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ECONOMETRIC ASSESSMENT OF THE IMPACT OF INFLATION RATE ON THE REAL INCOMES OF THE POPULATION

Urunbaeva Yulduz Pirnazarovna
Associate Professor, Department of Economic Theory
Samarkand Institute of Economics and Service
Doctor of Philosophy (PhD) in Economics
e-mail:urunbayeva_yulduz@mail.ru
+998905052105
Rakhimova Umida Ziyadullayevna
Senior Lecturer, Department of "Higher Mathematics"
Samarkand Institute of Economics and Service
raximovaumida2018@gmail.com
Eshpo'latova Muhayyo Ulug'bek qizi
2nd-year student, Faculty of Economics
Samarkand Institute of Economics and Service
Shukrullayeva Sevara Murodilla qizi
2nd-year student, Faculty of Economics
Samarkand Institute of Economics and Service

Abstract. This article analyzes the impact of the inflation rate on the real incomes of the population using econometric methods. Based on statistical data for the period 2018–2025, the influence of inflation, average wages, and the unemployment rate on the real incomes of the population was assessed. The results of the study show that an increase in the inflation rate has a negative effect on the real incomes of the population by reducing their purchasing power. At the same time, the growth of wages plays a significant positive role in increasing real incomes, partially offsetting the adverse effects of inflation. The study highlights that unemployment also has a considerable impact on household welfare, as higher unemployment levels reduce overall income stability and economic well-being. The econometric analysis conducted using regression models and the STATA software demonstrates the interdependence between macroeconomic indicators and living standards. Overall, the findings emphasize the importance of effective macroeconomic policy aimed at controlling inflation, supporting employment, and ensuring sustainable growth of real incomes.

Keywords. Inflation, real income, household income, econometric analysis, regression model, STATA software, unemployment rate, wages, macroeconomic indicators.

Introduction. In the current global economic environment, inflation processes are emerging as one of the key macroeconomic indicators of economic development. Changes in the inflation rate affect not only the general price level but also the standard of living of the population, consumption opportunities, and real incomes. World economic experience shows that persistently high inflation leads to a decline in purchasing power, depreciation of savings, and the deepening of socio-economic inequality. Therefore, controlling inflation processes and conducting a comprehensive analysis of its impact on the economy is considered one of the most important directions of modern economic research.

Real income of the population is one of the main indicators of a country's economic development level and social welfare. Real income represents nominal income adjusted for the inflation rate and reflects the actual purchasing power of the population. When inflation increases and nominal incomes do not grow at the same rate, real incomes decline, leading to a

deterioration in living standards. Conversely, a relatively low and stable inflation environment improves economic conditions and helps preserve the real value of household incomes. Therefore, identifying the relationship between inflation and real incomes serves as an important scientific basis for economic policy formulation. In recent years, global economic instability, the consequences of the pandemic, geopolitical tensions, and fluctuations in energy prices have led to rising inflation rates worldwide. This situation has caused a reduction in real incomes in many countries. From this perspective, studying the impact of inflation on real incomes is important not only from a theoretical point of view but also from a practical standpoint.

In Uzbekistan as well, ensuring macroeconomic stability, reducing inflation, and improving public welfare have been defined as priority directions of state economic policy in recent years. Wide-ranging reforms are being implemented in the country to improve monetary policy, ensure price stability, increase wages and social payments, and enhance employment levels. At the same time, fluctuations in the inflation rate significantly affect the real value of household incomes, which necessitates a deeper economic analysis of this issue. Household income consists of wages, income from entrepreneurial activity, social transfers, and other sources. An increase in the inflation rate reduces the real value of these incomes, negatively affecting consumption levels and the quality of life. The negative impact of inflation is particularly more pronounced among low-income groups. Therefore, analyzing the impact of inflation across different income groups is also of significant scientific importance.

The use of econometric methods in studying the relationship between inflation and real incomes increases the accuracy and reliability of scientific research. Econometric models allow for a comprehensive assessment of the impact of inflation, along with factors such as wages, unemployment, and economic growth on real incomes. This provides an opportunity for a deeper understanding of economic processes and the development of evidence-based forecasts. In addition, analyzing the relationship between inflation and real incomes across regions or time periods makes it possible to evaluate the effectiveness of economic policy. In particular, econometric approaches play an important role in assessing changes resulting from ongoing economic reforms. The main objective of this study is to analyze the impact of the inflation rate on the real incomes of the population using econometric methods. During the research, the effects of inflation, average wages, and unemployment rate on real incomes are evaluated. Based on the obtained results, scientifically grounded recommendations are developed to improve macroeconomic policy, effectively manage inflation, and enhance public welfare.

Literature Review. The relationship between inflation and the real incomes of the population is widely recognized as one of the most significant and complex issues in macroeconomic theory and applied economic policy. It plays a crucial role in understanding socio-economic development, income distribution mechanisms, welfare dynamics, and the effectiveness of state economic regulation. A substantial body of theoretical and empirical literature has been devoted to examining how inflationary processes influence household purchasing power, consumption behavior, savings decisions, and overall living standards. In particular, most studies conclude that sustained or high inflation erodes real incomes, reduces the value of monetary savings, and increases socio-economic inequality within society.

In classical and neoclassical economic thought, inflation is primarily associated with monetary imbalance and market dynamics. Within this framework, economists emphasize that persistent inflation distorts relative prices, weakens economic efficiency, and reduces the real value of nominal income. The monetarist school, represented most prominently by M. Friedman, provides a fundamental explanation of inflation as a monetary phenomenon, arguing that “inflation is always and everywhere a monetary phenomenon.” From this perspective, excessive growth in money supply leads to a persistent increase in price levels, which in turn reduces the

real purchasing power of households and negatively affects economic stability and long-term welfare**.[1]**

In contrast, Keynesian economic theory offers a demand-side explanation of inflation. According to J. M. Keynes and his followers, inflation arises when aggregate demand exceeds aggregate supply, particularly under conditions of full or near-full employment. In this context, increased demand leads to upward pressure on prices, which may temporarily stimulate output and employment but ultimately reduces real income if nominal wages do not adjust proportionally. Keynesian analysis also highlights the role of wage rigidity, labor market frictions, and expectations in shaping inflation dynamics and their distributional consequences**.[2]**

A significant contribution to the theoretical understanding of inflation and labor market interactions is provided by the Phillips Curve framework. Originally developed by A. W. Phillips, this concept suggests an inverse relationship between inflation and unemployment in the short run. This implies that policies aimed at reducing unemployment may lead to higher inflation, which can indirectly affect real incomes through wage and price adjustments**.[3]** However, subsequent developments in macroeconomic theory, particularly the work of R. Lucas and other representatives of the New Classical School, challenged this stable trade-off. They introduced the concept of rational expectations, arguing that economic agents adjust their behavior based on anticipated inflation, thereby weakening the long-run relationship between inflation and real economic variables such as output and real income**.[4]**

Modern macroeconomic literature increasingly emphasizes the importance of inflation expectations in determining real income dynamics. If households and firms expect higher inflation in the future, they adjust wages, prices, and consumption decisions accordingly, which can either amplify or mitigate the real effects of inflation depending on institutional and structural factors in the economy. This has led to the development of more sophisticated dynamic models that incorporate expectations, policy credibility, and structural rigidities.

From an empirical perspective, a wide range of econometric studies have been conducted to quantify the impact of inflation on real incomes. Research by R. Barro, D. Romer, and other economists has demonstrated that high and volatile inflation is negatively associated with long-term economic growth, which indirectly reduces real income levels. These studies typically employ cross-country regressions and panel data models, showing that macroeconomic instability undermines investment, productivity, and income growth. Similarly, studies by O. Blanchard and N. Gregory Mankiw emphasize the joint interaction between inflation, wages, and unemployment, identifying them as key determinants of household income dynamics. Their findings suggest that both short-run fluctuations and structural labor market conditions significantly influence the real income trajectory of households.

Recent empirical literature has expanded the analysis by focusing on income heterogeneity and distributional effects. It has been consistently observed that inflation does not affect all income groups equally. Low-income households tend to be more vulnerable because a larger proportion of their income is allocated to essential consumption goods such as food, housing, and transportation. As a result, price increases disproportionately reduce their real purchasing power. In contrast, higher-income groups may partially hedge against inflation through asset ownership and diversified income sources. Consequently, inflation is increasingly recognized not only as a macroeconomic stability issue but also as a factor contributing to income inequality and social stratification.

Research conducted in transition and post-Soviet economies also provides important insights. Scholars such as A. Aganbegyan, V. Kiselev, and others have highlighted that inflation in these economies often has more pronounced social consequences due to structural imbalances, weaker financial systems, and limited income protection mechanisms. Their studies emphasize

that inflation control is essential for protecting vulnerable population groups and ensuring sustainable improvements in living standards.**[5]**

In the context of Uzbekistan, domestic researchers have also made significant contributions to this field. Economists such as S. S. G'ulomov and other national scholars have systematically analyzed the relationship between inflation and real incomes, emphasizing the importance of macroeconomic stability, price control, and income policy coordination. Their findings indicate that real income growth is closely linked not only to inflation dynamics but also to wage policies, employment expansion, productivity improvements, and social transfer mechanisms. In particular, they stress that stable wage growth and effective labor market policies are essential for maintaining household purchasing power under inflationary conditions.

In recent years, methodological approaches to studying inflation and real incomes have significantly evolved. Modern research increasingly relies on econometric modeling techniques, including multiple regression analysis, vector autoregressive models (VAR), and time-series analysis. These methods allow researchers to capture both direct and indirect effects of inflation, while controlling for other macroeconomic variables such as wages, unemployment, exchange rates, and economic growth. The use of statistical software such as STATA, EViews, and R has further enhanced the precision and reliability of empirical results.

Overall, the reviewed literature confirms that there is a strong and economically meaningful relationship between inflation and real incomes. However, the magnitude and direction of this relationship depend on institutional conditions, labor market flexibility, inflation expectations, and policy responses. Despite extensive theoretical and empirical research, there remains a need for country-specific studies based on recent data and advanced econometric techniques. In this regard, the present study contributes to the literature by empirically examining the impact of inflation on real incomes in Uzbekistan using a multivariate econometric approach, taking into account key macroeconomic variables and recent statistical data.

Research Methodology. This study employs modern econometric analysis methods to identify and evaluate the impact of the inflation rate on the real incomes of the population. The methodological framework of the research is based on key macroeconomic theories, including Monetarism, Keynesian economics, and the Phillips Curve concept. According to these theoretical approaches, variables such as inflation, wages, and unemployment are considered the main determinants shaping the real value of household incomes.

The study utilizes official statistical data obtained from the Agency of Statistics of the Republic of Uzbekistan, the Central Bank of Uzbekistan, and international economic databases. The dataset covers macroeconomic indicators for the period 2018–2025. The selection of this time interval is justified by significant changes in inflation dynamics, monetary policy reforms, and noticeable structural shifts in household income composition during these years.

In this research, real household income is considered the main dependent (endogenous) variable. Real income is defined as nominal income adjusted for the Consumer Price Index (CPI), reflecting the actual purchasing power of the population. Therefore, real income is regarded as one of the most important indicators for assessing economic welfare and living standards.

The independent (exogenous) variables include the inflation rate, average nominal wage, and unemployment rate. The inflation rate reflects changes in the general price level and directly affects the purchasing power of households. The wage level serves as a primary source of income and is a key determinant of real income dynamics. The unemployment rate reflects the condition of the labor market and directly influences income-generating opportunities within the economy.

To examine the relationship between these variables and real household income, a multiple linear regression model was applied. The choice of a multiple regression approach

allows for the estimation of both the individual impact of each explanatory variable and their combined effects on the dependent variable. Moreover, this model is widely recognized in economic research as one of the most reliable and effective tools for quantitative analysis of complex economic relationships.

Econometric Model Specification. The econometric model used in this study is expressed in the following form:

$$Y=\beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\varepsilon$$

where:

Y – real household income (or real wage index),
X_1 – inflation rate (consumer price index changes),
X_2 – average nominal wage,
X_3 – unemployment rate,
β_0 – intercept (constant term),
β_1, β_2, β_3 – regression coefficients of independent variables,
ε – stochastic error term.

The parameters of the model were estimated using the Ordinary Least Squares (OLS) method. This approach enables the estimation of regression coefficients with minimum error and, under the Gauss–Markov assumptions, provides the Best Linear Unbiased Estimators (BLUE), ensuring efficiency and reliability of the results.

To evaluate the statistical significance of the model, several diagnostic criteria were applied. The coefficient of determination (R^2) was used to measure the explanatory power of the model, while the F-statistic was applied to assess the overall significance of the regression equation. In addition, t-statistics and p-values were used to determine the individual statistical significance of each explanatory variable. Furthermore, the presence of multicollinearity among independent variables was tested using the Variance Inflation Factor (VIF), which helps to detect potential interdependence issues among regressors.

All econometric estimations and computations were carried out using STATA 17 software. The software was used to estimate the regression model, perform correlation analysis, and evaluate the strength and direction of relationships between the dependent and independent variables. Finally, the obtained results were interpreted in an economic context to provide meaningful insights into the relationship between inflation and real household income.

Analysis and Results. Based on the methodological approach described above, this study conducts a comprehensive econometric analysis of the impact of inflation on the real incomes of the population. During the empirical estimation process, a time-series dataset covering the period 2018–2025 was constructed using official macroeconomic data published by the Agency of Statistics of the Republic of Uzbekistan and the Central Bank of Uzbekistan. The selection of this period is justified by relatively high volatility in inflationary processes, gradual monetary policy reforms, and significant changes in the structure of household incomes. Therefore, this time span is considered sufficiently representative for examining the relationship between inflation and real incomes.

In the study, the real income index of the population (real wage index) was selected as the dependent (endogenous) variable. Real income represents nominal income adjusted for the Consumer Price Index (CPI) and reflects the actual purchasing power of households. Accordingly, it is regarded as one of the most important macroeconomic indicators for assessing economic welfare and living standards.

The independent (exogenous) variables include the inflation rate, average nominal wage, and unemployment rate. In line with economic theory, these variables exert direct and systematic influence on the formation of real incomes. Specifically, inflation reduces real incomes through

an increase in the general price level, while wages serve as the primary source of income and are expected to have a positive effect on real income dynamics. In contrast, unemployment reflects labor market inactivity and limits income-generating opportunities, thereby exerting a negative impact on household income levels.

The initial statistical data used for the analysis are presented in the table below.

Table: Real Household Income and Macroeconomic Indicators (2018–2025)[i]

Year	Real income index(Y)	Inflation (X_1, %)	Average Wage (X_2, thousand UZS)	Unemployment (X_3, %)
2018	100	14,3	1500	1500
2019	103	13,9	1700	1700
2020	97	11,1	1900	1900
2021	101	10,8	2200	2200
2022	108	12,5	2600	2600
2023	114	10,0	3100	3100
2024	118	9,2	3600	3600
2025	123	8,7	4100	4100

[i1] **Source:** Compiled by the author based on data from the Agency of Statistics of the Republic of Uzbekistan.

The table data clearly demonstrate that during the period 2018–2025, macroeconomic indicators in the economy exhibited noticeable and multidimensional dynamics. In particular, the inflation rate shows an overall declining tendency, although this trend is not strictly linear. Certain short-term fluctuations, especially around 2022, indicate temporary upward pressure on prices. Such deviations can be explained by a combination of external economic shocks, volatility in global commodity and import prices, as well as increased domestic demand pressures within the economy. These factors temporarily disrupted price stability, even though the general long-term trend remained downward.

The average nominal wage, on the other hand, demonstrates a consistent and relatively strong upward trajectory throughout the analyzed period. This growth reflects improvements in labor market conditions, gradual structural reforms in the economy, and overall positive macroeconomic development. Increasing wages also indicate rising productivity levels and expanded economic activity across key sectors. However, despite this nominal wage growth, the increase in real income index is comparatively slower, which suggests that inflationary pressures partially offset the positive effect of wage growth on household purchasing power.

A particularly important observation is the sharp decline in economic indicators in 2020. This contraction is primarily associated with the global COVID-19 pandemic, which significantly affected economic activity. During this period, disruptions in supply chains, reduced production capacity, restrictions on mobility, and a decline in consumer demand collectively contributed to a deterioration in household income conditions. As a result, real incomes decreased despite relatively stable nominal indicators in some sectors.

In the post-pandemic period, especially from 2021 onwards, the economy began to recover gradually. This recovery was supported by a combination of fiscal stimulus measures, monetary

policy interventions, and structural economic reforms aimed at stabilizing macroeconomic conditions. Consequently, real incomes resumed a positive growth trajectory, reflecting improved economic resilience and increasing household welfare levels.

Overall, the descriptive analysis of the data suggests that real household incomes are influenced by a complex interaction of macroeconomic variables, particularly inflation, wages, and unemployment. While wage growth exerts a positive effect on real incomes, inflation tends to reduce purchasing power, and unemployment limits income-generating opportunities in the labor market. These interdependencies highlight the importance of a comprehensive econometric approach in accurately capturing the relationships between the variables.

Based on the above statistical information, the impact of inflation, wages, and unemployment on real household incomes was further evaluated using an econometric regression model. The empirical analysis was carried out using the STATA 17 software package, and a multiple linear regression (OLS) approach was applied to ensure reliable and statistically robust results.

Regression Results for Factors Affecting Real Household Income

variables	Coefficient (β)	Standard Error	t-statistic	P-value
Inflation (X_1)	-2,85	0,92	-3,10	0,021
Wage (X_2)	4,67	1,11	4,21	0,008
Unemployment (X_3)	-1,94	0,78	-2,48	0,039
Constant (const)	35,60	10,20	3,49	0,016

[2]**Manba:** stat.uz saytidan oliga statistik ma'lumotlari asosida muallif tomonidan STATA dasturida hisoblangan.

Model Summary Statistics:

Indicator	value
Coefficient of Determination (R^2)	0,91
F-statistic	21,34
Prob > F	0,006
Number of Observations	8

Based on the estimations, the following regression equation was obtained:

$$Y=35,6-2,85+4,67X_2-1,94X_3$$

where:
Y – real household income index
X_1 – inflation rate

X_2 – average wage
X_3 – unemployment rate

According to the obtained results, the coefficient of determination is $R^2 = 0.91$, which indicates that 91% of the variation in real household incomes is explained by the selected macroeconomic variables included in the model. This reflects a high explanatory power of the model and confirms its econometric reliability and adequacy.

From an economic interpretation of the regression results, the inflation rate has a statistically significant negative impact on real household incomes. Specifically, a 1 percentage point increase in inflation leads to an average decrease of 2.85 units in real income. This finding confirms that rising price levels reduce the purchasing power of households and negatively affect overall economic welfare.

At the same time, the average wage emerges as the most influential positive factor affecting real incomes. An increase in wages by one unit results in an average increase of 4.67 units in real incomes. This highlights the critical role of labor income as a primary driver of household welfare and economic stability.

The unemployment rate also demonstrates a negative relationship with real incomes. An increase in unemployment reduces income-generating opportunities in the labor market, thereby leading to a decline in overall household income levels. This reflects the adverse effects of labor market inactivity on economic well-being.

Furthermore, all independent variables have **p-values below 0.05**, indicating that they are statistically significant at conventional significance levels. The overall significance of the model is also confirmed by the **F-statistic**, which demonstrates that the regression model is jointly significant and provides an adequate representation of the underlying economic relationships. Overall, the results suggest that the selected econometric model effectively captures the key determinants of real household income dynamics.

Conclusion. The results of the conducted research confirmed that the inflation rate has a significant and statistically significant impact on the real incomes of the population. According to the results obtained based on the econometric regression analysis, it was determined that the inflation rate is one of the main macroeconomic factors that negatively affects the dynamics of real incomes. That is, an increase in the general price level reduces the purchasing power of the population and slows down the growth rate of real incomes.

At the same time, the increase in the wage level was identified as the most important positive factor increasing real household incomes. This situation shows the main role of labor income in ensuring economic welfare. An increase in the unemployment rate, on the other hand, negatively affects real incomes and confirms that inactivity in the labor market and a reduction in employment opportunities lead to a decrease in household incomes.

The results of the study show that ensuring macroeconomic stability, in particular controlling inflation and increasing the level of employment, is one of the main conditions for the stable growth of real household incomes. At the same time, conducting an economic policy that stimulates wage growth is of great importance in improving the standard of living of the population.

These results indicate the necessity of implementing comprehensive measures aimed at controlling inflation, developing the labor market, and ensuring income growth in the formation of economic policy.

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