

different approaches to the formation of a system of indicators for assessing the economic security of regions, their number, aggregation; the complexity of calculating indicators; availability of information; mathematical tools that are used to calculate indicators of economic security of regions. As a result of the analysis, a comprehensive approach to assessing the economic security of regions is proposed, which involves a sequence of certain stages: 1) grouping of the regions of Ukraine using cluster analysis methods according to the main socio-economic indicators to determine the state of their socio-economic development; 2) calculation of the integral indicator of the economic security of the region using a fuzzy-logical approach, which will allow comparing the state of the economic security of the region both with other regions of Ukraine and with regions of other countries of the world; 3) assessment of the level of threats that affect the economic security of the region using expert assessments for 7 groups of threats (industrial and technological nature; financial; organizational and legal; social and demographic; technogenic environmental; environmental pollution; information); 4) SWOT analysis for the study the strengths and weaknesses of the region, threats and opportunities, in order to further use the data obtained to develop a concept and strategy for the activities of regional authorities to improve the socio-economic situation of the region. 5) the use of an effective approach, which is based on the assessment of GRP per capita, as a generalized indicator of the economic security of the region, to assess the possibility of economic growth in the region.

Keywords: economic security of the region, threat level assessment, expert method, SWOT analysis, effective approach.

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<http://doi.org/10.35668/2520-6524-2021-3-04>

UDC 331.2, 331.5

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THE INTERCONNECTION BETWEEN LABOUR PRODUCTIVITY AND REAL WAGES IN AZERBAIJAN

Abstract. The presented article analyses the interconnection between real wages and labor productivity in Azerbaijan in 19 types of economic activity, as well as in the sub-sectors of the manufacturing in the period of 2010–2019. In general, the average annual growth rate of labor productivity in the economy, including mining, construction, professional scientific and technical activities, and entertainment and recreation activities (2010–2019) was negative. The average growth rate of real wages was negative in the construction and activities of administrative and support services. Simultaneously, the average annual growth rates of real wages were compared with labor productivity, and it was determined that the growth rate of labor productivity is approximately proportional to the growth rate of real wages. However, in 2019 real wages exceeded labor productivity which was due to the simultaneous increase in the minimum wage of the country in 2019.

Keywords: labour productivity, real wages, types of economic activity, Azerbaijan.

INTRODUCTION

The result and efficiency of purposeful activity of a person in the fields of economy is character-

ized by the quantity of material goods created by him for a certain period of time. In other words, the level of labor efficiency is determined by its

productivity. Labor productivity is characterized by the ability of a particular type of labor to produce more or less output per unit of time. It is possible to increase the level of productivity by quantitatively increasing the product produced per unit of time or reducing the amount of time spent on the production of a unit of product. Increasing labor productivity is considered to be one of the main and decisive factors in increasing national income and improving the well-being of the population.

The growth rate of labor productivity should be higher than the growth rate of the average wage. This is a necessary factor in the process of large-scale reproduction. As a result of increasing labor productivity, it is possible to reduce the cost of production by reducing conventional fixed costs per unit of output through satisfying wage costs, increasing production and improving the use of production capacity. The reduction of labor costs as a result of the application of advanced technologies is usually accompanied by savings in material resources, which results in a decrease in the cost of production for all items of expenditure. Labor productivity is one of the most important determinants of real wages. Its analysis plays a very important role in shaping economic policy.

The article uses the value-added created by economic sectors in 2010–2019, the number of the employed population, as well as nominal wages and consumer prices. The relationship between real wages and labour productivity in the economy as a whole, in the areas of economic activity, and in the sub-sectors of the manufacturing was analysed.

LITERATURE REVIEW

Labor productivity is one of the important economic indicators closely related to concepts such as economic growth, competitiveness, living standards. In a globalizing world, with the development of science and technology, companies and the countries in which they are available, have to adapt to a competitive and complex environment. The concept of productivity has come to the forefront in ensuring competitiveness. Labor productivity and the total factor productivity used by the fields of economic activity in the production process are being studied today.

If we look at the history of labor productivity initiatives in world practice, the first research on labor productivity dates back to the post World War II period. As a result of increased incentives and stimulation in the economy since the 1950s, interest in research in this area has increased, which in turn has resulted in the study of labor productivity in various fields. One of the first such experiments was applied in the textile industry in Germany, and as a result, in the 1960s, the United

Kingdom, which applied the same method to other industries, developed a number of methods for measuring productivity. In parallel with the United Kingdom, the United States, France, Japan, etc. began to explore the issue of productivity.

Labor productivity is one of the most important determinants of real wages. Despite this, wages and productivity differ in practice due to various economic and institutional factors. Erik S. Katovich and Alexandre Gori Maia analyzed the relationship between labor productivity and wage dynamics in Brazil in 1996–2014 and adopted a sectoral perspective in order to take into account different trends between economic sectors. The results show that labor productivity is significantly positively associated with wage levels in all economic sectors, but institutional factors such as employment contracts and minimum wages have the same significant impact, and that wage growth in 1996–2014 was equally important as the transformation of production structure in Brazil that was a result of institutional changes [6].

Dursun Balkan and Halit Suicmez studied the level of and the rate of change in labor productivity among the world countries and Turkey and also compared labor productivity in the manufacturing industry between Turkey and European countries. Ratio analysis method was used in the period between 2005–2014. The results indicate that between 2005 and 2014, Turkey ranked 17th among 24 OECD countries, and annual labor productivity growth averaged at 1.64 % per year [2].

Zekeriya Yildirim in his paper to examine the interrelationships among productivity, real wages and inflation in the Turkish manufacturing industry for the period of 1988:1 to 2012:2. The paper employs both cointegration analysis and a Granger causality test. This paper finds that inflation has a greater effect on labour productivity than do real wages. Furthermore, the Granger causality test shows that there is a strong feedback between labour productivity and inflation, suggesting policymakers targeting inflation should follow labour productivity [8].

In Canada, a number of analysts have examined the relationship between labor productivity and real wages. Fisher and Hostland found that although the relationship was stable between 1956 and 2001, labor productivity growth significantly outpaced real wage growth from 1994 to 2001 [7].

THE RELATIONSHIP BETWEEN LABOR PRODUCTIVITY AND REAL WAGES IN AZERBAIJAN

Analysis of labor productivity by types of economic activity shows that the disproportions in the sectoral and territorial structure of the economy are one of the main factors contributing to the low

Table 1

Labor productivity in the types of economic activity, (2010 = 100), thousand manat/person

Areas of the economy	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average growth rate of labor productivity over the years, %
Total economy	9.1	9.0	9.0	9.4	9.5	9.4	8.9	8.8	8.9	8.9	99.8
Agriculture, forestry and fishing	1.4	1.5	1.6	1.7	1.6	1.7	1.7	1.8	1.8	1.9	103.5
Mining	469.5	424.6	397.2	395.2	392.0	419.8	433.8	416.1	392.8	394.2	98.2
Manufacturing	9.6	10.2	10.4	10.2	10.5	11.2	10.5	10.1	10.5	11.2	101.8
Electricity, gas and steam production, distribution and supply	13.1	14.5	16.0	15.9	18.3	20.0	19.8	19.1	20.5	19.1	104.5
Water supply, waste treatment and disposal	1.8	2.1	2.1	2.3	2.4	2.5	2.1	2.0	1.6	2.3	104.2
Construction	12.0	13.4	15.1	18.2	19.2	16.5	12.5	12.4	11.1	10.5	99.5
Trade; repair of vehicles	4.3	4.7	5.1	5.4	5.8	6.4	6.4	6.5	6.7	6.9	105.5
Transport and storage	13.2	12.9	13.5	14.3	14.8	13.7	13.5	14.5	15.4	15.4	101.8
Accommodation and food service activities	9.4	11.3	13.2	15.2	15.9	16.4	15.0	15.0	15.1	15.6	106.2
Information and communication	14.2	15.3	17.5	19.5	22.1	23.1	23.9	25.2	27.2	31.7	109.4
Financial and insurance activities	20.2	19.0	18.8	18.6	20.4	21.2	22.9	22.6	22.3	22.8	101.5
Real estate activities	9.9	10.9	11.3	11.9	12.2	11.8	12.0	11.9	11.8	10.8	101.1
Professional, scientific and technical activities	9.5	9.9	8.8	9.1	8.9	8.8	7.6	7.6	7.9	8.1	98.4
Administrative and support service activities	4.9	5.2	5.4	5.5	5.6	5.6	5.2	5.5	5.3	4.9	100.1
Public administration and defence; social security	3.1	3.2	3.4	3.7	3.7	3.8	4.1	4.1	4.1	4.3	103.8
Education	4.1	4.3	4.4	4.3	4.2	4.2	3.8	3.8	3.9	4.1	100.1
Human health and social work activities	4.0	4.4	4.7	4.6	4.6	4.5	4.2	4.2	4.4	4.6	101.7
Art, entertainment and recreation	4.8	5.3	5.7	5.9	5.6	5.5	4.5	4.5	4.1	4.4	99.4
Other service activities	3.4	3.3	3.3	3.9	3.7	3.5	3.5	3.4	3.5	3.4	100.2

Source: Compiled by the author on the basis of data from the State Statistics Committee (SSC).

level of labor productivity in some sectors. Thus, in many cases, the level of competency of the employed population as a whole, lags behind the existing needs, resulting in inadequate staffing in some sectors, and the dominance of low-skilled workers in other sectors.

In **Table 1**, the calculation of labor productivity by types of economic activity was performed using the value added created by sectors and the number of employed people working in them. At the same time, the physical volume index of value added in each sector was brought to the base level of 2010, and the nominal indicators of value added were divided into basic physical volume indices and transformed in real.

As can be seen from the table, the highest levels of labor productivity in the country are observed in the mining industry, information and communication, as well as financial and insurance activities. Among the types of economic activity, the lowest productivity is agriculture. Despite the fact that more than 30% of the population is employed in the agriculture industry in the period under review, the level of labour productivity is low. This is due to the fact that all landowners in the country are registered as employed.

As all those who own land in agriculture are registered as employed, their number has increased significantly, and this has been reflected in the calculation of labor productivity and high employment in this sector. There is a need to strengthen the statistical base in this area, as owning land does not mean engaging in the production process in agriculture. Despite the low labor productivity in agriculture, the average annual growth rate of labor productivity in this sector in 2010–2019 was 3.5 %. On the economy as a whole, the average growth rate of labor productivity over the past 10 years was 0.2 %.

At the same time, the analysis shows that in the period after 2015, as the country's economy was facing new challenges, there was an increase in other areas while there was a decline in labor productivity in a multiple area. During this period, there was an increase in labor productivity in agriculture, forestry and fisheries, trade, repair of vehicles, transport and storage, financial and insurance activities, as well as public administration and defense; social security.

When looking at the average annual growth rates covering the 10-year period, the most labor-intensive areas are mainly information and communication, tourist accommodation and catering, trade, repair of vehicles, etc. In other areas, the situation was as shown in Table 1. According to the official statistics of the State Statistics Committee, the GDP produced by one employed person in 1

working hour in 2019 amounted to 8.6 manat/hour. Compared to 2015, this figure increased by 41 %.

Against the background of the threats posed by the COVID-19 pandemic in 2020, the forecasts of economic growth of all international financial institutions and organizations have been marked by negative trends for developed and developing countries. The negative effects of the COVID-19 pandemic on the global economy have not gone unnoticed in the Azerbaijani economy, and the government has taken precautionary measures to prevent the spread of the virus to a wider population, while partially or completely restriction a number of economic activities. As a result, GDP decreased by 4.3 % in 2020 in comparison to the previous year, including a decrease by 2.6 % of GDP in non-oil and gas [1].

At the same time, in 2020, the liberation, restoration and reintegration of the territories of Azerbaijan with rich economic and resource potential (20 % of the country's territory) which was occupied for almost 30 years will allow us to move to a new stage of economic development in the coming years. The region's potential includes industry, agriculture, tourism, etc. It will create great opportunities for the creation and expansion of competitive products and services, as well as increase labor productivity in the coming years.

The increase in labor productivity also raises the issue of changes in real wages. According to the theoretical relationship between real wages and labor productivity, an increase in real wages larger than labor productivity reduces the share of profits by increasing the share of wages in income, or vice versa.

Therefore, when comparing real wage growth and labor productivity, it is important that the size of wages be comprehensive, which should include, in particular, employers' contributions to retirement plans and additional income, including additional health benefits. The dynamics of labor productivity and wages show significant differences in practice for a number of institutional, and these differences have important implications for the economic development of each country.

In Azerbaijan (**Table 2**), the level of real wages by type of economic activity was calculated on the basis of the average monthly nominal wage by sector and the consumer price index, with 2010 selected as the base year. The types of economic activity with the highest real wages, as well as labor productivity, is the mining industry (1,948 manats in 2019), financial and insurance activities (1,024 manats in 2019), and the professional and scientific-technical activities (752 manats in 2019) and so on.

The increase in real wages in the economy as a whole in 2019 was due to the increase in the mini-

Table 2

Real wages by types of economic activity, (2010 = 100), Manat

Areas of the economy	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average annual growth rate of real wages, %
Total economy	331.5	337.5	365.2	380.6	392.4	396.4	377.5	353.5	356.1	404.8	102.4
Agriculture, forestry and fishing	160.3	182.0	184.3	195.1	213.0	208.7	191.7	174.9	183.8	236.7	105.0
Mining	1004.7	1094.0	1285.2	1357.4	1548.4	1843.0	2120.1	2055.0	1938.3	1947.5	108.0
Manufacturing	320.5	328.5	365.6	393.3	437.4	448.1	410.0	370.6	362.3	403.0	102.9
Electricity, gas and steam production, distribution and supply	349.4	383.1	406.7	418.2	432.0	435.7	381.2	366.5	381.4	407.2	101.9
Water supply, waste treatment and disposal	197.7	214.9	251.9	290.9	292.9	282.9	242.7	217.1	199.2	298.8	106.2
Construction	505.8	481.4	538.6	560.0	553.5	575.3	613.9	524.0	456.9	469.9	99.5
Trade; repair of vehicles	282.8	310.6	315.1	325.7	330.2	321.0	288.7	257.9	255.2	306.1	101.3
Transport and storage	395.1	414.1	468.9	480.1	468.2	488.8	490.4	490.9	527.6	545.4	103.7
Accommodation and food service activities	333.7	356.8	370.9	398.0	409.6	394.4	359.6	342.0	354.2	362.2	101.1
Information and communication	531.3	534.4	570.1	604.6	648.9	634.3	590.6	582.4	576.3	640.7	102.2
Financial and insurance activities	990.2	931.0	967.6	1008.4	1058.4	1027.9	928.4	928.3	954.3	1024.4	100.5
Real estate activities	168.1	211.6	234.3	263.1	272.1	261.6	254.5	237.2	276.3	355.8	109.4
Professional, scientific and technical activities	592.2	556.1	569.0	597.2	591.2	638.7	669.5	690.8	689.7	752.3	102.8
Administrative and support service activities	526.7	495.9	516.3	522.7	500.2	460.6	410.6	366.5	358.5	246.1	92.5
Public administration and defence; social security	376.5	373.2	414.9	407.3	423.4	420.0	385.6	357.6	389.7	509.8	104.0
Education	271.8	262.7	263.4	262.8	263.1	255.6	231.9	215.5	238.9	279.7	100.6
Human health and social work activities	155.2	152.0	160.5	162.6	174.6	173.3	162.2	148.8	156.5	224.6	105.1
Art, entertainment and recreation	208.4	195.5	193.7	197.5	220.8	214.5	195.5	179.5	193.6	270.1	103.8
Other service activities	280.3	307.5	337.0	338.0	353.3	375.1	357.5	443.2	413.1	402.7	104.5

Source: Compiled by the author on the basis of the State Statistics Committee.

minimum wage in the country that occurred twice — in March and September. The table shows that the average growth rate of real wages in the last 10 years was highest in real estate (9.4 %), mining (8 %), water supply, waste treatment and disposal (6.2 %), administrative and support services (-7.5 %) and construction (-0.5 %) (Table 2).

As noted above, the comparison of real wages with labor productivity in the country was calculated on the basis of the 2010 consumer price index and the physical volume index (Figure 1). GDP was taken as the calculation of labor productivity, and the average monthly nominal wage in the economy was taken as real wages. The increase in labor productivity (in real terms) is approximately proportional to the increase in real wages. This reveals that inflation is not yet expected in the country. In 2013–2016, the growth rate of real wages was relatively higher than the growth rate of labor productivity. As noted above, the increase in real wages over labor productivity in 2019, was an in-

crease in the minimum wage, which in turn led to an increase in average monthly nominal wages in economic activities. In general, the decline in labor productivity growth results in subsequent periods of inflation. The manifestations mentioned above are one of the main reasons for the rise in the dynamics of consumer prices after the first half of 2017.

According to Biesebroeck (2015), when real wages lag behind productivity growth, the distribution of income between capital and labor shifts in favor of capital, potentially worsening income inequality and reducing aggregate demand. When wage growth outpaces productivity growth, export competitiveness and investment may suffer [3].

Now let’s consider the relationship between real wages and labor productivity in the sub-sectors of the manufacturing industry (Figure 2). First of all, it should be noted that, unlike economic activity, labor productivity in the manufacturing was determined by multiplying the volume of industrial output in each sub-sector by the physical

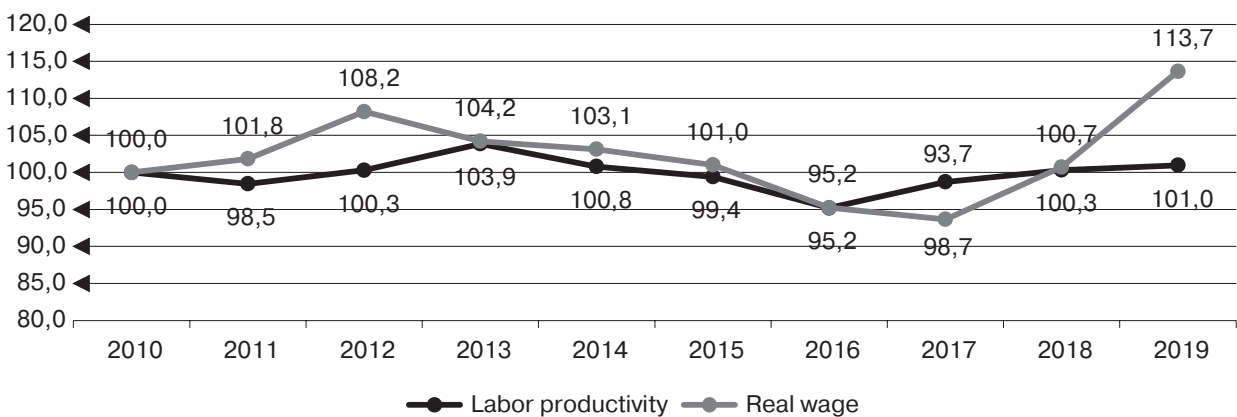


Figure 1. The relationship between real wages and labor productivity

Source: Compiled by the author on the basis of SSC data.

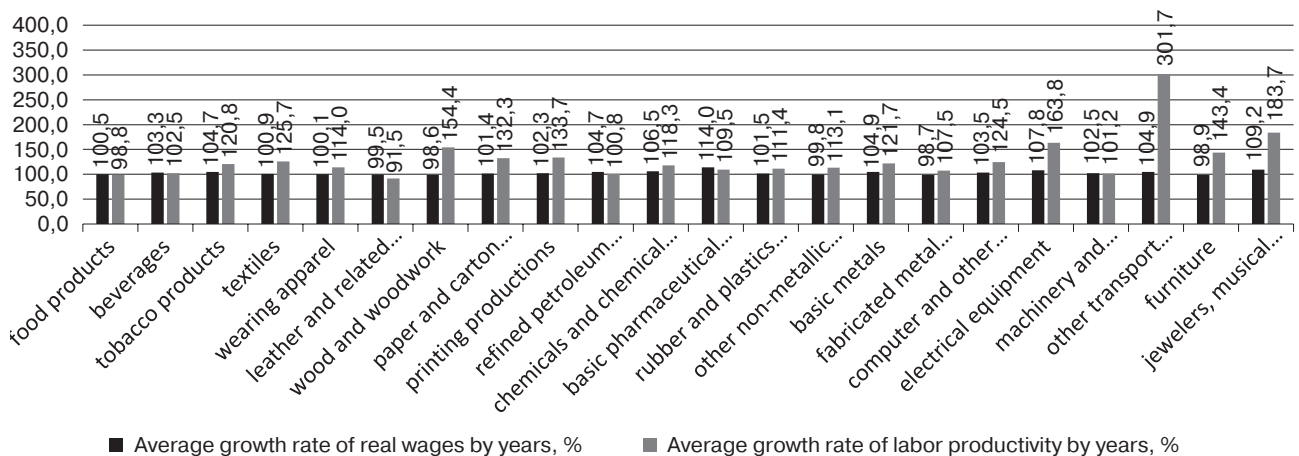


Figure 2. The relationship between real wages and labor productivity

Source: Compiled by the author on the basis of SSC data.

volume index (2010 = 100 %). The ratio between real wages and the average annual growth rate of labor productivity in the manufacturing shows that the average annual growth of productivity in most industries precedes the average annual growth of real wages. This is due to the sharp fluctuations in industrial production indices in these areas during the period 2010–2019.

CONCLUSIONS

It is important to know how the levels of labor productivity changed in the spheres of economic activity of Azerbaijan in 2010–2019 in terms of shaping economic policy.

At the same time, when comparing labor productivity with the annual average growth rates of real wages, it was found that the growth rate of labor productivity is approximately proportional to the growth rate of real wages.

During the period under review, the average annual growth of real wages was negative in some areas and low in others. It can be concluded from the analysis that against the background of several increases in nominal wages over the past 10 years, the real incomes of the population have not increased much or nominal increases have been “washed away” by inflation.

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ВЗАЄМОЗВ'ЯЗОК МІЖ ПРОДУКТИВНІСТЮ ПРАЦІ ТА РЕАЛЬНОЮ ЗАРОБІТНОЮ ПЛАТОЮ В АЗЕРБАЙДЖАНІ

Резюме. У представленій статті проаналізовано взаємозв'язок між реальною заробітною платою та продуктивністю праці в Азербайджані за 19 видами економічної діяльності, а також у підгалузях виробництва у період 2010–2019 років. Загалом середньорічні темпи зростання продуктивності праці в економіці, а саме: видобуток корисних копалин, будівництво, професійну науково-технічну діяльність та діяльність у сфері розваг і відпочинку (2010–2019 рр.), були негативними. Середній темп зростання реальної заробітної плати був негативним у будівництві та діяльності адміністративних і допоміжних служб. Автори статті порівняли середньорічні темпи зростання реальної заробітної плати з продуктивністю праці та визначили, що темпи зростання продуктивності праці приблизно пропорційні темпам зростання реальної заробітної плати. Однак у 2019 р. реальна заробітна плата перевищила продуктивність праці. Це було зумовлено одночасним збільшенням мінімальної заробітної плати країни в 2019 році.

Ключові слова: продуктивність праці, реальна заробітна плата, види економічної діяльності, Азербайджан.

REFERENCES

1. Alakbarov, E. (2020). Analysis of the effects of the coronavirus (COVID-19) pandemic on the economy of Azerbaijan. *Features and Problems of Economic Reforms Implementation in Azerbaijan by the Scientific Research Institute of Economic Reforms Collection of scientific works*. Special edition. P. 32–52.
2. Balkan, D., & Suicmez, H. (2017). Comparative analysis of labor productivity in Turkey and the world. *Productivity Magazine*. (1), 93–113. Retrieved from: <http://dergipark.org.tr/verimlilik/issue/28662/306327>.
3. Biesebroek, J. V. (2015). How Tight is the Link Between Wages and Productivity? A Survey of the Literature. *Conditions of Work and Employment Series No. 54*.
4. Boyle, R. (2006). Measuring public sector productivity: Lessons from international experience. CPMR Discussion Paper No. 35. *Institute of Public Administration*.
5. State Statistics Committee of the Republic of Azerbaijan. Retrieved from: <https://www.stat.gov.az/>.
6. Katovich, E. S., & Maia, A. G. (2018). The relation between labor productivity and wages in Brazil: a sectoral analysis. *Nova Economia*. Vol. 28. No. 1. P. 7–38. <https://doi.org/10.1590/0103-6351/3943>
7. Sharpe, A., Arsenault, F. J., & Harrison, P. (2008). The Relationship between Labour Productivity and Real Wage Growth in Canada and OECD Countries. *CSLS Research Report No. 2008-8*.
8. Zekeriya, Y. (2015). Relationships among labour productivity, real wages and inflation in Turkey. *Economic Research-Ekonomika Istraživanja*. 28:1. 85–103. <https://doi.org/10.1080/1331677x.2015.1022401>

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