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D. Akebayev<sup>1</sup>  
A. Kudebayeva<sup>2</sup>  
G. Pech<sup>3</sup>

KIMEP University, Almaty, Kazakhstan  
(E-mail: adastanjm@gmail.com<sup>1</sup>, almak@kimep.kz<sup>2</sup>, gpech@kimep.kz<sup>3</sup>)

## Level of education in assessing the tendency and propensity to migrate among the population of Kazakhstan

**Abstract.** *This article investigates the determinants of the decision to migrate and the role of education. As the literature suggests that more educated workers tend to migrate over a greater distance, we distinguish between migration from Kazakhstan within the CIS and wider international migration. Our goal is to identify the driving forces behind any brain drain.*

*We use regional data to construct panel estimations of propensities to migrate with national and regional education data and regional GDP per capita as determinants. We estimate separate regressions for CIS migration and migration to other countries for the periods 2009-2014 and 2015-2019.*

*For the period 2009-2014, we find that migration within the CIS responds strongly to the economic situation at home while international migration is unaffected by the economy. Since 2015 both kinds of migration have become largely decoupled from the economy, while both follow an increasing trend. In terms of their educational achievement, the cohorts of international and CIS migrants have become indistinguishable.*

**Keywords:** *International migration, human capital, brain drain, Kazakhstan, regional data, propensity to migrate.*

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### Introduction

Since independence, Kazakhstan has experienced the outflow of 4.2 million migrants. More recently, outgoing migration flows have been almost balanced by incoming migration

flows with a net outflow of around 90,000 persons in the five years leading up to mid-year 2020.[1]. In the 2000s, Kazakhstan has developed into an attractive destination for labor migrants from other Central Asian countries, reflecting differences in economic development [2]. A

substantive part of migration out of Kazakhstan is low-skilled: Ryazantsev [3] reports that in 2014 the construction sector was the main destination of Kazakhstani migrant workers in Russia, employing 42% of those with the work permit. Our data confirm that, until recently, most workers migrating to CIS countries was relatively low-skilled while the - numerically smaller - group of international migrants who migrate outside of the CIS countries is more highly skilled. Yet recent increases in the share of highly skilled persons in the group of CIS-destined migrants raises concerns about a potential brain drain.

Migration changes the skills composition of the workforce as migrant workers self-select into labour markets where their specific skills level is relatively scarce. Yet education is also an important determinant of the decision to migrate: Generally, educated workers tend to migrate over greater distances than uneducated workers: US Census data shows that workers with less time in education migrate relatively more within the state than workers with more time in education, who migrate relatively more between states [4]. Patterns of migration into the European Union are compatible with self-selection (see [5]): non-EU immigrants with high education tend to migrate to EU countries where the education level of the home population is relatively low and where they show a relatively stronger presence than EU workers.

Another main determinant of the decision to emigrate is the wage difference – or more generally the difference in likely economic well-being – between the host labor market and the home labor market [6].

In this study, we use regional migration data, which distinguishes between CIS and non-CIS international migration, and relate it to regional GDP and regional and national education data. For each kind of migration, we estimate four different models for the periods 2009-2014 and 2015-2019. For the earlier period, we find that migration to the CIS responds strongly to the economic situation at home while international migration is unrelated to the economic situation at home. For the period 2015-2019, CIS and international migration have become largely

decoupled from the economic situation at home. More students in higher education at the national level are associated with a greater propensity to migrate across our samples.

The data further breaks down the educational attainment of migrants, which allows us to test whether educational attainment in the group of CIS migrants is different from educational attainment in the group of other international migrants. While the share of migrants with high education is greater in the group of international migrants than in the group of CIS migrants when looking at the entire period, these differences have disappeared in the more recent subperiod.

*Literature.* The standard approach to the economic decision to migrate is based on the Roy model [6] which, in its simplest form, maintains that migration occurs when the wage differential – corrected for the pecuniary and non-pecuniary costs of migration – is positive. Borjas [7] suggests that there is a skills premium for educated workers moving to more developed economies. However, Belot and Hatton [8] only observe this effect after taking into account a poverty constraint in the sending country. As the wage differential may or may not respond positively to education the Roy model does not make a clear-cut prediction for the educational variables. Borjas [7] also suggests that greater inequality in the host labor market compared to the home labor market attracts workers, but the evidence is mixed: Brücker and Defoort [9] find that inequality in the receiving and sending country increases the skill level of migrants.

Schwartz [10], in his seminal paper on the relationship between education and migration, focuses on the set of migrants rather than the population as a whole and examines the determinants of migrants' moves between locations – in this case, 9 divisions of the United States. He finds that more educated migrants tend to move further and that education has a larger impact on the willingness to migrate further than youthfulness. Schwartz suggests that information costs related to finding opportunities at the destination are likely to decrease in education but to increase in distance. Moreover, the psychic cost is likely to be positively associated

with distance while education contributes to a reduction in this cost because the cultural background of more highly educated workers is more homogeneous across space. A recent study [11] of the transition countries Poland and Slovakia illustrates that the results are analogous for internal and internal-plus-external migration, although external migrants react more sensitively to unemployment.

Brücker and Trübswetter [12] use data on the East-West migration of East German workers after unification from an employment sample to explore whether they self-select. Unlike most of the literature, they find that more highly educated workers have a lower propensity to move as they enjoy a scarcity premium in their home region.

In terms of Kazakhstan and its region, Mansoor and Quillin [13] provide an overview of early migration movements in the former Soviet Union. Becker et al [14] use regional data to examine migration from Kazakhstan to Russia. The responsiveness of migrants in different age groups to differences in the economic development of the two countries suggests an integrated labor market between the two countries. They also find that it is mainly workers in the population centers, which can avail of opportunities in the Russian labor market. They do not, however, consider education as a driver of migration nor do they look at international migration.

In a more recent article, Aldashev and Dietz [15] look at movements between the Kazakhstani regions. They consider distance along with economic variables and population at origin and destination as determinants and find that economic differences drive migration within the country. Overall, a picture emerges which is compatible with workers from the poorer regions moving to the population centers of Kazakhstan and workers from the population centers moving to Russia. Ryazantsev [3] gives an overview of migration trends and labor market policies involving Kazakhstan and Russia. He presents data on the employment structure of Kazakhstani labor migrants in Russia which is, however, restricted to roughly one-half of migrants who -

in the absence of such a requirement - still apply for work permits when they migrate.

The relationship between migration and education has received particular attention in the context of a feared, so-called "brain-drain". Generally, there is concern that less developed countries lose highly qualified workers to more developed countries [16]. But there may also be positive effects of migration for the host countries including remittances [17] or an increased incentive for workers in home countries to invest in education and become part of international networks [18].

Our paper is the first paper we are aware of which systematically analyses the different drivers of CIS and international migration from Kazakhstan based on available official regional data. It explores economic and education variables as determinants of the propensity to migrate and, therefore, contributes to the question of how far Kazakhstan is affected by brain drain.

## Methodology

The preferred approach to determine the effect of education on migration is to use individual-level data. Such data involves observations of education level, economic variables, and migration decisions for every person of a random sample which includes migrants and non-migrants. Such data allows us to directly test our hypotheses such as that education increases the propensity to migrate over a greater distance. Unfortunately, such data is unavailable in the case of Kazakhstan.

Instead, we rely on regional data for the differential observations necessary to test a hypothesis. It is not uncommon that a researcher who is interested in individual responses faces a situation where the explanatory variables are only available at an aggregate level, for example at the level of postal codes or, as in our case, at the regional level. In this situation, there are necessarily efficiency losses in the estimation compared to a situation where individual data is available. This efficiency loss tends to be smaller, the more variation there is in the observed variables (see, e.g. the discussion in [19]). As our

**Table 1**

Share of migrants with high education among the groups of CIS and international migrants, two-sample t-test with unequal variances for 2009 - 2019

Variable	Obs	Mean	Std.Err.	Std.Dev.	[95% Conf. Interval]	
Share of highly educated among international migrants	170	0.382307	0.01509	0.19675	0.352517	0.412096
Share of highly educated among CIS migrants	176	0.336013	0.007701	0.10217	0.320814	0.351212
combined	346	0.358758	0.009465	0.157463	0.342108	0.375408
diff		0.046294	0.016942		0.012929	0.079658
Ho: diff = 0		diff = mean(IntShare) - mean(CISShare)		t=2.7325		
Ha: diff < 0		Welch's degrees of freedom = 252.969				
Pr(T<t)=0.9966		Ha: diff !=0				Ha: diff > 0
		Pr( T > t =0.0067				Pr(T>t) = 0.0034
Note: calculated by the authors based on [20]						

descriptive statistics show, there is a considerable variation for regional educational achievement and propensity of the population to migrate. If we want to show that individuals with higher education are more likely to migrate over a greater distance, we have to demonstrate that regions with relatively more educated individuals tend to produce more long-distance migration.

We use annual regional migration data for the period 2009-2019, collected by the Statistics Committee of the Republic of Kazakhstan [20].<sup>1</sup>

We divide our data into two subsamples: the first sample runs from 2009 to 2014 and the second sample runs from 2015 to 2019 corresponding to two post-crisis periods for the economy of Kazakhstan.<sup>2</sup> Our estimations show that behavior for the two time periods is markedly different. Dividing the time series also helps avoid problems with violations of the asymptotic behavior of the data.<sup>3</sup>

<sup>1</sup> Our data set and our estimation results can be retrieved from [www.geraldpech.net/materials](http://www.geraldpech.net/materials).

<sup>2</sup> Our observations start after the financial crisis of 2008/2009. Another crisis hit the Kazakhstani economy in 2015 when the oil price sharply decreased, putting pressure on the exchange rate of the Kazakhstani tenge which was allowed to freely float in August 2015, resulting in a major currency devaluation.

<sup>3</sup> See [23]. We encountered such problems when we estimated a data set with less detail for the period 2004-2015.

The Statistics Committee counts as emigrants those who fill out the paperwork required for emigration. Temporary migrants, such as those who study abroad, do not have to fill out the form. However, those who go to study abroad might choose to fill out the form if they plan to stay abroad.<sup>4</sup> Our data breaks emigration numbers down into the 16 regions (14 oblasts and the two cities of Astana – now Nur-Sultan – and Almaty) of Kazakhstan and divides migration flows into migrants into the CIS countries and international migrants.<sup>5</sup> We find that the average propensity to migrate to the CIS in 2015 was 0.15% and rose to about 0.2% in 2018. The average propensity to migrate internationally elsewhere was 0.02%.<sup>6</sup> We use national education data from the Statistics Committee of the Republic of Kazakhstan [21], which measures education as several students in the age group from 18 to 22, and regional data for students in higher education [22]. In addition, our migration data [20] breaks down migration flows

<sup>4</sup> URL: Verbal communication from the Statistics Committee of the Republic of Kazakhstan.

<sup>5</sup> Since 2018, there are 17 regions, where Shymkent city is counted separately, in our regression analysis, we put the data from Symkent into South-Kazakhstan obl, today is Turkestan obl.

<sup>6</sup> Overall propensity to migrate from Kazakhstan is comparable to the average propensity to migrate for the European Union of 0.28%, see [24].

to CIS countries and other countries by education level. The latter allows us to conclude the relative compositions of international and CIS migrants. Table 2 gives an overview of regional migration data, regional population, GDP, and enrollment for the years 2009, 2015, and 2018.

The share of individuals with higher education among international migrants is 38% compared to a share of 34% among CIS migrants. Our t-test shows that this difference is significant, i.e. the two groups of migrants belong to populations with clearly distinct levels of education. We tested the subperiods 2009-2014 and 2014-2019 separately. It turns out that the result for the first subperiod is quite similar, in the second subperiod, the share of individuals with higher education is 40% while their share among CIS migrants is now 37.5%. So, while overall the role of education for migrants has strengthened, it did more so for CIS migrants. From our T-test for this subperiod, the populations are no longer significantly different.

Our regional education data consists of the share of current students in higher education in the overall population. Because that share may or may not reveal educational characteristics of the overall population, we also use the share of individuals with higher education in the migrant population emanating from the region as a proxy for the regional educational achievement. Although that may be different from the population at large, it is not unreasonable to expect that the data truthfully reveals at least the rank of regions in terms of educational achievement.<sup>7</sup>

As an indicator of the economic incentives to emigrate from a region, we use regional GDP per capita. While in view of the wide range of destinations in the categories it is difficult to calculate a meaningful wage differential, we can argue that a negative shock to local GDP per capita signals worsening prospects in the home labor market. We use our panel data to estimate the

propensity of a member of the overall population to emigrate from an equation of the form:<sup>8</sup>

$$m_{it}^s = \beta_0 + \beta_1 gdp_{it} + \beta_2 s_{it} + \beta_3 e_{it} + \beta_4 E_t + c_i + \mu_{it} \quad (1)$$

where index  $i$  signifies the region and  $t$  the time variable.  $m_{it}$  is the propensity to migrate. We estimate separate equations for the propensity to migrate to CIS countries and the propensity to migrate internationally.  $gdp_{it}$  is GDP per capita in the region,  $s_{it}$  is the share of individuals with higher education in the group of all migrants from the region,  $e_{it}$  is current enrollment in higher education as a share of the overall regional population,  $E_t$  is the share of enrollment in technical and higher education at the national level in the relevant age cohorts.<sup>9</sup> Our theory suggests that the coefficient of  $gdp_{it}$  is negative as a ceteris paribus increase of regional wages reduces incentives to migrate. We expect the proxies for regional and general education to be positively associated with emigration as education tends to generate a skills premium – as suggested by Borjas [7] – and more so, for international migration because migration distance tends to increase with education – the effect discussed by Schwarz [10].  $c_i$  is an unobserved effect (heterogeneity/heterogeneity) and  $\mu_{it}$  is an error term.  $c_i$  will be treated as a random effect or a fixed effect (FE). The following presentation explains the difference between the two methods (see, e.g. [23]).

The random effects (RE) technique to estimating a coefficient  $\beta$  effectively inserts  $c_i$  into the error term, under the hypothesis that  $c_i$  is orthogonal to all independent variables (i.e.  $gdp_{it}$ ,  $s_{it}$ ,  $e_{it}$ ,  $E_t$ ) of the regression (1) and accounts for the implied serial correlation in the composite error  $v_{it} = c_i + \mu_{it}$  when using Generalized Least Squares (GLS) analysis.

The idea for estimating a coefficient  $\beta$  under fixed effects (FE) is to transform the equations to remove the unobserved effect  $c_i$ . When at least two time periods are available, several conversions

<sup>7</sup> It is possible to argue that oblasti with fewer economic opportunities may have fewer graduates but more of these graduates would enter the group of emigrants. Even if this were the case, the findings of Becker et al suggest that the first destination of such graduates would be the population centers of Kazakhstan rather than international or CIS migration – see also our results on regional dummies.

<sup>8</sup> See, e.g. [15] for a comparable model of migration.

<sup>9</sup> As a proxy we use the share of students in technical, higher university education level relative to the size of students in professional, technical and higher education for the age group from 18 to 22 in each region.

attain this aim. The FE transformation (or within transformation) is obtained by first averaging the equation (1) over  $t=1, \dots, T_0$  to get the cross-section equation<sup>10</sup>

$$\begin{aligned} m_i^s = & \beta_0 + \beta_1 \underline{gdp}_i + \beta_2 \underline{s}_i + \\ & \beta_3 \underline{e}_i + \beta_4 \underline{E} + c_i + \underline{\mu}_i \end{aligned} \quad (2)$$

where  $m_i^s$ ,  $\underline{gdp}_i$ ,  $\underline{s}_i$ ,  $\underline{e}_i$ ,  $\underline{E}$ ,  $\underline{\mu}_i$  are the corresponding mean values. Subtracting equation (2) from equation (1) for each  $t$  gives the FE transformed equation,

$$\begin{aligned} m_{it}^s - \underline{m}_i^s = & \beta_1 (gdp_{it} - \underline{gdp}_i) + \beta_2 (s_{it} - \underline{s}_i) + \\ & \beta_3 (e_{it} - \underline{e}_i) + \beta_4 (E_t - \underline{E}) + (\mu_{it} - \underline{\mu}_i) \end{aligned} \quad (3)$$

By this procedure, the unobserved effect  $c_i$  has been eliminated. Subsequently, we apply the pooled OLS estimator to get estimates of  $\beta$ .

A preference for either FE or RE is established using the Hausman test: considering that FE is consistent when  $c_i$  and  $x_i$  are correlated but RE is inconsistent, a statistically significant difference is interpreted as evidence against the hypothesis of the random effect.

## Results

Our results are summarized in tables 3 and 4. For each model, we have run a fixed and a random-effects variant. The table shows the preferred model where preference was established by the Hausman test.

In all the models we tested we have included the economic variable  $gdp_{it}$  as a determinant. Models (I) and (II) estimate equation (1) with migration to the CIS countries as the dependent variable. Model (I) uses local enrollment in higher education,  $e_{it}$  as proxy for educational achievement, and model (II) uses the share of educated migrants,  $s_{it}$ , and controls for enrollment at the national level,  $E_t$ .

For the period 2009-2014, the effect of local GDP per capita is negative and significant in both models, suggesting that the Roy model of relative economic advantages is relevant for the decision to migrate to CIS countries.

The constant in the model (I) confirms that across regions, there is an autonomous tendency to migrate of about 0.2% of the population. While the proxies for regional educational achievement are statistically insignificant, they have the predicted sign and their magnitude is quite substantive: if for a region enrollment were 100%, and assuming a linear relationship, the propensity to migrate would increase to 0.3% in the preferred random-effects model.

Model (II) which controls for the overall level of education at the national level is positive and significant at the 10% level; the propensity to migrate is explained by the interplay between economic incentives to stay and greater educational achievement pulling in the opposite direction.

Overall, our estimations for CIS migration in the period 2009-2014 confirm our theoretical predictions.

Our international migration models for the same period reveal a coefficient for the local economy,  $gdp_{it}$ , which is statistically insignificant and only in the case of the fixed effects variant of the model (III) has the predicted sign. Again, the constant of the model (III) confirms the average propensity to migrate internationally of 0.02%. However, the preferred fixed effects variant of the model (III) shows a negative effect of regional enrollment which is difficult to square with our earlier observation that the sample of international migrants has a greater share of educated workers than the sample of CIS migrants. However, the effect of education could be absorbed by the constant. A breakdown by regional dummies (not reported) shows that the propensity to migrate internationally out of Almaty city is twice as high as for any other city. Model (IV) returns a negative effect of education at the national level, suggesting an overall trend for international migration which runs counter to the trend for CIS migration.

Overall, our results show that there is practically no short-term effect of the economic situation on international migration while the effect of regional education on the propensity to migrate internationally is difficult to interpret from our data.

<sup>10</sup> See [23].

Table 2

Descriptive Data on Emigration, Population, Regional GDP and Enrollment for Kazakhstani Regions

	CIS Emigration (persons)			International Emigration (persons)			Regional Population in 1,000 persons			Regional GDP in bn kzt			Reg. Enrollment in HEI in persons enrolled		
	2009	2015	2019	2009	2015	2019	2009	2015	2018	2009	2015	2019	2009	2015	2019
Almaty	1,391	796	1,152	112	63	228	1,804	1,922	2,039	773	1,976	3,246	10,494	9,051	11,201
Almaty city	2,368	2,391	3,072	427	489	550	1,362	1,641	1,855	3,175	9,100	13,547	187,176	128,707	162,680
Akmola	3,122	2,240	2,776	254	329	432	739	737	739	525	1,121	1,936	17,609	9,267	11,994
Aktobe	982	652	1,924	35	70	55	757	823	870	853	1,769	2,974	24,335	20,336	27,695
Nur-Sultan	998	551	1,504	91	109	347	605	853	1,078	1,373	4,810	7,835	39,298	51,235	59,297
Atyrau	243	166	304	6	4	41	509	582	634	1,970	4,217	9,327	15,884	10,014	13,177
E Kazakhstan	4,967	4,045	6,924	180	174	219	1,397	1,395	1,379	984	2,311	4,025	47,541	26,842	31,560
Mangistau	456	516	549	0	7	18	483	607	678	1,109	2,124	3,685	7,906	3,976	10,036
N Kazakhstan	3,843	2,748	3,909	213	238	406	598	576	555	404	796	1,383	10,969	4,851	7,799
Pavlodar	2,645	2,994	5,131	207	401	463	572	756	754	837	1,736	3,030	4,560	12,703	16,689
Karaganda	3,359	3,982	4,922	374	679	854	1,341	1,378	1,379	1,516	3,107	5,388	56,308	36,976	43,462
Kostanay	3,506	3,034	5,265	214	325	443	886	881	873	724	1,378	2,452	29,328	19,014	21,542
Kyzylorda	113	59	70	1	0	6	678	753	794	642	1,165	1,829	15,037	10,055	11,411
S Kazakhstan <sup>1</sup>	1,062	821	688	48	64	102	2,463	2,788	2,993	925	2,508	4,219	73,911	70,827	118,994
W Kazakhstan	1,549	956	1,736	20	33	34	598	630	652	823	1,710	2,946	25,985	26,856	31,705
Zhambyl	1,123	1,041	1,022	76	70	144	1,021	1,098	1,125	349	1,015	1,713	26,195	18,950	25,103

Note: Compiled by the authors from [20] and [22]

<sup>1</sup>For 2019: Turkistan and Zhymkent.

**Table 3**

Determinants of the propensity to migrate to CIS and other countries in 2009-2014

VARIABLES	CIS Migration				International Migration			
	Model I		Model II		Model III		Model IV	
	a) fixed eff.	b) random eff. †	a) fixed eff.	b) random eff. †	a) fixed eff.	b) random eff. †	a) fixed eff.	b) random eff. †
gdpi	-.000192** (.000092)	-.000211*** (.000079)	-.000206*** (.000077)	-.000209*** (.000075)	-.000009 (.000014)	.000000 (.000010)	.000013 (.000011)	.000008 (.000010)
si			-.00071 (.001563)	-.000831 (0.001514)			-.000172 (.000219)	-.000133 (.000206)
ei	.003095 (.00921)	.001378 (.007372)			-.002442* (.001389)	-.00060 (.000840)		
E			.003735* (.00221)	.003735* (.002188)			-.001363*** (.000309)	-.001350*** (.000308)
Constant	.002156*** (.000453)	.002253*** (.000516)	.000567 (.001192)	.000605 (.001234)	.000225*** (.000068)	.000145*** (.000050)	.000834*** (.00017)	.000828*** (.000168)
Observations	96	96	96	96	96	96	96	96
R-squared	0.1027	0.1023	0.1372	0.1371	0.0426	0.037	0.207	0.205
Number of id	16	16	16	16	16	16	16	16
Standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1, † preferred model according to Hausman test								
gdpi = regional per capita gdp; ei = regional enrollment; si = share of educated migrants, E = national enrollment								
Note: calculated by the authors based on [20], [21], and [22]								

**Table 4**

Determinants of the propensity to migrate to CIS and other countries in 2015-2019

VARIABLES	CIS Migration				International Migration			
	Model I		Model II		Model III		Model IV	
	a) fixed eff. †	b) random eff.	a) fixed eff.	b) random eff. †	a) fixed eff. †	b) random eff.	a) fixed eff.	b) random eff. †
gdpi	.000183** (.000076)	.0000171** (.000073)	-.000064 (.000088)	-.000087 (.000081)	.000020** (.000008)	.000017** (.000008)	-.000003 (.000010)	-.000004 (.00001)
si			.000462 (.001298)	.000524 (.000919)			.00005 (.00011)	.000053 (.000200)
ei	.051241** (.02465)	.0022830 (.019312)			-.0008 (.002703)	-.00036 (.002115)		
E			.005412*** (.001083)	.005618*** (.001037)			.000378*** (.000128)	.000391*** (.000122)
Constant	.000238 (.000600)	.001037 (.00071)	-.000737 (.00056)	-.000791 (.000739)	.000191*** (.000066)	.00019** (.00008)	.00002 (.00007)	.000017 (.000088)
Observations	80	80	80	80	80	80	80	80
R-squared	0.2176	0.2078	0.4102	0.4095	0.095	0.0947	0.2079	0.2077
Number of id	16	16	16	16	16	16	16	16
Standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1, † preferred model according to Hausman test								
gdpi = regional per capita gdp; ei = regional enrollment; si = share of educated migrants, E = national enrollment								
Note: calculated by the authors based on [20], [21], and [22]								

For the period 2015-2019, in our estimation of CIS migration, model (I) returns a positive effect of regional GDP per capita, contradicting the Roy model. It also shows a positive effect of regional enrollment in our preferred fixed effects estimation. If we screen off education at the national level model (II), regional GDP per capita becomes insignificant while education at the national level is positive and highly significant.

Our estimation suggests that the reaction to short-term economic developments no longer plays a significant role in CIS migration.

In our estimations for international migration, model (III) returns a significant and positive effect of regional GDP, reflecting the same counter-intuitive trend as in the case of CIS migration, and an autonomous tendency to migrate of 0.02%. In model (IV), which screens off education at the national level, all variables are insignificant except for education at the national level.

The most striking feature of our results for the period 2015-2019 is that the structural equations for CIS migration and international migration have become quite similar. The overall pattern of our estimations for the 2009-2014 and the 2015-2019 periods sheds further light on our earlier comparison of the samples of international and CIS migrants: as national education has increased over time, the cohorts of international and CIS migrants have become more educated and they have not only become more similar in terms of educational achievement but also their economic behavior.

## Conclusion

Our results suggest that migratory behavior has changed between the periods 2009-2014 and 2015-2019. In the former period, the share of educated individuals in the cohort of international migrants was greater compared to the cohort of

CIS migrants. This difference has nearly melted away as both cohorts have become on average more educated. In many ways, determinants of the behavior of international migrants and CIS migrants have also become more similar.

In the earlier period, emigration to the CIS countries seemed to act as a buffer for the national Kazakhstani labor market, with a strong negative effect of regional GDP per capita, while international migration was largely unaffected by the economic situation at home. In the period 2015-19, there is no such buffer effect for either cohort.

National enrollment is positively correlated with migration in the 2015-2019 period for both destinations and CIS migration in the 2009-2014 period. There is a counter-trend for international migration for the earlier period. The role of regional enrollment turned out to be more difficult to interpret but for CIS migration, our results are largely in line with our theoretical predictions.

Reflecting on our starting point that generally more educated workers tend to migrate further, this claim no longer seems to reflect the reality of Kazakhstan in the international labor market. While in terms of numbers, the CIS and in particular Russia always has been an attractive destination for educated Kazakhstani workers, the relative premium to educated workers for international migration must have decreased.

More research is needed to judge the implications of this situation for a potential brain. To put our results in perspective, migration from Kazakhstan is mainly within the CIS region and at a level that is comparable to migration propensities between EU countries.

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**Д. Акебаев, А. Кудебаева, Г. Пек**  
*Университет КИМЭП, Алматы, Казахстан*

### **Уровень образования в оценке тенденции и склонности к миграции населения Казахстана**

**Аннотация.** В этой статье рассматриваются детерминанты решения о миграции, в частности, роль образования. Поскольку в литературе предполагается, что более образованные работники имеют тенденцию мигрировать на большее расстояние, мы различаем миграцию из Казахстана в СНГ и более широкую международную миграцию. Наша конечная цель - определить движущие силы, стоящие за утечкой мозгов.

Авторы используют региональные данные для построения панельных оценок склонностей к миграции, применяя национальные и региональные данные об образовании и региональный ВВП на душу населения в качестве определяющих факторов. Оцениваются отдельные регрессии для миграции в страны СНГ и миграции в другие страны.

Пока что существует мало систематических исследований по «утечке мозгов» из Казахстана, и, насколько нам известно, нет исследований в представленном направлении исследований. Текущее исследование дает важную информацию о том, где сосредоточить будущие исследовательские усилия.

За период 2009-2014 годов мы обнаружили, что миграция внутри СНГ сильно зависит от экономической ситуации внутри страны, в то время как международная миграция не зависит от экономики. С 2015 года оба вида миграции в значительной степени отделились от экономики, в то же время оба следуют растущей тенденции. С точки зрения образовательных достижений, когорты международных мигрантов и мигрантов из СНГ стали неразличимыми.

**Ключевые слова:** международная миграция, человеческий капитал мигрантов, утечка мозгов, Казахстан, региональные данные, склонность к миграции.

**Д. Акебаев, А. Кудебаева, Г. Пек**  
*КИМЭП университеті, Алматы, Казахстан*

### **Қазақстан халқының көші-қон үрдісі мен бейімділігін бағалаудағы білімнің деңгейі**

**Аннотация.** Мақалада көші-қон туралы шешімнің анықтаушылары және білім берудің рөлі туралы айтылады. Әдебиеттерден білімді жұмысшылардың үлкен қашықтыққа қоныс аударатындығы туралы айтылғандықтан, біз Қазақстаннан ТМД-ға және халықаралық көші-қонды ажыратамыз. Біздің басты мақсатымыз – «интеллектуалды миграцияға» әсер ететін қозғаушы күштерді анықтау.

Біз ұлттық және аймақтық білім және жан басына шаққандағы ЖІӨ жөніндегі аймақтық деректерді көші-қонға бейімділікті бағалау анықтайтын факторлары ретінде құрамыз. ТМД елдерінен қоныс аударудың және басқа елдерге көшудің жеке регрессияларын бағалаймыз.

Әзірге Қазақстаннан «интеллектуалды миграцияға» қатысты жүйелі зерттеулері аз және зерттеу бағытын қолданатын зерттеулер жоқ. Ағымдағы зерттеулер болашақ зерттеу күш-жігерін қайда бағыттауға болатындығы туралы маңызды ақпарат береді.

Біз ТМД шеңберіндегі көші-қон елдегі экономикалық жағдайға өте маңызды, ал халықаралық көші-қон экономикаға тәуелді емес деп санаймыз. Біздің аймақтық жұмыс күшінің білім деңгейіне сенім білдіруіміз мардымсыз, бірақ болжамды белгілері бар. Ұлттық деңгейдегі әр жас топтары бойынша білім алу студенттердің көп бөлігі және аймақта жоғары білім алатын халықтың көп бөлігі халықаралық көші-қонмен байланысты.

**Түйін сөздер:** халықаралық көші-қон, мигранттардың адами капиталы, «интеллектуалды миграция», Қазақстан, аймақтық мәліметтер, миграцияға бейімділік.

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**Information about authors:**

*Акебаев Д.* – КИМЭП Университетінің магистранты, Абай даңғылы 4, Алматы, Қазақстан.

*Кудебаева А.* – Даму Экономикасындағы Философия Ғылымдарының Докторы, КИМЭП Университетінің Ассистент Профессоры, Абай даңғылы 4, Алматы, CERGE-EI Қоры грантының иегері, Politických vězňů 7, 111 21, Прага, Чехия.

*Пек Г.* – негізгі автор, Экономикадағы Философия Ғылымдарының Докторы, КИМЭП Университетінің Ассоциативты Профессоры, Абай даңғылы 4, Алматы, Қазақстан.

*Akebayev D.* – Master’s degree student, KIMEP University, 4 Abay ave., Almaty, Kazakhstan.

*Kudebayeva A.* – Ph.D., Associate Professor, KIMEP University, 4 Abay ave., Almaty, Kazakhstan. CERGE-EI Foundation Teaching Fellow, Politických vězňů 7, 111 21 Prague 1, Czech Republic.

*Pech G.* – **The main author**, Ph.D., Associate Professor, KIMEP University, 4 Abay ave., Almaty, Kazakhstan.