Business & Social Science
IJRBS

Research in Business & Social Science

IJRBS VOL 14 NO 9 (2025) ISSN: 2147-4478

Available online at www.ssbfnet.com
Journal homepage: https://www.ssbfnet.com/ojs/index.php/ijrbs

Reassessing bilateral trade flows of an emerging economy through structural gravity: Case from Turkey

Tugba Ortay Baykal [(a)]* *Elif Guneren Genc* [(b)]

[(a)] *Istanbul Ticaret University, Department of International Trade, Istanbul, Turkiye*
[(b)] *Prof.Dr. Istanbul Ticaret University, Department of International Trade, Istanbul, Turkiye*

ARTICLEINFO

Article history:

Received 09 October 2025
Received in rev. form 23 Nov. 2025
Accepted 27 November 2025

Keywords:

Gravity Model, Bilateral Trade, Exchange Rate Volatility, Political Stability, Institutional Risk, Institutional Gravity, Emerging Markets

JEL Classification:
O24, F14, F31

ABSTRACT

The findings underscore the significance of institutional stability and macro-financial predictability in maintaining export performance in volatile emerging economies. Enhancing regulatory quality, bolstering macro-financial stability, and augmenting enterprises' capacity to manage risk will facilitate more robust export results. Incorporating institutional and financial frictions directly into gravity models offers a more accurate framework for policy assessment. This research employs a structural gravity model, estimated using Poisson pseudo maximum likelihood, to analyse Turkey's bilateral export flows to 164 partner nations from 1996 to 2020. Political stability and exchange rate volatility are integrated as time-varying institutional and financial frictions. Indices of economic scale, geographical distance, and remoteness are incorporated to maintain alignment with structural gravity theory. The political stability of destination nations is a crucial positive factor influencing Turkish exports and signifies the existence of a governance premium. Exchange rate fluctuation exerts a sustained adverse impact, diminishing the anticipated advantages of nominal depreciation. Visual data indicates two consistent behavioural tendencies. Exporters are increasingly venturing into politically risky countries; yet, long-term export growth is constrained by institutional inertia and robust network dependencies. The findings indicate that institutional reliability and macro-financial predictability are crucial for maintaining export performance in volatile emerging economies. Enhanced regulatory quality, greater macro-financial stability, and superior firm-level risk management are essential for achieving more resilient export outcomes. Incorporating institutional and financial frictions directly into gravity models offers a more accurate framework for comprehending trade dynamics and formulating effective policies.

© 2025 by the authors. Licensee SSBFNET, Istanbul, Turkey. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).

Introduction

In recent decades, Turkey has attained substantial increase in export quantities and market diversity through an export-oriented development strategy. This performance increasingly encounters limitations that beyond conventional trade barriers like tariffs or transportation expenses. Emerging market economies, such as Turkey, must contend with macro-financial volatility and institutional uncertainty that influence exporter behaviour in ways that standard gravity models inadequately address. This prompts a fundamental inquiry: to what degree can conventional gravity variables elucidate bilateral trade flows in contexts of structural uncertainty, and in what aspects do classic models prove inadequate? This research positions institutional and financial vulnerabilities as fundamental structural determinants of trade costs in an emerging-market context, contrasting with prior gravity studies that have regarded them as secondary control factors.

This study investigates these matters by incorporating institutional and macro-financial hazards directly into a structural gravity framework. The analysis centres on two interconnected determinants. The initial factor is the political stability of partner nations, indicative of governance predictability and institutional quality. The second factor is exchange rate volatility, which represents the

* *Corresponding author. ORCID ID: 0009-0001-1414-2523*
© 2025 by the authors. Hosting by SSBFNET. Peer review under responsibility of Center for Strategic Studies in Business and Finance.
https://doi.org/10.20525/ijrbs.v14i9.4614

financial uncertainty encountered by companies. The research integrates these variables as fundamental elements of trade costs, assessing their impact on export volumes, destination selections, and diversification trends.

This research makes three significant contributions. Initially, it enhances the gravity literature by establishing institutional and financial concerns as primary determinants of trade rather than peripheral factors. Secondly, it integrates Poisson pseudo-maximum likelihood calculations with comprehensive visual evidence to ascertain how these risks influence both the volume and direction of Turkey's export flows. Third, it contextualises these findings within the overarching dynamics of developing markets, highlighting how institutional inertia and external vulnerability constrain long-term diversification.

Turkey presents a notably pertinent example. Its geopolitical location connects developed economies with politically diverse emerging regions. The export system is varied but vulnerable to global disruptions. This combination offers a significant framework for analysing how exporters react to fluctuations in governance quality and financial stability among partner nations.

Two hypotheses direct the empirical analysis. Exchange rate volatility serves as a structural impediment to export expansion. Political stability in partner countries independently boosts Turkey's bilateral export flows, regardless of economic size or geographic distance. The results indicate two significant behavioural trends. The export responsiveness to depreciation continues to be feeble, particularly during the 2018 lira crisis. Moreover, although there is heightened interaction with more perilous destinations, diversity continues to be constrained and tethered to long-standing markets.

These trends indicate intentional yet limited risk-taking by exporters. Companies weigh prospects in emerging markets against the concerns stemming from macro-financial volatility and institutional rigidity. This conduct corresponds with current research advocating for a multifaceted perspective on trade infrastructure, whereby institutional reliability and financial predictability are as crucial as geography, logistics, and market size.

The subsequent sections of the paper are organised as follows. Section 2 examines the theoretical and empirical underpinnings of gravity models, emphasising institutional and macro-financial frictions. Section 3 delineates the specification of the structural model. Section 4 presents visual diagnostics of institutional and financial disparities. Section 5 delineates the data and empirical methodology. Section 6 presents the empirical findings, whilst Section 7 closes with policy implications and recommendations for future research.

Literature Review

Theoretical and Conceptual Background

Evolution of Structural Gravity Models

The gravity model has served as one of the most influential frameworks in empirical international trade analysis. Its origins date back to Tinbergen (1962), who established the intuitive relationship between bilateral trade, economic size, and geographic distance. Although early formulations successfully captured broad trade patterns, they lacked micro-founded theoretical underpinnings and failed to systematically account for global trade interdependence.

A major breakthrough came with the structural formulation of Anderson and van Wincoop (2003), who embedded the gravity model in a general equilibrium environment and introduced multilateral resistance terms (MRTs). These terms capture how each country’s trade depends not only on bilateral trade costs but also on its overall accessibility to world markets. This development resolved long-standing omitted variable concerns and positioned the structural gravity model as the dominant framework in modern trade analysis.

Subsequent contributions refined and extended the theoretical structure. Baldwin and Taglioni (2006) highlighted common specification errors and emphasized the need for equilibrium-consistent estimation. Head and Mayer (2014) provided a comprehensive synthesis, formalizing structural gravity as a unified framework for both theoretical and empirical inquiry. Recent methodological handbooks (Yotov et al., 2016; Larch et al., 2022) offer detailed guidance on implementing structural gravity models, including best practices for trade-cost identification and the interpretation of equilibrium-consistent parameters.

Methodological Advances in Empirical Gravity Estimation

Parallel to theoretical developments, substantial methodological advances have improved the empirical estimation of gravity models. Traditional log-linear Ordinary Least Squares (OLS) estimations have been shown to suffer from heteroskedasticity bias and to generate inconsistent estimates when applied to multiplicative models (Santos Silva & Tenreyro, 2006). These limitations also create bias when zero-trade flows are omitted, reducing the representativeness of empirical estimates.

To address these issues, Santos Silva and Tenreyro (2006, 2011) proposed the Poisson pseudo-maximum likelihood (PPML) estimator, which maintains the multiplicative structure of the gravity model and yields consistent estimates under general forms of heteroskedasticity. PPML has since become the preferred estimator in structural gravity applications. Its adoption has been further strengthened by tools that allow multiway fixed effects and large-scale panel estimation (Correia et al., 2020; Larch et al., 2022).

A recurring challenge in empirical gravity models is controlling for multilateral resistance. Although high-dimensional exporter-time and importer-time fixed effects offer one solution, they may obscure the role of institutional or macro-financial variables that vary

slowly over time. For such settings, remoteness indices—as introduced by Baier and Bergstrand (2009) and formalized in WTO (2012)—provide theoretically grounded proxies for outward and inward multilateral resistance, offering flexibility in models where fixed effects would over-control key covariates.

Institutional Determinants, Governance Frictions, and "Institutional Gravity"

The institutional turn in gravity modeling has expanded the understanding of trade costs beyond geographic and physical factors. Early studies by Wei (2000) and Anderson and Marcouiller (2002) demonstrated that corruption, weak contract enforceability, and limited legal reliability impose substantial trade barriers comparable in magnitude to tariffs or transport costs. Subsequent contributions emphasize that regulatory uncertainty, administrative inefficiency, and weak governance undermine exporters' ability to evaluate and sustain foreign market presence (Baier & Bergstrand, 2007; Egger & Larch, 2008).

An emerging consensus across WTO (2023) and IMF (2022) reports is that institutional reliability and governance proximity significantly enhance trade resilience, particularly during periods of global uncertainty. Empirical work by Beverelli et al. (2018) shows that higher-quality institutions reduce fixed and variable trade costs, promote market entry, and enhance the intensive margin of exports.

Country-specific evidence supports these findings. In the Turkish context, Aysan et al. (2017) show that political instability depresses export performance, while Yalçınkaya and Daştan (2020) demonstrate that governance quality influences both the direction and diversification of Turkish exports. These studies reinforce the importance of incorporating institutional variables directly into structural gravity models rather than merely treating them as auxiliary controls.

Exchange Rate Volatility and Macro-Financial Trade Costs

Macro-financial stability constitutes another critical dimension of modern trade costs. Exchange rate volatility has been shown to deter market entry, distort price-setting behavior, and raise risk premiums, placing a disproportionate burden on financially constrained exporters (Chaney, 2008; Berman et al., 2012). Gopinath et al. (2020) further demonstrate that exchange rate pass-through varies systematically with financial constraints, amplifying the negative trade effects of macro-financial instability.

For emerging markets, the implications are particularly pronounced. Demir and Javorcik (2021) provide evidence that financial volatility reduces diversification, lowers export survival rates, and weakens exporters' responsiveness to relative price changes. These findings underscore the importance of accounting for macro-financial risk when modeling export behavior in economies where exchange rate volatility is persistent.

Despite these advances, the literature typically analyzes political and financial risks separately. This fragmentation understates their joint influence—especially in volatility-prone emerging markets where financial and institutional uncertainty are often deeply intertwined. This motivates integrated approaches that examine these factors concurrently within a structural gravity framework.

The Distance Puzzle and the Role of Non-Geographic Trade Costs

One of the most persistent empirical regularities in gravity models is the "distance puzzle," whereby estimated distance coefficients remain large and stable over time despite dramatic improvements in transportation and communication technologies. Meta-analysis by Disdier and Head (2008) and recent re-evaluations by Yotov (2022) suggest that "distance" captures a variety of non-physical barriers, including cultural, informational, logistical, and institutional frictions.

Efforts to disaggregate distance into its conceptual components show that institutional and informational asymmetries account for a significant share of the puzzle (Melitz & Redding, 2014; Head & Mayer, 2014). Nonetheless, few studies jointly evaluate these forces in environments where macro-financial uncertainty is also high. By integrating governance and macro-financial risk variables, the current study contributes to resolving this puzzle by demonstrating that part of the traditional distance effect is driven by institutional and financial uncertainties rather than physical trade costs alone.

Contribution to Emerging-Market Institutional Gravity

Although institutional and macro-financial variables have been increasingly incorporated into structural gravity modeling (Anderson & Yotov, 2016; Gygli et al., 2019; Beverelli et al., 2020), empirical evidence from emerging and volatility-prone economies remains limited. The Turkish case is particularly relevant due to its persistent exchange rate volatility, heterogeneous institutional landscape, and reliance on imported intermediate inputs.

This study contributes to the emerging-market gravity literature by jointly examining the effects of governance and macro-financial risk within a structural gravity framework. By illustrating how political stability and exchange rate volatility shape both the magnitude and direction of Turkey's bilateral exports, the analysis expands institutional gravity to contexts where economic mass interacts with systemic uncertainty. These insights are broadly applicable to other emerging markets facing similar macro-financial and governance challenges.

Collectively, the reviewed literature highlights the growing importance of institutional and macro-financial frictions in shaping trade flows, while evidence from volatility-prone emerging markets remains incomplete. This gap motivates the present study's integrated modeling strategy.

Theoretical Foundations and Model Specification

The gravity model has long served as the canonical framework for analyzing bilateral trade, linking trade flows to the economic mass of each country and the geographic distance between them (Tinbergen (1962); Anderson and van Wincoop (2003)). While the classical log-linear form captures much of the empirical variation in trade, subsequent theoretical advances have highlighted the necessity of accounting for "multilateral resistance, " or the relative position of each country within the broader global trading network (Anderson and van Wincoop (2003); Head and Mayer (2014)). A key breakthrough in this literature is the introduction of structural micro-foundations, embedding gravity in a general equilibrium context, and explicitly modeling bilateral trade costs. The resulting equation for bilateral exports from country to country at time can be expressed as

$$X_{ijt} = \frac{Y_{it}E_{jt}}{Y_t}\left(\frac{t_{ijt}}{P_{it}P_{jt}}\right)^{1-\sigma} \quad (1)$$

where and denote the output of the exporter and the expenditure of the importer, represents bilateral trade costs, and are the outward and inward multilateral resistance terms, respectively.

While recent empirical applications often absorb these resistance terms using high-dimensional fixed effects, such approaches can obscure the role of time-varying institutional and macro-financial variables, which is central to the focus of this study. In settings where fixed-effects risk overcontrols for the main variables of interest, the literature recommends the use of theoretically motivated "remoteness" indices as proxies for multilateral resistance (Head and Mayer (2014); World Trade Organization (2012)). Building on this structural foundation, this study explicitly integrates institutional and financial frictions—namely, political stability and exchange rate volatility—into the core gravity specification. This approach is motivated by growing evidence that "behind-the-border" barriers such as legal reliability, governance quality, and macro-financial stability are foundational determinants of trade flows, especially for emerging economies subject to persistent volatility (Wei (2000); Anderson and Marcouiller (2002); Chaney (2008); Gopinath et al. (2020)). Thus, this empirical strategy extends the gravity model to quantify the impact of economic mass, geographic distance, institutional quality, and financial volatility on Turkey's bilateral trade. Full details on the variable construction, remoteness index calculation, and estimation methodology are provided in Section 4 (Data and Methodology).

Institutional & Strategic Barriers in Trade: A Visual Guide To Turkey's Export Performance

Understanding Turkey's export behavior extends beyond traditional gravity model explanations. In the context of heightened institutional uncertainty and macroeconomic volatility, visual diagnostics provides essential insights that illustrate the mechanisms underpinning observable trade patterns. The following figures ground our structural gravity approach in empirical realities, revealing how exchange rate volatility and governance quality operate as implicit trade barriers that shape the strategic orientation of Turkish exporters.

Exchange Rate Volatility and Export Performance

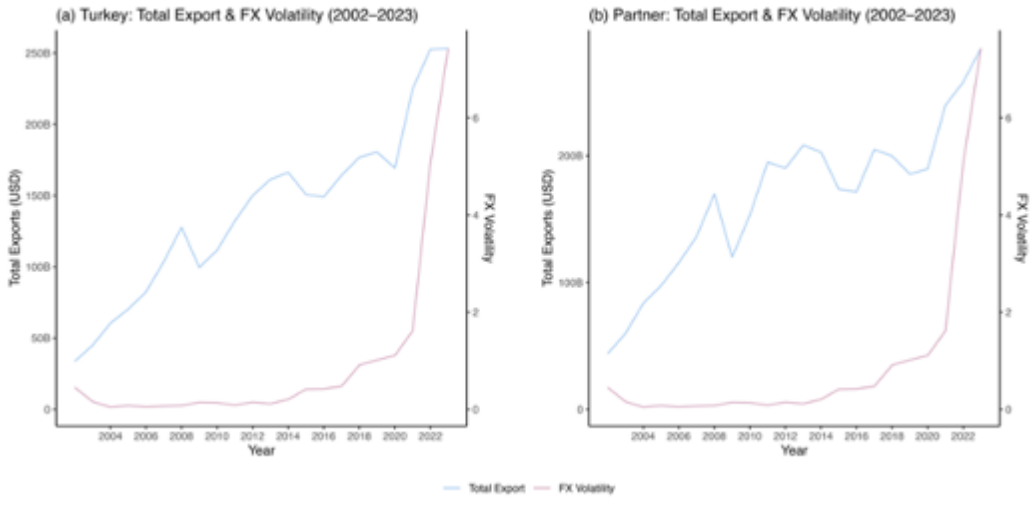


Figure 1: Total Export and FX Volatility; *Notes: Exchange rate volatility is measured as the three-year rolling standard deviation of the annual average USD/TRY rate (source: Central Bank of Turkey). Export values are in constant USD (log scale). The left panel shows the relationship between FX volatility and Turkish exports; the right panel compares the relative resilience of imports.*

Figure 1 provides a detailed examination of how exchange rate volatility interacts with Turkey's total export performance and reveals significant asymmetries in trade responsiveness. Panel (a) juxtaposes Turkey's aggregate export volume against domestic FX volatility measured as the 3-year standard deviation of the United States Dollar and Turkish Lira currency pair (USDTRY) annual average rate. Classical economic theory traditionally suggests that currency depreciation and the associated volatility should enhance exports by increasing price competitiveness. However, contrary to these expectations, Turkish exports have shown a muted response to sharp increases in FX volatility, which is particularly evident after the 2018 currency crisis. Rather than accelerating, export growth plateaued, highlighting a critical paradox: volatility operates as a structural impediment rather than an advantage. Heightened volatility increases input costs due to dollar-denominated intermediate imports, creates pricing uncertainty in export contracts, and undermines exporter confidence, especially among small and medium-sized enterprises. This pattern aligns with Chaney's (2008) framework on uncertainty and is supported by Gopinath et al. (2020), who show that volatility affects both the extensive and intensive margins of trade.

Panel (b) provides complementary insight by highlighting the contrasting behavior of imports. Turkey's import volumes continue to rise despite increasing FX volatility. This pattern reveals a structural asymmetry in Turkey's trade relationships. Exporters display high sensitivity to volatility, limiting their willingness to expand into external markets, while import demand, driven mostly by intermediate and production-oriented goods, remains relatively inelastic.

The empirical evidence in Table 2 supports these visual insights. Across all regression specifications, exchange rate volatility shows a statistically significant negative relationship with exports. This effect is strongest in the comprehensive Poisson pseudo-maximum likelihood model (Column 4, $\beta = -0.297$, $p < 0.001$). The persistence of this relationship, even after controlling for economic size, distance, and multilateral resistance, indicates that FX volatility is a structural friction rather than a temporary macroeconomic fluctuation. Together, Figure 1 and Table 2 confirm that macro-financial volatility limits export potential by reducing contract security, increasing pricing uncertainty, and weakening firms' ability to plan strategically.

The analysis also highlights a broader structural vulnerability. While volatility heavily constrains exporters by raising perceived risk, Turkey's reliance on imported intermediate goods generates relatively inelastic import demand even under heightened uncertainty. This asymmetry reflects deeper structural dependencies, which are also discussed in the global value chain literature (Bems et al., 2010).

Key Insights from Figure 1

i. FX volatility acts as a persistent structural friction that suppresses export growth despite depreciation.

ii. Import volumes remain resilient and relatively inelastic to volatility shocks due to production-linked import dependence.

iii. The negative volatility effect in the PPML results confirms that uncertainty raises risk premiums and weakens exporter responsiveness.

iv. The export and volatility asymmetry reveals deeper macro-financial vulnerabilities in Turkey's trade structure.

Political Stability and Export Orientation



Figure 2*: Total Export and Political Stability; Notes: Political stability is measured using the "Political Stability and Absence of Violence/Terrorism" index from the World Governance Indicators (scale: –2.5 = weak stability, +2.5 = strong stability). Export flows are shown in log USD. The figure illustrates the governance premium while highlighting diversification into riskier markets over time.*

Figure 2 presents a comprehensive analysis of how political stability interacts with Turkey's bilateral trade behavior. The left panel illustrates Turkey's total export growth along with the export-weighted political stability of its trade partners. Although aggregate exports have steadily increased over time, the average institutional quality of destination countries has deteriorated notably since the early 2000s. This trend indicates a subtle yet significant shift in the orientation of Turkey's exports. Instead of consistently prioritizing markets with strong governance structures, Turkish exporters have progressively diversified toward politically riskier yet economically promising destinations, particularly during periods characterized by heightened domestic instability. Rather than reflecting an outright disregard for institutional quality, this diversification strategy represents an adaptive mechanism that responds to saturation in established markets and increased volatility in Turkey's domestic economic environment.

The right panel provides complementary insight by examining Turkey's political stability weighted by its significance in partner countries' exports, together with inward trade flows. A clear divergence becomes evident after 2015, with partner-country exports to Turkey continuing to rise despite a concurrent decline in Turkey's institutional stability. This pattern highlights a cautious but persistent tolerance for institutional risks among Turkey's international trading partners, potentially driven by price advantages and established supply chain dependencies. However, the plateauing growth in partner exports also suggests potential constraints linked to Turkey's institutional reputation. Empirical regression analyses, as detailed in Table 2, corroborate these visual insights. Political stability consistently emerges with a positive and statistically significant coefficient across all model specifications, which is particularly pronounced in the comprehensive PPML estimation (Column 4, $\beta = 0.106$, $p < 0.01$). Nonetheless, Figure 2 reveals a fundamental paradox: despite the gravitational pull exerted by governance quality, Turkish exporters show a growing willingness to engage in riskier institutional environments when traditional markets become saturated or domestic uncertainty increases. This interplay between stable governance preferences and dynamic risk adaptation aligns closely with recent theoretical discussions on risk filtering and strategic flexibility among exporters in emerging markets.

Overall, the regression outcomes underscore the importance of governance quality, while the time-series patterns highlight exporters' evolving strategic calculus. Turkish exporters do not uniformly discount institutional reliability. Instead, they adjust their market choices according to shifting constraints and opportunities. These findings emphasize that political stability functions as a fundamental determinant of trade reliability. Its deterioration in Turkey or abroad prompts strategic realignments and adaptive responses, rather than abrupt trade disruptions, reflecting nuanced behavioral adjustments within Turkey's export community.

Key Insights from Figure 2

i. Export growth increasingly coincides with a shift toward politically riskier markets, especially during periods of domestic volatility.
ii. Partner-country exports to Turkey remain resilient despite declines in Turkey's institutional stability, indicating supply-chain-based tolerance for risk.
iii. Regression results confirm a clear governance premium: higher political stability in partner countries significantly boosts Turkish exports.
iv. The contrast between model expectations and evolving export orientation points to strategic risk adaptation in Turkey's export sector.

Economic Size, Remoteness, and Gravity Core Variables

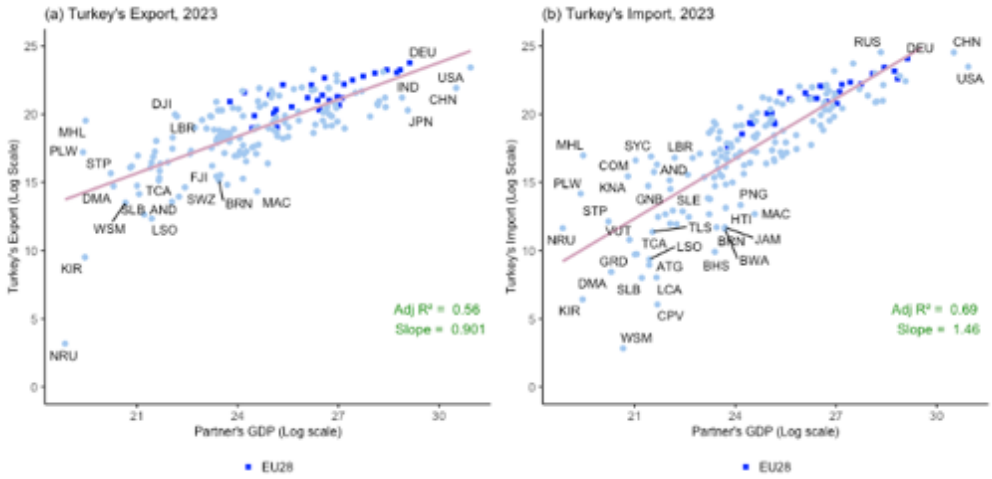


Figure 3: *Relationship Between Trade and Economic Size; Notes: Exporter and importer remoteness indices are calculated following Head and Mayer (2014) and WTO (2012), using trade-weighted bilateral distances. Lower values indicate greater network centrality.*

Export flows are in log USD. EU28 partners systematically outperform model predictions, while several large high-GDP partners underperform due to institutional and informational frictions.

Figure 3 provides a contemporary cross-sectional analysis of Turkey's bilateral trade volumes relative to partner countries' GDP for 2023, offering a current evaluation of the gravity model's explanatory power beyond the main estimation period from 1996 to 2020. Consistent with classical gravity theory, larger economies generally correlate with higher trade volumes, as seen in the positive regression slopes for both exports ($\beta = 0.901$) and imports ($\beta = 1.46$). However, when interpreted together with Figures 1 and 2, this foundational relationship reveals deeper structural complexities and behavioral patterns that shape Turkey's trade dynamics.

First, the adjusted R squared for exports (0.56) is noticeably lower than that for imports (0.69), indicating that economic size alone is insufficient to explain Turkey's export distribution. This gap reflects the structural constraints and strategic rigidities documented earlier. Figure 1 shows how FX volatility suppresses exporter responsiveness, while Figure 2 highlights an evolving preference for politically riskier markets. Together, these insights indicate that exporters operate within a multi-dimensional risk environment, where macroeconomic volatility and institutional characteristics mediate traditional economic forces. Second, the consistent outperformance of EU28 countries, represented by dark blue observations, underscores the enduring influence of institutional proximity and established trade networks. Although beneficial, this institutional affinity may also reinforce path dependence by anchoring exporters to traditional routes, thereby limiting diversification, a pattern explored further in Figure 4. Conversely, the import relationship aligns closely with GDP fundamentals, reflecting Turkey's structural dependence on imported intermediate goods. The muted sensitivity of imports to partner-side volatility (Figure 1) and to variations in Turkey's institutional environment (Figure 2) illustrates a clear structural asymmetry: exports are selectively responsive to institutional and macroeconomic risks, whereas imports are governed primarily by production needs and global value chain integration.

This institutional "premium", illustrated by the persistent overperformance of EU partners, represents both stability and rigidity. While institutional proximity supports reliable trade flows, it simultaneously constrains expansion into fast-growing but institutionally distant markets such as India and Vietnam. These frictions, which include contractual uncertainty, informational barriers, and logistical complexity, align with Head and Mayer's view of distance as a multidimensional concept that extends well beyond geographic separation.

Overall, Figure 3 illustrates the interplay between economic fundamentals and institutional constraints, emphasizing how traditional gravitational forces are shaped by macro-financial and governance-related factors. Incorporating these dimensions is essential for accurately capturing the complexity of Turkey's contemporary trade patterns within a structural gravity framework.

Key Insights from Figure 3

i. The GDP and trade relationship holds, but it explains exports less effectively than imports, indicating structural constraints on exporter responsiveness.
ii. EU28 partners systematically outperform gravity predictions, reflecting institutional proximity and path dependence in Turkey's export patterns.
iii. Imports adhere closely to GDP fundamentals and show limited sensitivity to institutional or macro-financial conditions.
iv. High-growth yet institutionally distant markets remain underutilized due to informational, contractual, and logistical frictions.

Geographic Orientation and Regional Shifts in Export Patterns

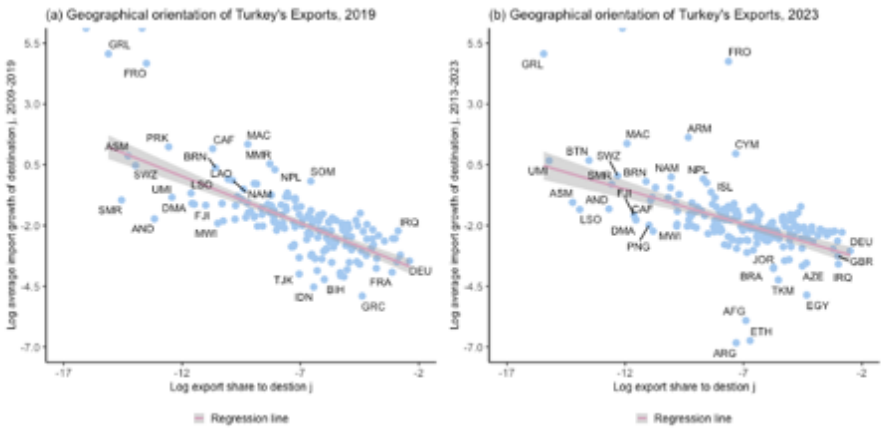


Figure 4: *Geographical Orientation of Turkey's Exports; Notes: The figure plots Turkish exports to major destinations against their import growth between 2010 and 2023. Despite slowing import growth in traditional partners, Turkish export shares remain anchored in these markets, reflecting path dependence. Export values are in log USD. Data source: CEPII TradeProd and author's calculations.*

Figure 4 reveals critical insights into the geographical orientation and persistent path dependence that shape Turkey's export behavior. The consistently negative slope observed for both 2019 and 2023 indicates that Turkish exporters predominantly engage in markets that exhibit lower or declining import growth, a pattern that challenges classical demand-driven predictions of gravity models. The flattening of this slope over time points to increasing hesitation among exporters to shift toward dynamic yet institutionally unfamiliar markets.

This inertia is not incidental. It reflects a cautious strategic response to macro-financial and institutional risks. When this visual evidence is interpreted alongside the institutional overperformance of EU partners in Figure 3, a deeper paradox emerges. Institutional proximity and historical trade relationships support trade stability, yet simultaneously reinforce structural rigidity. The mutual trust and familiarity that sustain strong ties with established partners limit incentives to diversify toward high-growth destinations that present institutional distance or governance uncertainty.

From a policy and firm-level standpoint, such conservatism is double-edged. On one hand, it reduces entry risk and ensures continuity of trade flows. On the other, it restricts adaptive flexibility in a rapidly evolving global environment. The literature on export hysteresis and stickiness (Baldwin, 1989; Albornoz et al., 2012) emphasizes that long-standing trade relationships generate informational and psychological switching costs. In an emerging economy like Turkey, where institutional volatility and macroeconomic risks are persistent, these switching costs may be even more binding, reinforcing entrenched market patterns.

Overall, Figure 4 captures a central behavioral tension. Turkish exporters balance the security provided by established, institutionally proximate markets with the uncertain yet promising opportunities available in new destinations. This dynamic embodies strategic stickiness, the tendency to remain anchored in familiar markets even when global opportunities shift. Recognizing this pattern underscores the importance of explicitly incorporating political stability, exchange rate volatility, and institutional proximity into structural gravity frameworks to fully explain trade dynamics in volatility-prone emerging economies.

Key Insights from Figure 4

i. Exporters concentrate on markets with low or declining import growth, displaying reluctance toward high-growth but institutionally distant destinations.
ii. Institutional proximity sustains stable trade flows but reinforces structural rigidity and limits diversification.
iii. Path dependence and switching costs amplify exporters' conservatism in the presence of institutional and macro-financial risks.
iv. Strategic stickiness reflects an emerging-market-specific tension between stability and opportunity, emphasizing the value of including institutional risk variables in structural gravity models.

Research And Methodology

This study employs an annual bilateral panel dataset covering Turkey's export flows to all trading partners from 1996 to 2020. The export data are obtained from the UN Comtrade Database (HS Rev. 1992), harmonized through the CEPII Tradeprod dataset to ensure cross-country comparability and consistent reporter–partner matching. Macroeconomic indicators such as GDP and GDP per capita are sourced from the World Bank's World Development Indicators (WDI). Exchange rate data come from the Central Bank of the Republic of Turkey, while political stability is taken from the Worldwide Governance Indicators.

To maintain transparency and replicability, the data pipeline follows three steps:

i. compiling bilateral export flows and macro-institutional variables from their respective sources,
ii. harmonizing series through currency conversion, deflation, and standardizing partner-year coverage,
iii. constructing gravity variables and estimating the structural models.

Data Sources and Variable Construction

The dependent variable is the annual bilateral export value $(TRADE_{ijt})$, measured in current USD and sourced from the CEPII TradeProd database. The panel covers 164 partner countries, yielding an unbalanced panel with up to seven years per country pair (2,253 observations after exclusion).

Economic mass variables are constructed directly from the panel:

Exporter output (Y_{it}): Total exports from country i in year t,

$$Y_{it} = \sum_{j} X_{ijt} \tag{2}$$

Importer expenditure (E_{jt}): Total imports into country j in year t,

$$E_{jt} = \sum_{i} X_{ijt} \tag{3}$$

Both variables are log-transformed to facilitate elasticity interpretation.

Geographic distance ($DIST_{ij}$) is measured as the great-circle distance between capitals from CEPII's GeoDist database and is log-transformed.

To address multilateral resistance, exporter and importer remoteness indices are constructed following Head and Mayer (2014) and the World Trade Organization (WTO) (2012), by weighting bilateral distances with each partner's share in world economic mass:

Exporter-side remoteness:

$$\ln REMEXP_{it} = \ln\left(\sum_{j\neq i} \frac{DIST_{ij}}{E_{jt}/E_t}\right) \tag{4}$$

Importer-side remoteness:

$$\ln REMIMP_{jt} = \ln\left(\sum_{i\neq j} \frac{DIST_{ij}}{Y_{it}/Y_t}\right) \tag{5}$$

Here, E_t and Y_t denote the world totals of importer expenditure and exporter output, respectively, in year t.

Institutional and macro-financial risks are captured by:

i. Exchange rate volatility ($\mathrm{FxVOL_t}$): Three-year rolling standard deviation of the annual average USD/TRY exchange rate (Central Bank of Turkey).
ii. Political stability $\left(PolStab_{jt}\right)$: "Political Stability and Absence of Violence/Terrorism" index from the World Governance Indicators (WGI) on the original scale.

All continuous variables are log-transformed unless otherwise indicated. Exchange rate volatility is used in levels.

Data Quality and Summary Statistics

All observations with missing or undefined values for any key variable were excluded using list-wise deletion. Because OLS models require a log transformation of the dependent variable, all cases with zero trade flows were automatically dropped from the OLS sample. Although the PPML estimator is often used to retain zeros, in this analysis, none of the 112 zero-trade observations could be included because each zero coincides with missing or undefined values in at least one key regressor, most commonly log output or log expenditure. As a result, both OLS and PPML estimations were conducted on the same balanced panel of 2,071 country-pair-year observations, all with strictly positive trade flows.

In this setting, the principal advantage of the PPML estimator lies in its robustness to heteroskedasticity and its ability to provide reliable inferences for trade flows measured in levels. The estimator is therefore adopted primarily for its distributional robustness rather than for zero-handling purposes.

Table 1 summarizes the main variables used in the analysis.

Table 1: Descriptive Statistics

Variable	N	Mean	SD	Min	Max
Trade	2253	1,170.60	12,673.20	0.00	311,279.57
Log Trade	2141	3.28	3.43	-11.45	12.65
Log Distance	2191	8.34	0.82	6.09	9.73
FX Volatility	2253	0.29	0.36	0.03	1.11
Political Stability	2246	-0.63	0.92	-3.28	1.76
Log Output	2212	7.65	5.55	-11.45	12.97
Log Expenditure	2182	8.29	4.75	-8.29	13.01
Log Exporter Remoteness	2222	17.80	9.39	6.44	30.16
Log Importer Remoteness	2222	19.65	11.20	6.44	33.35

Table 1 reveals substantial heterogeneity in Turkey's bilateral export flows, with values ranging from zero to over 311,000 USD (mean: 1,171 USD; SD: 12,674 USD), illustrating the pronounced skewness of international trade relationships. Similarly, the distribution of the log-transformed variables shows considerable dispersion, particularly for geographic distance and macro-financial

indicators. Notably, the sample covers trading partners with a wide variety of institutional and economic characteristics, as reflected in the spread of political stability (mean: -0.63, SD: 0.92) and FX volatility (mean: 0.29, SD: 0.36). The presence of missing values in some variables is almost entirely attributable to the zeros in the original trade data, as discussed above.

These summary statistics reinforce the importance of using an estimator such as PPML that can handle the highly unbalanced and variable nature of bilateral trade flows. Although the PPML estimator is widely recognized for its ability to accommodate zero trade flows, in our dataset, all zero-trade cases coincide with missing or undefined values in critical covariates, making their retention infeasible without imputation or strong distributional assumptions. For this reason, the estimation sample is restricted to strictly positive trade flows. In this setting, the main advantage of PPML lies not in its treatment of zeros but in its robustness to heteroskedasticity and its ability to provide consistent inference in level estimations of trade values. This ensures econometric validity without the need for arbitrary imputation procedures.

Empirical Specification and Estimation Strategy

The main estimating equation extends the structural gravity model to include institutional and macro-financial risks explicitly.

$$X_{ijt} = \exp\big(\beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln E_{jt} + \beta_3 \ln DIST_{ij} + \beta_4 FXVOL_{ijt} + \beta_5 POLSTAB_{jt} + \beta_6 \ln REMEXP_{it} + \beta_7 \ln REMIMP_{jt}\big) + \varepsilon_{ijt} \quad (6)$$

where variables are as defined above.

The estimation is conducted in four sequential steps to assess the incremental effects of institutional and macro-financial risk, as well as multilateral resistance controls:

i. OLS without remoteness,
ii. OLS with remoteness,
iii. PPML without remoteness,
iv. PPML with remoteness

Interaction terms and fixed effects were intentionally excluded to avoid multicollinearity and preserve interpretability, consistent with Baier and Bergstrand (2007). Instead of including exporter-year and importer-year dummies, the analysis follows Head and Mayer (2014) and the World Trade Organization (2012) by using remoteness indices as theoretically grounded proxies for multilateral resistance. This design choice prevents overcontrolling for political stability and exchange rate volatility, which are the central institutional variables of interest.

The PPML estimator is employed for its robustness to heteroskedasticity and its ability to provide consistent inference when trade flows are measured in levels. Since all zero-trade cases coincide with missing or undefined covariates, both OLS and PPML are estimated on the same sample, ensuring internal consistency. The convergence of coefficient signs and magnitudes across OLS and PPML serves as a built-in robustness check.

Potential endogeneity concerns, particularly reverse causality between trade flows and volatility or institutional quality, are mitigated by the structural features of the model. Political stability is measured at the importer level, and exchange rate volatility is defined using a rolling historical window, reducing contemporaneous feedback effects. While more advanced approaches such as instrumental variables or generalized fixed effects could further address endogeneity, these methods require additional data not available within the current dataset. Evaluating alternative measures of volatility or lag structures remains a promising direction for future research.

Overall, this empirical strategy balances econometric rigor with the primary objective of isolating institutional and macro-financial frictions within a structural gravity framework.

Ethical Compliance and Data Protection Measures

This research relies exclusively on secondary macroeconomic and institutional data obtained from publicly accessible international databases, including CEPII, WDI, and WGI. No human participants or personal data were involved in any stage of the study, and therefore, no ethical approval was required.

All datasets were used solely for academic and non-commercial purposes, in accordance with open-access and scientific integrity standards. The research process adhered to ethical principles of transparency, accuracy, and responsible data use throughout the analysis.

Findings and Discussion

The estimation results presented in Table 2 validate and refine the patterns suggested by the visual diagnostics in Section 4. While core gravity variables such as economic mass (log output, log expenditure) and geographic distance behave in line with theoretical expectations, the introduction of institutional and macro-financial variables adds deeper structural dimensions to Turkey's trade behavior.

Table 2: Regression Results (OLS vs. PPML)

	OLS		**PPML**	
	(1)	(2)	(3)	(4)
Log distance	-0.127***	-0.005	-0.011	0.032
	(0.019)	(0.018)	(0.030)	(0.028)
FX volatility	-0.608***	-0.674***	-0.225***	-0.297***
	(0.014)	(0.013)	(0.018)	(0.030)
Political stability	0.047***	0.082***	0.081***	0.106**
	(0.013)	(0.046)	(0.021)	(0.036)
Log output	0.938***	0.956***	0.890***	0.906***
	(0.005)	(0.004)	(0.011)	(0.011)
Log expenditure	0.921***	0.907***	0.915***	0.903***
	(0.006)	(0.008)	(0.011)	(0.011)
Exporter remoteness index		-0.136***		-0.059***
		(0.002)		(0.008)
Importer remoteness index		-0.097***		-0.040***
		(0.003)		(0.005)
Constant	-10.056***	-6.775***	-10.527***	-9.055***
	(0.210)	(0.164)	(0.324)	(0.447)
Sample size	2071	2071	2071	2071
R^2	0.98	0.98	0.97	0.97

Geographic distance retains a negative and significant effect in the baseline OLS regressions, yet its explanatory power diminishes substantially once remoteness indices are introduced. This confirms that what appears to be a pure distance effect actually reflects deeper barriers, including informational frictions, institutional incompatibility, and network structure. When multilateral resistance and third-country effects are captured through remoteness indices, the role of physical proximity becomes considerably weaker.

Exchange rate volatility emerges as a consistently negative and economically significant determinant of Turkish exports. As illustrated earlier in Figure 1, macro-financial instability acts as a structural trade friction rather than a short-term adjustment mechanism. Despite the sizeable nominal depreciation of the Turkish lira after 2018, exports did not accelerate as standard theory predicts. The regression results reaffirm this outcome by showing that volatility undermines exporter confidence, discourages long-term commitments, and suppresses entry into riskier or unfamiliar markets. The coefficient of approximately -0.297 in the PPML specification implies that a 10 percent increase in exchange rate volatility reduces exports by roughly 3 percent.

A related asymmetry emerges between exports and imports. While Turkish exports react strongly to volatility, import volumes remain robust even when partner-side volatility increases. As visualized in the right panel of Figure 1, this divergence reflects Turkey's structural dependence on imported intermediate inputs. Import demand is therefore far less sensitive to macro-financial risk, creating an imbalance in how volatility affects the two sides of Turkey's trade flows. This asymmetry reveals a hidden vulnerability in aggregate trade indicators: exporters operate under far greater uncertainty and path dependence than importers.

Political stability also proves to be a meaningful determinant of Turkish exports across all specifications. The coefficient of roughly 0.106 in the full PPML model indicates that a one-unit increase in the WGI political stability index is associated with an estimated 11 percent increase in exports. However, Figure 2 introduced an important nuance. Even though political stability raises export volumes, the average stability of Turkey's export partners has trended downward over time. This dynamic points to a structural paradox: as traditional stable markets stagnated, exporters increasingly diversified into riskier destinations, an adaptation shaped by domestic uncertainty and shifting global demand.

The remoteness indices clarify the broader structure of Turkey's trade network. Statistically significant negative coefficients suggest that countries embedded in dense and high-expenditure networks trade more intensively. Figure 3 reinforces this pattern. EU28 countries consistently outperform baseline gravity predictions due to institutional harmonization and strong historical ties, while several high-GDP non-European partners underperform, likely because of unresolved institutional or informational frictions. For example, the coefficient of approximately -0.059 for exporter remoteness indicates that a 10 percent increase in distance-weighted partner expenditure reduces bilateral exports by about 0.6 percent

Finally, Figure 4 illustrates the persistence of institutional familiarity. Even though import growth in Turkey's top destinations has slowed, Turkish export shares remain anchored in those markets. This flattening relationship between 2019 and 2023 highlights the cost of familiarity: the trust and predictability associated with long-established partners also create inertia, reducing incentives to enter new and unfamiliar markets.

Taken together, these results reveal a multi-layered trade structure. Institutional and macro-financial frictions matter at least as much as physical distance and often more. Network effects and governance alignment can amplify trade with familiar partners but can also entrench behavioral inertia. Turkish exports remain highly vulnerable to volatility, while imports are structurally resilient because of their role in production. Sustainable export growth therefore requires more than competitive pricing. It demands institutional reliability, systematic risk management, and strategic diversification.

In this sense, the empirical results connect the discussion in Sections 2 to 4 with the theoretical framework in Section 3 and the estimation strategy in Section 5, forming a unified structural account of Turkey's export performance.

Technical Interpretation

The four-model sequence in Table 2, progressing from baseline OLS to fully specified PPML, demonstrates how each structural component incrementally improves the explanatory power of the gravity framework.

In the initial OLS models, economic size and distance behave as expected, but the approach is constrained by the exclusion of zero trade flows and the assumption of homoscedasticity. These limitations can bias inferences and overstate the role of distance or economic size.

Introducing remoteness indices substantially refines the model by explicitly accounting for multilateral resistance. Once these indices are included, the coefficient on geographic distance declines sharply, revealing that much of the distance effect is in fact driven by network structure, institutional compatibility, and informational frictions rather than physical separation. This is fully consistent with the theoretical foundations presented in Section 3. Transitioning to PPML addresses heteroskedasticity and provides level-consistent estimates, offering a more robust econometric framework even though the unique ability of PPML to retain zero flows is not used here. The estimator remains valuable because Turkish trade data are highly skewed and subject to variance proportionality issues. Across all four specifications, exchange rate volatility retains a significant negative coefficient, and political stability remains a meaningful positive determinant. The slightly smaller magnitude of the volatility coefficient in PPML reflects the estimator's robustness to influential high-flow corridors. Nevertheless, the persistence of these effects confirms that institutional and macro-financial risks are not peripheral controls but central structural determinants of trade in emerging economies.

The remoteness coefficients also align with structural gravity theory: countries positioned closer to global expenditure and output hubs engage in more intensive bilateral trade. This reinforces the conceptual framework motivating their inclusion in Section 5.

Taken together, the technical evidence supports a clear conclusion. The fully specified PPML model is both statistically sound and conceptually aligned with structural gravity theory. Its results emphasize that institutional and macro-financial frictions shape not only the magnitude but also the geography and persistence of Turkey's export flows. Reducing volatility, improving institutional alignment, and strengthening network centrality are therefore as crucial to trade performance as traditional determinants such as distance or economic mass.

Discussion

Institutional and Macro-Financial Risk as Structural Trade Barriers

The empirical findings show that institutional and macro-financial frictions are central determinants of Turkey's export performance. Exchange rate volatility consistently acts as a trade barrier by weakening exporter confidence and limiting long-term market commitments. The stagnation of exports after the depreciation of the lira in 2018 illustrates that price advantages cannot compensate for financial instability. Political stability also plays a significant role. The results point to a measurable governance premium, where exporters trade more with politically reliable partners. At the same time, firms increasingly enter riskier destinations when demand weakens in traditional markets, revealing a strategic tension between institutional reliability and the need for expansion. The interpretation of the distance puzzle changes once remoteness indices are introduced. The explanatory power of geographic distance declines substantially, showing that much of what appears to be distance reflects institutional compatibility, network centrality, and informational frictions rather than physical separation.

These findings indicate that export resilience cannot rely solely on market access or relative prices. Priorities include reducing macro-financial volatility, strengthening institutional reliability, and improving firms' access to tools that help manage exchange rate and political risks. This is especially important for small and medium-sized exporters, whose exposure to uncertainty is higher. More broadly, the Turkish case demonstrates that macro-financial instability and governance heterogeneity jointly shape trade behavior in emerging economies. Sustainable export growth requires structural reforms that build confidence, lower uncertainty, and support long-term integration into global markets.

Policy Implications: Building Resilience and Credibility in Export Strategy

The findings indicate that Turkey's export strategy must move beyond traditional approaches based on price competitiveness and incremental market access. Institutional and macro-financial risks have become first-order determinants of trade, underscoring the need for policies that strengthen credibility, stability, and adaptability.

A central implication is the existence of a clear governance premium. Exporters systematically trade more with politically stable partners, which shows that legal harmonization, contract enforcement, and regulatory transparency are fundamental components of competitiveness. When domestic uncertainty increases, firms tend to remain anchored in familiar markets rather than diversify, a pattern that reflects strategic stickiness. Reducing this inertia requires coherent reforms aligned with international norms so that exporters face lower uncertainty and lower entry costs when expanding abroad.

Macroeconomic credibility forms the second pillar of export resilience. The negative effect of exchange rate volatility, especially after 2018, demonstrates that depreciation cannot substitute for stability. Short-lived price advantages are outweighed by the costs associated with unpredictability. Firms that rely on imported inputs or participate in global value chains are particularly vulnerable. Therefore, sustainable export growth demands a rule-based monetary framework, an independent central bank, and accessible hedging instruments. Deepening financial markets would allow exporters, especially SMEs, to share and manage risk more effectively.

A third policy dimension concerns digital and informational infrastructure. In rapidly evolving global markets, reliance on delayed or incomplete data constrains decision-making. Investments in real-time digital trade platforms are essential for monitoring market conditions, supply chain shifts, and regulatory developments. Complementary reforms should reduce soft frictions by streamlining cross-border documentation, improving dispute resolution systems, and strengthening institutional learning for firms operating in unfamiliar legal settings. Such improvements would widen export opportunities and support diversification beyond historically familiar partners.

In sum, export resilience depends on integrating legal reforms, macro-financial credibility, and digital modernization into a coherent national strategy. Incremental or isolated reforms will not be sufficient. A credible export agenda for Turkey must combine institutional reliability at home with targeted external engagement, enabling firms to navigate global risks with greater confidence.

Conclusions

This study reevaluates Turkey's bilateral exports using a structural gravity model that incorporates institutional and macro-financial concerns. The analysis reveals that the primary factors influencing export performance in emerging economies encompass exchange rate volatility and political stability, beyond just geographical and economic dimensions. Volatility consistently undermines export capability, whereas political stability offers a quantifiable governance advantage. When these frictions are considered, the traditional distance conundrum significantly diminishes, suggesting that distance is indicative of governance quality, information frictions, and network centrality rather than mere physical isolation.

The Turkish case enhances the institutional gravity literature by demonstrating how exporters navigate risk and opportunity amid uncertainty. Companies exhibit varying degrees of risk aversion: they accept governance instability during periods of market stagnation, yet cling to established networks when uncertainty escalates. This pattern of strategic stickiness demonstrates a reasonable, risk-averse calculation wherein institutional familiarity diminishes uncertainty while concurrently restricting diversification. Simultaneously, the robustness of imports underscores a structural asymmetry: exports are susceptible to instability, but import demand remains strong due to Turkey's extensive integration into global production networks.

The findings indicate that sustainable export growth need factors beyond competitive pricing and enhanced logistics for policymakers. Modernisation of legal and regulatory frameworks, robust macro-financial systems, and resilient digital infrastructure are crucial for establishing long-term resilience. These insights transcend the Turkish context, applying to other volatility-prone emerging countries, underscoring that institutional trust and macro-financial stability are the fundamental pillars of competitiveness.

This article emphasises how institutional and macro-financial risks collectively influence export performance in a volatility-prone emerging economy, in contrast to most institutional gravity studies focused on advanced economies or regional blocs. Incorporating exchange rate volatility and political stability into a structural gravity framework offers a fresh viewpoint on the combined limitations of macro-financial instability and governance diversity. The findings affirm that these risks are significant and represent primary trade frictions with extensive implications for like economies.

Future study should investigate the impact of regional trade agreements, digitalisation, and supply chain realignment on mitigating governance-related trade costs and facilitating diversification. Comprehending how institutional learning and behavioural adaptation transform trade networks will be particularly crucial for economies experiencing ongoing volatility. Turkey, like several emerging markets, faces the dual problem of augmenting exports while fortifying the institutional framework that underpins them.

Acknowledgement

Author Contributions: Both authors contributed equally to the manuscript.
Institutional Review Board Statement: Ethical review and approval were waived for this study, due to that the research does not deal with vulnerable groups or sensitive issues.
Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy.
Conflicts of Interest: The authors declare no conflict of interest.

References

Albornoz, F., Calvo Pardo, H. F., Corcos, G., & Ornelas, E. (2012). Sequential exporting. *Journal of International Economics*, *88*(1), 17–31. https://doi.org/10.1016/j.jinteco.2012.02.007

Anderson, J. E., & Marcouiller, D. (2002). Insecurity and the pattern of trade: An empirical investigation. *The Review of Economics and Statistics*, *84*(2), 342–352. https://doi.org/10.1162/003465302317411587

Anderson, J. E., & van Wincoop, E. (2003). Gravity with gravitas: A solution to the border puzzle. *American Economic Review*, *93*(1), 170–192. https://doi.org/10.1257/000282803321455214

Aysan, A. F., Disli, M., & Ng, A. T. (2017). Financial sector deepening and economic growth: Evidence from emerging markets. *Emerging Markets Finance and Trade*, *53*(10), 2248–2262.

Aysan, A. F., Nabli, B., & Véganzonès-Varoudakis, M. A. (2017). Determinants of export performance in Turkey: Institutional and macroeconomic perspectives. *Economic Systems*, *41*(1), 135–150.

Baier, S. L., & Bergstrand, J. H. (2007). Do free trade agreements actually increase members' international trade? *Journal of International Economics*, *71*(1), 72–95. https://doi.org/10.1016/j.jinteco.2006.02.005

Baier, S. L., & Bergstrand, J. H. (2009a). Estimating the effects of free trade agreements. *Canadian Journal of Economics*, *42*(1), 200–225.

Baier, S. L., & Bergstrand, J. H. (2009b). Estimating the effects of free trade agreements on international trade flows using matching econometrics. *Journal of International Economics*, *77*(1), 63–76. https://doi.org/10.1016/j.jinteco.2008.09.006

Baldwin, R. E. (1989). Hysteresis in import prices: The beachhead effect. *American Economic Review*, *79*(4), 773–785. https://doi.org/10.3386/w2393

Baldwin, R. E., & Taglioni, D. (2006). *Gravity for dummies and dummies for gravity equations* (NBER Working Paper No. 12516). National Bureau of Economic Research. https://www.nber.org/papers/w12516

Bems, R., Johnson, R. C., & Yi, K.-M. (2010). Demand spillovers and the collapse of trade in the global recession. *IMF Economic Review*, *58*, 295–326. https://doi.org/10.1057/imfer.2010.8

Berman, N., Martin, P., & Mayer, T. (2012). How do different exporters react to exchange rate changes? *Quarterly Journal of Economics*, *127*(1), 437–492. https://doi.org/10.1093/qje/qjr057

Beverelli, C., Keck, A., Larch, M., & Yotov, Y. (2018). Institutions, trade and development: A gravity analysis. *World Economy*, *41*(7), 1956–1981.

Beverelli, C., Neumueller, S., & Teh, R. (2018). Export diversification effects of the WTO trade facilitation agreement. *World Development*, *111*, 31–50. https://doi.org/10.1016/j.worlddev.2018.06.009

Chaney, T. (2008). Distorted gravity: The intensive and extensive margins of international trade. *American Economic Review*, *98*(4), 1707–1721. https://doi.org/10.1257/aer.98.4.1707

Correia, S., Guimarães, P., & Zylkin, T. (2020). Fast Poisson estimation with high-dimensional fixed effects. *The Stata Journal*, *20*(1), 95–115. https://doi.org/10.1177/1536867X20909691

Demir, B., & Javorcik, B. S. (2021a). Exporters of services: A firm-level analysis. *The World Economy*, *44*(3), 741–771. https://doi.org/10.1111/twec.13001

Demir, B., & Javorcik, B. (2021b). Does volatility affect exports? Evidence from micro data. *Review of Economics and Statistics*, *103*(1), 170–185.

Disdier, A.-C., & Head, K. (2008). The puzzling persistence of the distance effect on bilateral trade. *The Review of Economics and Statistics*, *90*(1), 37–48. https://doi.org/10.1162/rest.90.1.37

Egger, P. H., & Larch, M. (2008). Interdependent preferential trade agreement memberships: An empirical analysis. *Journal of International Economics*, *76*(2), 384–399. https://doi.org/10.1016/j.jinteco.2008.08.003

Egger, P., & Staub, K. E. (2016). GLM estimation of gravity models. *Stata Journal*, *16*(1), 23–50. https://doi.org/10.1177/1536867X1601600102

Gopinath, G., Itskhoki, O., & Rigobon, R. (2020). Currency choice and exchange rate pass-through. *American Economic Review*, *110*(1), 241–286. https://doi.org/10.1257/aer.20160021

Gygli, S., Haelg, F., Potrafke, N., & Sturm, J.-E. (2019). The KOF Globalisation Index – Revisited. *Review of International Organizations*, *14*, 543–574.

Head, K., & Mayer, T. (2014). Gravity equations: Workhorse, toolkit, and cookbook. In G. Gopinath, E. Helpman, & K. Rogoff (Eds.), *Handbook of international economics* (Vol. 4, pp. 131–195). Elsevier. https://doi.org/10.1016/B978-0-444-54314-1.00003-3

Helpman, E., Melitz, M. J., & Rubinstein, Y. (2008). Estimating trade flows: Trading partners and trading volumes. *Quarterly Journal of Economics*, *123*(2), 441–487. https://doi.org/10.1162/qjec.2008.123.2.441

International Monetary Fund (IMF). (2022). *Global financial stability report: Navigating the high-inflation environment*.

Larch, M., Yotov, Y. V., & Zylkin, T. (2022). On the robustness of gravity estimations. *Journal of International Economics*, *139*, 103627. https://doi.org/10.1016/j.jinteco.2022.103627

Melitz, M. J., & Redding, S. J. (2014). Missing gains from trade? *American Economic Review*, *104*(5), 317–321. https://doi.org/10.1257/aer.104.5.317

Nicita, A., & Olarreaga, M. (2007). Trade, production and protection 1976–2004. *World Bank Economic Review*, *21*(1), 165–182. https://doi.org/10.1093/wber/lhl008

Santos Silva, J. M. C., & Tenreyro, S. (2006). The log of gravity. *The Review of Economics and Statistics*, *88*(4), 641–658. https://doi.org/10.1162/rest.88.4.641

Santos Silva, J. M. C., & Tenreyro, S. (2011). Further simulation evidence on the performance of the Poisson pseudo-maximum likelihood estimator. *Economics Letters*, *112*(2), 220–222. https://doi.org/10.1016/j.econlet.2011.05.008

Tinbergen, J. (1962). *Shaping the world economy: Suggestions for an international economic policy*. The Twentieth Century Fund.

Wei, S.-J. (2000). *Natural openness and good government* (NBER Working Paper No. 7765). National Bureau of Economic Research. https://www.nber.org/papers/w7765

World Trade Organization (WTO). (2012a). *A practical guide to trade policy analysis*.

World Trade Organization (WTO). (2012b). *World trade report 2012: Trade and public policies: A closer look at non-tariff measures in the 21st century*. WTO Publications. https://www.wto.org/english/res_e/publications_e/wtr12_e.htm

World Trade Organization (WTO). (2023). *World trade report 2023: Re-globalization for a secure, sustainable, and inclusive future*.

Yalçınkaya, Ö., & Daştan, M. (2020a). Financial integration and growth nexus: Evidence from emerging markets. *Journal for Economic Forecasting*, (1), 97–116. https://www.ipe.ro/rjef/rjef1_20/rjef1_2020p97-116.pdf

Yalçınkaya, Ö., & Daştan, İ. (2020b). Political risk, institutions, and export performance: Evidence from Turkey. *Central Bank Review*, *20*(2), 53–61.

Yotov, Y. V. (2022). The distance puzzle: A closer look. *Review of International Economics*, *30*(4), 1080–1094. https://doi.org/10.1111/roie.12638

Yotov, Y. V., Piermartini, R., Monteiro, J.-A., & Larch, M. (2016). *An advanced guide to trade policy analysis: The structural gravity model*. World Trade Organization; United Nations. https://www.wto.org/english/res_e/booksp_e/advancedguidegravity16_e.pdf

Appendices:

Appendix 1: List of Countries included in the Analysis (1996–2020)

ISO3	Country	ISO3	Country	ISO3	Country
AFG	Afghanistan	GBR	United Kingdom	NGA	Nigeria
AGO	Angola	GEO	Georgia	NIC	Nicaragua
ALB	Albania	GHA	Ghana	NLD	Netherlands
ARE	United Arab Emirates	GMB	Gambia	NOR	Norway
ARG	Argentina	GRC	Greece	NPL	Nepal
ARM	Armenia	GTM	Guatemala	NZL	New Zealand
AUS	Australia	HKG	Hong Kong SAR	OMN	Oman
AUT	Austria	HND	Honduras	PAK	Pakistan
AZE	Azerbaijan	HRV	Croatia	PAN	Panama
BDI	Burundi	HTI	Haiti	PER	Peru
BEL	Belgium	HUN	Hungary	PHL	Philippines
BEN	Benin	IDN	Indonesia	PNG	Papua New Guinea
BFA	Burkina Faso	IND	India	POL	Poland
BGD	Bangladesh	IRL	Ireland	PRT	Portugal
BGR	Bulgaria	IRN	Iran	PRY	Paraguay
BHR	Bahrain	IRQ	Iraq	PSE	Palestinian Territories
BHS	Bahamas	ISL	Iceland	QAT	Qatar
BIH	Bosnia & Herzegovina	ISR	Israel	ROU	Romania
BLR	Belarus	ITA	Italy	RUS	Russia
BLZ	Belize	JAM	Jamaica	RWA	Rwanda
BMU	Bermuda	JOR	Jordan	SAU	Saudi Arabia
BOL	Bolivia	JPN	Japan	SDN	Sudan
BRA	Brazil	KAZ	Kazakhstan	SEN	Senegal
BRB	Barbados	KEN	Kenya	SGP	Singapore
BRN	Brunei	KGZ	Kyrgyzstan	SLE	Sierra Leone
BTN	Bhutan	KHM	Cambodia	SLV	El Salvador
BWA	Botswana	KOR	South Korea	SOM	Somalia
CAF	Central African Republic	KWT	Kuwait	SRB	Serbia
CAN	Canada	LAO	Laos	SUR	Suriname
CHE	Switzerland	LBN	Lebanon	SVK	Slovakia
CHL	Chile	LBR	Liberia	SVN	Slovenia
CHN	China	LBY	Libya	SWE	Sweden
CIV	Côte d'Ivoire	LCA	St. Lucia	SWZ	Eswatini
CMR	Cameroon	LKA	Sri Lanka	SYR	Syria
COG	Congo - Brazzaville	LTU	Lithuania	THA	Thailand
COL	Colombia	LUX	Luxembourg	TJK	Tajikistan
CPV	Cape Verde	LVA	Latvia	TKM	Turkmenistan
CRI	Costa Rica	MAC	Macao	TON	Tonga
CUB	Cuba	MAR	Morocco	TTO	Trinidad & Tobago
CYP	Cyprus	MDA	Moldova	TUN	Tunisia
CZE	Czechia	MDG	Madagascar	TUR	Turkey
DEU	Germany	MDV	Maldives	TZA	Tanzania
DNK	Denmark	MEX	Mexico	UGA	Uganda
DOM	Dominican Republic	MHL	Marshall Islands	UKR	Ukraine
DZA	Algeria	MKD	North Macedonia	URY	Uruguay
ECU	Ecuador	MLT	Malta	USA	United States
EGY	Egypt	MM	Myanmar (Burma)	UZB	Uzbekistan
ERI	Eritrea	MNE	Montenegro	VEN	Venezuela
ESP	Spain	MNG	Mongolia	VNM	Vietnam
EST	Estonia	MOZ	Mozambique	YEM	Yemen
ETH	Ethiopia	MUS	Mauritius	ZAF	South Africa
FIN	Finland	MWI	Malawi	ZMB	Zambia
FJI	Fiji	MYS	Malaysia	ZWE	Zimbabwe

FRA	France	NAM	Namibia
GAB	Gabon	NER	Niger

Publisher's Note: SSBFNET stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

© 2025 by the authors. Licensee SSBFNET, Istanbul, Turkey. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).

International Journal of Research in Business and Social Science (2147-4478) by SSBFNET is licensed under a Creative Commons Attribution 4.0 International License.