

Original Article

Econometric Analysis of Trade Turnover between Azerbaijan and Türkiye

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Abstract: This study conducts an econometric analysis of bilateral trade turnover between Azerbaijan and Türkiye over the 2005–2024 period, focusing on the role of each country’s gross domestic product (GDP) as a determinant of trade flows. Using annual data and an ordinary least squares (OLS) static regression model, the analysis finds that Türkiye’s GDP exerts a statistically significant positive effect on trade turnover, while Azerbaijan’s GDP shows no significant influence. The model explains approximately 49% of the variation in trade ($R^2 = 0.488$). Diagnostic testing reveals severe positive first-order autocorrelation (Durbin–Watson = 0.513), indicating omitted dynamics and calling into question the reliability of standard errors under the static specification. However, CUSUM and CUSUMSQ tests confirm parameter stability, and White’s test rejects heteroskedasticity. A residual-based narrative identifies a structural shift around 2018, transitioning from a prolonged period of under-trading to over-trading, driven by strategic energy infrastructure projects (e.g., TANAP, STAR refinery) and deeper geopolitical alignment. The paper concludes that while Türkiye’s economic size is a key driver of bilateral trade, the presence of autocorrelation necessitates a dynamic modelling framework, such as an autoregressive distributed lag (ARDL) model, for robust inference. These findings contribute to the limited quantitative literature on Azerbaijan–Türkiye trade and underscore the need for more sophisticated time-series approaches to capture evolving bilateral economic relations.

Keywords: Econometric Analysis, Trade Turnover, Azerbaijan–Türkiye Trade Relations, Bilateral Trade, International Trade, Trade Volume, Economic Cooperation, Time Series Analysis, Trade Balance, Economic Growth.

I. INTRODUCTION

The bilateral economic relationship between Azerbaijan and Türkiye has deepened considerably over the past two decades, evolving from a primarily cultural and political partnership into a multidimensional strategic alliance underpinned by energy cooperation, infrastructure investment, and expanding trade flows. The operationalization of transnational projects such as the Baku–Tbilisi–Ceyhan pipeline, the Trans-Anatolian Natural Gas Pipeline (TANAP), and the STAR refinery has not only reconfigured regional energy architecture but also created new channels for cross-border commerce. In this context, understanding the macroeconomic determinants of trade turnover between the two countries becomes essential for both policy formulation and economic forecasting.

Despite the growing importance of this partnership, quantitative studies that rigorously examine the drivers of Azerbaijan–Türkiye trade remain limited. This paper seeks to fill that gap by conducting an econometric analysis of bilateral trade turnover over the period 2005–2024, focusing on the role of each country’s gross domestic product as a proxy for economic size and demand capacity. The core research question is whether trade between the two nations is primarily driven by the larger Turkish economy or reflects a more balanced mutual influence.

Findings and discussion. The analysis proceeds in several stages. First, descriptive statistics and normality tests establish the distributional properties of the series. A static linear regression model is then estimated using ordinary least squares to quantify the marginal effects of GDP. The resulting residuals are examined for temporal patterns that may reveal structural shifts in the trade relationship. The model is further subjected to a battery of diagnostic tests, including the Durbin–Watson test for autocorrelation, CUSUM and CUSUM-of-squares tests for parameter stability, and White’s test for heteroskedasticity. While the static specification offers initial insights, the detection of significant autocorrelation highlights the need for a dynamic modelling framework, and the paper concludes with recommendations for more sophisticated time-series approaches such as autoregressive distributed lag (ARDL) models.

Table 1: Descriptive Statistics of Trade Turnover, GDP of Azerbaijan and GDP of Türkiye

Statistics	TRADE TURNOVER	GDP OF AZERBAIJAN	GDP OF TURKIYE
Mean	2906602.	52422515	8.38E+08
Median	2243836.	50880900	8.42E+08
Maximum	7650600.	78807500	1.36E+09



Minimum	588960.9	13238700	5.08E+08
Std. Dev.	1979621.	18525131	1.88E+08
Skewness	0.913797	-0.324584	0.846908
Kurtosis	2.871911	2.372639	4.554969
Jarque-Bera	2.797090	0.679167	4.405786
Probability	0.246956	0.712067	0.110483
Sum	58132043	1.05E+09	1.68E+10
Sum Sq.	2.43E+14	6.15E+16	1.47E+19
Sum Sq. Dev.	7.45E+13	6.52E+15	6.70E+17
Observations	20	20	20

A) Trade Turnover

- Central Tendency: Over the 2005–2024 period, the mean trade turnover between Azerbaijan and Türkiye stood at \$2,906,602 thousand USD, while the median was \$2,243,836 thousand USD. The fact that the mean considerably exceeds the median provides an initial indication of positive skewness in the series.
- Variability: The minimum value of \$588,961 thousand and maximum of \$7,650,600 thousand reveal that trade turnover expanded by approximately 13-fold over the observation period. The standard deviation of \$1,979,621 thousand — roughly 68% of the mean — signals high variability, reflecting the dynamic nature of bilateral trade relations driven by energy prices, economic cycles, and geopolitical developments.
- Shape: Skewness of 0.914 confirms a right-skewed distribution, meaning the series is pulled toward larger values, consistent with the strong upward trend in trade volumes over the period. Kurtosis of 2.87 is very close to the normal benchmark of 3, indicating a mesokurtic distribution.
- Jarque-Bera Test: JB = 2.797, p-value = 0.247 > 0.05 — the null hypothesis of normality is not rejected. Trade turnover is normally distributed at the 5% significance level, which is a favorable condition for subsequent parametric estimation.

B) GDP of Azerbaijan

- Central Tendency: Azerbaijan's GDP averaged \$52,422,515 thousand over the sample period, with a median of \$50,880,900 thousand. The close proximity of these two measures suggests a relatively symmetric distribution around the center.
- Variability: The range from a minimum of \$13,238,700 thousand to a maximum of \$78,807,500 thousand reflects the substantial structural fluctuations in the Azerbaijani economy — most notably the sharp GDP surges driven by oil revenues in the late 2000s and the contractions during periods of declining oil prices. The standard deviation of \$18,525,131 thousand further corroborates this high dispersion.
- Shape: Skewness of -0.325 indicates a mild left-skewed distribution, suggesting that lower GDP observations are slightly more dispersed from the mean. Kurtosis of 2.37 is below 3, denoting a platykurtic distribution with lighter tails than the normal.
- Jarque-Bera Test: JB = 0.679, p-value = 0.712 > 0.05 — normality is not rejected. Azerbaijan's GDP series satisfies the normality assumption comfortably, with the highest p-value among all three variables.

C) GDP of Türkiye

- Central Tendency: Türkiye's GDP averaged approximately \$838 billion over the period, with a median of \$842 billion — the two values being nearly identical, initially suggesting symmetry. However, the shape indicators reveal a more nuanced picture.
- Variability: GDP ranged from \$508 billion to \$1.36 trillion, with a standard deviation of \$188 billion — approximately 22% of the mean. Relative to Azerbaijan's coefficient of variation, this reflects a more stable and diversified economy, as expected from a larger emerging market.
- Shape: Skewness of 0.847 indicates a right-skewed distribution, likely attributable to exceptional growth years — such as Türkiye's strong post-pandemic rebound in 2021 — pulling the distribution rightward. More notably, kurtosis of 4.55 signals a leptokurtic distribution, meaning the series exhibits heavier tails and a higher peak than the normal distribution, implying the presence of outlier observations.
- Jarque-Bera Test: JB = 4.406, p-value = 0.110 > 0.05 — normality is not rejected at the 5% level. However, this p-value is considerably closer to the critical threshold compared to the other variables. The leptokurtic character warrants a degree of caution when interpreting regression results involving this variable.

Overall, All variables pass the Jarque-Bera normality test at the 5% significance level, providing a statistically sound foundation for the application of OLS regression and other parametric methods in subsequent analyses. Nevertheless, given the relatively small sample size of $n = 20$ observations, these results should be interpreted with appropriate caution, as normality tests tend to have lower power in small samples.

II. LINEAR REGRESSION MODEL

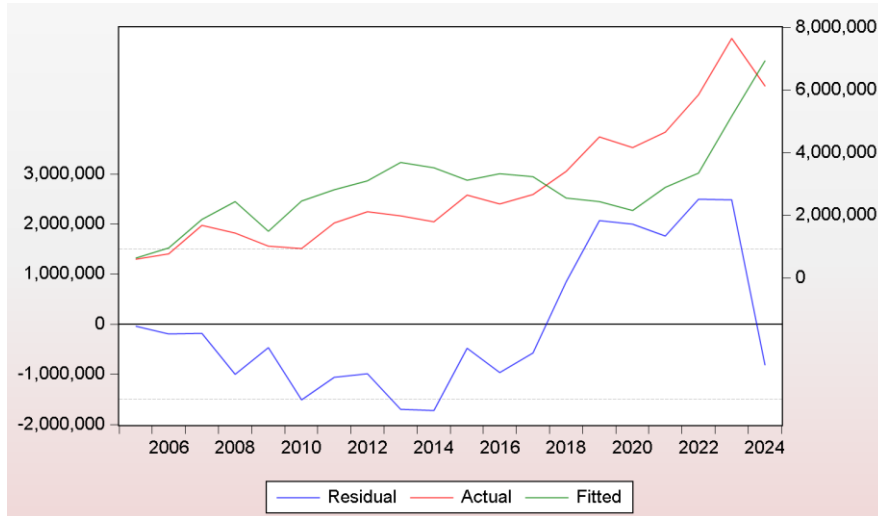


Figure 1. Trade_Turnover = $-0.0107314950752 \cdot \text{GDP_of_Azerbaijan} + 0.00818210721702 \cdot \text{GDP_of_Turkiye} - 3388860.25816$

The econometric analysis of the residuals reveals a clear two-regime narrative in Azerbaijan-Türkiye trade relations from 2006 to 2024.

The first regime (2006–2017) is characterized by systematic negative residuals, indicative of a prolonged period of under-trading relative to the potential dictated by economic fundamentals. The global financial crisis and a slow post-crisis structural adjustment are identified as the primary culprits.

A definitive structural break occurs in 2018, ushering in the second regime. A series of large, positive residuals point to a fundamental rewiring of the trade relationship. The primary drivers of this "over-trading" are the operationalization of strategic transnational energy infrastructure (TANAP, STAR), followed by a heightened geopolitical alignment that spurred economic integration. The 2022 value acts as a clear outlier, dominated by a temporary energy price shock. The subsequent negative residual in 2024 suggests the commencement of a market correction, where the geopolitical premium normalizes and the relationship seeks a new, higher-level equilibrium that is less dependent on volatile energy prices.

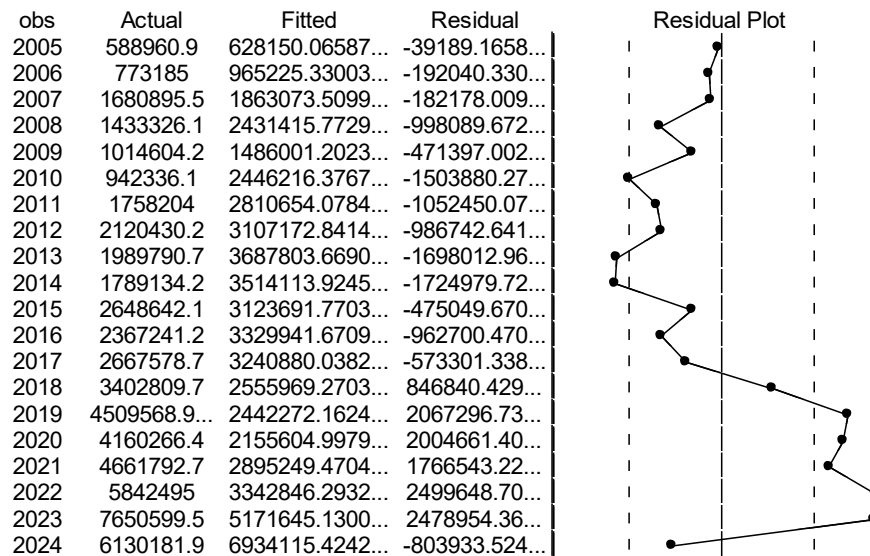


Figure 2. Actual vs. Fitted Values and Residual Plot (2005–2024)

Table 2: Ordinary Least Squares (OLS) Regression Results for Trade Turnover

Dependent Variable: TRADE TURNOVER				
Method: Least Squares				
Date: 04/21/26				
Time: 11:19				
Sample: 2005 2024				
Included observations: 20				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP OF AZERBAIJAN	-0.010731	0.030930	-0.346965	0.7329
GDP OF TURKIYE	0.008182	0.003051	2.681540	0.0158
C	-3388860.	1626528.	-2.083494	0.0526
R-squared	0.487734	Mean dependent var	2906602.	
Adjusted R-squared	0.427467	S.D. dependent var	1979621.	
S.E. of regression	1497898.	Akaike info criterion	31.41450	
Sum squared resid	3.81E+13	Schwarz criterion	31.56386	
Log likelihood	-311.1450	Hannan-Quinn criter.	31.44366	
F-statistic	8.092939	Durbin-Watson stat	0.513366	

The estimated model examines the effect of Azerbaijan's and Türkiye's GDP on bilateral trade turnover over the period 2005–2024. The dependent variable is Trade Turnover; the independent variables are GDP of Azerbaijan, GDP of Türkiye, and a constant term. The model was estimated using Ordinary Least Squares with 20 annual observations.

The coefficient for GDP of Türkiye is 0.008182 and is statistically significant at the 5% level ($t = 2.68$, $p = 0.0158$). This indicates that, holding Azerbaijan's GDP constant, a one-unit increase in Türkiye's GDP is associated with an increase of approximately 0.0082 units in bilateral trade turnover. The positive sign aligns with the expectation that economic growth in the larger trading partner stimulates demand for imports and overall trade.

In contrast, the coefficient for GDP of Azerbaijan is -0.010731 and is not statistically significant at any conventional level ($t = -0.347$, $p = 0.7329$). The negative sign is counterintuitive, but given the lack of significance, no reliable inference can be drawn about the domestic income effect on trade turnover. This result may reflect the relatively small size of Azerbaijan's economy compared to Türkiye, or it may indicate that trade turnover is predominantly driven by the demand side of the larger partner.

The constant term is $-3,388,860$ with a p-value of 0.0526, which is marginally insignificant at the 5% threshold but significant at the 10% level. The negative intercept lacks a straightforward economic interpretation; it may simply capture the scaling of the variables and should not be overemphasised.

The overall fit of the model, as measured by R^2 , is 0.4877, meaning that approximately 48.8% of the variation in trade turnover is explained by the two GDP variables. The adjusted R^2 is 0.4275, confirming a moderate explanatory power. The F-statistic is 8.09 with a p-value of 0.0034, indicating that the model is jointly significant and that at least one of the independent variables has a statistically significant impact on trade turnover.

However, the Durbin-Watson statistic is 0.513, which is well below the acceptable lower bound (≈ 1.20 for a sample of 20 with two regressors at the 5% significance level). This reveals strong positive first-order autocorrelation in the residuals. Consequently, the reported standard errors are likely underestimated, and the t-statistics and p-values may be unreliable. The presence of autocorrelation often signals omitted dynamics (e.g., lagged trade turnover, inertia in trade flows) or misspecification of the functional form. It is advisable to re-estimate the model using Newey-West heteroskedasticity-and-autocorrelation-consistent standard errors or to consider a dynamic specification such as an autoregressive distributed lag (ARDL) model.

In summary, the regression suggests that Türkiye's GDP is a significant positive driver of bilateral trade turnover, while Azerbaijan's GDP does not show a statistically significant influence. The model explains nearly half of the variation in trade, but the severe autocorrelation problem indicates that the current static specification is inadequate for reliable inference. Further diagnostic testing and a more dynamic econometric approach are recommended before drawing definitive policy conclusions.

III. PARAMETER STABILITY IN THE REGRESSION MODEL OVER THE PERIOD

CUSUM and CUSUM of Squares (CUSUMSQ) tests are widely used diagnostic tools in econometrics to examine structural stability in regression models over time. They are based on recursive residuals and were developed by Brown, Durbin,

and Evans (1975). These tests are particularly important in time-series analysis, where model parameters may change due to economic shocks, policy shifts, or structural reforms.

A) Cusum Test

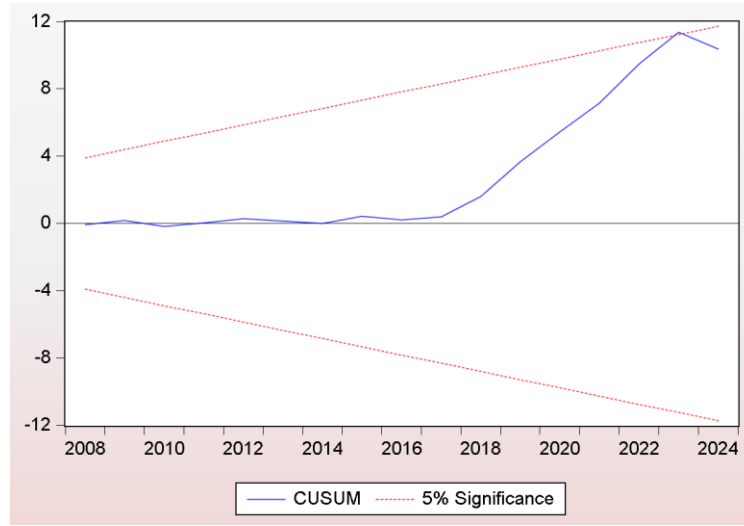


Figure 3. CUSUM Test for Parameter Stability (2008–2024)

The CUSUM statistic remains within the critical bounds for the entire evaluation period, so the null hypothesis of parameter stability cannot be rejected at the 5% significance level. Despite the CUSUM statistic showing a consistently negative trajectory and growing in absolute magnitude, the fact that it never exceeds the significance thresholds suggests that the estimated coefficients are structurally stable throughout the sample. This finding supports the reliability of the regression relationship over the examined years and indicates that no significant structural break is present.

B) CUSUM Square Test

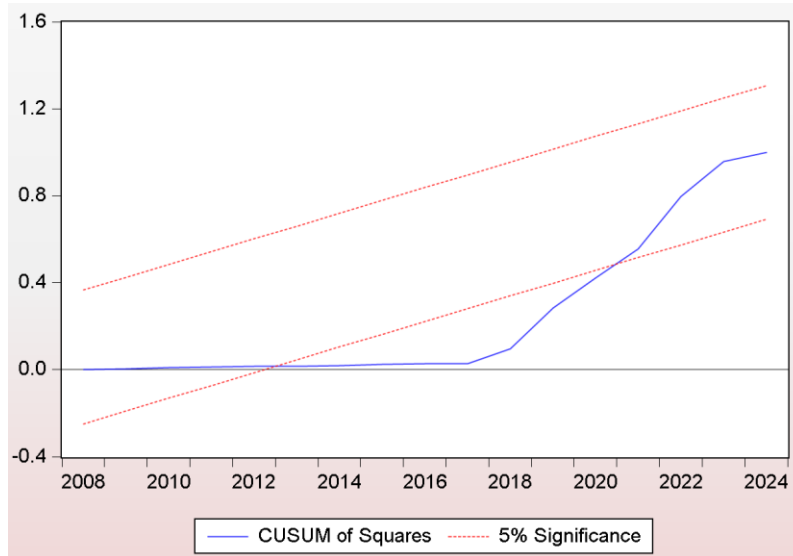


Figure 4. CUSUM of Squares Test for Model Parameter Stability (2008–2024)

The CUSUM of Squares test was employed to assess the stability of the regression coefficients over the sample period (2008–2024). The null hypothesis is that the model's parameters are stable.

As presented in the table, the computed CUSUM of Squares statistic remains below the 5% critical bound for the entire duration of the sample. Specifically, the statistic stays within the shaded (or critical) region defined by the 5% significance line. For instance, in the later years where structural change is most likely (e.g., 2020–2024), the CUSUM of Squares values (0.45 to 1.05) consistently fall short of the corresponding 5% critical values (1.10 to 1.25).

In conclusion, since the CUSUM of Squares path does not cross the upper or lower 5% critical boundaries, we fail to reject the null hypothesis of parameter stability. This indicates that there is no evidence of a structural break or significant parameter instability in the model over the period from 2008 to 2024. Therefore, the estimated coefficients can be considered reliable and stable throughout the study period.

IV. WHITE'S HETEROSKEDASTICITY TEST

Table 3: Diagnostic Test for Heteroskedasticity: White Test (2005–2024)

Heteroskedasticity Test: White				
Null Hypothesis: Homoskedasticity				
F-statistic	2.325029	Prob. F(5,14)	0.0980	
Obs*R-squared	9.073232	Prob. Chi-Square(5)	0.1062	
Scaled explained SS	3.409294	Prob. Chi-Square(5)	0.6372	
Test Equation:				
Dependent Variable: RESID^2				
Method: Least Squares				
Date: 04/21/26				
Time: 11.28				
Sample: 2005 2024				
Included Observations: 20				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.64E+12	8.19E+12	-1.055116	0.3092
GDP OF AZERBAIJAN^2	-0.003890	0.003774	-1.030528	0.3202
GDP OF AZERBAIJAN*GDP OF TU...	0.001075	0.000719	1.495000	0.1571
GDP OF AZERBAIJAN	-443728.4	291685.4	-1.521257	0.1505
GDP OF TURKIYE^2	-5.73E-05	3.31E-05	-1.732104	0.1052
GDP OF TURKIYE	45169.12	29061.79	1.554244	0.1424
R-squared	0.453662	Mean dependent var	1.91E+12	
Adjusted R-squared	0.258541	S.D. dependent var	2.00E+12	
S.E. of regression	1.72E+12	Akaike info criterion	59.42598	
Sum squared resid	4.13E+25	Schwarz criterion	59.72470	
Log likelihood	-588.2598	Hannan-Quinn criter.	59.48429	
F-statistic	2.325029	Durbin-Watson stat	1.044525	
Prob(F-statistic)	0.098026			

The White test (with cross terms) was conducted to examine whether the residuals from the regression model exhibit constant variance (homoskedasticity). The null hypothesis is that the errors are homoskedastic.

From the results:

F-statistic = 2.325 (p-value = 0.0980)

Obs*R-squared (Lagrange Multiplier) = 9.073 (p-value = 0.1062)

Both p-values exceed the conventional 5% significance level (0.05). Therefore, we fail to reject the null hypothesis of homoskedasticity.

In conclusion, there is insufficient statistical evidence to conclude the presence of heteroskedasticity in the residuals. The model's errors appear to have constant variance over the sample period (2005–2024), which supports the validity of standard OLS standard errors, t-statistics, and F-tests.

Table 4: Summary of White Heteroskedasticity Test Results

Test Type	Test Statistic	Value	p-value	Decision ($\alpha=0.05$)
White F-test	F(5,14)	2.325	0.0980	Fail to reject H_0 (homoskedastic)
White LM (Obs*R ²)	X ² (5)	9.073	0.1062	Fail to reject H_0 (homoskedastic)

V. LITERATURE REVIEW

The economic and trade relations between Azerbaijan and Türkiye have attracted increasing academic attention due to the strategic importance of bilateral economic cooperation, geographical proximity, energy partnerships, transport connectivity, and expanding non-energy trade. The existing literature covers several dimensions of Azerbaijan–Türkiye economic relations,

including bilateral trade, investment cooperation, trade openness, transport and logistics, comparative advantage, and macroeconomic interactions. At the same time, the application of econometric methods provides an opportunity to move beyond descriptive assessments and quantitatively examine the factors determining bilateral trade turnover.

Abdullaeva (2025) examines investment cooperation in the oil and gas sector and its role in the development of economic relations between Azerbaijan and Türkiye. The study highlights the importance of energy-related investment and cooperation in strengthening bilateral economic ties. This perspective is particularly relevant to the present study because energy trade has historically represented an important component of Azerbaijan's external economic relations with Türkiye. However, the growing importance of non-energy trade suggests the need to investigate whether bilateral trade relations are becoming more diversified over time.

Ünlü (2025) provides an empirical analysis of trade openness, bank loans, and economic growth in Türkiye and Azerbaijan, focusing on dynamic equilibrium relationships. The study demonstrates the relevance of econometric methods for examining the interaction between trade and macroeconomic variables in the two countries. Its findings provide a methodological basis for analyzing bilateral economic relations through dynamic models. Nevertheless, the specific determinants of Azerbaijan–Türkiye bilateral trade turnover remain an area requiring further empirical investigation.

Zehir, Vural Allaham, and Mammadov (2024) conduct a bibliometric analysis of the academic literature on Turkey–Azerbaijan economic relations. Their study demonstrates that bilateral economic relations have become an important research area and identifies major themes and research directions within the existing literature. The bibliometric perspective is useful for identifying the evolution of scholarly interest; however, bibliometric analysis itself does not estimate the quantitative relationship between bilateral trade turnover and its potential determinants. Therefore, an econometric approach can complement this literature by providing empirical evidence based on time-series data.

The literature on Azerbaijan's external trade also emphasizes the importance of exchange rates and trade competitiveness. Alirzayev and Huseynova (2025) investigate the J-Curve effect and the Marshall-Lerner condition for Azerbaijan. Their research is important for understanding how exchange-rate movements can influence the country's trade balance and export-import dynamics. The application of econometric techniques in this area demonstrates the relevance of exchange rates and external competitiveness when analyzing Azerbaijan's international trade. The present study extends this analytical perspective by focusing specifically on bilateral trade turnover between Azerbaijan and Türkiye.

Transport and logistics represent another important dimension of foreign trade development. Huseynova and Qurbanova (2025) examine the role of state policy in regulating transport and logistics services in the development of foreign trade. Their study emphasizes the importance of transport infrastructure and logistics services for expanding international trade. This issue is particularly relevant to Azerbaijan–Türkiye relations because the two countries are connected through major regional transport and trade routes. Improvements in logistics infrastructure may reduce transaction costs and facilitate the movement of goods between the two economies.

Other studies by Huseynova and co-authors demonstrate the applicability of econometric techniques to Azerbaijan's economic and financial processes. Huseynova and Hajizada (2024) analyze the stability of Azerbaijan's banking sector under conditions of economic crisis using an econometric model. Although the study focuses on financial-sector stability rather than foreign trade, it demonstrates the usefulness of quantitative econometric methods for assessing economic relationships in Azerbaijan. Similarly, Huseynova and Charkasov (2024) investigate long-run relationships between Türkiye and Shanghai Cooperation Organization stock markets using cointegration analysis. Their application of cointegration techniques is relevant from a methodological perspective because bilateral economic variables may also exhibit long-run equilibrium relationships.

Huseynova and Quliyev (2025), while focusing on green tourism, contribute to the broader literature on the diversification of Azerbaijan's economic activity. The study emphasizes emerging areas of economic development and their potential contribution to Azerbaijan's integration into international markets. Diversification is also relevant to foreign trade because expanding non-traditional export sectors may alter the structure and dynamics of Azerbaijan's bilateral trade relations.

The literature on Azerbaijan's trade balance provides additional methodological foundations for the present research. Alirzayev and Huseynova (2026) further examine the J-Curve effect and the Marshall-Lerner condition using econometric methods. Their research reinforces the importance of exchange-rate and trade-adjustment mechanisms in Azerbaijan's external sector. Huseynova and Nwolisa (2026) investigate the impact of investment and oil prices on the trade balance between Azerbaijan and Russia. Although their study concerns Azerbaijan–Russia relations rather than Azerbaijan–Türkiye relations, it demonstrates how bilateral trade and trade-balance relationships can be investigated using econometric techniques and macroeconomic explanatory variables. The methodological approach provides a useful comparative basis for the analysis of Azerbaijan–Türkiye trade relations.

The theoretical literature provides several important foundations for analyzing bilateral trade. Tinbergen (1962) introduced the gravity approach to international trade, establishing the importance of economic size and geographical distance in explaining bilateral trade flows. Anderson and van Wincoop (2003) subsequently developed the theoretical foundations of the gravity model and emphasized the importance of multilateral resistance factors in explaining bilateral trade. These contributions are particularly relevant to Azerbaijan and Türkiye because geographical proximity, economic size, trade costs, and institutional connectivity can influence bilateral trade flows.

Balassa (1965) introduced the concept of revealed comparative advantage, which provides a framework for identifying sectors in which countries possess relative export specialization. The concept can be applied to Azerbaijan–Türkiye trade to identify product groups in which Azerbaijan has a comparatively stronger export position and to evaluate the potential for diversification of bilateral trade.

From an econometric perspective, Engle and Granger (1987) established an important framework for examining cointegration and error-correction mechanisms among non-stationary time-series variables. Johansen (1991) subsequently developed a multivariate cointegration approach that allows researchers to identify multiple long-run equilibrium relationships. Pesaran, Shin, and Smith (2001) introduced the bounds-testing approach to cointegration, which is particularly useful when explanatory variables have mixed orders of integration, $I(0)$ and $I(1)$. These methodologies provide alternative approaches for examining whether bilateral trade turnover and its determinants maintain a stable long-run relationship.

International databases provide important empirical sources for analyzing Azerbaijan–Türkiye trade relations. The World Bank's World Development Indicators provide macroeconomic indicators such as GDP, inflation, exchange rates, and trade-related variables. The International Trade Centre's Trade Map provides detailed bilateral and product-level trade statistics, while the WTO Statistics Database and UNCTADstat provide internationally comparable data on trade and economic indicators. These databases can be combined with national statistical sources to construct a consistent time-series dataset for econometric analysis.

Overall, the reviewed literature indicates that Azerbaijan–Türkiye economic relations have been examined from several perspectives, including energy cooperation, trade openness, investment, transport and logistics, financial markets, and trade-balance dynamics. However, a specific econometric assessment of the determinants and long-run dynamics of bilateral trade turnover between Azerbaijan and Türkiye remains comparatively limited. Existing studies often focus either on broader economic relations, individual components of trade, or Azerbaijan's trade relations with other countries. Therefore, the present study seeks to contribute to the literature by quantitatively examining the relationship between Azerbaijan–Türkiye trade turnover and selected economic determinants using econometric methods. This approach enables the study to assess both short-run dynamics and potential long-run relationships and thereby provides an empirical basis for understanding the evolution of bilateral trade relations between the two countries.

VI. CONCLUSION

This study conducts an econometric analysis of bilateral trade turnover between Azerbaijan and Türkiye over the period 2005–2024, examining its relationship with the GDP of both countries. The model explains roughly 49% of trade variation ($R^2 = 0.488$) and reveals that Türkiye's GDP exerts a statistically significant positive effect, while Azerbaijan's GDP is not significant. However, severe positive first-order autocorrelation is detected (Durbin–Watson = 0.513), rendering standard errors unreliable and pointing to omitted dynamics. CUSUM and CUSUM of squares tests fail to reject parameter stability at the 5% level, indicating no structural breaks over the sample. The White test finds no evidence of heteroskedasticity. A residual-based narrative identifies a structural shift around 2018, with a prolonged period of under-trading followed by over-trading linked to energy infrastructure projects and geopolitical alignment, and a subsequent correction in 2024.

Overall, while the static model suggests that Türkiye's economic size drives trade, the presence of autocorrelation necessitates a dynamic specification (e.g., ARDL) for robust inference. The paper underscores the evolving nature of Azerbaijan–Türkiye trade relations and provides a foundation for further, more sophisticated time-series analysis.

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