GEORGIA'S FOREIGN TRADE POTENTIAL WITH THE UNITED STATES: A GRAVITY MODEL APPROACH

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ABSTRACT

The United States became an important strategic partner shortly after restoring Georgia's independence. On June 20, 2007, a trade and investment framework agreement was signed between the U.S. and Georgia. This agreement was to expand trade in goods and services between the two countries and improve Georgia's investment environment. Although Georgia does not yet have a free trade agreement (FTA) with the U.S., this research assesses the trade potential between Georgia and the U.S. through a gravity model using panel data for 2000-2021. The bilateral trade gravity model was evaluated by EGLS, two-stage EGLS, and GMM techniques, which includes the following variables: GDP, population, distance, and trade openness between Georgia and partner countries. In addition, dummy variables such as religion, common border, and trade agreement also play a role. The study results also reveal that Georgia's foreign trade potential with the United States is fragile.

Keywords: Gravity Model; bilateral trade; trade potential; Georgia; United States

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INTRODUCTION

The impact of globalization contributes to trade integration between countries (Nicoletti, Golub, Hajkova, Mirza, & Yoo, 2003). Adaptation to bilateral trade as a favorable mechanism for economic development is fundamental for many developing countries (Jayasooriya, 2021). Although new opportunities represent globalization and trade in the 21st century, they pose challenges for developing countries. The positions of Georgia and the United States in the global economy differ substantially from each other. Georgia is a small, open, developing economy with a small population and a modest share in global GDP and trade, while the U.S. represents a developed, world-leading economy in virtually all parameters. The U.S. is a major force in the global economy (Efthymiou, 2013).

As a result, other countries frequently attempt to preserve good ties with the United States, which impact their relations with the rest of the world (Sahar & McMillan, 2019).

Georgia restored its independence in 1990 after the collapse of the USSR. Since then, Georgia established partnerships with many countries and chose to integrate into world and regional economic structures as the main pathway to development (Sikharulidze, Shaburishvili, Kadagishvili, Minjishvili, & Sigua, 2022). Liberal foreign trade is a fundamental principle of Georgia's economic policy. This entails simplifying foreign trade programs, customs procedures, lowering import tariffs, and reducing non-tariff regulations. As a World Trade Organization (WTO) member, Georgia benefits from Most-Favored-Nation trading relations with 164 other WTO member countries. Georgia also has FTAs with ten former Soviet republics and the European Union (EU), which has since expanded (MESDG, 2023). At this stage, Georgia's foreign trade policy greatly defines the main vector of the country's potential economic development. Georgia is currently challenged with low economic development, technical and technological backwardness, and a lack of investment (Sikharulidze & Kikutadze, 2017). Since the restoration of sovereignty, Georgia has been characterized by a constant negative trade balance and a high dependence on imports (Lang, 2022).

Cooperation between Georgia and the United States in the political, social, economic, and cultural fields has a long history (U.S.D.S, 2023). The United States is a strategic partner for Georgia and considers Georgia a strategic ally (Lang, 2022). In 1994, Georgia and the United States signed a Bilateral Investment Treaty. This investment agreement provides Georgia with a unilaterally preferential trade program with the United States, the so-called GSP (Generalized System of Preferences). Georgia is eligible to export more than 3,500 types of products duty-free to the U.S. (ITA, 2023). As for the free trade agreement with the United States and Georgia, a high-level trade dialogue began in 2012 and is still under discussion (ITC, 2023).

Georgia's imports and exports with the U.S. play an important role in Georgia's economy, and trade relations between Georgia and the U.S. are developing dynamically. Total exports from Georgia to the U.S. have been characterized by an upward trend from 2012-2022.

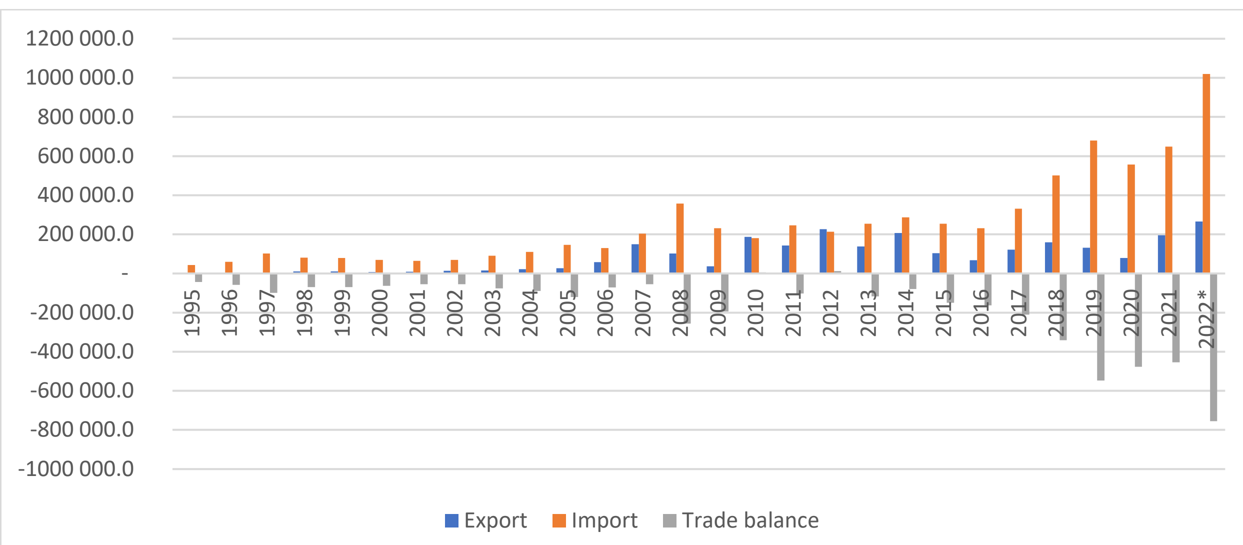

Figure 1. Total export, import and trade balance of Georgia with the USA

Source: Authors' calculation based on www.geostat.ge

Over the past 10 years, Georgia has had a trade balance deficit with the U.S., trending more downward in 2020 and 2021. According to preliminary data for 2022, the deficit increased by 66 percent. Despite the trade deficit with the United States, trade turnover has been characterized by steady growth over the past few years, although 2020 was an exception; turnover decreased sharply by 21.5 percent due to regulations related to the COVID-19 pandemic (Lang, 2022).

According to the literature review, there are various studies on Georgia's international trade in the context of the Deep and Comprehensive Free Trade Area (DCFTA). The preceding studies concentrated on trade connections between Georgia and the European Union (Mgebrishvili, 2020), or an overview of Georgia's foreign trade (Akhvlediani, et al., 2021), (Chkhikvadze, Groza, & Litra, 2021), (Eteria, 2020). Despite the fact that Georgia-US trade-economic connections date back three decades, empirical study of the nations' commercial relations has not yet been conducted in Georgia.

Thus, this research aims to study the factors affecting Georgia's foreign trade using a gravity model and also assess Georgia's foreign trade potential with the United States.

This paper's structure is as follows: Section 2 reviews the gravity model literature; sample selection, characteristics data sources, and model specifications are proposed in Section 3; estimation results from gravity model are performed in Section 4. The study is concluded in Section 5, as are the findings for the relationship between Georgia and its trade partners and the future trade potential for Georgia and U.S.

LITERATURE REVIEW

The gravity model can be used to study international issues and the challenges of the integration of countries within the world market (Grosh, 2011). The model relies on an imitation of Newton's law of gravity, in which the physical parameters and distance of objects play a crucial role. American economist Walter Isard (1954) pioneered the application of gravity concepts to economic problems. The fundamental model of commerce among each nation (i & j) takes the formula $F_{ij} = G * M_i M_j / D_{ij}$, where G serves as a constant, F represents trading flows, D indicates distance, and M denotes the economic characteristics of both nations to be observed (Isard, 1954).

Although some researchers believe that the gravity equation has no theoretical justification (Deadroff, 1998), the model is actively used to test hypotheses and has significant empirical validity in the study of bilateral trade (Magrini, Montalbano, & Nenci, 2017). The UNCTAD and WTO annual reports describe the gravity model of trade as a highly intuitive mechanism (Yotov, Piermartini, Monteiro, & Larch, 2016). The model predicts trade between countries based on the interplay between distances and economic measures (Akman, 2016). Similar to the law of gravity in physics, empirically, the gravity equation relates to trade between two countries, with a positive effect on income and an adverse impact on distance (Deadroff, 1998). The theory of gravity is generally implemented to study commerce between economies. It is also a potential way to explain the positive impact on the country's GDP and the negative impact of geographical distance (Heplman, Melitz, & Rubinstein, 2008). Recent studies show that there is absolute evidence that trade is prone to decline when distance is a factor (Carrere, Mrazova, & Neary, 2020). In a meta-analysis conducted by Disdier and Head (2008), they substantiate the negative outcome of long-distance trade.

In many scientific works, the gravity equation has been used to study the impact of geographic location, demographic parameters, Regional Trade Agreements (RTAs), and tariffs (Baier & Bergstrand, 2001), exports (Heplman, Melitz, & Rubinstein, 2008), subsidies, embargoes, trade sanctions, foreign aid, immigration, foreign direct investment (Francois, Pindyuk, & Woerz, 2009), and cultural ties on international trade. Using a gravity model for eight countries in South Asia, Kumar and Ahmed (2015) demonstrated that economic activities are influenced by factors related to population (Stewart, 1948), and gravity models have been used for economic output (Boulhol, Serres, & Molnar, 2008), distance (Anderson & Yotov, 2010), and tariffs (McGuire, 2002). In their study of Pakistan's worldwide trade Sultan and Munir (2015) revealed that export-import reports are different across regions.

Empirical studies such as those by Bergstrand (1985) have revealed that the impact of border barriers on trade is relatively small (Havranek & Irsova, 2016). Helpman and Krugman (1985) asserted that countries' income levels and trade interact with one another, which demonstrates that nations' trade in products that are distinct due to their resemblances. Although economists such as Irshad and Xin (2018) have used this perspective to investigate other factors influencing bilateral trade, particularly common boundaries and religion. A shared border also may also have a detrimental influence on a country's economy (Darmayadi & Megits, 2023).

The model is also used in international relations to analyze the impact of treaties and ties. Bialynicka-Birula (2015) presented a gravity approach to international trade in the EU, with a negative impact of distance. A gravity framework was employed to assess the trade potential of nations located in the former Silk Road region (Cinar, Johnson, & Geusz, 2016). In the same context, possible prospects for maintaining trade with China were investigated. Furthermore, the study demonstrated that beneficial outcomes were obtained through the South Asian Free Trade Area (SAFTA), which is productive in improving South Asian Association for Regional Cooperation (SAARC) countries' intra-regional trade. The concept of gravity was employed in a study between 1990 and 2016 examining models of trade with OPEC-participating nations in China (Irshad, Xin, Shahriar, & Ali, 2018). With respect to the income (GDP per capita) of China and WTO member OPEC countries, bilateral trade has a positive connection with GDP and trade openness. According to empirical evidence, greater openness has a favorable impact on the prosperity of some countries (Dragusha, Hasaj, Kruja, & Lulaj, 2023).

The gravity equation has been used successfully in the study of FTAs and their impacts on exports and imports. The FTA's goal is to lower barriers in all sectors. Hannan's (2016) research showed that export earnings increase when emerging and advanced markets trade. A study by Baier and Bergstand (2007) found that, on average, the FTA roughly doubles the two countries ' bilateral trade within the 10-year gap. The FTA also contributes to the country's economic growth, allowing it to become less dependent on foreign aid (Krugman, 1996).

Naroglu (2010) investigated the impact of the population on bilateral trade. She discovered that population in exporting countries had a positive impact on trade flows but had an adverse effect on importers. Matyas (1997) expressed the view that a higher population tends to increase trade, while Dell'Ariccia (1999) advocated a negative population ratio.

International trade may be influenced by a variety of other elements, including the sharing of a common culture and religion. For example, Mehanna (2003), using the examplefrom 33 Middle Eastern countries from 1996 to 1999, found that culture represented by religion and linguistic affiliation statistically impactsiddle Eastern trade (Mehanna, 2003). Some scholars have suggested that some religious cultures contribute more than others to the formation of international trade networks (Lewer & Van Den Berg, 2007).

METHODOLOGY

Sampling and data collection

The sample consists of 44 countries and Georgia. All data were gathered between 2000 and 2021, and there were 968 (22 x 44) observations. The data on Georgia's exports and imports came from national statistics, and these variables determined the bilateral trade volume in billions of USD. Economic output (GDP) and population estimates were obtained from data indicators provided by the World Bank. Population is represented in millions, and GDP is defined in billions of USD. The CEPII GeoDist database provided statistics associated with distance, common boundaries, and religion, while the Georgian Ministry of Economy and Sustainable Development provided the FTA data. Distance is measured in kilometers. The dummy variables FTA, CR, and CB have the following values: 0 for no free trade agreements, common religion and common borders; and 1 for free trade agreements, common religion, and common borders.

Conceptual framework

The standard framework of analysis for the gravity equation in its general form is as follows:

$$X_{ij} = GS_i M_j \emptyset_{ij}$$

Where M(j) stands for every factor unique to the importer that comprises the entire amount demanded from an importer (such as the importing country's GDP), X(ij) represents the cash value of exports from (i) to (j), and Si includes factors specific to the exporter that make up the total amount of supply that exporters are willing to offer. G is a variable, like the degree of global liberalization, that is independent of i and j. Finally, ϕ_{ij} indicates the inverse of bilateral trade costs, or how easy it is for exporter i to reach market j.

According to the theory and empirical research expressed in the above section, the concept of gravity is primarily influenced by the variables comprising countries' (i and j) GDP in USD billions, the population in USD millions, religion (dummy), and trade openness in states i and j, as well as distance in kilometers, a shared border, and a free trade agreement. The gravity equation's specified model of bilateral commerce is as follows:

$$\begin{aligned} \boldsymbol{logBtrade_{ijt}} = \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1 LogGDP_{it}} + \boldsymbol{\alpha_2 LogGDP_{jt}} \\ + \boldsymbol{\alpha_3 logDist_{ijt}} + \boldsymbol{\alpha_4 TO_{it}} \\ + \boldsymbol{\alpha_5 TO_{jt}} + \boldsymbol{Indicators_{ijt}} + \boldsymbol{\varepsilon_{ijt}} \end{aligned}$$

Table 1. Variables, descriptions, and sources of data

Variables	Description	Source
Bilateral trade volume	Export of Georgia to j country plus import of j country to Georgia in billions of US dollars.	National Statistic Office of Georgia
GDPit	GDP – USD billions (country i)	World Bank Data
GDPjt	GDP – USD billions (country j)	Data indicators https://data.worldbank.org/
POPi	Population: USD millions (country i)	Data indicators https://data.worldbank.org/
POPj	Population: USD millions (country j)	Data indicators https://data.worldbank.org/
Rel	Religion (dummy), Christian country – 1, other religion - 0	CEPII
TO it	Trade openness is measured by exports and imports, as a percentage of Georgia's GDP.	World Bank Data
TO jt	Trade liberalization, or trade openness, is measured by exports and imports as a percentage of a partner country's GDP.	World Bank Data
Distance	The distance between countries i and j in kilometers.	CEPII
CB	The common border between countries i and j (dummy).	CEPII
FTAs	Agreements on free trade between countries i and j (dummy)	Ministry of Economy and Sustainable Development of Georgia www.economy.ge

ESTIMATION RESULTS

One of the main issues in evaluating the gravity equation is the cross-section dependence test. As a result of unobserved factors, geographical effects, or spillover effects, time series for various cross-section units are associated. Pervasive cross-sectional dependence (CD), which takes place when every component is linked in the same cross-section, may have an effect on panel data. The influence of certain unexamined characteristic similarities shared by every group and having an impact on each of them, albeit differently, is frequently linked (Henningsen & Henningsen, 2019). As a result, a cross-sectional dependence test was performed (Breusch & Pagan, 1980). H_0 at 5% does not have a significant outcome, and Pesaran's (2004) CD test results are displayed in Table 2. The results suggest that data from panel time series show strong evidence of cross-sectional dependence.

Table 2. Panel cross-section dependence (CD)

Variables	Statistic.	d.f.	Prob.
Breusch-Pagan (1980) LM	4137.828	946	0.00
Pesaran scaled LM	73.38020		0.00
Pesaran's (2004) CD	25.49103		0.00

Source: Author's calculation, EViews 12

To assess bilateral trade in Georgia, we used the following econometric techniques: EGLS, Two Stage-EGLS, and GMM. Table 2 provides our estimation results which examined the impact of gravity model variables on bilateral trade between Georgia and partner countries (see Appendix 1). Estimation findings in Table 3 indicate that R-squared adjusted, which assesses the performance of variables, is adequately large for all models, implying that regressions collectively explain roughly 80% of modifications in trade flows between 2000 and 2001.

Table 3. Estimation results (Georgia and 44 countries)

Independent variables	**EGLS**	**Two-stage EGLS**	**GMM**
LN_GDPG	1.315335*	1.300699***	1.697081***
	(0.718387)	(0.387731)	(0.556041)
LNGDP_P	0.370771***	0.370775***	0.259989***
	(0.044670)	(0.032516)	(0.039160)
LN_POP_PC	0.396875***	0.396850***	0.498059***
	(0.042149)	(0.035700)	(0.043437)
LN_POPG	-16.51219***	-16.64678***	-13.56706***
	(5.268422)	(3.311422)	(4.763021)
FTA	-0.950541***	-0.950499***	-0.539084***
	(0.105879)	(0.179155)	(0.196750)
CB	2.186565***	2.186616***	2.195464***
	(0.064148)	(0.072306)	(0.096345)
RELIGION	-0.306948***	-0.306898***	-0.275751***
	(0.034079)	(0.073260)	(0.097499)
TC_DISTANCE	-0.000340***	-0.000340***	-0.000234***
	(1.91E-05)	(2.71E-05)	(3.35E-05)
TO	-2.01E-08***	-2.01E-08***	-2.12E-08***
	(4.52E-09)	(4.74E-09)	(5.37E-09)
TO_GEO	-0.001626	-0.001554	-0.002986
	(0.007288)	(0.004402)	(0.006366)
C	222.9338***	225.3067***	170.0197***
	(95.06808)	(58.15446)	(83.59388)
R-squared	0.86	0.86	0.767
R-squared adjusted	0.859	0.859	0.764
S.E. of regression	0,931	0,931	0,949
Durbin-Watson stat	0.356596	0.356864	0.345884

Source: Authors' calculation from EViews 12

Notes: ***, **, * indicate significance at 1%,5%, and 10%, respectively.

The coefficient for GDP is statistically significant for all models at the 1% level. This variable has a positive effect on trade flows. Trade openness, as measured by proportion of (imports + exports) to GDP, appears to have an adverse effect on Georgia's bilateral trade. Over the 2000-2021 periods, this factor has negative and statistically significant coefficients. FTA has a statistically significant negative influence on Georgia's trade flows. We suppose that the free trade agreements signed between Georgia and partner countries have not been fully enacted. Georgian economists share much the same opinion. For example, in their work 'Main directions of improving the foreign trade balance of Georgia', Ghaghanidze and Ramishvili (2017) did not link export growth with free trade agreements. A similar result was observed in the work of Muhammad Saqib Irshad and Xin (2018), who investigated Pakistan's bilateral trade with partner countries.

The partner country's population statistically significantly and positively impacts Georgia's trade flows. This cannot be said about the population of Georgia, which has a negative and statistically significant relation to trade flows.

Geographic distance also negatively affects Georgia's trade flows and is statistically significant at the 1% level; however, this impact is not that large. The regression results of all three techniques (EGLS, Two Stage-EGLS, and GMM) show that shared border has a positive and statistically significant effect on trade. Religious differences create a negative statistically significant result on trade.

Analysis of Georgia's trade potential with the United States

Georgia's trading potential with the U.S. was calculated using the results of the Gravity Regression Equation. We obtained the results of the estimated regression equation for Georgia based on the empirical analysis of Georgia and 44 partner countries in the period of 2000-2020.

Figure 2. Results for Georgia's trade potential with USA (EGLS)
Source: Authors' calculation

Figure 3. Results for Georgia's trade potential with USA (Two stage -EGLS)
Source: Authors' calculation

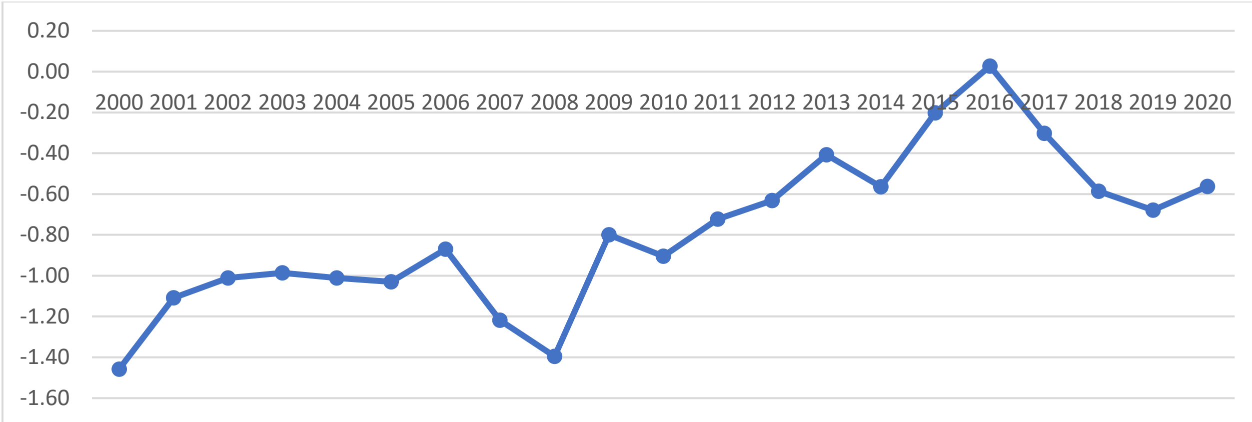

Figure 4. Results for Georgia's trade potential with USA (GMM)
Source: Authors' calculation

To assess Georgia's trade potential with the United States, we used the following formula: ΔT = Potential trade – actual value, in which, using Irshad and Xin (2018), an upward trend indicates Georgia's future trade growth, although an adverse outcome signifies Georgia's trade perspective with the United States is limited. Figures 1, 2, and 3 show Georgia's trade potential with the U.S. using the EGLS, Two stage-EGLS, and GMM techniques respectively. Each technique has been used to evaluate the equation of the gravity model. The results obtained through the three techniques confirm that despite the large and attractive U.S. market, Georgia's trade potential with the U.S. is underperforming. Several factors, including a weak competitive advantage, less diversification of Georgian exports, imposed high standards in the U.S., and high transportation costs, are involved in that underperformance. Georgia's lack of competitive advantage stems from low-value-added products dominating the country's exports. Figure 1 shows that an upward and downward trend characterizes Georgia's exports to the United States. Georgia has a persistent trade deficit with the United States. The Georgia government has no specific strategy to exploit the U.S. market. This implies the need to promote competitive, high-value-added products and aggressive marketing campaigns. Iron and steel, beverages, spirits, vinegar, electrical machinery and equipment, and parts thereof, sound recorders and reproducers, television, vegetable, fruit, nut, or other plant preparations, and articles of iron or steel are among Georgia's top commodity exports (HS 4 digits) to the United States. Unfortunately, the majority of these products offer low added value.

DISCUSSIONS

Contributions

Within the framework of this paper, we have empirically investigated bilateral trade ties between Georgia and 44 trade partners using the gravity model, and we have evaluated Georgia's trade potential with the United States. No similar research in Georgia has been undertaken. Overall, the analysis shows that the size of the economy, religion, distance, openness to trade, common border, and free trade agreements all have an impact on bilateral trade with Georgia. In addition, Georgia's trade potential with the United States, one of the major markets, is not fully realized due to a variety of factors. As a result, the study provides valuable insights and noteworthy findings, which are useful resources for economists and policymakers to gain a deeper understanding of bilateral trade between Georgia and the U.S.

Limitations of the Research and Future Research

Our findings suggest several avenues for further research, including more extensive data collection to improve accuracy and reduce detection errors. Other possibilities include adopting a gravity model with different variables or separating exports and imports at the industry and product levels.

CONCLUSION

The research aims to study the trade potential between Georgia and the U.S. In addition, the research also has investigated Georgia's bilateral trade relations with 44 trade partner countries. The study combines econometric methodologies on the 2000-2001 panel database: EGLS, two-stage EGLS, and GMM. With the exception of Georgia's trade openness, the regression parameter test findings reveal that all of the discussed factors are statistically important. In particular, GDP, population, free trade agreement, common border, distance, religion, and partner country's trade openness are statistically significant variables. However, imports and exports are unfavorably and statistically significantly affected by free trade agreements, trade openness, religion, and distance. Population size as well as a common border are in positive relation to trade flows. Although the main goal of free trade agreements is to increase trade flows between partner countries, which is usually achieved by the participating countries in the long term, our research has shown the opposite. Currently free trade agreements are not yielding positive results on Georgia's trade flows. We suppose this is caused by Georgia not taking full advantage of the features and benefits offered by them.

Even though the variables used in this study reflect the influence of factors affecting bilateral trade in Georgia, we think it will be interesting for future research to add additional variables, trade restrictions, and other factors impacting exports and imports.

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Appendix

Table 4. List of Countries

Countries	FTA	Common Border
Austria	Yes	No
Belgium	Yes	No
Bulgaria	Yes	Yes
Germany	Yes	No
Denmark	Yes	No
Spain	Yes	No
Estonia	Yes	No
Ireland	Yes	No
Italy	Yes	No
Cyprus	Yes	No
Latvia	Yes	No
Lithuania	Yes	No
Luxembourg	Yes	No
Malta	Yes	No
Netherlands	Yes	No
Poland	Yes	No
Portugal	Yes	No
Romania	Yes	Yes
Greece	Yes	No
France	Yes	No
Slovak Republic	Yes	No
Slovenia	Yes	No
Hungary	Yes	No
Finland	Yes	No
Sweden	Yes	No
Czechia	Yes	No
Croatia	Yes	No
Azerbaijan	Yes	Yes
Belarus	Yes	No
Turkmenistan	Yes	No
Moldova	Yes	No
Russian Federation	Yes	Yes
Armenia	Yes	Yes
Tajikistan	Yes	No
Uzbekistan	Yes	No
Ukraine	Yes	Yes
Kazakhstan	Yes	No
Kyrgyz Republic	Yes	No
United States	No	No
United Kingdom	No	No
Turkiye	Yes	Yes
Iran, Islamic Rep.	No	No
Canada	No	No
China	Yes	No