

## **Impact of Minimum Wage Policy on Income Inequality: Azerbaijan Case**

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*Abstract:* - The effects of the minimum wage on income inequality in households were assessed in the article, by using the differences-in-differences method. The authors claim that since the minimum wage in Azerbaijan is much lower than the average wage, as well as because the number of waged (and salaried) employees has a small share in the total employment, the impact of the minimum wage on the total income of households is not felt. However, such an effect can be observed in the income inequality of low-income families. The authors suggest that the minimum wage should be closer to the average wage and the level of self-employment in the country should decrease. This can lead to a reduction in income inequality between households.

*Key-Words:* minimum wage, average wage, self-employment, income inequality, differences-in-differences method

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## 1 Introduction

The implementation of the minimum wage (MW) in all sectors of the economy or individual sectors is considered state intervention in the economy. To ensure that such intervention is effective and legally based, in some countries, for example, in Azerbaijan, a special law is adopted. In some countries, the mechanisms for applying the MW are different. The application of the MW in any field of economic activity can be based on the decision of the trade union organization formed in those fields. Regardless of the mechanism by which it is implemented, the implementation of the MW is part of the state's economic policy and the state intervention in the economy is essential. As with some forms of government intervention in the economy, the full or partial implementation of the MW is bipolar. The two-polarity of the state's intervention in the economy with the (MW) mechanism is related to its effects on both the business environment and the social protection of the employed. The state tries to prevent wages of wage workers from falling below a certain level through the policy of MW. This essentially means ensuring the social protection of wage workers. Determining the limit of the lower level of wages of wage workers in all enterprises, regardless of ownership, undoubtedly has a positive effect on the social protection of low-skilled workers. However, it should be taken into account that in some countries, as well as in Azerbaijan, the level of the MW also acts as a measure of the service fee in some service areas. In this case, an increase in the level of the MW leads to an increase in those service fees. However, while the increase in the level of the MW directly affects the level of wages of low-skilled workers, the effect of the increase in various service fees is indirect and is distributed among all classes of the population as a whole. The other pole of the MW as a mechanism of state intervention in the economy is related to its effects on the business environment. Thus, the adoption of a law or a decision at any level regarding the increase in wage (or salary) requires business subjects to look at the wage system again. Since the change in the volume of expenses related to labor wages in the enterprise immediately affects the profit, it is required to take appropriate measures to keep the profit, at least, stable. However, the measures implemented in the field of cost reduction should be such that the

competitiveness of the enterprise does not decrease. That is, among such measures, increasing the selling price of manufactured products or using cheaper and lower-quality raw materials can be among the last measures. Usually, in such cases, companies are more inclined to reduce the number of employees or cut back on incentive spending. In both cases or other cases, the social protection of wage workers is indirectly affected.

If a business entity reacts to an increase in the MW by reducing its profits, this leads to a weakening of the business environment. In all cases, raising the MW forces businesses to create a higher wage bill.

The effects of the MW on the social protection of the employed are accompanied by an increase in the wages of low-skilled workers. Increasing the lower limit of wages through the policy of the MW does not affect income inequality in the country. Thus, the inflation process is unavoidable in almost all countries of the world. This can happen as a result of increasing the money supply, among other factors, due to at least one factor, for example, in connection with increasing the aggregate demand in the country. The introduction of an MW allows reducing of the effects of inflation to some extent by increasing the wages of low-skilled workers. In this case, income differences between low-income workers and high-income workers are somewhat reduced. But it cannot be claimed absolutely. Because in most cases, especially in developing countries, the incomes of highly skilled workers increase faster than the wages of low-income workers, and it is not possible to achieve a serious reduction of this difference by increasing the MW. Nevertheless, the MW is one of the economic intervention mechanisms applied by the government to reduce income inequality among the population.

It should be noted that income inequality can arise for various reasons. These reasons may include qualifications or educational level, as well as gender and race. There are important reasons why the level of MW does not have a univalent effect on income inequality. So, at first, glance, if the level of MW increases, then the wages of low-skilled workers should rise, and the difference between the wages of such a group of workers and the wage level of middle-skilled workers should decrease. The reduction of such differences should reduce the level of inequality between the incomes of these population groups. But in reality, the processes are

more complicated. Thus, since the increase in MW affects the business environment, the unemployment rate of low-skilled workers may increase. In this case, the income of households to which low-skilled workers belong may decrease. A decrease in income in such household groups can accelerate inequality again.

Studying the relationship between MW level and household income inequality is important for every country. The importance of solving the problem is, first of all, related to the efficiency of decisions about MW. Decisions about MW are effective when the welfare of the wider population, especially the low-skilled workers, is improved. On the other hand, such decisions should not harm the business environment. One of the important indicators in evaluating the efficiency of MW decisions is the level of income inequality in household groups. However, it should be noted that the effects of MW decisions on income inequality vary from country to country. Theoretically, the study of the relationship between these two indicators is not unambiguously evaluated, making it necessary to use empirical methods.

## 2 Literature Review

The study of the effects of MW on income inequality was carried out on the example of different countries. In the case of Albania, these problems are reflected in the research carried out by, [1], the study shows that MW can act as an important instrument in reducing income inequality. But for its effectiveness, it is better to use it together with other instruments. Thus, when MW is applied together with collective agreements, better results can be achieved in reducing income inequality. And collective agreements can enable equal outcomes for women and youth. According to the author's claim, MW by itself cannot allow low-skilled workers to receive higher wages. However, MW has the effect of reducing the income inequality of workers in the lower groups of the income distribution.

In, [2], the author studied the effects of MW on income inequality through the channel of influence on wages in the case of Turkey. In the study, the changes in the wage level before and after the increase of the MW level in the period 2003-2011 were analyzed. The main conclusion is that MW played an important role in reducing wage inequality between both women and men in the period 2003-2005.

Note that income inequality is a serious problem for developed countries, including the United States. MW in this country varies from state to state.

According to the decision made at the federal level, MW per hour is set at \$7.25 in 2023, but in some states, the level of MW is much higher. For example, the level of MW in Colombia is even 16.5 dollars per hour. It's \$15.74 in Washington and \$15.5 in California. In other states, the MW level drops from \$15.5 to \$7.25 per hour of work. In the United States, the MW instrument is also used to reduce income inequality. In the example of the USA, this problem has been analyzed by a large number of researchers as a subject of scientific research. For example, a study conducted by, [3], argues that since the level of MW in the United States after 2009 has not been changed by the Federal government, its effects are weak, and states make individual decisions about MW to strengthen its influence. In the study, the Gini index was taken as an indicator of income inequality. The study shows that an effective MW policy cannot have significant statistical and economic effects on the level of income inequality. The main conclusion reached by the author is that the MW does not affect income inequality in US states if other economic conditions do not change.

This issue was also explored by, [4], in the case of the United States. The study takes into account that although the level of wage inequality in the United States has slightly decreased in recent years, this level has tended to increase since the 1970s. Some reasons stimulate wage inequality in the country. Rising levels of inequality pose additional challenges, particularly for low-wage workers. Inequality in terms of wages also causes serious inequality in the pension provision of employees. The study argues that the policy implemented by the US federal government regarding MW has been aimed at mitigating the level of inequality in wages and subsequently inequality in pension amounts. The dynamic modeling method of income was used in the study. According to this method, the level of inequality is compared with the initial period against the background of increasing wage inequality in the long run. The study calculated incomes and levels of inequality under conditions where MW would increase from \$7.25 to \$12 an hour in 2017 and be indexed to inflation. The study also predicted the level of inequality caused by education in the level of wages. Education wage increases are projected to grow at a slower rate and continue to grow through 2070. And then such growth will remain unchanged. After education supplements peak, wage inequality will have increased by 15 percent compared to the base year. During the study, household income was taken into account in quintiles based on income from various sources. During the evaluation, it was

divided into two parts on the basis that a significant part of household income is provided by the husband and wife, that is, by two people.

In the study carried out by, [5], the effects of the MW on inequality in the last 30 years were evaluated using empirical methods in the example of the United States. The income of men aged 25-61 was taken into account in the study. Data are based on social security administrative correspondence for the years 1981-2015. The obtained results confirm that the increase in the national income tax reduces the level of inequality in the annual distribution of wages below the 12th percentile. On the other hand, increasing the level of the minimum wage has a stronger effect on the lower parts of the hourly wage distribution. The obtained results confirm that the increase of the national income tax, in addition to the increase of the annual wage in the groups of workers with low wages, also reduces the level of inequality between these groups by 1.85% and is an important instrument in the direction of reducing the level of income inequality.

In, [6], the author argues in his research that the implementation of MW is necessary to lift low-skilled workers out of poverty. MW also has the power to negotiate between the employee and the business. In the study, the role of MW is justified to strengthen the position of the employee in the negotiations between the employee and the firm. A panel analysis of US states in the study shows that increasing MW helps reduce income inequality to some extent. The study shows that the reduction of the level of inequality in incomes occurs mainly at the expense of the top 1% of the income distribution.

In their study, [7], the authors not only note the role of the MW mechanism in income distribution, but also its unemployment-generating effects. The usefulness of the MW mechanism in income redistribution was studied by the microsimulation method and the study of its effect on employment elasticity. According to the obtained result, although MW has the effect of creating unemployment at a certain level, it also has the effect of reducing poverty. However, due to these two effects, the poverty reduction effect of MW is limited. Such contradictory characteristics of MW are also inherent in its impact on income inequality. Thus, although the increase in MW reduces income inequality, income inequality increases again due to the creation of unemployment. The study argues that the MW instrument should be implemented considering its impact on unemployment.

A study by, [8], also focused on the effects of MW on income inequality in the case of the United

States. The study shows that MW affects the bottom of the wage income distribution. It is that part that has been more exposed to changes in the labor structure since 1980. In the study conducted by, [9], a new method was proposed to estimate the impact of an increase in MW on employment, based on the comparison of vacant jobs with wages at or slightly above MW and jobs with wages below MW. Note that there are differences between the MW level at the federal level in the United States and the MW set at the various state levels. In the study, the analysis of the 138-fold change of MW in the period 1979-2016 was carried out, and the conclusion was reached that the number of workplaces with a low wage level practically did not decrease. However, the increase in MW led to an increase in the average wage level. The fact that low-wage jobs are not decreasing suggests that such jobs are difficult to replace. The study also shows that an increase in MW does not create unemployment at all. Thus, the reduction of wage income inequality as a result of MW does not lead to additional unemployment.

A study conducted by, [10], on the example of the USA also proves that an increase in MW leads to an increase in income in households at the lower end of the household income distribution. The study shows that the elasticity of poverty level with respect to MW ranges from -0.220 to -0.459 for a period of one hundred years or more. In, [11], the author focused his study on the example of OECD countries, claiming that the increase in MW in the countries included in this union leads to a decrease in income inequality. However, an important finding in the study is that an increase in MW to a certain optimal level, not a continuous increase, reduces income inequality. Beyond this limit, the opposite effect occurs.

In, [12], the author studied this problem in the case of China. It should be noted that the Chinese economy is developing rapidly. But at the same time, income inequality in China is still high. As the country developed, the incomes of the population increased, and income inequality increased. However, panel analysis for the period 2004-2009, as well as household surveys, shows that the increase in MW reduced inequality. This is due to the reduction of differences between the median and the bottom level of the income distribution.

The study, [13], analyzed the effects of real MW on income distribution in Latin American countries. The study included data covering the years 2000-2012 for four countries, namely Argentina, Brazil, Chile, and Uruguay. A semi-parametric technique was used to estimate the distribution function. The obtained results prove that MW has an inequality-

reducing effect in Argentina, Brazil, and Uruguay. As a result of the increase in MW in these countries, crowding occurs in the lower parts of the income distribution. Such agglomeration reduces the level of income inequality. In the case of Chile, the MW has no such effect on income inequality.

A similar study was conducted by, [14], on the example of Latin American countries. Six countries were included in this study. MW is different in these countries. The study proves that the increase in MW in these countries had a tightening effect on wage distribution in the early 2000s. During that period, rapid economic growth and revival in the labor market took place in these countries. But in the 2010s, the labor market weakened a bit.

In, [15], the authors used regression analysis to estimate the effects of a six percent increase in MW levels on hourly wages and household income distribution in the case of Ireland. The study estimates that an increase in MW reduces the wage rate ratio at the 90th and 10th percentiles by eight percent and by four percent at the 75th and 25th percentiles. The effects of MW on workers' wages also vary by age. Thus, an increase in MW reduces the ratio between the 90th and 10th percentile wages of workers under the age of 25 by 24 percent.

A study by, [16], quantified the impact of MW on employment, capital formation, wage distribution, and other macroeconomic indicators. According to the results of the research, the change of MW at a low level does not affect the level of employment. However, such changes lead to an increase in wages by tightening the distribution of wages. A study performed by, [17], quantified the effects of the IPR legislation on the distribution of wages in Germany. The obtained results show that the adoption of MW legislation leads to an increase in the lower part of the distribution of hourly wages. In the example of Germany, the effects of MW on income inequality are also reflected in the study performed by, [18]. In the study, the effects of MW on the change in monthly wages in the period between 2000 and 2017 were quantitatively assessed. The authors quantified the extent to which MW had an effect in increasing wage inequality during the period covered by the study, but then decreasing to its previous level. The "differences in differences" method was used during the research. The obtained results prove that MW affects the lower part of the wage distribution. Employment dynamics do not affect the nature of the wage distribution.

In, [19], the authors perform a quantitative analysis of the impact of MW on the economic well-being of low-skilled immigrants in the United States

and conclude that an increase in MW negatively affects the employment of low-skilled immigrants. However, such effects are gradually decreasing. The state's migration policy causes low-skilled immigrant workers to move from formal to informal employment. Based on the calculations, the authors conclude that MW is not an effective instrument in reducing poverty among immigrants.

In, [20], the authors quantified the effects of MW on income inequality in the case of Brazil. The study shows that since 1994, the growth of MW has played an important role in reducing income inequality in Brazil. The results obtained in the case of Brazil are slightly different from the results of the studies we reviewed above. Thus, according to the results of the study, MW affects even the upper parts of the wage distribution. As a result, the decrease in the logarithmic dispersion of logarithmic returns in Brazil after 1994 is explained.

A comparative analysis of the large number of studies devoted to the effects of MW on wage and household income inequality suggests that such effects do not lead to the same results. Depending on the level of MW, the areas of economic activity in which it is applied, the average wage level in the country, the extent of its change, and other factors, the effects on the level of inequality are also different.

### 3 Methodology

There are some difficult aspects to quantifying the impact of the MW on income inequality. The main difficulty is that not all of the population's income comes from wages. There is no country in the world where all employed people receive wages. According to this indicator, developed countries lead the list. The nature of the relationship between the volume of GDP per capita for 2021 and the indicator "share of wage earners among the employed population" also shows that there is a positive relationship between these indicators. The larger the wage-earning part of the working population, the more the MW legislation can affect the population.

Based on the structure of the incomes of the population in Azerbaijan over the last 10 years, wages do not constitute a high percentage of these incomes (Graph 2). Thus, in the period between 2002 and 2021, the incomes obtained in connection with salaried work have changed from 30% to 36% of the total incomes of households. In 2001, this number was approximately 40%. The share of income from self-employment changed from 33% to 42% during that period. Income from property

received current transfers and other income are around 30% of household income.

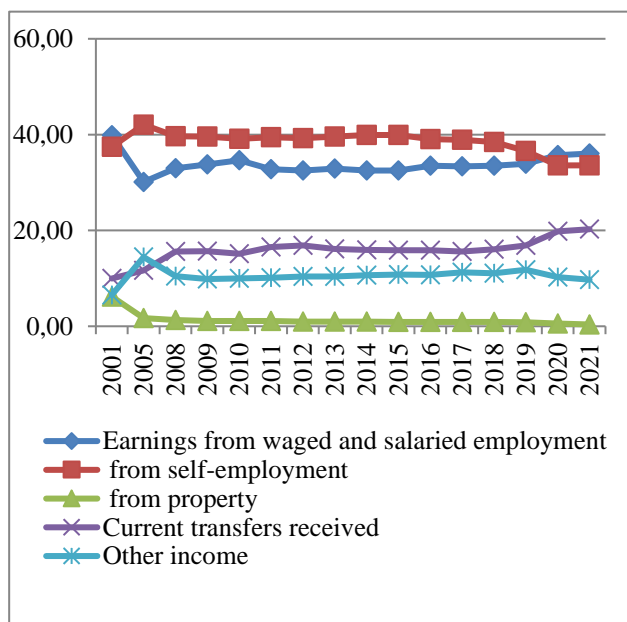


Fig. 1: Dynamics of the share of households' income from various sources in total income (%)

The fact that income from wage employment is less than total household income significantly weakens the effects of the MW on income inequality. Taking into account the characteristics of the economy of Azerbaijan, we can note that the basis for choosing self-employment activities is the very low MW and difficulties in finding paid work. Such low employment levels are exacerbated when the MW is raised due to the already small number of waged (and salaried) jobs. Thus, during the assessment of the impact of the MW on employment in Azerbaijan, it was determined that the increase of the MW has a negative effect on the employment level of low-skilled workers. The Gini coefficient of household income inequality will be used as an indicator of income inequality in the study. The Gini coefficient can also be calculated using the Gini formula:

$$G = \frac{\sum_{i=1}^n \sum_{j=1}^n |y_i - y_j|}{2 * \bar{y} * n^2} \quad (1)$$

Here, the number of the n-household group,  $y_i$  and  $y_j$  – respectively, the share of the income of the i-th and j-th households in the total income,  $\bar{y}$  – is the average value of the share of the income of the household in the total income, [21], to assess income equality, we can use the distribution of household income by deciles and quintiles. However, according to the GINI coefficient

calculation methodology, the more income groups there are, the more reliable the results are. With this in mind, we will use data from the State Statistical Committee of the Republic of Azerbaijan on household monthly income per capita. In such a distribution, income is distributed in groups of 20 or more. However, one drawback of such distribution is that the incomes are shown as sums after a certain maximum volume, and in some years even 40-45% of the total incomes of households are collected in this group. To obtain a more reliable value of the Gini coefficient, it is necessary to divide these groups into as small groups as possible. On the other hand, the source of household income is not taken into account when calculating the Gini coefficient. As we mentioned above, there is a significant difference in the source of income. In such a case, the difference between wages alone cannot be the basis of inequality between household incomes. Another distinguishing feature of households in Azerbaijani society is that some young families are supported by their parents, and some elderly parents are supported by young families. Such patronage is not reflected in household income. Also, during the calculations, the monthly income of household income (HHI) was taken as a numerical average. Per capita, income was calculated as the total income of the population divided by the population. It should be noted that when calculating the number of households, a small group of the population, that is, those in children's and old people's homes, was not taken into account. According to the methodology of the Gini coefficient, its numerical value indicates a certain level of inequality in a certain interval (Table 1). According to World Bank data for 2021, among the 50 countries surveyed, Colombia and Costa Rica have the highest levels of income inequality, with 51.5 and 48.7 points, respectively.

Table 1. The relationship between the numerical value of the Gini coefficient and the level of income inequality

The numerical value of the Gini coefficient	Level of income inequality
$G < 0,220$	Very low
$0,240 < G < 0,260$	down
$0,260 < G < 0,330$	medium
$0,330 < G < 0,350$	High
$G > 0,350$	Very high

To calculate the effects of the MW on income inequality, we will use the difference-in-differences method. Periods of such policy changes will be taken into account to determine the impact of MW legislation or economic policy on household income

inequality. That is, we will compare the difference between the level of inequality between household incomes before the adoption of the law on the MW and the inequality after the adoption of this law or the change of the MW level. In this case:

$$\hat{\delta} = (\hat{C} - \hat{E}) - (\hat{B} - \hat{A}) = (\overline{Gini}_{tr,aft} - \overline{Gini}_{con,aft}) - (\overline{Gini}_{tr,bef} - \overline{Gini}_{con,bef}) \quad (2)$$

Here  $\hat{\delta}$  - is the "difference in difference" estimator of exposure to the minimum wage.

$\overline{Gini}_{tr,aft} = \hat{C}$  - is the Gini coefficient after the change in the level of the minimum wage in the group affected by the minimum wage;

$\overline{Gini}_{con,aft} = \hat{E}$  - is the Gini coefficient after the change of the MW level in the control group;

$\overline{Gini}_{tr,bef} = \hat{B}$  - is the Gini coefficient before the change of the MW level in the affected group;

$\overline{Gini}_{con,bef} = \hat{A}$  - is the Gini coefficient before the change of the MW level in the control group;

According to the methodology, we can also use the difference-in-differences regression format. This time:

$$y_{it} = \beta_1 + \beta_2 * TREAT_i + \beta_3 * AFTER_t + \delta * (TREAT_i * AFTER_t) + e_{it} \quad (3)$$

We can use the regression equation. Here  $y_{it}$  -  $t$  is the result of the  $i$ th observation at time  $t$ . This observation can be either from the "affected group" or from the "control group".  $AFTER_t$  - is an indicator that is equal to "0" before the change of the MW (i.e. when  $t=1$ ) and "1" after the change of MW (i.e. when  $t=2$ ).  $TREAT_i$  is a dummy indicator and is equal to "1" when the observation is from the "exposed group" and "0" when it is from the "control group".

In this case, the regression function

$$E(y_{it}) = \begin{cases} \beta_1 & TREAT=0, AFTER=0 \\ \beta_1 + \beta_2 & TREAT=1, AFTER=0 \\ \beta_1 & TREAT=0, AFTER=1 \\ \beta_1 + \beta_2 & TREAT=1, AFTER=1 \end{cases}$$

[Control before=A]  
[Treatment before=B] .....(4)  
[Control after=E]  
[Treatment after=C]

If we compare the regression function (3) with (2),  $A=\beta_1$ ;  $B=\beta_1+\beta_2$ ;  $E=\beta_1 + \beta_3$ ;  $C=\beta_1 + \beta_2 + \beta_3 + \delta$ . Thus,

$$\delta = (C - E) - (B - A) = (\beta_1 + \beta_2 + \beta_3 + \delta) -$$

$$-(\beta_1 + \beta_3) - (\beta_1 + \beta_2) - \beta_1 \quad (5)$$

If we use the method of least squares,

$$\hat{\delta} = [(b_1 + b_2 + b_3 + \delta) - (b_1 + b_3)] - [(b_1 + b_2) - b_1] \quad (6)$$

According to econometric theory, the estimate of  $\delta$  in equation (5) is  $\hat{\delta}$  in equation (6) and can be calculated as the difference between the "control group" and the "affected" groups in the MW change. To assess the effects of the minimum wage on income inequality in Azerbaijan using the "difference in difference" method, "households whose income is less than the average nominal wage" as the "affected group" and "households whose income is greater than the average nominal wage" are the control group. Of course, the division of households into these groups requires certain assumptions to be accepted. Thus, there are no statistical data reflecting how many households there are in these groups or what their income is. On the other hand, it is much more difficult to determine the number of wage earners in households belonging to which income group. Considering these or other shortcomings, we will assume that:

- 1) The number of wage earners from each household member is equal to the national average;
- 2) Income from wages of each household (HH) is equal to the national average;
- 3) A change in the National Income Tax can directly or indirectly affect all households. This assumption allows us to calculate the Gini coefficient based on the share of household income on wage income in total wage income. In this case, we can take the Gini coefficient of HHW as the "affected" group, and the Gini coefficient of households on total income as the "control" group.

Several statistical data will be used to calculate the share of household income in total wage income:

- a) the share of household income per capita in the total number of households;
- b) the Monthly per capita income of households;
- c) the total income of the population in the country;
- d) share of income from wages in total income;
- e) the number of households;
- f) the number of population;
- g) household size;
- j) the share of salaried employees in the total number of employees;
- k) the share of the employed in the total population.

Using these indicators, to calculate the Gini coefficient for household wages (HHW), the share of wage income in the income of  $i$ -th households in the total monthly wage income for the country.

$$y_{i,t} = \frac{WAGE_{i,t}}{WAGE_t} = \frac{B2_{i,t} * D2_{i,t} * wsare_t}{WAGE_t} \quad (7)$$

where  $y_{i,t}$  is the share of monthly wage income in the year "t" in the i-th HHW in the total wage income for the country,  $WAGE_{i,t}$  –in the i-th HHW in the year "t" total monthly income from wages,  $WAGE_t$  total monthly income from wages in the year "t" for t-country,  $B2_{i,t}$  average monthly income per person in the year "t" in the i-th HHW,  $D2_i$  the number of believers living in the i-th HHW in the year "t",  $wsare_t$  is the share of income from wages in the income of the HH in the year "t".

## 4 Results

### 4.1 Estimating the Impact of Minimum Wages on Income Inequality in Some Developing Countries: A Cross-Country Analysis

The minimum wage is applied in most countries of the world. However, as one of the forms of state intervention in the economy, it cannot be confirmed that it is always effective. Nevertheless, most countries prefer to implement the minimum wage as it is related to the social protection of low-skilled workers. Despite the presence of heteroscedasticity in Figure 1, which depicts the dependence of the minimum wage on GDP p.c., it can be argued that as the country's income increases, there is a tendency to apply a higher minimum wage. For example, according to the data of the International Labor Organization (ILO, 2022), the monthly minimum wage in Switzerland in 2021 was 4385 US dollars, and in Uganda, it was 1.67 US dollars. In that year, the minimum wage in Azerbaijan was 147.06 US dollars. According to graph 2.5.1, which shows the dependence of the minimum wage on the GDP of 133 countries with different levels of development, the minimum wage in most of these countries is less than the average price, i.e. 522 US dollars. The median in this ranking is 244.12 USD (Samoa).

The dependence of GDP (current USD-monthly) on GDP (current USD-annual) in some countries for 2021 is presented in Figure 2. Moreover, the dependence of the Gini index on GDP volume for 50 countries with different levels of development (Figure 3), shows that there is no serious relationship between these indicators. However, with the increase in GDP volume, the tendency of the Gini index to decrease is felt to some extent.

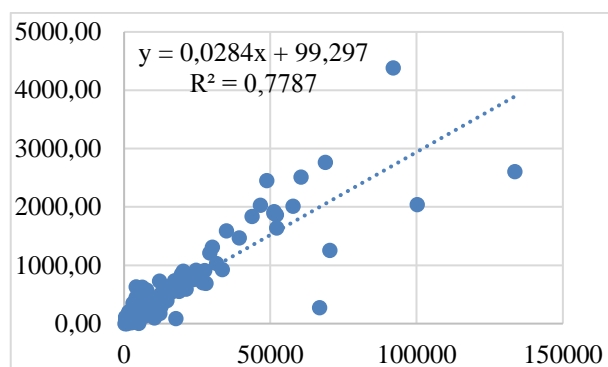


Fig. 2: Dependence of GDP (current USD-monthly) on GDP (current USD-annual) in some countries (2021)

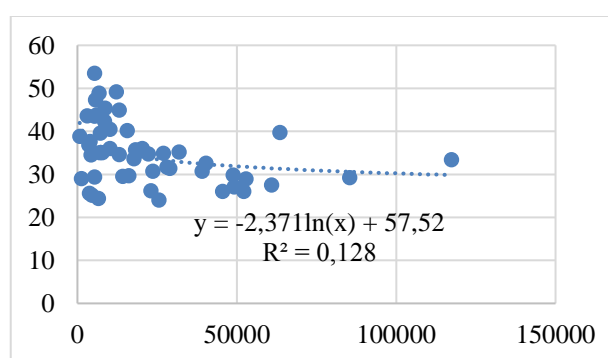


Fig. 3: Dependence of the Gini index on GDP in some countries (current US dollars) (2020)

The results of a 10-year panel analysis for 28 countries to assess the dependence of the Gini index on the MW level in different income countries suggest that there is an inverse, but much weaker relationship between these indicators (Table 2 and Table 3).

Table 2. The dependence of the Gini index on the MW level in different income countries (PLS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MW	-0.001730	0.000497	-3.482842	0.0006
C	35.08298	0.513188	68.36282	0.0000
R-squared	0.041809	Mean dependent var		33.74107
Adjusted R-squared	0.038363	S.D. dependent var		5.784374
S.E. of regression	5.672337	Akaike info criterion		6.316197
Sum squared resid	8944.764	Schwarz criterion		6.342160
Log likelihood	-882.2675	Hannan-Quinn criter.		6.326610
F-statistic	12.13019	Durbin-Watson stat		0.033451
Prob(F-statistic)	0.000576			



Table 3. The dependence of the Gini index on the MW level in different income countries (RLS)

Dependent Variable: GINI  
Method: Robust Least Squares  
Date: 01/03/23 Time: 23:20  
Sample: 2011 2020  
Included observations: 280  
Method: M-estimation  
M settings: weight=Bisquare, tuning=4.685, scale=MAD (median centered)  
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
MW	-0.001814	0.000517	-3.506331	0.0005
C	35.03668	0.534473	65.55369	0.0000
Robust Statistics				
R-squared	0.041860	Adjusted R-squared	0.038413	
Rw-squared	0.064819	Adjust Rw-squared	0.064819	
Akaike info criterion	363.6556	Schwarz criterion	370.4976	
Deviance	7190.889	Scale	4.474105	
Rn-squared statistic	12.29436	Prob(Rn-squared stat.)	0.000454	
Non-robust Statistics				
Mean dependent var	33.74107	S.D. dependent var	5.784374	
S.E. of regression	5.673730	Sum squared resid	8949.156	

## 4.2 Household Income Inequality (Gini Coefficient) in Azerbaijan

As we mentioned, the problems of the impact of the MW on the inequality level of workers' wages have attracted more attention in the example of different countries. There are certain reasons for this. The main reason is that wages dominate people's incomes. On the other hand, the government's intervention in the economy with the MW instrument has a direct impact on wages. Although the influence of the Ministry of Economic Affairs on other sources of income is to some extent, such effects are not direct. For example, income from self-employment is not directly affected by the MW level, even though it is a significant share of total household income in some countries. However, it is impossible to claim that there is no influence between them. For example, some able-bodied people who do not want to work for wages because of the low MW or who are unemployed because of the implementation of the MW may choose to be self-employed.

To study the impact of the MW on household income inequality, it can be useful in several ways to assess the effects of the MW on income inequality by wages as well as the effects of the MW on the level of inequality in total household income. First, such a comparison is useful if household incomes have an important weight in addition to wages. In the case of Azerbaijan, in the last 20 years, the share of salary income in total income is comparable to the share of income from self-employment. Therefore, income other than wages can be taken as an "unaffected" or "control" group, regardless of the MW.

Despite such shortcomings in the calculation of the level of inequality between household incomes,

when we calculate the Gini coefficient based on Formula 1, we calculate the indicators  $y_i$  and  $y_j$ , that is, the share of income from wages of the  $i$ -th and  $j$ -th households in the total income, respectively for the last 12 years, we will consider 1) the income of the population, 2) the number of households, 3) the number of the population, 4) the size of the household. The dynamics of these indicators in the 2009-2021 periods are given in Table 4. In Javal, the division of households into different groups by monthly income, the number of HH in households, and other indicators indicate the distribution of meat farms by income.

The problems of household income inequality in Azerbaijan have been studied by various researchers. Inequality in terms of household income was evaluated in studies conducted by, [22], and inequality in areas of economic activity was evaluated by, **Σφάλμα! Το αρχείο προέλευσης της αναφοράς δεν βρέθηκε..** Based on the indicators of the last 20 years, the inequality level of household incomes (Gini coefficient) is given in Figure 3. Specifically, Figure 3 shows that the Gini coefficient  $G > 0.350$  in Azerbaijan in the last 10 years. That is, the level of total income inequality in households in Azerbaijan is very high. During the calculations, the division of ARDSK households into different numbers of income groups based on total income in different years was taken as a basis.

For example, in 2009, households were divided into 20 different groups, and in 2021, they were divided into 26 different groups. Calculations show that the level of inequality in terms of total incomes among HHI-s was much lower in the period between 2002 and 2005 than in the following years.

Table 4. Dynamics of some indicators for calculating household income

	incomes of the population (thousand manats*)	Share of income from wages (%)	Number of HH (number)	population (thousands)	The size of the HH (population/number of HH)	The average share of HHI (%)	Number of HHI (number)	Share of salaried employees in the total number of employees (%)	Share of the employed in the total population (%)
2009	1115300,0	33,76	1982756	8922,4	4,5	5,000	20	32,43	47,88
2010	1297453,9	34,67	1914383	8997,6	4,7	5,000	20	31,94	48,11
2011	1512442,6	32,77	1938532	9111,1	4,7	4,762	21	31,71	48,02
2012	1762980,6	32,53	1964915	9235,1	4,7	5,263	19	33,31	48,13
2013	2008840,6	32,93	1990745	9356,5	4,7	4,762	21	33,49	48,32
2014	2179733,0	32,52	2016404	9477,1	4,7	5,263	19	33,02	48,57
2015	2307116,5	32,52	2041064	9593,0	4,7	4,545	22	32,16	48,70
2016	2502103,7	33,48	2205818	9705,6	4,4	4,348	23	31,81	49,04
2017	2633004,0	33,35	2229545	9810,0	4,4	4,545	22	31,62	49,15
2018	2731875,6	33,48	2199578	9898,1	4,5	4,762	21	31,80	49,30
2019	2920586,9	33,94	2434512	9981,5	4,1	4,762	21	33,34	49,48
2020	2933552,9	35,72	2455390	10067,1	4,1	4,762	21	34,83	48,44
2021	3041902,7	36,05	2468073	10119,1	4,1	3,846	26	34,26	49,29

Note: collected and calculated by authors  
\*)manat is Azerbaijan's national currency

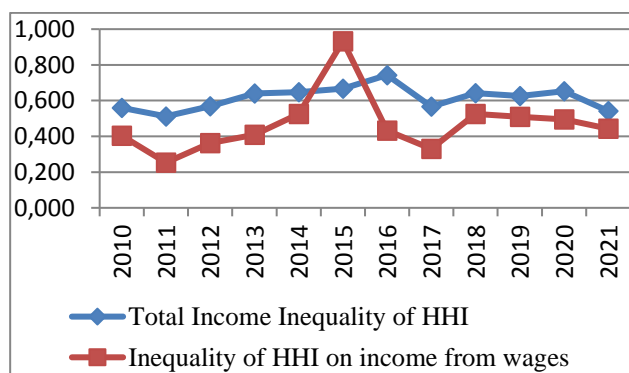


Fig. 4: Dynamics of the Gini Index in Azerbaijan (2010-2021)

Source: The Gini coefficient for 2001-2008 is taken from the statistical database of the World Bank, [24]. The Gini coefficient for the years 2009-2021 was calculated by the author.

In the period between 2009 and 2021, the number of employees receiving monthly wages in Azerbaijan did not exceed 35% of the total number of employees. That is why the share of wages in household incomes changed from 32% to 36.05% in those years. By affecting household wage income, the minimum wage changes household wage inequality. Calculations show that the Gini index of these incomes in Azerbaijan has regularly increased and decreased in the inter-annual period of 2009-2021 (Figure 4). Although the inequality of total incomes and wage incomes are very different in HHI, the Gini index for both is very high.

In Azerbaijan, the impact of the national income tax on the incomes of households can be when its change increases incomes. However, a comparison of the dynamics of the minimum wage and the average wage in the country suggests that there is a sharp difference between them (graph 2.5.4). This difference has steadily increased in the period from 1999 to 2021. The ratio of the average wage to the minimum wage decreased from 33 times (1999) to 3 times (2021). Therefore, the 354% (2001) change in the national income tax and its increase from 1.1 manats to 5 manats could not have a serious impact on the average salary of 52 manats. In the 2010-2021 period covered by the study, the difference and the ratio between the average salary and the average salary was very high. After 2017, the increase of the national income tax with a higher percentage reduced this difference somewhat (Fig. 5). Nevertheless, in those years, the average wage in the households located in the lowest parts of the distribution of HHI was higher than the level of the minimum wage. Thus, in 2010, the average salary of the employed population in the HHI with an average income of 73 manats was higher than 164 manats, while the average wage was 78.3 manats. While it was 85.7 manats in 2011, the average salary of the employed population was higher than 200 manats. Lastly, the dynamics of monthly nominal wages and national income tax in Azerbaijan (manats) are presented in Figure 5.

In the following years, the dynamics of the average income of the minimum wage, the average incomes of the HHI with the lowest incomes, and

the wage volumes of the employed population in those groups (Figure 6) show that even the incomes of the HHI with the lowest incomes of the minimum wage in 2010-2020 were not able to have a serious impact in the interannual period. Only in 2020, the level of the minimum wage (250 manats) was comparable to the average salary of an employee in the lowest-income HHI (264 manats). Although the level of the minimum wage did not increase in 2020 and 2021, this volume created an incentive for a certain increase in the average wage of occupation in the lowest-income HHI in the country.

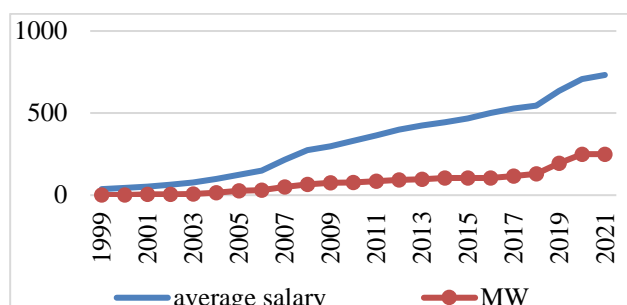


Fig. 5: Dynamics of monthly nominal wages and national income tax in Azerbaijan (manats)

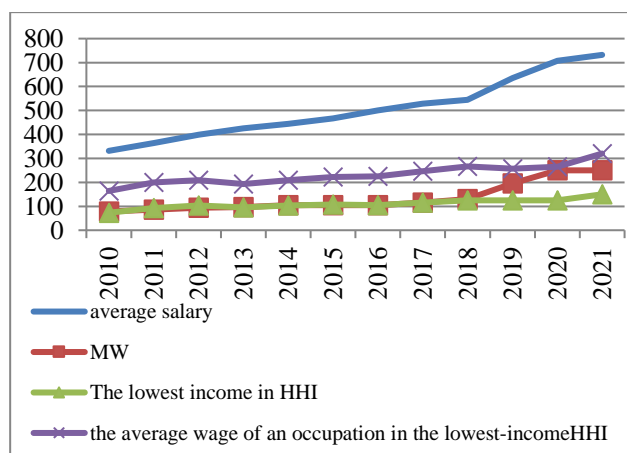


Fig. 6: The dynamics of the increase of the national salary and the average salary in Azerbaijan (in annual %)

### 4.3 Effects of the Number of Waged (and Salaried) Employees on Per Capita GDP

As we mentioned above, in the last 20 years, the number of salaried workers receiving monthly wages in Azerbaijan has been 30-35% of the total number of employees. A significant part of the employed is self-employed. According to the data of ARDSK for 2022, the unemployment level in the country has changed around 5-7% in the last 10 years. In 2021, the unemployment rate in the country was approximately 6%. However, the positive effects of the number of wage earners on

economic development in each country suggest that it is important to reduce the level of self-employment. Thus, the calculations based on the indicators of 228 and 229 countries for the years 2000 and 2019, respectively, show that there is a positive relationship between the share of salaried employees in the total number of jobs and the volume of GDP per capita (according to 2.5. 6th and 2.5.7 graphs). In countries with a self-employment rate of more than 40%, GDP per capita is less than \$10,000. In all countries with a GDP per capita higher than 10,000 US dollars, the number of wage earners exceeds 60% of total employment. According to estimates for 2019, in all developed and high-income countries (with GDP per capita higher than 40,000 US dollars), the number of wage earners is higher than 80% of the total employed population, and the level of self-employment is less than 20%. Due to the high level of self-employment, the number of wage earners in households is also low. This leads to a worsening of income inequality in HHI. Lastly, the relationship between the share of waged (and salaried) in total employment and GDP per capita (2000) for 228 countries is shown in Figure 7 whereas, the relationship between the share of waged (and salaried) in total employment and GDP per capita (2019) for 229 countries is presented in Figure 8.

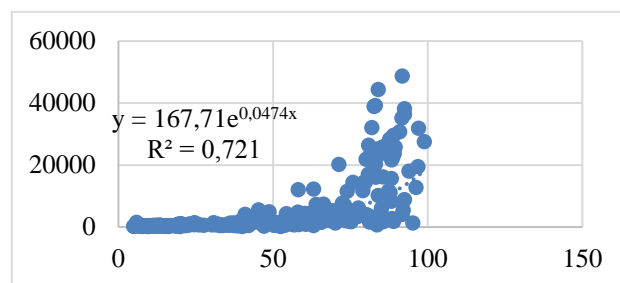


Fig. 7: The relationship between the share of waged (and salaried) in total employment and GDP per capita (2000) (228 countries)

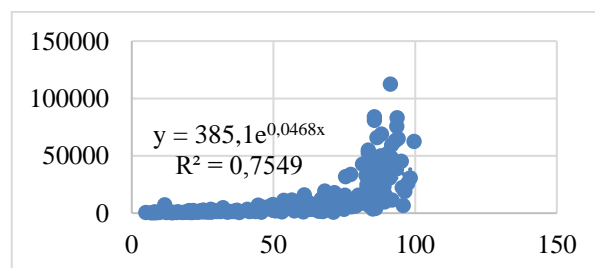


Fig. 8: The relationship between the share of waged (and salaried) in total employment and GDP per capita (2019) (229 countries)

#### 4.4 The Relationship between the Number of Hired Workers and GDP Per Capita in Azerbaijan

Unfortunately, the level of self-employment in Azerbaijan was close to 65-70% in some years. This means 30-35% of the total number of salaried employees. Wages account for one-third of total income in HHI, meaning that the vast majority of households do not have steady wage earners. This not only causes income inequality in those households but also causes the country's GDP to weaken. The effects of the indicator of the share of the number of wage-earning employees in the total number of employees on GDP per capita (current US dollars) in Azerbaijan (1991-2018) are shown in Graph 8. The graph shows that there is no relationship between these two indicators. The main reason for this is that a significant part of the GDP volume in Azerbaijan is related to oil revenues. The number of workers from the oil sector is approximately 1% of the total number of employees. Therefore, the effects of the level of self-employment on the volume of added value created in the oil sector, and consequently on the volume of GDP, are not noticeable. Since self-employment is mainly in the non-oil sector, its effects can be reflected in the added value created in this sector. Indeed, it can be seen from Graph 9 that the indicator of the share of the number of salaried workers in the total number of employees in Azerbaijan has a positive effect on the volume of GDP per capita in the non-oil sector. The regression dependence of the logarithm of the volume of GDP per person in the non-oil sector ( $\log(nonoil_t)$ ) on the share of the number of salaried workers in the total number of employees ( $waged_t$ ) shows that although the hypothesis  $H_0$  is rejected, there is autocorrelation in this dependence. Nevertheless, the positive relationship between these indicators is consistent with the cross-country results based on data from 129 countries.

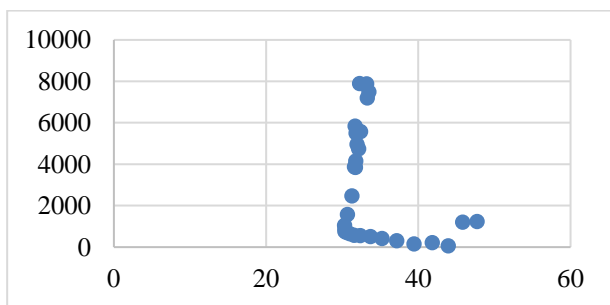


Fig. 9: Effects of the share of the number of waged (and salaried) in the total number of employment in Azerbaijan (X-axis) on GDP per capita (Y-axis) (current US dollars) (1991-2018)

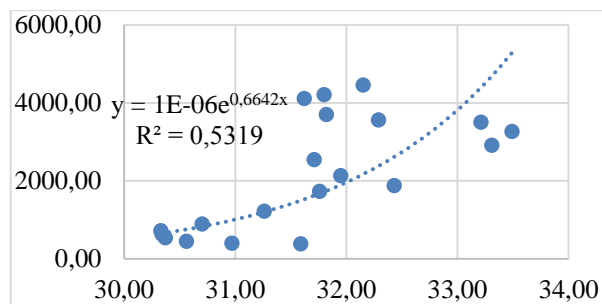


Fig. 10: Effects of the share of the waged (and salaried) in the total number of employment in Azerbaijan (X-axis) on the volume of GDP per capita (Y-axis) in the non-oil sector (current US dollars) (1991-2018)

The effects of the share of the number of waged (and salaried) in the total number of employment in Azerbaijan (X-axis) on GDP per capita (Y-axis) (current US dollars) regarding 1991-2018 are presented in Figure 9. Similarly, the effects of the share of the waged (and salaried) in the total number of employment in Azerbaijan (X-axis) on the volume of GDP per capita (Y-axis) in the non-oil sector (current US dollars) regarding 1991-2018 are shown in Figure 10.

The regression analysis between  $\Delta nooil_t$  and  $\Delta wages_t$ , as well as between  $\log(nonoil)_t$  and  $wages_t$  indicates that decreasing in the level of self-employment and increasing in the number of waged (and salaried) workers in Azerbaijan have a positive effect on the volume of GDP per capita (Table 5 and Table 6, respectively). The presence of waged (and salaried) workers in the household has a serious impact on household income. Unlike income from self-employment, this source of income is more stable. However, the self-employment of a significant part of the employed population (65-70%) deprives a significant part of households of sustainable income.

Table 5. Results of regression analysis between  $\Delta nonoil_t$  and  $\Delta wages_t$  indicators

Dependent Variable: D(NONOIL)  
Method: Least Squares  
Date: 01/21/23 Time: 15:01  
Sample (adjusted): 2001 2019  
Included observations: 19 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(WAGED)	115.2361	55.02475	2.094260	0.0515
C	211.1294	30.81800	6.850846	0.0000

R-squared	0.205085	Mean dependent var	214.5258
Adjusted R-squared	0.158325	S.D. dependent var	146.2200
S.E. of regression	134.1464	Akaike info criterion	12.73504
Sum squared resid	305919.4	Schwarz criterion	12.83446
Log likelihood	-118.9829	Hannan-Quinn criter.	12.75187
F-statistic	4.385923	Durbin-Watson stat	1.915925
Prob(F-statistic)	0.051529		

Table 6. Results of regression analysis between indicators  $\log(nonoil)_t$  and  $wages_t$

Dependent Variable: LOG(NONOIL)  
Method: Least Squares  
Date: 01/08/23 Time: 13:20  
Sample: 2000 2019  
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
WAGED	0.664232	0.146877	4.522353	0.0003
C	-13.67318	4.655580	-2.936944	0.0088

R-squared	0.531880	Mean dependent var	7.371681
Adjusted R-squared	0.505873	S.D. dependent var	0.881167
S.E. of regression	0.619409	Akaike info criterion	1.974538
Sum squared resid	6.906017	Schwarz criterion	2.074111
Log likelihood	-17.74538	Hannan-Quinn criter.	1.993976
F-statistic	20.45168	Durbin-Watson stat	0.362408
Prob(F-statistic)	0.000264		

The number of waged (and salaried) workers has a significant impact not only on the volume of GDP per capita in the non-oil sector but also on the formation of household incomes, thereby also on the generation of income inequality between households. Given that, in theory, the minimum wage raises the wages of low-income workers, we can hypothesize that:

**Hypothesis 1: the MW also affects the formation of household incomes;**

**Hypothesis 2: The MW affects income inequality among HHIs.**

Although the share of wages in household income is small, the total income of HHI depends on the number of wage workers. The positive effect of the number of wage workers on the value created in

the non-oil sector is reflected in the total income of households. A simplified model of this relationship

$$\log income_t = -12,79129 + 0,644585 \times waged_t(8)$$

(4.557775) (0.143792)

as we can express. Here,  $\log income_t$  - is the logarithm of the income of the population "t",  $waged_t$  - is the share of the number of wage earners in the year "t" in the total number of employed people. The positive relationship between the number of wage earners and the income of the population suggests that an increase in wages for any reason, including through the mechanism of the minimum wage, will have a positive effect on the volume of income. Indeed, according to the results of the double regression analysis between the minimum wage ( $MW_t$ ) and the population's income from wages ( $wincome_t$ ), there is a positive relationship between these two indicators (Table 7). Although there is some autocorrelation in the model, this model can be considered adequate. Moreover, the regression analysis of the impact of the MW on the population's income from wages is presented in Table 8.

Table 7. Dependence of the logarithm of the income of the population on the share of the number of alaried employees in the total number of employees

Dependent Variable: LOG(INCOME)  
Method: Least Squares  
Date: 01/08/23 Time: 13:38  
Sample: 2000 2019  
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
WAGED	0.644585	0.143792	4.482762	0.0003
C	-12.79129	4.557775	-2.806476	0.0117

R-squared	0.527499	Mean dependent var	7.631089
Adjusted R-squared	0.501249	S.D. dependent var	0.858647
S.E. of regression	0.606396	Akaike info criterion	1.932074
Sum squared resid	6.618900	Schwarz criterion	2.031647
Log likelihood	-17.32074	Hannan-Quinn criter.	1.951512
F-statistic	20.09516	Durbin-Watson stat	0.363866
Prob(F-statistic)	0.000288		

Table 8. Regression analysis of the impact of the MW on the population's income from wages

Dependent Variable: WINCOME

Method: Least Squares

Date: 01/08/23 Time: 14:17

Sample (adjusted): 2008 2021

Included observations: 14 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MW	0.014436	0.003378	4.273414	0.0011
C	31.81484	0.467385	68.06983	0.0000
R-squared	0.603464	Mean dependent var		33.62023
Adjusted R-squared	0.570419	S.D. dependent var		1.141301
S.E. of regression	0.748036	Akaike info criterion		2.388833
Sum squared resid	6.714699	Schwarz criterion		2.480127
Log likelihood	-14.72183	Hannan-Quinn criter.		2.380382
F-statistic	18.26207	Durbin-Watson stat		1.199626
Prob(F-statistic)	0.001082			

As we mentioned above, although the number of salaried workers has a positive effect on the income of the population, the number of salaried workers also depends on the MW level in certain cases. Thus, when the MW is low, able-bodied people prefer self-employment and do not want to work in low-income jobs. This situation reduces the supply in the labor market. On the other hand, the increase of the MW above a certain level reduces the demand in the labor market. The regression analysis of the effects of the minimum wage ( $MW_t$ ) on the share of the number of waged (and) salaried workers in the total employment ( $Waged_t$ ) in the example of Azerbaijan in the period covering the years 2001-2019 suggests that a positive relationship is observed between these indicators. However, the MW in Azerbaijan did not have a significant impact on the increase in supply in the labor market (9). Because the level of the MW was not at the level affecting the supply. This level is achieved when the MW has the power to affect wage income, at least in low-income HHI. Only in 2019, 2020, and 2021 was the level of the MW at the level of affecting the income of low-income HHI. The further increase of the MW in 2022 and 2023 will also affect the income of the HHI. The channel of the main effects is related to the increase in supply in the labor market. Another problem is that the demand for low-skilled workers is not high in the labor market.

One of the channels through which the minimum wage affects household income inequality is its effect on the number of waged (and salaried). As we mentioned, the minimum wage increase can

also increase the number of waged (and salaried) employment, under certain conditions. In this case, the level of inequality may decrease in the lower parts of the income distribution, as the incomes of low-income HHIs increase first. The dependence of the number of waged (and salaried) employment on the minimum wage is presented in Table 9. The regression analysis of the effect of the number of waged (and salaried) employees on income inequality related to the salary of this HHI in the example of Azerbaijan is given in Table 10. According to these results, as the number of waged (and salaried) increases, the GINI index increases. Serious differences between the average wage and the minimum wage in Azerbaijan reduce the effects of the minimum wage on the GINI index to almost nothing.

Table 9. Dependence of the number of waged (and salaried) employment on the minimum wage

Dependent Variable: WAGED

Method: Least Squares

Date: 01/08/23 Time: 15:12

Sample: 2001 2019

Included observations: 19

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MW	0.013476	0.003481	3.871691	0.0012
C	30.70302	0.306518	100.1670	0.0000
R-squared	0.468584	Mean dependent var		31.68790
Adjusted R-squared	0.437324	S.D. dependent var		0.993745
S.E. of regression	0.745425	Akaike info criterion		2.349577
Sum squared resid	9.446202	Schwarz criterion		2.448992
Log likelihood	-20.32098	Hannan-Quinn criter.		2.366402
F-statistic	14.98999	Durbin-Watson stat		0.537264
Prob(F-statistic)	0.001225			

The analysis of the effects of the MW on income inequality by the "difference in difference" method also confirms the above-mentioned result. Thus, in the period between 2011 and 2021, we can apply the "difference in difference" method, taking the inequality of total HHI as the "control group" and the wage inequality as the "affected group".

The results obtained for the period 2011-2021 (Table 11) show that in these years the MW did not always have an effective effect on the reduction of income inequality in households. Thus, in 2010-2011, the Gini index for wages decreased faster than the Gini index for total income. But in the following four years (2011-2012, 2012-2013, 2013-2014, and 2014-2015), on the contrary, wage inequality grew

faster. It even reached the level of 0.9 in 2015. This can happen more with the devaluation of the manat.

Table 10. Dependence of household income inequality on the number of waged (and salaried) Employment

Dependent Variable: GINI  
Method: Least Squares  
Date: 01/08/23 Time: 15:04  
Sample (adjusted): 2001 2017  
Included observations: 17 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
WAGED	4.108929	0.833959	4.927017	0.0002
C	29.88717	0.413433	72.29031	0.0000

R-squared	0.618082	Mean dependent var	31.77118
Adjusted R-squared	0.592621	S.D. dependent var	1.015461
S.E. of regression	0.648131	Akaike info criterion	2.080682
Sum squared resid	6.301099	Schwarz criterion	2.178707
Log likelihood	-15.68580	Hannan-Quinn criter.	2.090426
F-statistic	24.27550	Durbin-Watson stat	1.085480
Prob(F-statistic)	0.000182		

Table 11. Calculating the effects of the level of GDP on the income inequality of households using the "differences in difference" method

	$\Delta M\Theta H$ (azn)	$\Delta O\Theta H$ (azn)	$\overline{Gini}_{con}$	$\overline{Gini}_{tr}$	$\overline{Gini}_{tr,aft}$	$\overline{Gini}_{con,aft}$	$\overline{Gini}_{tr,bef}$	$\overline{Gini}_{con,bef}$	$\delta$
2010	7,4	33,5	0,559	0,405	-	-	-	-	-
2011	7,8	32,7	0,512	0,253	0,253	0,512	0,405	0,512	-0,152
2012	3,8	34,2	0,569	0,362	0,362	0,569	0,253	0,569	0,109
2013	7,7	26,7	0,640	0,408	0,408	0,64	0,362	0,64	0,046
2014	0	19,4	0,648	0,525	0,525	0,648	0,408	0,648	0,117
2015	0	22,4	0,667	0,932	0,932	0,667	0,525	0,667	0,407
2016	11	32,9	0,743	0,432	0,432	0,743	0,932	0,743	-0,5
2017	14	28,7	0,567	0,331	0,331	0,567	0,432	0,567	-0,101
2018	65	16,1	0,642	0,525	0,525	0,642	0,331	0,642	0,194
2019	55	90,5	0,625	0,509	0,509	0,625	0,525	0,625	-0,016
2020	0	72,6	0,652	0,495	0,495	0,652	0,509	0,652	-0,014
2021	50	24,4	0,543	0,443	0,443	0,543	0,495	0,543	-0,052

Note: calculated by the authors

## 5 Conclusion

Thus, in 2015, the manat lost more than twice its value compared to the US dollar. In 2016-2017 and 2017-2018, the level of wage inequality decreased faster than the Gini index for total income. But in 2018-2019, the Gini index for total incomes decreased faster. During that period, the increase in the average wage and the increase in the MW were comparable. However, it is impossible to say that the MW had a serious effect on income inequality during that period. Nevertheless, in 2018-2019, 2019-2020, and 2020-2021, wage inequality fell faster than total household income inequality.

## References:

- [1] Kruja Alba. The minimum wage – how does it affect inequality? Albania Case, URL: <https://www.inclusivegrowth.eu/files/Call-25/Kruja-Social-Dialogue-5.pdf>
- [2] Pelek Selin. The impact of the minimum wage on the wage distribution: Evidence from Turkey, *Ekonomi-tek*, Volume 7, No: 1, 2018,p.17-59.
- [3] Teal A. (2019). Assessing the Impact of Minimum Wage on Income Inequality. *UGA Journal of Economics*, 1(2). Retrieved from <https://econjournal.terry.uga.edu/index.php/UGAJUE/article/view/40>

- [4] Cosic D., Johnson R. W., Smith K. E. (2018). *Growing wage inequality, the minimum wage, and the future distribution of retirement income*. Washington, DC: Urban Institute.
- [5] Engelhardt Gary V., Purcell Patrick J., The Minimum Wage and Annual Earnings Inequality (August 2018). Available at SSRN: <https://ssrn.com/abstract=3240741> or <http://dx.doi.org/10.2139/ssrn.3240741>
- [6] Malloy L. C. The minimum wage, bargaining power, and the top income share, *In Forum for Social Economics*, March 2016, p. 1-24. <https://doi.org/10.1080/07360932.2016.1155468>.
- [7] Karakitsios A., Matsaganis M., Minimum Wage Effects on Poverty and Inequality, Working Paper Series 18-01 January 2018, pp.48
- [8] Manning D.H., Smith A., The Contribution of the Minimum Wage to US Wage Inequality Over Three Decades: A Reassessment, *American Economic Journal: Applied Economics*, Vol. 8 (1), 2016, pp.58-99.
- [9] Cengiz D., Dube A., Lindner A., Zipperer B. The Effect of Minimum Wages on Low-Wage Jobs: Evidence from the United States using a Bunching Estimator, *CEP Discussion Paper*, No. 1531, 2018, pp.108.
- [10] Dube A. Minimum wages and the distribution of family incomes. *American Economic Journal: Applied Economics*, 11(4), 2019, pp.268–304.
- [11] Litwin Benjamin S., Determining the Effect of the Minimum Wage on Income Inequality, *Student Publications*, 300, 2015, pp.24. [https://cupola.gettysburg.edu/student\\_scholars\\_hip/300](https://cupola.gettysburg.edu/student_scholars_hip/300).
- [12] Lin Myeong-Su Yun, The Effects of the Minimum Wage on Earnings Inequality: Evidence from China. *IZA. Discussion Paper* No. 9715, February 2016., pp.179-212.
- [13] Maurizio R., Vazquez G. Distribution Effects of the Minimum Wage in Four Latin American Countries: Argentina, Brazil, Chile and Uruguay, *International Labour Review*, Vol. 155 (1), 2016, pp.97-131.
- [14] Carlo Lombardo, Lucia Ramirez-Veira, Leonardo Gasparini, 2022. "Does the Minimum Wage Affect Wage Inequality? A Study for the Six Largest Latin American Economies, *CEDLAS, Working Papers* 0302, CEDLAS, Universidad Nacional de La Plata, 09, 2022, pp.30.
- [15] Paul Redmond, Karina Doorley, Seamus McGuinness, The Impact of a Minimum Wage Change on the Distribution of Wages and Household Income. *Oxford Economic Papers*, 73 (3), 2021, pp.1034-1056.
- [16] Bauducco S., Janiak A. The Macroeconomic Consequences of Raising the Minimum Wage: Capital Accumulation, Employment and the Wage Distribution, *European Economic Review*, Vol. 101, 2018, pp.57-76.
- [17] Caliendo M., Fedorets A., Preuss M., Schröder C., Wittbrodt L. The Short-Term Distributional Effects of the German Minimum Wage Reform, *IZA Discussion Papers 11246, Institute for the Study of Labor (IZA)*, December 2017, pp.48.
- [18] Mario Bossler, Thorsten Schank, Wage Inequality in Germany after the Minimum Wage Introduction. *IZA Institute of Labor Economics, Discussion Papers* No. 13003, 2020, pp.60.
- [19] Churchill B.F., Sabia J.J. The Effects of Minimum Wages on Low-Skilled Immigrants' Wages, Employment, and Poverty, *Industrial Relations: A Journal of Economy and Society*, vol. 58 (2), 2019, pp.275-314
- [20] Engbom, N. and Moser, C. Earnings Inequality and the Minimum Wage: Evidence from Brazil. *Working Paper 28831, National Bureau of Economic Research*, 2021 pp.125. [https://www.nber.org/system/files/working\\_papers/w28831/w28831.pdf](https://www.nber.org/system/files/working_papers/w28831/w28831.pdf)
- [21] Ilenkovi S. D., Microeconomic Statistics, Finance and Statistics (*Mikroekonomicheskaya statistika, Finansy i statistika*), 2004, pp.554
- [22] Gulaliyev Mayis G., Kazimov Fail M., Abasova Samira T., Gurbanova Tunzale T., Mammadova Gultekin G., Tagiyeva Nigar S. Macroeconomic effects of income inequality: Azerbaijan case. *Revista ESPACIOS*. Vol. 41 (24) 2020, Art. 4 Macroeconomic effects of income inequality: Azerbaijan case ([revistaespacios.com](http://revistaespacios.com)).
- [23] Gulaliyev M., Ismayilzade A., Ismayilzade A., Azizov A., Kazimov F., Mir-Babayev R. Assessing the degree of inequality in the distribution of national income and its macroeconomic consequences in Azerbaijan. *Amazonia Investiga*, (2018). 7(17), pp.85-108.
- [24] World Bank. Open Data Electron resurs: <https://data.worldbank.org/>



**Contribution of Individual Authors to the  
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