Trade Prospects between Turkey and Central Asian Countries

A Rudimentary Application of Gravity Model

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Abstract

In the context of international trade theory the gravity model states that the volume of trade between two trading partners is proportional to the product of their income and inversely related with the distance between them. Using only GDP and distance variable in a rudimentary way this paper shows that a possible economic cooperation (or union) between Turkey, North Cyprus and the Central Asian countries would not lead to significant gains for all parties except for North Cyprus. Central Asian countries cover Kazakhstan, Azerbaijan, Uzbek, Turkmenistan, Kyrgyzstan, and Tajikistan. Their relatively smaller economic sizes (compared with Turkey) and the long distances between them and Turkey make large bilateral trade volumes less likely. Still there could be some potential gains out of a new form of cooperation among the above mentioned countries in the area of international politics. However this aspect is not the main concern of the present paper.

1. Introduction

In this paper, along with the rudimentary application of the gravity model we also introduction the paper is organized in seven sections. In the second section the gravity model is introduced with a numerical example. In section three the same model is applied for eight countries: Turkey, Northern Cyprus, and Central Asian Countries over the period 2000-2007. In section three we review the actual trade data for Turkey for 2009. In section five an international comparison is also provided with the addition of some other countries to better evaluate the growth performance of Turkey and North Cyprus. Finally, section six states main conclusions and policy implications.

2. The Gravity Model

2.1 Origins

The origin of the gravity equation goes back to 1687, the Newton's "Law of Universal Gravitation" (Head, 2003). This law states that the attractive force between two objects i and j is given by

$$F_{ij} = G \frac{M_i M_j}{D_{ij}^2}$$ (1)

where
F_{ij} is the attractive force
M_i and M_j are the masses.
D_{ij} is the distance between the two objects.
G is the gravitational constant depending on the units of measurement for mass and force.

In the context of international economics the gravity model assumes that there is a strong empirical relationship between the size of an economy (measured by its GDP, or population, or both) and the volume of its imports and exports. For bilateral trade volume in addition to the economic size of trading countries, the distance between them also affects the volume of total trade. However the distance plays a negative role as opposed to the size of the economy.

The simplest version of the gravity model is expressed by the formula

$$T_{ij} = A * Y_i * Y_j / D_{ij}$$ (2)

where
A is a constant term.
T_{ij} is the value of trade between country i and country j.
Y_i is country i's GDP.
Y_j is country j's GDP.
D_{ij} is the distance between country i and country j.

"The reason for the name is the analogy to Newton's law of gravity: just as the gravitational attraction between any two objects is proportional to the product of their masses and diminishes with distance, the trade between any two countries is, other things equal, proportional to the product of their GDPs and diminishes with distance" (Kurugman and Obstfeld, 2006).

The empirical estimation of the gravity equation requires a new form as

$$T_{ij} = A * Y_i^{\alpha} * Y_j^{\beta} * D_{ij}^{\gamma} * e^{\omega} \qquad (3)$$

where

α is the elasticity of T_{ij} with respect to Y_i.

β is with respect Y_j, and γ is with respect D_{ij}.

An econometric estimation of Equation (3) can be obtained by the logarithmic transformation

$$\ln T_{ij} = \ln A + \alpha \ln Y_i + \beta \ln Y_j + \gamma \ln D_{ij} + \omega_{ij} \qquad (4)$$

In their book *International Economics: Theory and Policy*, Krugman and Obstfeld (2006) provide strong supportive evidences for the gravity theory. For example they point out that, in 2003, the trade between the US and Canada is more than (about 102%) the trade between the US and EU, though the size of the Canadian economy is roughly the same size as Spain (about 8% of EU total). Similar arguments go with Mexico as well. The size of the Mexican economy is equal to that of the Netherland's (about 5% of EU total) its trade with the US is more than 60% of US trade with EU. This fact verifies the negative effect of the distance on the volume of trade. They also show that the trade volumes between the US and the members of the EU are proportional to the size of their GDP.

2.2 A Numerical Example

Suppose the world consist of four big regions or countries, namely A, B, C, and D. The size of their income (GDP) with the world total is given in Table 1 below.

Country	Income, Y (trillions of $)	Income share, w (%)
A	20	0.50
B	10	0.25
C	6	0.15
D	4	0.10
Total	40	1.00

Table 1. World income and share of each country

Then we set the following assumptions:
a. Export from country i to country j is proportional to country i's income share and country j's GDP. In other words

$$T_{ij} = w_i Y_j \qquad (5)$$

Where

$w_i = \dfrac{Y_i}{\sum\limits_{i=1}^{4} Y_i}$, share of country i's GDP in world total (weight).

b. It can be verified that the second assumption implies the balanced trade between any pair of trading countries. Thus

$$T_{ij} = T_{ji} \qquad (6)$$

c. Transportation cost is zero for all destinations. That is to say the distance does not play any role in the volume of trade between any two economies. That is $\gamma = 0$.

d. Finally, it is assumed that in Equation (3), $\alpha = \beta = 1$

e. It can also be assumed that export or import of each country cannot exceed its GDP, but this may not be always the case.

Based on these assumptions one can obtain the following bilateral trade matrix (Table 2).

Destination	A	B	C	D	Total exp
A	-	5.0	3.0	2.0	10.0
B	5.0	-	1.5	1.0	7.5
C	3.0	1.5	-	0.6	5.1
D	2.0	1.0	0.6	-	3.6
Total imp	10	7.5	5.1	3.6	26.2

Table 2. Trade matrix for four-nation world (values of exports, $ trillion)

Using matrix notation, it can be shown

$$T = \hat{w}Y \qquad (7)$$

where
T is trade flow matrix.
$\hat{w}$ is the diagonal matrix made of income shares.
Y is income matrix.

In our example

$$\hat{w} = \begin{bmatrix} w_1 & 0 & 0 & 0 \\ 0 & w_2 & 0 & 0 \\ 0 & 0 & w_3 & 0 \\ 0 & 0 & 0 & w_4 \end{bmatrix} = \begin{bmatrix} .50 & 0 & 0 & 0 \\ 0 & .25 & 0 & 0 \\ 0 & 0 & .15 & 0 \\ 0 & 0 & 0 & .10 \end{bmatrix}$$

$$Y = \begin{bmatrix} 0 & Y_2 & Y_3 & Y_4 \\ Y_1 & 0 & Y_3 & Y_4 \\ Y_1 & Y_2 & 0 & Y_4 \\ Y_1 & Y_2 & Y_3 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 10 & 6 & 4 \\ 20 & 0 & 6 & 4 \\ 20 & 10 & 0 & 4 \\ 20 & 10 & 6 & 0 \end{bmatrix}$$

Thus premultiplying Y by $\hat{w}$ results the flow matrix of bilateral trade volumes; i.e., the symmetric matrix of trade flows in Equation 5 and Table 2.

$$T = \hat{w}Y = \begin{bmatrix} .50 & 0 & 0 & 0 \\ 0 & .25 & 0 & 0 \\ 0 & 0 & .15 & 0 \\ 0 & 0 & 0 & .10 \end{bmatrix} \begin{bmatrix} 0 & 10 & 6 & 4 \\ 20 & 0 & 6 & 4 \\ 20 & 10 & 0 & 4 \\ 20 & 10 & 6 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 5.0 & 3.0 & 2.0 \\ 5 & 0 & 1.5 & 1.0 \\ 3.0 & 1.5 & 0 & 0.6 \\ 2.0 & 1.0 & 0.6 & 0 \end{bmatrix}$$

Table 3 shows total exports and their shares in GDP for each country.

Country	Exports	Domestic use	GDP	Exp/GDP
A	10.0	10.0	20	0.50
B	7.5	2.5	10	0.75
C	5.1	0.9	6	0.85
D	3.6	0.4	4	0.90
Total	26.2	13.8	40	0.66

Table 3. The shares of exports in GDP

Table 3 reveals the fact that the size of foreign trade is relatively high for low income countries. It is the lowest for the country with the highest income.

2.3 Finding the value of constant A.

From the assumptions and the corresponding numerical example provided in the previous paragraph the simplest form of the gravity equation becomes

$$T_{ij} = A * Y_i * Y_j \tag{7}$$

Hence,

$$A = \frac{T_{ij}}{Y_i * Y_j} \tag{8}$$

which is a single constant for all values of i and j.

For example trade volume between A and B produces

$$A = \frac{T_{ij}}{Y_i * Y_j} = \frac{T_{AB}}{Y_A * Y_B} = \frac{5}{20*10} = 0.025$$

Another example is the trade between C and D.

$$A = \frac{T_{ij}}{Y_i * Y_j} = \frac{T_{CD}}{Y_C * Y_D} = \frac{.6}{6*4} = 0.025$$

Again this example produces the same value of A, 0.025.

Thus all the elements of trade matrix will satisfy the following equation

$$T_{ij} = 0.025 * Y_i * Y_j \qquad (9)$$

To verify Equation (9) for the trade flow between B and C for example

$$T_{BC} = 0.025 * Y_B * Y_C = 0.025 * (10) * (6) = 1.5$$

This number is the same with the element in the cell in row B and column C.

3. Application to Turkey and Central Asian Countries

To apply the example provided in the previous paragraph we assume that six countries from Central Asia, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Turkey, and North Cyprus can form an economic union. This is just a hypothetical case since Turkey cannot engage in any new economic union since it since it is a candidate to become a full EU member in a near future. Under such circumstances the trade creation effects of two hypothesized cases. In the first case we assume that the distance between each pair of these countries is one or $\gamma = 0$. In the second case we allow the distance play its adverse role on the volume of bilateral trade among the member states.

3.1 Distance Ignored

The possible members of the new economic union are shown in Table 4 below with their GDP and their respective shares in total income as a group.

GDP (Billions   % of total

of dollars)

1	Turkey	487.6	73.8
2	Kazakhstan	104.1	15.8
3	Azerbaijan	31.2	4.7
4	Uzbekistan	19.3	2.9
5	Turkmenistan	7.3	1.1
6	Kyrgyzstan	3.7	0.6
7	Tajikistan	3.7	0.6
8	NC	3.4	0.5
	Total	660.4	100.0

Table 4. Income share of states as a group, (GDP, 2007)

Then the share matrix can now be formed as follows

$$\hat{w} = \begin{bmatrix} .738 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & .158 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0.047 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & .029 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0.011 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & .006 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0.006 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & .005 \end{bmatrix}$$

Similarly the income matrix for the group is given below

$$Y = \begin{bmatrix} 0 & 104.1 & 31.2 & 19.3 & 7.3 & 3.7 & 3.7 & 3.4 \\ 487.6 & 0 & 31.2 & 19.3 & 7.3 & 3.7 & 3.7 & 3.4 \\ 487.6 & 104.1 & 0 & 19.3 & 7.3 & 3.7 & 3.7 & 3.4 \\ 487.6 & 104.1 & 31.2 & 0 & 7.3 & 3.7 & 3.7 & 3.4 \\ 487.6 & 104.1 & 31.2 & 19.3 & 0 & 3.7 & 3.7 & 3.4 \\ 487.6 & 104.1 & 31.2 & 19.3 & 7.3 & 0 & 3.7 & 3.4 \\ 487.6 & 104.1 & 31.2 & 19.3 & 7.3 & 3.7 & 0 & 3.4 \\ 487.6 & 104.1 & 31.2 & 19.3 & 7.3 & 3.7 & 3.7 & 0 \end{bmatrix}$$

Then the trade matrix for the whole group is calculated as in Equation (5) (Table 5 below).

Billion $	Turkey	Kazakhs	Azerba	Uzbek	Turkmen	Kyrgyzstan	Tajikistan	NC
Turkey	0.0	76.9	23.1	14.2	5.4	2.8	2.8	2.5
Kazakhstan	76.9	0	4.9	3.0	1.1	0.6	0.6	0.5
Azerbaijan	23.1	4.9	0	0.9	0.3	0.2	0.2	0.2
Uzbekistan	14.2	3.0	0.9	0	0.2	0.1	0.1	0.1
Turkmenist	5.4	1.1	0.3	0.2	0	0.0	0.0	0.0
Kyrgyzstan	2.8	0.6	0.2	0.1	0.0	0	0.0	0.0
Tajikistan	2.8	0.6	0.2	0.1	0.0	0.0	0	0.0
NC	2.5	0.5	0.2	0.1	0.0	0.0	0.0	0
Total Import	127.6	87.7	29.8	18.7	7.2	3.7	3.7	3.4

Table 5. Export Matrix, Gravity Model with Distance Ignored

Then the trade volume within the hypothetical union totals $281.8 billion with Turkey supplying/receiving (exporting/importing) $127.6 billion (45.5%, the highest) and TRNC supplying/receiving $3.4 billion (1.2% the lowest) of this total.

3.2 Distance taken into account

Table 6 shows the distances in thousands of kilometers between the capitals of the assumed member states of the union. This table can be referred as the distance matrix.

	Turkey	Kazak	Azerb	Uzbek	Turkm	Kyrgyz	Tajik	NC
Turkey	0.00	3.21	1.44	3.05	2.21	3.46	3.20	0.53
Kazak	3.21	0.00	2.05	1.11	1.80	0.95	1.46	3.52
Azerb	1.44	2.05	0.00	1.63	0.78	2.07	1.76	1.56
Uzbek	3.05	1.11	1.63	0.00	1.00	0.48	0.37	3.19
Turkm	2.21	1.80	0.78	1.00	0.00	1.48	1.02	2.25
Kyrgyz	3.46	0.95	2.07	0.48	1.48	0.00	0.66	3.63

Tajik	3.20	1.46	1.76	0.37	1.02	0.66	0.00	3.27
NC	0.53	3.52	1.56	3.19	2.25	3.63	3.27	0.00

Table 6. Distance Matrix in 1000 Kilometers (Between Capitals)

Dividing each element in Table 5 with the corresponding element in Table 6 one can obtain a new table which shows the full implication of the gravity model. It can be noted that this is an example of element by element multiplication of two matrices.

Table 7 shows the new and reduced trade volume for each member states after allowing for the adverse effect of distance.

Billion $	Turkey	Kazak	Azerb	Uzbek	Turkm	Kyrgyz	Tajik	NC
Turkey	0.0	23.9	16.0	4.7	2.4	0.8	0.9	4.8
Kazak	23.9	0.0	2.4	2.7	0.6	0.6	0.4	0.2
Azerb	16.0	2.4	0.0	0.6	0.4	0.1	0.1	0.1
Uzbek	4.7	2.7	0.6	0.0	0.2	0.2	0.3	0.0
Turkm	2.4	0.6	0.4	0.2	0.0	0.0	0.0	0.0
Kyrgyz	0.8	0.6	0.1	0.2	0.0	0.0	0.0	0.0
Tajik	0.9	0.4	0.1	0.3	0.0	0.0	0.0	0.0
NC	4.8	0.2	0.1	0.0	0.0	0.0	0.0	0.0
Imports	53.4	30.9	19.7	8.7	3.8	1.8	1.7	5.1

Table 7. Export Matrix, Gravity Model with Distance Taken into Account

Table 7 shows that when distance is taken into account, trade volume among the member states falls except for North Cyprus.

	Export without distance			Export without distance		
Billion $	Total	% of total	Exp/GDP %	Total	% of total	Exp/GDP %
Turkey	127.6	45.3	26.2	53.4	42.7	11.0
Kazak	87.7	31.1	84.2	30.9	24.7	29.7
Azerb	29.8	10.6	95.3	19.7	15.7	62.9
Uzbek	18.7	6.6	97.1	8.7	7.0	45.3
Turkm	7.2	2.5	98.9	3.8	3.0	52.3

Kyrgyz	3.7	1.3	99.5	1.8	1.4	48.1
Tajik	3.7	1.3	99.5	1.7	1.4	46.7
NC	3.4	1.2	99.5	5.1	4.1	148.0
Imports	281.8	100.0	42.7	125.1	100.0	18.9

Table 8. Comparison of trade volumes, without distance and with distance

Table 8 gives the comparison for each state. Proximity of North Cyprus to the biggest trading partner increases the possibility of more trade between the two. For that reason trade volume i.e. export (or import) share of North Cyrus in its GDP goes up from 99.5% to 148%. Figure 1 shows the same comparison in a column chart.
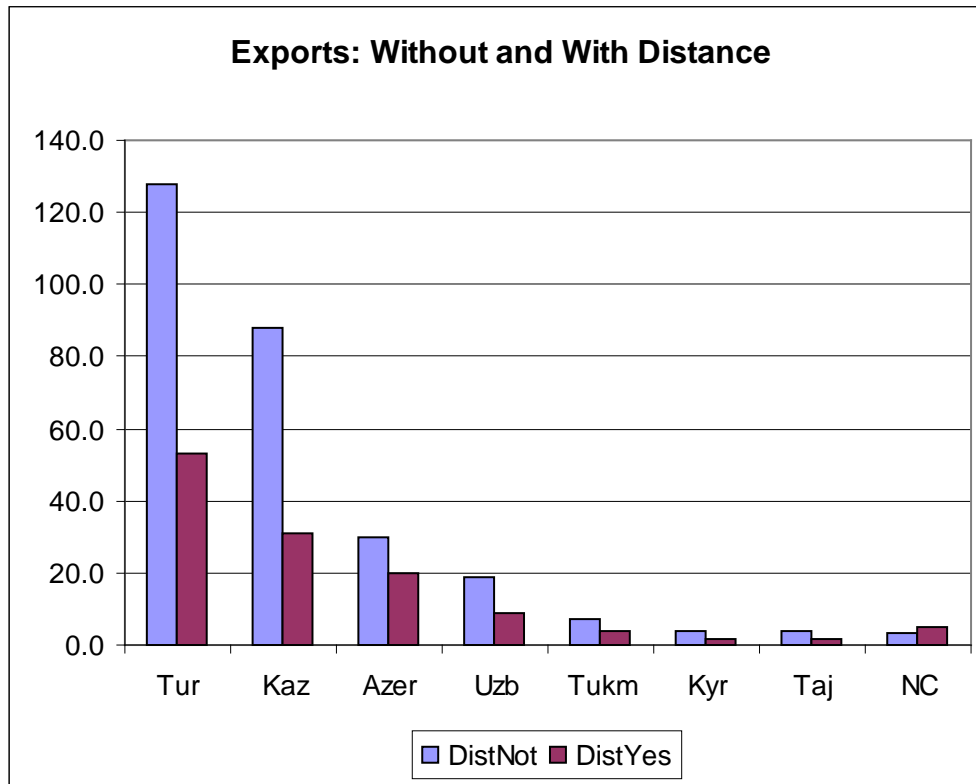

Figure 1.   Comparison of trade volumes, without and with distance

Now it can be concluded that when the distance is allowed to play its adverse role the total trade volume within the hypothetical union falls to $125.1 billion, 44.4% of the total with distance ignored. Turkey still gets the highest share (42.7%), but TRNC's share surprisingly jumps from 1.2% to 4.1%, and overtakes Turkmenistan, Kyrgyzstan, and Tajikistan.

"Why do the United States' North American neighbors trade so much more with the United Sates than its European partners? One main reason is the simple fact that Canada and Mexico are closer" (Krugman and Obstfeld, 2006). Similar reasoning can be applied for the trade volume between Turkey and North Cyprus.

3.3 Why distance matters

The adverse effect of the distance on the trade between any two countries is its positive contribution to the cost of transportation of the good. In most cases the cost of transportation increases even further if one of the countries is a landlocked one. This is so because the cost of maritime transportation is much lower than the cost of land or air transportation. Thus landlocked countries pay much more transport cost for their imports then those countries having sea links and ocean shores. For example in 1999 a 40-feet container shipped from Baltimore to Dar es Salam, the largest port city in Tanzania, 12500 km away from Baltimore cost $1000. The same container cost $4000 to Ankara, the capital of Turkey, a landlocked city, 8600 km away from Baltimore. Finally it cost $13000 to Katmandu (Nepal), a landlocked city, 12400 km to Baltimore, (World Bank, 2002). Clearly high transportation cost is a real barrier to trade sometimes more effective than trade sanctions, embargoes, or tariffs.

In relation to trade prospects between the Central Asian countries and North Cyprus, the gravity model leads us to focus on two disadvantages. One for the small size of the home country North Cyprus, the second is the long distance between the Central Asian countries and North Cyprus. For example the distance between Nicosia and Astana, the capital of Kazakhstan is 3304km, and the distance between Nicosia and Baku, the capital of Azerbaijan is 1382 km. Furthermore all of the Central Asian countries even with their big ports on the shores of Caspian Sea are landlocked countries. This fact adds more to transportation costs on trade and travel.

These conditions give way to think of a better option. That is to improve the trade relations between Turkey and North Cyprus. The simplest reason is the predictions of the gravity model. Turkey is only 80 km away from the Northern cost of North Cyprus, i.e., the distance between Taşucu, a port in Mersin (Turkey) and Kyrenia, one of two major ports in North Cyprus. Lights and mountains are visible on one side from the other side when the sky is clear over Mediterranean. Furthermore both population and GDP of Turkey are greater than the sum of each of these variables for all six Central Asian countries. Total population of these countries is 68.3 million while that of Turkey is 74.5 million, about 10% higher than this total. Similarly, the total GDP of these countries is $169.4 billion which is only 35.4% of Turkey's GDP of $487.5 billion. Furthermore coast to coast maritime transportation lowers the transportation cost between Turkey and North Cyprus to a possible minimum. Air transport between the two has also similar cost advantage. Finally, it can be noted that Turkey's GDP is relatively small country compared with the EU, the United States, and other big economies. Although it is a member of G20 its GDP is only 5% of the US GDP.

In relation to the gravity model it looks that not only the size of GDP but also the population of a country plays an important role on bilateral trade volumes. For example, concerning intra EU trade relations, Grassini (2008) suggests that, "If 'a harmonious, balanced and sustainable development of economic activities' is the leading principle of the European Union economic

policy, a country's economic size may be measured by the population". Thus, Turkey can play a central role to promote trade relations for the benefit of all Turkic nations in Central Asia at least for two reasons: The first is its relatively big size of population, the second is the size of its GDP.

4. Looking at the Actual Data

4.1 Turkey's Foreign Trade Data

4.1.1 Export

Table 8 shows export in value for the period January-July 2009

	Country	Value ($ Mn)	Share (%)	Change (yy, %)	Cumulat (%)
1-	Germany	5361	9.4	-34.1	9.4
2-	France	3390	6.0	-22.1	15.4
3-	United Kingdom	3017	5.3	-41.4	20.7
4-	Italy	3204	5.6	-40.1	26.4
5-	Iraq	2954	5.2	52.2	31.6
6-	USA	1789	3.2	-24.8	34.7
7-	UAE	1741	3.1	-63.5	37.8
8-	Spain	1449	2.6	-46.4	40.3
9-	Egypt	1778	3.1	122.2	43.5
10-	Russia	1679	3.0	-58.3	46.4
11-	Saudi Arabia	1008	1.8	-18.2	48.2
12-	Netherlands	1173	2.1	-42.6	50.3
13-	Romania	1176	2.1	-54.4	52.3
14-	China	705	1.2	-19.1	53.6
15-	Iran	1109	2.0	-10.4	55.5
16-	Algeria	1110	2.0	36.5	57.5
17-	Libya	956	1.7	52.0	59.2
18-	Belgium	974	1.7	-25.4	60.9
19-	Israel	851	1.5	-28.2	62.4
20-	Greece	937	1.7	-38.4	64.0
21-	Syria	733	1.3	20.8	65.3
22-	Azerbaijan	749	1.3	-20.5	66.7
23-	Bulgaria	756	1.3	-43.9	68.0
24-	Poland	661	1.2	-35.5	69.2
25-	Turkmenistan	477	0.8	48.4	70.0
26-	Ukraine	505	0.9	-61.7	70.9
27-	Austria	437	0.8	-29.1	71.7
28-	Georgia	434	0.8	-23.1	72.4
29-	Sweden	378	0.7	-33.3	73.1
30-	Switzerland	3165	5.6	76.9	78.7
31-	Kazakhstan	340	0.6	-36.6	79.3
32-	Malta	334	0.6	-43.5	79.8

33-	Slovenia	339	0.6	-22.5	80.4
34-	Turk Rep.Nor.Cyp.	399	0.7	-42.6	81.1
35-	Denmark	367	0.6	-41.5	81.8
36-	Lebanon	381	0.7	1.9	82.5
37-	Tunisia	299	0.5	-32.2	83.0
38-	Morocco	332	0.6	-50.2	83.6
39-	Jordan	229	0.4	-17.9	84.0
40-	Yemen	263	0.5	34.8	84.4
41-	Czech Republic	247	0.4	-43.6	84.9
42-	British Virgin Isl.	99	0.2	226.0	85.1
43-	India	223	0.4	-28.8	85.4
44-	Uzbekistan	151	0.3	-20.6	85.7
45-	Brazil	170	0.3	-9.4	86.0
46-	Canada	178	0.3	-13.1	86.3
47-	Hungary	215	0.4	-51.5	86.7
48-	Cayman Islands	30	0.1	245.0	86.8
49-	Ethiopia	132	0.2	17.9	87.0
50-	Singapore	126	0.2	-79.0	87.2
	Others	7260	12.8	-38.8	100.0
	Total	**56 770**	**100.0**	**-30.2**	

Table 9. Turkey's export by fifty selected countries (January-July, 2009)

4.1.2 Import Data

		Level ($ M)	Share (%)	Change (yy, %)	Cumulat (%)
1-	Russia	10381	13.9	-47.3	13.9
2-	Germany	7391	9.9	-37.2	23.8
3-	China	6542	8.7	-29.9	32.5
4-	Italy	4024	5.4	-43.8	37.9
5-	USA	4713	6.3	-31.3	44.2
6-	France	3763	5.0	-34.7	49.2
7-	Spain	2006	2.7	-31.2	51.9
8-	Iran	1814	2.4	-63.3	54.3
9-	United Kingdom	1798	2.4	-50.1	56.7
10-	Switzerland	962	1.3	-68.9	58.0
11-	Netherlands	1339	1.8	-33.0	59.8
12-	South Africa	652	0.9	-32.6	60.7
13-	Japan	1556	2.1	-40.2	62.8
14-	Belgium	1235	1.7	-39.6	64.4
15-	Ukraine	1808	2.4	-55.4	66.8
16-	South Korea	1700	2.3	-31.6	69.1
17-	Romania	1163	1.6	-53.8	70.7
18-	India	968	1.3	-38.3	72.0
19-	Saudi Arabia	968	1.3	-55.5	73.3
20-	Algeria	1189	1.6	-44.2	74.9

21-	Poland	915	1.2	-28.0	76.1
22-	Greece	637	0.9	-4.1	76.9
23-	Sweden	1110	1.5	-5.4	78.4
24-	U.A.E	333	0.4	19.0	78.9
25-	Iraq	462	0.6	-42.8	79.5
26-	Nigeria	345	0.5	-4.4	79.9
27-	Hungary	469	0.6	-42.9	80.6
28-	Austria	666	0.9	-29.6	81.5
29-	Taiwan	611	0.8	-41.8	82.3
30-	Czech Republic	528	0.7	-42.2	83.0
31-	Bulgaria	542	0.7	-57.8	83.7
32-	Ireland	483	0.6	-21.3	84.4
33-	Indonesia	538	0.7	-39.5	85.1
34-	Finland	483	0.6	-36.2	85.7
35-	Malaysia	490	0.7	-47.4	86.4
36-	Thailand	512	0.7	-43.9	87.1
37-	Slovakia	416	0.6	-29.4	87.6
38-	Kazakhstan	604	0.8	-63.6	88.4
39-	Israel	628	0.8	-34.8	89.3
40-	Canada	543	0.7	-25.0	90.0
41-	Egypt	354	0.5	-45.9	90.5
42-	Pakistan	342	0.5	2.1	90.9
43-	Azerbaijan	458	0.6	-19.7	91.5
44-	Denmark	354	0.5	-39.5	92.0
45-	Uzbekistan	198	0.3	-55.9	92.3
46-	Brazil	552	0.7	-35.9	93.0
47-	Norway	348	0.5	-21.1	93.5
48-	Bangladesh	259	0.3	17.7	93.8
49-	Portugal	214	0.3	-30.8	94.1
50-	Turkmenistan	137	0.2	-46.9	94.3
	Others	4266	5.7	-33.8	100.0
	Total	**74 769**	**100.0**	**-40.9**	

Table 10. Turkey's imports by fifty selected countries (January-July, 2009)

4.2 TRNC Foreign Trade Data

4.2.1 Export Data

Export to (% of total expo)	2001	2006
Turkey	38.2	45.6
UK	32.4	11.8
Russia	8.8	8.8
Kuwait	5.9	7.4
Ukraine	5.9	5.9

Free zone	2.9	4.4
Others	5.9	16.2
Total	100.0	100.0
Total exports (Mns of US$)	34	68

Table 11. TRNC's Percentage Distribution of Exports by Countries

Source: Data from State Planning Organization: *Statistical Yearbook   2006*

The value of exports by commodity groups is shown in Table 12 for 2006. Main export goods are Vegetables (mainly citrus) (34.3%), Live animal and animal products (24.3%), Prepared foodstuff, beverage and tobacco (%13.9), and Textile (11.5%).

Exported goods (% of total exports)	2006
Vegetables	34,3
Live animal and animal products	24,3
Prepared foodstuff beverage and tobacco	13,9
Textile	11,5
Base metal and metal products	8,0
Mineral products	3,5
Others	4,5
Total	100,0
Total exports (millions of US$)	68

Table 12. Value of Exports by Commodity Groups, Percent of Total, 2006

Source: Data from State Planning Organization: *Statistical Yearbook 2006.*

4.2.2 Imports of North Cyprus

Imports to North Cyprus by country of origin are shown in Table 13 for 2001 and 2007. For the flow of imports, like exports, the main trading partners of North Cyprus are Turkey and the UK. In 2007 Turkey provided more than two thirds (68.8%) of the total imports of $1376 millions. Although the UK is the second largest supplier of imported goods its share has declined from 10.7% in 2001 to 6.3% in 2007

Imports from (% of total imports)	2001	2006
Turkey	63.6	68.8
UK	10.7	6.3

Germany	4.4	4.4
Italy	3.3	1.7
Israel	2.9	3.1
Holland	1.5	2.2
USA	1.5	1.3
NIS*	0.7	0.2
Others	11.4	12.1
Total	100.0	100.0
Total imports (millions of US$)	272	1376

Table 13. Percentage Distribution of Imports by Country of Origin.

*Note: NIS: Newly Independent States.
Source: Data from State Planning Organization: *Statistical Yearbook 2006*

The value of imports by commodity groups is shown in Table 14 for 2006. The main import commodities are Mineral products (19.6%), Machinery and mechanical appliances, Electrical equipment and parts (14.8%), Vehicles and spare parts (13%), Basic metals and articles of basic metals (11.1%), and Prepared foodstuffs, beverages and tobacco (8.7%).

Imported commodities (% of total imports)	2006
Mineral products	19,6
Machinery and mechanical appliances, electrical equipment and parts	14,8
Vehicle , aircrafts, vessels	13,0
Base metals and articles of basic metals	11,1
Prepared foodstuffs, beverages and tobacco	8,7
Articles, stone, plaster, cement, asbestos	4,0
Chemical products	6,1
Textile	4,2
Plastics and rubber	3,6
Vegetables	3,5
Others	11,4
Total	100,0
Total Imports (millions of US dollars)	1376

Table 14. Value of Imports by Commodity Groups, Percent of Total

Source: Data from State Planning Organization: *Statistical Yearbook 2006*.

Tourism is an important dimension of the structure and openness of an economy. The number of tourists arriving in North Cyprus was 716 thousand in 2006, of which 80% are from Turkey. The total revenue obtained from tourism was $762 million. The distribution of incoming tourists by country of origin is given in Table 15. Around 1 thousand people arrived from Kazakhstan.

Country of origin	Thousands	% of total
UK	67	9.4
Turkish Cypriots (diasporas in UK)	32	4.5
Turkey	572	79.9
Germany	6	0.8
Switzerland	5	0.7
Kazakhstan	1	0.1
Others	33	4.6
Total arrivals (1000)	716	100.0

Table 15. Number of Tourists by Country of Origin in 2006 (Arrivals to TRNC)

Source: Data from State Planning Organization: *Statistical Yearbook 2006*

Another source of foreign currency earnings are foreign student fees and expenditures studying in six internationally recognized universities. These kinds of earnings are part of exports in education service (World Bank, 2002). In 2006-2007 academic year there were about 42 thousands students enrolled in these six universities. Of this total 67% comes from Turkey, 26% are citizens of TRNC, and the remaining 7% are from other countries, mainly North Africa (Table 16).

Categories (by nationality)	Number of students	% of total
Turkish students	28	67
TRNC	11	26
Other	3	7
Total (1000)	42	100

Table 16. Number Students in the Universities of TRNC, 2007

Source: Data from State Planning Organization (2000a, 2000b, 2000c, 2000

5. Comparison of Growth Rates among states

This section gives a brief account of economic state of 10 new countries in addition to 8 Turkic states. The growth rates of 18 economies together with some other economic indicators are given in Table 17.

	Population (Million)	GDP (Billion $)	Per capita GDP (Thousand $)	Real GDP growth rate %	
				Cumulative	Annual
Azerbaijan	8.6	31.2	3.7	216.3	16.5
Kazakhstan	15.4	104.1	6.8	96.9	9.7
China	1305.7	3400.4	2.6	95.2	9.6
Qatar	0.8	63.9	76.0	85.1	8.8
Tajikistan	6.7	3.7	0.6	80.6	8.4
India	1169.0	1141.3	1.0	66.4	7.3
TRNC	0.3	3.4	14.0	59.3	6.7
Russia	142.5	1289.6	9.1	55.4	6.3
Cuba	11.3	52.3	4.6	55.1	6.3
Uzbek	27.4	19.3	0.7	51.2	5.9
Turkmenistan	5.0	7.3	1.5	45.8	5.4
Singapore	4.4	161.3	36.4	43.3	5.1
Turkey	74.9	487.6	6.5	37.7	4.6
Kyrgyzstan	5.3	3.7	0.7	34.3	4.2
Greece	11.1	313.6	28.1	34.2	4.2
Cyprus	0.8	21.3	27.5	27.3	3.4
Malta	0.4	7.4	18.2	11.9	1.6
Haiti	9.6	5.9	0.6	2.7	0.4

Table 17. Basic Economic Indicators for 18 Countries, 2000-2007

Source: Data from UN (2008): http://unstats.un.org/unsd/economic_main.htm.; SPO (2008b).

The aim of this comparison is to show that notwithstanding with their trade relations economies can show different growth path as well as different state of development. Furthermore some economists, particularly politicians or government ministries both in Turkey and North Cyprus claim that the TRNC economy has shown outstanding growth performance in recent years, particularly after 2004. However Table 17 shows that this is not the case. Of those economies

six have shown higher growth rates than North Cyprus. These are listed in Table 18 with their annual growth rates over 2000 to 2007.

Period	Azerbaijan	Kazakhstan	China	Qatar	Tajikistan	India	TRNC
2000	11	10	8	9	8	4	-1
2001	10	14	8	3	10	5	-5
2002	11	10	9	7	11	4	7
2003	11	9	10	4	11	8	11
2004	10	10	10	21	10	8	15
2005	26	10	10	6	7	9	14
2006	35	11	11	10	6	9	13
2007	25	9	11	14	8	9	-2
Average	16.5	9.7	9.6	8.8	8.4	7.3	6.7

Table 18. Real GDP Growth Rates for Seven Economies, 2000-2007, %

Source: Data from UN (2008) http://unstats.un.org/unsd/economic_main.htm;; SPO (2008b).

Figure 2 shows the same comparison for the seven economies in the form of line charts from 2000 to 2007.
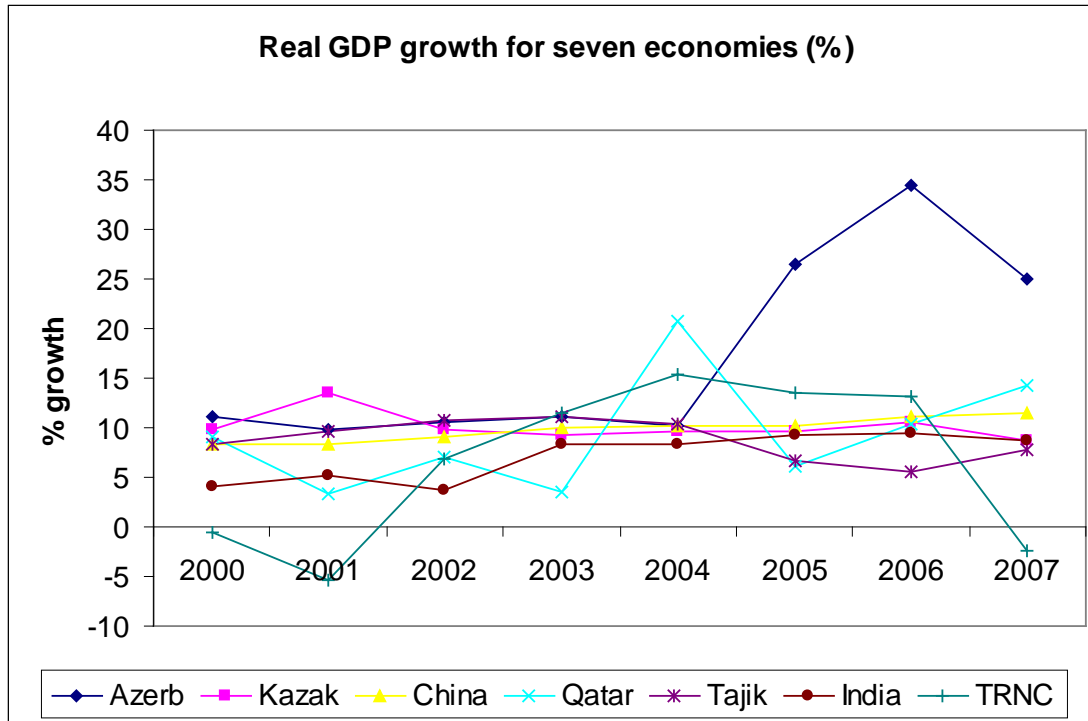
Real GDP growth for seven economies (%)

Figure 2. Real GDP Average Annual Growth Rates for Seven Economies (%)

Source: Data from UN (2008): http://unstats.un.org/unsd/economic_main.htm; SPO (2008b)

Without the foregoing comparison with some other economies one cannot appreciate the growth performance of the TRNC economy properly. Some economies have done better and some have not.

6. Conclusion

The paper explores the possibility of extending the foreign trade relations as well as the diplomatic ties between TRNC and the Central Asian Countries - Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. Our adherence to the gravity theory of international economics does not encourage us to expect considerable contributions of trade between these countries to the economy of North Cyprus. The main reason for this conclusion is that the natural barriers put by the long distance between the two parts which makes the trade more costly for the consumers on both sides. However if we think that trade can be diversified there can be some room for new markets in tourism, higher education, health service, and probably in construction. External demand from the Central Asian countries can boost the activities and revenues in these sectors in North Cyprus.

It should also be emphasized that, Inforum model can be adopted to explore the effects of such possible positive external shocks on the TRNC economy under different assumptions and scenarios. Without such a model one cannot appreciate and quantify the contributions of any new project to the economy.

Turkey, in addition to its regular monetary donations, with its relatively big economic size (in terms of both income and population) and its powerful position in international affairs makes it still the most contributory partner to the Turkish Republic of North Cyprus. The most likely contributions to North Cyprus of improved relations with the Central Asian countries will be the benefit of having new strategic alliances in international politics.

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