Gazi İktisat ve İşletme Dergisi, 2025; 11(2): 148-161 *https://dergipark.org.tr/tr/pub/gjeb*

GAZİ İKTİSAT VE İŞLETME DERGİSİ
GAZİ JOURNAL OF ECONOMICS & BUSINESS

The potential effects of the Zangezur Corridor on Türkiye's foreign trade

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ARTICLE INFO

Received:09.11.2024
Accepted:19.06.2025
Available online:28.06.2025
Article type: Research article

Keywords:
Zangezur corridor, International trade, International economics, Political economy, Structural gravity model

ABSTRACT

The Zangezur corridor connects Azerbaijan and the Nakhchivan Autonomous Republic. An exclave of Azerbaijan. After the 2020 Nagorno-Karabakh War, the obstacles to opening the Zangezur corridor were solved through the ceasefire agreement. Implementing the Zangezur corridor will shorten the route used nowadays by the Baku—Tiflis—Kars railway by almost 150 km. For this reason, it is thought that this corridor would decrease transportation costs and increase trade volumes. Türkiye, which will have direct land contact with Turkic countries, is the country of one of the most prominent effects of the opening of the Zangezur corridor. The main objective of this study is to determine the effect of Türkiye's trade volumes on the opening of the Zangezur corridor. To investigate this, the study constructs a built-in structural gravity model with a new economic geography perspective covering 182 countries from 2007 to 2023. Then, the coefficient values obtained from the model are used to determine the possible change in Türkiye's trade with nine Asian countries that are expected to use this corridor directly. According to the results, it is expected that Türkiye's top three export-enlarging countries, respectively, are Armenia, Azerbaijan, and Turkmenistan, which will be import-enlarging Azerbaijan, Armenia, and Uzbekistan.

Zangezur Koridorunun Türkiye'nin dış ticareti üzerindeki potansiyel etkileri

MAKALE BİLGİSİ

Geliş:09.11.2024
Kabul:19.06.2025
Çevrim içi kullanım tarihi:28.06.2025
Makale Türü: Araştırma makalesi

ÖZ

Zengezur koridoru. Azerbaycan ile Azerbaycan'ın bir eksklavı olan Nahçıvan Özerk Cumhuriyeti'ni birbirine bağlamaktadır. 2020 Dağlık Karabağ Savaşı'ndan sonra Zengezur koridorunun açılmasının önündeki engeller ateşkes anlaşmasıyla çözülmüştü. Zengezur koridorunun hayata geçirilmesi günümüzde Bakü-Tiflis-Kars demiryolunun kullandığı

Doi: https://doi.org/10.30855/gjeb.2025.11.2.004

e-ISSN: 2548-0162

Anahtar Kelimeler: Zangezur, uluslararası ticaret, uluslararası iktisat, politik iktisat, yapısal çekim modeli.

güzergâhı yaklaşık 150 km kısaltacaktır. Bu nedenle bu koridorun taşıma maliyetlerini düşüreceği ve ticaret hacmini artıracağı düşünülmektedir. Türki ülkelerle doğrudan kara teması kuracak olan Türkiye. Zangezur koridorunun açılmasının en belirgin etkilerinden birinin yaşanacağı ülkedir. Bu çalışmanın temel amacı. Türkiye'nin ticaret hacminin Zangezur koridorunun açılması üzerindeki etkisini belirlemektir. Bunu araştırmak için çalışmada. 2007-2023 yılları arasında 182 ülkeyi kapsayan yeni bir ekonomik coğrafya perspektifiyle yerleşik bir yapısal çekim modeli oluşturulmuştur. Daha sonra modelden elde edilen katsayı değerleri. Türkiye'nin bu koridoru doğrudan kullanması beklenen dokuz Asya ülkesi ile ticaretindeki olası değişimi belirlemek için kullanılmıştır. Sonuçlara göre. Türkiye'nin ihracatını artıran ilk üç ülkenin sırasıyla Ermenistan. Azerbaycan ve Türkmenistan. ithalatını artıran ülkelerin ise Azerbaycan. Ermenistan ve Özbekistan olması beklenmektedir.

1. Introduction

During the historical period, international trade was associated with trade routes or, in other words, trade roads. The most essential elements for the development of trade are convenient roads, facilities to accommodate ports and shippers, and some infrastructure facilities. When trade routes were enlarged, more complex, and more systematic, trade volumes also increased. One of the significant examples of this situation was the Silk Road, which was founded in almost 3000 B.C. and connected Asia with Europe (Ateş, 2024, p. 10). Other examples include the Spice Road, which linked East to West with a maritime route; the Amber Road, which linked Baltic states to other European countries and the Trans-Saharan Road, which connected North Africa to West Africa. They were a cause of the increased trade volume and increased interaction with people and cultures in historical eras. The importance of trade routes in international trade continues today. This can be seen in such projects as the Belt and Road Initiative, which led to China, Mausam, Cotton, and Spice Routes, which prompted India; Nurly Zhol Project, which Kazakhstan led; and Transport Corridor Europe-Caucasus-Asia-TRACECA, which the European Union led.

The Caucasus region is a significant trade hub connecting Europe and Asia. Following the dissolution of the Soviet Union, the countries in the Caucasus area assumed significant roles as crucial global transportation hubs. This transition began a new era where a robust transportation infrastructure became crucial for facilitating international trade in goods and services (Dadaşlı and Valiyev, 2024, p. 1). The Zangezur corridor, located on the border between Azerbaijan and Nakhchivan and with a length of 45 km, has emerged as a promising strategic trading route. Azerbaijan first governed this region, but transferring Zangezur to Armenia was completed in 1921 (Acicbe, 2020, p. 153; Mustafayev and Sadıgova, 2022, p. 1587). This corridor is shown in Figure 1. Following the 'Nagorno-Karabakh War' in 2020, which began on September 27, 2020, and lasted 44 days, a tripartite declaration was signed in November 2020 by Russian President Vladimir Putin. Azerbaijani President Ilham Aliyev and Armenian Prime Minister Nicole Pashinyan (Gulahmadov and Huseyn, 2023, p. 121). This declaration referred to the transport corridor linking the western parts of Azerbaijan to the Autonomous Republic of Nakhchivan, effectively resolving the mountain Karabakh problem and paving the way for the Zangezur corridor (Ismailzade and Babayev, 2021, p. 2).

Article 9 of the 2020 Nagorno-Karabakh ceasefire agreement states that "... The Republic of Armenia guarantees the safety of transport links between the western regions of the Republic of Azerbaijan and the Nakhichevan Autonomous Republic in order to organize the unimpeded movement of citizens, vehicles, and goods in both directions. Control over transport communication is carried out by the bodies of the Border Guard Service of the FSB of Russia." (Commonspace, 2020; Peace Building and Human Rights, 2021; The Official Web Site of The President of the Republic of Azerbaijan, 2020). This statement could be made possible by the Zangezur Corridor. The first step in implementing the Zangezur Corridor was taken in October 2021, when Azerbaijan's President Ilham Aliyev and Turkish President Recep Tayyip Erdogan laid the foundation stone of the Horadiz-Jabrayil-Zangilan-Aghbend

road (Chedia, 2024, p. 199). The Horadiz-Ağbend railway has also been in the construction stage (TRT Avaz, 2024).

Figure 1. Zangezur Corridor (Source: TRT World)

Establishing the Zangezur corridor has the potential to significantly enhance foreign trade between countries in the area, such as Türkiye, Armenia, and Azerbaijan. etc., and open up new opportunities for economic growth. Additionally, establishing this corridor together with China's Belt and Road Initiative (BRI) will enhance new opportunities. BRI is an initiative led by China that aims to link Europe and Asia and improve transportation infrastructure quality. BRI has six land routes, including the Middle Corridor or China- Central Asia- West Asia Economic Corridor, which passes through Central Asian countries, Azerbaijan, Georgia, and Türkiye (Ateş and Seymen, 2022, p. 284). The Zangezur corridor has the potential to give more efficiency to the Middle corridor (Agayev, 2023, p. 7). Nowadays, the Middle Corridor has functioned on the Baku- Tiflis -Kars railways, which have a longitude of 841 km. However, if the Zangezur Corridor were active, the corridor would have a length of almost 691 km. Namely, due to the establishment of the Zangezur corridor, the middle corridor could be shortened by almost 150 km. This decrease in distance owing to the Zangezur corridor could diminish transportation costs and increase trade volumes (Agayev, 2023, p. 8). This process, when thinking with the blockade for the Ukraine- Russia War on BRI's North Corridor, which passes through Russia, gives an advantage to the Middle Corridor in BRI.

The establishment of the Zangezur corridor can yield six benefits. First, the Zangezur Corridor is expected to connect the entirety of the Turkic world (Azizi and Isachenko, 2023, p. 2). This corridor will establish a direct land connection between Türkiye and Azerbaijan, significantly improving the economic and tourism ties between the two nations (Gulahmadov and Huseyn, 2023, p. 126). Second, with the Ukraine-Russia War, BRI's North Corridor was almost completely blocked, and the Zangezur Corridor could be a solution for BRI's land route. Third, with limited global trade and integration, Armenia stands to gain economically from transcontinental trade (Aracioğlu and Esmer, 2023). Armenian Economy Minister Vahan Kerobyan asserts that the resumption of Armenia's borders and transportation lines with Türkiye and Azerbaijan will result in a 30 percent growth in the country's GDP within two years (Eldem, 2022, p. 1). Fourth, European countries will have the opportunity to engage in commerce with Eastern countries, which are significant providers, by utilizing several alternative routes and benefiting from lower transportation costs. Fifth, the Zangazur corridor will serve as a strategic gateway for Türkiye, enhancing its economic connections with Central Asia and strengthening its trade relations with the Turkic World (Sultanova and Rahimov, 2024, p. 3). Owing to the Zangezur Corridor, Türkiye's geoeconomic and political power could be strengthened in the region. The sixth and last one, after the Ukraine- Russia War, is that the concepts of energy and food security take importance. This corridor can help improve energy and food security in the region (Diriöz, 2022, p. 9).

On the other hand, establishing the Zangezur corridor has three main obstacles. One of the primary issues is the absence of trust between Azerbaijan and Armenia (Karimov, 2024, p. 1). It is a determinant feature of the future of the Zangezur corridor. Second, Iran has opposed opinions about the Zangezur corridor. Kamal Kharazi, Iran's former foreign affairs minister, strongly criticized the construction of the Zangezur corridor. He claims that the corridor is being referred to as NATO's "Turan corridor" and alleges that Israel and NATO are backing this project, intending to incite ethnic tensions in the Turkish-inhabited regions of Iran (Gawliczek and iskandarov, 2023, p. 40). Additionally, after

implementing the Zangezur corridor, Iran fears Türkiye's increasing regional influence, reducing Iran's transit advantages and expanding relations between Azerbaijan and Israel, and stretching NATO and Russian presence in the region (Koolaee and Rashidi, 2024, p. 2). Another of Iran's primary concerns is Azerbaijan's intention to forcefully establish the Zangezur Corridor, which may undermine or shut the 40-kilometer border between Iran and Armenia (Dadparvar and Kaleji, 2024, p. 203). The third and last one is about Georgia. Georgia fears that implementing the Zangezur corridor will decrease the importance of the Baku-Tbilisi-Kars (BTK) railway (Chedia, 2024, p. 207).

The primary motivation of this study is to specify how it could affect Türkiye's foreign trade in Central Asian countries. According to the results, to give a foreign trade perspective to Türkiye on the Zangezur corridor. This study has two research questions. The first is: How does the Zangezur corridor affect Türkiye's exports and imports? Second. How will this situation be distributed according to Central Asian countries? For the opening of the Zangezur corridor to reduce transportation costs. New Economic Geography (NEG), which uses iceberg transportation costs, has been chosen. Two different supplementary methods are used to answer these research questions. The first method is the structural gravity model, which is frequently used in the related literature. After that, it is calculated how the Zangezur corridor will affect Türkiye's trade volumes with coefficients taken from gravity analyses of each Central Asia country. This is the second method, and the impact of the corridor on Türkiye's trade volume with 9 Central Asian countries was determined by reducing the transportation distance to approximately 150 km. The data used in this study comprises 182 countries and involves a yearly period of 2007-2023.

The rest of the research is structured as follows: Section 2 covers the literature review. Section 3 covers the methodology, which includes data, model details, and applied econometric techniques. Section 4 interprets the empirical results. Section 5 concludes the study.

2. Literature review

This section summarizes studies related to the Zangezur corridor in the literature. The number of studies increased after the 2020 Nagorno-Karabakh ceasefire agreement. These studies are generally related to perspectives on historical and international relationships. The Zangezur corridor will also affect economic relationships. However, when looking at the related literature, it can be seen that there are limited studies about economic perspectives. There are also very few studies that try to answer the question of how the Zangezur corridor affects Türkiye's foreign trade. One of the aims of this study is to contribute to this limited literature. To this end, it was divided into two different perspectives. The first summarizes studies with economic perspectives on the Zangezur corridor, and the second summarizes studies with Türkiye's economic perspectives.

Studies have analyzed the Zangezur corridor from an economic perspective. One of the first studies about resolving the Nagorno-Karabakh conflict's effect on regional economies is the study of Saha et al. (2018). The results claimed that the full resolution of this problem would create more trade volume, investment, and tourism potential. Ismailzade and Babayev (2021) examined this corridor for economic importance. As a result, they have asserted that this corridor offers an opportunity to increase trade volumes in the region. This corridor's economic and cultural cooperation ability has been analyzed by Jabbarov et al. (2022). Gulahmadov and Huseyn (2023) have asserted that the corridor will benefit the South Caucasus in terms of economic reconciliation. Agayev (2023) has emphasized that the Zangezur corridor is more critical due to the Ukraine- Russian war. Gulahmadov and Hajiyeva (2023) used the gravity model and proved the effect of enhancing trade volume in the region's countries. Gawliczek and Iskandarov (2023) examined the feasibility of utilizing the Zangezur corridor and underscored its significance as a vital component of the global transportation network. The importance of the Zangezur corridor in BRI's Middle corridor was examined by Valiyev (2023). The potential effect of this corridor's implementation on tourism was evaluated by Leyla (2023). According to the findings of Dadaşlı and Valiyev (2024), the corridor has facilitated enhanced trade and investment, resulting in the advancement of transportation infrastructure and the proliferation of transportation networks. Chedia (2024) said the corridor has economic potential and political constraints on implementing the Zangezur corridor. Kocalar and Dilaver (2024) argued that the Zangezur Corridor is a significant initiative that fosters regional growth and collaboration by establishing a strategic link between Türkiye and

Azerbaijan. Sultanova and Rahimov (2024) asserted that the corridor will increase the geoeconomic power of Azerbaijan.

Studies have analyzed the Zangezur corridor from the perspective of the Türkiye economy as follows; The impact of this logistics corridor, which possesses cultural and historical connections between Türkiye and the Turkic Republics, on Türkiye's Eastern Mediterranean ports was examined by Aracioğlu and Esmer (2023). The results indicate that, with the region's road and railway infrastructure, significant advantages may be cultivated for Asia-Europe trade through port links and an extended hinterland. The rivalry between Türkiye and Iran originated from the implementation of the Zangezur Corridor, referred to by Azizi and Isachenko (2023). The Zangezur Corridor, its potential on BRI's Middle Corridor, and its potential effects on the Turkish economy and Turkish policy have been examined by Kazancı and Barun (2023). The Zangezur Corridor was investigated from the perspective of the Türkiye- Azerbaijan tourism relationship with the study of Kaya et al. (2024) and asserted the enlarging tourism effect of this corridor. The studies in the related literature generally argue that implementing the Zangezur Corridor will foster the effects of international trade.

3. Theoretical framework, data and method

According to related literature, having a developed transportation infrastructure is one of the main reasons for benefiting from the wealth of international trade. The reason for this consideration is that the cost of transportation and distance is accepted as a curtailer of global trade (Garciá-Pérez et al.. 2016. p. 1; Linders et al.. 2008. p. 440). The question of how transportation costs affect trade is the research area that is defined as economic geography, a field that is not only relevant but also crucial in understanding the dynamics of international trade and the global economy. Economic geography examines why economic activities occur and cluster in certain areas (Ottaviano, 1999, p. 247). One of the primary contributions to economic geography is Paul Krugman's New Economic Geography (NEG) in 1991 (Tunalı Çalışkan and Kaya, 2018, p. 78). In contrast to traditional theorems. NEG examines spatial effects in trade theories with concepts such as increasing returns to scale, dynamic equilibrium models, transportation costs, intra-industry trade, imperfect competition, and factor mobility. One of the main assumptions of the NEG is about transportation costs. For NEG, transportation cost is one of the primary factors in choosing the location of economic activity, and according to NEG, firms choose the nearest location to the market (Bosker and Garretsen, 2010, p. 486). According to NEG, transportation cost is defined as iceberg transportation cost; during transportation, the products melt down some portion of their own (Tunalı Çalışkan and Kaya, 2015, p. 40). For this reason, this study is based on the NEG as the economic model.

Panel data is used in this study. Panel data analysis allows model parameters to take values according to time and/or units. Models that vary only by units are called "One-Way Models", while models whose parameters vary by unit and time are called "Two-Way Models". There are three models in panel data: classical, fixed effects, and random effects. In the classical panel data model, both the constant and the slope parameters do not vary across units and time. The fixed effect model is based on the assumption that differences between units are constant. In the random effect model, the units are randomly selected; in this case, the differences between the units are also random.

Two distinct supplemental methodologies are employed to address these study inquiries. The first one is the structural gravity model. This model is widely used in academic studies on international economics. The reason for choosing this method in this study is that the empirical power of the gravity model has been proven in the literature and that geographical variables such as distance, economic variables such as GDP, and cultural variables such as speaking Turkic language and religion can be added to the model. The structural gravity model originated with Anderson and van Wincoop's 2003 study "Gravity with Gravitas: A Solution to the Border Puzzle" in 2003. The main feature distinguishing the structural gravity model from the traditional gravity model is the inclusion of multiple trade resistances in the analysis. While the traditional gravity model includes only reciprocal trade costs in the analysis, the structural gravity model considers multiple trade costs. The failure to include multiple trade resistances in the analysis conducted with the gravity model has been described as a "gold medal mistake" (Baldwin and Taglioni, 2007, p. 782). Anderson and van Wincoop suggested using importer and exporter dummy variables to include multilateral trade resistances in the model. It is suggested that

the Poisson Pseudo Maximum Likelihood (PPML) estimator be used as an estimation method. This is because the estimator solves the problem of changing variance, prevents data loss in the case of zero trade flows, and is suitable for general equilibrium analysis of the effects of trade policies. This study uses a structural gravity model with panel data and an estimator PPML.

The second method is to take the coefficient values from the econometric model and determine how the reduction in the distance that the corridor will create will affect Türkiye's trade volume with the 10 Asian countries that are likely to use the Zangezur corridor. Nowadays, trade between Türkiye and Azerbaijan or Central Asian countries is predominantly made via the Baku—Tbilisi—Kars Railway (BTK). This road is 839 km (Özpay, 2018, p. 103). With the opening of the Zangezur Corridor, the Baku to Kars route distance goes down by almost 690 km. This means that implementing the Zangezur corridor will cause the distance to decrease by almost 150 km. This distance decrease also causes a decrease in transportation and timing costs and also can create an increased effect on trade volume. To examine the distance decrease effect on 9 Asian countries' trade volumes with Türkiye, the coefficient value was taken from the gravity model result. Then, it implemented the effect of decreasing 150 km. In forecasting analysis, the reason for selecting these ten countries is that these countries could use this route due to their geographical locations.

Figure 2. Baku- Tbilisi - Kars Railway and The Zangezur Corridor (Source: Anadolu Agency)

In the study, four different models for exports and imports are constructed. The data set consists of annual data for 2007-2023 for 182 countries. Table 1 shows the sources and units of the variables in the study. The dependent variable in the model consists of Türkiye's exports (ln_exab)/imports (ln_exba) with the partner country and is denominated in US dollars. The independent variables are the gross domestic product (GDP) variable representing the economic size of the countries. This variable is included in the export model as (ln_gdpb), representing the GDP of other countries, and in the import model as (ln_gdpa), representing the GDP of Türkiye. In order to see the effect of distance in the model, the distance variable (ln_dl) is included in the model as the distance between the capitals of the countries. The variable "border" was created and included in the model by assigning a dummy variable to the countries with which Türkiye has border neighbors. The variable "turkic" was created to see whether the languages with a common root with Turkish impact on trade. Finally, a dummy variable, "oic" was created for the member countries of the Organization of the Islamic Cooperation, and the effect of belonging to the same religion was tried to be included in the model. Export and import data are taken from TUIK, GDP data from the World Bank, distance and neighborhood variables from CEPII websites. In addition, being a member of the Organization of Islamic Cooperation was taken from the official website of the organization, and the Turkic variable was assigned to Turkic countries by the author. All variables used in the models are in natural logarithm form.

Table 1

Variables Used in the Models

Name of the variables	Source	Description
Export (ln_exab)	TUIK	US Dollar
Import (ln_exba)	TUIK	US Dollar
GDP (lngdpa /lngdpb)	World Bank	US Dollar
Distance (ln_dl)	CEPII	Kilometer
Membership of the Organization of the Islamic Cooperation (OIC)	Organization of the Islamic Cooperation Web Site	Dummy variable
Contiguity (border)	CEPII	Dummy variable
Language (Turkic)	Author	Dummy variable

Table 2 presents the statistical data utilized in the investigation. All variables utilized in the model were presented in natural logarithmic form.

Table 2

Descriptive statistics of the data

Variable	Obs	Mean	Std. dev.	Min	Max
ln_exba	3077	16.77	4.88	0.00	24.77
ln_gdpa	3077	27.44	0.13	27.19	27.73
ln_exab	3077	18.16	3.16	0.00	23.68
ln_gdpb	3077	24.40	2.22	18.74	30.94
ln_dl	3077	8.39	0.82	6.56	9.77
border	3077	0.03	0.18	0.00	1.00
turkic	3077	0.03	0.16	0.00	1.00
oic	3077	0.31	0.46	0.00	1.00

Table 3 shows the correlation matrix for the variables. The correlation values show that the relationships between the variables are not very high.

Table 3

Correlation relationship of variables

Export Models	ln_exab	ln_gdpb	ln_dl	border	turkic	oic	Import Models	ln_exba	ln_gdpa	ln_dl	border	turkic	oic
ln_exab	1.00						*ln_exba*	1.00					
ln_gdpb	0.72	1.00					*ln_gdpa*	0.08	1.00				
ln_dl	-0.49	-0.23	1.00				*ln_dl*	-0.44	0.00	1.00			
border	0.20	0.08	-0.30	1.00			*border*	0.15	0.00	-0.30	1.00		
turkic	0.13	0.00	-0.11	0.16	1.00		*turkic*	0.10	0.00	-0.11	0.16	1.00	
oic	0.17	-0.07	-0.20	0.01	0.25	1.00	*oic*	0.07	0.00	-0.19	0.01	0.25	1.00

This study estimated two models with two estimators to analyze Türkiye's exports and imports. Türkiye's export was used as the dependent variable in export models. Also, Türkiye's import was used as the dependent variable in import models. There are no differences between the two models except for the GDP variables. The partner country's GDP was an independent variable in export models. However, the import models used Türkiye's GDP as an independent variable. Variables such as type are used because a country's export depends on partner countries, and its import depends on its GDP, in theory. In Equations 1 and 2, t =1….T represents the period. β_0 represents the constant parameter and β_1 represents the explanatory variable parameter.

Model 1: $ExportTR_t = \beta_0 + \beta_1 GDPx_t + \beta_2 Distance_t + \beta_3 Border_t + \beta_4 Turkic_t + \beta_5 OIC_t + \varepsilon_t$ (1)

Model 2: $ImportTR_t = \beta_0 + \beta_1 GDPTR_t + \beta_2 Distance_t + \beta_3 Border_t + \beta_4 Turkic_t + \beta_5 OIC_t + \varepsilon_t$ (2)

Table 4 presents the stability tests and model results for exports and imports. The table includes the results obtained first with the Least Squares (OLS) method and then with the Poisson Pseudo-Maximum Likelihood Estimation (PPML) estimator. The table presents the stability tests and results of the models. While White and Breush-Pagan tests investigate the presence of heteroscedasticity, the Ramsey test investigates whether there are identification errors in the models. The null hypothesis of the White and Breush-Pagan tests states that all error variances are equal (homoskedasticity), while the alternative hypothesis states that error variances are a multiplicative function of one or more variables (heteroskedasticity) (Breusch and Pagan, 1979, p. 1287; White, 1980, p. 817). The null hypothesis of the Ramsey test is that there is no misspecification in the model, while the alternative hypothesis is that there is misspecification (J. B. Ramsey, 1969, p. 351). The identification error means whether the model will be linear or nonlinear.

Table 4 shows that all models constructed with OLS have changing variance and identification errors. For this reason, it was deemed appropriate to construct the models with PPML, which is resistant to changing variance and a nonlinear estimator. The results for export models show that all variables are statistically significant and have coherent signs with the gravity model. According to the results, Türkiye's export volume increases as the partner countries' GDP, existing contiguity, being a Turkic country, and being a member of the Organization of the Islamic Cooperation increase but decrease in heightened distance. When the partner country's GDP, existing contiguity, being a Turkic country, and being a member of the Organization of the Islamic Cooperation increased by %1, Türkiye's exports increased by %0.09, %0.21, %0.06, and %0.33, respectively. However, when distance increased by %1. Türkiye's export decreased by %0.13.

The findings for import models indicate that all variables are statistically significant and consistent with the gravity model. The results indicate that Türkiye's export volume rises with increased GDP, existing contiguity, status as a Turkic nation, and membership in the Organization of Islamic Cooperation. At the same time, a greater distance leads to a decline. When Türkiye's GDP, existing contiguity, being a Turkic country, and being a member of the Organization of the Islamic Cooperation increased by %1, Türkiye's imports increased by %0.17, %0.87, %1.63, and %0.53, respectively. However, when distance increased by %1, Türkiye's imports decreased by %1.37.

As a result, distance is an extenuator variable for Türkiye's export and import. This effect is more significant for imports (% -1.37) than exports (% -0.13). Based on this finding, it can be said that owing to the opening of the Zangezur corridor. Türkiye's imports could increase more than Türkiye's exports.

Table 4

Model Results for Export and Import

Models For Export	OLS	PPML	Models For Import	OLS	PPML
	ln_exab	ln_exab		ln_exba	ln_exba
ln_gdpb	1.664***	0.0919***	ln_gdpa	2.851***	0.169***
	(24.87)	(24.84)		-11.13	-10.35

ln_dl	-1.481	-0.126**	ln_dl	-16.35*	-1.375***
	(-0.38)	(-2.96)		(-2.20)	(-10.30)
border	-0.734	0.212***	border	-7.095*	0.870***
	(-0.07)	(-5.59)		(-2.21)	-10.94
turkic	1.930	0.0648***	turkic	19.92*	1.635***
	(0.15)	(7.61)		-2.34	-10.71
oic	-3.005	0.329***	oic	-12.30**	0.528***
	(-0.26)	(5.48)		(-2.84)	-8.75
R2	0.91	0.91	R2	0.86	0.87
Breusch–Pagan Test	8753.08 (0.000)		Breusch–Pagan Test	8753.08 (0.000)	
Ramsey Test	108.31 (0.000)		Ramsey Test	108.31 (0.000)	

Note: t statistics in parentheses

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$

The second method is forecasting analysis using coefficient values for export and import models. This method estimates the impact of the distance reduction due to the implementation of the Zangezur corridor on Türkiye's trade with these countries. For this purpose, the distance coefficient values obtained from the gravity models estimate the impact of the 150 km distance reduction due to the Zangezur corridor on trade with 9 Asian countries. In this method, not only does a distance variable have the power to determine forecasting results, but results are also affected by other variables. For example, Armenia has a border with Türkiye but is neither a Turkic country nor a member of the Organization of Islamic Cooperation. For these reasons, the border coefficient value is not used when forecasting for Georgia, but the Turkic and Organization of Islamic Cooperation coefficient values are used.

Table 5 shows the forecasting analysis results. The results suggest that the Zangezur corridor will have an extended effect on Türkiye's foreign trade volume in 9 Asian countries. All countries included in this analysis positively affect exports and imports. Armenia is the top country regarding Türkiye's export enlarging (% 0.93); the second one is Azerbaijan (% 0.44), and the third one is Turkmenistan (% 0.26). The most minor enlargement for Türkiye's exports is China (%0.08) and Mongolia (%0.15).

When investigating the results regarding Türkiye's imports, the most significant import enlargement belongs to Azerbaijan, with % 3.39. The second one is Armenia, with % 2.94, and the third one is Uzbekistan, with %0.83. The lowest is China, at % 0.04, and Mongolia, at % 0.05.

These percentage increases are calculated relative to existing trade volumes with Türkiye. According to results from forecasting analysis, the Zangezur corridor will enlarge the effect on Türkiye's foreign trade volume specific to nine Asian countries.

Table 5

Results for Forecasting Analysis

	Export	Import
Azerbaijan	0.44	3.39
Kazakhstan	0.17	0.78
Armenia	0.93	2.94
Uzbekistan	0.19	0.83
Turkmenistan	0.26	0.11
Kyrgyzstan	0.18	0.07
Tajikistan	0.22	0.08
China	0.08	0.04
Mongolia	0.15	0.05

4. Discussion and findings

Despite technological improvements in transportation, distance remains a crucial obstacle for international trade and logistics. The best options to resolve this obstacle are creating new trade routes and improving the quality of existing transportation facilities. These solutions decrease transportation costs and, finally, increase trade volumes. The Zangezur corridor can potentially be a key trade route in Asian-European trade. Especially after the trade sanctions on Russia due to the Ukraine- Russian war, the importance of the Zangezur corridor has increased.

Additionally, the Zangezur corridor is essential for the BRI. After the Ukraine- Russian war, the China—Mongolia—Russia economic corridor and the New Eurasia Land Bridge or North Corridors, mainly in Russia, lost their importance. The middle corridor, BRI's shortest corridor for reaching Asia to Europe by land, will replace the North corridors. Also, due to the Zangezur corridor, the middle corridor will be shortened, thanks to a more effective corridor in BRI for reaching Asia to Europe.

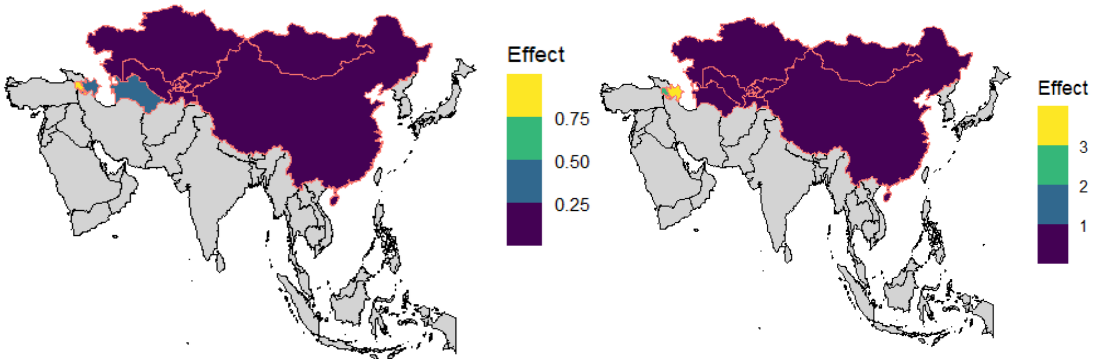
Türkiye is a crucial country for the Zangezur and BRI's middle corridor. Due to the Zangezur corridor. Türkiye can reach Turkic countries by land, which could benefit country diversification and foreign trade. Also, this process could strengthen the geoeconomic and political power of Türkiye. For these reasons, the Zangezur corridor is of crucial importance to Türkiye. Nevertheless, there are some threats to Türkiye as well. The first one is Türkiye's trade deficit with China. In 2023, Türkiye's trade deficit with China was almost 40 billion dollars. The Zangezur corridor could lead to this deficit being higher. The second is Iran's Persian Gulf—Black Sea International Transport and Transit Corridor. The main idea behind this corridor is to reduce the importance of Türkiye's transportation routes between Asia and Europe (Dadparvar and Kaleji, 2024).

This study has two research questions. The first is: How does the Zangezur corridor affect Türkiye's exports and imports? Second, how will this situation be distributed according to Central Asian countries?

The first answer is that the results show that the Zangezur corridor will positively affect Türkiye and Asian countries, which are highly likely to use this corridor for trade. Figure 3 shows the results of Türkiye's trade effects from the Zangezur corridor. According to the results, export and import effects are positive, and import effects are higher than export effects. It can be said that the Zangezur corridor will be beneficial for Türkiye's foreign trade with Asian countries. When considered with Türkiye's leading trade partners are the European Union countries, the Zangezur corridor could open a new era for Türkiye's trade relationships with Asian countries. Due to the Zangezur corridor, Türkiye can improve trade ties with Asian countries, which could be a chance to reach trade potential for Türkiye.

The second answer is shown in Figure 3. According to Figure 3, the countries nearest to Türkiye will benefit the most from Türkiye's trade volumes. Armenia places first in Türkiye's export growth at %0.93; Azerbaijan follows in second at %0.44, and Turkmenistan is third at %0.26. The lowest increases in Türkiye's exports are to China (%0.08) and Mongolia (%0.15). In examining Türkiye's imports, the most substantial increase is attributed to Azerbaijan at %3.39, Armenia at %2.94, and Uzbekistan at %0.83. The lowest figures are for China at %0.04 and for Mongolia at %0.05.

These results are coherent with Aracioğlu and Esmer (2023) and Kazancı and Barun (2023). These studies asserted that the implementation of the Zangezur Corridor could positively affect the Turkish economy. In other words, the results of the study empirically proved the two studies' arguments.



(a) Export (b) Import

Figure 3. The Results of Türkiye's Trade Effects on the Zangezur Corridor

This study's main limitation is that only 9 Asian countries are included in forecasting analyses. These countries will potentially use this corridor, so the trade effect on Türkiye could be different if it included other countries. This is the main recommendation of the following studies.

5. Conclusion

The Zangezur corridor has a massive potential for improving and strengthening trade ties while decreasing transportation costs. The benefits of implementing the Zangezur corridor will support regional sustainable development. This corridor can increase trade volumes and contribute to regional security and peace. To fully exploit its potential, the countries of the region should take action with compromise, willingness, and trust. Nevertheless, some difficulties exist, such as Iran's negative perspective on the corridor or the possibility of Armenia's resistance or unwillingness.

Azerbaijan will significantly benefit from the corridor in economic and political ways. Also, Armenia can take a chance on end for its regional political and economic isolation and improve its integration into the world economy. One of the biggest beneficiaries will be Türkiye. Türkiye will take a chance to reach land with Turkic countries directly. This could improve Türkiye's geoeconomic and political power, especially in Central Asia. Additionally, Türkiye can increase the country's diversity of foreign trade due to the Zangezur corridor and thus can decline the dependency on trade with European Union countries. Türkiye needs strategy plans to take advantage of the Zangezur Corridor. Thanks to the Zangezur corridor, Türkiye will be able to increase its trade volume by reducing the transportation and logistics costs it incurs in its trade with Asian countries. In addition, the Zangezur corridor will be able to mitigate the trade diversionary effects of the Green Deal adopted by the European Union.

The results suggest that the Zangezur corridor will positively affect Türkiye's trade volumes. However, this corridor can create so many different effects. For this reason, Türkiye does not consider this corridor only from a trade perspective and should prepare for different political, economic, historical, and cultural effects.

Author statement

Research and publication ethics statement

This study has been prepared in accordance with the ethical principles of scientific research and publication.

Approval of the ethics board

Ethics committee approval is not required for this study.

Author contribution

This study has one author.

Conflict of interest

There is no conflict of interest arising from the study for the authors or third parties.

Declaration of support

No support has been granted for his study.

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