BORDER OPENING IMPACTS: TRADE

A PHASED STRATEGY FOR OPENING ARMENIA'S WESTERN BORDER

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Abstract: *This paper discusses possible strategies for and the potential economic effect from opening the borders between Turkey and Armenia. In particular, we emphasize the need for gradual (phased) opening of border check points between the two countries to work out the technical and security aspects involved in facilitating the growing volume of trade and human traffic across the border. To estimate changes in aggregate trade volumes between Armenia and Turkey from border opening we use the gravity model of trade. We find that there is significant unused trade potential between Armenia and Turkey due to the closed border. The study also investigates how opening of the border between Turkey and Armenia would affect all countries in and around the region, including: Azerbaijan, Georgia, Iran, and Russia. Due to availability of new transportation routes after border opening we expect positive impact on trade between Turkey and other countries in the region. As for increased competition in Turkish markets due to better access of Armenian firms to those markets, which can potentially be a concern to Georgia, we don't expect a big conflict of interests due to a) a relatively large size of Turkish markets and b) limited overlap in structure of exports to Turkey from Armenia and from other countries in the region.*

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Introduction

In this paper is outlined a plan to open Armenia's borders in a way that is economically beneficial and preserves and enhances security for Turkey and Armenia. Likely changes in trade flows between the two nations are examined, with particular emphasis on trade between Armenia and eastern Turkey. An important part of the latter is the observation that the impacts of the closed border on trade are magnified the closer the origin and/or destination is to the border and the further south the origin and/or destination is relative to the northwest corner of Armenia. Another important aspect addressed in this study is how to ensure that removal of the closed border between Turkey and Armenia would result in positive gains for all countries in and around the region, including: Azerbaijan, Georgia, Iran, and Russia. This is important both for the sake of fully exploiting potential economic gains and also to promote concurrence with opening the border across as many parties as feasible.

Literature review

There are several studies that are devoted to predicting the likely results from opening the Armenian-Turkish border. It is widely accepted that border opening will have a positive economic effect on countries in the region, but what raises the most argument is how to quantify economic gains that will accrue to different countries. The estimates of such benefits vary widely from one study to another.

In his study "Changing Trade Patterns after Conflict Resolution in South Caucasus" Polyakov uses the results of the gravity model developed by Baldwin for estimating the potential integration of East and West European trade to assess potential trade flows between Armenia and some of its trade partners, including Turkey (Polyakov, 2001). However, using the results from a model that was originally estimated for developed countries with intensive trade relations among themselves leads to overly optimistic conclusions. For example, Polyakov estimates that potential exports from Armenia into Turkey in industrial products outside of natural resources could be as high as US$35.6-65.7 million[1] (the lower bound represents exports flows from Armenia under the GDP levels in 1996; the higher bound uses the projection for 2002 data). Armenia's exports of energy and natural resources are estimated to increase to US$230 million, thanks to the exports of electricity and construction materials. Furthermore, due to the multiplier effect the increase in Armenian exports to Turkey is calculated to as account for as much as 38% of the GDP.

AEPLAC's "Study of the Economic Impact on the Armenian Economy from Re-Opening of the Turkish-Armenian Borders" (Jrbashyan *et al*, 2005) is, on the other hand too conservative in their estimates of potential economic effects of border opening. The authors estimate a gravity model of trade using data on trade between Armenia and its most important 20 trading partners to calculate short and medium term effects of border opening. The results are then used for a more complete analysis of border opening effects on Armenian economy based on a CGE model of Armenia. The study assumes that transportation costs to various destinations to decrease by an average of 4.1% which will lead to an increase of 4.7% in imports and 5.9% in exports in the short run. Further decrease in transportation costs over medium-term (5 years)

[1] All values are expressed in 1996 US dollars.

and intensification of trade relations with Turkey are estimated to lead to nearly 17.4-fold increase in exports to and nearly 2.3-fold increase in imports from Turkey, as compared to 2003 trade volumes.

It is a very challenging task to develop and to use a CGE model for a country that has not been studied using this method before. In that sense AEPLAC's study makes a considerable first contribution to this direction of economic analysis. One critique that CGE modeling renders to is the fact that it is very sensitive to model assumptions; the results of simulations can be completely different in their magnitude and direction for different model "inputs".

The AEPLAC's study correctly notes that one of the most important arguments for the necessity of re-opening the Turkish-Armenian border is the perspective of regional development of the eastern regions of Turkey. In our study we apply gravity modeling to carefully explore this idea and get a better understanding of potential cross border effects of border opening on trade between Armenia and eastern and south-eastern provinces in Turkey.

Current access to Turkey

With closed border trade between Yerevan and cities in Turkey has to go via Georgia, see Figure 1. There are two major border passages that are being used for Armenian transit trade with Turkey: passage G1 - 17 kilometers south of Batumi (near Tkhilnari village); and passage G2 - 20 kilometers south-west of Akhaltsikhe. An additional passage that is sometimes used for Armenian transit trade with Turkey is G3 located 42 km south-west of Akhalkalaki. There is no railroad connection between Georgia and Turkey.

Figure 1. Current border passages to Turkey via Georgia

Armenian traffic to/from Istanbul, and other cities in Western and northern Turkey use passage G1. Traffic to/from other cities in Eastern Turkey most often goes via passage G2: Akhaltsikhe-Tbilisi-Yerevan. This road is in a good condition and does not suffer

much from seasonal whether changes. Another option is to travel via passage G3: Akhalkalaki-Gyumri-Yerevan. This road is 122 kilometers shorter then going through Tbilisi, however parts of this road are in a poor condition, which is particularly problematic for traffic during winter/rainy seasons. If the road is fixed it will save some travel time and costs by avoiding the 122 extra kilometers on the loop through Tbilisi.

With open border between Armenia and Turkey there are shorter routes from Armenia to Turkey. An additional benefit of opening the border is re-opening the railroad connection between Armenia and Turkey, southwest of Gyumri, see A2 in Figure 2.

Strategies for Opening the Border

In this study, "phasing" refers to steps necessary to minimize potential problems associated with a border opening with Turkey. It does not assume gradual removal of trade restrictions: once the border is open, Armenian trade with Turkey will be regulated by EU customs union rules. To develop a rational strategy for re-opening the Armenian-Turkish border it is important to carefully access the volume and structure of trade that will be passing across the common border, since both sides need to take all the necessary measures to assure feasibility, safety, and fairness of that trade.

Figure 2. Initial Border Crossings with Turkey, Stage I

Note: A1 – Passage A1, A2 – Passage A2

Stage I: Opening Two Passages to Handle Initial Traffic and Test Systems

There are six potential border crossings by road and one rail connection between Armenia and Turkey.

Initially, we propose opening two passages: one of the passages nearest to Yerevan (passage A1) and the rail and road passage southwest of Gyumri (passage A2), see Figure 2.

Passage A1, South-West of Metsamor

One passage that could be re-opened relatively early in the process of border opening is the road through Metsamor. Metsamor is a small city 46 kilometers west of Yerevan. Border passage with Turkey lies 24 kilometers to the south-west of Metsamor, and it is connected with Yerevan by a high quality road. Immediately after crossing the border with Turkey the road links to a major Turkish highway. This passage offers an excellent road connection with Southern provinces of Turkey (Igdir, Agri, Van, Mus, Bitlis, and other territories), as well as gives access to Syria and northwestern Iran, see Figure 3. There is also good access to the major east-west roadways through central Anatolia. It's close location to Yerevan as the center of economic activity in Armenia, and the ease of access to the Southeastern Turkey makes this passage an attractive route.

Passage A2, South-West of Gyumri

This passage will allow re-opening road and rail communication with Turkey. We suggest opening this passage in the first stage of border opening process.

This passage can be used for trade and travel between Armenia and Turkish provinces that lie to the West of Armenia (Kars, Erzrum, Ardahan, Artvin, Rize, Trabzon (sea port), and other provinces further to the West), as well as beyond to the Balkans and the rest of Europe. The railroad will also link Armenia to a major Mediterranean seaport Mersin.

An additional benefit of opening this passage is the potential for development of Gyumri and also Vanadzor that are located along the rail and road lines to/from Turkey.

The Russian Empire and, later, the Soviet Union used a wider gauge than the European standard, which is used by Turkey. For that reason, cargoes have to be transferred at the border.[2] The facility for this is southwest of Gyumri, on the Armenian side of the border. The rail line from Turkey extends about one kilometer into Armenia. A rail line from the Armenian system runs parallel to and about 25 meters from away from the European gauge line from Turkey. There is a loading dock between the lines which could facilitate transfers of general freight to and from boxcars.

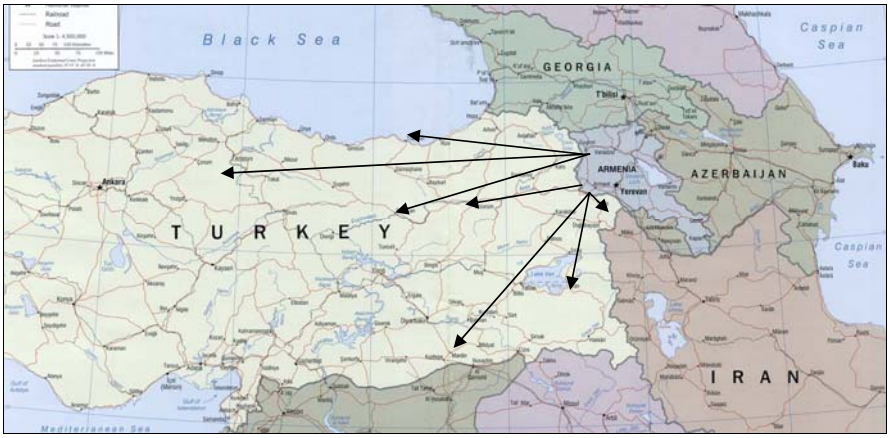
It is likely, however, that most freight would be containerized. One option would be to have a paved area between the tracks and self-propelled units to move containers between wagons on the two tracks. Another option would be to have an overhead crane system, with its base straddling the two tracks. Containers could be lifted and then transferred overhead across to a wagon on the other track.

[2] Technologies exist for rail wagons with telescoping axles. This would allow the same railcar to run on both gauges. Over the foreseeable future, the volumes of freight passing through the Gyumri gateway would not be sufficient to justify investment in such equipment and the necessary tracking systems to ensure expedited return of these special wagons.

The second option is attractive from the standpoint that such cranes are common throughout Armenia. It should be noted, however, that many are in poor condition and may not have sufficient power for lifting fully loaded containers. Moreover, a stationary, overhead crane would necessitate good coordination to move the trains on the two tracks. Also, a stationary, overhead crane would not allow for situations in which containers have to be stored prior to arrival of the receiving train.

Initially, the volumes passing through this gateway will likely be small, permitting establishment of a fairly simple and low cost system. Despite its limitations, if a suitable stationary, overhead crane were available in Armenia, it could facilitate a startup and allow time to assess demands. The system should be designed to accommodate growth. This should include development of a secure storage area for containers and other freight and good access for delivery/pickup of cargoes at the gateway by trucks.

Figure 3. Access to Destinations in Turkey via Passages A1 and A2.



Due to their locations near Armenia's main population centers and east-west transit routes, these passages would be sufficient for facilitating trade between Armenia and Turkey initially. By focusing their efforts on these two crossings, Turkey and Armenia would better ensure good use of border clearance personnel and facilities when traffic volumes are still low and better monitor the situation to deal with and learn from problems which may arise.

Stage II: Opening Additional Border Crossings

As traffic volumes increase, both countries could set up additional border crossing between them using personnel trained and protocols developed at the first two passages. There are several convenient crossings that are located along secondary and tertiary roads that could be also re-opened (see Figure 4). These include a passage 24 km south of Margara village (Passage A3), a passage at Bagaran village (Passage A4), a crossing at Haykadzor village (Passage A5), and a crossing South of Paghakn village (Passage A6).

Figure 4. Opening Additional Border Crossings with Turkey, Stage II

Note: A3 – Passage A3, etc.

Potential benefits of open borders to the other countries of the region

In this section are discussed potential benefits of open borders between Turkey and Armenia for Azerbaijan, and Georgia and to lesser extents, for Iran, Russia, and the Central Asian Republics.

Azerbaijan

Turkey's Dilemma

The scenario around which the project has been developed is the opening of borders between Turkey and Armenia, but not between Azerbaijan and Armenia. This was based on the reasonable presumption that full resolution of issues between Azerbaijan and Armenia would prove more difficult and that an accommodation with Turkey might be a more feasible first step. Clearly, there are constituencies in Armenia and Turkey which favor opening the border. However, Turkey closed the border in support of Azerbaijan. Ending it without Azerbaijan's acquiescence would be politically difficult, at best, and more likely impossible. To gain Azerbaijan's acquiescence, Turkey has to be able to make a credible case that this will work to Azerbaijan's advantage and, if possible, that concessions favoring Azerbaijan were achieved.

Armenia's Potential as an East-West Transshipment Corridor

The generally north-south orientation of Armenia may suggest that that would be the axis for Armenia's greatest potential as a transshipment corridor. However, Armenia's unfavorable topography in the southern part of the country makes north-south routings through Armenia both longer (by approximately 55 kilometers) and more difficult than those available through Azerbaijan (i.e., Nakhichevan), Turkey, or a combination of Armenia and either Turkey or Azerbaijan.

In an east-west direction, Armenia has considerable potential for transshipments. Between Baku and Kars or Istanbul, routes through Armenia are as short as or shorter than alternative routings and have to negotiate fewer natural barriers (i.e. mountain ranges), see Figure A1. Moreover, the only rail connection between the Caucasus and Turkey is in Armenia, at Akhurian southwest of Gyumri.

The Georgian Buffer

Full cessation of the Closed border between Armenia and Azerbaijan is here defined as including the opening of border crossings between Armenia and the 'mainland' part of Azerbaijan (i.e., on the eastern border of Armenia, not with Nakhichevan). Such openings are assumed to be impossible within the scope of this study.

Fortunately, the main east-west rail line and roadway connect Armenia and Azerbaijan via Georgia.[3] This would allow carriers and freight to transit between the two countries without crossing a common border.

Transshipments Using Turkish Motor Carriers

With an open border between Armenia and Turkey, Turkish carriers would be free to transit Armenia. If Armenian customs permitted such transits in a non-discriminatory fashion, regardless of origin or destination, freight linkages between Azerbaijan and Turkey, as well as points west would be improved. The simple expediency might be resorted to, if necessary, of adjusting the F.O.B. terms of shipments to ensure that freight is owned by a non-Azeri party when it moves across Armenian territory.

In addition to guaranteeing non-discriminatory treatment of transshipments, the levels of roadway, fuel and other fees would have likely have to be sufficiently low to avoid the perception or reality of Armenia 'getting rich' off of Azeri freight.

Both Armenia and Azerbaijan would have to decide if, and to what extent, they would allow Turkish carriers to provide transport for Armenian-Azeri trade.

Transshipments Using Rail

Armenia's rail system also could carry transshipments of freight bound to or from Azerbaijan. Again, the routing through Georgia[4] would obviate the need for direct

[3] There is an east-west line directly connecting Armenia and Azerbaijan between Ijevan and Qazax. Much of the overhead cables in Armenia have been removed. The condition on the Azeri side is not known.

contacts between Armenian and Azeri officials. Also as with the preceding discussion on roadways, there would have to be non-discriminatory treatment of cargoes and fees would likely have to be at or near cost levels. It should be noted that the Armenian rail system is severely underutilized and any traffic which contributes above the marginal costs of the movement would be beneficial.

Eliminating the Need for the Akhalkalaki-Kars Rail Line

For over 10 years, Georgia, Azerbaijan, and Turkey have considered building an alternative rail link between the Caucasian railroads and the Turkish rail system. Estimated costs for constructing the line have varied from around $400 million to $800 million. Relative to the existing gateway near Gyumri, the new line would offer no distance advantages and traverse more rugged terrain. That the proposed line has merited serious consideration over an extended period is indicative of the international value of the gateway near Gyumri.

Access to Nakhichevan

Nakhichevan is an Azeri enclave separated from the rest of Azerbaijan by Armenia. Unlike the rest of Azerbaijan, there was virtually no fighting or land occupations during the 1988-94 war with Armenia.[5] In addition, Nakhichevan is a small and relatively poor part of Azerbaijan with a population of about 350,000. As such, it does not pose a credible military threat to Armenia. Another difference is that Azerbaijan closed the border between Armenia and the main part of Azerbaijan, but not Nakhichevan. It was Armenia which closed the border on Nakhichevan in retaliation for the Azeri action. So, that portion of the closed border is at Armenia's, not Azerbaijan's, discretion to modify or eliminate.

For all of these reasons, it might be easier to effect a partial opening of the border between Armenia and Nakhichevan, than with the rest of Azerbaijan. This might be conceived of as Stage III of a phased opening. The northern road and rail crossing between Armenia and Nakhichevan is in an open, sparsely populated area which could be easily controlled (see Figure 5, passage A7). Armenia might consider offering to open that crossing for Turkish carriers transiting Armenia as well as for transits by rail. A USAID study indicated that there would be minimal costs returning this line to service (see Box 1).

In addition to being a possible concession during negotiations for opening its border with Turkey, relaxing its border closure with Nakhichevan could yield additional benefits for Armenia and the region. Through Nakhichevan is a lower and shorter (by approximately 55 kilometers) roadway connecting northern Armenia with (its southernmost) Meghri Marz and with Iran. Parallel to this roadway is a heavy duty rail line. That rail line also connects to the Iranian system south of Jolfa (although the condition and even the existence of that rail line must be checked).

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[4] In 1998 and 1999, Armenia and Azerbaijan explored this possibility. It was not acted upon because of other issues extant at that time.

[5] The most significant exception was the occupation by Armenia of the enclave village Karki. It is known in Armenia as Tigranashen.

Language could be put into an agreement for a phased expansion of transit for the purpose of providing Azerbaijan with better access to Nakhichevan to also allowing transit for non-Armenian trade with and through Iran and, finally, for Armenian trade with Iran as well as shipments to and from Meghri Marz.

Figure 5. Opening Border Crossing with Nakhichevan, Stage III

Box 1: Rail Line Between Masis And The Nakhichevan Border

This 53 km section was inspected by road between Masis, just south of Yerevan and Yeraskh which is at the Nakhichevan border. The border is closed and we were prohibited from approaching nearer than about 200 meters. We were advised that during the Soviet era up to 2,500 loaded wagons were carried over this line daily while currently there are only a few local passenger trains. The line is single track with passing loops at each station. The signal system is not working between stations, though manually operated signals at the stations are in service. According to Armenian railway officials this line can be operated without the between-station signals, though this would create delays if traffic levels became very high.

The line is essentially flat and lightly curved. The track is heavy duty, with 65 kg/m rail supported by concrete and timber cross ties all in acceptable condition. The overhead traction system also appears to be in good condition.

Within Nakhichevan the railway does not have electric traction and diesels are used. (Indeed, we understand that this is the case along the entire "southern route" to within about 100 kilometers of Baku.) Prior to the conflict between Azerbaijan and Armenia, the exchange between diesel and electric locomotives took place 10 kilometers within Nakhichevan, at the limit of the electrified system. From our vantage point, it was evident that the contact wire and perhaps their supporting arms have been removed within Nakhichevan. If cross-border traffic began again, the cost of replacing the wire (and, possibly, their supports) could be avoided simply by having the diesel/electric exchange at Yeraskh. As far as we could see into Nakhichevan, the track appears to be in good condition. Just on the Armenian side of the border there is a pile of debris over the track, approximately 3 meters high and with a diameter of 6 meters. Presumably the pile was built for military purposes. It would take a work crew a few days to clear this. Most likely the track underneath is unharmed, but even if not; replacement of this short distance would involve minimal costs.

Source: Beilock, Mosel, Ball, Der-Boghossian and Neben, 1998, "Caucasus Transportation Strategy Interim Report" report prepared for USAID, IRIS Caucasus, Yerevan, pp. 22-23.

Table 1 summarizes savings in distance for travel between Baku and destinations in Turkey that will result from opening Armenian-Turkish border. The table lists current routs used for transportation of cargo, as well as the routs that will be available with open border.

Table 1. Routes between Azerbaijan and Turkey before and after border opening

	Routes	Closed border	Open border
Baku–Kars	Road	Baku-Tbilisi-Kars (991 km)	Baku-Tbilisi-Gyumri-Kars (869 km)
	Rail	No railroad connection	Baku-Tbilisi-Gyumri-Kars (around 900 km)
Baku – Istanbul	Road	Baku-Tbilisi-Batumi-Istanbul (2280 km)	No better routes
	Rail	All rail – not available	Baku-Istanbul (around 3000-3500 km)
	Road/Rail + sea	Baku-Batumi-Istanbul, (975 km + 1100 km)	No better routes
Baku–Igdir	Road	Baku-Tbilisi-Kars-Igdir (1130 km)	Baku-Tbilisi-Yerevan-Igdir (892 km)
	Rail	No railroad connection	No railroad connection
Baku– SE Turkey	Road	Baku-Tbilisi-Akhaltsikhe-Kars- City A	Baku-Tbilisi-Gyumri-Kars-City A will save 122 km
	Rail	No railroad connection	No railroad connection
Baku– Erzrum	Road	Baku-Tbilisi-Erzrum (1197 km)	Baku-Tbilisi-Gyumri-Erzrum (1075 km)
	Rail	No railroad connection	Baku-Tbilisi-Gyumri-Erzrum, (about 1100-1200 km)
Baku – places W of Erzrum	Road	Baku-Tbilisi-Akhaltsikhe-Erzrum-City B	Baku-Tbilisi-Gyumri-Erzrum-City B will save 122 km
	Rail	No railroad connection	Railroad distances comparable with road distances for most destinations

Note: Appendix provides maps of different routes discussed in this section.

Table 2. Routes between Azerbaijan and Nakhichevan before and after Border Opening

Routes		Closed Border	Open Border
Baku – Nakhichevan	Road	Baku-Tbilisi-Kars-Nakhichevan (1260 km) OR Baku - Pars Abad (Iran) – Nakhichevan (576 km, however, not a major roadway)	Baku-Tbilisi-Yerevan-Nakhichevan (966 km)
	Rail	No railroad connection	Baku-Tbilisi-Yerevan-Nakhichevan (around 1000 km) NOTE: A more direct routing exists through the territories in southern Azerbaijan and Armenia. Its use, almost surely, would require an overall settlement of the Karabakh dispute.

Georgia

Georgia is, perhaps, the only nation which may be economically a net loser if the Turkish-Armenian border were reopened, at least in the short run. Because of the Closed border, Georgia has had a virtual monopoly over surface freight movements to and from Armenia. Exploiting this advantage, for many years Georgia levied surcharges on rail freight to and from Armenia and neglected the road and rail infrastructures near the Armenian border. In recent years, however, some maintenance and upgrading have been done near the border. Also, it should be noted that Georgian government has taken steps to lower transit fees for Armenian trade, and also to limit unofficial payments on the road.

In addition to its current control over surface movements to and from Armenia, virtually all freight moving between the West and Azerbaijan (including transit traffic through Azerbaijan from Central Asia) uses Georgian roads or rails and its ports.

With open borders between Turkey and Armenia, the Turkish road system, as well as its ports could offer competition. For example, the road distance between Yerevan and Poti, Georgia is 610 kilometer, versus 672 kilometers from Yerevan to Trabzon, Turkey. It should be noted that Trabzon is approximately 200 kilometers further west than Poti, more than compensating for the slightly longer road distance.

While stiff competition from Turkish Black Sea ports might be expected for Armenian imports and exports, Georgian ports would likely still dominate for freight moving through a Black Sea port and to or from Baku (and points east). Depending upon the routing, the road distance between Baku and Trabzon is 350 to 800 kilometers further

than to Poti. Moreover, only the Georgian ports offer rail access to Baku. So, open borders between Armenia and Turkey may reduce the volumes and/or premiums possible for Georgia to realize on Armenian transit traffic, but is unlikely to threaten its most important transit role, providing the link between Azerbaijan and points east to the Black Sea.

And there could be benefits for Georgia. If transit traffic through Nakhichevan were permitted, Georgian importers and exporters would benefit from improved access to Iran and the Gulf States, see Figure A2. This area currently accounts for 3% percent of Georgia's two way trade or approximately 71 million US dollars worth of goods (UN COMTRADE, 2004). Some of this moves by trucks through Armenia, with virtually all of the remainder transiting Azerbaijan. An accommodation allowing transits through Nakhichevan would lower the route distance by 55 kilometers and avoid significant mountain barriers. Moreover, if rail transits through Nakhichevan were also allowed and feasible, Georgia would have rail access to Iran and the Gulf States.

Both to expedite its own trade and as a north-south transshipment corridor, the benefits of rail and improved road access to Iran and the Gulf States could grow significantly over time if and as the Gulf States recover from the Iraq conflict and/or rail and road access to Russia is restored through Abkhazia.

Turkey already is one of Georgia's most important trading partners. Georgian importers and exporters would also benefit from improved road access to some parts of Turkey and the realization of rail access to that country, see table 3.

Besides some changes in the volume of Armenia-Turkey trade going through Georgia, there is a possibility of negative effects of export diversion for Georgia when Armenian-Turkish border opens. To a lesser extent this also concerns other countries in the region that might face new competition from Armenian products in Turkish markets. The degree to which these countries are affected will depend critically on how much overlap there is between their exports and that of Armenia.

Table 3. Routes between Tbilisi and Turkey and Iran before and after Border Opening

Routes		Closed Border	Open Border
Tbilisi-Kars (Turkey)	Road	Tbilisi-Akhaltsikhe-Kars, (330 km)	Tbilisi-Gyumri-Kars (283 km)
	Rail	No railroad connection	Tbilisi-Gyumri-Kars (around 300 km)
Tbilisi-Tabriz (Iran)	Road	Tbilisi-Yerevan-Meghri-Tabriz (750 km)	Tbilisi-Yerevan-Nakhichevan-Tabriz (600 km)
	Rail	No railroad connection	Tbilisi-Yerevan-Nakhichevan-Tabriz (600 km)

Note: Appendix provides maps of different routes discussed in this section.

It is feasible to determine the extent to which the export composition from a given pair of countries overlaps by using export similarity technique, also known as Finger-Kreinin Index (FKI). The FKI estimates export similarity by calculating the relative importance of various commodities in the export structure of country pairs, and then using a filtering technique, that is:

$$(1)\quad S = \sum_j \min\left([X_{ja} / \sum X_{ja}], [X_{jb} / \sum X_{jb}]\right)$$

Where:
j indexes trade by commodity
a and *b* are two countries of interest

The first ratio is the share of product *j* in country *a*'s total export and the second ratio is the share commodity *j* in country *b*'s exports. If those shares are equal, then the ratio in the formula would sum to one, indicating perfect similarity. If they are totally different, the result will be zero. Thus the index ranges from 0 to 1.

Table 4 lists FKI values calculated for Armenia-Georgia exports to EU-25 in the year 2004, as well as for Armenia-Azerbaijan and Azerbaijan-Georgia exports to EU-25 for the same year. The choice of EU-25 as the export market is explained by the fact that trade with Turkey is (will in the case of Armenia) be conducted according to EU customs Union rules. Hence, looking at exports of our countries of interest going to EU-25 will convey a good idea about how close in composition are these export flows. In addition, trade with EU-25 has not been extremely distorted by the situation in the South Caucasus and to some extent it reflects the current comparative advantages of countries in that region. And finally, EU-25 trade accounts for a large share of trade in all three countries of the Caucasus.

Based on 3-digit level data analysis using equation (1) above, we can conclude that overall Armenian and Georgian export flows to the EU in 2004 did not have a big overlap: FKI is calculated to be 0.182, which indicates a very low level of product overlap in export commodities. This suggests that Armenian and Georgian goods are not very close substitutes in European markets and, presumably, the same might be expected with respect to Turkey.

To identify in which industries there might be competition between Armenian and Georgian goods we look at FKI values calculated separately for each industry[6] following formula (1), where aggregation is done within each industry. These results are summarized in Table 4, and as can be seen the highest values of the index are calculated to be 0.717 for industry SITC 2 (Crude Materials, Inedible, except Fuels) and 0.343 for industry SITC 6 (Basic Manufactured Goods). This indicates a high degree of overlap in Armenian and Georgian exports of crude materials and a moderate degree of overlap in exports of manufactured goods. However, products that are similar in exports from these two republics include such items as ferrous waste and scrap, copper ores and concentrates, ore concentrate base metals, pig iron, and aluminum. Since the share of some of these categories in overall exports is low, while some other

[6] Industries are defined according to SITC Rev.3 classification. See Table A1 in the Appendix for a short description of each industry.

categories of goods are homogeneous in nature (i.e., copper, aluminum, etc.), and considering the large size of Turkish market, competition between Armenia and Georgia is not a significant issue.

Table 4. Finger-Kreinin Index of Export Similarity (3-digit SITC, 2004)

Country Pair ↓→	Armenia	Georgia	Azerbaijan
Armenia	---	0.182	0.006
SITC 0	---	0.010	0.036
SITC 1	---	0.096	0.623
SITC 2	---	0.717	0.007
SITC 3	---	0.000	0.000
SITC 4	---	0.000	0.000
SITC 5	---	0.034	0.033
SITC 6	---	0.343	0.076
SITC 7	---	0.053	0.028
SITC 8	---	0.062	0.034
SITC 9	---	0.139	0.874
Georgia	0.182	---	0.375
SITC 0	0.010	---	0.790
SITC 1	0.096	---	0.469
SITC 2	0.717	---	0.062
SITC 3	0.000	---	0.646
SITC 4	0.000	---	0.000
SITC 5	0.034	---	0.051
SITC 6	0.343	---	0.241
SITC 7	0.053	---	0.378
SITC 8	0.062	---	0.153
SITC 9	0.139	---	0.109
Azerbaijan	0.006	0.375	---
SITC 0	0.036	0.790	---
SITC 1	0.623	0.469	---
SITC 2	0.007	0.062	---
SITC 3	0.000	0.646	---
SITC 4	0.000	0.000	---
SITC 5	0.033	0.051	---
SITC 6	0.076	0.241	---
SITC 7	0.028	0.378	---
SITC 8	0.034	0.153	---
SITC 9	0.874	0.109	---

Source: COMTRADE direction of trade, Authors' Calculations.

From our discussion it follows that development of Armenian trade relations with Turkey will not have a very strong diversion effect on trade between Georgia and Turkey, at least in the short- to medium-run.

To complete our discussion of this issue we look at export overlap that currently exists between Georgian and Azeri trade. If anything, this will provide us with some baseline for judging the level of Georgia-Armenia export competition. As it follows from Table

4 Georgian and Azeri exports to EU-25 has much bigger overlap than in the case of Georgia and Armenia. The value of FKI being 0.375 suggests significant level of competition between Georgian and Azeri goods in European markets. This competition is particularly strong in industries SITC 0 (Food and Live Animals) and SITC3 (Fuels, Lubricants, etc.) where FKI is 0.790 and 0.646 respectively, and is moderate in industries SITC 1 (Beverages and Tobacco), SITC 6 (Basic Manufactured Goods), and SITC 7 (Machines, Transport Equipment) with the FKI being equal to 0.469, 0.241, and 0.378 respectively. As for products that overlap in exports from these two countries, there are some goods that can potentially compete in foreign markets, for example, fruit, nuts, non-alcoholic beverages, engineering equipment, metalworking machinery, mechanical handling equipment, and also goods that will not suffer from competitive pressure, for example, petroleum oils and aluminum.

Hence there is much stronger competition between Georgian and Azeri goods than there is between Georgian and Armenian goods, at least in EU-25 markets. As Armenia-Turkey border opens, there will be no sizeable competitive pressure on Turkey-Georgia trade. To a greater extent this is also true for Turkey–Azerbaijan trade, which will be even less affected by Armenian exports to Turkey (FKI for Armenia-Azerbaijan is only 0.006, which indicates an extremely low level of overlap in exports from these countries).

Russia, Iran and the Gulf States

In addition to improved access to destinations in Turkey, opening the border will allow shortening of travel distances to Iran (to Tabriz, by road) Syria (to Aleppo, by road and rail), Lebanon (to Beirut, by road and rail) and further to the south. Railroad from Gyumri will allow convenient access to Greece (Thessaloniki) and other European counties.

If passage to Nakhichevan is also opened, communication between Armenian south-eastern territories and “mainland” Armenia will become easier. Table 5 summarizes distance savings in travel between Armenia and these additional destinations.

These benefits would be magnified if road and rail transits through Abkhazia were also restored.

Table 5. Routes for travel between Armenia and Selected Destinations in the Region before and after Border Opening

Routes		Closed Border	Open Border
Yerevan-Meghri	Road	Yerevan-Meghri (311 km, including a steep 2,438 meter high pass)	Yerevan-Nakhichevan-Meghri (256 km)
	Rail	No railroad connection	Yerevan-Nakhichevan-Meghri (around 260 km)
Yerevan-Tabriz	Road	Yerevan-Meghri-Tabriz (300 km of bad road in Armenia + 200 km of bad road in Iran)	Yerevan-Nakhichevan-Tabriz (350 km)
	Rail	No railroad connection	Yerevan-Nakhichevan-Tabriz (350 km)
Yerevan-Beirut	Road	Yerevan-Akhaltsikhe-Beirut (2095 km)	Yerevan-Igdir- Aleppo-Beirut (1625 km)
	Rail	No railroad connection	Gyumri-Kars-Aleppo-Beirut (around 2000 km)
Yerevan-Aleppo	Road	Yerevan-Akhaltsikhe-Aleppo (1595 km)	Yerevan-Igdir-Kilis-Aleppo (1125 km)
	Rail	No railroad connection	Gyumri-Kars-Aleppo (around 1500 km)
Yerevan-Thessaloniki	Road	Yerevan-Batumi-Istanbul-Thessaloniki (around 3000 km)	Yerevan-Kars-Istanbul- Thessaloniki (around 2600 km)
	Rail	No railroad connection	Yerevan-Kars-Istanbul- Thessaloniki (around 2700 km)

Estimating Changes in Regional Trade Pattern

The discussion in this section will provide some estimates of volumes of potential trade flows between countries in the region after opening Armenia's border with Turkey.

The most general approach to assess bilateral trade potential of a pair of countries is to employ a gravity type model for a wide range of countries to estimate volume of trade

between countries of interest and to compare it with the actual trade flows. We follow this approach and estimate a gravity model for a very specific sample of countries which includes Transition Economies (TEs) and a range of developed countries, see below.

After obtaining our gravity model estimates we calculate the increase in trade volume that will result from border opening. This increase will come from:

- Shorter distance
- Common border

Basically, we want to use the results from a gravity model to estimate the impacts of 'moving' a 'country' the size of eastern Turkey from a distance equivalent to the circuitous distance necessary due to the Closed border to being closer and also adjacent.

To see the effect of border opening on trade with different provinces, we perform our analysis on the province level. Each province is viewed as a separate country, with its capital being the center of economic activity. This approach adds to our understanding of border opening effects on specific provinces in Eastern Turkey.

General Gravity Model

To assess potential trade flows between Armenia and Turkey we develop and estimate a gravity model and then use the results to predict trade volumes between these two countries. Despite the fact that there are numerous similar models that have been estimated in the literature and could be used for our analysis, we believe that developing our own model is important for obtaining results based upon data which is the most germane possible to examining impacts of opening the Turkish-Armenia border. To achieve that we estimate our model using a sample of transition countries, developed European countries, Turkey, and Israel. The model is estimated for 1999 data, and then we use 2004 data for regressors to estimate volume of trade for 2004.

Our estimations are performed using the following formulation of the gravity model:

$$\begin{aligned}&\log(PX_{aij}) = \beta_0 + \beta_1 * \log(GDP_i) + \beta_2 * \log(GDP_j) + \beta_3 * \log(gdp_i) + \beta_4 * \log(gdp_j) + \\ &+ \beta_5 * \log(Skill_i / L_i) + \beta_6 * \log(Land_i / L_i) + + \beta_7 \log(Dist_{ij}) + \beta_8 * \log(Mkt_{ij}) + \\ &+ \gamma_1 * Brdr_{ij} + \gamma_2 * FTA_{ij} + \gamma_3 * \mathrm{Reg}1 + \gamma_4 * \mathrm{Reg}2 + \gamma_5 * \mathrm{Reg}3 + \gamma_6 * \mathrm{Reg}5 + \gamma_7 * \mathrm{Reg}6 + \varepsilon_{ij}\end{aligned}$$

In this equation exporter GDP is a proxy for *i*'s national output in terms of units of capital,[7] exporter's GDP per capita is a proxy of *i* 's capital-labor endowment ratio. Importer GDP is *j*'s national income. Importer's GPD per capita is *j*'s per capita income. Skill per worker and land per worker measure exporter's endowments of skill and natural resources. Further, a dummy variable, indicating the presence of free trade agreements (FTA), and EBRD markets and trade restructuring indicator (*Mkt)* are used to proxy for trade restrictions. $Dist_{ij}$ is distance between *i*'s and *j*'s capital cities, and

[7] Using exporter's GDP per capita as a proxy of exporter's capital-labor endowment ratio follows standard practice commonly used in literature. These two variables usually are highly correlated, which justifies the choice of a proxy variable we adhere to.

$Border_{ij}$ is a dummy variable for a common border or shoreline. Regional dummies are included to account for country specific differences in TE trade patterns not captured by other variables in the model. TEs are grouped into sub-regions based on geographic proximity to each other as well as their transition speed and depth. It is common to group TEs into FSU republics and Eastern Europe countries, where FSU can be further split into Baltic states, Caucasus, Asian States, and the central part of FSU, and Eastern Europe can be subdivided into Southern and Central parts. Table A1 in the Appendix lists TEs by sub-regions.

The main sources of trade data used in this study are the Supplement to the World Trade Annual, UN Statistical Division and UN COMTRADE database. We use total volumes of trade (SITC, Revision 3) for the year 1999 between 25 transition economies and 17 developed European countries, Turkey, and Israel. Table A2 in the Appendix provides the list of countries in our sample. Trade values are in thousands of US dollars converted from national currency to US dollars based on weighted averages of exchange rates (consult data source for additional details). Trade data are converted into real 1995 $US using the US Consumer Price Index from the World Development Indicators, the World Bank.

Exporter and importer GDP (billion PPP current $US) and GDP per capita (PPP current international $US) data are taken from World Development Indicators database, and are converted to 1995 real $US.

Exporter skill per worker is proxied by the Human Development Index (HDI) annually reported by the United Nations in its annual Human Development Report. HDI combines indicators of national income, life expectancy and educational attainment to give a composite measure of human progress, ranging from 0 (the least developed) to 1 (the highest development level). Compared to mean years of schooling, often used in the literature as a proxy for country skill level, HDI better reflects quality differences in human capital across countries by combining several indicators of human progress, including mean years of schooling. Land per worker (measured in square kilometers) is the ratio of country land territory and the total number of people in the workforce, as reported by the World Development Indicators.

Distance measures bilateral flying distance between capital cities in kilometers. Data on this variable are taken from the http://www.etn.nl/distance.htm website. The Markets and Trade index is an average of price liberalization, trade and foreign exchange system, and competition policy indicators developed by the European Bank for Reconstruction and Development (EBRD) among several other indicators to measure progress in transition in central and Eastern Europe, the Baltic states, and the CIS. More information on these indicators can be obtained from EBRD annual Transition Reports. The foreign trade agreements variable indicates the presence of such an agreement between a pair of countries (as a bilateral or as part of a multilateral agreement), and is composed based on WTO's list of Regional Trade Agreements notified to the GATT/WTO and in force. The border dummy indicates the presence of a common border or shoreline between a given pair of countries. Every pair of countries in our sample that is divided by at most one sea is considered to have a common shoreline.

Table A3 in the Appendix contains basic summary statistics for the model variables. Number of observations in our sample is 493 for imports into transition economies and 491 for exports from transition economies.

Tables A4 and A5 contain robust (heteroskedasticity corrected) OLS estimation results for aggregate TE exports and imports. According to these results, the model explains 81.5% of total variation in TE exports and 75.1% of total variation in TE imports. Most of the coefficient estimates are highly significant and are in line with results from similar gravity equation studies of aggregate trade flows.

To check the robustness of our results we estimated Armenia-Turkey trade volumes for 2004 and compared them to data reported by UN COMTRADE databases. Armenian imports from Turkey in 2004 was $37,498,051, very close to our estimate of $33,887,690 import volume in the case of closed border (border dummy=0, distance is taken between Ankara and Yerevan). Exports from Armenia to Turkey according to UN COMTRADE database were $1,200,233. Our model predicts $ 3,918,173 of exports from Armenia to Turkey in the case of closed border, which suggests that the overall effects of the Closed border are disproportionately affecting Armenian exporters, relative to those in Turkey.[8] This also suggests that Armenian exporters would benefit disproportionately from an end to the Closed border.

With an open border (border dummy is equal to 1) the estimated volume of Turkish imports is $51,041,170, some 50% higher than with closed border. If we adjust distance as well to reflect shorter travel time increase in trade volume is likely to be even higher. Based on our estimates, each 10% of reduction in distance (or equivalently, in transportation costs) will lead to 15.6% increase in imports from Turkey. As for Armenian exports to Turkey, the volume of trade is expected to go up to $5,404,574 which corresponds to 38% increase in exports. And again, this estimate does not take into account the effect of shorter distance, which will add another 12.6% to the volume of exports for every 10% reduction in transportation costs.

These estimates are for 2004 levels of GDP and GDP per capita, and resource endowments for Armenia and Turkey. The values of these variables for both countries continue growing due to: 1. High rate of GDP growth in Armenia, 2. Turkey's emphasis on increasing GDP and education levels to facilitate its integration into the EU. These factors are likely to have very pronounced positive effect on Armenia-Turkey trade relations. For example, considering the fact that GDP growth rates in 2005 in Turkey and Armenia were 5.6% and 13.9% correspondingly, Armenian exports to Turkey with open border would be 23.8% higher ($1.3 mln. increase), while Armenian imports from Turkey would be 20.8% higher (some $14 mln.) than calculated above. If Turkey successfully implements education reforms, that would improve its HDI ranking. As a result, trade with Armenia and other countries in the CIS will go up.

[8] There are several possible explanations for this. It may be that Armenian exporters are more reticent or face more Closed border-related bureaucratic or marketing barriers to target Turkish markets, than is the case for Turkish exporters to target markets in Armenia. Another explanation is that Armenian importers have fewer alternatives to Turkish goods than do Turkish importers to Armenian goods. If true, Turkish importers can more easily avoid Closed border-related impediments or aversions.

In addition, we should take into consideration the fact that with open border there will be railroad connection between Armenia and Turkey, which is not reflected in our model. Hence, there is another important factor that will influence trade volumes between our two countries.

Conclusion

This paper discusses a phased strategy for opening the Armenian-Turkish border in a way that is economically beneficial for the immediate participants of this process, as well as for other affected countries. We propose to open two passages to Turkey, namely passage A1 South-West of Metsamor near Yerevan and passage A2 South-West of Gyumri, as the initial step in border opening process.

These two passages are located near Armenia's main population centers and east-west transit routes. Initially, when traffic volumes are not too high, these passages would be enough for facilitating trade between Armenia and Turkey. Experience gained by Armenia and Turkey from operating and operating these passages can be used to open additional border crossings, as need arises.

We discuss the effect of border opening for countries in the region that will be affected by this change. In particular, we discuss some of the implications of border opening for Armenia and Turkey, as well as for Azerbaijan, and Georgia and to lesser extents, for Iran, Russia, and the Central Asian Republics.

This study assumes that borders between the main part of Azerbaijan (i.e., not including Nakhichevan) and Armenia will remain closed. Fortunately, the main east-west rail line and roadway connect Armenia and Azerbaijan via Georgia. Hence, Azeri freight could pass through Armenia without crossing a common border. In addition to improved road access to destination markets, Azeri trade would benefit from re-opening of the railroad going through Armenia and linking to Turkish railroad system. To increase benefits to Azerbaijan from opening the border, Armenia could also consider a partial opening of the border between Armenia and Nakhichevan. This would provide Azerbaijan with road (using Turkish or other third country carriers) and rail access to Nakhichevan.

Because of the closed border, Georgia has had a monopoly over surface freight movements to and from Armenia. In addition, virtually all freight moving between the West and Azerbaijan (including transit traffic through Azerbaijan from Central Asia) uses Georgian roads or rails and its ports. While stiff competition from the Turkish road system and Turkish Black Sea ports might be expected for Armenian imports and exports when border opens, Georgian ports would likely still used for freight moving through a Black Sea port and to or from Baku (and points east). So, while open border between Armenia and Turkey may reduce the volumes of Armenian transit traffic through Georgia, it is unlikely to threaten Georgia's role as transit provider linking Azerbaijan and points east to the Black Sea.

Another important issue that arises in the case of open border between Armenia and Turkey is the competition Armenian products might potentially create for Georgian (and to less extent, Azeri) goods going to Turkish markets. To assess the effects of export diversion for Georgia and Azerbaijan when Armenian-Turkish border opens we

look at the similarity of exports from the South Caucasus Republics. We find that there is very modest overlap in the exports originating from Armenia and from Georgia, and hence the vast majority of products from these two countries are not direct competitors in foreign markets. This statement holds even stronger for Armenian and Azeri exports. If anything, there is a relatively big overlap in Georgian and Azeri exports abroad, meaning that these two countries face more serious competition from each other than they will from Armenia.

As our next step we study potential changes in trade flows between Armenia and Turkey when the border opens. We find that due to the closed border there is unused trade potential that can benefit both nations when the border is open. This assessment was made by estimating a gravity model for a sample of transition countries, developed European countries, Turkey, and Israel for the year 1999 and using the results to predict trade volumes between Armenia and Turkey in 2004. Our model explains 81.5% of total variation in exports 75.1% of total imports from transition economies; our results are highly significant and are in line with other similar studies. As a result, our model very closely predicts current (2004) trade volume for Armenia and Turkey, particularly so for Armenian imports of Turkish goods. As for Armenia exports, there is some unused potential that can be attributed to possible difficulties Armenian exporters face when trading with Turkey and some other factors. This suggests that Armenian exporters would benefit disproportionately from an opening of the border.

With an open border we estimate that the volume of Turkish imports will be $51,041,170, which is 50% higher than with closed border. In addition, each 10% of reduction in distance due to open border will lead to additional 15.6% increase in imports from Turkey. As for Armenian exports to Turkey, it is expected to go up by some 38% reaching $5,404,574.

The effect of a distance reduction by 10% on Armenian exports will bring an additional 12.6% increase in the volume of trade. These estimates are rather modest since they do not include the effect of changes in some other model variables on trade flows between Armenia and Turkey. As GDP and GDP per capita for Armenia and Turkey continue growing they will contribute to further expansion of trade flows between these two countries. For example, high GDP growth rates in 2005 in Turkey and Armenia (5.6% and 13.9% correspondingly), would result in 21-24% increase in predicted Armenian-Turkish trade volume. In addition, Turkey's strong emphasis on education reforms will further contribute to expansion of trade between our two countries.

APPENDIX 1.

Table A1. Description of industries (SITC Rev.3)

Industry code	Industry name	Description
SITC0	Food and Live Animals	Goods in this category include products of farming, (semi)processed food and other agricultural products.
SITC1	Beverages and Tobacco	Includes alcoholic and non-alcoholic beverages, manufactured and unmanufactured tobacco.
SITC2	Raw Materials (excluding fuels)	This category includes minimally processed raw materials such as wood, skins of animals, crude minerals, metal ores, stone, and other similar items.
SITC3	Fuels	Main items here are petroleum oil and products, natural gas.
SITC4	Animal and Vegetable Oil & Fats	This is a small category, includes oil and fat of plant and animal origin.
SITC5	Chemicals	This industry list includes organic and inorganic chemical products, including pharmaceutical and perfumery products.
SITC6	Basic Manufactures	This category includes items that have undergone more advanced processing than items in category 2. Examples include: wood manufactures, paper, leather items, textiles, more processed metal (aluminum, copper, etc.), some basic equipment such as tools.
SITC7	Machinery and Transport Equipment	This industry listing includes different equipment, such as electric and non-electronic equipment, data processing, telecommunication equipment, transportation.
SITC8	Miscellaneous Manufactures	This category includes more processed manufactured items compared to categories 6 and 2. Items in this category include: closing and footwear, watches, print materials, works of art, musical instruments, office supplies, etc.
SITC9	Goods not Classified by Kind	This category includes mail not classified by kind and special transactions not classified elsewhere.

Table A2. List of Sample Countries

Transition Economies	Partner Countries
Region 1: Caucasus	Austria
Armenia	Belgium (and Luxembourg)
Azerbaijan	Denmark
Georgia	Finland
Region 2: Asian republics of the FSU	France
Kazakhstan	Germany
Kyrgyzstan	Greece
Tajikistan	Iceland
Turkmenistan	Ireland
Uzbekistan	Israel
Region 3: Baltic States	Italy
Estonia	Netherlands
Latvia	Norway
Lithuania	Portugal
Region 4: BRUM	Spain
Belarus	Sweden
Russian Federation	Switzerland
Ukraine	Turkey
Moldova	UK
Region 5: Central-Eastern Europe	
Czech Republic	
Hungary	
Poland	
Romania	
Slovakia	
Macedonia	
Region 6: South-Eastern Europe	
Albania	
Bulgaria	
Croatia	
Slovenia	
Bosnia and Herzegovina	

Table A3. Summary Statistics

Variable	Mean	Stand. Dev.	Min	Max
Log of Real Exports to TE	9.76	3.11	0	16.29
Log of Real Imports from TE	9.11	3.62	0	16.09
Log of TE Real GDP	24.20	1.24	22.43	27.43
Log of Partner Country Real GDP	26.17	1.26	22.63	28.20
Log of TE Real GDP per Capita	8.40	0.66	6.80	9.55
Log of Partner Country Real GDP	9.88	0.32	8.66	10.14
Log of TE HDI	-0.27	0.67	-0.42	-0.13
Log of Partner Country HDI	-0.10	0.05	-0.29	-0.06
Log of TE Land/Labor	-3.35	0.86	-4.31	-1.25
Log of Partner Country Land/Labor	-3.76	1.22	-5.38	-0.44
Log of TE Markets and Trade Index	1.01	.024	0.26	1.25
Log of Bilateral Distance	7.53	0.67	4.03	8.82
FTA Dummy	0.36	0.48	0	1
Border Dummy	0.09	0.29	0	1
Caucasus Dummy (Region 1)	0.11	0.32	0	1
Asian Republics Dummy (Region 2)	0.19	0.40	0	1
Baltic States Dummy (Region 3)	0.12	0.32	0	1
BRUM Dummy (Region 4)	0.15	0.36	0	1
SE Europe Dummy (Region 5)	0.19	0.39	0	1
CE Europe Dummy (Region 6)	0.19	0.40	0	1

Note: BRUM – Belarus, Russian Federation, Ukraine, Moldova

Table A4. Generalized Gravity Equation Estimates, TE Imports from Europe and Turkey

Variable	Coefficient Estimate	Standard Error
Log GDP Exporter	1.15	0.06
Log GDP Importer	1.03	0.07
Log GDP per capita Exporter	0.19	0.68
Log GDP per Capita Importer	-0.07	0.19
Log HDI Exporter	1.09	4.82
Log Land/labor Exporter	-0.31	0.08
Log distance	-1.56	0.15
Log markers and trade Index	0.10	0.46
Common Border	0.41	0.21
Free Trade Agreement	0.67	0.22
Caucasus	0.72	0.25
Asian Republics of the FSU	-0.19	0.28
Baltic States	1.09	0.30
South-Eastern Europe	0.76	0.27
Central-Eastern Europe	0.21	0.29
Constant	-36.57	8.32
R-squared	0.8150	

Table A5. Generalized Gravity Equation Estimates, TE Exports to Europe and Turkey

Variable	Coefficient Estimate	Standard Error
Log GDP Exporter	1.21	0.12
Log GDP Importer	1.25	0.07
Log GDP per capita Exporter	-2.08	1.18
Log GDP per Capita Importer	-0.41	0.27
Log HDI Exporter	21.29	10.53
Log Land/labor Exporter	0.36	0.22
Log distance	-1.26	0.17
Log markers and trade Index	-0.17	0.60
Common Border	0.32	0.27
Free Trade Agreement	1.51	0.23
Caucasus	-1.72	0.65
Asian Republics of the FSU	-1.15	0.47
Baltic States	0.31	0.50
South-Eastern Europe	0.06	0.43
Central-Eastern Europe	-0.23	0.43
Constant	-14.78	15.26
R-squared	0.7512	

Figure A1. Routes between Azerbaijan and Turkey before and after border opening

Map Source: World Atlas at http://encarta.msn.com

broken line (⌐¬) – railroad

solid lines – road routes between Baku and Turkey with closed border

zigzag line (∿∿∿)– road rout between Baku and Kars with open border

Figure A2. Routes between Tbilisi and Kars (solid and broken lines) and Tbilisi and Tabriz before and after Border Opening (zigzag and dashed lines)

Map Source: World Atlas at http://encarta.msn.com

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