial diversification of the importance of individual measures constitute a very complex group. In the literature on the subject, it is mentioned that the setting of wages should be most strongly dependent on the dynamics of labour productivity or the dynamics of the profitability of the enterprise. All the above statements fill the research gap regarding the method of setting wages. However, there is no research on the development of wages in individual ownership sectors and sections of the economy. Therefore, the following research questions were posed in this article:

1. Was there a relation in all sectors and sections of the economy between remuneration and business performance?
2. Were there sectorial and sectional differences between the remuneration and the effectiveness of business operations?
3. Was there an increase in wages in all sectors and sections of the economy?
4. Was the relation between wages and labour productivity indicators stronger than between wages and profitability ratios?

The purpose of this article is to determine the strength and direction of the relation between remuneration and the effectiveness of economic activity, taking into account its various measures as well as sectorial and sectional division of the Polish economy.

Research hypotheses based on a literature review are as follows:

1. There was a relation in all sectors and sections between the remuneration and the effectiveness of the business.
2. The relation between remuneration and the effectiveness of business activity varied depending on the sector and sections.
3. In all sectors and sections, the increase in the efficiency of business operations was accompanied by an increase in wages.
4. In all sectors and sections, there was a stronger relation between wages and labour productivity than between wages and profitability.

The methods used to verify hypotheses are critical literature analysis, case analysis and statistical significance tests.

## 2. Literature review

Salary fulfils a number of functions in business life. From the company's point of view it is a cost (cost function). However, from the point of view of the employee receiving it, this is an income (income function). This fact makes remuneration an object of interest both for the company that seeks to minimize it as well as for the employee who wants to maximize it. It makes it a distinctive cost factor among other costs in an enterprise (Hamermesh, 2014, pp. 1–10). The board of company use remuneration to form attitudes and behaviours of their employees (motivating function). The motivating function is a consensus between the cost and income functions. Companies spend money on remuneration of employees to buy their work.

They expect quality and high efficiency of work. Employees work according to the expectations of board for the remuneration at the level accepted by them (Oleksiak, 2013, p. 132).

Remuneration is one of the most difficult areas of business management. According to the literature on the subject, the purpose of managing remuneration is, among others: gratification of employees for the created value, harmonization of the method of remuneration with the objectives of the enterprise, setting the culture of high effectiveness of work and communication of the company with employees (Armstrong, 2005, pp. 19–23). The implementation of the above objectives should enable setting the expected employee attitudes in the enterprise (incentive function) (Pinto, 2011, pp. 81–91; Rynes, Gerhart and Minette, 2004, pp. 381–394). Therefore, setting the level and structure of remuneration in an enterprise is a complicated task, which is most often a challenge for the managerial staff (Folwarski, 2017, pp. 105–114; Kawka, 2016, pp. 78–90).

Managers can choose a fixed or variable remuneration system. The basic difference between systems is the degree of linking remuneration with goals. In the system of permanent remuneration, the remuneration results from the adopted structure and philosophy of the enterprise. However, as proven by the research, both the system of permanent remuneration and the system with a low significance of the part associating the remuneration with the effects reduces the activity and initiative of the employees (Bun and Huberts, 2018, pp. 1–21). Therefore, the system of variable remuneration is more often implemented, in which the remuneration depends on the results achieved (Madhani, 2011, pp. 5–17). From an enterprise perspective, consideration of the results generated in the remuneration process is beneficial (Lazear, 2000, pp. 1346–1361; Fibirova and Peter, 2013, pp. 3–19). It allows to increase the efficiency of the labour force, which is reflected in the result of the company's activity (Syverson, 2011, pp. 326–365). At the same time, thanks to its flexibility, the system enables adjustment of labour costs to business cycles (Gielen, 2007, pp. 2–18). In addition, linking remuneration to the company's goals changes the attitude of employees and their perception of the remuneration system and the business itself (Blanchflower, 1991, pp. 3–9).

The policy of a variable remuneration system generates a problem related to the necessity of choosing a clearly defined measure used in the process of setting remuneration. The company can take various results as the effectiveness of its business operations. It is indirectly conditioned by the industry's characteristics and the diversified importance of individual indicators in the financial analysis (Zabolotnyy, 2009, pp. 121). One of the most popular results to be achieved are profitability ratios. They inform about the return on assets, revenues or capital invested by the owner (Ważna, 2012, pp. 526–537). A characteristic feature of profitability is its syntheticity, stemming from the method of calculating the financial result. Therefore, it can form the basis for setting wages (Kruk, 2017, pp. 17–225). However, labour productivity is used more often than profitability, which is in line with the theory of an effective wage (Adamczyk, 2007, pp. 55–65). In this theory, the remuneration depends on the productivity of work (Golnau, 2012, pp. 151–159). The basic assumption of the effective wage theory is the existence of a positive relation between remuneration and productivity (Nyk, 2016, pp. 175–187). Employees should not receive more than they are able to produce (Kotovitch and Maia, 2018, pp. 7–31). Most often, the value of income or financial result divided by the number of employees in the enterprise is considered as labour productivity (Velnampy,

2011, pp. 1–15; Datta, Guthrie and Wright, 2005, pp. 135–145). In addition, it should be remembered that due to the existence of various employee groups in the enterprise, there may be a situation in which objectives are achieved separately for each group (Kopycińska and Wiśniewski, 2016, pp. 167–189).

### 3. Research methodology

The analysis uses statistical data published by the Central Statistical Office for the years 2005–2017. The information on employment as of the 31st of December and the value of revenues from total activity, equity, liabilities, net financial result, average monthly gross remuneration (hereinafter: remuneration) were used. The analyses were made in accordance with the breakdown done by the Central Statistical Office for the general value, including the ownership sector and the section of the Polish Classification of Activities (PKD).

The study was about determining the relation between remuneration and the effectiveness of business operations and the evaluation of this relation. For this purpose, the following indicators of business operations effectiveness were used: work efficiency calculated on the basis of revenues from total activity (hereinafter: income productivity) and net financial result (hereinafter: result productivity), return on equity (hereinafter: ROE), return on assets in total (hereinafter: ROA), profitability of revenues from total operations (hereinafter: ROTR).

The labour productivity rate is the quotient between revenues from total activity and the number of employees as of the 31st of December. The result productivity rate is the quotient between the net financial result and the number of employees for the 31st of December. The ROE ratio is the quotient between the net financial result and the equity. The ROA ratio is the quotient between the net financial result and the sum of equity and liabilities.

The ROTR ratio is the quotient between the net financial result and the revenues from total activity. The remuneration, income and result productivity were calculated using natural logarithm so as to obtain relative values. This treatment will reduce the risk of erroneous results and misinterpretation. Pearson's correlation analysis was used to determine the relation. The degree of connection between the examined features was determined according to the following scale. In the range from 0.0 to 0.3—irrelevant correlation, from 0.3 to 0.5—weak correlation, from 0.5 to 0.7—moderate correlation, from 0.7 to 0.9—strong correlation and from 0.9 to 1.0—very strong correlation (interval right closed) (Mukaka, 2012, pp. 69–71; Watters and Boslaugh, 2008, pp. 169–189). At the same time, the positive value of the coefficient means that the increase in the value of one characteristic is accompanied by an increase in mean values of the second characteristic, while the negative value is that the increase in the value of one characteristic is accompanied by a decrease in mean values of the second characteristic (Samuel and Okey, 2015, pp. 22–28). The level of p-value significance was set to 0.01 or 0.05, respectively. For this interpretation, it was assumed that the null hypothesis means the lack of correlation between the examined features, while the alternative hypothesis means the existence of a correlation between the examined features (Gogtay and Thatte, 2017, pp. 78–81).

## 4. Results

The study consisted in analyzing the relation between remuneration and individual measures of business operations' effectiveness and its evaluation. Table 1 presents the results of Pearson's correlation coefficient and statistical significance calculated for the relation between remuneration and individual measures of the effectiveness of business operations.

In general, the relation between remuneration and individual measures of economic efficiency in the period 2005–2017 was as follows. In the period under consideration, there was almost a full correlation between remuneration and labour productivity (a statistically significant result) and poor dependence on the resulting work performance (statistically insignificant result).

The direction of change in remuneration and both measures of work efficiency was the same. The relation between remuneration and profitability ratios was poor for ROA and ROE, and for ROTR the correlation was irrelevant (statistically insignificant results). At the same time, it was established that the increase in remuneration was accompanied by a decline in profitability, and vice versa.

Taking into account sectorial affiliation, the following was diagnosed. In the private sector, there is practically full dependence, while in the public sector there is a strong relation between remuneration and income performance (statistically significant results). In the private sector, in the audited period, the correlation between remuneration and the result efficiency was irrelevant (statistically insignificant result). In turn, in the public sector, this relation was moderate (statistically significant result).

The direction of change in remuneration and both measures of labour productivity was the same both in the public and private sectors. In the public sector, the remuneration was positively correlated with the following indicators: ROA, ROE, ROTR, while in the private sector negatively. In the public sector, the relation was practically non-existent between remuneration and ROA and ROE, while in the case of ROTR it was moderate (statistically insignificant results). On the other hand, in the private sector, the relation between remuneration and ROA and ROE was weak, while in the case of ROTR dependencies were not diagnosed (statistically insignificant results).

Regarding the sectional division, the following was observed. In four sections, there was practically full dependence (statistically significant results) between remuneration and income performance, in five a strong relation (statistically significant results), in one moderate relation (statistically significant result) and in three weak dependence (statistically insignificant results). Pearson's correlation coefficient was negative only in the Information and communication section, in other sections the direction of change in remuneration and income performance was the same. In two sections, there was a strong relation (statistically significant results) between remuneration and the result work, moderate in three (statistically significant results), one moderate relation (statistically insignificant), four weak dependence (statistically insignificant results) and in three virtually no dependencies were identified (statistically insignificant results).

As in the case of the analysis of the remuneration relation with the revenue-related work efficiency, only in the Information and communication section, Pearson's coefficient was negative. In two cases, a strong negative relation was observed between remuneration and ROA,

ROE, and ROTR (statistically significant results). In the Human health and social work activities section, a strong negative relation was observed between remuneration and ROA, and a moderate negative relation between ROE and ROTR (statistically significant results). In addition, a moderate negative and statistically significant relation between remuneration and ROTR was diagnosed in the Administrative and support service activities section, the ROA and ROE remuneration ratio was both statistically insignificant as well as very infinitesimal.

In five sections between remuneration and profitability ratios, the diagnosed relation was insignificant (statistically insignificant results). In other four sections, the remuneration was moderate: ROA in two cases, ROE in three cases, poor in ROA and ROE in one case, with ROTR in two cases, to a negligible extent from: ROA in one case and ROTR in two cases (statistically insignificant results).

Analyzing the setting of individual effectiveness indicators, the following was diagnosed. In thirteen out of sixteen cases, the relation between wages and the rate of labour productivity was the strongest. In fifteen cases, the increase in the income of labour productivity was accompanied by an increase in wages, and only in the case of the Information and communication section the situation was reversed. From among all analyzed relations in the section Accommodation and catering, the strongest relation between remuneration and the result efficiency was diagnosed.

However, in seven subsequent cases it was the second. As in the case of income productivity of labour in the majority of fourteen cases, the increase in labour productivity was accompanied by an increase in wages. Only in the case of the Information and communication and Construction sections, the situation was reversed. Sections where the strongest relation was not between pay and income or result efficiency was the Information and communication section—where, although negative, the strongest relation was diagnosed with ROA—and the Industry section where also the negative strongest relation was diagnosed with ROE.

In the case of the relation between remuneration and ROA, ROE and ROTR rates, a large variation was diagnosed. Pearson's correlation coefficient between remuneration and profitability ratios assumed values for: ROA nine negative seven positive, ROE eight negative eight positive, ROTR ten negative six positive.

In addition, there were diagnoses of situations in which the direction of change in remuneration was the same as the direction of revenue change and the resulting work efficiency, and the opposite ROA, ROE, and ROTR. This situation was diagnosed in: total, private sector, three sections (Industry, Education, Health and social work activities). The same direction of change in remuneration and all measures of effectiveness of business operations was diagnosed in: public sector and four sections (positive in: Agriculture, forestry and fishing, Transporting and storage, Financial and insurance activities; negative in: Information and communication). In the other six sections, however, the situation was very diverse.

Table 1. Pearson's correlation between remuneration and efficiency rate

Specification	Total	Public Sector	Private Sector	Section				
				Agriculture, forestry and fishing	Industry	Construction	Trade; repair of motor vehicles	Transportation and storage
Work productivity (total revenue)	P.c.	0.959**	0.942	0.922	0.468	0.803**	0.809**	0.864
	S.s.	0.000	0.000	0.000	0.107	0.001	0.001	0.000
Work productivity (net financial result)	P.c.	0.441	0.235	0.668	0.492	-0.014	0.803**	0.523
	S.s.	0.131	0.439	0.012	0.088	0.963	0.001	0.067
ROA	P.c.	-0.414	-0.421	0.543	-0.500	-0.204	-0.168	0.180
	S.s.	0.160	0.152	0.055	0.082	0.504	0.583	0.556
ROE	P.c.	-0.364	-0.377	0.548	-0.550	-0.079	0.141	0.196
	S.s.	0.221	0.204	0.052	0.051	0.797	0.647	0.521
ROTR	P.c.	-0.216	-0.282	0.478	-0.161	-0.184	0.103	0.240
	S.s.	0.479	0.350	0.098	0.600	0.548	0.738	0.429
Specification	Accommodation and catering	Information and communication	Financial and insurance activities	Real estate activities	Professional, scientific and technical activities	Administrative and support service activities	Education	Human health and social work activities
Work productivity (total revenue)	P.c.	0.410	0.951**	0.891**	0.665	0.938**	0.891**	0.969
	S.s.	0.164	0.000	0.000	0.013	0.000	0.000	0.000
Work productivity (net financial result)	P.c.	0.458	0.638*	0.161	0.174	0.493	0.333	0.669
	S.s.	0.115	0.019	0.599	0.570	0.087	0.266	0.012
ROA	P.c.	-0.098	0.284	0.428	-0.290	-0.228	-0.788**	-0.733
	S.s.	0.751	0.347	0.144	0.337	0.454	0.001	0.004
ROE	P.c.	0.028	0.350	0.531	-0.272	0.245	-0.734**	-0.665
	S.s.	0.928	0.241	0.062	0.370	0.420	0.004	0.013
ROTR	P.c.	-0.094	0.359	-0.159	0.044	-0.556*	-0.828**	-0.596
	S.s.	0.761	0.229	0.603	0.888	0.049	0.000	0.032

\* Correlation significant at 0.05 (two-sided). \*\* Correlation significant at 0.01 (two-sided). P.c.—Pearson's correlation. S.s.—subsidiary significance

Source: Author's own study based on the Statistical Yearbook of the Republic of Poland, 2006–2018.



## 5. Discussion and conclusion

The study of the relation between remuneration and individual measures of effectiveness of conducted business activity allowed to achieve the goal of the article, to answer the research questions posed and verify the hypotheses posed on the basis of the literature review.

In all analyzed cases, the value of Pearson's correlation coefficient was different from zero. However, in five out of eighty cases, it was diagnosed that the Pearson correlation coefficient obtained the classification value as a practical lack of dependence between the examined categories. Therefore, one cannot accept the hypothesis assuming that in all sectors and sections there is a connection between remuneration and individual measures of effectiveness of conducted business activity.

In total, in individual sectors and sections, Pearson's correlation coefficient between remuneration and individual measures of the effectiveness of business operations assumed various values. This differentiation is not only due to the fact that Pearson's correlation coefficient assumes a different value of force. This coefficient is also different in terms of determining the direction of co-association of the analyzed values. These statements allow for a positive verification of the hypothesis regarding the sectorial and sub-sectorial diversification of the relation between remuneration and individual measures of effectiveness of business operations.

In the study of eighty cases thirty-two were diagnosed with Pearson's correlation coefficient as negative. This means that in thirty-two cases, the increase in the efficiency of economic activity was not accompanied by an increase in wages. Therefore, it is necessary to reject the complex hypothesis about the coexistence of the growth of individual effectiveness measures of business operations with the increase in wages. It should be noted, however, that the vast majority of Pearson's negative correlation coefficients were the result of an analysis of the link between remuneration and profitability ratios of assets, equity and revenues from total activity.

The results of the study also allow to negatively verify the last hypothesis, assuming that the existing relation between the pay and work performance was stronger than between remuneration and profitability. The study shows that in total, in both sectors and most sections, Pearson's correlation coefficient between revenue and resultant labour productivity was the strongest. However, in two sections, i.e. Industry and Information and communication, the most significant remuneration was related to the return on equity and the profitability of total assets.

The findings of the research allow to conclude as follows. Forming remuneration is a very difficult and complex issue. The theory of management of human resources states that remuneration should depend on the effectiveness of the conducted business activity which may be measured by means of various indicators. In practice, there are a large number of effectiveness indicators and the dependence of remuneration on a specific indicator is an individual issue of the company. The research shows that in a given sector remuneration may be linked with one or more than one effectiveness indicator. It varies from sector to sector and from section to section. Additionally, the theory assumes that remuneration should develop in the same direction as effectiveness, although it should not be viewed as a core principle while forming remuneration. Depending on a sector, the direction of remuneration development may be consistent with only one selected indicator, while the relation with other direction may be opposite. The research also revealed that the direction of a change in remuneration and in effectiveness in-



dicators in some sectors was not the same in all the cases. It means that remuneration may be dependent on factors other than the effectiveness of business activity. The above conclusions supplement those drawn from statistical verification of the hypotheses. It should be noted that forming remuneration is an essential issue in terms of economics, management and finance. It is the area with research gaps and unverified hypotheses worth further examination.

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## Analiza związku wynagrodzenia z efektywnością prowadzonej działalności gospodarczej przedsiębiorstw – ujęcie sektorowe i sekcyjne

**Abstrakt:** W niniejszym artykule poruszono problematykę powiązania wynagrodzenia z efektywnością prowadzonej działalności gospodarczej. Celem badania było określenie siły i kierunku związku pomiędzy wynagrodzeniem a efektywnością prowadzonej działalności gospodarczej z uwzględnieniem różnych jej miar oraz podziału sektorowego i sekcyjnego polskiej gospodarki. W tym celu wykorzystano dane z GUS za lata 2005–2017 dla wartości sklasyfikowanych, jako dane: ogółem, dla sektora prywatnego i publicznego oraz dla poszczególnych sekcji PKD. Do określania związku w badaniu wykorzystano współczynnik korelacji Pearsona, który został oszacowany dla relacji wynagrodzenia pomiędzy wydajnością pracy (bazującą na przychodach z ogółu

działalności i wyniku finansowym netto) a rentownością (aktywów, kapitałów własnych, przychodów z ogółu działalności). Negatywnie zweryfikowano trzy z czterech postawionych hipotez. Po pierwsze, wynagrodzenie nie zawsze było powiązane z efektywnością prowadzonej działalności gospodarczej. Po drugie, wzrostowi efektywności prowadzonej działalności gospodarczej nie zawsze towarzyszył wzrost wynagrodzeń. Po trzecie, wynagrodzenie nie zawsze było najsilniej powiązane z wydajnością pracy. Jedyną pozytywnie zweryfikowaną hipotezą była hipoteza zakładająca sektorowe i sekcyjne zróżnicowanie związku pomiędzy wynagrodzeniem a poszczególnymi miarami efektywności prowadzonej działalności gospodarczej.

**Słowa kluczowe:** wynagrodzenia, wydajność pracy, rentowność