

Geopolitical Shocks and Romania's Macroeconomic Indicators: A Quantitative Assessment Using the Geopolitical Index

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Abstract

This study aims to quantify the impact of geo-economic events on Romania's economic development between 2015 and 2025. Specifically, it examines how fluctuations in the global Geopolitical Risk Index influence three core macroeconomic indicators (the inflation rate, GDP per capita and unemployment rate) that together operationalise economic development as a multidimensional construct. The research adopts a quantitative approach grounded in secondary data extracted from Statista and the World Bank database and the GPR index developed by Caldara and Iacoviello. Pearson correlation analysis was used to establish bivariate associations, while univariate linear regression models served as the primary econometric tool to estimate directional impacts and test the research hypotheses. The Pearson correlation matrix revealed a strong positive association between GPR and the inflation rate ($r = 0.67$), a moderately strong link with GDP per capita ($r = 0.60$), and a weaker relationship with the unemployment rate ($r = 0.34$). The univariate regression model for GDP per capita confirmed a statistically significant positive effect of GPR ($\beta = 32.279$, $p = 0.049$), with the model explaining 36.6 % of the variation in output growth. The study contributes to the existing literature by bridging the micro-level focus on SME resilience and cognitive frameworks with a macroeconomic econometric assessment of GPR transmission channels in an Eastern European context. The findings emphasise the mitigating potential of countercyclical fiscal and monetary policies, EU structural-fund absorption, and targeted labour-market interventions.

Keywords

Geopolitical risk index; economic development; SMEs, inflation rate; GDP per capita; unemployment rate

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Introduction

The contemporary global economy operates under persistent geo-economic uncertainty, shaped by a confluence of disruptive events ranging from the COVID-19 pandemic and the Russia–Ukraine war to escalating trade tensions, oil-price volatility, or Brexit. These developments have elevated geopolitical risk to a central driver of macroeconomic outcomes, prompting renewed scholarly attention to its transmission channels across supply chains, commodity markets, and domestic price and output dynamics (Caldara & Iacoviello, 2022). A growing body of evidence demonstrates that heightened geopolitical risk tends to generate inflationary pressures through disrupted trade flows and commodity price spikes (Caldara et al., 2025; Sohag et al., 2023), while simultaneously exerting heterogeneous effects on economic growth, particularly in open economies reliant on EU structural funds (Di Caro et al., 2026). In Central and Eastern Europe (CEE), where proximity to conflict zones amplifies exposure, such shocks have been shown to intensify inflation and moderate GDP trajectories more markedly than in Western Europe (Daianu et al., 2025). At the micro level, parallel research highlights how SMEs navigate these pressures through adaptive leadership, cognitive framing, and resilience strategies (Lengnick-Hall et al., 2011; Roloff, 2023), yet the aggregate national-level consequences remain comparatively underexplored, especially in country-specific settings such as Romania.

This study aims to bridge that gap by quantifying the impact of global geopolitical risk on Romania's economic development between 2015 and 2025. In this context, the research problem is highlighted around the extent to which fluctuations in the GPR (geopolitical risk) index shape key macroeconomic indicators that collectively operationalise economic development: the inflation rate, GDP per capita and the unemployment rate. These variables were selected to provide a multidimensional assessment of price stability, output growth, and labour-market conditions, thereby capturing the main ways in which geo-economic shocks propagate through the Romanian economy.

1. Review of the scientific literature

At the micro level, SMEs respond to these geo-economic shocks through resilience strategies, transformational leadership, and different cognitive frameworks (Lengnick-Hall et al., 2011; Roloff, 2023). Roloff (2023) shows how managers adopt business, business case, or paradox frameworks that influence crisis responses, from pure survival to social innovation during the COVID-19 pandemic. While these firm-level adaptations may partially mitigate the effects of geopolitical shocks, the present study focuses primarily on the aggregate macroeconomic consequences at the national level.

At the macroeconomic level, geopolitical risk is transmitted to the economy mainly through supply disruptions, uncertainty-induced demand contractions, commodity price shocks, and policy responses. Caldara and Iacoviello (2022, 2025) document that a higher geopolitical price rate (GPR) systematically increases inflation through trade disruptions, supply chain disruptions, and higher energy and food prices. Using historical data from several economies, Caldara et al. (2025) show that geopolitical shocks portend sustained inflationary pressures, with heterogeneous effects depending on a country's exposure to commodities and trade openness. The main transmission channels include commodity and energy markets, where geopolitical events trigger sharp increases in oil and food prices, generating imported inflation, especially in energy-dependent economies (Sohag et al., 2023).

Trade and supply chain disruptions reduce exports, imports and investment, putting downward pressure on GDP growth (Bondarenko et al., 2025; Hodula et al., 2024). Increased uncertainty also increases risk aversion, reducing consumption and investment, while increasing unemployment risks and the volatility of capital flows (Di Caro et al., 2026). Emerging and Central and Eastern European economies tend to experience stronger impacts on both inflation and output, due to higher exposure to energy imports and proximity to conflict zones (Daianu et al., 2025). Recent evidence from Central and Eastern Europe confirms these dynamics. Di Caro et al. (2026) demonstrate that increased geopolitical risk weakens the growth effects of EU cohesion policy. Daianu et al. (2025), using Bayesian SVAR models, quantify that war-related GPR shocks contributed to higher inflation and slightly lower GDP in the region, with more pronounced effects in Central and Eastern European countries compared to Western Europe.

At the macroeconomic level, a growing body of evidence has documented the transmission of geopolitical risk to key indicators of economic development. Di Caro et al. (2026) demonstrate that elevated geopolitical risk substantially weakens the growth-enhancing effects of EU cohesion policy across member states, reducing the marginal impact of structural funds by approximately 0.45–0.55%. Complementing these findings, Sohag et al. (2023) provide region-specific evidence from Europe, showing that aggregate and Russia-specific geopolitical risk measures exert heterogeneous effects on food inflation, with stronger long-memory inflationary pressures observed in Eastern Europe. These results are consistent with the broader historical analysis of Caldara et al. (2025), who establish that geopolitical risk shocks systematically raise inflation through supply-chain disruptions and commodity-price channels. Daianu et al. (2025), employing Bayesian SVAR models on Central and Eastern European economies, quantifies the war-related GPR shock as contributing to higher inflation and modestly lower GDP in the region, with more pronounced effects in CEE countries compared with Western Europe.

Although micro-level resilience mechanisms can partially mitigate the impact of geopolitical shocks, aggregate national outcomes ultimately depend on the strength of macroeconomic transmission channels. The present study links these perspectives by providing a quantitative econometric assessment of how global geopolitical risk, as measured by the GPR index, affects Romania's main macroeconomic indicators (inflation rate, GDP per capita, and unemployment rate) over the period 2015-2025. This approach extends the existing literature from predominantly firm-level analyses to a macroeconomic perspective in an Eastern European context.

2. Research methodology

Considering the reviewed literature, the main objective of the current study involves quantifying the impact of geo-economic events on economic development in Romania. The sub-objectives of the current research involve implementing a quantitative analysis to identify the correlation between the evolution of global geopolitical risk and the fluctuation of the inflation rate in Romania

The study focuses on the period 2015–2025 and uses monthly observations of the selected economic indicators. The major geo-economic events captured within this timeframe include the COVID-19 pandemic, the Russia–Ukraine war, the increase in U.S. tariffs, fluctuations in global oil prices, and the United Kingdom’s withdrawal from the European Union (Brexit). Secondary data were collected from two primary sources, represented by the Statista and the World Bank database and the Geopolitical Risk (GPR) index developed by Caldara and Iacoviello. The research adopts a quantitative approach, and in order to achieve the primary objective, univariate linear regression analysis was utilized as the main econometric tool. In addition, a correlation matrix was constructed, and Pearson’s correlation coefficient was calculated to address the secondary objectives.

Therefore, the dependent variables of the model, quantifying Romania’s economic development, are conceptualised as a multidimensional construct and are measured through three complementary macroeconomic indicators: the inflation rate, expressed as the annual percentage change in the Consumer Price Index (CPI), GDP per capita, reported in current or constant prices and the unemployment rate. These indicators were selected because they collectively reflect the key dimensions of macroeconomic performance (price stability, output growth, and labour market conditions) and allow for a nuanced assessment of how geopolitical shocks propagate through the Romanian economy. Each indicator is analysed both individually (univariate regressions) and jointly (via correlation matrix and Pearson’s correlation coefficients) to fulfil the primary and secondary research objectives. In terms of the independent variable, the study utilises values of the GPR (geopolitical risk) in order to reflect and evaluate the fluctuation of the geopolitical events.

Building on the findings synthesised in the literature review, which collectively underscore the disruptive influence of geo-economic shocks on economic stability, organisational resilience, supply-chain dynamics, consumption patterns, and financial performance, the present study formulates the following research hypotheses at the macroeconomic level. In particular, Roloff (2023) demonstrates how major geo-economic events (exemplified by the COVID-19 pandemic) fundamentally reshape business operations and managerial cognitive frameworks, while Neacșu and Georgescu (2024) document the intensified linkages between sustainability practices, resilience, and long-term financial outcomes in the post-2020 period. Therefore, relying on the information collected through the literature review, the following main hypotheses were identified:

H₀: The fluctuation of the geopolitical risk has no significant impact on the evolution of Romania’s economic development

H₁: Romania’s economic development is significantly influenced by the evolution of the geopolitical risk.

H₂: The fluctuation of the geopolitical risk is not directly correlated with the evolution of the inflation rate in Romania.

H₃: There is a strong and direct correlation between the fluctuation of the geopolitical risk and the evolution of the inflation rate in Romania.

The linear regression model has the following format:

$$ED = \alpha + \beta_1 * GPR + \epsilon \quad (1)$$

where:

ED = Economic Development of Romania

α = intercept

GPR= Geopolitical Risk

β_1 = coefficient of the GPR index

ϵ = error term

3. Results and discussion

The Pearson correlation matrix (Table 2) presents the bivariate associations among the study variables and provides initial empirical support for the research hypotheses formulated in the methodology section. As the primary independent variable, the Geopolitical Risk (GPR) index, constructed to capture the intensity of major geo-economic events such as the COVID-19 pandemic, the Russia–Ukraine war, fluctuations in global oil prices, increases in U.S. tariffs, and Brexit, exhibits statistically meaningful linear relationships with Romania’s macroeconomic indicators over the 2015–2025 period. The strongest association is recorded between GPR and the inflation rate (IR), with a Pearson correlation coefficient of 0.67. This value denotes a strong, positive, and direct relationship, indicating that elevations in global geopolitical risk are systematically accompanied by higher inflation in Romania. The result robustly confirms hypothesis H3 (there is a strong and direct correlation between the fluctuation of geopolitical risk and the evolution of the inflation rate in Romania) and leads to the rejection of H2. Methodologically, this finding aligns with the transmission mechanisms emphasised in the literature and the study design: geopolitical shocks propagate through disrupted supply chains, elevated energy and commodity prices, and imported inflation, all of which exert upward pressure on Romania’s Consumer Price Index. The magnitude of the coefficient (0.67) underscores the sensitivity of domestic price stability to external geo-economic disturbances, consistent with the univariate regression framework adopted to quantify these effects.

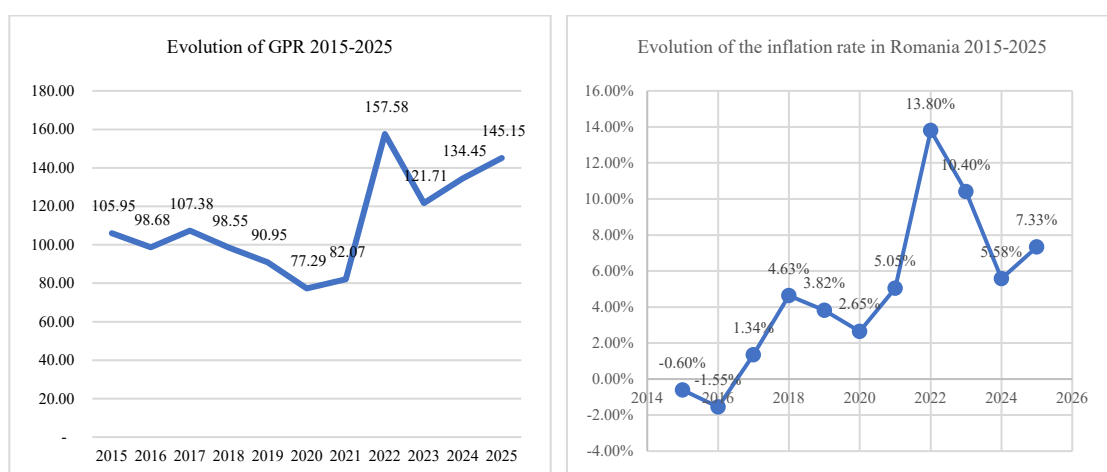


Figure no. 1. Evolution of the GPR and the IR in Romania 2015-2025

A similarly positive albeit slightly weaker association emerges between GPR and GDP per capita (0.60), reflecting a direct and moderately strong correlation. Contrary to the conventional expectation that heightened geopolitical uncertainty would depress economic output, the data suggest that increases in GPR coincided with expansions in Romania’s GDP per capita during the analysed timeframe. This counter-intuitive pattern may be attributable to several contextual factors embedded in the research period: countercyclical fiscal and monetary policy responses, substantial EU structural funds inflows that partially offset external shocks, and domestic demand resilience following the initial COVID-19 contraction. The positive coefficient lends preliminary support to hypothesis H1 (Romania’s economic development is significantly influenced by the evolution of geopolitical risk), while the direction of the relationship invites further scrutiny through the univariate regression models (not reported here but implemented as the core econometric tool) to disentangle short-term demand-side stimuli from longer-term supply-side costs.

The correlation between GPR and the UR is considerably weaker (0.34), suggesting only a modest positive linear association. This lower coefficient implies that labour-market conditions in Romania have been less directly responsive to geopolitical risk fluctuations compared with price and output variables. Possible explanations include labour-market rigidities, active employment-support measures implemented during the pandemic and energy crisis, and structural shifts toward services and IT sectors that proved relatively insulated from geo-economic volatility.

Table no. 2. Pearson correlation coefficient values

Variables	GPR
GPR	1.00
IR	0.67
GDP	0.60
UR	0.34

The overall regression model created is significant at the 5 % level ($F(1, 9) = 5.197$, $p = 0.049$), confirming that GPR generates a significant influence on economic development in Romania. The estimated coefficient on GPR is positive and statistically significant ($\beta = 32.279$, $SE = 14.160$, $t = 2.280$, $p = 0.049$), and the regression model created explains up to 36.6% of the fluctuation of the economic development in Romania based on the variation of the GPR. For a univariate linear regression model, considering the time-frame selected for the analysis, the results are considered representative. These findings provide empirical support for hypothesis H_1 and lead to the rejection of the null hypothesis.

Table no. 3. Pearson correlation coefficient values

Coefficient	Value
R Square	0.366045
β_1	32.279
Significance F	0.048594

Considering the results of the regression, the final format of the model is the following:

$$ED = 1194.99 + 32.28 * GPR + \epsilon \quad (2)$$

4. Discussions

The empirical results reveal a complex pattern of relationships between the geopolitical risk index (GPR) and Romania's macroeconomic indicators. While the strong positive correlation with inflation ($r = 0.67$) aligns with theoretical expectations and the existing literature on supply chain disruptions and imported inflation, the moderately strong positive association with GDP per capita ($r = 0.60$) and the statistically significant positive regression coefficient ($\beta = 32.279$, $p = 0.049$) seem counterintuitive at first glance.

This positive relationship between GPR and GDP per capita can be interpreted through several complementary mechanisms specific to the Romanian context in the period 2015-2025. First, periods of heightened geopolitical risk (notably the COVID-19 pandemic and the Russia-Ukraine war) coincided with substantial inflows of EU structural and recovery funds, which acted as a significant countercyclical buffer. These funds likely supported public investment and private consumption, offsetting some of the negative effects of geopolitical uncertainty. Second, the Romanian authorities' proactive fiscal and monetary policy responses—including fiscal stimulus packages and accommodative monetary policy—appear to have cushioned the economy, allowing for a relatively rapid recovery in per capita output. Third, the resilience of key sectors, such as IT services, agPRculture, and domestic consumption, may have contributed to this outcome, as these sectors proved less vulnerable to global supply shocks.

This finding is consistent with that of Di Caro et al. (2026), who point out that the mitigating role of EU cohesion policy can weaken the negative growth effects of geopolitical risk. It also complements the findings of Daianu et al. (2025), who document heterogeneous impacts across Central and Eastern European countries, suggesting that domestic policy space and European integration play a crucial role in shaping net macroeconomic outcomes. However, the positive coefficient should be interpreted with caution, as it may reflect period-specific dynamics rather than a universal relationship. In the long run, sustained geopolitical risk could continue to exert negative pressure on potential GDP growth through reduced investment and higher uncertainty.

Conclusions

The empirical findings of this study confirm that geopolitical risk, as measured by the GPR index, exerts a statistically detectable influence on Romania's macroeconomic performance over the 2015–2025 period. The correlation analysis revealed a strong positive association between GPR and the inflation rate ($r = 0.67$), a moderately strong link with GDP per capita ($r = 0.60$), and a weaker relationship with the unemployment rate ($r = 0.34$). These identified patterns were further substantiated by the univariate linear regression results for GDP per capita, where the GPR coefficient proved positive and significant ($\beta = 32.279$, $p = 0.049$), explaining approximately 36.6 % of the observed variation. Collectively, these findings represent evidence that leads to the rejection of the null hypothesis H_0 and provides support for both H_1 and H_3 , underscoring that geo-economic shocks are not neutral with respect to Romania's price stability and economic development. Although the positive direction of the relationship between GPR and the economic development in Romania may appear counter-intuitive given the disruptive nature of geo-economic shocks, it is consistent with the broader literature reviewed and may reflect the mitigating role of countercyclical

fiscal and monetary policies, substantial EU structural-fund absorption, and the resilience of domestic demand during major events such as the COVID-19 pandemic and the Russia–Ukraine war.

The present analysis differs from the existing body of research in its explicit extension of the geo-economic resilience literature from the micro-level (firm behaviour, cognitive frameworks, and SME responses documented by Roloff, 2023; Neacșu and Georgescu, 2024) to a macroeconomic scale. While prior studies have richly illustrated how individual enterprises interpret and react to crises such as COVID-19, few have attempted to quantify the aggregate transmission of global geopolitical risk onto national indicators in an Eastern European context. By integrating the Caldara and Iacoviello GPR index with Statista data, and the data from the World Bank and applying both correlation and regression model, this research offers a systematic econometric assessment of how major geo-economic events have shaped Romania's inflation dynamics and per-capita output, filling the gap between firm-level resilience narratives and macro-level policy realities.

Nevertheless, several limitations temper the ability to extend these conclusions, as even if the dataset contains monthly values of the variables between 2015–2025, the timeframe remains restricted. Additionally, given the model variables, the study is excluding the impact of potentially important control variables such as EU fund absorption, monetary-policy interventions, or domestic fiscal measures that may have cushioned external shocks. Given the type of relationship identified through the study between GPR and the economic development in Romania, although statistically robust within the sample, does not align with the conventional and intuitive correlation between the two concepts, which can indicate that the results are period specific.

Therefore, considering the research limitations, future studies can explore the possibility to extend the dataset in order to be able to compare the results and observe if the relationship between the variables maintains the same positive direction. Additionally, comparative studies across Central and Eastern European economies can be implemented, in order to clarify whether the Romanian pattern is idiosyncratic or representative of the broader region. In terms of additional variables that can be added to the model, the study can include in the future results from panel surveys of SME managers, that could illuminate the micro-foundations of the observed aggregate resilience.

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