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Gravity Approach Applied to Central Asian Migration Flow

Canan ÇETİN*

Abstract

This essay attempts to discuss empirical results on determinants of international migration stock from the perspective of destination countries, Turkey and Russia, and applies the gravity model of migration to statistically test the migration stock from Central Asia (Kazakhstan, Kyrgyzstan, Turkmenistan, Afghanistan Tajikistan, Azerbaijan, Uzbekistan and Pakistan) for ten years periods between 1990 and 2013. This paper does not aim to describe historical events or bilateral relations between the Central Asian States with Turkey and Russia. The findings of the study unveil that area and population of the destination country, the distance between countries, difference in GDP, historical and cultural ties with the Soviet Union influence migration stock in Turkey and Russia.

Keywords: *Gravity Approach, Central Asia, Turkey, Russia, Corridor Country, Migration*

* Lecturer, Eskişehir Osmangazi University, Economics and Business Administration Faculty Department of International Relations, e-mail cetinc@ogu.edu.tr, ORCID: 0000-0001-6228-6313

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Orta Asya Göç Akımı'na Yerçekimi Kanunu Yaklaşımı

Canan ÇETİN*

Özet

Bu çalışma Orta Asya devletlerinden (Kazakistan, Kırgızistan, Turkmenistan, Afghanistan, Tacikistan, Azerbaycan, Özbekistan ve Pakistan)Türkiye ve Rusya'yı koridor ülke olarak kullanılarak Avrupa'ya giden uluslararası göç stoğunu istatistiksel olarak Newton'un Yerçekimi Kanunu modelini uluslararası göçe uygulamayı hedeflemektedir. Çalışma,uluslararası göçü 1990 ve 2013 yılları arasındaki onar yıllık periodlar şeklinde incelemektedir. Bu çalışmanın temel amacı tarihi olayları açıklamak ya da Orta Asya devletleriyle Türkiye ve Rusyanın ikili ilişkilerini incelemek değildir. Çalışmanın amacı, Yer Çekimi Kanunun önerdiği değişkenlere ek olarak eklenmiş kukla değişkenlerle Orta Asya'dan Avrupa'ya giden göçe yön veren parametreleri açıklamaktır. Çalışmanın sonuçları, varılan ülkenin nüfusu ve toprak genişliği, ülkeler arasındaki uzaklık, Gayrisafi Milli hasılalar arasındaki farklılık, ve tarihsel ve kültürel olarak Sovyetler Birliğine olan bağlılığın uluslararası göç stoğuna Türkiye ve Rusya'nın seçiliminde yön verdiği ve etkilediğini ortaya çıkarmaktadır. Çalışma yerçekimi kanunu uluslarası göç üzerinden bu bölgeye ilk kez uygulaması bakımından özgündür.

Anahtar Kelimeler: *Yerçekimi Kanunu, Orta Asya, Türkiye, Rusya, Koridor Ülke, Göç*

*Öğr.Gör. Eskişehir Osmangazi Üniversitesi İktisadi ve İdari Bilimler Fakültesi Uluslararası İlişkiler Bölümü, e-posta: cetinc@ogu.edu.tr, ORCID: 0000-0001-6228-6313

1. Introduction

For centuries, people have been migrating all over the world, especially after the Cold War migration increased year by year between both continents and countries (Kaplan, 2000). Presently, there is a huge human flow to Europe from Middle Eastern and Central Asian states (CAS) via Turkey or Russia due to several reasons, such as the civil war in Syria, undemocratic governments and low wages (Koser, 2007). According to UN statistics, there are more than 214 million people living abroad rather than in their country of birth (Unstats.un.org, 2015). Thus migration seems to be an emerging issue not only for Europe but also for the rest of the World, particularly for bridge countries, including Turkey and Russia. The main reason for migration from Middle Eastern Countries is undoubtedly abuse or violence of human rights, but there is no obvious reason for the Central Asian migration flow (Reisman, 1990). There are several factors that push or pull the migration from the countries. These can be divided into two different aspects based on their residential time, temporary migrants staying between three to 12 months such as tourism, temporary employment or business, and permanent migrants living for more than 12 months, but if someone stays less than three months, they are classified as visitors (UN, 2011).

This paper aims to research the causes of migration between Central Asian countries, Russia and Turkey. Apart from different migration theories which can be applied to migration in order to analyse from different approaches (such as, liberalism, realism, and developmental studies) due to the closeness of countries 'The Gravity Model of Migration' seems pragmatically the best-fitted concept for this research (Karemera, Oguledo and Davis, 2000). Furthermore, migration statistics also suggest that people generally migrate to closer countries such as Bulgarian and Russian people in Turkey or Ukrainians in Russia (See Appendix III). In this context, Newton's Gravity Model will set the framework of migration between these countries. In other words, the analysis will focus on how the distance, population and GDP per capita (PPP) have been affecting the migration in this region since the independence of Central Asian countries.

First of all, a brief overview of the migration from Central Asia to Turkey and Russia is given to accommodate the concept. Secondly, various studies and approaches about migration and the gravity model will be addressed to determine the theoretical framework. Thirdly, a brief historical condition of the region will be given to clarify the antecedent and intervening variables. In the next section, the research design of the essay is structured based on the studies of different scholars' equation of the Gravity Model of Migration. Then, a regression analysis will be applied to independent and dependent variables, providing (1) a test of significance to understand the presence of the associations between the variables, (2) Pearson's Correlation to measure the strength of the expected association of the variables, and finally, (3) the regression equation (Agresti and Finlay, 2009). In the final part, the results of the regression and the equation will be discussed to interpret how distance, population, GDP per capita and migration are correlated with the framework of the Gravity Model on Central Asian countries.

2. Research Context

Since 1991, Central Asian republics have been developing their democratic conditions, but due to deprived economic stability, violations of human rights and non-transparent elections generally cause migration to more developed countries (Mazur, 2004). The migrants mostly use Russia and Turkey as a bridge country on the way to the European Union, particularly in the last two decades, this situation resulted in several crises (such as increased asylum seekers, illegal migrants, and escalating crime rates) not only for Europe but also for Russia and Turkey (Tonry, 1997). The reasons for migration from Central Asia to Europe are not the subject of this paper, but it will be analysed based on the distance between the two countries, population, and the difference in GDP of the country of destination to the origin affecting the migration bilaterally. To do so, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Azerbaijan, Uzbekistan, Afghanistan, and Pakistan will be bilaterally observed with Russia and Turkey in terms of their distance, population and GDP per capita with the last 23 years' statistics. It is important to emphasize that migration from Afghanistan and Pakistan could be higher than in other countries due to the presence of

terrorist groups such as the Taliban (Akiner and Ehteshami, 1995). Thus, including those two countries could give us the opportunity to measure how terrorist activities make people migrate to other countries.

3. Literature Review

In this part of the study, it is aimed to explain the historical relations between Central Asian countries with Turkey and Russia. Firstly, it is important to highlight that this study is an explanatory study which explains the relations between variables, rather than a descriptive study that defines the whole story of a specific situation. Therefore, that historical perspective of those countries relations would give us a chance to explain how Russian and Turkish historical bonds could be effective in our unit of analysis. According to Thomas Wheeler (2013), after the collapse of the Soviet Union, Turkey had started to dream about the initiation of the 'Turkic sister republics' as a union on the counterpart of the European Union. However, Turkey underestimated Russian influence and the 'russification' of the region on the historical framework (Hiro, 2011).

In order to make sense of what happened in the past to understand the newly developing issues, going back to Imperial Russian under Romanovs, Central Asia had started to be under the rule of the Russian Empire since the second half of the 19th century (Ubaidulloev,2015). In 1917, when the Russian revolution started, Central Asian society was still under the Russian rule (Swanston, 2007). At this point, Soviet Russia continued to rule central Asian countries from 1922 to 1991. Absorbing that much Russian influence into their cultural, social and political lives, undoubtedly have had some consequences since then into their decision-making process even when it comes to choosing a corridor country for their migration route. As an instance to russification of central Asian countries, it can be seen building railroads between each countries for the easiness of the travel for both materials and peoples, creating complex interdependence between countries tying them from raw materials to the industrial area, using the Russian language as a main communication tool and so on(Omelicheva,2018).

According to different studies (Laruelle:2015, Petrovich-Belkin et al.: 2019), after the collapse of the Soviet Union, there was a significant

decline in the political influence of Russia on the central Asian region for several reasons. Firstly it can be seen that after the Cold War era Russia has experienced economic difficulties, to do so not being a big brother of the region anymore, each country had to have their economies, capacities and own political system. Therefore, instead of ruling a region, being a powerful partner role is a more efficient and practical way for the Russian economy, by doing so, Russia would be able to shift the burden of the region (Petrovich-Belkin et al.: 2019). In addition to this, as it is highlighted by neo-liberals, even after the hegemon stability of the system could still be seen. According to this argument, after Soviet Russia with the advantage of the historical ties and the socio-cultural framework that is already structured by Russia, there was no need to give extra importance to stabilize the region.

In the same era, Turkey was the first country which recognized Central Asian Country's independence declarations (Wheeler, 2013). Looking from a historical perspective, the relation between Turkey and Central Asian countries is mostly different in different aspects. First of all, Turkey has never had a historical relation like the relation between Russia and Central Asian countries which is structured on an imperial framework since the 1870's. Historically, Central Asian land was under the rule of Persian tribes at first then Turkic tribes (Hiro,2009). That is why Turkey references of having historical ties and the same ancestors with central Asian societies. Despite the fact of this argument, Turkey, and even the Ottoman Empire has a very limited socio-cultural influence on this region. After the collapse of the Soviet Russia, Turkey, like its contemporary European countries, considered itself as to be a 'bridge country', with the advantage of its geopolitical location, for the Central Asian countries' development and engagement to Europe (Wheeler, 2013). However, this project has not lived long, for some reason on the frame. First of all, Central Asian countries were still invisibly engaged to Russia, in spite of being independent, and were approaching cautiously with the idea of a new union with Turkey as a new 'big brother' (Wheeler, 2013). Secondly, the new ruling party AKP, has diverted the aim to a different region the Middle East, but still maintaining the economic relations with Central Asian countries (Hiro, 2009). To sum up, both Turkey and Russia have an influence over the region, but

at different levels. The importance of giving a historical perspective of the region is to clarify the condition and the background of the Central Asian States and their peoples while they are deciding on choosing their route Europe over either Russia or Turkey.

4. Theoretical Framework

According to Ortega and Peri (2013), the income of destination country has a big impact on the decision of migration. Additionally, Lewer and Berg (2008) claimed that the difference between wages is the most effective reason for migration between countries in terms of the gravity model. On the other hand, Timothy Hatton and Jeffrey Williamson (1999) added Population as a pushing factor. For Joel Cohen and Keuntae Kim (2010), language, culture, shared history and borders are also effective on migration. Finally, Burulcha Sulaimanova and Aziz Bostan (2014) applied the gravity model of migration to emigrants of Tajikistan and Kyrgyzstan. The motive of this paper is to analyse quantitatively the central Asian migration stock with two corridor countries Russia and Turkey in the context of the Gravity model. The Gravity model of migration has been used several times by different scholars but it will be the first time for this region(R).

Generally, migration studies support that the development of the country is the key factor to be an attractive country for migration, while distance and population are classified as the most important values for trade on the framework of the Gravity Model (Oguledo and Macphee, 1994). It is important to indicate that this model is also applied to trade, tourism and democratization relations (Emerson and Noutcheva, 2004; Khadaroo and Seetanah, 2008; Burger, van Oort and Linders, 2009). The application of this model in various scenarios purposes that distance, the geographical size of countries, demographic statistics and economic development have a strong influence on countries' bilateral relations. Furthermore, Karemera, Oguledo and Davis (2000), point out that the closeness and the developmental differences of two countries trigger the labour migration, thus this condition promotes more trade relations between those countries. The implication of the labour migration on the context of the gravity model will be analysed in the next paragraph.

The effects of migration flows can be distributed in two categories, political implications and social implications. On one hand, having more migrants in society involves more political regulations and policies, which must be morally fitted with international standards (Juss, 2007). On the other hand, the more migrants lead to a more multi-cultural structure for societal life (Vasta, 2007). At this point, there are two different views on multi-ethnic and cultural society. Liberal multiculturalists argue that minorities enhance social and cultural life (Kymlicka, 1995), while the realist perspective claims that migrants increase the population and decrease the business opportunities (Taylor, 1987). Technically speaking, it is essential to consider that migrants result in an increase in population, which will be used as an independent variable in this research. Migration leads to population expansion of the host country, which works as a pull factor attracting more migrants creating a snowball effect (Bagasao, 2004). Nevertheless, there is a different point of view which claims that a soaring population has a negative effect on economic development due to the limited state resources (Preston, 2007). Resultantly, this study analyse the impact of economic development and population on migration and would help in illustrating which has a greater impact on the latter.

The strategic geographical position of CAS (Central Asian States) has been highlighted several times in migration studies to clarify how it affects the relationship between countries (King, 2011). To do so, most scholars used geographical location and size as a way of studying migration, trade and tourism on the framework of the gravity model. For example, Krugman (2009) and McCann (2005) suggest that the geography of the country has a big impact on the costs of transport, which sometimes causes a reduction in the trade relations between two countries. In other words, the distance between the countries plays a crucial role in trade relations, as closer the countries the greater would the trade relations be due to the decreased transportation cost, and vice-versa (Butler, 2008). Nevertheless, this perspective seems as an old-fashioned idea by liberalist view. For instance, liberals argue that in contemporary politics, cooperation, and agreements favour the physical features of the countries including population, geostrategic location (Copeland, 1996). It is important to emphasize that the significance of the location is still an essential part of the relations

according to Melitz (2007) and Lewer & Van den Berg (2008), who used statistics on their scientific research to analyse the importance of distance in the context of the gravity model. According to World Bank 2005 report, distance has still a huge influence on migration and tourism, whereas Brun (2005) argues that it has limited effects on trade in view of the increased globalization and liberalization of the World. Therefore, the statistical result of the research would point out that whether the distance between countries has an effect on migration or not. Additionally, the geographical size of the country will be also be added to the equation in order to strengthen the model, due to the inconvenience of calculation for distance between two countries such as Turkey and Azerbaijan are neighbours so their closest point is Dilucu border gate but for the distance calculation, the capitals of the two countries will be used as a measure. Having said that, contiguity will be added as a dummy variable in the model to understand how having a common border has an effect on migration.

5. Research Design

5.1. Unit of Analysis, Case and Time Selection

The unit of analysis is dyadic migration stock between Central Asian states and Turkey and Russia, for the last three decades from 1990 to 2013, with dyads being Turkey and Russia on the one side and Afghanistan, Azerbaijan, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan and Uzbekistan on the other side. Each dyad will be analysed separately for four years; 1990, 2000, 2010 and the closest date for available data 2013, supplemented by a combination of all observations in one analysis and an application dummy variables to all dyads to analyse the impact of the historical and cultural relationship on migration as a pushing and pulling factor. This sums up 32 observations for Turkey from Central Asian states and 32 observations for Russia, overall 64 observations will be used in four different times. In each of the observations, values are derived from International Migration Data-Set for the dependent variable (migration stock), from United Nations and OECD statistics for the independent variable and from GeoDist data set for dummy variables.

One-way migration from Central Asia to Turkey and Russia will be applied to The Gravity model of Migration in order to understand the implications of different factors, including that Russia has a huge historical and cultural impact on CAS so this situation could be a pushing factor for emigration to Russia. Additionally, Turkey does not have any historical and cultural relationship between these countries and doing so, at the end of this research we will be able to analyse the impact of historical and cultural relations, common language and border as well.

Furthermore, it is important to give a brief explanation of relationships of countries in general, particularly from the historical perspective to clarify the situation of countries. Firstly, Azerbaijan has both a historical relation with Turkey and Russia, whereas different from other Post-Soviet countries. It is underlined that 'one nationality two countries' as put forward by the president of Azerbaijan for Turkey (Aras and Suleymanov, n.d., 2012). Secondly, Turkmenistan does have a historical and cultural relationship with Russia and cultural and lingual commonalities with Turkey. Thirdly, Afghanistan has not a historical and cultural relationship with Turkey but after for 10 years period it was also under the rule of Soviet Russia from 1979 to 1989, but terrorism might be the most effective reason for emigration to both countries (Puar, 2002). Another post-soviet country is Kazakhstan and it has a historical and cultural relation with Russia and good historical relation with Turkey. A similar pattern can be seen in Kyrgyzstan relationship with Russia and Turkey, but the different point is that the economic development of Kyrgyzstan is slightly slower when compared to Kazakh economy. Tajikistan and Uzbekistan have the same historical and cultural relation with Russia and good historical relationship but they have considerably less developed economies and religious radicalization problems in societies. (Huntington, 1996) At this point, it is important to indicate that Armenia is not in the list due to the closed border with Turkey, so including Armenia to the model can manipulate the objectivity and validity of the research because there is no available date for the emigration of Armenian to Turkey (Mooradian, 1998).

5.2. Operationalizing the Independent Variables: Population, Distance, GDP

Generally, the gravity model is enlarged with additional variables combined with different pulling and pushing factors (Ortega and Peri, 2013). This essay is inspired by the research design of Raul Ramos and Jordi Surinach (2013), which includes both the Gravity model variables, such as distance, population, GDP per capita and migration stock, and dummy variables to eliminate biases because of the multilateral resistance to migration. Furthermore,the statistical result of the research helps in analysing the yearly steady increase in the evolution of the migration stock, as a result of adding time as fixed effect.

In order to test the model, considering all the factors ,the specification of our model will be applied in this paper, as it is stated below;

$$Log\ M_{ijt} = ß_0 + ß_{1.}\ log\ pop_{it} + ß_{2.}\ log\ pop_{jt} + ß3.log\ Dist_{ij} + ß4.log\ Area_i + ß5.log\ Area_j + ß6.contiguity_{ij} + ß7.comlangof_{ij} + ß8.comlangethno_{ij} + ß9.Colony_{ij} + ß10.\ log\ GDPpc_{jt}/GDPpc_{it} + u_{ijt}$$

where $Log\ M_{ijt}$ stands for the logarithm of the stock of immigrants from country i (refers to origin country) in country j (referring destination) at time t. $log\ pop_{it}$ denotes the population of country of origin at time t while pop_{jt} stands for the destination country. $log\ Dist_{ij}$ means the logarithm of the distance between capitals of country of origin and destination. $log\ Area_i$ and $log\ Area_j$ denote the geographical size of the countries for origin and destination. Additionally, $log\ GDPpc_{jt}/GDPpc_{it}$ stands for relative differences of GDP per capita between origin and destination countries at time t. The rest of variables are dummies including whether the origin and destination country are contiguous '$contiguity_{ij}$', have a common official language '$comlangof_{ij}$', share a language spoken by ethnicities (not less than 9% of the population) in both countries '$comlangethno_{ij}$' , have a historical and cultural relationship '$Colony_{ij}$'. As it has been already mentioned fixed effects and origin and destination country fixed effects are also added to the model. Finally, u_{ijt} represents random error values. Additionally, it is essential to highlight that the logarithm is used in order to normalize values.

The data for distance and dummies is obtained from CEPII GeoDist dataset and gravity data, particularly for the dyadic analyse it is widely used and perfectly fitted with our model.

5.3. Operationalizing the Dependent Variable: Migration

International migration is the hardest value to record due to several reasons, such as asylum seekers, refugees, and illegal migrants (Pânzaru, 2013). Thus, the most reliable data can be found only in United Nations reports and the World Bank, in this research. The World Bank bilateral international migration stock statistics are used as a dependent variable to analyse the model. In order to analyse the correlation between migration and independent variables of the model, this research aims to use three different models to see the different effects of variables on migration stock in Turkey and Russia. To do so, in this section these three models will be briefly explained before we continue to Hypotheses of the research.

Firstly, in Model (1) the correlation between migration stock and all the variables including dummies will be analysed in order to understand how those variables effective on migration to this region when all possibilities are gathered for four different periods. Secondly, in Model (2) the correlation of migration and population and area of the destination country will be analysed to test the Gravity model based on its basic arguments. Then, Finally in Model (3), dummy variables effects on migration stock will be analysed with regression analysis.

As it is already implied the finding data for migration stock is constraint, particularly for Central Asian states, this condition is harder than any other region due to governmental reasons, such as Kazakh and Kyrgyz governments which are not willing to provide the emigrant statistics to international organizations according to NGOs reports (Human Rights Watch, 2015) or terrorist activities in Afghanistan.

5.4. Hypotheses

Three hypotheses are constituted based on Newton's Gravity Model and studies on the context of this model suggest that;

H1: Distance between countries and migration stock are negatively correlated.

H2: The population of the country of destination and migration stock are positively correlated.

H3: There is a positive correlation between GDP per capita (PPP) ratio and migration stock.

6. Results

Table 1: Specifications of the Gravity Model in Linear Regression

Dependent variable: Migration Stock (LogMijt)				
Explanatory Variables		(1)	(2)	(3)
$ß_0$	Unstandardized Regression Coefficients	2.802 (9.833)	1.106 (16.274)	3.640 (0.093)***
	Pearson Correlation			
	R^2			
log pop_{it}	Unstandardized Regression Coefficients	-0.473 (0.174)***		
	Pearson Correlation	-0.286**		
	R^2	0.082		
log pop_{jt}	Unstandardized Regression Coefficients	2.071(1.424)	1.555 (2.508)	
	Pearson Correlation	0.688***	0.688***	
	R^2	0.474	0.474	
log $Dist_{ij}$	Unstandardized Regression Coefficients	-4.797(1.293)***	-3.983 (1.028)***	
	Pearson Correlation	-0.468***	-0.468***	
	R^2	0.219	0.219	
log $Area_i$	Unstandardized Regression Coefficients	1.096 (0.252)***		
	Pearson Correlation	-0.72		
	R^2	0.005		
log $Area_j$	Unstandardized Regression Coefficients	-0.270 (0.387)	0.719 (0.664)**	
	Pearson Correlation	0.695***	0.695***	
	R^2	0.482	0.482	
$contiguity_{ij}$	Unstandardized Regression Coefficients	0.033 (0.259)		0.489 (0.210)**
	Pearson Correlation	0.456***		0.456***
	R^2	0.208		0.208

$comlangof_{ij}$	Unstandardized Regression Coefficients	-0.94 (0.257)		0.120 (279)
	Pearson Correlation	0.520***		0.520***
	R^2	0.271		0.271
$comlangethno_{ij}$	Unstandardized Regression Coefficients	-0.94 (0.257)		0.120 (279)
	Pearson Correlation	0.520***		0.520***
	R^2	0.271		0.271
$Colony_{ij}$	Unstandardized Regression Coefficients	1.820 (0.208)***		2.045 (0.204)***
	Pearson Correlation	0.861***		0.861***
	R^2	0.741		0.741
log $GDPpc_{jt}$/ $GDPpc_i$	Unstandardized Regression Coefficients	0.227 (242)		
	Pearson Correlation	-0.335***		
	R^2	0.112		
R^2		0.883	0.588	0.764
*** p≤ 0.01; **p≤ 0.05; *p≤ 0.10 statistically significant. Standard errors are shown in parentheses.				

Table 1 shows the regression analyses for the Gravity Model of migration in three different specifications of the model applied different variables to empirically assess the determinants of emigration from Central Asia to Turkey and Russia by 1990 to 2013.

Looking from a general overall perspective, the empirical results revealed that as it is shown in Table.1 most parameters are statistically significant and the R-squared levels are on average high. In particular, apart from the difference in GDP per capita (destination to origin)the rest of the independent variables are statistically significant. R^2 is considerably high for all specifications which means that independent variables of the Gravity model are pretty close to explaining the migration stock in Russia and Turkey from Central Asia.

Before the regression model, the correlation of the variables was estimated, as a result, it can be said that hypotheses of the Gravity model are not all satisfied in Central Asian migration stock. Then, estimated models were checked in the regression model and surprisingly difference in GDP per capita has a negative correlation with migration stock in Central

Asia, rather as stated in the theoretical framework section, which points that it was assumed that there is a positive correlation between GDP and migration. Therefore, after the regression analysis, it is clear that there is a considerable correlation between migration stock and other independent variables, particularly with dummy variables.

In this paragraph, the results for the different specification of the regression model will be analysed. The results illustrate that the population of the destination country has a positive effect on migration stock in both 1st and 2nd models, which include the population of the destination country as a variable. Thus, it could be said that the higher population in the destination country encourages immigration flows (Appendix I). Contrastingly, the population of origin country has a negative effect on migration stock. Thus, it could be said that in less crowded countries opportunities might be limited, so people tend to migrate more to crowded countries in order to find a job or get an education. Secondly, as it is already expected that the distance between the two countries has a negative effect on migration stock in both specifications of the 1st and 2nd model. Additionally, its coefficient appears with the expected results and it has more effect on migration stock with 46% in Central Asia than the population of the origin, which has a 28% impact on migration stock. Although the area of the destination country has a really important effect on migration stock (Appendix I), it is really hard to say the same pattern for the area of the origin country. As it is understood within the R-squared value is 0.005, which proved that we cannot establish a correlation between migration stock in Central Asia and the geographical size of the origin country. Surprisingly, dummy variables have a considerably high impact on migration in all specifications due to the Post-historical and cultural historical relations between Central Asia and Russia. Having a shared border encourages people to migrate at a rate of 45% to Turkey or Russia. Although a common border has a positive impact on migration, whereas historical and cultural relations has more impact on migration than border, such as Azerbaijani people tend to migrate more to Russia than Turkey even if they have a common borders with Turkey (See Appendix III). Considering the R-squared value, Pearson Correlation and also statistical significance it could be said that historical

and cultural relation has the most significant effect on migration stock in Central Asia (Appendix I). Finally, common official of primary language has the same proportion with the language spoken by at least 9% of the population in both countries, so that they are both slightly effective, despite the low R-squared rate. Before finishing this part it is important to emphasize that considering only the unstandardized ß value is not enough solely to provide the most significant variable unless it is indicated with its standard error. Furthermore, according to MacKinnon et al. (2002) the standardized coefficient value also must be indicated by comparing the significance of the variables. So, considering all the indicators we could say that the most significant independent variable is the historical and cultural relationship.

7. Discussion

The objective of this paper was to analyse the impact of the Gravity Model's indicators on migration stock in Turkey and Russia from Central Asia. To do so, all variables were examined in three different specifications in the linear regression model and the results point out that the distance and the population of the country are correlated with migration stock in Central Asia, but the correlation between the difference in GDP per capita and migration stock is not significantly observed from the three specifications. Surprisingly, the third specification showed that historical and cultural relations have a stronger impact on migration stock from Central Asia. At this point it is important to emphasize that there is a statistically significant negative correlation between the difference GDP per capita destination to origin with migration stock according to Pearson correlation (See Appendix II) but in multilinear regression, which includes effects of variables on migration stock at the same time, shows that it has considerably less effect when other variables included the equation. As a result, contrastingly our H (3) Hypothesis suggested that there is a positive correlation between the difference in GDP per capita and migration stock, this argument rejected in Pearson correlation and points out that there is a negative correlation with migration in Central Asia. In this section, three different specifications will be analysed to see how variables effect can change when they are combined with other variables.

The first specification includes all variables to test the Gravity Model with dummy variables at the same time. To start with the R-squared value is 0,883 proving a stronger prediction about migration. Considering all the variables, the strongest impact can be observed from distance between two countries followed by the population of destination based on their coefficient values. The estimated variable, historical and cultural relation is observed as a third strongest impact on migration stock. The least impact is estimated from common official language of countries and common ethnic language in this model.

The second specification includes only the Gravity Model's variables and excludes dummy variables to see the sole impact of main determinants such as distance between two countries, population and area of country of destination. The R-squared value of this model is relatively smaller than the first specification but it is still statistically significant and reliable. In the second specification the population of the destination country has the strongest impact on migration stock in Central Asia. Furthermore, all determinants appear with the expected signs and statistically significant. Considerably low impact is observed from the Distance between the two countries. Thus, it could be said that considering only the distance, population and area indicators, Population of the destination country encourages more migrants to Turkey and Russia from Central Asia by 1990 to 2013. Furthermore, it is important to indicate that the argument of Preston is rejected based on the results of regression model for Central Asia, so we could say that the difference in GDP from destination country to origin has not a positive impact on migration stock in that region.

Final specification (i.e. 3rd model) includes only the dummy variables to analyse how the historical relationship between countries is effective on migration stock. The R-squared value is considerably high and all determinants are observed statistically significant. The outcomes for the third specification, representing the historical and cultural relations, common border and language, show that their coefficient appears with the expected signs but the most significant one is undoubtedly historical and cultural relations between two countries. In other words, if one country had ties with an imperial power in the past, people of this country tend to

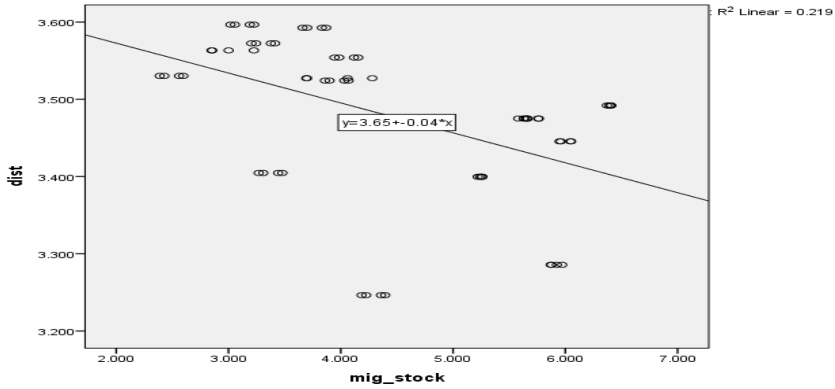
migrate to a core country such as Kazakh migration stock in Russia (Appendix III). More migrants living in Russia can be explained from this perspective (Appendix III), because Russia has historically been tied with different countries especially the Russian Empire era while Turkey does not have that kind of relation with any country from the Central Asian region.

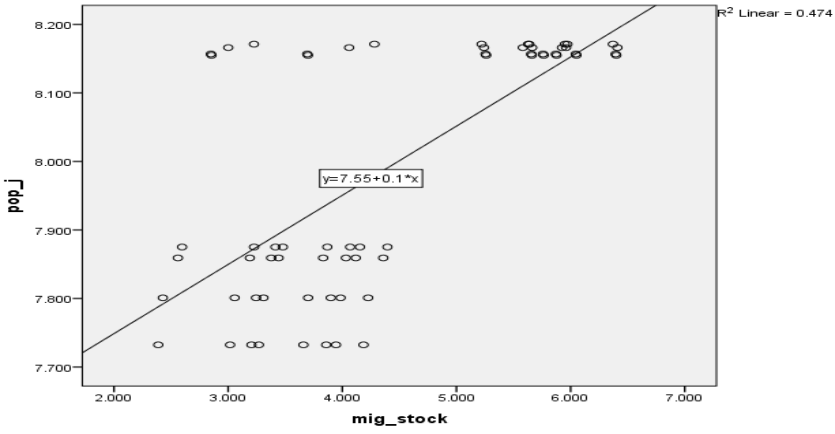
8. Conclusion

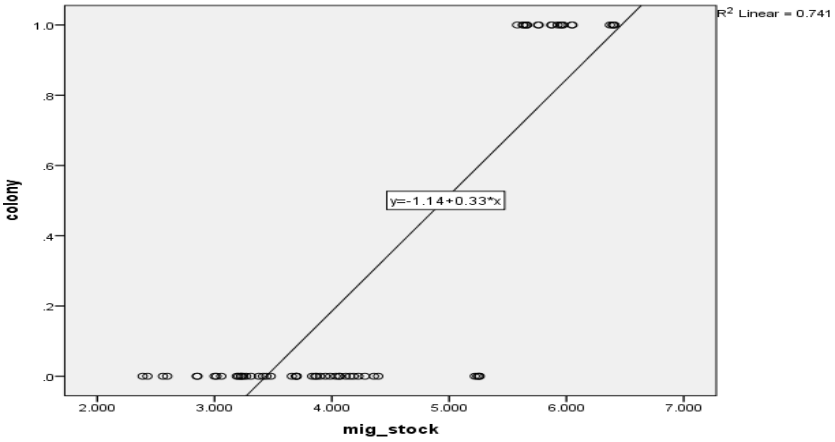
The present study applies the gravity model of migration to empirically assess the determinants of migration stock from Central Asian Countries; Afghanistan, Azerbaijan, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan and Uzbekistan, to Turkey and Russia for ten years period between 1990 and 2013. To estimate the gravity model, the multi-linear regression model was used in three different specifications. Before the regression model, the Pearson Correlation was used to understand whether there is a correlation between variables. Then, in order to analyse how effective one variable is on another, the multi-linear regression model was applied. Recalling the research question from the beginning, the answer is that while our first and second hypothesis is confirmed that there is a strong and statistically significant correlation between migration stock, distance, and population of country of destination, contrastingly the correlation between difference in GDP and migration stock is observed in negative way for Central Asia as it was claimed in an opposite way. Furthermore, historical relationship indicators are observed highly effective on migration stock from Central Asia to Turkey and Russia. For further research in this model, historical and cultural relationship could be also used as the main determinant factor on migration stock due to the historical and cultural relationship in this region. Additionally, the democratic level of countries, diplomatic relations between countries and human rights scores could strengthen the model for further studies.

This essay attempted to test the gravity model of migration for a new region, i.e. Central Asia in order to display the impact of independent variables on migration stock in Turkey and Russia since Post-Soviet countries gained their independence in 1991.

Appendix I: Scatter Plot Graphics of Most Significant Determinants







Appendix II: Descriptive Statistics

Variable	Pearson Correlation with Migration Stock				Min.	Max.	Mean	St. Dev.	N
GDP_j/i	-0.335**				0.09	1.48	0.73	0.38	64
pop_i	-0.286*				6.56	8.26	7.15	0.47	64
pop_j	0.688**				7.73	8.17	7.98	0.17	64
dist_	-0.468**				3.25	3.60	3.48	0.10	64
area_i	-0.072				4.94	6.43	5.61	0.45	64
area_j	0.695**				5.89	7.23	6.56	0.67	64
Mig_stock	1				2.39	6.41	4.38	1.21	64
Correlation is significant at the 0.01 level (2-tailed).**									
Correlation is significant at the 0.05 level (2-tailed).*									

Appendix III: Migration Stock Statistics in Russia and Turkey in 2016

Russian Federation		Turkey	
Migrant Native Countries	Migrants	Migrant Native Countries	Migrants
Ukraine	3674234	Bulgaria	538686
Kazakhstan	2648315	Germany	306456
Belarus	958719	Greece	66344
Uzbekistan	940539	Macedonia	35308
Azerbaijan	866843	Netherlands	24450
Georgia	644390	Romania	23232
Armenia	493126	Russian Federation	22246
Kyrgyzstan	474882	United Kingdom	21225
Tajikistan	392446	Azerbaijan	18807
Moldova	284330	France	17979
Total Immigrants	12270388	Total Immigrants	1410947

According to data from (Peoplemov.in, 2016)

Datasets

Cepii.fr, (2016). *CEPII - GeoDist - Presentation*. [online] Available at: http://www.cepii.fr/cepii/en/bdd_modele/presentation.asp?id=6 [Accessed 10 Jan. 2016].

Data.oecd.org, (2016). *Domestic product - Gross domestic product (GDP) - OECD Data*. [online] Available at: https://data.oecd.org/gdp/gross-domestic-product-gdp.htm [Accessed 10 Jan. 2016].

Data.worldbank.org, (2016). *International migrant stock, total | Data | Table*. [online] Available at: http://data.worldbank.org/indicator/SM.POP.TOTL [Accessed 10 Jan. 2016].

Data.worldbank.org, (2016). *Population, total | Data | Table*. [online] Available at: http://data.worldbank.org/indicator/SP.POP.TOTL [Accessed 10 Jan. 2016].

BIBLIOGRAPHY

AGRESTI, A. and Finlay, B. (2009). *Statistical methods for the social sciences*. Upper Saddle River, N.J.: Pearson Prentice Hall.

AKINER, S. and Ehteshami, A. (1995). From the Gulf to Central Asia: Players in the New Great Game.International Affairs (Royal Institute of International Affairs 1944-), 71(4), p.832.

ARAS, O. and Suleymanov, E. (n.d.). Azerbaycan'ın Bağımsızlığının 20 Yılında: Azerbaycan-Türkiye Ekonomik İlişkileri Ve Perspektifi (Economic Relations and Perspective between Azerbaijan and Turkey: In 20 Years of Azerbaijan's Independence). *SSRN Electronic* Journal.(2012)

BAGASAO, I. (2004). Migration and development: the Philippine experience. Small Enterprise Development, 15(1), pp.62-67.

BRUN, J. (2005). Has Distance Died? Evidence from a Panel Gravity Model. The World Bank Economic Review, 19(1), pp.99-120.

BRYMAN,Alan. 2012. Social Research Methods. Oxford: Oxford University Press

BURGER, M., van Oort, F. and Linders, G. (2009). On the Specification of the Gravity Model of Trade: Zeros, Excess Zeros and Zero-inflated Estimation. Spatial Economic Analysis, 4(2), pp.167-190.

BUTLER, A. (2008). Distance Still Matters: Evidence from Municipal Bond Underwriting. Rev. Financ. Stud., 21(2), pp.763-784.

COPELAND, D. (1996). Economic Interdependence and War: A Theory of Trade Expectations. International Security, 20(4), p.5.

EMERSON, M. and Noutcheva, G. (2004). Europeanisation as a gravity model of democratisation. Brussels: Centre for European Policy Studies.

HIRO, D. (2011). Inside Central Asia: A Political and Cultural History of Uzbekistan, Turkmenistan, Kazakhstan, Kyrgyz stan, Tajikistan, Turkey, and Iran. Abrams.

HUMAN RIGHTS WATCH, (2015). World Report 2015: Kazakhstan. [online] Available at: https://www.hrw.org/world-report/2015/country-chapters/kazakhstan [Accessed 7 Jan. 2016].

HUMAN RIGHTS WATCH, (2015). World Report 2015: Kyrgyzstan. [online] Available at: https://www.hrw.org/world-report/2015/country-chapters/kyrgyzstan [Accessed 7 Jan. 2016].

HUNTINGTON, S. (1996). The clash of civilizations and the remaking of world order. New York: Simon & Schuster.

JUSS, S. (2007). International migration and global justice. Aldershot: Ashgate.

KAPLAN, R. (2000). The coming anarchy. New York: Random House.

KAREMERA, D., Oguledo, V. and Davis, B. (2000). A gravity model analysis of international migration to North America. Applied Economics, 32(13), pp.1745-1755.

KHADAROO, J. and Seetanah, B. (2008). The role of transport infrastructure in international tourism development: A gravity model approach. Tourism Management, 29(5), pp.831-840.

KING, R. (2011). Geography and Migration Studies: Retrospect and Prospect. Population, Space and Place, 18(2), pp.134-153.

KOSER, K. (2007). International migration. Oxford: Oxford University Press.

KRUGMAN, P. (2009). The Increasing Returns Revolution in Trade and Geography. American Economic Review, 99(3), pp.561-571.

KYMLICKA, W. (1995). The Rights of minority cultures. Oxford: Oxford University Press.

LARUELLE, M. (2008). Russia's Central Asia Policy and the Role of Russian Nationalism. Silk Road Studies Program.

LEWER, J. and Van den Berg, H. (2008). A gravity model of immigration. Economics Letters, 99(1), pp.164-167.

MACKINNON, D., Lockwood, C., Hoffman, J., West, S. and Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. Psychological Methods, 7(1), pp.83-104.

MAZUR, R. (2004). Realization or Deprivation of the Right to Development Under Globalization? Debt, Structural Adjustment, and Poverty Reduction Programs. GeoJournal, 60(1), pp.61-71.

MCCANN, P. (2005). Transport costs and new economic geography. Journal of Economic Geography, 5(3), pp.305-318.

MELITZ, J. (2007). North, South and distance in the gravity model. European Economic Review, 51(4), pp.971-991.

MOORADIAN, M. (1998). The OSCE: Neutral and impartial in the Karabakh conflict?. Helsinki Monitor, 9(2), pp.5-17.

OGULEDO, V. and Macphee, C. (1994). Gravity models: a reformulation and an application to discriminatory trade arrangements. Applied Economics, 26(2), pp.107-120.

OMELICHEVA, M. (2013). Russian foreign policy: A quest for great power status in a multipolar world. Foreign Policy in Comparative Perspective: Domestic and International Influence on State Behavior. London: SAGE, 94-117.

ORTEGA, F. and Peri, G. (2013). The effect of income and immigration policies on international migration. Migration Studies, 1(1), pp.47-74.

PÂNZARU, C. (2013). The Determinants of International Migration. A Panel Data Analysis. Journal of Politics and Law, 6(1).

PEOPLEMOV.in, (2016). peoplemovin - A visualization of migration flows. [online] Available at: http://peoplemov.in/#t_RU [Accessed 9 Jan. 2016].

PETROVICH-BELKIN, O. K., Eremin, A. A., & Bokeriya, S. A. (2019). THE DECLINE OF RUSSIA'S INFLUENCE IN THE POST-SOVIET REGION AND THE REASONS BEHIND IT. Сравнительная политика, 10(3).

PRESTON, S. (2007). The changing relation between mortality and level of economic development. International Journal of Epidemiology, 36(3), pp.484-490.

PUAR, J. (2002). Monster, Terrorist, Fag: The War on Terrorism and the Production of Docile Patriots.Social Text, 20(3 72), pp.117-148.

REISMAN, W. (1990). Sovereignty and Human Rights in Contemporary International Law. The American Journal of International Law, 84(4), p.866.

REITZ, J., Hatton, T. and Williamson, J. (1999). The Age of Mass Migration: Causes and Economic Impact. International Migration Review, 33(3), p.766.

SWANSTON, A., Swanston, M., & Mapping, R. L. (2007). Mapping History Battles and Campaigns. Cartographica.

TAYLOR, J. (1987). Undocumented Mexico-U.S. Migration and the Returns to Households in Rural Mexico. American Journal of Agricultural Economics, 69(3), p.626.

TONRY, M. (1997). Ethnicity, Crime, and Immigration. Crime and Justice, 21, pp.1-29.

UBAIDULLOEV, Z. (2015). The Russian-Soviet legacies in reshaping the national territories in Central Asia: A catastrophic case of Tajikistan. Jour-

nal of Eurasian Studies, 6(1), 79-87.

UN, (2011). Statistics on International Migration A Practical Guide for Countries of Eastern EUROPE AND CENTRAL ASIA. [online] Available at: http://www.unece.org/fileadmin/DAM/stats/publications/International_Migration_Practical_Guide_ENG.pdf [Accessed 29 Dec. 2015].

UNSTATS.un.org, (2015). United Nations Statistics Division - Demographic and Social Statistics. [online] Available at: http://unstats.un.org/unsd/Demographic/sconcerns/migration/default.htm [Accessed 29 Dec. 2015].

VASTA, E. (2007). From ethnic minorities to ethnic majority policy: Multiculturalism and the shift to assimilationism in the Netherlands. Ethnic and Racial Studies, 30(5), pp.713-740.

WHEELER, T. (2013). Turkey's role and interests in Central Asia. Saferworld Briefing, 3.