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FULL LENGTH ARTICLE

Economic Implications of Advanced International Migration Analysis in Central Asia

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ABSTRACT

This study explores the economic implications of international migration dynamics in Central Asia over the past two decades. It provides an advanced analysis of migration patterns, identifying key destination trends and the economic, demographic, and political factors shaping these movements. Employing 24 years of panel data and econometric analysis using the OLS model, the research examines how variables such as GDP per capita, unemployment rates, inflation, and population growth influence migration flows across the region. Additionally, it assesses the impact of political stability on migration decisions and highlights the role of international organizations and regional cooperation frameworks in managing migration for economic development. The findings offer insights for policymakers aiming to harness migration as a driver of sustainable economic growth and regional integration.

Keywords: Economic Implications ▪ Sustainable Economic Growth ▪ The International Organization for Migrants ▪ Central Asia ▪ International Migration ▪ Labour shortage ▪ Demographic factor

1. INTRODUCTION

Human migration and mobility may be age-old phenomena touching almost every society worldwide. However, they have changed in important ways over time. Examining these shifts in scale, direction, demography, and frequency can help us understand how migration is evolving, and can inform effective policies, programs, and operational responses on the ground [1]. Most people migrate internationally for reasons such as employment, family reunification, or education. Their migration processes do not usually pose significant challenges for either the migrants or the host countries. Such migration is largely safe, orderly, and regular. However, some individuals are forced to leave their homes and countries for dire and tragic regions, such as conflict, persecution, or natural disasters. Although refugees and internally displaced persons (IDPs) make up a relatively small proportion of the total migrant population, they are among the most vulnerable groups and often require significant assistance and support. According to the United Nations Department of Economic and Social Affairs, there were about 281 million international migrants around the world in 2020, accounting for 3.6 percent of the global population [2].

The Central Asian population also continues to grow dramatically, with around half of the population now under 30 years old. Economic hardship, limited job opportunities, and underdeveloped education systems are forcing many young Central Asians to seek work and career advancement abroad. Corruption, nepotism, and capital flight are further weakening domestic economies, making migration the only solution for many [3].

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Russia remains the main destination for Central Asian migrants, especially Tajik and Kyrgyz citizens. This is due to the closeness to the Russian language and culture, geographical proximity, and Russia's high demand for labor migrants. The simplification of the process of obtaining Russian citizenship for highly qualified specialists such as doctors and engineers has also contributed to the growth migration trend. In addition, the European Union after Russia placed next places with granted work, study, and residence permits. According to the EU statistics platform (Eurostat), as of 31 December 2022, the total number of Uzbek nationals with residence permits was 40,406 individuals [4]. On top of that, South Korea has become a major destination for migrants, especially Kazakhs and Uzbeks, with many Central Asians moving there nearly doubling in 2023.

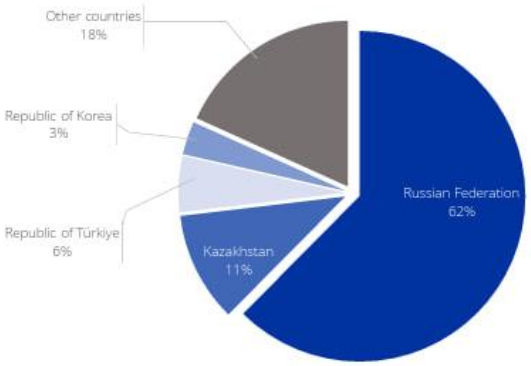


Figure 1. Share of Uzbek migrant workers abroad by country of destination, September 2023 (percentage). **Source:** AELM, 2023.

Turkey, the Gulf States, and China also attract Central Asian migrants, but their impact is less well studied. The long-term consequences of migration from Central Asia pose serious challenges. In particular, the increasing "brain drain" in Kazakhstan has resulted in many skilled professionals permanently residing abroad, weakening the social fabric of the country. Economically, over-reliance on remittances from migrant workers has left Tajikistan, Kyrgyzstan, and Uzbekistan vulnerable to external economic shocks and has slowed domestic economic development. From a political perspective, migration serves as a means of reducing social discontent caused by unemployment, helping to maintain the stability of authoritarian regimes. Analysis of these migration trends highlights the need to improve effective migration management strategies in Central Asia. By learning from international experiences, including advanced data-based migration analysis tools and policy strategies, Central Asian governments can better manage migration flows, mitigate their negative impacts, and develop long-term economic strategies to reduce dependence on external labor markets.

In order to address these issues, some questions remain:

- How have migration trends in Central Asia evolved over the two decades, and what economic factors have influenced these changes?
- What role do international organizations and regional cooperation play in addressing migration challenges in Central Asia?

This research seeks to explore the advanced foreign experiences in migration patterns in Central Asian countries using data from 24 years of observations through the OLS model by examining global best practices, innovative methodologies, and policy-driven frameworks.

2. LITERATURE REVIEW

International migration has increased dramatically because of globalization processes and rapid changes in the world's political and economic structures. According to Delovarova, Shkapyak, and Kukeyeva, the majority of labor migrants in Central Asia migrate from southward to northward—from countries that lack natural resources and labor surplus to resource-rich nations where labor is scarce. Russia is the first migration hub for Central Asian migrants and Kazakhstan has become an important destination state since the 2000s. The other Central Asian countries—Kyrgyzstan, Tajikistan, and Uzbekistan—are sending states [5]. The main factors attracting migrants to Russia and Kazakhstan are the need for a permanent workforce, labor shortages caused by population growth, high salaries, no visa requirements, cheap transportation costs, and, especially, a common culture and language with Kazakhstan. Communication between labor migrants from Kazakhstan and Uzbekistan and local employers is facilitated by a common culture and language.

Large movements of migrants and money are central to the region's development prospects—especially for Central Asia's less wealthy countries [6]. Remittances sent by migrant workers abroad play a significant role in the economies of several Central Asian countries. In particular, in Tajikistan and Kyrgyzstan, these funds have played a significant role in reducing poverty and ensuring economic growth. However, excessive reliance on remittances weakens the economies of these countries, especially when host countries, such as Russia, experience economic crises. In this regard, the United Nations Development Programme (UNDP) emphasizes the need to integrate labor migration management systems into national development strategies. This approach will help shape a more sustainable future and improve the well-being of the people of these countries.

Incaltarau, Sharipov, Pascariu, and Moga [7] examine trends in economic growth and convergence in the Eastern Partnership and Central Asian countries after the collapse of the Soviet Union. Their study highlights how different development trajectories have shaped migration patterns, with economic disparities driving labor migration from less developed to more prosperous regions. The study examines the broader implications of these migration flows, including their impact on labor markets, demographic changes, and economic stability. The authors emphasize the importance of combining economic and policy responses to address structural imbalances and create more sustainable development pathways, which ultimately help reduce the push factors for migration.

As migration dynamics continue to evolve, Central Asian countries are seeking new policy solutions and strengthening international cooperation. One striking example is the agreement signed between Germany and Uzbekistan in September 2024 to facilitate the migration of skilled workers from Uzbekistan to Germany. This initiative aims to help alleviate the labor shortage in Germany while also creating new employment opportunities for Uzbek citizens.

Migration patterns in Central Asia are undergoing significant changes because of the complex interplay of economic, geopolitical, and environmental factors. As this process continues, it is increasingly important for policymakers to have a deep understanding of its implications. This way, they can effectively address the challenges of migration while also taking advantage of the positive opportunities it can bring to the region.

3. RESEARCH METHODS

The prior aim of this study is to point out the main indicators that significantly influence the overall rate of net migration. To carry out this investigation, relevant data for observing countries from reliable sources should be obtained. This research obtained panel data for eight variables from the World Bank's open data platform (databank.worldbank.org). Eight indicators for Asian countries—Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan—were analyzed. The observation period was from 2000 to 2022. The main software used in this research was Microsoft Excel 2023 and STATA 15, which helped to manage and analyze all collected data. These variables were selected to provide insights into specific economic and social indicators relevant to the study. Before conducting the analysis, the data underwent a series of preparatory steps to ensure its suitability. These preliminary checks were crucial for confirming that the data met the assumptions required for subsequent statistical analysis.

The Pearson pairwise correlation test was employed to assess the relationships between the selected variables. This test helped identify the strength and direction of the linear relationships among variables, which provided a foundational understanding of how these factors interact. Following this, the Ordinary Least Squares (OLS) regression model was used for the main analysis. OLS was chosen for its effectiveness in quantifying the impact of independent variables on the dependent variable and for its ability to provide interpretable coefficients that reveal the magnitude and significance of these relationships. The main OLS model is:

$$\begin{aligned} \mathrm{NMR} = \beta_0 + \beta_1 \mathrm{GDPPC} + \beta_2 \mathrm{UN} + \beta_3 \mathrm{IR} \\ + \beta_4 \mathrm{PG} + \beta_5 \mathrm{PRR} + \varepsilon, \end{aligned} \tag{1}$$

where β_0 is the intercept of the model; β_1 is the coefficient of GDP per capita; β_2 is the coefficient of the unemployment rate; β_3 is the coefficient of the inflation rate; β_4 is the coefficient of population growth; β_5 is the coefficient of personal remittances received; and ε is the error term.

4. RESULTS

As shown in Table 1, the observation period is 24 years, which begins in 2000 and continues through 2023. The lowest net migration rate was −66,547 in Uzbekistan in 2000, whereas the highest figure was 54,704 in Kyrgyzstan in 2020. Figure 2 graphically illustrates the trend and changes in the net migration rate during the observation years.

Generally, according to Figure 2, net migration for all countries has a decreasing trend, except for Uzbekistan. Figure 3 compares all countries in one graph.

In terms of Figure 4, it is clearly seen that Kazakhstan and Turkmenistan experienced a significant increase over the 24 years. Tajikistan starts with the lowest GDP per capita at 136.926 US$ in 2000 and Kazakhstan ends with the highest one at 13,478.46 US$, while the mean for the remaining countries is 3,098.803 US$. It is noticeable that the average GDP per capita for Uzbekistan during the observing years is lower, at 1,628.992, than the mean for the remaining countries. The indicator for Kyrgyzstan is almost the same as Tajikistan.

As shown in Figure 5, there were upward trends in population growth in Uzbekistan and Kazakhstan, which increased approximately to 2 percent and 1.5 percent, respectively. Kyrgyzstan, Tajikistan, and Turkmenistan showed a modest decrease after 2010. The minimum point is equal to 0.3 percent

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Country	120	3	1.42	1	5
Year	120	2011.5	6.951	2000	2023
NMR	120	-9340.783	21537.389	-66547	54704
GDPPC	120	3098.803	3411.316	136.926	13478.46
UN	120	6.064	3.071	1.858	12.75
IR	114	9.126	6.477	-2.67	60.6
PG	120	1.702	0.501	0.3	2.56
PRR	113	1.850×10^9	2.749×10^9	0	1.551×10^{10}
LD	120	1	0	1	1
BD	120	1	0	1	1

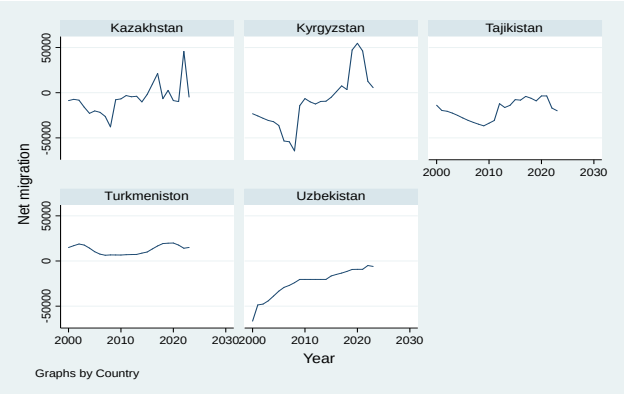


Figure 2. Net migration rate for observing countries from 2000 to 2023. **Source:** Created by the author in STATA (panel regression results).

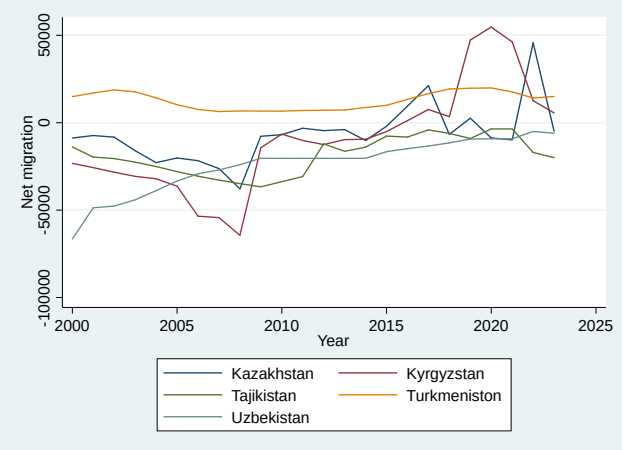


Figure 3. Comparison of net migration rate between countries from 2000 to 2023. **Source:** Created by the author in STATA (panel regression results).

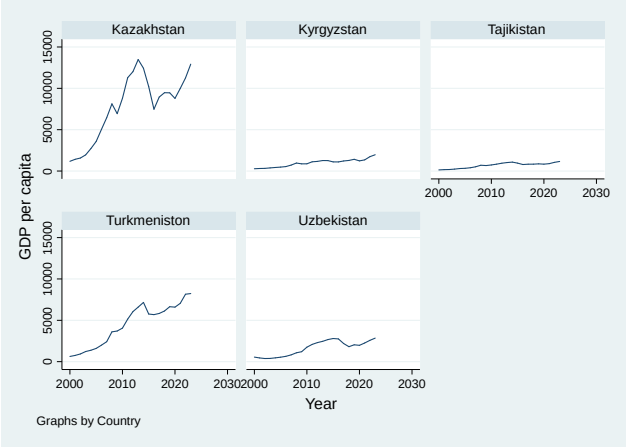


Figure 4. Countries' GDP per capita change during 2000–2023. **Source:** Created by the author in STATA (panel regression results).

for Kazakhstan in 2000 and the highest one is 2.56 percent for Tajikistan in 2015, while the mean for the observing period was 1.702 percent. Figure 5 demonstrates a graphical illustration of the population growth rate.

Kyrgyzstan witnessed the lowest unemployment rate, at 1.858 percent in 2000, while Kazakhstan showed the highest one, at 12.75 percent, at the same time. The unemployment rate in Uzbekistan decreased until the end of the period. As demonstrated in Figure 6, the unemployment rate in Kazakhstan and Turkmenistan has a decreasing trend between 2000 and 2023. The mean for the observation period was 6.064 in Uzbekistan in 2006.

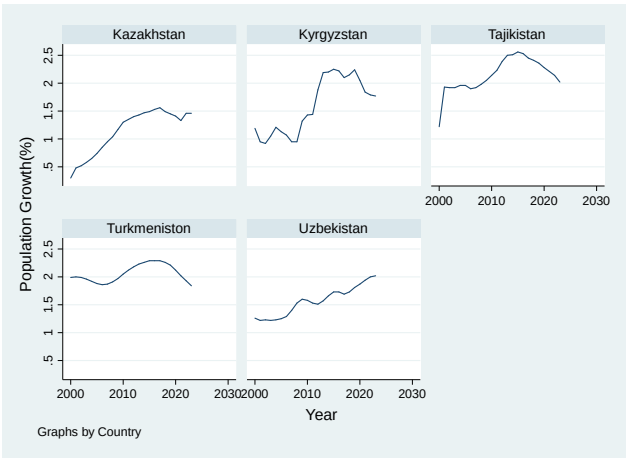


Figure 5. The population growth rate of countries between 2000 and 2023. **Source:** Created by the author in STATA (panel regression results).

The scatter plot in Figure 7 depicts the relationship between the unemployment rate and net migration. The x-axis represents the unemployment rate, while the y-axis shows the net migration rate. Each blue dot indicates an observation, highlighting the spread and clustering of data points. The fitted line (red) represents the regression model's predicted values, showing a slight downward trend, suggesting a negative and weak association between the unemployment and net migration rates.

The second and third scatter plots illustrate relationships between population growth, GDP per capita, and the net migration rate. The graph suggests that there is a strong correlation

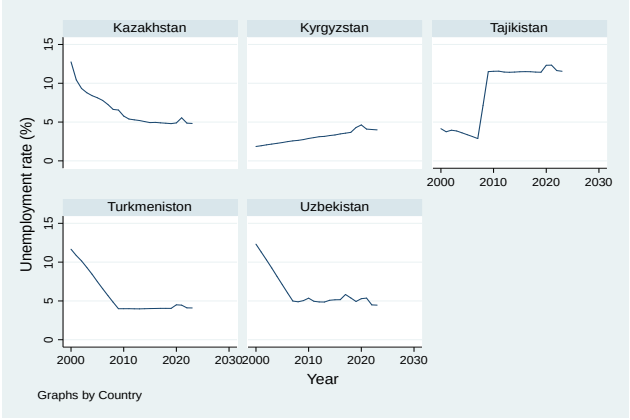


Figure 6. Unemployment rate of countries from 2000 to 2023. **Source:** Created by the author in STATA (panel regression results).

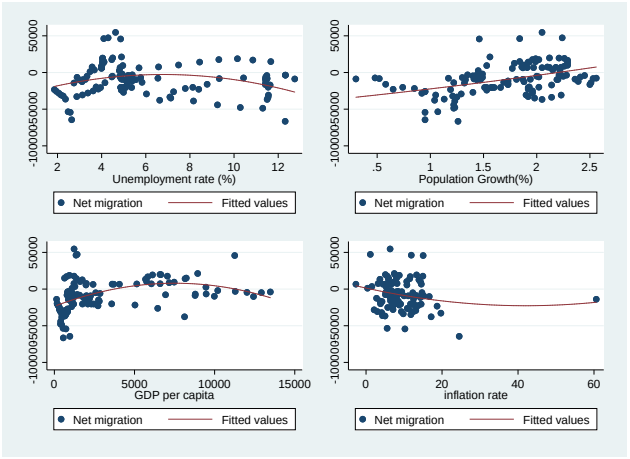


Figure 7. Scatter plot of unemployment rate, population growth, GDP per capita, and inflation rate in 2000–2023. **Source:** Created by the author in STATA.

between them, while the inflation rate and migration show a weak negative relationship.

Table 2. Pairwise Correlation Test Results

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) NMR	1.000					
(2) GDPPC	0.362*	1.000				
	(0.000)					
(3) UN	-0.109	-0.213*	1.000			
	(0.235)	(0.020)				
(4) IR	-0.160	-0.077	-0.112	1.000		
	(0.089)	(0.415)	(0.234)			
(5) PG	0.432*	-0.089	0.108	-0.208*	1.000	
	(0.000)	(0.335)	(0.242)	(0.026)		
(6) PRR	-0.097	-0.253*	0.045	0.156	0.224*	1.000
	(0.309)	(0.007)	(0.634)	(0.100)	(0.017)	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 2 shows the relationships between the main variables in this study using a pairwise correlation test. These correlation coefficients help to understand the strength and direction of the relationship between the variables. The significance levels ($p < 0.01$, $p < 0.05$, and $p < 0.1$) indicate that these relationships are statistically significant.

The dependent variable (net migration rate) shows a moderate positive correlation with GDP per capita ($r = 0.362$, $p < 0.01$), meaning that as GDP per capita increases, the net

migration rate also tends to increase. Similarly, population growth also has a strong positive correlation with the net migration rate ($r = 0.432$, $p < 0.01$), indicating a strong relationship between these variables.

On the other hand, the unemployment rate and inflation rate have weak negative correlations with the net migration rate ($r = -0.109$ and $r = -0.160$, respectively), but these correlations are not statistically significant. Personal remittances received also show a negative correlation with the net migration rate ($r = -0.097$), but this correlation is also not statistically significant.

When we analyze the correlations between the independent variables, several important aspects are observed. There is a negative correlation between the unemployment rate and GDP per capita ($r = -0.213$, $p < 0.05$), which may indicate a potential multicollinearity problem. Personal remittances received also showed a significant negative correlation with GDP per capita ($r = -0.253$, $p < 0.01$), but a positive correlation with population growth ($r = 0.224$, $p < 0.05$).

Table 3. Regression Results

NMR	Coef. (S.E.)	t	p	95% CI Lower / Upper	Sig.
GDPPC	2.091 (0.497)	4.21	0	1.117 3.066	***
UN	-52.2 (557.93)	-0.09	0.925	-1145.723 1041.323	
IR	-431.006 (397.664)	-1.08	0.278	-1210.412 348.4	
PG	17869.315 (3476.175)	5.14	0	11056.137 24682.493	***
PRR	0 (0)	-1.08	0.28	0 0	
Constant	-39695.299 (8403.318)	-4.72	0	-56165.499 -23225.098	***

Mean dependent var	-7215.946	SD dependent var	20273.799
Overall r-squared	0.316	Number of obs	112
Chi-square	48.964	Prob $> \chi^2$	0.000
R-squared within	0.242	R-squared between	0.501

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The estimated model reported in Table 3 is:

$$\begin{aligned} \text{NMR} = & -39695.299 + 2.091(\text{GDPPC}) - 52.2(\text{UN}) \\ & - 431.006(\text{IR}) + 17869.315(\text{PG}) \\ & + 0(\text{PRR}) + \varepsilon. \end{aligned} \tag{2}$$

Here, NMR is the migration rate (dependent variable); GDPPC is GDP per capita with a coefficient of 2.091; UN is the unemployment rate with a coefficient of -52.2; IR is the inflation rate with a coefficient of -431.006; PG is population growth with a coefficient of 17,869.315; PRR is personal remittances received with a coefficient of 0 (not statistically significant); the constant is $-39{,}695.299$; and ε is the error term.

Looking at the results, a one-unit increase in GDP per capita is associated with a 2.091-unit increase in the net migration rate, all other factors remaining constant. Similarly, population growth has a strong positive effect, as its one-unit increase leads to a significant increase in the net migration rate of 17,869.315 units.

On the other hand, the unemployment rate and inflation rate have negative effects, but these effects are not statistically significant, meaning that these variables do not affect the migration rate clearly or significantly. The coefficient of personal remittances received is zero, indicating that it is not important in explaining changes in the net migration rate.

Finally, the constant ($-39{,}695.299$) indicates that the net migration rate takes this negative initial value if all independent variables are equal to zero. However, in real-life situations, this result should be interpreted with caution, as it may not always have practical significance.

Table 4. Skewness/Kurtosis Tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj_chi2(2)	Prob$> \chi 2$
NMR	120	0.449	0.106	3.250	0.197
GDPPC	120	0.000	0.075	23.100	0.000
IR	114	0.000	0.000	.	0.000
UN	120	0.000	0.076	12.990	0.002
PG	120	0.016	0.537	5.930	0.052
PRR	113	0.000	0.000	56.920	0.000

5. DISCUSSION

Migration patterns in Central Asia have changed significantly over the past two decades due to economic restructuring, political changes, and labor market dynamics. In the early years of independence, economic instability prompted many citizens from Central Asian countries to seek employment in Russia and neighboring countries. Over time, income disparities, demographic changes, and changing economic opportunities have reinforced migration patterns, making labor migration a permanent phenomenon in the region.

In recent years, global economic crises, geopolitical developments, and labor market changes have had an additional impact on migration processes. For example, the COVID-19 pandemic temporarily disrupted migration flows, resulting in many migrant workers losing their jobs and changing remittance patterns [8]. Nevertheless, economic disparities between Central Asian countries continue to encourage migration, highlighting the region's dependence on labor mobility.

Econometric analysis shows that economic differences play a crucial role in migration decisions. Differences in wages and employment opportunities have a significant impact on migration trends, consistent with the push–pull theory of migration. Countries with limited jobs and low wages tend to have higher emigration rates, while countries with better economic conditions attract migrants.

Demographic factors also play an important role, in particular population growth and youth unemployment. Countries with high youth populations, especially those facing economic difficulties, are more likely to migrate [9]. Education also influences migration decisions—skilled workers are more likely to migrate in search of higher-level opportunities. This reflects the growing trend of skill-based migration in the region [10].

Political stability has also emerged as a key factor shaping migration trends. The results of the study show that people from politically unstable regions are more likely to migrate. This confirms that the quality of governance and the stability of institutions have a significant impact on migration processes.

International organizations, including the International Organization for Migration (IOM), the World Bank, and the International Labour Organization (ILO), play a key role in

addressing migration-related issues in Central Asia. They help improve labor mobility, protect migrants' rights, and promote economic development projects through technical assistance, policy advice, and financial resources.

Regional cooperation is also important for effective migration management. Central Asian countries have been cooperating within the framework of multilateral agreements and bilateral labor migration agreements to regulate migration flows. However, challenges remain in ensuring social protection, fair labor rights, and harmonized migration policies. Strengthening regional cooperation, developing dialogue, information exchange, and improving legal mechanisms are necessary to manage migration more effectively. This will help ensure a more sustainable and equitable approach to the labor movement.

To address the economic challenges that drive migration, firstly, governments should focus on creating new jobs, raising wages, and investing in key sectors. Encouraging entrepreneurship, supporting small businesses, and investing in infrastructure projects will create new job opportunities, which will make it more likely that people will build a promising future at home rather than move abroad. Moreover, to reduce migration driven by political instability, governments need to focus on building strong institutions, fighting corruption, and improving governance. When people trust their leaders and feel safe in their own countries, they are less likely to seek opportunities abroad. Strengthening the rule of law and pursuing fair and transparent policies foster stability and hope for the future. Since migration is a common problem in Central Asia, countries in the region need to work together. By developing agreements on labor mobility, social protection, and migrant rights, governments can create a fair and sustainable system that benefits not only migrants but also their home and host countries. A collaborative approach can help make migration a conscious choice, not an obligation.

6. CONCLUSION

Migration patterns in Central Asia have changed significantly over the past two decades, driven by economic, demographic, and political factors. Many people still leave their homelands in search of better opportunities, while Russia and Kazakhstan remain the main destinations due to labor shortages and cultural ties. For countries such as Kyrgyzstan, Tajikistan, and Uzbekistan, remittances from migrants remain an important part of the local economy. However, overreliance on these funds poses long-term risks, and it is important to find more sustainable economic solutions.

Statistical analyses show that GDP per capita growth and population growth are closely related to migration trends, while unemployment and inflation have a slightly negative impact. These trends are consistent with the "push–pull" theory, which states that economic opportunities and wage differentials shape migration decisions. Political instability is also a major factor, and people from unstable regions are more likely to seek new opportunities abroad.

A comprehensive approach is needed to address migration challenges. Governments should focus on strengthening their economies, creating jobs, and improving governance, which will reduce the need for people to migrate involuntarily. At the same time, regional cooperation and regulated migration programs, such as Uzbekistan's recent agreement with Germany, can help create safe and beneficial migration routes. A balanced strategy that includes economic development, fair labor policies, and strong international cooperation will be essential going forward. Central Asian countries can effectively manage migration and maximize its benefits by promoting long-term stability and local opportunities while ensuring that migrants work in fair conditions abroad.

REFERENCES

[1] M. McAuliffe and A. Triandafyllidou, Eds., *World Migration Report 2022*. Geneva: International Organization for Migration (IOM), 2021, 540 pages.

[2] United Nations Department of Economic and Social Affairs, Population Division, "International migration 2020 highlights," United Nations, New York, Tech. Rep. ST/ESA/SER.A/452, 2020.

[3] S. Khashimov, R. Zhandayeva, K. Nuranova, and Z. Aisarina, "Introducing the central asia migration tracker," Oxus Society for Central Asian Affairs, 2022.

[4] International Organization for Migration, "Migration situation in uzbekistan: Compilation report (april–september 2023)," International Organization for Migration, Tech. Rep., 2023, mobility Tracking Matrix, 17 pages.

[5] L. Delovarova, O. Shkapyak, and F. Kukeyeva, "Migration processes in central asia: Main directions and key issues of regional system," *Middle-East Journal of Scientific Research*, vol. 15, no. 11, pp. 1505–1510, 2013.

[6] United Nations Development Programme, "Labour migration, remittances, and human development in central asia," United Nations Development Programme, Tech. Rep., 2015.

[7] C. Incaltarau, I. Sharipov, G. C. Pascariu, and T. L. Moga, "Growth and convergence in eastern partnership and central asian countries since the dissolution of the USSR—embarking on different development paths?" *Development Policy Review*, vol. 40, no. 1, p. e12547, 2022.

[8] World Bank, "Migration and remittances: Recent developments and outlook," World Bank, Tech. Rep., 2021.

[9] S. Castles, H. de Haas, and M. J. Miller, *The Age of Migration: International Population Movements in the Modern World*, 6th ed. Red Globe Press, 2020.

[10] M. A. Clemens, "Economics and emigration: Trillion-dollar bills on the sidewalk?" *Journal of Economic Perspectives*, vol. 25, no. 3, pp. 83–106, 2011.