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# Crossroads of Peace: Advancing Regional Integration and Global Trade Through Post-Conflict Cooperation

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**Abstract**
*This article examines the potential economic benefits of the Crossroads of Peace (CoP) initiative proposed by the Government of Armenia. To assess regional trade dynamics, three indicators were applied: the Export Similarity Index (ESI), the Trade Complementarity Index (TCI), and the Revealed Comparative Advantage (RCA). The findings reveal that the ESI between Armenia and its regional partners, Türkiye and Azerbaijan, is 0.25, indicating minimal competition in export markets. In contrast, the TCI score of 0.5 from the region to Armenia suggests a relatively higher degree of complementarity, highlighting stronger opportunities for regional exports to Armenia than vice versa. Furthermore, Armenia's projected trade volume with Türkiye in 2024 is estimated at USD 787 million, underscoring the initiative's potential to foster significant economic exchange.*

**Keywords**
*Crossroads of Peace; Armenia; Türkiye; Azerbaijan; Regional Trade; Export Similarity Index; Trade Complementarity Index; Freedom of Movement*

## INTRODUCTION

The Crossroads of Peace (CoP) initiative, proposed by the government of the Republic of Armenia, envisions an economic transformation for the South Caucasus, a region with untapped potential situated at the intersection of modern and historical trade routes. Situated at the crossroads of Europe and Asia, Armenia has long stood at a pivotal point of commerce, innovation, and diverse cultures. The CoP introduces a complementary network of routes designed to enhance the strategic importance and expand the capacity of the Trans-Caspian Corridor. These connections will create additional logistical pathways and position the South Caucasus as a competitive transit option for accessing major markets in the Middle East, Europe, and Asia.

The initiative also seeks to revive long-stalled economic cooperation hindered by decades of conflict and political fragmentation. Blocked roads, abandoned transportation corridors, and closed borders, including the Armenia–Türkiye border, which has been sealed since 1993, have prevented the region from capitalizing on its geographical proximity and historical trade links. Research indicates that these barriers impose substantial economic costs, with Armenia and Azerbaijan incurring estimated annual GDP losses of 3% and 2.4%, respectively, due to conflict-related expenditures and reduced investment (Saha et al. 2018). Moreover, the German Economic Team (2022) suggests that opening the Armenia–Türkiye border could raise Armenia's trade with Türkiye from less than 1% to over 10% of its total trade volume, representing approximately $123 million in additional annual exports. By leveraging the

region's natural geographic advantages, the CoP has the potential to build new bridges between nations and drive them toward regional prosperity and stability.

Classical liberalism, as seen in Adam Smith's "The Wealth of Nations" (1776) and David Ricardo's "On the Principles of Political Economy and Taxation" (1817), emphasizes that free markets and reduced barriers enhance both economic efficiency and individual liberty. In conflict-affected regions such as the South Caucasus, these principles gain particular relevance, as closed borders not only distort economic potential but also restrict the fundamental freedom of movement for millions of people.

Liberal economists have long recognized that barriers to the mobility of labor and goods significantly limit human freedoms and liberties (Mill 1848). While some influential thinkers have raised security concerns regarding immigration, they nonetheless acknowledge that free labor mobility is an essential component of both economic prosperity and liberty (Friedman 1980).

This study, mindful of contemporary debates over border policies, supports the ideas of liberal economic theory, exploring how economic rationality can reduce tensions and expand personal freedoms through carefully managed regional integration.

While existing literature examines the role of infrastructure in post-conflict development, limited research has quantified trade complementarities in the South Caucasus or modeled the potential economic impacts of border re-opening.

This study addresses that gap by employing Trade Complementarity Index (TCI) analysis, Export Similarity Index calculations, and gravity modeling to assess Armenia's trade potential with Türkiye and Azerbaijan.

Fundamentally, the CoP initiative supports the principle that well-developed infrastructure, modern railways, border crossings, and restored trade routes are essential for sustainable economic growth (Spolaore and Wacziarg 2005). Through this initiative, Armenia is advancing the establishment of seven border checkpoints with Türkiye and Azerbaijan, complemented by the restoration of four key railway lines totaling approximately 130 km. These include the Nrnadzor–Agarak branch (43 km), the dismantled Hrazdan–Kayan section (80 km), the 1-km Yeraskh–Nakhichevan border link, and the 6-km Gyumri–Türkiye border connection. In addition, five new railway checkpoints will be introduced, four along the Armenia–Azerbaijan border and one on the Armenia–Türkiye border, transforming former dividing lines into bridges for economic exchange (Bruggeman-Sękowska 2023). The project's road infrastructure component is equally ambitious, including the complete reconstruction of the North–South Highway (approx. 461 km), along with major East–West corridors such as Kayan–Armavir (approx. 210 km), Kayan–Akhurik (approx. 170 km), Goris–Angeghakot (approx. 84 km), and Sotk–Yeraskh (approx. 271 km) (Arm Road n.d.).

Together, these routes will enable greater transit efficiency across Armenia's territory, linking the Black Sea, the Caspian Sea, and the Persian Gulf region (Union of Informed Citizens 2021). This integrated network is designed to establish Armenia as a reliable transit hub between the Middle East, Central Asia, and Eurasian markets, offering reduced congestion and shorter distances for specific trade flows.

Railway rehabilitation will significantly reduce transportation costs, streamline supply chain operations, and support the development of modern logistical routes through Armenia. These routes will be significant for Middle Eastern and Central Asian exporters seeking efficient


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access to European markets, with the Armenian corridor providing an alternative high-capacity transit option featuring lower congestion and shorter distances for specific flows.

Enhanced railway accessibility will also benefit countries such as China and India by contributing to a more interconnected and multipolar transport network across the continent, as well as neighboring Georgia through the North–South corridor. The revival of these routes aligns with global efforts to diversify supply chains, reducing overreliance on any single port or corridor.

Armenia's geography positions it as a vital integrating element among adjacent trade zones, with cumulative impacts including stronger commercial ties, lower transaction costs, and greater investment attractiveness across sectors ranging from services to agriculture and manufacturing.

Beyond short-term objectives, the CoP project presents an opportunity to build enduring frameworks for cooperation. Infrastructure investments promise sustained benefits across multiple areas of the economy. Studies suggest that every dollar invested in transportation infrastructure generates approximately 1.5 times that amount in economic returns, as improved trade routes boost productivity, lower logistical costs, and expand market access (Global Infrastructure Hub 2021). These benefits extend beyond economics; enhanced connectivity lays the foundation for stable and resilient regional partnerships.

The CoP represents an opportunity to jumpstart regional trade links and align them with global economic trends. In today's world, fragmented markets create inefficiencies, while interconnected economies thrive through cooperative ventures. The Trade Complementarity Index (TCI) analysis, discussed further below, supports this view by revealing a moderate yet promising correlation between the Republic of Armenia's import needs and the export strengths of Türkiye and Azerbaijan. If adequately implemented, trade among the South Caucasus countries can become more diversified and competitive, generating long-term gains for all participants. These findings are consistent with the research of Chandran (2010) and Martincus et al. (2018), who emphasize that trade complementarities drive bilateral trade expansion and strengthen economic interdependence.

By focusing on pragmatic economic outcomes, the CoP initiative shifts attention away from political disputes and highlights the value of economic cooperation. In this way, peace can become not just a goal but a byproduct of practical collaboration and shared economic interests. Success, however, requires recognizing that countries linked through trade become interdependent gradually, with political sensitivities and regulatory frameworks influencing the process. While economic interdependence can reduce the likelihood of conflict, sustained commitment from all parties is essential to overcome historical divisions.

Ultimately, the CoP represents a vision for the entire region achievable through cooperation. Infrastructure that supports trade and tourism not only enhances economic performance but also fosters dialogue, builds trust, and lays the foundation for lasting peace. As countries work together to capitalize on the opportunities created by this project, they contribute to a regional order where commerce, rather than conflict, shapes the future.


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## LITERATURE REVIEW

Regional economic integration has long been recognized as a key mechanism for promoting sustainable development, particularly in conflict-affected regions such as the South Caucasus. The crucial role of trade openness and cooperation in driving growth, along with the ongoing expansion of economic blocs, has fueled both theoretical and empirical exploration of the relationship between integration and potential future prosperity (Kizito and Lean 2019).

Researchers such as Nicita (2009) and Falvey et al. (2012) focus on the effects of deeper integration within specific countries or regions, while scholars like Baldwin and Venables (1995) examine the broader role of infrastructure development in facilitating trade relations and economic interdependence. They argue that regional cooperation reduces transaction costs and enhances productivity. Integration into global markets and trade liberalization have long been seen as pivotal drivers of overall economic performance, contributing to increased bilateral trade, reduced intra-household inequality, and higher GDP *per capita* growth (Hadhek and Mrad 2015; Santos-Paulino 2015; Vamvakidis 1998).

Furthermore, Vamvakidis (1998) suggests that regional trade agreements can positively impact growth rates when smaller economies integrate with larger, more developed partners. For the South Caucasus, this implies that the CoP initiative should consider economic incentives for larger economies. Many countries have also embraced trade openness to gain additional insights into production processes (Bas 2012; Ahn et al. 2019; Muazu and Vo 2020), attract foreign investment (Baldwin et al. 1995; Bajo-Rubio et al. 2010; Khalid and Marasco 2019), and leverage economies of scale (Conti 2014).

Infrastructure investments have consistently been linked to sustainable growth, particularly in regions with untapped economic potential. A study by Calderón and Servén (2010) demonstrates that infrastructure quality and accessibility have a significant influence on trade efficiency, market access, and industrial productivity. Similarly, Timilsina et al. (2021) assess the contribution of physical infrastructure to economic growth, concluding that its impact is greater in developing economies. Notably, their study highlights that the efficiency of road infrastructure depends not only on its expansion but also on its optimal utilization.

In a comparable vein, the World Bank (2019) analysis of transport corridors in Central Asia emphasizes how investments in logistics facilitate regional trade. The report highlights that many countries in Central Asia lack adequate infrastructure, emphasizing the need for substantial investment in transport corridors to enhance connectivity. To capitalize on these advantages, nations have adopted varied trade liberalization strategies. Some pursue "going-alone liberalization" (Bhagwati 2002), which involves uniformly reducing customs tariffs across all trade partners, while others implement regional integration by selectively opening markets through reciprocal agreements. Agbetsiafa (2010) suggests that the latter approach enables countries to manage trade liberalization more effectively while mitigating the risks posed by foreign competition.

Trade complementarity reveals potential natural partnerships, as explored by Hosein et al. (2021) and Martincus et al. (2018). The author Chandran (2010) examines trade relationships between India and ASEAN countries, demonstrating that complementary trade structures lead to increased bilateral trade. A World Bank study (2008) investigates regional imports of


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intermediate goods from neighboring countries and their impact on global export performance, emphasizing that complementarity in regional trade can enhance global competitiveness.

In the context of the CoP initiative, trade complementarity modeling indicates that Armenia's potential imports from Türkiye could reach 12.8% of total imports, amounting to approximately USD 678 million (German Economic Team 2022).

However, Copeland (2015) outlines a trade expectations theory, arguing that political regimes are primarily motivated by security concerns rather than economic welfare, social harmony, or ideology. This perspective helps explain why trade agreements, often designed as incentive mechanisms or "carrots," can produce unexpected outcomes when the anticipated economic or political benefits fail to materialize. Such cases underscore the need for comprehensive analyses of the interests of various state and societal actors.

Ultimately, in light of this study's focus and findings, it is crucial to examine the connection between enhanced regional integration and peacebuilding. Clague (2019) emphasizes that economic recovery through increased trade is crucial for maintaining stability in post-conflict countries. Similarly, the UNDP report (2008) and the UN Chronicle article (2024) underline that supporting economic stability and providing essential services are critical to preventing the recurrence of conflict and promoting sustainable development in post-conflict societies. These sources specifically highlight that effective governance and the restoration of livelihoods play a vital role in building trust among communities, thereby laying the groundwork for lasting peace and prosperity.

The principle that economic integration can deliver a peace dividend is also supported empirically. For example, Jrbashyan et al. (2005) note that the eastern regions of Türkiye could particularly benefit from deeper integration with Armenia, as they are approximately 2.5 times less economically advanced than Armenia's national average. This evidence reinforces the CoP initiative's premise: cross-border economic benefits can transcend national boundaries and create conditions conducive to sustainable peace.

Despite extensive literature on this topic, gaps remain regarding post-conflict infrastructure initiatives such as the CoP. Specifically, limited research exists on trade complementarities in the South Caucasus or on the economic modeling of the impacts of border re-opening (German Economic Team 2022). This study addresses these gaps by examining the multifaceted effects of the Crossroads of Peace, highlighting its potential to foster economic growth, enhance regional cooperation, and contribute to long-term peacebuilding. The findings provide valuable insights for policymakers and business practitioners regarding post-conflict regional integration.

## METHODS

This study uses a mixed-methods approach combining quantitative trade analysis, econometric modeling, and comparative estimation. Regional trade potential was assessed with 2023 Trade Map data (4-digit HS) using three indicators: Export Similarity Index (ESI) (Finger and Kreinin 1979), Trade Complementarity Index (TCI) (World Bank 2023), and Revealed Comparative Advantage (RCA) (Balassa 1965), measuring export overlap, sectoral complementarity, and competitiveness between Armenia, Türkiye, and Azerbaijan.


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Trade volume determinants were analyzed using a panel regression based on the Gravity Model, covering Armenia's trade with 189 countries (2004–2023) and estimated via Random Effects (Torres-Reyna 2023). Explanatory variables included GDP, distance, urban population, trade bloc membership (EAEU), and EU membership.

For the 2024 Armenia–Türkiye trade forecasts, IMF macroeconomic projections were applied to the regression estimates. In the absence of bilateral tourism data, Georgia served as a proxy to estimate potential tourist flows and expenditures.

## INTERNATIONAL TRADE

Due to the absence of historical trade data between Armenia and Azerbaijan, as well as the limited availability of data on Armenia–Türkiye trade, alternative analytical approaches must be employed to anticipate the potential effects of border openings on international trade.

A helpful approach is to analyze how Türkiye and Azerbaijan currently engage in trade with other members of the Eurasian Economic Union (EAEU), of which Armenia is a member. Türkiye, for instance, conducts more than $40 billion in annual trade with EAEU countries such as Russia and Kazakhstan (Observatory of Economic Complexity, OEC 2023). These exchanges are primarily driven by Türkiye's exports of machinery, textiles, and food products, while its imports consist primarily of energy resources, metals, and chemicals. Azerbaijan also maintains active trade ties with the EAEU, primarily through oil and gas exports, while importing machinery and agricultural products.

These trade patterns point to tangible opportunities for Armenia and its neighbors. As a member of the EAEU, Armenia already operates within a shared regulatory framework, which could facilitate the establishment of trade relations with Azerbaijan and Türkiye once borders open. Moreover, Armenia's geographic position offers the potential to serve as a transit hub, linking Türkiye to other EAEU markets.

A closer examination of product-level trade highlights these opportunities. Azerbaijan's (OEC 2023) demand for machinery, vehicles, and processed food products could align well with Armenia's (OEC 2023) emerging manufacturing sector. At the same time, Türkiye's (OEC 2023) industrial output, particularly textiles, household goods, and machinery, could complement Armenia's import needs. Armenia also holds a comparative advantage in specific niche sectors, such as high-quality agricultural goods, including dried fruits, wine, and organic produce, which could attract buyers in both Türkiye and Azerbaijan.

Practical examples from the region suggest this is feasible. Georgia, for instance, conducts more than $2 billion in annual trade with Türkiye and nearly $1 billion with Azerbaijan (OEC 2023), despite its comparatively small economy. This demonstrates that substantial trade volumes can develop even between neighbors with modest markets. By analogy, Armenia could expect similar, if not greater, trade flows following the opening of its borders.

To systematically assess these opportunities, tools such as the Export Similarity Index (ESI), Trade Complementarity Index (TCI), and Revealed Comparative Advantage (RCA) are applied. These indices help identify the degree of overlap and complementarity in the export and import structures of Armenia, Azerbaijan, and Türkiye, thereby revealing both the competitive and cooperative dimensions of potential trade relations. The results of this analysis are presented in the text below.


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## Export Similarity Index

The Export Similarity Index (ESI), developed by Finger and Kreinin (1979), measures the degree of overlap between Armenia's export structure and the combined export structure of Türkiye and Azerbaijan. By comparing the share of each product in the respective export baskets, the ESI indicates whether these economies are likely to compete in the same international markets or complement each other. The index is calculated using the Export Similarity Index formula:

$$ESI_{ij} = \sum_{i}^{n} min(x_{ik}/X_i), (x_{jk}/X_j)$$

Where:

- $x_{ik}$ the value of exports of product $k$ by country $i$ (Armenia).
- $X_i$ the total exports of country $i$ (Armenia).
- $x_{jk}$ the value of exports of product $k$ by country $i$ (Türkiye and Azerbaijan combined).
- $X_j$ the total exports of country $i$ (Türkiye and Azerbaijan combined).

The index ranges from 0 to 1, where 0 indicates no overlap in export structures and 1 indicates perfect overlap. The analysis uses observed data from 2023 trade statistics at the 4-digit HS code level (Observatory of Economic Complexity, OEC) to ensure greater accuracy.

Following the calculations, the Export Similarity Index (ESI) for Armenia and the combined region of Türkiye and Azerbaijan was found to be 0.25. This relatively low value reflects a diversified export structure between Armenia and the region, indicating minimal direct competition in export markets. Such a pattern highlights opportunities for complementary trade relationships, allowing each country to leverage its unique export strengths to enhance trade cooperation and foster deeper economic integration within the South Caucasus.

## Trade Complementarity Index

The Trade Complementarity Index (TCI) was calculated to assess the degree of alignment between Armenia's export patterns and the import needs of Türkiye and Azerbaijan. This widely used metric evaluates how well one country's exports complement another country's imports, offering insights into the potential for enhanced bilateral trade. The TCI can also highlight specific sectors where trade relations could be strengthened. The index ranges from 0 to 1, with values closer to 1 indicating high complementarity and values near 0 indicating low complementarity. For this study, trade data from 2023 at the 4-digit HS code level were used to ensure accuracy. The index was calculated using the Trade Complementarity Index formula:

$$\boldsymbol{TCI = 1 - (1/2) \times \Sigma \left| (X_{cg}/X_c) - (M_{rg}/M_r) \right|}$$

Where:

- $X_{cg}$ represents the exports of product $g$ by Armenia.
- $X_c$ is Armenia's total exports.


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- $M_{rg}$ is the combined imports of product $g$ by Türkiye and Azerbaijan.
- $M_r$ is the total combined imports of Türkiye and Azerbaijan.

After applying the TCI formula to Armenia's exports (retrieved from TradeMap 2023) in relation to Türkiye's and Azerbaijan's imports, as well as to the reverse scenario, Türkiye's and Azerbaijan's combined exports in relation to Armenia's imports, the following results were obtained:

- TCI from Armenia to the Region (Türkiye and Azerbaijan): 0.3
- TCI from the Region (Türkiye and Azerbaijan) to Armenia: 0.5

A TCI of 0.3 from Armenia to the region suggests that there is some overlap between Armenia's exports and the import needs of Türkiye and Azerbaijan, but the alignment is relatively weak. This suggests moderate potential for beneficial trade, while highlighting the need for further alignment or diversification of Armenia's export portfolio to enhance trade prospects.

Conversely, a TCI of 0.5 from the region to Armenia indicates a higher degree of complementarity between Türkiye's and Azerbaijan's exports and Armenia's import needs, suggesting stronger trade opportunities for the region's exports to Armenia.

The results of the TCI analysis are significant for all parties involved. For Armenia, understanding its alignment with the region's import structure allows policymakers and businesses to target sectors with strong trade potential. Likewise, Türkiye and Azerbaijan can focus on exporting goods that are in high demand in Armenia, enhancing the prospects for mutual trade benefits. Emphasizing key industries where complementarity is strongest is crucial, as sectors with higher alignment offer immediate opportunities for trade expansion. By prioritizing these sectors, policymakers can facilitate faster gains from trade. Conversely, in areas with lower complementarity, efforts could be directed toward adjusting production or exploring new markets, either through diversification or policy-driven trade initiatives.

High-potential sectors identified through the TCI analysis:

- **Armenia → Region:** Apparel and clothing accessories (HSN 62), Electrical energy (HSN 2716), and Ores, slag, and ash (HSN 26).
- **Region → Armenia:** Motor vehicles for the transport of ≥10 persons (HSN 8702), Bars and rods of iron and steel (HSN 7214), and Furniture and parts thereof (HSN 9403).

The results from the TCI analysis are significant for all parties involved. For Armenia, understanding its alignment with the region's import structure enables policymakers and businesses to target sectors with strong trade potential. Similarly, Türkiye and Azerbaijan can focus on exporting goods in high demand in Armenia, improving the prospects of mutual trade benefits.

Given that the complementarity levels are moderate, there is substantial potential to enhance trade relationships by concentrating on sectors with higher complementarity and by fostering trade through economic cooperation and diversification strategies.


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## Revealed Comparative Advantage

The Revealed Comparative Advantage (RCA) was calculated for Armenia, Türkiye, and Azerbaijan based on their top three export products. Developed by Balassa (1965), the RCA measures whether a country has a relative advantage or disadvantage in producing a particular good compared to the rest of the world. An RCA value greater than 1 indicates that the country possesses a comparative advantage in that product. The index was calculated using the Revealed Comparative Advantage formula:

$$\boldsymbol{RCA} = (\boldsymbol{X_{ij}} / \boldsymbol{X_{it}}) / (\boldsymbol{X_{wj}} / \boldsymbol{X_{wt}})$$

Where:

- $X_{ij}$ is the export of product *j* by country *i*.
- $X_{it}$ is the total exports of country *i*.
- $X_{wj}$ is the world export of product *j*.
- $X_{wt}$ is the total world exports.

The results of the RCA calculations of the RCA calculations are as follows:

**Table 1: Armenia's Top Three Export Products Compared to Türkiye and Azerbaijan (Source: Trade Map 2023)**

| HS Code | Description | RCA Armenia | RCA Türkiye | RCA Azerbaijan |
|---|---|---|---|---|
| 71 | Precious metals, jewelry | 10.30 | 1.43 | 0.13 |
| 85 | Electrical machinery | 0.79 | 0.40 | 0.01 |
| 26 | Ores, slag, and ash | 6.61 | 0.55 | 0.04 |

From Table 1, it is evident that Armenia holds a higher comparative advantage in its top three export products compared to Türkiye and Azerbaijan. In particular, Armenia exhibits the most decisive advantage in precious metals and ores, highlighting its relative specialization and competitive edge in these sectors.

**Table 2: Azerbaijan's Top 3 Products vs. Armenia's Top 3 Products (Source: Trade Map 2023)**

| HS Code | Description | RCA Azerbaijan | RCA Armenia |
|---|---|---|---|
| 27 | Mineral fuels, oils | 6.72 | 0.07 |
| 8 | Edible fruit and nuts | 2.49 | 0.95 |
| 39 | Plastics | 0.44 | 0.15 |

Similarly, Table 2 shows that Azerbaijan holds a higher comparative advantage in its top three export products. In particular, the country exhibits the most decisive advantage in edible fruits and mineral fuels, underscoring its specialization and competitive edge in these sectors.

Table 3: Türkiye's Top Three Export Products Compared to Armenia's (Source: Trade Map 2023)

| HS Code | Description | RCA Türkiye | RCA Armenia |
|---|---|---|---|
| 87 | Vehicles | 1.50 | 0.77 |
| 84 | Machinery, boilers | 0.90 | 0.05 |
| 27 | Mineral fuels, oils | 0.47 | 0.27 |

While Türkiye demonstrates only a moderate comparative advantage in its top three exported products, its figures remain substantially higher than Armenia's performance in the global market (see Table 3). This RCA analysis highlights that Armenia possesses substantial comparative advantages in specific sectors where Türkiye and Azerbaijan exhibit weaker positions. Conversely, Azerbaijan and Türkiye also maintain specific sectors of decisive advantage.

Focusing on sectors where each country holds pronounced comparative strengths can significantly enhance regional trade potential. Moreover, specific products, such as edible fruits and nuts, emerge as promising areas for future trade between Armenia and Azerbaijan, due to the high competitiveness of both countries in these categories.

## DETERMINANTS OF TRADE VOLUME: A PANEL DATA ANALYSIS OF ARMENIA-TÜRKIYE TRADE

The authors of this study investigate the factors influencing Armenia's trade volume with 189 countries over the period 2004–2023 using panel data regression techniques. The analysis applies the theoretical framework of the Gravity Model of trade (Egger 2002, 5), which posits that bilateral trade flows are positively related to the economic sizes of the trading partners and negatively related to the geographic distance between them. Beyond these core determinants, the study also incorporates the roles of urban population, trade agreements, and EU membership in shaping trade patterns.

The dataset includes the following economic and trade-related variables:

- Defined as the sum of exports and imports between Armenia and its trading partners, obtained from Trade Map, which provides detailed trade flow data. The dataset spans 189 countries from 2004 to 2023, enabling a comprehensive longitudinal analysis of Armenia's trade patterns.
- Data on Armenia's GDP and its trading partners, as well as urban population figures (measured as the number of people residing in urban areas), were sourced from the World Bank's Open Data platform.
- Calculated as the distance between Yerevan and the capitals of Armenia's trading partners, serving as a proxy for geographic trade costs.
- Information on free trade agreements (FTAs) and Armenia's membership in regional economic blocs was collected from the WTO Regional Trade Agreements Database.
- Data on the Eurasian Economic Union (EAEU) were obtained from the official EAEU website. At the same time, information on EU Member States was sourced from the European Union's official enlargement webpage (European Union official website, History of enlargement).


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The Random Effects (RE) model was selected to account for unobserved country-specific heterogeneity, assuming these effects are uncorrelated with the regressors. It is suitable for large panels with repeated observations, like the dataset used here. The model is specified as follows:

$$\ln(\text{TradeVolume}) = \beta_1 \ln(\text{GDP}) + \beta_2 \ln(\text{Armenia's GDP}) + \beta_3 \ln(\text{Distance}) + \beta_4 L1.\ln(\text{Urban}) + \beta_5 \text{TradeBloc} + \beta_6 \text{EU} + u_i + \epsilon_{it}$$

Where:

- $u_i$ represents the unobserved country-specific effect, capturing factors unique to each country such as culture, history, and formal institutions.
- $\epsilon_{it}$ is the idiosyncratic error term, accounting for random shocks and measurement errors not explained by the model.

Unlike other panel data models, which control for time-invariant differences by allowing each entity to have its own intercept, Random Effects (RE) models assume that the unobserved individual effects are random and uncorrelated with the explanatory variables. This assumption allows for the inclusion of time-invariant variables, such as geographic distance, in the model, which is particularly important in trade studies (Torres-Reyna 2007).

## Regression Results and Interpretation

The estimated Random Effects model produces the following equation for Armenia's trade volume:

$$\ln(\text{Trade Volume}) = 1.28 \ln(\text{GDP}) + 1.69 \ln(\text{Armenia's GDP}) - 1.65 \ln(\text{Distance}) + 0.57 L1.\ln(\text{Urban}) + 3.97(\text{TradeBloc}_1) + 3.78(\text{TradeBloc}_2) + 1.81(\text{EU}) + u_i - 54.49$$

Attention is now directed to the interpretation of the model's coefficients, focusing on the manner in which each factor affects Armenia's trade volume:

- Economic size plays a significant role in determining the volume of trade. The coefficient for partner country GDP (β=1.28, p<0.01\beta = 1.28, p<0.01β=1.28, p<0.01) indicates that a 1% increase in a partner country's GDP leads to a 1.28% increase in trade volume, a statistically significant effect at the 1% level. Similarly, Armenia's GDP (β=1.69, p<0.01\beta = 1.69, p < 0.01β=1.69, p<0.01) exerts a strong positive influence, suggesting that as Armenia's economy grows, its overall trade expands.
- Distance has a negative and highly significant effect (β=−1.65, p<0.01\beta = -1.65, p<0.01β=−1.65, p<0.01), confirming that countries located farther from Armenia trade substantially less, consistent with the predictions of the Gravity Model.
- Urban population, included with a one-year lag (β=0.57, p<0.05\beta = 0.57, p<0.05β=0.57, p<0.05), also exhibits a significant positive impact. The lagged effect indicates that as urban areas expand, improvements in infrastructure, logistics, and market accessibility gradually enhance trade flows.
- Membership in a trade bloc significantly boosts trade volume. Countries with a free trade agreement (FTA) but not in the EAEU experience trade volumes 3.97 times higher (p<0.1p < 0.1p<0.1) than non-members. Countries participating in both an FTA and the


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EAEU show a slightly lower, yet still significant effect, with trade volumes 3.78 times higher (p<0.01p < 0.01p<0.01).

- EU membership also has a statistically significant effect (β=1.81, p<0.01\beta = 1.81, p<0.01β=1.81, p<0.01), indicating that membership in the EU is associated with an 81% increase in trade volume, highlighting the strong economic integration between Armenia and European markets (Policy Trade Europe 2025).

## Model Performance and Statistical Tests

The overall $R^2$ value of 0.6362 indicates that the model explains 63.62% of the variation in trade volume across countries and years. The between-country $R^2$ of 0.7657 suggests that differences between countries account for 76.57% of the variation in trade volume.

Several statistical tests were conducted to validate the model:

- Breusch-Pagan Lagrange Multiplier Test (Panel Effect Test):
  - Test result: $\chi^2(1) = 7173.47$, p = 0.000
  - Conclusion: Confirms that a Random Effects (RE) model is more appropriate than OLS.
- Heteroskedasticity Test:
  - Test result: $\chi^2(1) = 316.26$, p = 0.000
  - Conclusion: Heteroskedasticity is present; therefore, robust standard errors were used.
- Variance Inflation Factor (VIF) – Multicollinearity Test:
  - Mean VIF = 2.36
  - Conclusion: No severe multicollinearity detected.

Based on the estimated Random Effects model, we will now use the following equation to predict Armenia's trade volume with Turkey for 2024:

$$Volume_{predicted} = e^{(1.28\times28.92+1.69\times23.29-1.65\times6.90+0.57\times18.70+3.97\times0+3.78\times0+1.81\times0-54.49+u_i)} - 1$$

Where:

- Türkiye's GDP in 2024 (IMF forecast): $1,344.3 billion (ln(1,344,300,000,000) = 28.92)
- Armenia's GDP in 2024 (IMF forecast): $24.08 billion (ln(24,080,000,000) = 23.29)
- Distance between Yerevan and Ankara: 992.15 km (ln(992.15) = 6.90)
- Urban population of Türkiye in 2023 (World Bank): 66.1 million (ln(66,096,052) = 18.70)
- Türkiye's trade agreement status with Armenia: No FTA or EAEU membership (TradeBloc1 = 0; TradeBloc2 = …)
- EU membership status: Türkiye is not an EU member (EU = 0)
- $u_i$ Unobserved country-specific effect (Baltagi 2005, 11)

Based on this estimation, Armenia's predicted trade volume with Türkiye in 2024 is approximately USD 787 million, assuming Türkiye maintains trade patterns similar to those with other countries.


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The model cannot forecast trade volume between Armenia and Azerbaijan due to the lack of historical trade data between the two countries. Since no recorded trade flows exist in the dataset for Azerbaijan between 2004 and 2023, the model is unable to estimate a country-specific effect, making a reliable prediction infeasible.

While trade potential with Türkiye can be estimated based on available sectoral and regional data, the absence of historical trade between Armenia and Azerbaijan highlights the enduring legacy of division in the South Caucasus. Nevertheless, the newly opened borders and ongoing normalization efforts create the conditions for transformative change, not only in trade but also in the movement of people. As barriers to travel are removed, the experience of neighboring countries suggests substantial opportunities for Armenia to benefit from increased cross-border tourism. Assessing these opportunities requires a careful comparative approach, drawing on Georgia's experience as a regional analogue to project potential tourism flows and their economic impact.

## TOURISM

Since there is no historical data on tourism figures from Azerbaijan and Türkiye to Armenia, the potential impact of opening the land borders was estimated using Georgia as a reference. Georgia shares cultural, economic, and geographical similarities with Armenia and has direct land borders with both Azerbaijan and Türkiye, making it a suitable comparator.

According to the National Statistics Office of Georgia, approximately 1.4 million Turkish nationals visited Georgia in 2023. In contrast, just over 12,000 Turkish nationals visited Armenia in the same year, according to the Statistical Committee of the Republic of Armenia (2023). It is important to note that the only current route for Turkish nationals to visit Armenia is via flights from Istanbul, as there are no open land borders between the two countries.

In 2023, approximately 200,000 nationals from Azerbaijan visited Georgia (National Statistics Office of Georgia, 2023, Tourism Statistics). However, due to the absence of diplomatic relations, no Azerbaijani nationals have visited Armenia for many years. If the land borders were opened and diplomatic relations restored, the number of visitors from Türkiye and Azerbaijan would not immediately reach the figures seen in Georgia. Nevertheless, over a period of 5 to 10 years, tourism from these countries could potentially approach similar levels, thereby enhancing people-to-people diplomacy, fostering cross-cultural understanding, and supporting peacebuilding efforts.

According to the Tourism Committee of Armenia, tourists spend an average of approximately $776.90 per visit (Tourism Committee of RA 2023). Assuming Armenia initially attracts 20% of the total number of Turkish and Azerbaijani tourists who visit Georgia, this could result in an estimated $250 million increase in tourism revenue, contributing positively to Armenia's GDP and overall economy. As familiarity with the newly opened borders grows and neighborly relations strengthen, this number is expected to rise over time (Carril-Caccia et al. 2022).

Conversely, Armenian tourists spend around $880 per trip abroad, according to the International Visitors Survey conducted by the Tourism Committee of Armenia in collaboration with the World Bank (Tourism Committee of RA, International Visitor Survey 2023). If similar numbers of Armenian tourists visit Türkiye and Azerbaijan as they do Georgia, Türkiye could see

an additional $246 million in tourism revenue. In comparison, Azerbaijan could gain approximately $35 million (author's estimate based on the above-mentioned data).

It is also important to contextualize how these multidimensional factors translate into actionable opportunities for regional development, particularly through the lens of people-to-people diplomacy and cross-border tourism. By quantifying potential gains in tourism flows between Armenia, Türkiye, and Azerbaijan, this study illustrates how improved political relations and modernized infrastructure can directly contribute to economic growth and social cohesion. As border openings facilitate greater movement, economic activity is amplified—not only through substantial increases in tourism receipts and ancillary service industries but also through the strengthening of cross-cultural understanding and peacebuilding mechanisms. Over time, the normalization of travel and trade practices between neighboring countries, supported by sustained technological advances and international partnerships, can transform the South Caucasus from a zone of division into a region characterized by openness, prosperity, and lasting stability. This integrated approach ensures that the Crossroads of Peace initiative leverages political will, economic strategy, social connectivity, and technological modernization to maximize its impact at both the state and societal levels.

## PEST ANALYSIS

This study employs the Political, Economic, Social, and Technological (PEST) framework to provide insights into the broader regional dynamics and global trends that shape the project's outcomes. By analyzing these dimensions, the study identifies key opportunities and challenges that could influence the initiative's implementation and long-term strategy.

| Factor | Key Insights | Opportunities / Impacts |
|---|---|---|
| **Political** | Success depends on easing historical tensions and establishing cooperative frameworks among Armenia, Türkiye, and Azerbaijan. Stable political environments support reliable border crossings and transport networks. | Open corridors reflect commitment to mutual growth. International support mitigates risks. US-brokered 2025 peace agreement accelerates diplomatic normalization. |
| **Economic** | Aligns with global trends of supply chain resilience and trade diversification. Infrastructure investments have high multipliers (1 USD → 1.5 USD economic return). | Increased trade, tourism, and industrial cooperation. Reduced transaction costs, attracted FDI, and integrated into global value chains—leverages comparative advantages in agriculture, energy, and manufacturing. |
| **Social** | Infrastructure improves cross-border movement, tourism, and cultural exchange. Fanyan and Petrosyan (2024) estimate a potential annual trade increase of USD 2.0–2.4 billion. | Promotes people-to-people connections and sustainable peace. Tourism, business, and academic exchanges strengthen social cohesion. The TRIPP corridor increases trade potential. |
| **Technological** | Advanced transport/logistics technology improves customs efficiency, enables real-time monitoring, and enhances railway management. Digitalization lags behind the Baltic states (LPI 2.6 vs 3.5). | Enhanced operational efficiency, faster trade flows, and smart logistics investment. Strengthens regional competitiveness in a digitized global economy. |


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The Crossroads of Peace initiative relies on a complex interplay of political, economic, social, and technological factors that collectively determine its prospects for success. Politically, the project's viability is closely tied to resolving historic animosities and establishing frameworks for cooperation among Armenia, Türkiye, and Azerbaijan. Creating stable, cooperative political environments is crucial to ensuring the reliability of border crossings and transportation networks across the region. The opening of corridors signals a genuine commitment to mutual growth and is reinforced by international support, which helps mitigate risks associated with unresolved tensions. The US-brokered 2025 peace agreement, initialed in Washington, has accelerated diplomatic normalization, creating a context conducive to sustainable cross-border engagement.

Economically, the Crossroads of Peace aligns with global trends that aim to enhance supply chain resilience and diversify trade pathways. Substantial investments in infrastructure are expected to generate significant economic multipliers, with every US dollar invested returning approximately USD 1.50 in economic benefits. The ripple effects are extensive: increased trade and tourism, deeper industrial cooperation, and reduced transaction costs all contribute to greater integration into global value chains. The project leverages the region's comparative advantages, particularly in agriculture, energy, and manufacturing, making the South Caucasus more attractive to foreign direct investment and strengthening its potential as a pivotal commercial hub.

From a social perspective, new and upgraded infrastructure promises to significantly enhance cross-border mobility, tourism, and cultural interaction. Assessments by Fanyan and Petrosyan (2024) estimate that regional trade could increase by USD 2.0–2.4 billion annually due to the initiative. These developments are expected to foster deeper people-to-people connections, which in turn underpin sustainable peace. Expanded opportunities for tourism, commerce, and academic exchange will help forge new social ties and reinforce cohesion within and between communities. The TRIPP corridor, in particular, increases regional trade potential, serving as a tangible pathway to greater interconnectedness and shared prosperity.

Technologically, the initiative incorporates advanced transport and logistics systems that enhance efficiency at borders through improved customs management, real-time monitoring, and smarter railway operations. However, the process of digitalization still lags behind leading benchmarks; the region's Logistic Performance Index (LPI) stands at 2.6 compared to 3.5 for the Baltic States. Continued investment in digital solutions is crucial for enhancing operational effectiveness, streamlining trade flows, and enabling the region to compete in an increasingly digitalized global economy. Smart logistics and technological upgrades will help the South Caucasus not only catch up but also establish itself as a hub of digital-era commerce.

In summary, the Crossroads of Peace presents a wide range of opportunities. For example, it can transform historic fault lines into bridges for growth, deepen economic and social integration, and elevate the South Caucasus' role in global supply chains. The initiative's success, however, depends on addressing political legacies, harnessing economic multipliers, nurturing social linkages, and investing in digital infrastructure to ensure sustainable, long-term regional competitiveness and cooperation.


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## CONCLUSION

The Crossroads of Peace (CoP) initiative aims to transform the South Caucasus into a regional trade hub and a model for economic cooperation in conflict-affected areas. Building on decades of scholarly and policy research on trade and regional integration, targeted investments in railways, border checkpoints, and tourism infrastructure offer Armenia, Türkiye, and Azerbaijan a real opportunity to develop robust commercial ties that transcend political boundaries.

This study demonstrates that re-opening existing routes and introducing new roads can unlock channels for goods, services, and people, boosting the region's global connectivity. The TCI analysis identifies Armenia's high-potential sectors as apparel and clothing accessories, electrical energy, and ores, slag, and ash. For countries in the region exporting to Armenia, the top sectors include motor vehicles for transporting ten or more people, iron and steel bars and rods, and furniture and its parts. Moreover, the Export Similarity Index for Armenia and the region (Türkiye and Azerbaijan) is 0.25, highlighting significant potential for trade complementarity. While limitations in available data prevented modeling trade volume between Armenia and Azerbaijan, the predicted trade volume between Armenia and Türkiye is estimated at USD 787 million, indicating substantial growth potential.

As the South Caucasus becomes increasingly interconnected, economic interdependence can act as a stabilizing force, reducing incentives for conflict and fostering long-term stability and freedom of movement for the region's populations. If trust is rebuilt, trade and tourism can drive cross-cultural exchange and shared prosperity across former dividing lines. A cornerstone of the Crossroads of Peace vision is the restoration of genuine freedom of movement for the peoples of the South Caucasus, a region historically constrained by closed borders and entrenched political divisions.

The gradual removal of barriers between Armenia, Türkiye, and Azerbaijan promises to facilitate the movement of people, goods, and services, enabling workers to access new job opportunities across borders and allowing students and tourists to participate in a more vibrant regional exchange. The implementation of internationally standardized procedures for customs, vehicle, and passenger transit, guided by principles of national sovereignty and reciprocal access, can provide secure, predictable, and non-discriminatory passage, which is essential for both humanitarian and economic development.

In this context, freedom of movement becomes more than a technical arrangement: it is a practical mechanism for building trust. Cross-border mobility allows societies to transition from mutual suspicion toward mutual benefit and shared prosperity. Expanding personal and commercial travel reduces incentives for isolationism, fosters cross-cultural understanding, and promotes peace through everyday experiences. Over time, sustained access and openness are likely to lower the socio-economic costs of fragmentation, laying the groundwork not only for incremental integration but also for a transformative shift in the collective identity and stability of the South Caucasus.

The success of CoP relies on strategic policymaking in conjunction with infrastructure development. Policymakers must ensure that newly opened corridors are supported by complementary trade frameworks, enabling businesses to leverage emerging opportunities fully.


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The gradual liberalization of trade relations between Armenia, Türkiye, and Azerbaijan will enable commerce to adapt to new realities and maximize benefits for all parties.

Beyond regional gains, CoP aligns with global trends in trade integration and supply chain diversification. The South Caucasus is strategically positioned to serve as a critical transit point between Europe, Asia, and the Middle East, enhancing its appeal for investment and strengthening its role in resilient supply chains.

CoP represents not only an economic initiative but a strategic vision for a more prosperous and interconnected future. Armenia, Türkiye, and Azerbaijan have an opportunity to move from division to cooperation. While these dynamics will not emerge overnight, each incremental step toward collaboration brings the region closer to a future founded on practical benefits and the economic well-being of its population.

Ultimately, the CoP's success depends on a sustained commitment from all stakeholders, including investing in infrastructure, supporting cross-border cooperation, and aligning economic objectives with the broader pursuit of peace. Through these efforts, the South Caucasus can achieve lasting growth and stability, offering tangible evidence of the power of collaboration over division. With continued commitment, the region can become a beacon of cooperation, providing lessons in economic integration and peaceful coexistence that extend far beyond its borders.

## Limitations of the Study

Several limitations should be acknowledged. The absence of official trade data between Azerbaijan and Armenia prevents a precise estimation of Azerbaijan's trade potential within the regression model. To partially address missing historical tourism data, Georgia's statistics were used as a proxy, offering a transparent basis for estimating future tourism flows.

Economic modeling in conflict-prone regions faces broader challenges. Factors such as geography, infrastructure, historical ties, market conditions, and institutional frameworks all shape trade dynamics. Non-tariff barriers, logistical challenges, and sector-specific trade potential are difficult to quantify due to the region's complexity.

Political and security considerations also limit the scope of the analysis. While open borders create economic opportunities, diplomatic realities, regulatory frameworks, and public perceptions continue to influence trade patterns. Sustainable integration depends on trust, stability, and cooperation among all parties.

Despite these constraints, CoP envisions regional connectivity that extends beyond immediate economic gains, emphasizing trade, infrastructure, and collaboration as foundations for long-term stability and growth in the South Caucasus.


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## CRediT AUTHOR STATEMENT

**Gevorg Papoyan:** conceptualization, validation, writing – review and editing, supervision, project administration, investigation. **Albert Hayrapetyan**: methodology, software, validation, formal analysis, investigation, resources, data curation, writing – original draft.

All authors have read and agreed to the published version of the article.



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