

Study of the Interrelation between the Dynamics of Wages in the Public and Private Economy Sectors

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Abstract—In this study, the authors analyzed the availability and degree of interrelation between salaries of the budget and private economy sectors in the regional context based on data from 2013 to 2020. Dynamic and graphical analysis of the relationship between wages in the public and private economy sectors indicates that there is a correlation between them, which differs in regions. Regions with low average wages and a low intersectoral wage gap have a high share of "ukazniki"¹ in the total number of employees in the region's economy. Over the long-term, the private sector is the leader in wage dynamics, while the budget sector is only the follower. This is consistent with the "May" executive order of the President of the Russian Federation on ensuring and maintaining equality of salaries of "ukazniki" to the average level in the region's economy, including in the long term. In the short term, the wage level in the private sector depends on wages in the public sector. Private sector decisions are more flexible than state decisions that are regulated by the Budgetary Code of the Russian Federation. In regions of the Russian Federation with a high share of employees in the public sector and a low intersectoral wage gap, the dynamics of wages has an impact on the private sector. With a growing wage gap and decrease in the share of "ukazniki" the impact of changes in the salaries of the budget sector on the private sector is decreasing.

Keywords—intersectoral wage gap, regional differences, the public sector.

I. INTRODUCTION

In Russia, the share of the public sector employment is sufficiently high and according to the employed population structure by kinds of economic activity in the main job on yearly average by the data of the sample labor force surveys performed by Russian Statistic Committee, the share of employment in the public sector is 24.4%².

The share of the public sector in the structure of the regional economy varies depending on the level of economic

development of the subject. Economically developed regions are characterized by a low contribution of the public sector to GRP and budget tax revenues [17]. Regions with struggling domestic economy are characterized by a high share of revenues from state-owned enterprises and institutions in the GRP and tax base [16].

From an economic perspective, if the state provides high salaries to employees, this can lead to an increase in the labor supply in this area. As a result, private sector jobs may be "displaced" if private sector wages do not increase. In addition, such policies may lead to an increase in the budget deficit and/or higher taxes. If instead the public sector pays lower wages than the private sector there may be a problem with hiring and retaining qualified employees.

The income difference can have a significant impact on the private sector's behavior in setting wages. In cases where public sector wages "outstrip" private sector wages, a narrowing of the wage gap can negatively affect competitive ability through wage inflation.

It is assumed that in a number of areas, employment in the public and private sectors can act as a kind of substitutes: if the government of the Russian Federation sets the public sector salary too high, this decision will shift the labor supply of economically active citizens to the public sector. In order to restore economic balance, the private sector will also have to increase wages. In the opposite case, with low public sector wages, positions in it will be unattractive and wages may not increase in the private sector.

In last years the public sector wages were increasing faster than in the private sector. This is largely due to the implementation of the "May" decrees of the President of the Russian Federation (dated May 7, 2012) regarding the remuneration of employees in the social sphere (education, science, healthcare, culture, physical culture and sports,

¹ Specialties that were the main group of execution of the Presidential decree No. 597 "On National Social Policy" dated 07.05.2012 ("May decrees") in terms of bringing the wages of social workers to indicative levels determined by the average salary of employees in the territories.

² To assess the budget sector, we used data on employment in education, healthcare, state administration, maintenance of security and social welfare based on the data of a sample survey of the labor force performed by Rosstat at the end of 2019.

social welfare, etc.), as well as the implementation of additional indexation of remuneration for state employees during pre-election periods.

Assured financing of the state and municipal institutions' activities, as well as guaranteed remuneration of their employees, can become stabilizing factors for the most economically weak regions of the Russian Federation.

Under crisis conditions, in order to lower the deficit, the government's decision to avoid annual wage indexation in the public sector may lead to the need for a "catching-up" increase in salaries to attract and retain qualified staff in the future.

At the same time, rapid growth of wages in the public sector may lead to a retaliatory wage indexation in the private sector, which in turn leads to a cumulative growth in the wage fund in the economy in general and increases pro-inflationary risks.

With a balanced state policy in the field of public spending, the Russian government's plans of increasing wages in the public sector can serve as a guide for the private sector on the level of wage growth in the economy in the current year. Therefore, it is necessary to take into account the specifics of the formation of remuneration in the public sector, as well as the possible impact of government decisions on the labor market in this area in general.

In this paper, we study the hypothesis of the mutual influence of wage dynamics in the public and private sectors of the economy in the regional context.

The significance of the results is due to the possibility of taking them into account in the development of macroeconomic and regional policies. In particular, understanding the mechanisms and parameters of the studied interrelation is relevant in the context of monetary policy pursued by the Central Bank of the Russian Federation, which has been striving to provide a comprehensive micro and meso justification of its policy (see publications on the official website cbr.ru).

At the same time, at the regional level, Executive authorities also need to justify the parameters of such regulation, when faced with imbalances in regional labor markets and seeking to regulate them by changing wages.

II. LITERATURE REVIEW

The study of the interrelation between the size of wages in the private and public sectors is reflected in both Russian and foreign scientific theoretical and empirical works. A detailed review of available research on the wage gap between budget and state sector employees in Russia and in the world is presented in [9; 14].

There are two areas of research. The first one is the analysis of the intersectoral wage gap size, taking into account the individual characteristics of employees, as well as the assessment of factors that play a significant role in the formation of regional differences in the intersectoral wage gap.

The second direction is related to the analysis of the causal relationship between wages in the private and public

sectors and the identification of factors that determine the dynamics of wages.

TABLE I. RESEARCH BY RUSSIAN AND FOREIGN AUTHORS ON THE MUTUAL DYNAMICS OF WAGES IN THE PUBLIC AND PRIVATE ECONOMY SECTORS

Authors	Gimpelson V., Lukyanova A., Sharunina A. [4,5,14,15]	Ivanova M. [9]	Afonso, Gomes [1]
Hypothesis	The dependence of the intersectoral wage gap in Russia on the characteristics of employees and jobs, the economic opportunities of regions, and the heterogeneity of the labor market.	The interrelation between the dynamics of wages in the private and public sectors of the economy.	The interrelation between wages in the private and public sectors, as well as the impact of other determinants on their dynamics.
Conclusions/ results	The analysis showed significant regional differences in the size of the intersectoral wage gap, which are mainly due to the regional structure of employment, as well as the economic and budgetary opportunities of specific regions.	Significant 3 VEC models were built for the private and public sectors and subsectors. In General, in the Russian Federation the private sector is the leader in the long term and the budget sector in the short term.	The impact of public sector salaries on the private sector, as well as such indicators as unemployment, labor productivity, inflation, and hours worked per employee is confirmed.

Compiled by: [1, 4, 5, 9, 14, 15]

III. RESULTS

The study uses data on the level of the average monthly nominal charged wages for a full range of organizations in Russia overall and by regions in absolute value in monthly terms from January 2013 to March 2023, as well as data on the salary and number of individual categories of social and scientific workers.

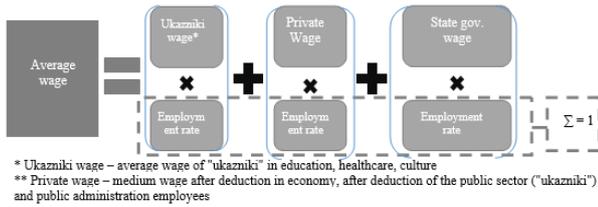
As the wages of the public sector, we use data on wages of «ukazniki» categories of public sector workers in the fields of education and science, healthcare, social policy, culture, physical culture and sports. The «ukazniki» categories are understood as specialties that were the main group of execution of the decree No. 597 "On national social policy" dated 07.05.2012 ("may decrees") by the President of the Russian Federation in terms of bringing the wages of social workers to indicative levels determined by the average salary of employees in the territories [11].

It is worth noting that the achieved levels of wages in the social sphere by the end of 2018 will have to be maintained in the future. In addition, the "The main directions of the

³ Nominal accrued wages by type of economic activity (from January 2013 to March 2020). Data source: Unified Interdepartmental Statistical Information System.

budget, tax and customs tariff policy in 2019 and the planning period of 2020 and 2021 years», approved by the Ministry of Finance of Russian Federation, provides indexation of salaries of "ukazniki" in subsequent years in proportion to the growth of average wages in the territories [10].

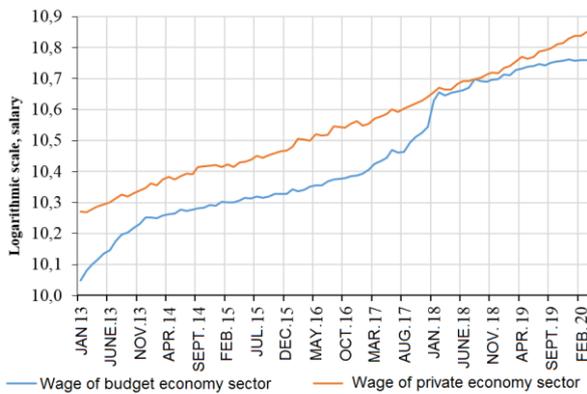
In this study, the average level of wages in the public and private sectors was estimated taking into account the share of employment in Russia. For this purpose, we used data on the employed population structure by types of economic activity in the main job from 2013 to December 2019. In order to calculate the average level of wages in the public sector, the data from the economy sector "State administration" was not used.



Source: compiled by the authors

Fig. 1. Scheme for calculating the medium wage in the public and private sectors of the economy

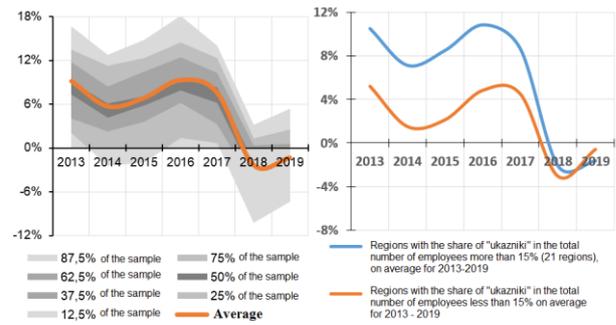
To assess the nature of the mutual dynamics of the wage level in the public and private sectors, data was deseasonalized using the Tramo/Seats method using the JDemetra+software package. Figure 2 shows that by the beginning of 2016, the growth rate of wages in the public sector is slowing down and the intersectoral pay gap is growing. Then, since mid-2016, there has been an acceleration in the salary growth of "ukazniki". By the end of 2018, on average, the gap in Russia was almost leveled due to the need to implement the "May decrees" Of the President of the Russian Federation by 2018.



Sources: Rosstat, UISIS, authors' calculations

Fig. 2. Dynamics of deseasonalized wages in the public and private sectors of the economy in the Russian Federation from 2013 to 2020, rub

In the context of regions, the public-private wage gap of remuneration had increased by 2016. Then there is its reduction at the beginning of 2018. A significant reduction of the wage gap was observed in the regions with a relatively low share in the public sector and became almost equal to the values in the regions with a relatively high employment share in the public sector.



Source: Rosstat, authors' calculations

Fig. 3. Dynamics of the distribution of the ratio of the wage gap in the public and private economy sectors in the regions of the Russian Federation to the average wage in the region, %

To determine the options for evaluating the causal relationship, a check for the availability of a unit root in the data was performed using statistical tests with the help of Eviews software. So, the extended Dickey-fuller, Phillips-Perron Test revealed the presence of a unit root in the data. This indicates the non-stationary nature of the variables. The Johansen test also confirmed the existence of a cointegration interrelation in the data.

Taking into account the dynamic nature of the interrelation between the levels of wage in the private and public sectors, the availability of a cointegration relationship between variables, it is advisable to use the error correction model (VECM) as the main analysis tool. Using VECM models helps determine the direction of the interrelation in the long and short periods. This is the standard approach when performing analysis with this problem.

This model assumes that the short-term dynamics adjusts according to the deviation from the long-term relationship in the data under consideration. The General view of the Vector Error Correction Model is as follows:

$$\Delta x_t = C + \Pi x_{t-1} + \sum_{l=1}^{p-1} \Gamma_l \Delta x_{t-l} + \gamma D + \epsilon_t \quad (1)$$

where, Δx – is the first difference of variables in vector x , C - is the vector of free terms (intercepts), Γ , γ – is the coefficient matrix, D - is the vector of exogenous variables, $\Pi = \alpha\beta^T$, where α - is the matrix of correction coefficients, β – is the matrix of cointegrating vectors.

The VECM model is applied to non-stationary series that are known to be cointegrated. In the case of long-term dynamic behavior, endogenous variables converge to their cointegrating ratios, taking into account short-term dynamic correction, i.e. the deviation from long-term dynamic equilibrium is corrected gradually through a series of partial short-term dynamic adjustments.

The availability of long-term cointegration relations is also based on a theoretical approach: this is consistent with the "May" decrees of the President of the Russian Federation on ensuring and maintaining equality of wages of "ukazniki" to the average level in the regional economy, including in the long term.

According to the tests for the number of lags in the work, three lags were selected according to the SIC (Schwartz) criterion. The model also includes a dummy variable to account for the structural change in early 2018 and 2017. Logarithms of time series are considered during modeling.

Because of the analysis, we found that in the AR-roots model, within the unit circle, there is no autocorrelation and heteroscedasticity of the residues, and the residues are distributed normally.

Thus, according to the VEC model, in the long term, the private sector is the leader and the budget sector is the follower with a rate of adjustment of 2%. The public sector does not have a significant impact on the private sector in the long term. This is consistent with the economy-wide observation and logic. According to the "May" decrees of the President of the Russian Federation of 2012, the salary of "ukazniki" should correspond to the average level in the region, and accordingly adapt to the wage growth in the private sector of the economy. Since there are fewer employees in the public sector and "ukazniki" than private owners, it is private owners who mainly determine the medium wage level in the region.

Consequently, it is their salaries that ultimately determine the salaries of "ukazniki" whose annual indexation depends on the growth and level of private and average wages in the subject.

In the short term, the public sector has a significant impact on the private sector i.e. the public sector is the leader which is confirmed by the Wald/Granger test. Comparable findings for Russia based on data from 2004 to 2014 were obtained in the work of M.A. Ivanova [9].

According to the results of the model, the coefficient of determination (R^2) for salaries in the budget sector is 0.66, and for the private sector – 0.27. It can be concluded that wages in the public sector affect the dynamics of wages in the private sector. However, there are other significant factors that determine the dynamics of wages in the private sector in the short term.

TABLE II. EVALUATION OF THE VEC MODEL FOR PUBLIC AND PRIVATE SECTOR WAGES

№	Name of the indicator	Wage in the public sector	Wage in the private sector
1.	Coefficient of determination (R^2)	0.66	0.43
2.	The coefficient of cointegration	-0.02*	0.018
3.	Granger/ Wald Test (prob.)	0.65 (causality from wages in the private sector)	0.047** (causality from wages in the public sector)
4.	The leader in the long term	-	+
5.	The leader in the short term	+	-

* significance level (10% -*, 5% - **, 1% - ***)

The decrees of the President of the Russian Federation were designed to raise wages in socially important professions. However, this has an impact on the level of wages for the private sector as well. The regional labor market in the regions is quite differentiated, so it is necessary to conduct a cluster analysis. Clustering of regions will give the chance to test the hypothesis: in regions with a high share of "ukazniki" employed in the economy, there is a low average salary and a low wage gap between the budget and private sectors of the economy.

To assess the impact of the wage level of the budget economy sector on private ones, depending on the share of "ukazniki" employed in the regional economy and the intersectoral gap in wages, it is advisable to group and cluster the subjects of the Russian Federation.

In order to rank the regions of the Russian Federation, there was a share calculation of the employment volume in the public sector belonging to the category of "ukazniki" in the average number of employees in organizations in the region for the study period from 2013 to 2019. The obtained results made it possible to identify a number of (TOP-10) regions with a high share (1) and a low (2) share of "ukazniki". The remaining regions are in the middle (average) (3) group (table 4).

The medium wage is based on monthly data for the period from 2013 to 2019. The wage gap between the private and public sector employees was obtained for the same period by comparing the wages of both sectors in the regions of the Russian Federation to the average salary in the territories

TABLE III. TOP 10 REGIONS WITH HIGH/ LOW SHARE OF "UKAZNIKI" ON AVERAGE FOR 2013-2019

Regions	Republic of Tatarstan	Republic of Bashkortostan	Republic of Chuvashia	Republic of Tatarstan	Magadan Oblast	Republic of Khanty-Mansi Autonomous Okrug	Republic of Nenets Autonomous Okrug	Chukotka Autonomous Okrug	Khanty-Mansi Autonomous Okrug	Yamalo-Nenets Autonomous Okrug	Other regions
Share of ukazniki %	34.38	32.61	31.62	30.16	26.23	25.28	23.86	23.78	22.13	19.71	10.72
Medium wage (thousands of RUBLES)	23.11	21.32	23.61	31.66	22.19	23.18	22.26	25.54	22.17	23.69	33.49
Wage gap, %	-11.07	-8.98	-11.29	5.19	-8.50	-8.21	1.48	-8.71	-2.44	3.82	-1.52

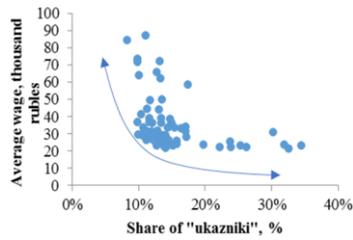
Source: Rosstat, authors' calculations

Based on the type assignment of regions, it can be assumed that there is an inverse interrelation between the level of average wages in the region, its intersectoral gap and the share of "ukazniki" in the territories.

A.V. Sharunina comes to a similar conclusion due to the analysis results of the Consumer Rights Protection Society reporting for 2005-2013 in her work [11]. In this work, it is noted that the welfare level of a region (GRP per capita, the level of wages) affects the gap size. There is a tendency that the level of the intersectoral wage gap is decreasing and the share of employees in the public sector ("ukazniki") is growing as they move from richer to less affluent regions. A high share of employment in the public economy sector and, consequently, a low share of employment in the private economy sector in a particular region may indicate a relatively less developed private sector.

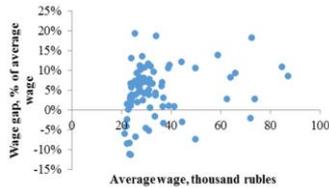
An assessment of the interrelation between the average wage level in the regions of the Russian Federation from the calculated share of "ukazniki" and the gap between private and public sector wages makes it possible to draw the following conclusions:

- With the increase in the share of "ukazniki", the average salary in the region is lower than in regions with a low share of employees in the budget sector (figure 4);
- The lower the gap between private and public sector wages, the lower the average wage in the region and Vice versa (figure 5).



Source: Rosstat, authors' calculations

Fig. 4. The interrelation between the average wage in the regions and the share of "ukazniki" on average for 2013-2019.



Source: Rosstat, authors' calculations

Fig. 5. The interrelation between the wage gap in the budget and non-budget sectors and the average wage in the territories on average for 2013-2019.

Cluster analysis of regions to identify the interrelation between the share of "ukazniki", medium wages in the region and the intersectoral wage gap (private and public sectors) will further confirm or refute the previously proposed hypothesis.

The priority task of clustering is to select objects and features. The objects will be the regions of the Russian Federation.

Clustering features correspond to the hypothesis being tested: the share of employees in the public sector ("ukazniki"), the average monthly nominal wage and the intersectoral wage gap on average for the year.

In order to normalize the selected indicators, their transformation was carried out (the ratio of the share of "ukazniki" in the total number of employees in the region's economy and the intersectoral wage gap of the private and budget sectors to the average nominal wage in the territories).

Therefore, both features are normalized and brought into a single system of dimensions (percentages), which qualitatively increases the performance of cluster analysis.

TABLE IV. CHARACTERISTICS OF REGIONAL CLUSTERING FOR THE PERIOD FROM 2013 TO 2019 (THE CLUSTER CENTERS)

Cluster	2013	2014	2015	2016	2017	2018	2019	Average (2013-2019)
<i>Share of «ukazniki» in the number of people employed in the region's economy, %</i>								
1	27.9	27.3	27.7	29.0	28.3	27.3	27.2	27.8
2	12.5	12.3	12.4	12.1	11.6	11.1	11.0	11.9
3	14.0	13.7	13.5	13.6	13.2	12.7	12.6	13.3
<i>Average wage, rub</i>								
1	19 984	21 416	21 823	22 655	24 005	27 358	29 534	23 825
2	57 008	61 830	63 410	67 823	70 387	77 454	85 603	69 035
3	24 483	26 497	27 419	29 155	30 821	33 959	37 110	29 961
<i>Intersectoral gap between private and public sector wages in the average nominal salary of the region, % of the medium wage in the territories</i>								
1	-2.2	-6.5	-6.6	-5.4	-4.4	-7.8	-4.1	-5.3
2	12.5	10.1	12.6	14.4	9.4	-0.6	1.8	8.9
3	10.3	6.8	7.9	10.6	9.0	-1.9	-1.5	5.8

Source: compiled by the authors

Clustering was performed using R software using the "k-means" method for the period from 2013 to 2019. The optimal number of clusters is determined by the "elbow method" - 3 clusters. An increase in the number of clusters to four ones led to the cluster fragmentation with the largest number of regions, which resulted in mixed results and significant fluctuations in the number of regions in new clusters. In the end, we have obtained robust results that confirm the hypothesis under study.

It is worth noting that in 2014-2015 there was no uniform indexation of wages around the country. Indexation of "ukazniki" was not carried out selectively for all categories and subject to availability.

Figure 6 shows a cartogram of the distribution of Russian regions by formed clusters on average for 2013-2019 (based on table 4.).



Source: authors' calculations

Fig. 6. Cartogram of clustering of Russian regions by mutual influence of wages in the budget and private sectors on average for 2013-2019

The first cluster was formed by regions with a high share of "ukazniki" (9 subjects of the Russian Federation). These regions have always had the lowest salaries and a negative wage gap between sectors. Throughout the period under review, this group included the southern republics and some regions of Siberia: Kalmykia, Dagestan, Ingushetia, Karachay-Cherkessia, Kabardino-Balkaria, North Ossetia, Chechnya, Altai, and Tyva.

The second cluster was formed by regions with a low share of "ukazniki" and high wages and an intersectoral wage gap (10 subjects of the Russian Federation). During the period under review, this group included resource-rich regions and remote territories.

In general, the clustering helped to group the regions of Russia by the mutual influence of wages in the private and public sectors and confirm the hypothesis that regions with a high share of "ukazniki" employed in the economy have lower medium wages and a low wage gap between the private and public economy sectors.

This information is useful when analyzing the change impact of public sector wages on private sector wages, specifically: in regions with a high share of the public economy sector and a small difference in the wage levels in the private and public sectors; changes in the latter will mainly affect the wage dynamics in other sectors of the economy and, accordingly, these changes are most likely to lead to greater pro-inflationary pressure and will require a certain response from the regulator. At the same time, all other things being equal, this may lead to a source shortage of funding for budget expenditures, including labor payment.

To assess the response of private sector wages in the context of regions to changes in public sector wages for each of the clusters, a panel Error Correction Model was constructed using Eviews software from January 2013 to March 2020 (87 observations). The use of this class of models caused by the availability of cointegration relations between the variables at the level of the Russian ideas about the "May" decrees of the President of the Russian Federation (2012), on the wage dynamics of "ukazniki" categories of public sector employees with reference to the average wage in the territories.

The logarithms of deseasonalized wages of the private and public economy sectors is used as variables. According to the obtained estimates of the extended Dickey-fuller test, these variables are non-stationary I (1), but their residuals are stationary at the significance level of 5% in each cluster. In general, the Error Correction model (ECM) looks like this:

$$\Delta y_t = \mu + a\Delta x_t - \beta(y_{t-1} - c - \gamma x_{t-1}) + \varepsilon_t \quad (2)$$

where Δy_t , Δx_t – are variables in the first difference; a , β , γ , μ , c – coefficients; ε_t – error; c , μ – intercepts.

In each model, the Hausman test indicates the need to use a model with Random effects.

TABLE V. SPECIFICATIONS OF PANEL REGRESSIONS FOR CLUSTERS OF RUSSIAN REGIONS

№	Cluster	The dependent variable, the economy sector	Coefficient of determination, R ²	Short-term effect (a)	Long term effect (B, the correction factor)
1	Cluster 1	Private	0.31	0.40	-0.038
		Public	0.33	0.47	-0.101
2	Cluster 2	Private	0.16	0.10	-0.036
		Public	0.41	0.20	-0.115
3	Cluster 3	Private	0.26	0.13	-0.063
		Public	0.34	0.20	-0.041

Source: authors' calculations

Table 5 shows that the impact of wage changes in the public sector on the wage dynamics in the private sector is higher in cluster 1 with the highest share of "ukazniki" and the smallest wage gap between the private and public sectors of the economy. The impact of public sector wages is decreasing.

In addition, according to the ECM models, in the first differences in cluster 1, the public sector wages have a significant impact on the wage dynamics in the private sector according to the Granger Test. In the regions of cluster 2 with a high level of the average wages of the intersectoral wage gap and a low share of "ukazniki", wage changes of the budget sector do not have a significant impact on wages in the private sector.

Thus, we can make a conclusion that in a crisis, the wage indexation in the public economy sector, all other conditions being equal, can lead to a retaliatory wage increase in the private sector of the economy.

This, in turn, can lead to cost increase for enterprises and increased pressure on businesses during the crisis period. The effect of this is higher in less economically developed regions with a high share of employees in the public economy sector. However, the wage indexation freeze in the public economy sector under the crisis may lead to a greater increase in the cost of retaining and hiring qualified employees to restore balance in the labor market in the future.

IV. CONCLUSION

The regional analysis of the dynamics and nature of variations in the wage gap between employees in the budget and non-budget sectors in the Russian economy has shown that there is a correlation between wages in the budget and private sectors of the economy. A similar nature of the interrelation on the all-Russian data was found in the work of A.V. Sharunina [14]. There is significant regional variation in estimates of intersectoral gaps. Regions with low average wages and an intersectoral wage gap have a high share of "ukazniki" in the total number of employees in the region's economy. In addition, the study showed that on average, intersectoral gaps have decreased over time, including due to the implementation of Presidential Decree "On National Social Policy" dated 07.05.2012 ("may decrees") in terms of bringing the wages of social workers to indicative levels determined by the average salary of employees in the territories.

In the context of a balanced government policy, the annual indexation of wages in the public sector can serve as a guide for wage changes in other sectors, for maintaining a balance in the labor market, as well as for assessing the expected level

of inflation. During periods of sharp economic downturn and the private sector revenue contraction caused by quarantine measures, the stability of public sector incomes will support domestic consumer demand.

At the same time, the wage indexation in the public sector of the economy during the crisis can lead, all other things being equal, to an increase in wages in the private sector that is not caused by an increase in labor productivity. Therefore, this can cause negative consequences for organizations, such as increased costs and reduced competitive ability.

The wage Indexation of the public economy sector under the crisis can act as a stabilizing factor in maintaining demand in the economy in regions with the lowest share of "ukazniki" categories among the employed in the economy, since its impact on wages in the private sector is the smallest.

The unavailability of wage indexation in the budget sector under the crisis may lead to the need for a significant increase in labor costs in the long term, to retain and hire highly qualified staff and restore balance in the labor market.

Research shows that although a public sector wage freeze reduces public spending in the short term it is not an effective policy measure to reduce public spending in the medium and long term [18]. In addition, the study shows a long-term trend of leadership of the private sector in the remuneration dynamics and the budget sector acts as a follower. The result is consistent with the "May" decrees of the President of the Russian Federation on ensuring and maintaining equality of salaries of "ukazniki" to the average level in the regional economy. In the short term, the wage level in the private sector depends on wages in the public sector. Private sector decisions are more flexible than state decisions that are regulated by the Budgetary Code of the Russian Federation.

It is also worth noting that in general, the effect of wage growth in the private sector exceeds the effect of wage growth in the public sector.

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