

# Spillover Effects of Sanctions on Migration and Remittances (the Case of Transition Economies)

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## Abstract

We study possible spillovers of the economic sanctions against the Russian Federation on changes in migrant stock and remittance flow between this country and transition economies, and vice versa. This analysis focuses on twenty-seven transition economies of the Former Soviet Union, and Central and Eastern Europe. We use gravity models to assess the impact of sanctions for the period from 2014 to 2019. Using Poisson pseudo-maximum likelihood (PPML) econometric technique, we show that emigration from transition economies to Russia declined as a result of imposed Western and US sanctions. We also estimate that the sanctions significantly contracted the flow of remittances to transition economies from Russia. A 1% increase in Western/US sanctions resulted in the decline of emigration by 11/9 individuals and of remittances to transition economies by \$0.014/0.01 million. In light of our further findings that the flow of migrant remittances to transition economies from Russia also had a function of poverty alleviation through providing financial means to the families with higher numbers of dependent elderly and children as well as to the countries with higher levels of income inequality, we conclude that their contraction affected the most vulnerable groups of population of those countries. Our recommendation is, simultaneous to imposing sanctions against a large open economy, to provide targeted financial aid of welfare nature to its neighboring small open economies, which would restore the distortions spilled over by sanctions.

## JEL classifications:

**Keywords:** Sanctions, Migration, Remittances, Transition economies, Spillover effects, Gravity models.

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## **1. Introduction**

During last decades the economic sanctions have been gaining importance as a strategic tool for resolving severe conflicts between foreign powers. The literature provides volumes of studies with assessment of the full-scope economic impact that the sanctions may produce in target countries. Thus, the attention of researchers covers two main debates applied to target countries. In the first case, they assess the effectiveness of imposed sanctions measured as the depth of the economic shock produced in receiver countries. Other studies evaluate the overall improvements in political and/or human rights conditions which had caused the imposition of sanctions against target countries. More recent literature also studies the impact of sanctions on sender economies. However, the literature on possible spillover effects of sanctions into third-party countries is comparatively scarce and is falling behind particularly applied to the research on movement of human capital and related changes in private remittance flows. The motivation for this study is to fill the outlined gap and produce an analysis that would assess the medium-term spillovers of sanctions imposed against Russia into transition economies. Here, we measure the economic spillovers in terms of the changes in migration stock and corresponding shifts in private remittance flows received in transition economies from Russia, and vice versa. In the literature the term “transition economies” is used to cumulatively refer to the countries of the Former Soviet Union (FSU), and Central and Eastern Europe (CEE) (Gevorkyan, 2018).

The first round of Western sanctions against the Russian Federation was imposed in March of 2014. Since then, researchers have thoroughly studied the impacts of these sanctions on the economy of Russia. Overall, researchers have not developed a final consensus about the extent of shock these sanctions produced in the target country. Although, there is an agreement that the economy of Russia experienced significant contraction in 2014-2015, the views of

economists about the causes of this decline were divided. Thus, some studies assessed that the GDP fluctuations were primarily due to a sharp decline in the world price of oil. Other studies estimated that both the change in the price of oil and imposition of Western sanctions were direct contributors to Russia's economic slowdown. Notwithstanding the described attention to Russia's economy from 2014 onward, the literature remains quite limited in terms of assessing a wider scope of the impact these sanctions may have produced and their possible economic spillovers into other, likely, smaller economies neighboring Russia. The scarce but growing literature studying the impact of Western sanctions against Russia on transition economies has already evaluated some economic aspects of these spillovers into transition economies in terms of contraction of domestic GDP, reduced bilateral trade, decline in infrastructure development, and decrease in direct investments (Makhmutova, 2019; Sedrakyan, 2021; Veebel, 2021).

De Haas (2009) asserts that the income earning related obstacles of source countries are the main motive for migration. Over time, this general approach has been revisited with the studies assessing that migration and corresponding changes in remittance flows are the product of much broader societal issues. These factors include but are not limited to income earning risks, income inequality, lack of investments in human capital (e.g., education), gender inequality, birth and death rates, ethnic relations, political instability, and environmental issues (De Haas H., 2009).

Although, one of the primary concerns of this study is the private remittance flows which represent the largest component of the diasporic contribution of emigrated population to the development and poverty reduction of the source country, other forms of diaspora assistance are also discussed in the literature. These programs include collective transfers of various kinds through charitable donations and home town associations, as well as support through diaspora

NGOs, social and political lobbying, and commercial and financial investments by diasporans in source countries (Van Hear et al., 2004). However, the lack of relatively precise and recurrent data associated with the listed assistance programs to countries of origin bounds us only to the analysis of private remittance flows. The latter determinant is available through the World Bank and United Nations' corresponding databases.

To proceed with evaluations, we use two gravity models of bilateral migration and bilateral remittance flows. These models enable assessment of the medium-term spillover shocks from the sanctions against Russia into transition economies. To best address the specifics of the dataset, the Poisson pseudo-maximum likelihood (PPML) econometric tool is used for this analysis.

The novelty of this study is twofold. Despite the vast interest of researchers to the topic of sanctions, the literature is yet to assess the full scope of arising economic implications they may cause. One of those topics of interest is the spillovers of sanctions into third-party countries particularly applied to the case of changes in migration and corresponding flow of remittances in transition economies. This paper fills that gap and contributes to the existing literature by focusing on the spillovers of sanctions against Russia into transition economies and evaluating the aforementioned bilateral macroeconomic changes between Russia and transition economies. We also use the newly developed dataset of the Western sanctions against Russia from Sedrakyan (2021), which provides the estimates of sanctions from 2014 to 2018. These data will be used to assess the impact of sanctions on migration and remittances for the first time.

This paper is structured as follows. The literature review is discussed in section 2. Section 3 discusses the data and their modifications used in the analysis. Section 4 outlines the

econometric methodology used in the paper. The summary of the findings is provided in section 5. Section 6 concludes the study.

## **2. Literature Review**

The existing literature suggests various socio-economic channels through which the sanctions may impact target countries. Traditionally, the research in the field of sanctions assesses the impact of these macroeconomic shocks by evaluating the level of fluctuation in trade of target countries. It is believed that higher economic integration between countries raises the economic cost of sanctions through disrupted flow of commerce for both parties and, therefore, reduces possibilities of imposing sanctions against partner countries (Doyle, 1997; Gartzke et al., 2001; Schneider et al., 2003; Lektzian and Biglaiser, 2013 b). Neuenkirch and Neumeiers (2016) paper studies the impact of sanctions on the increased poverty gap in target countries for the period of 1982-2011. These negative effects have a long-lasting nature and become more severe if the sanctions are imposed multilaterally. Garfield (2002) estimates that sanctions may have negative consequences in terms of reduced access to healthcare and pharmaceutical services. Lopez (2000) concludes that sanctions may cause constrains for access to food and clean water. Daponte and Garfield (2000) estimate that sanctions may even reduce the overall life expectancy and result in higher levels of infant mortality in target countries. The literature also finds a negative relation between the imposed sanctions and FDI from the source. Using the panel data for 171 countries for 1969-2000, Lektzian and Biglaiser (2013 a) estimate two important connections. They assess that, on the one hand, the sanction-driven decline in the flows of US FDI to targets enables the global FDI to replace them. On the other hand, they assess that the sanction-driven policy changes in targets are moderate. Therefore, their analysis concludes that

the US sanctions may be counterproductive particularly for the US firms which, due to the sanctions, forgo their profitable opportunities in targets. In another study, these authors assert that having higher levels of FDI flows from the US will significantly diminish a country's capacity for becoming a target of the US sanctions (Lektzian and Biglaiser, 2013 b).

The positive link between the level of migration and remittance inflow to source economies has been widely discussed in the literature (Brown R.P.C., 1997; Adams and Page, 2005; Lim and Morshed, 2015; Lim and Basnet, 2017). Thus, Brown R.P.C. (1997) studies the change in the level of migration on the volatility of remittances received in source countries of Tonga and Western Samoa. This paper considers not only the fact of migration but also the length of absence and migrant earnings. It estimates the invalidity associated with the hypothesis of remittance decay in these countries and suggests that the level of remittances does not decline over time. Lim and Basnet (2017) use the panel data on five South Asian countries for 1975-2011 to estimate whether the duration of migration had any impact on the propensities either to spend or to save. They estimate that the short-term work migrants' remittances increase income and, therefore, contribute its share to savings, while consumption remains unaltered in countries of origin. Adams and Page (2005) construct a dataset on international migration, remittances, inequality and poverty from 71 developing countries and use it to estimate the impact of country's increased share of migrant population on reduced poverty. Their estimates suggest that a 10% increase in the migrant population reduces the share of people living on \$1 or less by 2.1%. Another study, by Lim and Morshed (2015) assesses that during economic contractions, an increase in remittances is not driven by the migrants residing in remitting countries who try to increase savings for sending more to their countries of origin. They estimate that this rise in

remittances is rather accelerated by an increase in the number of emigrants, who consider sending a share of their earnings to family members left behind to be a self-enforced contract.

We also find that the literature studying the relation between Western sanctions and their effects on migration and remittances associated with transition economies is very limited. Thus, Khitakhunov et al. (2017) discuss political and economic situation in the Eurasian Economic Union (EAEU). Their work particularly focuses on the period when the first Western sanctions were imposed. Although they do not create a direct link between the sanctions and their impact on migration, they talk about the fluctuations in the Russian ruble, which was impacted by sanctions, and relate it to the decline in the value of remittances received by the EAEU partner countries from Russia. In contrast, the literature provides studies on the impact of sanctions on migration associated with other episodes of sanctions. Thus, Schulz and Batalova (2017), and Connell et al. (2021) focus on the effects of the early 1990s US economic sanctions against Haiti, which came as a response to a government coup which ousted then President Jean-Bertrand Aristide. These sanctions had severe implications on Haitian economy in terms of decline in GDP, contraction of trade, and rise in unemployment rate and malnutrition. As a result, during the outlined period, the emigration from Haiti significantly increased with the US becoming the top destination for these migrants. Connell et al. (2021) use the data from the Threat and Imposition of Sanctions (TIES) database and estimate that sanctioned countries are usually associated with much higher levels of emigration in the following years.

### **3. Data**

To analyze the impact of sanctions on bilateral migration and remittance flows between the Russian Federation and transition economies, we construct a dataset with the socio-economic, geographic and demographic determinants, which are commonly used in the literature as explanatory variables in gravity models of migration and remittance flow. The data are summarized in *Table 1* and the corresponding discussion is provided below.

#### **3.1. Endogenous variables**

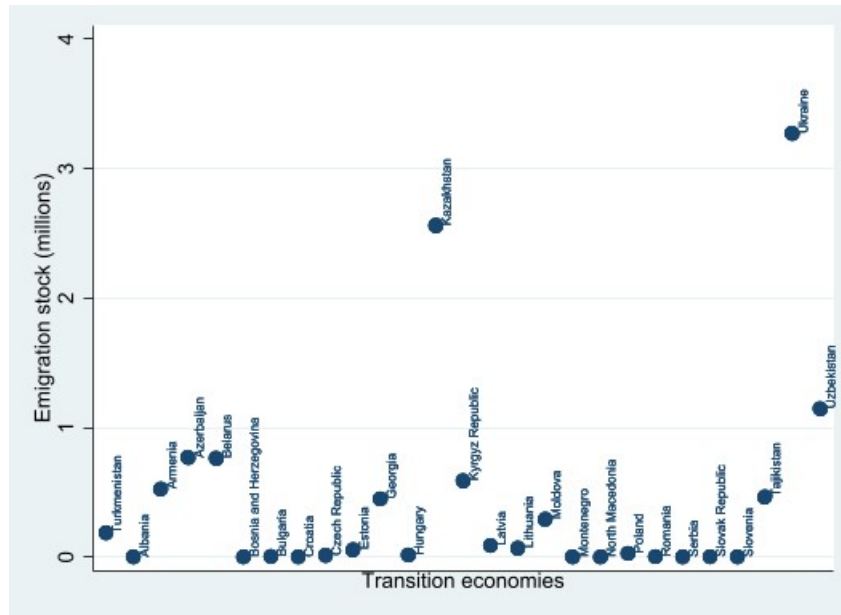
##### **Bilateral migration**

Both, the World Bank and the United Nations report data on bilateral migration. We use the dataset of the international migration stock, which reports the data on migrant population by destination and origin compiled by the United Nations (United Nations, 2019). The data are reported every five years since 1990 onward. To provide a general overview, the total number of emigrants from the rest of the world who eventually decided to reside in the Russian Federation grew by 4 percent, from 11.19 million to 11.64 million, for the period from 2010 to 2015, which is 1 year after imposing the first round of Western sanctions against this country. Of total emigrant population moving to Russia, the share of emigrants from transition economies consistently comprises about 97 percent. Notably, the immigration of individuals of Russian origin to other countries grew by less than 1 percent for the same period of 2010-2015. However, the comparison of these data for a longer duration, 2010 vs. 2019, suggests a much larger increase, about 4 percent, in this ratio. Thus, for the mentioned period the total number of people of Russian origin who immigrated to other countries increased from 10.12 million to 10.49 million.



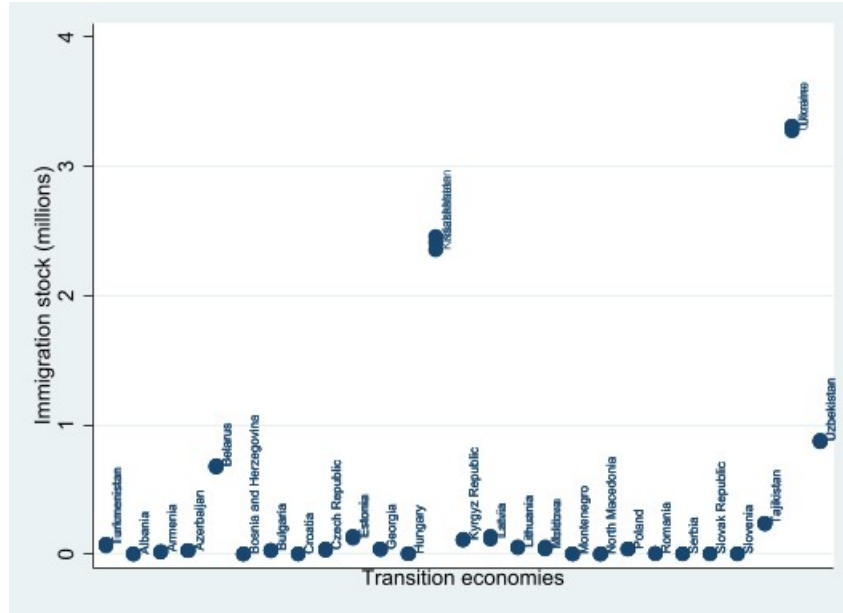
The newest UN dataset on migration in addition to the five-year distribution also includes the data on 2019. The archived data on 2017 were added to the working dataset, which allowed us to test the impact of sanctions for three consecutive periods, from 2015 to 2019, with the two-year frequency analysis.

Figure 1. Total number of emigrants from Transition Economies moving to Russia (2019)



To balance this described dataset, the model specifications were adjusted to set up the time as delta 2, versus more commonly applied 1 year. Figures 1 and 2 show the total number of individuals emigrated from a respective transition economy, country of origin, to Russia, the destination country, and vice versa, commonly denoted in the literature as migrant stock. Current analysis captures twenty-seven transition economies, the latter denotes a group of countries of the former Soviet Union, and Central and Eastern Europe also shown in Figures.

Figure 2. Total number of immigrants from Russia in Transition Economies (2019)



### Bilateral remittances

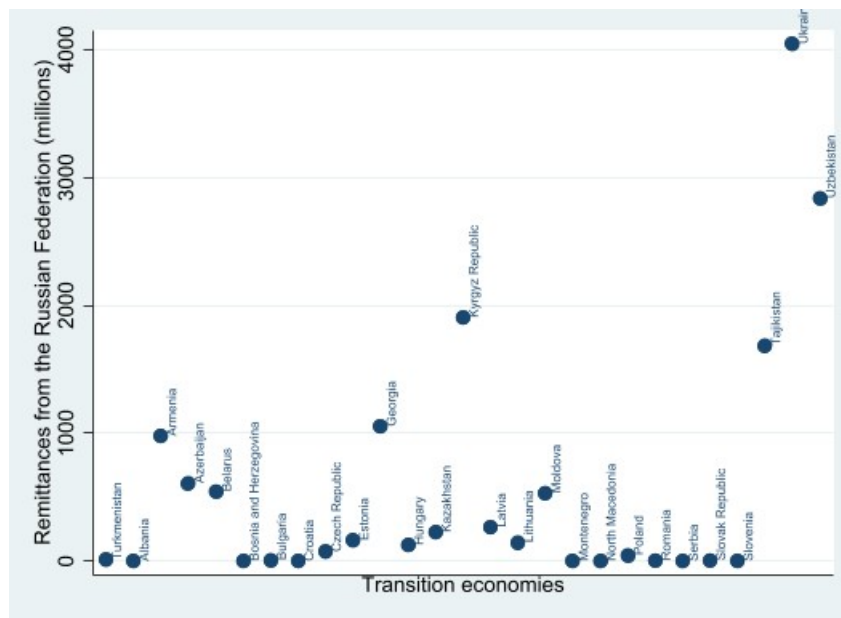
According to the World Bank data on bilateral remittances, Russia was the third largest country, after the US and Saudi Arabia, in terms of serving as the source of remittance outflow in 2013, one year prior to becoming a target of sanctions. Due to the economic slowdown of 2014, the remittance outflow from Russia declined by 38 percent, from \$23,469 million to \$14,547 million, in the period from 2013 to 2015. Notably, the world remittance outflow for the same period increased by 4.22% from \$557,083 million to \$580,594 million. This sharp decline of remittances from Russia was particularly severe for the transition economies, the destination of about 95% of remittances sent from Russia in 2013. Of those, the countries of the former Soviet Union were the recipients of the largest, about 99 percent, share or about \$22,095 million.

The variable representing remittances consists of two main components, i.e., personal transfers and compensation of employees. In this setting the migrants' personal transfers are the remittances sent not only to the family members but also to anyone in the home country by

migrants residing in the host country over one year. We extract the information on bilateral remittance flows from the Russian Federation to another transition economy, and vice versa.

*Figure 3* represents the distribution of remittances sent from Russia to transition economies in 2017. During that year, of the total volume of remittances sent from the Russian Federation to the world (USD 16,503 million), of which 93 percent went to the countries of this study.

*Figure 3. Remittances sent from the Russian Federation to transition economies (2017)*

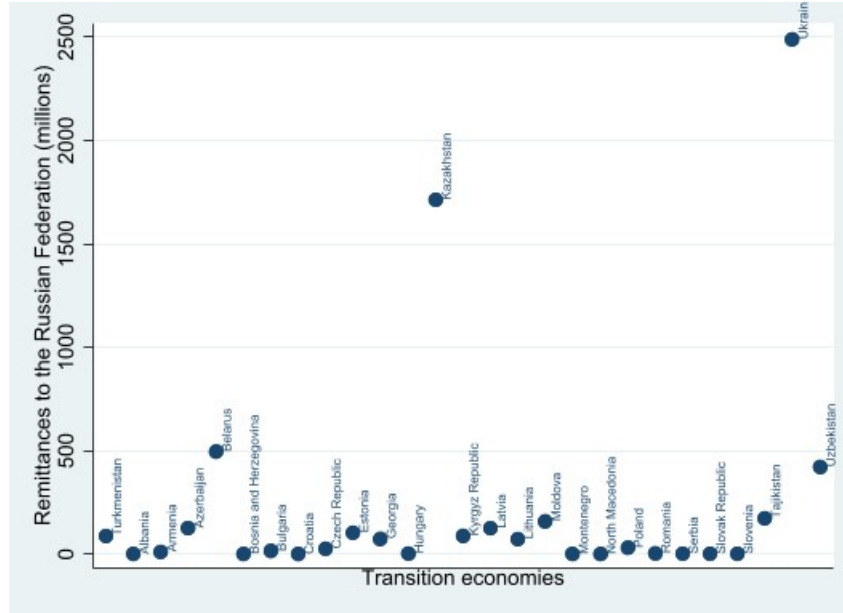


In contrast, *Figure 4* represents the flow of remittances from transition economies to the Russian Federation in 2017.

The availability of the data on bilateral remittance flows is also limited. Although, the annual aggregate data on inflows and outflows of remittances per country is publicly available; currently, the disaggregated data on bilateral remittance flows between country pairs is not.

Thus, for this analysis we are using archived datasets on bilateral remittances, which covers the period of 2014-2017. They were retrieved from the World Bank database in September, 2019.

Figure 4. Remittances sent from transition economies to the Russian Federation (2017)



### 3.2. Exogenous variables

#### 3.2.1 Sanctions

The first Western and US sanctions against the Russian Federation were imposed on 6<sup>th</sup> March, 2014. This came as a response to the Russia’s activities in Ukraine and, in particular, annexation of the Crimean Peninsula. Initially, the sanctions took a more targeted approach in the form of visa restrictions and asset freezes imposed against the Russian and Crimean individuals. The early sanctions by the European Union and the US were imposed against 21 and 11 individuals, respectively. During the same month, more individuals were added to that list. Very soon, the sanctions became more severe, as, first, they captured a wider scope including targeted entities, such as Bank Rossia and Crimean Chernomorneftegaz oil company. Then, the whole sectors of economy were targeted by sanctions, e.g., the US sanctions on Russia’s imports of the US goods contributing to the former’s military capabilities (28<sup>th</sup> April, 2014). In addition to the Crimean crisis, the sanctions against Russian individuals were imposed for human rights

violations, also known as Global Magnitsky Act. Finally, the US unilaterally imposed sanctions against Russia for interference in the 2016 US presidential elections. As a response to the imposed sanctions, Russia retaliated and enacted reciprocal sanctions against sanction imposing countries. They targeted certain sectors, e.g., imports of agricultural products, and individuals. In this analysis, due to the objective of our study, the focus is on the Western sanctions against Russia.

We are using the dataset of the Western sanctions against Russia constructed in Sedrakyan (2021). This dataset compiles the information on all sanctions imposed against Russia for the period from 2014-2018. It assigns a value to each episode of sanction and this estimate reflects several characteristics, which include the level of pre-indictment economic integration with the sanction imposing country, time coefficient, and type of a sanction. The level of economic integration represents the share of trade that the sanction imposing country had in Russia's trade in the last five years (2009-2013) preceding the indictment. The time coefficient takes into consideration the month and year when the sanction was imposed. The type coefficient breaks down the sanction into four main subgroups, viewing them as having exclusively political context (expelling diplomats) and as imposed against individuals, entities and sectors of the economy. The literature suggests that the economic impact will diverge due to the types of sanctions (Neuenkirch and Neumeier, 2016; Dreger et al., 2016; Sedrakyan, 2021). The dataset we are using also reflects this notion by assigning numbers 1, 2 or 3 to a sanction, where the ascending order represents a more severe economic shock to a target. Thus, it assumes that a deeper economic shock may be caused by sectoral sanctions, therefore number 3 is assigned to this type. Conversely, a milder economic shock will be expected from sanctions imposed for political narrative or against individuals; therefore, the dataset assigns number 1 to these types.

*Table 1* includes the descriptive statistics defining both the Western sanctions and the disaggregated US sanctions.

### **3.2.2 Other exogenous variables**

The macroeconomic data included in this analysis as control variables is mostly available through the World Development Indicators (WDI) online database produced by the World Bank. These data include GDP per capita of transition economies and Russia, population size, population density, unemployment rate, Gini coefficient, enrollment ratio in secondary education, and life expectancy. We use the United Nations conference on trade and development database (UNCTAD) to collect information on two ratios measuring the dependence of old age population and of children. Both are estimated as ratios of the number of people in the mentioned groups of interest and hundred individuals aged 15-64. The rate of inflation is compiled using two sources- the WDI and UNCTAD datasets. The Gini coefficient is retrieved from the World Development Indicators. This coefficient ranges from 0 to 100 where higher levels reflect those societies where the income across population is more unevenly distributed; in other words, the level of inequality is higher. Thus, for the four countries of interest without reported data we assign coefficients in the range of [41 – 42]. This is 1 unit above the highest inequality coefficient reported by a country included in the dataset. Here the assumption is, that the missing data would most likely reflect comparatively higher inequality coefficients which countries are trying to conceal by not reporting them. The distance is estimated by using the Google maps applications, which enables assessment of the direct distance between the capitals of the countries included in the study, where Moscow, the capital of Russia, is one of the capitals in each country pair. For the quality of governance, the determinant of political stability and

Table 1. Descriptive statistics and data sources

Variables	Description	Mean	Std. Dev.	Min	Max	Source
Dependent variables						
$Em_{it}$	Emigration from TE to Russia (stock) (million)	0.419	0.779	0.00	3.272	United Nations
$Imm_{jt}$	Immigration from Russia to TE (stock) (million)	0.305	0.762	0	3.310	United Nations
$R_{jt}$	Remittances from Russia to TE (millions)	568.755	1021.728	0	5,653.000	World Bank, Migration and Remittances Data
$R_{it}$	Remittances from TE to Russia (million)	210.723	510.460	0	2,489.817	World Bank, Migration and Remittances Data
Independent variables						
$SanW_t$	Sanctions West (unit)	20.079	5.059	14.618	26.753	Sedrakyan G., 2021
$SanUS_t$	Sanctions US (unit)	4.237	1.479	2.638	6.186	Sedrakyan G., 2021
$GDP_{it}$	GDP per capita transition econ	9,336.074	6,582.501	807.103	26,115.91	World Development Indicators, WB
$GDP_{jt}$	GDP per capita Russia	11,362.63	2,215.124	8,704.898	14,095.65	World Development Indicators, WB
$Dist_{ij}$	Direct distance (km)	1,731.544	639.865	676.89	2,992.61	Google Maps
$Pop_{it}$	Population size (million)	9.731	11.268	.622	45.272	World Development Indicators, WB
$PopD_{it}$	Population density	73.741	34.106	6.404	137.6934	WB
$Unem_{it}$	Unemployment rate	9.979	6.170	0.5	28.03	WB
$Inf_{it}$	Inflation	3.260	4.535	-1.584	18.120	WB and UNCTAD
$ExchR_{it}$	Exchange rate of 1 unit of local currency to ruble	21.869	24.2142	.0152	74.174	UNCTAD
$Edu_{it}$	Enrollment ratio in secondary education	97.838	9.314	79.991	116.652	WB
$LExp_{it}$	Life expectancy	74.743	3.050	67.552	81.378	WB
$GINI_{it}$	GINI coefficient	33.154	5.796	24	42.08	WB
$PolSt_{it}$	Political stability and absence of violence	0.081	0.654	-2.021	1.039	World Governance Indicators (WGI), World Bank
$DepEld_{it}$	Old-age dependency ratio	19.526	7.920	4.811	31.307	UNCTAD
$DepCh_{it}$	Child dependency ratio	28.097	9.875	20.860	59.315	UNCTAD
$CIS_i$	Country of the Commonwealth of the Independent States (binary)	.297	.460	0	1	CIS official webpage ( <a href="https://cis.minsk.by/map">https://cis.minsk.by/map</a> )
$FSU_i$	Country of the former Soviet Union (binary)	0.519	.503	0	1	Gevorkyan A., 2018
$EU_i$	Member of the European Union (binary)	0.407	0.494	0	1	europa.eu
$EAEU_i$	Member of the Eurasian Economic Union (binary)	.148	.358	0	1	Khitakhunov et al. (2017)
$Cont_i$	Contiguity-Common border with Russia (binary)	.333	.474	0	1	The World Factbook, CIA
$Land_i$	Landlocked (binary)	0.519	.503	0	1	World Population Review
$Rem_{it}$	Remoteness (million)	7.292	9.674	.168	34.602	Own calculations

absence of violence/terrorism is included from the World Governance Indicators database produced by the World Bank. The model also includes a set of binary variables, which control parameters such as whether a country is a member of the European Union, Eurasian Economic Union, former Soviet Union, shares a boarder with Russia, and is landlocked. Here we assign 1 if the country belongs to the listed groups, and 0, if otherwise. We are also using a binary variable which controls for being a member of the Commonwealth of Independent States (CIS), an organization which became a successor of the Soviet Union in 1993. It maintains some level of control over the trade, finance, lawmaking, and security of member states and also operates as a free trade area for the signatory countries. According to the official website of the CIS, the following countries are the member states of it: Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan and Uzbekistan. Although, Ukraine had been one of the founding members, following the annexation of Crimea, it proceeded with legislative actions to end its participation in the CIS in March 2014. In light of these steps taken by Ukraine, we are not including it as a CIS member in our analysis.

#### 4. Methodology

To explore the impacts of sanctions on bilateral migration and remittance flow, we construct two models described below. The impact of sanctions on bilateral migration between the Russian Federation and transition economies is analyzed by using the model described in Eq. [1].

$$\begin{aligned}
 M_{ij} = & \alpha + \beta_1 \ln S_{jt-1}^r + \beta_2 \ln dist_{ij} + \beta_3 \ln GDP_{it-1} + \beta_4 \ln GDP_{jt-1} \\
 & + \beta_5 Gini_{it-1} + \beta_6 unem_{it-1} + \beta_7 polst_{it-1} + \beta_8 \ln popd_{it-1} + \beta_9 \ln pop_{it-1} \\
 & + \beta_{10} rem_{it-1} + \beta_{11} \ln edu_{it-1} + \beta_{12} \ln infl_{it-1} + \beta_{13} \ln lexp_{it-1} + \beta_{10} A_i + \varepsilon_{it}
 \end{aligned}$$

[1]



This model analyzes whether the Western sanctions against Russia had any impact on changes in the level of migrant stock of transition economies. This change is studied in terms of both emigration of these countries' population to the Russian Federation and immigration of Russian population to these countries. Then, the disaggregated data for the US sanctions enables the model which studies the possible impact of this unilateral mechanisms on the change in bilateral migration between transition economies and Russia. Since the UN data on bilateral migration is provided for every five years from 1990 to 2019, including, we are using the data on 2015 and 2019. We combine it with the archived data on 2017, which allows to create consistent time-series from 2015 to 2019 with the recurrence frequency of two years. Therefore, in the model specification the delta for time variable takes 2, instead of commonly used yearly periodicity. All time-varying control variables are one-year lagged data. We also conduct log-transformation of count data. Since this analysis is using the PPML technique developed in Santos-Silva and Tenreyro (2006), we follow their recommendation and specify the model in the level-log format. The final model of migration is described by Eq. [1]:

where,

$S_j^r$  -sanction imposed against Russia, where  $r$  stands for Western or unilaterally imposed US sanctions

$dist_{ij}$  - distance between migrant-exporting country  $i$  and migrant-receiving country  $j$

$GDP_i$  - income measured by per capita GDP in transition economies

$GDP_j$  - income measured by per capita GDP in Russia

$Gini_i$  - level of income inequality measured by the Gini coefficient

$unem_i$  -rate of unemployment

$polst_i$  -political stability and absence of violence

$popd_i$  -population density measured by number of people per square kilometer

$pop_i$  -population size

$rem_i$  -remoteness

$edu_i$  -share of population over 25 years with a secondary education

$infl_i$  rate of consumer inflation

$lexp_i$  life expectancy in transition economies

$A_i$  -vector of binary variables which control whether a country is a member of the European Union, Eurasian Economic Union, former Soviet Union, shares a border with Russia and is landlocked.

$\varepsilon_{it}$  -cluster robust error, clustered by country pairs.

Usually, the basic gravity model of migration uses logarithmic values of three main variables: population of migrant sending country, population of migrant receiving country and distance between the country-pair (Poot et al., 2016). The basic gravity model of remittances uses logarithmic transformation of the following: GDP of remitting country, GDP of remittance receiving and the distance between this country pair (Lueth and Ruiz-Arranz, 2007). We are trying to create a link between these two models and as the basic component use the logarithmic transformation of GDP per capita of both countries and the distance. Then, additional explanatory variables are added.

To assess the impact of sanctions on bilateral private remittance flow between Russia and transition economies, we build the following model described in Eq. [2]

$$\begin{aligned}
R_{ij} = & \alpha + \beta_1 \ln S_{jt}^r + \beta_2 \ln(\text{Dist})_{ij} + \beta_3 \ln(\text{GDP})_{it-1} + \beta_4 \ln \text{GDP}_{jt-1} + \beta_5 \ln \text{pop}_{it-1} \\
& + \beta_6 \ln \text{lexp}_{it-1} + \beta_7 \ln \text{nedu}_{it-1} + \beta_8 \ln \text{Gini}_{it-1} + \beta_9 \text{unem}_{it-1} \\
& + \beta_{10} \text{infl}_{it-1} + \beta_{11} \text{exchr}_{it-1} + \beta_{12} \text{polst}_{it-1} + \beta_{13} \ln \text{depeld}_{it-1} + \beta_{14} \ln \text{depch}_{it-1} \\
& + \beta_{15} \text{rem}_{it-1} + \beta_{16} A_i + \varepsilon_{it}
\end{aligned}
\tag{2}$$

The majority of determinants controlled in model [2] are similar to those we used for testing the impact of sanctions on bilateral migration. However, according to the stepwise test outcomes, the variable of population density is replaced by two other variables which control for old-age dependence ( $\text{depeld}_{it-1}$ ) and child dependence ( $\text{depch}_{it-1}$ ). Both variables are added with log transformation. Another macroeconomic determinant added to this model is the exchange rate ( $\text{exchr}_{it-1}$ ). In terms of binary variables, which are combined in vector  $A_i$ , two binary variables which control for being a member state of the Eurasian Economic Union and a country of the former Soviet Union are replaced by a binary determinant which controls for being a member of the Commonwealth of Independent States ( $\text{CIS}_i$ ). The rest of binary variables is similar to those described in Eq. [1]. The most recent annual data on bilateral remittance flow between countries is limited to 2017. Since the first sanctions were imposed in 2014, our analysis captures four-year period from 2014 to 2017. In this model, to be able to test a longer time horizon (four years), the data on sanctions is not lagged.

The data analysis is conducted by using the Poisson pseudo-maximum likelihood (PPML) econometric technique described in Santos-Silva and Tenreyro (2006). The authors of this study estimate that PPML technique is well-suited when the data are heteroscedastic or the endogenous variables are equal to zero. In general, the literature on international trade, remittance flows and international migration suggests that these issues are frequently found in

corresponding datasets. In current analysis, the PPML technique allows for mitigation of heteroscedasticity issues. In addition, this econometric method also performs well with the gravity models that include limited time series, which is reflective of both datasets used in this analysis. Here, we also follow the recommendations of Anderson and van Wincoop (2003) about the need to control for multilateral resistance terms (MRT) when constructing gravity models. Thus, there are two main approaches to address this point. First, some authors choose to address MRT by introducing sender receiver country fixed effects. Due to the specifics of the datasets used in this analysis, where only one country, Russia, is one side of either migrant (or remittance) receiving or sending relation in each country pair, controlling for sender or receiver country fixed effects would not be useful. Therefore, to control for the multilateral resistance terms, we are using an alternative option suggested in the literature, which is to estimate remoteness (Head, 2003). The determinant of remoteness in our datasets is calculated using Eq. [3].

$$rem_i = \sum_i \frac{dist_{ij}}{GDP_i/GDP_w} \quad [3]$$

According to Head (2003), Eq. [3] measures a country's average weighted distance from other trading partners, where the weights represent GDP share of transition economy ( $GDP_i$ ) in the world GDP ( $GDP_w$ ). The descriptive statistics of this variable is included in *Table 1*.

Finally, Santos-Silva and Tenreyro (2006) suggest conducting heteroscedasticity-robust RESET postestimation tests. These tests are evaluated in terms of the significance of an additional regressor assessed as  $(xb)^2$ , where  $b$  is the vector of estimated values. Overall, the  $p - value > 0$  of the tested model including  $(xb)^2$  regressor reflects properly specified gravity equations. *Table 3* and *Table 4* report the results of our analysis and the *RESET p - values* of described post estimation tests are listed in the last rows of both tables.

## 5. Results

The results of the study addressing the impact of sanctions on bilateral migration between transition economies and the Russian Federation are provided in *Table 3*. Further, the outcomes with the assessed effects of sanctions on bilateral remittance flow are compiled in *Table 4*.

According to the results of our analysis the sanctions, Western and US, against the Russian Federation had a significant spillover effect and reduced the total number of emigrants from transition economies to Russia. Thus, with other explanatory variables held constant, every additional 1% increase in the US or Western economic sanctions corresponded with the fall in the stock of emigrants from transition economies to Russia by 9 or 11 individuals, respectively. These outcomes are also consistent with the literature which suggests that multilateral sanctions imposed by a large group of economies usually would produce much stronger shocks than the ones indicted by a single country. The fluctuations in Russia's GDP were also a factor that had a significant inverse impact on change in the total number of emigrants moving from transition economies to Russia. Another factor that strongly contributed to the emigration from transition economies to Russia was mainly driven by the population of countries which were part of the former Soviet Union. In contrast, the model estimated a significant inverse relation between the change in the emigrant population of the transition economies, which were also members of the European Union, suggesting that the share of population from these countries was much lower among the emigrants moving to Russia during the studied time horizon. These outlined results were consistent across both models, i.e., Western sanctions and US sanctions.

The model which studies the effects of sanctions on immigration of Russian population to transition economies did not find any significant impact produced by sanctions. The only variable that played a significant role in this model was the Gini coefficient, which reflected that

the income disparity and inequality among different groups of population was the only significant ground among the controls used in our analysis that resulted in immigration of Russian individuals to transition economies (*Table 3*).

Our research estimates that both, Western and US, sanctions had a strong negative impact on inward remittances from Russia received in transition economies. Thus, 1% increase in Western sanctions contracted the remittances from Russia to transition economies by \$0.014 million. We observed that the US sanctions alone reduced the remittances by a lower extent, of about \$0.01 million, than Western sanction. This divergence was expected, as, usually, multilaterally imposed sanctions produce more profound effect than the unilateral ones. The model estimated that the remittance flow was much higher to the countries with lower life expectancy. Thus, an additional 1% lower life expectancy in a transition economy corresponded with an increase in the remittance inflow from Russia, on average, by \$0.19 million. The depreciation of the local currency to the Russian ruble led to an increase in the volume of remittances received in transition economies. This outcome may also suggest that the cost of the depreciated currency in countries of origin was partially redistributed to the remitting individuals. Politically stable and low violence transition economies also determined higher levels of remittance inflow.

Table 3. The impact of sanctions on bilateral migration between the Russian Federation and Transition Countries 2015-2019

	Emigration from TE to Russia	Emigration from TE to Russia	Immigration from Russia to TE	Immigration from Russia to TE
$\ln S_{jt-1}$ (Sanc. West)	-.0011*** (.0001)		-.0313 (.0487)	
$\ln S_{jt-1}$ (Sanc. US)		-.0009*** (.0001)		-.0226 (.0352)
$\ln GDP_{it-1}$	-.0001 (.0001)	-.0001 (.0001)	-.0287 (.0375)	-.0287 (.0375)
$\ln GDP_{jt-1}$	-.0020*** (.0001)	-.0020*** (.0001)	-.0052 (.0252)	-.0068 (.0246)
$\ln Dist_{ij}$	-1.8535 (1.2498)	-1.8535 (1.2498)	-.8975 (3.7242)	-.8975 (3.7242)
$\ln Pop_{it-1}$	.0077 (.0088)	.0077 (.0088)	-.0455 (.3014)	-.0455 (.3014)
$\ln LE_{it-1}$	-.0014 (.0037)	-.0014 (.0037)	.3794 (3.4856)	.3794 (3.4855)
$\ln PDens_{it-1}$	-.0080 (.0091)	-.0080 (.0091)	.3307 (.4580)	.3307 (.4580)
$\ln Edu_{it-1}$	.0005 (.0006)	.0005 (.0006)	.1943 (.6188)	.1943 (.6188)
$\ln Gini_{it-1}$	.0006 (.0006)	.0006 (.0006)	.3349* (.1406)	.3349* (.1406)
$\ln Infl_{it-1}$	-0.0007 (0.0007)	-0.0007 (0.0007)	-.0015 (.0025)	-.0015 (.0025)
$PolSt_{it-1}$	-.0001 (.0001)	-.0001 (.0001)	.0144 (.0962)	.0144 (.0962)
$Rem_{it-1}$	-0.0003 (0.0009)	-0.0003 (0.0009)	-.0006 (.0057)	-.0006 (.0057)
$EU_i$	-2.5984*** (.6808)	-2.5984*** (.6808)	-.54165 (1.5180)	-.54165 (1.51780)
$FSU_i$	2.7809* (1.1077)	2.7809* (1.1077)	3.4575 (3.5384)	3.4575 (3.5384)
$EAEU_i$	.5780 (.7854)	.5780 (.7854)	1.4904 (4.4463)	1.4904 (4.4463)
$Land_i$	.7623 (.6734)	.7623 (.6734)	.0467 (.9477)	.0467 (.9477)
$Cont_i$	-.3523 (1.0898)	-.3523 (1.0898)	.1406 (5.3302)	.1406 (5.3302)
$Const$	24.2873** (8.9060)	24.2856** (8.9061)	11.4766 (28.6465)	11.4303 (28.6696)
N groups/observations	27/81	27/81	27/81	27/81
Pseudo log-likelihood	-657.7700	-657.7676	-5934.9477	-5934.9477
RESET p-val.	0.9354	0.9354	0.1307	0.1307

Note: clustered robust standard errors in parenthesis; \*, \*\* and \*\*\* indicate significance at 0.05, 0.01 and 0.001, respectively.

This model also estimates that the dependence ratios of old-age population and of children significantly impacted the inflow of remittances and their volume disproportionately increased in transition economies where these ratios were high. This outcome may also signal the need for improvements in the management of public sector so it would redistribute enough financial resources and possibly implement welfare programs that would enable decent living for elderly and children. Otherwise, as this analysis estimates, the lack of sufficient public sector involvement caused emigrated population of those countries to fill that void by magnifying the remitting amounts to protect the most vulnerable groups residing in countries of origin. These results held for both models of Western and US sanctions.

Western and US sanctions did not have a significant effect on the remittances sent to the Russian Federation from transition economies. The decline in Russia's GDP per capita significantly increased the inward remittances received from transition economies. Transition economy's larger population size, being a CIS and a neighboring country, which share a boarder with Russia were significant determinants for serving as a source of higher inward remittances sent to the Russian Federation. The countries with higher rate of inflation remitted less; partly, because higher domestic prices possibly reduced savings, and, therefore, weakened the propensity to remit. The rise in the life expectancy of a transition economy had an inverse effect and reduced remittance inflow to Russia. In contrast, the Russian migrants from the transition economies with higher dependence rate of children had tendency to remit more back home. The results of the model which studies the impact of US sanctions on the inflow of remittances from transition economies to the Russian Federation were closely related to the ones on Western sanctions discussed above.



Table 4. The impact of sanctions on bilateral remittance flows between the Russian Federation and Transition Economies 2014-2017

	Remittances sent to TE from Russia	Remittances sent to TE from Russia	Remittances sent to Russia from TE	Remittances sent to Russia from TE
$\ln S_{jt}$ (Sanc. West)	-1.3952*** (.1695)		-.1930 (.1512)	
$\ln S_{jt}$ (Sanc. US)		-1.0268*** (.1286)		-.0785 (.1229)
$\ln GDP_{it-1}$	.0563 (.2423)	.0548 (.2403)	.1416 (.1236)	.1305 (.1293)
$\ln GDP_{jt-1}$	.1507 (.0918)	.0326 (.1085)	-.2635* (.1080)	-.2619* (.1139)
$\ln Dist_{ij}$	-1.8140 (2.222)	-1.4464 (2.4864)	-1.9572 (1.4524)	-1.8768 (1.4531)
$\ln Pop_{it-1}$	.4513 (.6834)	.4496 (.6671)	.8838*** (.2509)	.8648*** (.2569)
$\ln LEExp_{it-1}$	-18.7748* (8.0551)	-19.2705* (8.4207)	-30.1878*** (6.6713)	-31.3632*** (6.4111)
$\ln Edu_{it-1}$	-.6095 (.7126)	-.7771 (.8053)	2.6367 (1.9017)	2.7651 (1.9198)
$\ln Gini_{it-1}$	.59217 (.9147)	.7715 (1.0228)	-.3329 (.7904)	-.4127 (.8012)
$\ln Infl_{it-1}$	-.0030 (.0018)	-.0033 (.0019)	-.0056*** (.0014)	-.0058*** (.0013)
$ExchR_{it-1}$	-.0122* (.0055)	-.0125* (.0057)	-.0093* (.0041)	-.0098* (.0041)
$PolSt_{it-1}$	.0076** (.0026)	.0089*** (.0027)	.0037 (.0038)	.0039 (.0038)
$\ln DepEld_i$	9.3265*** (.9961)	10.1137*** (1.2019)	2.4071 (1.8469)	2.4397 (1.8587)
$\ln DepCh_i$	8.6879*** (2.4543)	8.4686*** (2.5450)	4.5134*** (1.3846)	4.4318*** (1.3009)
$CIS_i$	6.3364*** (.9627)	6.5412*** (.9585)	2.6105*** (.7878)	2.6103*** (.8125)
$EU_i$	-2.2976 (1.6753)	-2.7713 (1.7567)	.6648 (1.1113)	.7114 (1.0477)
$Unem_i$	-.0010 (.0170)	.0011 (.0181)	.0035 (.0244)	.0016 (.0254)
$Land_i$	2.8911 (1.5055)	3.2876* (1.5497)	-.4889 (.9508)	-.4723 (.9180)
$Cont_i$	1.4066 (1.1108)	1.4712 (1.2537)	1.3005** (.4497)	1.3328** (.4490)
$Rem_{it-1}$	.0335** (.0126)	.0389** (.0134)	.0211 (.0293)	.0201 (.0300)
$Const$	43.2978 (36.2477)	39.7199 (40.3484)	114.0463*** (25.5180)	118.0259*** (24.6456)
N groups/observations	27/108	27/108	27/108	27/108
Pseudo log-likelihood	-588.9741	-602.1399	383.8978	-384.7918
RESET p-val.	0.0015	0.0011	0.7845	0.7514

Note: clustered robust standard errors in parenthesis; \*, \*\* and \*\*\* indicate significance at 0.05, 0.01 and 0.001, respectively.

## 6. Conclusions

This analysis assessed the spillovers of Western and US sanctions against the Russian Federation into transition economies. These are twenty-seven small economies of the Former Soviet Union, and Central and Eastern Europe, which due to their geographic proximity, shared history or culture had developed strong economic integration with Russia.

Our analysis assessing the change in bilateral migration for the period of 2014-2019. It estimated significant impact of sanctions on emigration, assessing that 1% increase in US or Western sanctions contracted the number of emigrants from transition economies residing in Russia by 9 or 11 individuals, respectively. We also estimated contractions in the flow of remittances which were significantly affected by sanctions. This model captured the period of 2014-2017. We estimated that 1% increase in US or Western sanctions reduced the volume of remittances sent from Russia to transition economies by \$0.01 million or \$0.014 million, respectively. This decrease can partly be attributed to the outlined above reduction in the number of emigrants moving from transition economies to Russia during the periods of sanctions.

As recommendations we would like to note that, according to our estimates, the main drivers of remittances to transition economies had a socio-economic nature and were driven by inequality. Thus, lower life expectancy, high dependence of old-age and child population were the most significant motivating factors that facilitated higher levels of remittance inflow to transition economies. On the one hand, these issues can be resolved if the public sector of those transition economies responds to arising challenges in a timely manner. On the other hand, from the perspective of sanction imposing countries, if it is believed that sanctions can potentially contribute to a rise in poverty, inequality or decline in life expectancy in third-party countries, then possibly direct engagement with these small economies and provision of aid to support

welfare programs there might be a step in smoothening out the unwanted effects from spillovers of sanctions.

## Acknowledgements

The author would like to express gratitude for the financial support provided by the Bagwell Center for the Study of Markets and Economic Opportunity at Kennesaw State University. The regular disclaimer applies.

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