

International Migration: A Panel Data Analysis of the Determinants of Emigration from Tajikistan and Kyrgyzstan

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Abstract

This study presents empirical evidence on determinants of international migration from the perspective of a source country and applies the gravity model of migration to empirically assess the determinants of emigration from Tajikistan and Kyrgyzstan from 1998 to 2011. The findings of the study unveil that economic factors such as, GDP per capita, real wage(s), value added per worker in agriculture, remittances, exchange rates and demographic factor as amount of labor force influence the emigration decision.

Keywords: Emigration, Remittances, Panel Data, Gravity Model, Kyrgyzstan, Tajikistan.

JEL Code Classification: F22, F24

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1. Introduction

The disintegration of the Soviet Union in 1991 brought about the collapse of the shared political and economic system of the 15 former Soviet republics. The national borders of each newly independent republic were drawn and the economies of each began functioning autonomously. The termination of the Soviet economy, in very a short period of time, foreboded the impending production shortages, high unemployment levels, and political instability that Central Asian countries experienced.

It was against this polieconomic backdrop, that the first wave of Central Asian migration, commonly based on ethnic and political reasons, began in the early 1990s. Specific catalysts included events, such as: the - ethnic armed conflicts in Central Asia: Osh (Kyrgyzstan, 1990), Fergana (Uzbekistan, 1989), Noviy Uzen (Kazakhstan, 1989), civil war in Tajikistan (1992-1997); political changes in laws of the state language had accelerated the outflow (or repatriation) of Russian-speaking population from Central Asia (Denisenko&Chudinovskih, 2012).

After the mid 1990-s, the impetus for Central Asian migration became an economic one, where migrants benefited from the comparative advantages of working abroad. This migration has accelerated the rapid rise in remittance inflow, reaching 30-50% of Gross Domestic Products of Tajikistan and Kyrgyzstan. According to the World Bank (2012) Tajikistan is 1st and Kyrgyz Republic is 3rd (after and Liberia) among the top 10 recipients of migrant remittances as percent of GDP in 2011.

Recognizing the significant impact of migration to the countries of origin - it is vital to identify the factors causing migration outflow. The present paper investigates panel data of international migration outflows from Kyrgyzstan and Tajikistan by applying the gravity model to ascertain the factors causing migration.

The paper is organized as follows: in section two, the empirical studies on migration are reviewed; in section three and four, the methodology with data description and empirical results are given respectively; in the final section conclusion is provided.

2. Literature Review

Ullah (2012) has empirically estimated the determinants of international migration flows from Bangladesh to 23 destinations during the period from 1995 to 2009. The findings of the study unveil that along with economic and demographic factors, cultural similarities strongly influence the decision to emigrate.

Guan and McElroy (2012) examined the determinants of migration in 42 small, mainly tropical islands. Thirteen independent variables were used to measure various economic, social and demographic influences (per capita income, working-age population, literacy, political status) on these islands' migration patterns. The

empirical results suggested that affluent immigrant islands functioned as the economic destinations for the labor from the relatively stagnant emigrant islands.

Balderas and Greenwood (2010) have estimated and compared the determinants of European emigration to Argentina, Brazil and the USA by using panel data for period 1870-1910. They have found that in general, migration was from low-wage source countries, countries with large stocks of immigrants in the destination who were born in the origin - and from countries with relatively much recent migration to the destination.

Kim and Cohen (2010) have analyzed the determinants of international migratory inflows to 17 Western countries, and the outflows from 13 of these countries between 1950 and 2007 using panel-data analysis techniques. The empirical results suggest that destinations with a younger population demographic were associated with lower inflows, while origins sharing the same characteristic had higher outflows. Their findings also indicate that, being landlocked, having a common border, having the same official language, sharing a minority language, and colonial links each had statistically significant impact on migration.

Mayda (2010) investigated the determinants of migration inflows into 14 OECD countries, by country of origin, between 1980 and 1995. The paper have analyzed the effect of average income and income dispersion in destination and origin countries on migration, and examined the impact of geographical, cultural, and demographic factors, migration policy changes in destination countries'.

Ivan (2008) investigated the macroeconomic determinants of interregional migration in Italy during the period 1996-2002. The study found that per capita GDP acts as both a strong push and pull factor. Unemployment rates appear to be an important determinant as well.

Lewer and Van den Berg (2008) tested the hypothesis of the gravity model on immigration patterns of 16 OECD countries from 1991 to 2000. They found that the model is useful for testing other hypothesized determinants of immigration. The results show that geographic contiguity is not significant, suggesting that people move more easily across multiple borders than do goods; the significant immigrant stock coefficients shows that immigration is path dependent. The study confirmed that more educated people are more likely to immigrate, thus suggesting that improved education in source countries serves to increase the 'brain drain'.

Poveda (2007) analyzed the current migration in rural population in the south of Veracruz state (Mexico). By applying a three-level multinomial logistic model and taking into account individual, family, and local characteristics of the migrants, they found different determinants in each space. These determinants were related to the objectives, needs and means of the migrants and their families.

Cebula (2005) investigated the impact of economic and non-economic factors on gross state in-migration during the 1999 to 2002 period. The empirical estimates

indicate that gross state in-migration was an increasing function of per capita income and a decreasing function of the average cost of living. However, the interstate unemployment rate differentials according to results did not influence gross migration.

Carlos (2002) explored the roles of population, average earnings and employment rates in the sending and host countries on international migration. The empirical analysis examines international migration from the Philippines to 26 non-Middle Eastern countries in the period 1981-1995, by using fixed effects panel data regression method to determine the impact of the economic variables in the sending and host countries. According to the study's findings, the population growth in the Philippines has raised the probability of migration, while average domestic earnings have reduced it.

Yang and Guo (1999) examined gender differences in the determinants of temporary labor migration from a multi-level perspective with the 1988 migration survey data in Hubei province. They found that community level factors have played a key role in temporary labor migration, whereas the models omitting community-level variables were poor in predicting temporary labor migration. They also found that significant gender differences exist in determinants of temporary labor migration. For men, temporary labor migration was mainly a response to community level factors; and individual or household characteristics had little predictive power. For women, by contrast, temporary labor migration was predominantly determined by individual characteristics; community level factors were not as important.

Brockerhoff and Eu (1993) used data from eight Demographic and Health Surveys (DHS) in sub-Saharan Africa to assess whether fertility, child mortality and other individual-level characteristics motivate or constrain long-term female migration from rural to urban and other rural areas. Findings indicate that the likelihood of rural-to-urban and rural-to-rural migration is lower in most countries when the woman has had two or more recent births, but not when she has had only one birth. Also, the likelihood of rural-to-urban migration was greatly increased when the woman had attended school, was not married, was in her twenties, or did not belong to the largest ethnic group.

Constantinou and Diamantides (1985) formulated a model for the investigation of international migration and tested the model with data on emigration from Greece to the United States from 1820 to 1980. Their analysis revealed that the intensity of migration was greatly affected by events in Greece and was conditioned by the constraints introduced by changes in American immigration law.

As for Kyrgyzstan, Eurasian Development Bank's Centre for Integration studies was the first to study the determinants of migration empirically, culminating in its 2013 report titled "Effects of accession of Kyrgyzstan into the CU and SES for labor

market and human capital". Their results suggest that GDP per capita in origin acts as strong pushing factor.

3. Methodology and Data Description

The gravity model of migration was used in conducting the empirical analysis for this study. This model enables assess to not only the impact of economic factors, but also to the factors reflecting socio-demographic, cultural and political characteristics of both migrant sending and receiving countries.

The significant feature of this model is - its simplicity in using of time series, cross-sectional, and panel data analysis. Another important feature of this model is that it can be modified by adding new variables to test their relationship with migration. Mayda (2010), Balderas and Greenwood (2010), Ivan (2008), Lewer and Van den Berg (2008), Ullah (2012) have investigated the determinants of international and interregional bilateral migration by testing the hypothesis of the gravity model of migration. Independently, they found that migration was from low-wage source countries, from countries with large stocks of immigrants in the destination who were born in the origin, and from countries with relatively high recent migration to the destination. They also found that GDP per capita acts as both as strong push and pull factor and that unemployment rate appears to be an important determinant as well.

To test the hypothesized factors of emigration from Tajikistan and Kyrgyzstan we have used the migration gravity model given below: (Ullah, 2010, p.16):

$$M_{ij} = k P_i P_j / D_{ij} \quad (1)$$

- M_{ij} , migration from i to j region;
- k , constant;
- P_i , population of i region;
- P_j , population of j region;
- D_{ij} , distance between i and j regions.

The migration gravity model was then further refined by adding the following variables: migrant remittance inflows (Rem_{it}), official exchange rate ($Exch_{it}$), GDP per capita in origin ($GDPo_{it}$) and in Russian Federation ($GDPPr_{it}$), labor force in origin ($Lforce_{it}$), agriculture value added per worker in origin (Agr_{it}), real wage per hour in Russian Federation ($Rwage_{it}$); and the specification of the gravity model applied in this paper as follows:

$$M_{it} = \beta_0 + \beta_1 Rem_{it} + \beta_2 Exch_{it} + \beta_3 GDPo_{it} + \beta_4 GDPPr_{it} + \beta_5 Lforce_{it} + \beta_6 Agr_{it} + \beta_7 Rwage_{it} + \varepsilon_{it} \quad (2)$$

Where M_{it} stands for annual emigration flow from Tajikistan and Kyrgyzstan; this emigration amount shows overall emigrants from these countries.

The variable Rem_{it} shows the amount of remittance inflow to Tajikistan and Kyrgyzstan, the rapid growth of this variable has influenced the domestic

economies, but the sign of β_1 is unknown. That is why we can assume that the impact of remittances on migration could have one of two effects. Either, growing remittances incentivizes additional migration. Or, alternatively, increased remittances disincentivizes prospective migrants to migrate because their cash demands are being met by remittances.

$Exch_{it}$ indicates official exchange rates of local currencies of Tajikistan and Kyrgyzstan per unit of US dollar at time t ; a rise or fall in this exchange rate indicates depreciation or appreciation of these countries' currency respectively. Ullah (2012) was first to use this variable and showed that depreciation of local currency results in higher streams of income from remittances, which in fact causes higher rates of emigration. As for Tajikistan and Kyrgyzstan, it is assumed that sign of β_2 will be positive, since the level of dollarization of economies is very high, and depreciation of local currencies leads to the fact that income received from abroad – remittances make people wealthier, and which subsequently could serve as pushing factor to emigrate.

Variable $GDPo_{it}$ shows GDP per capita in Tajikistan and Kyrgyzstan. As in most studies, β_3 is expected to be negative, thus the growth of income in the country of origin reduces emigration. While β_4 is expected to be positive, since most migrants from Kyrgyzstan and Tajikistan leave for Russian Federation, the growth of GDP per capita in Russian Federation should attract more migrants.

The other variable hypothesized to have influence on migration is labor force in the country of origin; it is worth mentioning that this variable is used to test the migration and population relation in the migration gravity model. It is assumed that growing labor force is prone to emigrate, in other words β_5 is expected to be positive according to the model.

The variable Agr_{it} indicates agriculture value added per worker. The sign for β_6 is expected to be negative, inasmuch as most of the population of Kyrgyzstan and Tajikistan reside in rural areas and work in the agricultural sector. The growth of output in this sector should lead to the growth of employment in agriculture, which in turn decreases the migration outflow.

The last variable in model 2 is $Rwage_{it}$. This variable reflects the pulling factor of migration from Kyrgyzstan and Tajikistan to the Russian Federation. Since the growth of wages in the Russian Federation, should increase, the willingness of migrants to migrate to the Russian Federation, to earn higher salaries compared to Kyrgyzstan and Tajikistan.

To estimate the panel gravity model the data of given variables above have been collected from the National Statistic Committee of Kyrgyzstan, Agency on Statistics under President of the Republic of Tajikistan, the World Bank and Passport GMID internet data resources for the period of 1998-2011. The variables in the model are presented in natural logarithmic forms; see the Table 1 for detailed data description.

Table 1: Data Description

Variable		Periods
M_{it}	Amount of emigration	1998-2011
Rem_{it}	Migrant remittance inflows(US\$ million)	Kyrgyzstan 1998-2011; Tajikistan 2002-2011
$Exch_{it}$	Official exchange rate (LCU per US\$, period aver.)	1998-2011
$GDPO_{it}$	GDP per capita (constant 2005 US\$) in origin	1998-2011
$GDPr_{jt}$	GDP per capita (constant 2005 US\$) of Russian Federation	1998-2011
$Lforce_{it}$	Labor force, total, in origin	1998-2011
Agr_{it}	Agriculture value added per worker (constant 2005 US\$), in origin	1998-2011
$Rwage_{it}$	Real wage per hour in Russian Federation (US \$)	1998-2011

4. Empirical Results

The results for the different specification of the model are shown in the Table 4. All parameters are statistically significant and the R-squared levels are in average high, indicating that the main determinants of emigration flows are included. The estimated models were checked for autocorrelation and heteroscedasticity, and no autocorrelation and no heteroscedasticity occurred (in the first, second and third models the robust estimators are presented).

Per capita GDP appears to be the main macroeconomic determinant and acts as both a pushing and pulling factor. A high per capita GDP in the destination encourages immigration flows. Contrastly, low levels per capita GDP in the country of origin encourages out migration flows.

The outcomes for the labor force, representing the demographic variable, shows that its coefficient appears with the expected signs but it has less impact on migration than the per capita GDP. Nevertheless, with accordance to statistical data of National Statistic agencies of Kyrgyzstan and Tajikistan the economically active population of these countries are around 60 % and the proportion of young population are around 30 %; which, indicate growing labor forces. Whereas, it can be assumed that high level of unemployment in these countries can push the unemployed labor forces to migrate.

The estimated variable $Rwage_{it}$ indicates that the higher the wage level in the destination country, the higher rate of emigration from the country of origin. The stable economic growth in Russian Federation after 1998, brought forth steady wage level increases. While in Tajikistan and Kyrgyzstan, GDP and wages remain in their 1991 levels. It is worth mentioning that the wages in the Russian Federation is approximately five and nine times higher than in Kyrgyzstan and Tajikistan respectively (Denisenko & Chudinovskih, 2012).

Depreciation of domestic currency was found to exert a positive and significant impact on emigration, indicating that with depreciation of local currency,

emigration increases. The growth in value added in agriculture per worker is significantly reducing the migration outflow. Rem_{it} is also reducing migration, showing that with the growth of remittances, migration outflow decreases.

Table 2: Empirical Results

Random-effects GLS regression						
Dependent variable: Migration						
Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)
B_0	8.2051 (1.3969)***	3.5817 (1.2741)***	-11.7374 (2.9083)***	-10.0576 (4.2035)**	-15.2157 (9.6419)***	-15.5837 (8.0480)*
$GDP_{r_{it}}$	1.4018 (0.2979)***	1.6927 (0.4536)**	2.7082 (0.3654)***	2.9592 (0.5761)***	2.4468 (0.5619)***	2.1006 (0.4839)***
Rem_{it}			-0.1932 (0.0394)***	-0.4078 (0.1181)***	-0.3871 (0.1045)***	-0.3112 (0.0911)***
$GDPo_{it}$		-1.3575 (0.5478)***		-0.4865 (0.2737)*	-3.8067 (1.2694)***	-2.8135 (1.1134)**
$Rwage_{it}$				0.5190 (0.2576)**	0.9623 (0.2848)***	0.7780 (0.2460)***
$Exch_{it}$	0.3469 (0.1253)***	0.1913 (0.1033)*			0.6308 (0.2298)***	0.8377 (0.2046)***
$Lforce_{it}$					1.8697 (0.8843)**	2.2685 (0.7507)***
Agr_{it}	-1.5562 (0.4804)***					-1.3612 (0.4695)***
R^2	0.6427	0.5698	0.7646	0.8075	0.8672	0.9129

***- statistically significant at 1%, **- st. sig. at 5%, *- st. sig. at 10% Standard errors are shown in parenthesis.

5. Conclusion

The present study applies the gravity model of migration to empirically assess the determinants of emigration from Tajikistan and Kyrgyzstan for the period of 1998-2011. To estimate the gravity model, the Random Effects estimation method was used. Apart from the economic, demographic determinants of emigration found in the literature, the current study examined the possible effects of remittance inflow to countries of origin. The empirical results revealed that strong and statistically significant pushing factors of migration are: labor force in country of origin, remittance inflow, GDP per capita and agriculture value added per worker. While factors increasing emigration are: GDP per capita and real wage per hour in Russian Federation, and depreciation of local currencies and labor force growth in countries of origin.

References

- Balderas, J.U., Greenwood, M.J., (2010) "From Europe to the Americas: a comparative panel-data analysis of migration to Argentina, Brazil, and the United States, 1870-1910", *Journal of Population Economics*, 23:1301-1318
- Brocknerhoff, M. & Eu, H., (1993) "Demographic and Socioeconomic Determinants of Female Rural to Urban Migration in Sub-Saharan Africa", *International Migration Review*, 27(3): 557-577
- Carlos, Ma. Reinaruth D., (2002) "On the Determinants of International Migration in the Philippines: An Empirical Analysis", *International Migration Review*, 36(1): 81-102
- Constantinou, S.T. & Diamantides, N.D. (1985) "Modeling International Migration: Determinants of Emigration from Greece to the United States, 1820-1980", *Annals of the Association of American Geographers*, 75(3): 352-369
- Denisenko M. M. & Chudinovskih O. (2012) "Migratsii mejdu Stranami SNG", *Demoskop Weekly*, № 533 – 534, <http://demoscope.ru/weekly/2012/0533/analit04.php>
- EDB Centre for Integration studies (2013) "Effects of accession of Kyrgyzstan into the CU and SES for labor market and human capital", EDB: St. Petersburg
- Guan, J. & McElroy, J.L., (2012) "The determinants of migration in small islands", *The International Journal of Research into Island Cultures*, 7(1): 80-93
- Ivan, E., (2008) "Determinants of interregional migration in Italy: a panel data analysis", MPRA paper No. 8637
- Kim, K. & Cohen, J.E., (2010) "Determinants of International Migration Flows to and from Industrialized Countries: A Panel Data Approach Beyond Gravity", *International Migration Review*, 44(4): 899–932
- Lewer, J.J. & Van den Berg, H., (2008) "A gravity model of immigration", *Economics Letters*, 99(1): 164-167
- Mayda, A.M., (2010) "International migration: a panel data analysis of the determinants of bilateral flows" *Journal of Population Economics*, 23:1249-1274
- Poveda, Alberto del Rey, (2007) "Determinants and consequences of internal and international migration: The case of rural populations in the south of Veracruz, Mexico", *Demographic Research*, 16: 287-314
- Richard J.C., (2005) "Internal Migration Determinants: Recent Evidence", *International Advances in Economic Research*, 11:267–274
- Ullah, A. A.K.M. (2010) *Population Migration and Asia: Theories and Practice*, EBSCO Publishing: eBook Academic Collection Trial
- Ullah, M.Sh., (2012) "Determinants of international labor migration from Bangladesh: a gravity model of panel data", <http://www.ritsumei.ac.jp/acd/re/ssrc/result/memoirs/kiyou25/25-06.pdf>
- World Bank, 2012, "Migration and Development Brief 12"
- Yang, X. & Guo, F., (1999) "Gender Differences in Determinants of Temporary Labor Migration in China: A Multilevel Analysis", *International Migration Review*, 33(4): 929-953.