

MIGRATION FLOWS AND THEIR DEMOGRAPHIC CONSEQUENCES IN THE COMMONWEALTH OF INDEPENDENT STATES*

1. INTRODUCTION

The collapse of the iron curtain and breakup of the former Soviet Union (fSU) set in motion vast migration flows. The implications of these flows for labor and housing markets and social disruption created concern among policy-makers in both sending and receiving countries. According to the State Committee of the Russian Federation on Statistics (SCRFS)¹, net migration flows to the Russian Federation (RF) from other Commonwealth of Independent States (CIS)² countries totaled 12.3 million between 1989 and 2009. Various estimates of migration from the CIS to the European Union suggest that as many as 13.5 million individuals might move between 2000 to 2050 (e.g. Mansoor and Quillin, 2006, p. 55). This stresses the importance of migration studies within the CIS where migration has become a complex social phenomenon influenced by changing political systems, diverging economic and demographic situations, and complex border management issues among the member states.

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¹ See e.g. the annual publications of SCRFS “Russia in Figures”, (2003-2010).

² Throughout this paper we will use the term Commonwealth of Independent States (CIS) as a mnemonic shorthand for the non-Baltic successor states of the former Soviet Union. In doing so, we are well aware that the Republic of Georgia withdrew from the CIS in 2008 and that Ukraine and Turkmenistan, although informally participating in some CIS programs, are not officially members.

Prior empirical studies of migration flows within the CIS include Andrienko and Guriev (2004, 2005), Gerber (2006), Korobkov and Zaionchkovskaia (2004), Korobkov (2007), Memedovic *et al.* (1997), Patzwaldt (2004), and Weiss *et al.* (2003). These have identified ethnicity, demographics, and political and economic factors as key determinants of migration (Cao and Nee, 2000). Quality of life issues are important determinants of migration within CIS countries (e.g. out-migration from the Northern and Eastern parts of Russia). Ethnic factors are a main force for migration between successor countries of the fSU with minority nationalities relocating to their newly independent national homelands. Most earlier work has, therefore, downplayed the impact of traditional labor market factors on immigration flows within the CIS, especially given that wage arrears and extensive bartering meant that standard market signals did not function or were not captured in the data (e.g. Cao and Nee, 2000). According to Gerber (2005), a relatively small fraction of migration (about 25%) within Russia was motivated by economic incentives in the 90s, while various non-economic factors such as educational opportunities, re-unification with family members, political reasons, climate and quality of life were more important determinants of internal migration flows. Other studies have, however, argued that the labor market variables operated in post-Soviet countries exactly as theory predicts (Andrienko and Guriev, 2004 and 2005; Heleniak, 2009). Lazareva (2008) stresses that immigration to Russia played an equilibrating role across Russian regional labor markets.

Empirical studies within the framework of traditional migration theories (e.g. Barro and Sala-i-Martin, 1991; Greenwood *et al.*, 1991; Pissarides and McMaster, 1990) are focused on the relationship between net migration and various factors, including wages, unemployment rates, geographic distance, satisfaction with the location of origin, attachment to local labor markets, institutional and legal conditions, family ties, and customs and cultural differences between immigrants and natives (Enchautegui, 1997; Fertig and Schmidt, 2000; Lazear, 1998). Many of these studies, however, ignore the forward looking nature of migration decision (see Gallin, 2004). Some studies add market uncertainty and risk in evaluating migration decisions (Chen *et al.*, 2003; Stark, 1991), using migration as a strategy to diversify risk. Thus, correlation between labor markets across countries and regions are key determinants of family migration decisions.

In the current study, we extend the investigation of the determinants of migration flows within the CIS to take into account income differentials between countries that create economic

incentives to migrate, the demographic situation and the forward looking nature of migrants' decision. After reviewing the earlier patterns of migration flow in the region, net migration flows are linked with differences in incomes *per capita*, population size, and path dependence of migration density per kilometer distance between capitals of the two countries. Based on this, the potential size of immigration flows to the Russian Federation from both the European, Caucasus and Central Asia parts are assessed. Then, the demographic consequences of such migration are analyzed. The bottom line is that despite widespread fears to the contrary, expected migratory flows will not create meaningful economic impacts and will be little affected by possible policy responses.

2. EARLIER PATTERNS OF MIGRATION WITHIN THE CIS

As a vast region with few geographic barriers, especially east of the Ural mountains, the territory of the fSU has long been subject to waves of human movement including those of the inhabitants of the Kievan Rus region towards Moscow in the 12th century and of the Mongols into the Russian heartland in the 13th century. Modern migration flows in the CIS are heavily influenced by prior movements dating back to the 19th century when Russian territorial borders were sharply extended towards the Caucases and Central Asia. In this period, under Alexander II, the Russian Empire initiated substantial reforms in education, government, and in the judiciary and military including a policy of agricultural colonization. Following the Crimean War of 1854 and the abolition of serfdom in 1861, Russia gained control of the Caucasus region although it was forced to deal with subsequent revolts of Muslim tribes under the leadership of the Chechen rebel³, Shamil. Following the pacification of the Caucasus region, the empire expanded into Central Asia. By 1868, Russian forces had occupied the territory of Turkestan and later, in the 1870s, incorporated the remaining Central Asian emirates into the empire. In 1881, the Turkmen lands on the Persian and Afghan border were added.

In the 20th century, the territory of the former Russian Empire expanded further. Between 1920 and 1945, the former Bukhara and

³ This example demonstrates that some of the current ethnic conflicts in the CIS have very old roots.

Khiva Emirates⁴, Western Ukraine, Western Byelorussia, Bessarabia, Northern Bukovina, the Baltic States, Tuva, and Königsberg (i.e. Kaliningrad) were incorporated into the Soviet Union. Migration from those regions, as well as in other economic and geographic peripheries of the former Empire, was intensified by urbanization and emphasized in Soviet planning between 1917 and 1941 for core republics such as Russia and Ukraine. After World War II, urbanization spread to other regions including Belarus, Moldova, Central Asia, and several eastern autonomous republics of Russia. Between the 1940s through the 1980s, the SU exhibited one of the fastest rates of urbanization in the world (Gang and Stuart, 1999). With the twin goals of urbanization and developing virgin lands with rich natural resources, the authorities of the SU intensively relocated citizens from the European regions towards the East, North-East, and South. Pockney (1991) and many others report that many civilians were taken forcibly from their homelands and scattered to newly incorporated territories in the eastern and southern regions of the SU.

These massive forced or induced population flows have largely been ignored in the economic literature since they were determined by political priorities rather than economic incentives. The studies that do exist are largely descriptive. Santalov and Segal (1927) report, for example, that about a quarter of the population in the former Russian Empire left the country immediately after the revolution of 1917. During the following years, between 1921 and 1933, between 4.0 and 5.5 million people emigrated abroad prior to the collectivization and repressions of the 1930s, when no emigration was possible (Pockney, 1991). Although emigration was almost impossible between 1937 and 1941, there was an unprecedented migration within the country primarily, from European territory towards the East and South. This was due to the collectivization policies of the early 1930s and repressions, largely victimizing intellectual elites during the late 1930s, followed by fleeing from the advancing German forces during the early stages of World War II.

After World War II, there was a second large wave of emigration during which between 8 and 10 million people left the SU, followed by a repressive period from the 1950s to the 1970s when emigration

⁴ The Bukhara Emirate and the Khiva Khanat, which were located in Central Asia, were included in the fSU in 1920 as parts of present Uzbekistan, Tajikistan, and Turkmenistan.

was almost impossible (Lewis and Rowland, 1979). A third wave of emigration started in 1988 when legislation was passed that allowed citizens of the SU to travel abroad by private invitation. As a result of this law, emigration increased by 2.5 times between 1987 and 1988, mainly consisting of individuals returning to their historical homelands or joining powerful foreign diasporas. Fassmann and Munz (1994) report that more than a third of these emigrants were ethnic Germans supported by the Federal Republic of Germany.

According to the Census of 2002, post-Soviet migration showed distinct geographic patterns with the main source countries to Western Europe being the European part of the CIS (84%). The total number of emigrants from Russia to outside of the CIS is estimated to have been approximately 1.2 million between 1989 and 2002, of which 59% went to Germany, 25% to Israel, and 11% to the USA (Andrienko and Guriev, 2005). During this period, the number of ethnic Germans in the CIS decreased by about 50%. The largest portion of these emigrants came from capitals and large cities. About 40% of emigrants from Russia previously resided in Moscow and St. Petersburg, while emigrants from Ukraine were primarily inhabitants of Kiev and Odessa, those from Belarus used to live in Minsk and the Gomel province, and those from Kazakhstan came from Alma-Ata and Karaganda province.

Ethnic factors played an important role in migration flows within the CIS (Korobkov, 2007; Korobkov and Zaionchkovskaja, 2004) both because of the migration of ethnic groups to the states in which they form a titular nation and migration to Russia by the members of all nationalities who had been assimilated into Russian culture (Locher, 2002). With the transformation of the SU into the CIS, about 73 million people became members of 'minority' ethnic groups in their country of residence. The largest fraction of these were ethnic Russians (26 million) living outside of Russia. There was an increase in the number of ethnic Russian refugees and accompanying groups (e.g. Russian speaking small ethnicities) due to ethnic and religious conflicts⁵ in the CIS resulting from controversies over political power, ownership, and citizenship created by a revival

⁵ Examples of these conflicts include the Nagorno-Karabakh conflict in Azerbaijan, conflicts between Kyrgyz and Uzbeks in the Osh region in Kyrgyzstan, between Uzbeks and Meskhetian Turks in the Fergana Valley of Uzbekistan, between Chechens and Ingushis in the Northern Caucasus, and the civil war in Moldova and Georgia.

of nationalism. The extent of these flows in recent years can be seen and Table 1.

TABLE 1 - *Migration Flow to and from Russia: 1980-2008*

	1980	1985	1990-2000	2001-2005	2006-2008	1980	2001-2005	2001-2005	2001-2005	2006-2008
	Thousands					percent				
<i>Immigration</i>	876	877	7908	804	755	100.00	100.00	100.00	100.00	100.00
CIS	841	847	7561	757	722	96.00	96.58	95.61	94.25	95.63
Other countries	35	30	347	46	33	4.00	3.42	4.39	5.75	4.37
<i>Emigration</i>	781	705	4321	471	141	100.00	100.00	100.00	100.00	100.00
CIS	733	666	3228	233	93	93.85	94.47	74.70	49.39	65.96
Other countries	48	39	1093	239	48	6.15	5.53	25.30	50.61	34.04
Net migration to Russia from other CIS states										
Total	108	181	4333	524	629	100.00	100.00	100.00	100.00	100.00
Azerbaijan	12	20	351	14	49	11.11	11.05	8.10	2.75	7.79
Armenia	5	9	201	24	76	4.63	4.97	4.64	4.49	12.08
Belarus	6	2	-3	-8	2	5.56	1.10	-0.07	-1.45	0.32
Georgia	10	13	373	28	26	9.26	7.18	8.61	5.35	4.13
Kazakhstan	34	70	1554	174	89	31.48	38.67	35.86	33.27	14.15
Kyrgyzstan	7	9	294	51	62	6.48	4.97	6.79	9.81	9.86
Moldova	3	3	79	27	36	2.78	1.66	1.82	5.14	5.72
Tajikistan	5	7	355	22	43	4.63	3.87	8.19	4.27	6.84
Turkmenistan	4	6	121	22	13	3.70	3.31	2.79	4.18	2.07
Uzbekistan	11	16	671	111	131	10.19	8.84	15.49	21.14	20.83
Ukraine	11	26	337	58	102	10.19	14.36	7.78	11.07	16.22

Source: SCRFS, Statistical Yearbook of Russia (2003-2010).

The European Core of the CIS

The European core of the CIS contains Belarus, Moldova and Ukraine, with a total population of about 203 million. Here Russia is the center of migration in the fSU, both receiving and sending a large fraction of migrants. According to SCRFS, about 5.2 million people emigrated from Russia between 1990 and 2008, the majority to other CIS states (75.5%). Outside the CIS, Germany (16.1%) and Israel (5.5%) were the largest recipients. During this period, SCRFS reports that approximately 9.6 million people entered Russia, mostly

from Kazakhstan (23.8%), Ukraine (20.3%), Uzbekistan (14.0%), Caucasus (15.7%), and other CIS countries (21.4%).

One key concern for Russia is the large size of irregular immigration. According to the International Organization for Migration (IOM, 2009, p.15), official estimates of irregular immigrants residing permanently in the Russian Federation in 2005 ranged from 3 to 5 million people. Moreover, about 12 to 15 million immigrants enter Russia every year for seasonal work, although the number of work permits obtained for foreigners by Russian employers annually is much fewer (range from about 300 thousand to 1.8 mln. between 2005 to 2008)⁶. Thus, the majority of foreigners are working illegally in Russia, mainly in shadow and informal parts of the economy (ILO, 2009; Andrienko and Guriev, 2005). Migration policies focus primarily on the reduction of irregular immigration. These policies include actions taken for simplifying cumbersome procedures in migration policies (Schenk, 2010).

The demographic situation in Russia is characterized by an imbalance in the geographic distribution of migration flows and an unequal distribution of population in terms of age structure across regions (Andrienko and Guriev, 2005). The large migration of young adults from rural areas to the central and southern parts of the country intensified in the 1990s, resulting in the depopulation of regions like Siberia and the Far East. Moreover, according to the forecasts of Russian demographers, the population of the country will decline by a further 10 million people between 2006 and 2025 (Voronina, 2006). This will create a decline in working age population by more than 1% per year. Migration policies, therefore, are focused on filling the growing labor gap with ethnic Russians. Return programs are implemented on a regional basis, depending on regional economic needs, which vary between industry and agriculture.

Ukraine, with a population of about 47 million, was even more affected by emigration than Russia. Between 1991 and 2004, about 4.5 million left. More than 2 million of these emigrants moved to Russia. Outside the CIS, migrants from Ukraine mostly went to the US, Canada, Argentina and the European Union. The number of immigrants coming permanently from other CIS states to Ukraine is estimated to have been about 2 million (Cipko, 2006). When

⁶ See e.g. <http://www.workpermit.com/news/2008-01-10/russia/russia-one-point-eight-million-work-permits-2008.htm>.

combined with falling birth rates (the country has the highest rate of natural population decrease in the world at -0.8%), net out-migration contributed to an actual decline in Ukraine's population. Because of a large number of Ukrainians leaving for abroad, the government of Ukraine has signed a number of bilateral labor agreements for the purpose of simplifying employment procedures for Ukrainian workers and protecting their rights in other countries⁷. These include, for example, an agreement on temporary labor migration with Portugal where Ukrainians form about 2% of the population. In 2005, Italy granted legal status to about 100,000 workers from Ukraine. The EU and Switzerland have announced that visa regimes for Ukrainian workers will be eased. According to Cipko (2006), however, relatively well educated Ukrainian citizens living in these and other European countries are mostly working in low-skilled jobs such as agriculture (harvesting fruits and vegetables), construction, care taking (of seniors, children and the sick) and services (hotels, cafeterias, restaurants, nightclubs).

Caucasus

The Caucasian countries, with a total population of 16 million, experienced a difficult state-building processes, accompanied by natural and human disasters with devastating economic effects. Areas of conflict include Nagorno-Karabakh or Karabakh between Armenia and Azerbaijan, attempts by various Georgian regions to secede (leading to the Russian invasion of Georgia in 2008) and secessionist conflict within Russia itself in the Northern Caucasus. As a result, ethnic and socio-economic tensions are a major push factor creating emigration. Between 1988 and 2005, almost 1 million people permanently left Armenia (Yeganyan, 2006), while about 2 million and 1.9 million emigrated from Azerbaijan and Georgia, respectively. Azerbaijan exports significant labor to the CIS, with about 75% of Azeri emigrants living in Moscow and other major Russian cities (Aliyev, 2006). Social and economic problems in the region are significantly mitigated by diaspora networks abroad, especially the large and prosperous Armenian diaspora. In 2011

⁷ The list of these countries includes: Belarus, Armenia, Moldova, RF, Latvia, Lithuania, Poland, Portugal, Spain and Slovakia.

remittances amounted to about 9% of the Georgian GDP and may have been as high as 15% of the Armenian GDP.

Central Asia

The countries in the Central Asian part of the CIS, with a population of 58 million people, diverged after the break-up of the fSU. Due to dynamic economic development and relatively high wages⁸, Kazakhstan became a major destination for labor migrants. Some are temporary migrants for seasonal work, with about one million illegal migrants coming every year from poorer neighboring countries, while others use Kazakhstan as a transit country before moving on to Russia and Europe. These 'transit' migrants include workers not only from Central Asia, but also from Eastern Russia, China, Turkey and Afghanistan (Buldekbaev, 2006): irregular immigrants compose 80% of all immigrants in the country. The Kazakh government has set annual quotas for foreign specialists in each industrial sector in order to protect the national labor markets. Many ethnic Russians and Germans, on the other hand, have left Kazakhstan, while over 300 thousand ethnic Kazakhs have returned since the beginning of the 1990s especially under special immigration quotas for ethnic Kazakhs (or 'oralmans') from Russia, Uzbekistan, Turkmenistan and Mongolia. Other countries in the region – Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan – are primarily migrant-sending countries. Various studies (e.g. IOM, 2005; Rios, 2006) indicate that migration outflow from these countries amounted to between 2 and 3 million from 1995 to 2005.

3. GRAVITY MODEL AND RECENT MIGRATION FLOWS WITHIN THE CIS

The discussion above suggests that the socio-economic, ethnic and political factors that have played important roles in migratory flows both from and within the CIS will also determine the direction, pattern and magnitude of future flows. In terms of economic and demographic factors, the CIS countries are characterized by large disparities. Table 2 contains selected economic and demographic indicators from the CIS countries in 2008, showing these differences.

⁸ The average wages in Kazakhstan was 250 USD, while the average salary in Kyrgyzstan and Uzbekistan was about 60 USD in 2005.

TABLE 2 - *Demographic and Economic Indicators: 2008*

Countries	Population			GDP		Inflation, Consumer Prices	Current Account Balance
	Total (million people)	Annual growth rates (%)	Urban (% of total)	Growth rates per 2008 (%)	<i>Per capita</i> (constant, 2000 USD)	Average rates per 2008 (%)	BoP (current, million USD)
Armenia	3.08	0.15	64.3	6.80	1 519.93	8.95	-1 382.85
Azerbaijan	8.68	1.14	50.0	10.80	2 131.23	53.43	16 453.64
Belarus	9.68	-0.22	72.8	10.02	2 484.77	14.84	-5 209.30
Georgia	4.31	-1.17	51.7	2.00	1 268.31	10.00	-2 915.13
Kazakhstan	15.67	1.22	55.9	3.20	2 377.65	17.15	6 595.27
Kyrgyzstan	5.28	0.82	33.9	7.60	375.87	24.52	-630.84
Moldova	3.63	-0.93	41.3	7.20	587.80	12.77	-987.39
Russia	141.95	-0.11	73.3	5.60	3 030.09	14.11	102 400.93
Tajikistan	6.84	1.60	24.5	7.80	244.96	20.47	47.57
Turkmenistan	5.00	1.32	45.6	9.80	1 700.20	14.54	3 560.00
Ukraine	46.26	-0.54	67.3	2.10	1 155.85	25.23	-12 763.00
Uzbekistan	27.31	1.65	36.5	9.00	839.57	12.75	3 562.00

Source: World Development Indicators, data extracted online from the *Countries and Economies* database.

For example, the greatest annual population decrease is in Georgia (-1.17%), while in Uzbekistan population increased by 1.65% a year. Generally, the European part of the CIS is characterized by a low ratio of children under 15 when compared to the Caucasus and Central Asia. In terms of economic growth rates, GDP growth rates in the CIS members fluctuated in a wide range, between -44.9% and 34.5% during the period from 1989 to 2008. Furthermore, although prior to 2004, the countries were converging in terms of GDP growth rates, after this date they largely diverged. Therefore, in terms of economic differentials, there is substantial impetus for increased migration flows.

One can assume that future migration within the CIS will largely depend on the relative socio-economic and political situation in the CIS, as well as migration policies. In particular, the situation in Russia, the major receiver of migrants within the CIS, will be important. If Russia achieves a high rate of economic growth and implements effective reforms in migration policies, a large number

of potential migrants can be absorbed by its labor markets. If conditions in Russia for accepting a considerable number of return migrants remain unfavorable, however, most migrants will naturally consider alternatives beyond the CIS. In order to estimate the size of potential net migration to Russia, a standard gravity model with the following specification is estimated:

$$\ln(M_{iRt}) = C + \alpha_1 \ln(Y_{Rt}/Y_{it}) + \alpha_2 \ln(P_{Rt}/P_{it}) + \alpha_3 \ln(MK_{iRt-4}) + e_{it}. \quad (1)$$

The dependent variable M in equation (1) denotes net migration flow from county i to country R (Russia) at time t . The terms Y , MK and P denote GDP *per capita*, migration density per kilometer distance between the capital cities and the population size of the countries, respectively. All variables are expressed in natural logarithms. The first term proxies wage differentials between the countries (Y_{Rt}/Y_{it}). Large wage differentials between countries should result in large migration flows, implying $\alpha_1 > 0$. One of the main priorities in the migration policy of receiving countries (e.g. Kazakhstan and Russia) is to meet their growing labor shortage by attracting ethnic Kazakhs and Russians, as opposed people from elsewhere. Thus, differences in the population size between two countries (P_{Rt}/P_{it}) should have a positive effect on net migration flows ($\alpha_2 > 0$).

We use the lagged value of migration density, a measure obtained by dividing the total number of migrants between a pair of countries by distance in kilometers between sending and receiving countries. The longer the distance between countries, the higher the transportation and information costs, which should affect the decision-making of potential migrants. The larger the previous flow, the lower these costs. In addition to these variables, country (D_{it}) and time dummies (D_{2t}) are employed which are assigned to control for unobserved heterogeneity across countries and years. Indexes i denote origin countries such that $I=1, \dots, 11$ and t stands for years such that $T=1, \dots, 15$. The data for GDP and unemployment are from the World Bank's World Development Indicators (The World Bank, 2010). The data for migration flows come from the annual publications of the SCRFSS (2003-2010), which contain official data for the period from 1990 to 2009.

Equation expression (1) is estimated using ordinary least squares (OLS), fixed effects (FE) as a least squares dummy variable (LSDV) model, and random effects (RE) models. Both level and first differenced data are used for estimations. The problems of autocorrelation and heteroskedasticity in the data are dealt with by adding lagged variables and using robust standard errors, correspondingly. When the OLS model is estimated on level data,

however, the hypothesis of no AR(1) serial correlation in residuals is rejected at the 5% significance level. OLS models should, therefore, be estimated using first differences, while panel data can be applied to variables specified in levels⁹. The OLS and RE models do not seem to satisfy the requirements for residuals being independently and identically distributed. Both the White and Hausman specification tests¹⁰ indicate that Fixed Effects, estimated as the LSDV model is the preferable specification. Therefore we focus on results from the LSDV model highlighted in Table 3.

TABLE 3 - *Estimation Results*

Variables		Coefficients				
Net migration flows from country i to country R at time t	$\ln(M_{iRt})$		Models estimated on:			
			First Differences		Levels	
Independent variables:			OLS	FE	LSDV (country dummies)	FE
GDP <i>per capita</i> _R /GDP <i>per capita</i> _i	$\ln(Y_{Rt}/Y_{it})$	α_1	1.2935 (0.4576)**	1.3530 (0.5826)**	2.1678 (0.6175)***	2.1678 (1.0910)***
Population size _R /Population size _i	$\ln(P_{Rt}/P_{it})$	α_2	1.2439 (0.4739)**	1.3798 (0.6021)**	1.9308 (0.6322)***	1.9308 (1.0961)***
Number of migrants per 1 km. of distances between the capital cities of countries i and R (with a time lag)	$L.\ln(MK_{iRt})$	α_3	-0.2822 (0.0854)**	-0.1991 (0.1229)*	-0.4191 (0.1608)**	-0.4191 (0.1601)**
Constant term		C	0.0562 (0.0393)	0.1176 (0.0290)***	-4.3219 (1.4307)**	-3.7163 (4.1029)*
Number of observations			143	110	121	121
Adjusted R-square			0.0731	0.0683	0.8381	0.4381

White Heteroskedasticity-consistent, robust standard errors: *, **, *** define 1%, 5% and 10% significance level, respectively.

Source: the authors' estimations.

As seen in Table 3, an increase in GDP *per capita* and population ratios between the countries cause larger migration flows. The sign

⁹ In the case of the FE model estimated on the level data, the H0 cannot be rejected at 5% significance.

¹⁰ The results of the tests are not reported but they are available upon request.

of the lagged migration density measure is negative, which suggests that greater distance or migration costs decrease the flows. Tests for the presence of statistically significant country and time effects suggest unobserved differences both across countries and years. These results are in line with a basic intuition that the CIS members are not a sample drawn randomly from full population of countries. On the one hand, they share common history, economic background and policies, therefore the correlated fixed effects are important. On the other hand, due to differences in e.g. pre-Soviet history, culture, religion and language, the assumption of significant unobserved heterogeneity across countries makes perfect sense, as the coefficients of the country dummies demonstrate (Table 4).

TABLE 4 - *Coefficients on Country Dummies in the LSDV Model*

Countries	Coefficients
Azerbaijan	Omitted
Armenia	-1.0439 (0.5015)**
Belarus	0.3981 (0.2954)
Georgia	0.2031 (0.3545)
Kazakhstan	4.4039 (0.5608)***
Kyrgyzstan	-1.9860 (0.7526)**
Moldova	-1.6244 (0.6531)**
Tajikistan	-2.7551 (0.8344)**
Turkmenistan	0.7769 (0.3765)**
Ukraine	3.8879 (0.6716)***
Uzbekistan	4.4018 (0.3307)***

Standard errors: *, **, *** define 1%, 5% and 10% significance level, respectively.

As shown in Table 4, a countries intercepts differ greatly. Keeping in mind that the omitted country is Azerbaijan, reported standard errors can be used to see which countries do and do not differ from each other, suggesting unobserved heterogeneity across

the countries. The reported coefficients are used in the computations of the immigration potential to RF. Assessing potential immigration to Russia from the CIS countries requires a number of assumptions regarding future differences. Our assumptions about future differences in the GDP *per capita* between countries are based on forecasts available in the reports of Economy Watch¹¹ and population forecasts made by ILO (2009)¹².

TABLE 5 - *Projected Net Migration Flows to RF from other CIS States*

Years	Net migration, thousand migrants			Net migration, % of total		
	OLS	Fixed effect	LSDV (country dummies)	OLS	Fixed effect	LSDV (country dummies)
<i>European Part</i>						
2010	49.93	52.28	60.40	23.41	23.81	16.14
2011-2015	203.96	206.67	166.07	24.73	24.93	16.92
2016-2020	137.28	181.61	98.87	26.37	27.13	22.57
2021-2025	91.81	151.69	55.58	27.21	28.08	24.43
<i>Caucasus</i>						
2010	55.42	51.56	36.95	25.98	23.48	9.87
2011-2015	218.94	190.52	97.15	26.54	22.98	9.90
2016-2020	144.71	165.49	56.54	27.79	24.72	12.91
2021-2025	98.45	141.22	31.77	29.18	26.14	13.96
<i>Central Asia</i>						
2010	107.95	115.76	276.97	50.61	52.71	73.99
2011-2015	401.92	431.88	718.22	48.73	52.09	73.18
2016-2020	238.66	322.38	282.71	45.84	48.15	64.53
2021-2025	147.13	247.34	140.18	43.61	45.78	61.61
<i>Total Net Migration to RF from all CIS Regions</i>						
2010	213.30	219.60	374.32	100.00	100.00	100.00
2011-2015	824.82	829.07	981.44	100.00	100.00	100.00
2016-2020	520.65	669.48	438.13	100.00	100.00	100.00
2021-2025	337.40	540.25	227.53	100.00	100.00	100.00
2010-2025	1 896.17	2 258.40	2 021.41	#	#	#

Source: the authors' calculations.

¹¹ See "Econ Stats: Economic Indicators for Countries, 1980-2015" (Economy Watch), <http://www.economywatch.com..>

¹² See "Total and Economically Active Population / Estimates and Projections, 1980-2020" (ILO, 2009).

Based on these projections and the estimated coefficients of the gravity model, the projected flow of migration to the Russian Federation from other CIS states is computed for the horizon period 2010 to 2025. Potential migration flows using various estimators are remarkable consistent, as seen in Table 5.

4. DEMOGRAPHIC CONSEQUENCES OF MIGRATION IN CIS COUNTRIES

Numerous CIS countries are ageing rapidly and are already experiencing declining populations. Migration has the potential to modify the age structure of the population, either positively or negatively. To evaluate the consequences of migration from a demographic perspective, we project the population composition under different migratory scenarios for three countries: Russia, Ukraine and Uzbekistan. These countries were chosen based on their size and the relative importance of migratory flows. In order to analyze the demographic consequences of migration flows we update population cohorts from 2005 by sex and by age with three components of demographic change: fertility, mortality and net migration. By applying survival probabilities according to age and sex, we estimate the surviving population for the following year. At the same time, the female fertility rate is applied to calculate the number of births expected during the year. Finally, net projected migration by sex and by age is added to the number of survivors at the end of the year.

TABLE 6 - *Assumptions Related to the Demographic Projections*

		Total fertility rate	Men life expectancy	Women life expectancy	Net Migratory flows
Russian Federation	Initial indicator	1.34	59.0	72.6	250.00
	Target value	1.71	68.5	77.9	250.00
Ukraine	Initial indicator	1.22	62.1	73.8	-100.00
	Target value	1.59	71.0	79.1	-100.00
Uzbekistan	Initial indicator	2.49	64.4	70.4	-200.00
	Target value	1.85	71.5	77.2	-100.00

Source: United Nations (2006).

The values used for the projection come from the United Nations (Table 6). Total fertility in all countries is assumed to converge eventually towards the level of 1.85 children per woman, except for countries where the total fertility rate was already far below 1.85 in 2000-2005 (Russia and Ukraine). Mortality is projected on the basis of models capturing projected changes in life expectancy produced by the United Nations Population Division under which gains are inversely related to current life expectancy. We then add projected net migration flows as developed in Section 4. The age distribution of migration flows for each country is based on standardized United Nations projections. As observed at the beginning of the period, most migrants (emigrants in the case of Ukraine and Uzbekistan; immigrants in the case of Russia) are young workers. We assume that the age distribution of net migration flows is constant over time whatever the migratory scenario. We present demographic projections under three migratory flow assumptions: 1) a 'no migration' scenario (benchmark), which exactly corresponds to the United-Nation's 'zero migration' variant; 2) a 'high migration' scenario which uses the status quo assumptions regarding convergence but an assumption of increase uncertainty; and 3) a 'low migration' scenario which uses the status quo assumptions regarding convergence without policy and uncertainty impacts. Projections results are given in Tables 7 to 9 for each of the three countries.

The first part of each table gives the 'No migration' results. Russia and Ukraine are clearly more affected by ageing than Uzbekistan. Both their total and working-age population decreases while Uzbekistan sees its population increasing during the next half century. Aging in Russia and Ukraine is largely the result of low fertility, far below replacement level. One common measure of ageing is the old age dependency ratio (i.e. the ratio of people aged 65+ to people aged 20-64). Again, the situation is totally different across our three countries. In Russia and Ukraine the old age dependency ratio more than doubles over the forecast period, reaching, respectively, 43.4% and 48.6% by 2050. This aging will raise numerous problems for pension schemes since the burden of the retirees will grow spectacularly. On the contrary, this ratio in Uzbekistan is clearly lower, reaching the level in 2050 that prevails in Russia today. Increasing the size of the working age population through international migration (or limiting the departure of young people to foreign countries) could be a method in the short and medium term to reduce increases in the projected dependency ratio.

TABLE 7 - *Demographic Consequences of Migration in the Russian Federation*

	2005	2010	2020	2030	2040	2050
No migration						
Net migration flows (in thousands)	0	0	0	0	0	0
Total population (in thousands)	143 953	140 054	131 564	122 449	113 660	105 018
Age group (% of population):						
<20	23.5	20.8	21.2	19.9	18.9	19.9
20-65	62.7	66.6	63.8	61.0	60.5	55.9
65+	13.8	12.6	14.9	19.1	20.5	24.2
65+/20-65	22.0	18.9	23.4	31.3	33.9	43.4
Scenario 1						
Net migration flows (in thousands)	272	285	417	417	417	417
Net migration flows (% of population)	0.19	0.20	0.31	0.34	0.36	0.38
Total population	143 953	140 326	132 470	124 314	116 568	109 010
Age group (% of population):						
<20	23.5	20.8	21.3	20.0	19.1	20.1
20-65	62.7	66.6	63.9	61.2	60.8	56.3
65+	13.8	12.6	14.8	18.8	20.1	23.6
65+/20-65	22.0	18.8	23.2	30.8	33.1	41.9
Scenario 2						
Net migration flows (in thousands)	186	227	197	197	197	197
Net migration flows (% of population)	0.13	0.16	0.15	0.16	0.17	0.18
Total population	143 953	140 240	132 210	123 569	115 278	107 152
Age group (% of population):						
<20	23.5	20.8	21.2	20.0	19.0	20.0
20-65	62.7	66.6	63.9	61.1	60.7	56.1
65+	13.8	12.6	14.9	18.9	20.3	23.9
65+/20-65	22.0	18.9	23.3	31.0	33.4	42.6

Source: the authors' calculations.

The second two panels in Tables 7 to 9 present the demographic consequences of migration flows in the context of two reasonable scenarios. Only Russia, however, is characterized by inflows and these have a minor impact on dependency ratios. In the case of the Russian Federation, the contribution of net positive flows is relatively weak. Indeed, the total population is only 3.8% higher (2% for the second scenario) in 2050. The size of the working age

TABLE 8 - *Demographic Consequences of Migration in Ukraine*

	2005	2010	2020	2030	2040	2050
No migration						
Net migration flows (in thousands)	0	0	0	0	0	0
Total population (in thousands)	46 918	45 273	42 004	38 612	35 268	31 984
Age group (% of population):						
<20	22.4	19.8	18.8	17.9	16.8	17.3
20-65	61.6	64.6	64.1	61.4	60.5	55.6
65+	16.1	15.6	17.1	20.7	22.8	27.0
65+/20-65	26.1	24.1	26.6	33.7	37.6	48.6
Scenario 1						
Net migration flows (in thousands)	-128	-122	-116	-116	-116	-116
Net migration flows (% of population)	-0.27	-0.27	-0.28	-0.31	-0.34	-0.38
Total population	46 918	45 145	41 616	37 959	34 341	30 780
Age group (% of population):						
<20	22.4	19.8	18.8	17.8	16.6	17.2
20-65	61.6	64.6	64.0	61.2	60.2	55.2
65+	16.1	15.6	17.2	21.0	23.2	27.7
65+/20-65	26.1	24.2	26.9	34.2	38.5	50.1
Scenario 2						
Net migration flows (in thousands)	-93	-86	-80	-80	-80	-80
Net migration flows (% of population)	-0.20	-0.19	-0.19	-0.21	-0.23	-0.26
Total population	46 918	45 180	41 728	38 152	34 620	31 145
Age group (% of population):						
<20	22.4	19.8	18.8	17.8	16.7	17.2
20-65	61.6	64.6	64.1	61.3	60.3	55.3
65+	16.1	15.6	17.2	20.9	23.1	27.5
65+/20-65	26.1	24.1	26.8	34.1	38.3	49.6

Source: the authors' calculations.

population is also slightly higher, but the old age dependency ratio is reduced by only 1.5 percentage points in even the more optimistic scenario at the end of the projection period. In fact, migration flows vary between 187 thousand and 417 thousand per year and represent less than 0.4% of the total population. The other two countries are characterized by net migration outflows. In the case of Ukraine, which will be strongly affected by demographic ageing, migration outflows reinforce the consequences of ageing though the departure of young people to Russia and Western Europe. Given

TABLE 9 - *Demographic Consequences of Migration in Uzbekistan*

	2005	2010	2020	2030	2040	2050
No migration						
Net migration flows (in thousands)	0	0	0	0	0	0
Total population (in thousands)	26 593	28 796	32 963	35 940	38 283	39 677
Age group (% of population):						
<20	44.9	40.7	35.1	30.3	26.3	24.6
20-65	50.3	54.9	59.7	61.4	62.9	61.2
65+	4.7	4.3	5.2	8.2	10.8	14.2
65+/20-65	9.4	7.9	8.7	13.4	17.2	23.3
Scenario 1						
Net migration flows (in thousands)	-52	-50	-49	-49	-49	-49
Net migration flows (% of population)	-0.19	-0.17	-0.15	-0.14	-0.13	-0.13
Total population	28 593	28 745	32 793	35 650	37 864	39 126
Age group (% of population):						
<20	44.9	40.7	35.1	30.4	26.3	24.6
20-65	50.3	54.9	59.7	61.4	62.8	61.1
65+	4.7	4.3	5.2	8.3	10.9	14.3
65+/20-65	9.4	7.9	8.7	13.5	17.3	23.4
Scenario 2						
Net migration flows (in thousands)	-47	-47	-46	-46	-46	-46
Net migration flows (% of population)	-0.18	-0.16	-0.14	-0.13	-0.12	-0.12
Total population	26 593	28 749	32 806	35 671	37 894	39 164
Age group (% of population):						
<20	44.9	40.7	35.1	30.4	26.3	24.6
20-65	50.3	54.9	59.7	61.4	62.8	61.1
65+	4.7	4.3	5.2	8.3	10.9	14.3
65+/20-65	9.4	7.9	8.7	13.5	17.3	23.4

Source: the authors' calculations.

that forecasted flows are relatively small, however (less than 0.4% of the total population), these will not destabilize the age pyramid in any catastrophic way.

As previously seen, Uzbekistan is in a totally different situation from the other countries since its total population (as well as its working age population) will continue to increase during the next half century without migration. Net migratory outflows are lower than in Ukraine and will have limited demographic consequences.

5. CONCLUSION

This paper reviews migratory flows within the CIS, focusing on net immigration to RF from other CIS members. Based on the gravity model of migration, the potential size of net migration flows are proposed for the period from 2010 to 2025. In addition to income differentials, differences in the population size and migration costs, the forward looking nature of migration is controlled by the lagged values of migration density. This measure incorporates the network of migrants, transportation and information costs which are important in the decision-making process of potential migrants. Tests for the presence of statistically significant country and time effects detected unobserved differences across countries and years. The test statistics also revealed that a single overall time trend cannot be used for all countries within the CIS. The FE estimated as a LSDV model is preferable because: first, the CIS members share common history, economic background and policies, therefore the correlated fixed effects are important; second, since the CIS members vary (e.g. culture, religion and language), the assumption of significant unobserved heterogeneity across countries makes a very good sense.

The coefficients on the independent variables have the expected signs. An increase in the ratio of GDP *per capita* and population size between the countries causes larger migration flows, while gaps in the distance or migration costs decrease the flows. The potential of net immigration to Russia from the CIS countries are estimated at about 2 mln. individuals for the horizon from 2010 to 2025. Based on these flows, the consequences of migration are evaluated in terms of their ability to mitigate future population aging in RF. We conclude that further demographic ageing is inevitable over the next decades, although the rate differs across the three countries. In Russia and Ukraine, the dependency ratio, or the ratio of retirees to

the working population, should double. The study also shows that migratory flows will not have a significant impact on these trends unless there are massive unanticipated increases.

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ABSTRACT

Migration in the Commonwealth of Independent States (CIS) has become a very complex phenomenon due to changing political systems, diverging economic and demographic situations, and issues related to border management in the successor states to the former Soviet Union. In this paper, we empirically analyze net migration flows to the Russian Federation, the largest destination of within-CIS migration. The results show economic incentives and demographic factors to be important determinants of migration flows. We further find that population ageing is almost inevitable over the next decades even accounting for projected migration. Indeed, the dependency ratio, or the ratio of retirees to the working population, may double in some CIS countries. We conclude that reasonably and economically motivated migratory flows will have no significant impact on these trends.

Keywords: Migration Flows, Demography, Labour Market, the CIS States, Population

JEL Classification: J01, J11

RIASSUNTO

Flussi migratori e conseguenze demografiche nella Comunità degli Stati Indipendenti

Le migrazioni nella Comunità degli Stati Indipendenti (CSI) sono

diventate un fenomeno molto complesso a causa dei sistemi politici in cambiamento, delle situazioni economiche e demografiche divergenti e dei problemi relativi alla gestione delle frontiere negli stati che si sono formati dall'ex-Unione Sovietica. Questo studio analizza empiricamente i flussi migratori verso la Federazione Russa, la destinazione più frequente tra le migrazioni all'interno della CSI. I risultati mostrano che incentivi economici e fattori demografici sono motivazioni importanti per spiegare i flussi migratori. Inoltre vi sono evidenze che l'invecchiamento della popolazione è pressoché inarrestabile per i prossimi decenni, anche in caso di migrazioni programmate. In particolare, il rapporto tra pensionati e lavoratori potrebbe raddoppiare in alcuni paesi della CSI. La conclusione è che flussi migratori ragionevolmente ed economicamente motivati non avranno effetti significativi su queste tendenze.