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INFLATION IMPACT ON INCOME INEQUALITY AT EU LEVEL IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

The relationship between inflation and inequality is a topic of great interest in the economic literature, with contradictory empirical results, studies reporting positive, negative, nonlinear or insignificant relationships, which suggests a contextual dependency insufficiently investigated in the European space.

This research extends the analysis by integrating the normative framework of the 2030 Agenda, demonstrating that inflation is not a simple macroeconomic phenomenon, but a structural mechanism that can compromise social sustainability in the long term. We identified a gap in the literature review that consists in very few studies that simultaneously analyse the impact of inflation on several dimensions of the SDGs in the European context.

Our main purpose is to analyse and quantify the impact of inflation on the economic and social indicators used to measure the degree of achievement of SDG 1, SDG 8 and SDG 10 at the EU level, during the period 2014–2024.

Methodology and research hypotheses

Our research has two main hypotheses:

Hypothesis 1 – Asymmetric social impact (SDGs 1 & 10): Rising inflation leads to increased income inequality and poverty rates. The transmission mechanism targeted is the degradation of the purchasing power of low-income employees (working poor), whose real incomes do not keep pace with the increase in prices of basic goods.

Hypothesis 2 – Inflation–economic growth correlation (SDGs 8): High inflation exerts a negative impact on the growth rate of real GDP per capita, discouraging investment and reducing aggregate demand.

We used a quantitative econometric approach based on panel data analysis for the 27 EU Member States, for the period 2015–2024 (270 observations after transformation into first differences). The data are extracted from Eurostat, and the processing was performed in EViews 12 Student Lite. The methodology includes: descriptive statistical analysis; Im, Pesaran & Shin (IPS) test for stationarity;

correlation matrix (levels and stationary series); Hausman test; EGLS model with random effects; Granger test (2 lags); Jarque-Bera test.

Table 1

Analysed indicators

Indicator	Sustainable Development Goal	Justificare
Inflation (Consumer Price Index)	Macroeconomic context	The central independent variable; acts as a regressive tax on fixed incomes
Gini Index	SDG 10	Standard indicator of income concentration; allows comparability at EU level
Poverty risk (40% median threshold)	SDG 1	Identifies severe poverty; relevant for groups without the capacity to absorb price shocks
Working poverty (working poor)	SDG 1 & 8	Demonstrates that employment is no longer sufficient protection in inflationary conditions
S80/S20 Index	SDG 1 & 10	The ratio of the incomes of the richest 20% to the poorest 20% – similar to the Gini Index
Real GDP/ capita growth	SDG 8	Tests whether aggregate economic growth reduces inequality and poverty

Source: own work

We analysed the abovementioned indicators using descriptive statistics.

Table 2

Descriptive statistics – 270 observations, 27 EU Member States, 2015–2024

Indicator	Mean	Median	Min.	Max.	St. Dev.	Skewness	Kurtosis
Inflation (%)	2,92	1,90	-1,50	19,40	3,67	1,98	7,31
Gini Index	29,61	29,20	20,90	40,80	3,96	0,35	2,88
Poverty Risk (%)	16,55	16,05	8,60	25,40	3,06	0,60	3,43
In-Work Poverty (%)	8,12	7,85	2,50	18,90	3,82	0,25	2,05
S80/S20 (Distribution)	4,81	4,47	3,03	8,32	1,16	0,85	3,05
Real GDP Growth (%)	2,28	2,23	-11,44	23,46	3,81	0,32	7,45

Source: own work

Inflation averages 2.92%, with extreme values ranging from -1.5% to 19.4%, reflecting the volatility of the period under review (pandemic crisis, energy shock

2022). The average Gini coefficient of 29.61 indicates a moderate level of inequality at EU level, but the high standard deviation signals major disparities between Member States. Real GDP growth shows extreme variability, from -11.44% (Spain, 2020) to +23.46% (Ireland, 2015), confirming the asymmetry of temporal shocks.

Correlation analysis

Table 3

Main correlation relationships (levels and stationary series, n = 270)

Relations	Levels of correlation	Unit roots correlations	Interpretation
GINI and Poverty Risk	0.862 (very strong)	0.402 (moderate)	Inequality is a strong structural determinant, but shocks have a moderate impact
In-Work Poverty and Poverty Risk	0.728 (strong)	0.429 (moderate)	Confirmă transmiterea șocurilor, dar mai slabă decât relația structurală (persistentă în timp)
GINI and In-Work Poverty	0.634 (strong)	0.152 (weak)	The relationship is predominantly structural, not dynamic
Inflation and Poverty Risk	0.060 (non-existent)	0.045 (non-existent)	Confirms the absence of inflation impact

Source: own processing in EViews 12

Inflation is not the determinant of structural poverty in the EU (2014–2024). Income inequality (Gini and S80/S20) is the main predictor of all forms of poverty. GDP growth does not automatically translate into reduced inequality or poverty, in the absence of explicit redistributive mechanisms, the benefits of growth are captured by the upper segments of the income distribution.

Panel Models and Granger Causality

For the correlation analysis, we used the Hausman test, where we had to choose between the Fixed Effects model (the model considers that each of the 27 countries has unique, fixed features, which must be completely isolated) and the Random Effects model (considers that the differences between countries are random variations in a common European system).

The result obtained (Prob = 0.9476 – higher than the threshold of 0.05) indicates the absence of a significant correlation between the error components specific to the entities (countries) and the explanatory variables (D_GINI, Inflation, D_Poverty, D_Labor_Poverty), so we cannot reject the null hypothesis. The role of the Hausman

test is to verify whether the differences specific to each country (their unique features) are correlated or not with the independent variables (Gini, Inflation, etc.).

We analyzed the delta Poverty Risk (the dependent variable) as a function of the inflation constant to correlate the inflation „shock” with the „change” in poverty.

Table 4

EGLS panel model with random effects to explain variation in poverty risk

Independent variable	Coefficient	Standard Error	t-Statistic	Prob.
Intercept	-0,0566	0,0582	-0,973	0,331
Inflation	0,0134	0,0113	1,193	0,234
GDP Growth	-0,0014	0,0109	-0,130	0,897
Δ Gini	-0,1730	0,0923	-1,874	0,062
Δ In work at poverty risk	0,2727	0,0519	5,255	0,000
Δ S80/S20 Distribution	1,7437	0,3044	5,728	0,000

Source: own processing in EViews 12

Interpretation of the coefficients. Income distribution (S80/S20) is the factor with the strongest impact: a one-unit increase in distributional inequality generates a 1.74-unit increase in the risk of poverty ($p = 0.000$). In-work poverty has a positive and highly significant impact (coef = 0.27; $p = 0.000$): a 1% increase in the proportion of working poor determines a 0.27 percentage point increase in the overall risk of poverty. Inflation (coef = 0.013; $p = 0.234$) and GDP growth (coef = -0.001; $p = 0.897$) do not show a statistically significant influence in the presence of inequality indicators.

Granger causality: inequality vs. in-work poverty

The Granger test (2 lags, 216 observations) provides probabilities of 0.3449 (Δ In-work poverty \rightarrow Δ Gini) and 0.1476 (Δ Gini \rightarrow Δ In-work poverty), both are above the 0.05 threshold. The null hypotheses cannot be rejected: neither variable temporally precedes the other. Inequality (SDG 10) and in-work poverty (SDG 8) coexist as simultaneous manifestations of the same structural shocks, which requires integrated, not sequential, policy interventions.

Conclusions and policy recommendations

The research confirms that poverty in the EU (2014–2024) is a structural phenomenon, driven predominantly by income inequality and in-work poverty, rather than by nominal inflation dynamics or gross economic growth. Main empirical findings:

- Inflation is not the determining factor of structural poverty in the EU: correlations with all poverty and inequality indicators are practically non-existent ($r < 0.06$) and statistically insignificant.

- Income inequality (S80/S20) is the strongest predictor of poverty risk (coef = 1.74; $p < 0.001$), supporting the priority of SDG 10 for achieving SDG 1.

- In-work poverty directly fuels general social exclusion (coef = 0.27; $p < 0.001$): the simple fact of having a job no longer constitutes sufficient protection in inflationary periods.

- Economic growth (GDP) explains less than 1% of the variation in social indicators ($r^2 < 0.01$), confirming the decoupling of aggregate growth from the well-being of vulnerable populations.

- Inequality and in-work poverty react simultaneously to the same structural stimuli (Granger test: $p = 0.14\text{--}0.34$), which requires integrated, not sequential, policy interventions.

Policy recommendations

1. Prioritize redistributive tax policies (SDG 10 & 1). Member States should adopt more effective progressive taxation systems and strengthen targeted social transfers to the bottom quintiles of income. Econometric modelling demonstrates that reducing distributive inequality has a substantially greater multiplier impact on poverty reduction than simply maintaining price stability.

2. Index the minimum wage to the consumer basket, not just to inflation (SDG 8). The strong and simultaneous correlation between overall and in-work poverty demonstrates that simply creating jobs does not guarantee protection from poverty. The minimum wage should be aligned with productivity and inequality dynamics, not just the inflation rate.

3. Decouple the Sustainable Development Strategy from the GDP growth paradigm. Empirical results highlight the absence of a link between GDP and social welfare indicators. It is recommended to adopt government performance indicators based on inclusive well-being, integrating the achievement of SDG 1 and SDG 10 into the budget process.

Limitations and future directions

The research has several limitations: (a) the use of random effects may blur the differences between mature economies (Germany, France) and convergent ones (Romania, Bulgaria); (b) the period 2014–2024 covers a single atypical inflationary cycle, limiting generalizability; (c) the model does not integrate relevant qualitative factors (degree of digitalization, resilience of education systems, demographic structure). Future directions include comparative analysis of non-euro EU vs. euro area

on the protection of SDGs through exchange rate and the use of EU-SILC microdata to quantify the differential impact of energy inflation on low-income households.

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