

# How Salaries Influence on Labour Productivity?

Kateryna Kuznietsova

**Abstract:** *The purpose of this paper is to cover the issue of relationship between salaries and labour productivity and consider the possible positive effect of salary rise on the labour productivity levels. High productivity is the basic of stable economical growth, but in the recent years economies of many countries experienced decrease in its levels. In conditions of economical crisis it becomes clear that the rise of labour productivity is necessary condition in process of restoring and successful continuation of economical growth, which leads to necessity of deeper research of mechanisms which could enhance labour productivity. According to the aim the article analyses the relationship between average wages and labour productivity indicators on the example of four countries from different regions and of different level of economical development during 2012 – 2016, an attempt to evaluate the strength of links using correlation coefficientis made. As a result, conclusions about positive and negative relationship between significatives were made and recommendations on using obtained correlations were given.*

**Keywords:** *Labour Productivity, Labour Cost, The Relationship Between Indicators, Salaries.*

## I. INTRODUCTION

In the light of the recent economic crisis most of the countries experienced fall in enterprises effectiveness and labour productivity. For example, for the period of 2017 year United States rate of labour productivity increase, the same as Eurozone, showed a 0.5% slowdown with the following gradual increase [1]. Hence, the issue of restoring and successful continuation of economic growth obtained more popularity in scientific research. Amongst the other issues, relation between salaries and labour productivity has become the topic of scholars` interest as one of the possible ways of improving economies.

The fact of empirical association between salaries and labour productivity level is in a little doubt. Generally this fact is consistent with microeconomic theory, and idea of close dependence between salaries and marginal productivities. Moreover, microeconomic theory also suggests that the labour demand would increase following the salaries growth, due to production extension and enterprise`s profits rise, which puts forward the idea of using the mentioned correlation in the process of restoring economies. From this point of view, salaries adjustments can result in improving of enterprise effectiveness which in turn reflects on the economy growth. The mentioned topic was researched taking the growth of productivity as the reason of wages growth [2], and on the contrary, examining the growth of wages as the mechanism to enhance productivity [3]. Also, issue was looked into using examples of different national economies [4], but there is no any research conducted using new data comparing results for different economies of different regions.

Therefore, the issue is not researched thoroughly and requires full and detailed analysis which makes it worth research and encourages author`s interest [5].

Our desire to research given topic is determined by its importance for modern economics and world economy development in the circumstances of global economy crisis and on the recovery phase.

Relying on this background, the aim of the paper is to explore the relationship between productivity growth and labour productivity, and therefore with enterprise effectiveness outcomes, presuming possibility of using researched data and conducted analysis in the area of performance management and drawing on two main sources:

Firstly, we should briefly review the theoretical background of the issue, including empirical evidence where it is available, examining two existing points of view on the salaries and labour productivity growth as the reason and outcome of the single phenomenon.

Secondly, we will present the analysis of correlation between salaries and labour on the example of five different national economies from different regions of the world and standing on different stages of economical development (*France, Indonesia, Kenya, China*), relying five years statistics of salary changes and changes in labour productivity levels. Correlation coefficientis is going to be made in attempt to prove and evaluate the strength of the correlation between these two indexes. This choice of empirical material for the research is motivated by the international character of the labour productivity increase issue; furthermore, it is determined by the opportunity to evaluate the influence of salary growth on labour productivity on few different levels, to show wide range of correlation variations depending on the economy region and level of development; finally, choice of empirical material is motivated by the practical value of such research for the process of restoring and further development of different national economies that faced the drop in labour productivity levels.

## II. THEORETICAL BACKGROUND

Few theoretical approaches to relationship between wages and labour productivity exist. The most widespread neo-classical theory suggests that wages are determined by labour productivity, which increase, in turn, stimulates economic growth.

Looking closer at scientific researches devoted to the given topic from this point of view, already mentioned Mankiw [2] is worth detailed observation. In his research scientist looked at the relationship between labour productivity and salaries trying to work out the mechanism of using this relationship to increase business profits. As a result,

**Revised Version Manuscript Received on April 09, 2018.**

Kateryna Kuznietsova, School of Management Studies, Yangtze University, Jingzhou City, China. E-mail: [dina.alikperova@gmail.com](mailto:dina.alikperova@gmail.com)

## How Salaries Influence on Labour Productivity?

He found out that decision to hire more employees must correspond with how it will reflect on the correlation between resulting productivity and rise of salaries expenditure. He also found out that salaries are higher in those sectors where productivity is higher, supposing that growth in labour productivity can cause growth in labour demand (due to enterprise development) and, therefore, will lead to increase of salaries. The other researcher, Wakeford [3] noticed the direct relationship between two given significatives. To his opinion, high salaries encourage productivity growth to avoid labour force overflow. Great Seven Countries statistics from the period of 1960 – 2004 were analysed by Narayan and Smyth [4], to confirm meaningful correlation. Among the other researches there are researches based on data from Slovenia [5], Malaysia [6], Romania [7], all of them found strong statistically meaningful correlation between two given significatives.

Talking about correlation between given significatives, Australian researchers Kumar, Geoff, Webber Don [8] also confirmed strong positive relationship between salary growth and labour productivity (noticing that for researched region wage growth exceeds productivity growth), whereas Sidhu [9] found out that for his researched region (India) labour productivity growth exceeds salary increase.

Among the other researchers who worked on this issue, there are some worth mentioning. For instance, Lopez-Villavicencio and Silva [10] worked on such relationship for permanent and temporary workers collecting statistics from OECD countries in 1985 – 2007 and found out that for the first ones salaries growth rates were higher than productivity growth and the opposite situation was observed for the second ones. The other interesting and indirectly connected to the researched issue founding was presented by Mora and Lopez-Tamayo [11]. Their research based on the data from European countries for the period from 1981 – 2001 revealed narrowing the gap between salaries and labour cost, but did not analyse the question of labour productivity.

Relying on the opinion of the mentioned researchers we can suggest the first hypothesis.

Hypothesis 1: positive correlation between given significatives exists.

On the other hand, macroeconomic theory suggests that given relationship may affect economics negatively. Such effect is possible when growth of wages is faster than the growth of labour productivity, which occurs, for example, in the circumstances of labour force shortage [12]. In this situations employers tend to rise wages to cover the existing lack of labour force that leads to rise of production expenditure, therefore productivity does not cover wages growth. In long-term perspective, such situation can lead to economic growth slowdown [13]. On the contrary, if productivity growth and wages growth are balanced, this brings around the possibility of rising productivity without increase of production costs, which leads to further opportunities of rising salaries and business development. That is why high salaries are regarded by some scientists as the element of national economy development [14].

Hypothesis 2: there is negative relationship between labour productivity and salaries growth.

Still, not all of the researchers confirm existence of strong and direct relationship between salaries and labour

productivity. For example, Huizinga [15] and Bruce [16] independently try to prove that modern neo-classical theory is mistaken. To their opinion there is no direct relationship between productivity and salaries, since salaries rate can be determined by the wide range of factors. For example, Huizinga pays attention to the role of classical principle of demand and supply. According to this research, if demand for the production decreases, price of the product, and thus, salaries also will decrease independently from the productivity rates. Moreover, even if labour productivity rises, it will bring about increase of production and in accordance to demand and supply principle will cause salaries decrease. In long perspective even the rise of the salaries in area with high productivity may cause the migration of labour force which results into fall of salaries, which makes the given correlation useless. Relying on the examples of their countries` economies, mentioned scientists claim that relationship between productivity and salaries is meaningful only in short terms. For the long terms it is useless.

Supporting this opinion, there is the third hypothesis made.

Hypothesis 3: there is no correlation between productivity and salaries growth.

To sum up, we should state that most of the researchers who worked on the given topic support the idea of the positive correlation between salaries and labour growth, confirming the idea of possible usefulness of this correlation in process of stimulating economical growth and enterprise development. Still, the topic is arguable, since there are some researches to prove opposite point of view. During the analysis of literature we found out three possible hypothesis devoted to the issue of correlation between labour productivity and salaries. The first one suggests that positive correlation exists. The second one, on the contrary, supposes that there is relationship between given significatives but with negative correlation, where growth of salaries may influence negatively the labour productivity. The third hypothesis denies any correlation between productivity and salaries.

In the next part of the paper we appeal the analysis of the actual international data to examine the hypothesis and to confirm one of them.

### III. METHODOLOGY

The aim of this part of the paper is to present the methods used to evaluate the relationship between salaries and labour productivity. The data represented for analysis in the next part are the coefficients of the annual salary growth and annual changes in labour productivity. There are for countries chosen for analysis – France, Indonesia, Kenya, China. The period of analysis is five years from 2012 to 2016. The initial data is monthly wages rate in the given countries during analysed period (presented in USD) and levels of labour productivity growth (presented in percentage). Data used in the paper is the complex of collected data and own calculations.



In calculations of labour productivity we completely relied on the information resource, salaries growth is represented by own calculations based on the amounts of average monthly wages in the countries chosen for analysis. The formula is following:

$$AWG = \frac{AW_{ap} - AW_{pp}}{AW_{pp}} 100\%$$

AWG – average wages growth;  
AW<sub>ap</sub> – average wages for the actual period;  
AW<sub>pp</sub> – average wages for the previous period.

The correlation coefficient was made in attempt to evaluate the strengths of relationship between labour productivity levels and salaries growth levels. The following formula was used:

$$r = \frac{\sum_{i=1}^n (X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^n (X_i - \bar{X})^2 \sum_{j=1}^n (Y_j - \bar{Y})^2}}$$

where  $\bar{X}$ ,  $\bar{Y}$  - arithmetic averages of productivity growth levels and salary growth levels, correspondingly, which were calculated this way:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

$$\bar{y} = \frac{1}{n} \sum_{i=1}^n y_i$$

Possible values of the coefficient are from -1 to 1, where negative values mean negative correlation, positive values mean positive correlation.

To simplify process of data analysis few line graphs reflecting correlations were built.

#### IV. DATA ANALYSIS

Collection of the data related to the average monthly wages in the countries chosen for the analysis resulted in the next table (the data is presented in USD).

**Table 1. Average Monthly Wages**

|      | France | Indonesia | Kenya  | China  |
|------|--------|-----------|--------|--------|
| 2011 | 3234   | 152,98    | 419,54 | 563,98 |
| 2012 | 3542   | 154,13    | 416,1  | 630    |
| 2013 | 3590   | 160,49    | 502,79 | 694    |
| 2014 | 3643   | 147,14    | 581,76 | 760    |
| 2015 | 3695   | 138,85    | 555,42 | 838    |
| 2016 | 3772   | 171,63    | 526,45 | 895    |

The information about labour productivity for given period is presented in the next table (GPD per capita in USD).

**Table 2. Average Labour Productivity**

|      | France   | Indonesia | Kenya  | China  |
|------|----------|-----------|--------|--------|
| 2011 | 41349,19 | 3262,7    | 999    | 4971,5 |
| 2012 | 41224,73 | 3415,4    | 1016,8 | 5336,1 |
| 2013 | 41249,45 | 3560,1    | 1048,3 | 5721,7 |
| 2014 | 41431,04 | 3692,9    | 1075,6 | 6108,2 |
| 2015 | 41689,71 | 3827,5    | 1107,9 | 6496,6 |
| 2016 | 42013,29 | 3974,1    | 1143,1 | 6894,5 |

Basing on the collected data calculations of salary growth indexes were made. As a result, analysed data presented in the next tables. Next we suggest apply to data related to every particular country and analyse it in details.

Firstly, let us look at salaries and productivity levels growth in France. From the data it is obvious that quick temp of salary growth slowed down significantly in 2013 year, though it remained positive. Productivity levels experienced minor decrease in 2012 with following steady increase during 2013 – 2015 years and slowdown in 2016. As it is seen from the figures, the fastest increase in salary levels occurred the same year when the dip in productivity levels did so. Calculation of correlation index resulted in figure: 0,911, which means that in case with France there is the strong positive correlation between labour productivity and salaries growth.

**Table 3. France**

|        |                     | Salary | GDP   |
|--------|---------------------|--------|-------|
| Salary | Pearson Correlation | 1      | .911* |
|        | Sig. (2-tailed)     |        | .011  |
|        | N                   | 6      | 6     |
| GDP    | Pearson Correlation | .911   | 1     |
|        | Sig. (2-tailed)     | .011   |       |
|        | N                   | 6      | 6     |

The next country to analyse is Indonesia. The thing that must be noticed is that during analysed period average salaries levels in the country were unstable, having experienced serious decrease in 2014 – 2015 years with the next unexpected rise. Talking about productivity levels, they remained quite stable in their positive values with slowdowns in 2014 and 2016. The other important detail is that in 2016 Indonesia experienced strong rise in the levels of salaries on the contrast to fall of productivity that took place the same year, which still led to positive correlation index estimated 0,172. We can suppose that such a change is connected with the specifics of economical situation in Indonesia.



## How Salaries Influence on Labour Productivity?

**Table 4. Indonesia**

|        |                     | salary | GDP  |
|--------|---------------------|--------|------|
| Salary | Pearson Correlation | 1      | .172 |
|        | Sig. (2-tailed)     |        | .744 |
|        | N                   | 6      | 6    |
| GDP    | Pearson Correlation | .172   | 1    |
|        | Sig. (2-tailed)     | .744   |      |
|        | N                   | 6      | 6    |

Addressing to situation in Kenya we can say that low levels of productivity remained during the analyzed period. On the contrast, average salary rates were not so stable, they experienced rocketing increase in 2013 and 2014, the rest of the period salary growth levels decreased. It's worth mentioning that during first three years link between salary rates and productivity is obvious (for this period correlation index is 0,65), but in general for the analysed period Kenya's correlation index is negative, estimated as -0,771.

**Table 5. Kenya**

|        |                     | salary | GDP  |
|--------|---------------------|--------|------|
| Salary | Pearson Correlation | 1      | .771 |
|        | Sig. (2-tailed)     |        | .073 |
|        | N                   | 6      | 6    |
| GDP    | Pearson Correlation | .771   | 1    |
|        | Sig. (2-tailed)     | .073   |      |
|        | N                   | 6      | 6    |

The last country we address to is China. The most noticeable thing here is comparatively high levels of productivity and salary growth and their stability, which can be explained by modern China fast economical development. Productivity growth was pretty stable with minor slowdown after 2012 and 2013. Salary growth rates also remained positive with the minor decrease in 2014 and noticeable one in 2016. As we can see, dynamics are similar for both significatives, which leads to correlation index estimated as 0,76. Such index confirms positive correlation between labour productivity and salary growth rates in case of China.

**Table 6. China**

|        |                     | salary | GDP   |
|--------|---------------------|--------|-------|
| Salary | Pearson Correlation | 1      | .999* |
|        | Sig. (2-tailed)     |        | .000  |
|        | N                   | 6      | 6     |
| GDP    | Pearson Correlation | .999   | 1     |
|        | Sig. (2-tailed)     | .000   |       |
|        | N                   | 6      | 6     |

To sum up, it can be said that during the data analysis we noticed at least partial positive correlation between labour productivity and salaries growth rates in the most of the cases, it revealed its steady character in case of China, France and Indonesia. To make it obvious, we present general correlation for all countries for the analyzed period.

**Table 7. Whole Results**

|        |                     | Salary | GDP    |
|--------|---------------------|--------|--------|
| Salary | Pearson Correlation | 1      | .906** |
|        | Sig. (2-tailed)     |        | .000   |
|        | N                   | 24     | 24     |
| GDP    | Pearson Correlation | .906   | 1      |
|        | Sig. (2-tailed)     | .000   |        |
|        | N                   | 24     | 24     |

As we can see, correlation has generally positive character, which confirms the first hypothesis: there is the positive correlation between salaries and labour productivity exists and, therefore, can be used to manipulate productivity and this way to restore and develop economies.

### V. CONCLUSION

We conducted the research devoted to the influence of salaries on the labour productivity. In the first part of the research we studied the literature related to the given issue. Here we found out that not all the researchers agree on the existence of relationship between salaries and labour productivity, as well as those who support the idea of such relationship not always insist on the positive correlation between productivity and salaries. Therefore, as a result of the literature insight, we made three hypothesis to confirm in the research.

The main conclusion that we can make is that relationship between salaries and labour productivity definitely exists.

Generally, for three of the countries the correlation index was positive, showing positive correlation between significatives (France, Indonesia, China). General correlation that includes the data from all the countries is also positive. Therefore, our research confirms the first hypothesis stated at the beginning of the paper.

To give more detailed insight we offer results of the research for each country with the possible way of using the obtained result:

1. In France, general positive correlation (0,911) occurred, taking into account existence of the positive correlation at some period of time. Thus, for France at the moment our suggestion is to keep salaries growth level to stimulate labour productivity.

2. The second analysed country is Indonesia. Here also the positive correlation revealed (0,172). The same suggestion as for France can be made for Indonesia, since here positive correlation can be observed with resent rocketing growth of salaries.

3. As for Kenya, here situation is different, the correlation is negative (-771). In Kenya decrease of the salaries led to the improvement of the productivity. In such situation, our suggestion is to give more control to salaries with the possible future increase after the peak of productivity increase.



4. In China we could see the direct positive relationship (correlation estimated at 0,999) between salaries growth and productivity levels, since both of these parameters are in constant increase for China. Thus, the suggestion is to continue such policy while it is successful. To sum it up, we can state that our research generally reflected the first hypothesis (positive correlation between salaries and labour productivity), but one case to prove the second hypothesis also occurred. We can suppose that there is positive correlation between salaries growth and labour productivity that can among other method be used to restore economies, but it occurs only on some period of time which makes the supposed way of using given relationship quite difficult and requiring.

#### LIMITATIONS AND RECOMMENDATIONS

This paper was called to contribute to the studies in the area of economics and human resource management. The number of the samples and the analysed period is the first limitation. Bigger quantity of samples and longer period of statistics to analyse could improve research results and make them more precise. Further insight into the specifics of national economies of analysed countries and their development could also bring us to deeper understanding of the research results and allow continuance of the research in the direction of the practical applicability of the found relationship.

#### REFERENCES

1. Global wages report 2016/2017. Wage inequality on the workplace. Available online at: < [http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms\\_537846.pdf](http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_537846.pdf)> (03.04.2018)
2. G. Mankiw, *Macroeconomics*, 5<sup>th</sup> edition, Worth publishers, 2003, 502 p.
3. J. Wakeford, "The productivity-wages relationship in South Africa: an empirical investigation," *Development South Africa*, 21, 2004, pp. 109-132.
4. P. K. Narayan, R. Smyth, "The effect of inflation and real wages on productivity: new evidence from panel of G7 countries," *Applied Economics*, 41, 2009, pp. 1285 – 1291.
5. M. Verbic, F. Kuzmin, "Coefficient of structural concordance and an example of its application: labour productivity and wages in Slovenia," *Panoeconomicus*, 56 (2), 2009, pp. 227 – 240.
6. Tang Chor Foon, "The non-economic effect of real wages on labour productivity: New evidence from the manufacturing sector in Malaysia," *International Journal of Social Economics*, 39 (6), 2012, pp. 391 – 399.
7. Z. Goschin, A.R. Danciu, M. Gruiescu, "The connection between labour productivity and wage in Romania. Territorial and sectoral approaches," 2008, Available online at: < <http://masters.donntu.org/2010/iem/boreyko/library/article05.pdf>> (03.04.2018)
8. S. Kumar, J. Webber Don, P. Geoff, "Real wages, inflation and labour productivity in Australia," *Applied economics*, Taylor and Francis Journals, 44 (23), 2012, pp. 2945-2954.
9. H. Sidhu, "Productivity led wage disparity in the Indian industry," *Indian Journal of Industrial relations*, 45 (3), 2010, pp. 350 – 366.
10. A. Lopez-Villavicencio, J. Silva, "Employment protection and the non-linear relationship between the wage-productivity gap and unemployment", Working paper CEPN-CNRS, University of Paris Nord, 2012.
11. T. Mora, J. Lopez-Tamayo, J. Surinach, "Are wages and productivity converging simultaneously in euro-area countries?" *Applied economics*, 37, 2005, pp. 125-150.
12. R.J. Gordon, "Productivity, wages and prices inside and outside of manufacturing in the US, Japan and Europe," *European economic review*, 31, 1997, pp. 685- 739.
13. M. Bildrici, E.A. Alp, "The relationship between wages and productivity: Tar unit root and

- Tar cointegration approach," *International Journal of Applied Econometrics and Quantitative Studies*, 5, 2008, pp. 93-110.
14. J. Srtauss, M. Wohar, "The linkage between prices, wages and labour productivity: A panel study of manufacturing industries," *Southern Economic Journal*, 70, 2004, pp. 920-941.
  15. F. Huizinga, P. Broer, "Wage moderation and labour productivity," Netherlands Bureau for economic policy analysis, series CPB Discussion Papers, 28, 2004, pp. 28-34.
  16. C. Bruce, "The connection between labour productivity and wages," *Economica LTD, The Expert Witness*, 7 (2), 2002, pp. 68- 74.

#### Author's Profile

**Kateryna Kuznietsova**, Education: Yangtze University, Jingzhou city Hubei province, China. Major: Enterprise Management (Human Resource), Email: [dina.alikperova@gmail.com](mailto:dina.alikperova@gmail.com) , Tel: +380668147607