IRSTI 06.61.33 https://doi.org/10.26577/be.2024.150.i4.a2

A. Kudebayeva[1*], A. Sätre[2]

[1] KIMEP University, Almaty, Kazakhstan
[2] Uppsala University, Uppsala, Sweden
*e-mail: almak@kimep.kz

REGIONAL INEQUALITY AND WELL-BEING OF HOUSEHOLDS IN KAZAKHSTAN: DISTRICT-LEVEL ANALYSIS

The importance of this study is that the first time in Kazakhstan the regional inequality is explained by the district level inequality by using household survey data, due to that regional inequality mainly studied by using only aggregate macroeconomic indicators before. The main aim of this study using data from Kazakhstan Household Budget Surveys (KHBS) for the period from 2018-2021 to estimate decomposable measures of inequality on levels of regions and districts and identify which components (within or between regions inequality) are the main contributors to the income inequality. To our knowledge there is a gap in literature in assessment of the effects of district level of inequality on well-being of households in Kazakhstan. The main significance of the paper is that by applying Generalized Entropy indexes of inequality the study finds that rural inequality declines in that period. Which can be explained by distributional effects of Targeted Social Assistance policies. The methodology consists of the evaluation generalized entropy indexes on rural/urban, regions and districts level. Moreover, based on pooled OLS methodology for regressions analysis the main associates of well-being of households is estimated empirically. The results indicate that decomposition of inequality indicators illustrates that the portion of between groups inequality in total is greater for smaller areas such as districts (rayons) than for provinces (regions). The empirical model by application of annual Kazakhstan Household Budget surveys demonstrates that the effects of district inequality is significantly and negatively affect to the well-being of households, by taking into consideration socio-demographic characteristics of households. Moreover, the location in more rich cities by macroeconomic indicators such as Almaty and Astana is negatively associates with well-being of households due to the district inequality. The main contribution of this work is that policymakers have to pay more attention on district inequalities even in more prosperous regions in terms of macroeconomic indicators.

Key words: district inequality, income distributions, decomposable inequality indexes, Kazakhstan, well-being of households.

А. Кудебаева[1*], А. Сэтре[2]

[1]КИМЭП Университеті, Алматы қ., Қазақстан
[2] Уппсала Университеті, Уппсала қ., Швеция
*e-mail: almak@kimep.kz

Қазақстандағы үй шаруашылықтарының өңірлік теңсіздігі және әл-ауқаты: аудандық деңгейдегі талдау

Бұл зерттеудің маңыздылығы мынада: алғаш рет Қазақстандағы аймақтық теңсіздік үй шаруашылығын зерттеу деректері арқылы аудан деңгейіндегі теңсіздікпен түсіндіріледі, өйткені бұрын аймақтық теңсіздік негізінен тек агрегаттық макроэкономикалық көрсеткіштерді пайдалана отырып зерттелген. Бұл зерттеудің негізгі мақсаты-2018-2021 жылдар кезеңіндегі Қазақстан үй шаруашылықтары бюджеттерін зерттеу (ҚҮШБЗ) деректерін пайдалана отырып, өңірлер мен аудандар деңгейіндегі теңсіздіктің ыдырайтын көрсеткіштерін бағалау және кірістер теңсіздігіне қандай компоненттер (өңірлер ішіндегі немесе олардың арасындағы теңсіздік) негізгі үлес қосатынын анықтау. Біздің білуімізше, Қазақстандағы аудандық деңгейдегі теңсіздіктің үй шаруашылықтарының әл-ауқатына әсерін бағалайтын әдебиетте жетіспеушілік бар. Бұл жұмыстың басты маңыздылығы, теңсіздік индекстерінің жалпыланған энтропиясын пайдалана

отырып, зерттеу ауылдық жерлерде теңсіздіктің осы кезеңде төмендейтінін анықтайды. Бұл атаулы әлеуметтік көмек саясатының үлестіру әсерімен түсіндіріледі. Әдістеме ауыл/қала, облыстар мен аудандар деңгейінде жалпыланған энтропия көрсеткіштерін бағалаудан тұрады. Сонымен қатар, біріктірілген ең кіші квадраттар әдістемесінің негізінде регрессиялық талдау үй шаруашылығының әл-ауқатының негізгі байланысты факторларын эмпирикалық түрде бағалайды. Нәтижелер теңсіздік өлшемдерінің ыдырауы топтар арасындағы теңсіздік үлесі аймақтарға қарағанда аудандар сияқты кішігірім аумақтар үшін әдетте үлкенірек екенін көрсетеді. Қазақстандағы үй шаруашылығы бюджетін жыл сайынғы зерттеулер негізінде қолданылған эмпирикалық модель үй шаруашылықтарының әлеуметтік-демографиялық ерекшеліктерін ескере отырып, аудандық теңсіздіктің салдары үй шаруашылықтарының әл-ауқатына айтарлықтай және теріс әсер ететінін көрсетеді. Оның үстіне, Алматы және Астана сияқты макроэкономикалық көрсеткіштер бойынша неғұрлым бай қалаларда орналасуы аудандық теңсіздікке байланысты үй шаруашылықтарының әл-ауқатымен теріс байланыста. Бұл жұмыстың басты үлесі – өңірлік даму саясаты макроэкономикалық көрсеткіштер бойынша дамыған аймақтардың өзінде аудан теңсіздігіне көбірек көңіл бөлуі керек.

Түйін сөздер: аудандық теңсіздік, кірістерді бөлу, ыдырайтын теңсіздік индекстері, Қазақстан, үй шаруашылықтарының әл-ауқаты.

А.Кудебаева[1*], Анн-Мари Сэтре[2]
[1]Университет КИМЭП, г. Алматы, Казахстан
[2]Уппсальский Университет, г. Уппсала, Швеция
*e-mail: almak@kimep.kz

Региональное неравенство и благосостояние домохозяйств в Казахстане: анализ на уровне районов

Важность данного исследования заключается в том, что впервые в Казахстане региональное неравенство объясняется неравенством на районном уровне с использованием данных обследования домохозяйств, поскольку ранее региональное неравенство в основном изучалось с использованием только агрегированных макроэкономических показателей. Основная цель данного исследования – с использованием данных обследований бюджетов домохозяйств Казахстана (ОБДК) за период 2018–2021 гг. оценить разложимые показатели неравенства на уровне регионов и районов и определить, какие компоненты (неравенство внутри регионов или между ними) вносят основной вклад в неравенство доходов. Насколько нам известно, в литературе существует пробел в оценке влияния районного уровня неравенства на благосостояние домохозяйств в Казахстане. Основная значимость данной статьи заключается в том, что, применяя индексы обобщенной энтропии неравенства, исследование обнаруживает, что сельское неравенство снижается в этот период. Что можно объяснить распределительными эффектами политики адресной социальной помощи. Методология состоит из оценки индексов обобщенной энтропии на уровне села/города, областей и районов. Более того, на основе объединенной методологии наименьших квадратов для регрессионного анализа основные ассоциированные факторы благосостояния домохозяйств оцениваются эмпирически. Результаты показывают, что разложение показателей неравенства иллюстрирует, что доля неравенства между группами в целом больше для меньших территорий, таких как районы, чем для областей. Эмпирическая модель с применением ежегодных обследований бюджетов домохозяйств Казахстана показывает, что влияние неравенства районов существенно и отрицательно влияет на благосостояние домохозяйств, принимая во внимание социально-демографические характеристики домохозяйств. Более того, расположение в более богатых городах по макроэкономическим показателям, таких как Алматы и Астана, отрицательно связано с благосостоянием домохозяйств из-за неравенства районов. Основной вклад этой работы заключается в том, что при проведении политики развития регионов должны уделять больше внимания неравенству районов даже в более благополучных регионах с точки зрения макроэкономических показателей.

Ключевые слова: неравенство районов, распределение доходов, разложимые индексы неравенства, Казахстан, благосостояние домохозяйств.

Introduction

The issue of regional inequality is particularly applicable to Kazakhstan, as it confronts considerable disparities in geographic circumstances and infrastructure expansion among its regions. Regrettably, while a raise in the economy, inflamed by favorable oil and gas prices, has elevated the general living standards, improved infrastructure, and extended state services, substantial regional disparities sustain, mostly in contrast to the early 1990s (Turganbayev, 2018).

The uneven distribution of natural resources, presented by the differing accessibility of scarce resources such as oil and minerals, plays an essential role. Areas endowed with plentiful resources dispose to experience a significant economic development, exacerbating the economic divide. The western part of Kazakhstan, the regions such as Atyrau, Mangystau are rich in oil and gas reserves and illustrates the higher values of gross regional product. Conversely, the southern part of Kazakhstan such as Turkestan, Zhambyl and Almaty regions are behind in terms of poverty indicators. Additionally, there is a significant difference between the largest cities such as Almaty and Astana and other rural areas of Kazakhstan.

Kazakhstan experiences substantial regional inequalities, including variances in development of social infrastructure. These disparities are not limited to economic measures but also include access to public goods and services, and quality of life. According to a study by the Asian Development Bank (Asain Development Bank (ADB), 2023), it is important to take into consideration regional disparities in subjective well-being of individuals and determinants of subjective well-being such as, social capital, subjective assessment of health, personal security, access to education. Kazakhstan's regional disparities in social infrastructure and opportunities are expressively larger than those of most developed countries, which could bring future difficulties for the country.

Previous studies of regional inequalities in Kazakhstan did not pay attention on district inequalities. The previous research tending to focus on socioeconomic variances within the country measured by macroeconomic indicators, such Gross regional product, employment, human development indicators and etc. (Asian Development Bank (ADB), 2021, Nurlanova et al., 2018; Nurlanova et al., 2019; Sermagambet et al., 2022 , Turganbayev, 2018). Moreover, all previous research is based on regional level data in Kazakhstan. Recently, (Rodrigues-Pose et al., 2024) based on Regional Well-Being Survey of Kazakhstan confirms the presence of high and growing regional polarization. Additionally, the researchers depicted via the complete examination that shortages happen even in more stable regions and less strong regions, similarly those in the east and south of the Kazakhstan, could have comparatively greater volumes in other well-being indicators such as personal security and social connections. To our knowledge there is a gap in literature in assessment of the effects of district level of inequality on well-being of households in Kazakhstan. The main aim of this study using data from Kazakhstan Household Budget Surveys (KHBS) for the period from 2018-2021 to estimate decomposable measures of inequality on levels of regions and districts and identify which components (within or between regions inequality) are the main contributors to the income inequality. Based on the research aim the following research objectives are formulated:

1. Identify the decomposable measures of inequality and its application to the wellbeing of households in Kazakhstan;
2. Evaluate critically the models and theoretical frameworks in application of regional and/or district inequalities in literature;
3. Empirically evaluate the decomposable district inequality measurements by using KHBS for the period 2018-2021. Empirically estimate the association between the district level inequality and well-being of households in Kazakhstan.
4. Formulate the policy recommendations.

The study is arranged as follows. The section two is concentrated on the literature review followed by the background section on Kazakhstan. Afterwards, the next sections display the methodology and results of empirical evaluations and regression analysis. The final section makes some conclusions.

Literature review

The literature on inequalities between regions and social groups is well developed. This literature divided into two broad groups. The first part of literature studies the inequality on aggregate level

by analyzing at national and cross-country levels. The second part of literature studies the well-being inequalities within countries and social groups based on household level data. This part of paper observes the studies on inequality at the micro-level.

There are various conclusions on association of income inequality with subjective wellbeing, for example, Sommet & Elliot (2022) found that association between self-reported subjective well-being and income inequality is almost zero based on data from the USA. However, Ifcher et al. (2019) found that that the connection is mutually dependent on scale and measurement: income inequality is wellbeing decreasing in big provinces for every measurements, wellbeing decreasing in small areas for some measurements. Mastronardi & Cavallo (2020) emphasized the impact of the spatial measurement on income inequality in Italy. The study highlights that inequality is higher in the centers of urban areas where the population density is high (Mastronardi & Cavallo, 2020). However, for developing countries the main cause of inequality and polarization is the variances within the individual groups of farmers, though, related to the environmental settings, between-group variances is the key basis of polarization in Ghana (Lu & Horlu, 2017).

Some studies (Nguyen et al., 2007) illustrate that inequality between rural and urban households raised from 1993 to 1998 in Vietnam. The between inequality increased due to variances in returns to households endowments, mainly due to educational achievements of the head of household. Also the authors discover that the dissimilarities in household characteristics as main sources of inequality at lower tails of distribution. Moreover, (Thu Le, 2014) lengthen their study of Vietnam and analyze the period between 1993 and 2006, using unconditional quantile regression decomposition founded on re-centered influence functions. They found that the main contributing causes to household inequality are education, industrial structure and remittances.

A number of researchers focused on variances in well-being between social groups (Azam, 2012;Mahdzan et al., 2019). The main findings are that inequality is higher at the top quantiles of distributions of rural India and financial wellbeing has the substantial variances observed between the low-, middle- and high-income households in Malaysia (Azam, 2012; Mahdzan et al., 2019). Azam (2012) confirms that inequality across the distributions is explained by the differences in returns to endowments. Dissimilar to the studies in Vietnam and India, Hassine (2015) finds that inequality in the 12 countries in the Arab region is forced by variances in household endowments such as demographic characteristics, human capital and community features. Other scholars (Agyire-Tettey et al., 2018) explained the rural-urban welfare gaps between 1998 and 2013 by using an unconditional quantile regression and decomposition technique based on re-centered influence functions (Fortin et al., 2011). The authors found that substantial spatial differences in consumption spending across quantiles with rural-urban inequalities mainly explained by variances in returns to endowments.

Some scholars applied the Coefficient of Regional Differences in order to evaluate the impacts of various costs of living in regions of Kazakhstan (El-Hodiri et al., 2015). The authors showed that these adjustments shift the households in the distributions of consumption expenditures from upper quintiles to lower quintiles based on Kazakhstan household budget survey data for 2009 (El-Hodiri et al., 2015).

Rodriguez-Pose and his associates based on Regional Well-Being Survey of Kazakhstan estimated Subjective well-being indexes for each region and aggregating with material well-being and quality of life indicators constructed regional well-being indicators (Rodriguez-Pose et al., 2024). The study confirms that the leader regions in subjective well-being are Zhetysu, Karaganda, North Kazakhstan. The following regions are best performing in material well-being: Karaganda, North Kazakhstan, Zhetysu, which are least performing by macroeconomic indicators. Moreover, the top regions in terms of quality of life are North Kazakhstan, Zhetysu and Akmola (Rodriguez-Pose et al., 2024).

Despite mostly macroeconomic studies of inequality, not much research has been done on microeconomic studies of inequality in Central Asia and especially for Kazakhstan, that there is a gap in literature in empirical estimation of district the inequalities and their effects on well-being of households.

Background Kazakhstan

Based on World Bank data Kazakhstan is most developed country in Central Asia region. Although, during the last decade 2010-2021 the

economic growth rates slow down, the price levels increased in 2016 due to the National Bank of Kazakhstan moved from the Exchange rate targeting policy to the Inflation targeting policy in 2015, which depreciated the national currency by 26 percent. Moreover, the decline of world oil prices since 2015 and reaching the minimum in 2016, caused further fall in economic growth rates in Kazakhstan, due to that the 20-25 percent of GDP depends on exports of oil. Which illustrates, that Kazakhstan is enormously exposed to outside shocks. Additionally, the COVID-19 pandemic affected on domestic production and economic life, by reducing the growth rates of GDP. However, the social support from the state authorities reduced the vulnerability of households to lockdowns and other consequences of the pandemic.

During the transition from a planned to market economy in 1990's the country experienced the hyperinflation, the decline of GDP per capita, the increase of poverty rates. However, since 2000's due to favourable world oil prices and an increase of production and exporting of oil, the economy started a boom, which increased GDP per capita from 7,322 USD in 1992 to 28,685 USD in 2021 in PPP terms (World Bank). The poverty indicators decline sharply from 46.6 percent in 2001 to 2.75 percent in 2015 by using the national poverty line (i.e subsistence minimum). From January 1, 2018, the structure of the subsistence minimum has been changed. A fixed share of expenses for non-food goods and services is set at 45% of the cost.

Moreover, since 2011, the Bureau of National Statistics of Agency for Strategic Planning and Reforms of the Republic of Kazakhstan (BNS) started to measure a relative poverty by using as a relative poverty line 60% percent of the median income, so relative poverty dropped from 10.5% in 2011 till 9.3 % in 2021. The poverty level has been declined to 14.29 percent in 2018 from 19.17 percent in 2011 and raised in the midst of the pandemic to 25.6 percent and projected to reduce to 15.5 percent in 2022 according to the World Bank. The poverty line for Kazakhstan was updated by the World Bank from the previous $5.5 in 2011 PPP to a new $6.85 level based on 2017 PPP. According to data from Bureau of National Statistics (BNS) of Kazakhstan the regional poverty illustrates that highest poverty rate is in oil rich Mangystau (in western part of country) and agricultural Turkestan with high population density.

Kazakhstan consists of 16 regions (14 regions (equivalent to provinces), Astana (the capital) and Almaty (former capital) cities) in 2018, however at the end of 2018, there are some structural changes occurred in regions, the South Kazakhstan region is renamed to Turkestan region and the Shymkent city is separated from the region's statistics. So, since 2019 till 2022, the administrative division of Kazakhstan consists of 17 regions (14 provinces and 3 main cities). Further changes in administrative division happened at the end of 2022, by dividing some regions, so currently there are 20 regions (17 provinces and 3 main cities). In 2022, three new provinces were created: Abay (split from the East Kazakhstan region), Zhetysu (split from Almaty region) and Ulytau (split from Karaganda region). Thus, in our analysis consists of 17 regions, due to the fact that the data from KHBS covers the period from 2018-2021.

The regional data on inequality of income based on Gini indexes from 2018-2021 illustrates the highest levels of inequality in following regions Karaganda, Pavlodar, North-Kazakhstan, East-Kazakhstan and Almaty city (see Figure 1).

The lowest level of inequality in income distributions are in Mangystau, Turkestan, Symkent city and Atyrau. Moreover, Turkestan region and Shymkent city indicate highest levels of poverty. Overall for Kazakhstan the income inequality measured by Gini index is low consist of 0.285 in 2022. The low level of Gini index could be explained by several reasons: that very wealthy households do not participate in surveys, also will be better to measure inequality by wealth or assets. The statistical data of Gross Regional Product (GRP) per capita indicates the leaders are oil producing regions Atyrau, West-Kazakstan and Mangystau, also two main cities Almaty and Astana (https://www.stat.gov.kz/). The worst performing regions by GRP per capita are located in southern Kazakhstan, which are Turkestan, Zhambyl, and Almaty regions with highest densities of population.

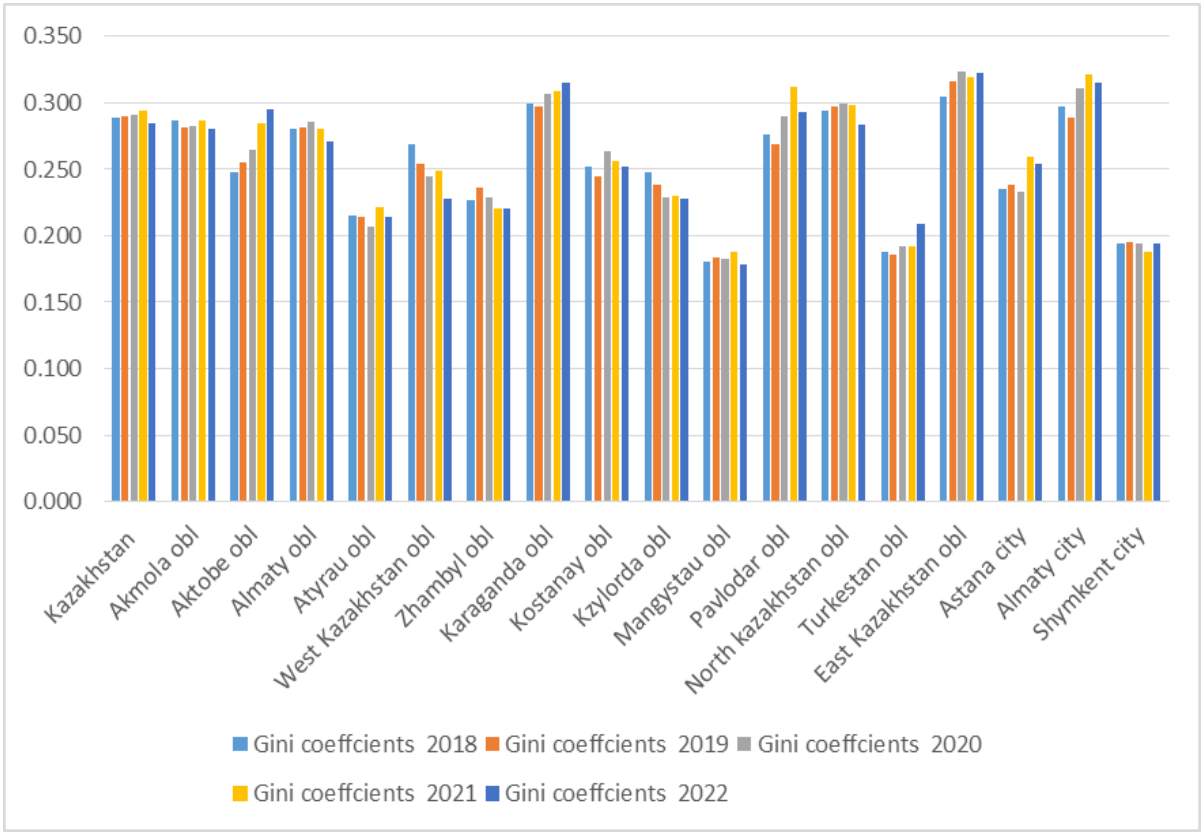

Figure 1 – Regional Gini indexes in Kazakhstan 2018-2022
Note – compiled by the authors based on data form Bureau of National Statistics of RK

Methodology

Data

The data from the Kazakhstan Household Budget Surveys (KHBS) for 2018, 2019, 2020, and 2021 years are implemented to examine a regional inequality in Kazakhstan. The reason of not using KHBS for 2022 is that the new regions were created in 2022, therefore it generates the difficulties in empirical estimations at the region level. The KHBS is annual household survey collecting data on 12,000 households and representative at the national level. The survey data is representative at the level of region (province), then it is split by rural and urban areas and similarly by small, medium and large cities. The survey also employed a rotating sample, with 25 per cent of households surveyed substituted every year. The questionnaires consist of five sections: (i) data on food and necessity spending; (ii) data on spending for clothing, durables, utilities, educations, healthcare, transportation, other spending and incomes of household members; (iii) the data on dwellings, cattle, equipment and machinery, the level of education, and employment status; (iv) household composition and size; and (v) satisfaction with life, organizations and services. The data cleaned and checked for duplicates and near-duplicates, then merged within each year and appended to each other starting from 2018 to 2021. The Stata 18 software have been applied for data analysis. The descriptive statistics are presented in Table1 below.

Table 1 – Descriptive statistics

	2018			2019			2020			2021		
VarName	Obs	Mean	SD	Obs	Mean	SD	Obs	Mean	SD	Obs	Mean	SD
Log of per capita income	10918	10.902	0.551	11955	10.911	0.597	11643	11.12	0.497	11959	11.161	0.538
District inequality (GE(1))	11148	0.116	0.054	11998	0.12	0.052	12000	0.094	0.038	11959	0.11	0.042
Satisfaction with health	11135	7.156	1.935	11862	7.122	1.887	11889	7.248	1.863	11923	7.256	1.817
Age	11148	49.754	13.631	11999	50.242	13.713	11966	47.325	16.624	11959	51.441	14.094
Head of HH employed	11148	0.654	0.476	11999	0.6212	0.4875	12000	0.584	0.493	11959	0.568	0.495
Head of HH self-employed	11148	0.078	0.268	11999	0.083	0.277	12000	0.076	0.266	11959	0.069	0.253
Head of HH is male	11148	0.513	0.5	11999	0.512	0.5	12000	0.406	0.491	11959	0.491	0.5
Head of HH is married	11148	0.657	0.475	11999	0.656	0.475	12000	0.621	0.485	11959	0.622	0.485
Head with university degree	11148	0.277	0.448	11999	0.288	0.453	12000	0.293	0.455	11959	0.301	0.459
HH size	11148	3.453	1.761	11999	3.537	1.808	12000	3.455	1.838	11959	3.527	1.902
Number of children under 18	11148	1.162	1.267	11999	1.249	1.335	12000	1.191	1.334	11959	1.216	1.374
Location in rural	11148	0.483	0.5	11999	0.455	0.498	12000	0.453	0.498	11959	0.454	0.498
Note – compiled by the authors based on KHBS data												

Methodology

Decomposable measurement of inequality

The popular measurement of inequality the *Gini* index is not decomposable. Therefore, in our analysis the possibility of inequality measures to be decomposed by subgroups is applied. This contains a separating of the people into a numerous split smaller groups, such as by regions, districts etc. and my goal to discover how general level of inequality can be split into contributions due to inequality within each of the subgroups and inequality between groups. In our case, the subgroups are provinces (regions), rural/urban division and districts. An inequality index I is called subgroup decomposable if for $J \geq 2$ and for all $x^1, x^2, \ldots, x^J$

$$I(x) = \sum_{i=1}^{J} w_i(\underline{\lambda}, \underline{n}) I(x^i) + I(\lambda_1 1^{n_1}, \lambda_2 1^{n_2}, \ldots, \lambda_J 1^{n_J}), \quad (1)$$

where n_i is the population dimension related with the distribution x^i, $n = \sum_{i=1}^{J} n_i$, $\lambda_i = \lambda(x^i)$ mean of the distribution x^i, $\underline{\lambda} = (\lambda^1, \lambda^2, \ldots, \lambda^J), \underline{n} = (n^1, n^2, \ldots, n^J), w_i(\underline{\lambda}, \underline{n})$ is the positive weight allocated to inequality in the distribution x^i expected to rely on the vectors $\underline{\lambda}, \underline{n}$ *and* $x = (x^1, x^2, \ldots, x^J)$. The *between-group* term is $I(\lambda_1 1^{n_1}, \lambda_2 1^{n_2}, \ldots, \lambda_J 1^{n_J})$ and the *within-group* term is $\sum_{i=1}^{J} w_i(\underline{\lambda}, \underline{n}) I(x^i)$. The *between-group* word is the volume of inequality that would originate if any well-being in a subgroup were substituted by the mean well-being of the subgroup. Alternatively, the *within-group* term is the weighted sum of inequalities in dissimilar subgroups. In my case J is the number of regions, districts and 2 for rural/urban division.

Decomposable Indices of Inequality inspect how the whole level of inequality can be split into contributions due to (i) inequality within each of the subgroups and (ii) inequality between subgroups, that is, due to discrepancies in average levels of well-being between these subgroups. Shorrocks (Shorrocks, 1980; 1984) demonstrated that the only family of relative subgroup decomposable indices is the generalized entropy (GE) class:

$$GE\ \ (x) = \begin{cases} \frac{1}{n\alpha(\alpha-1)} \sum_{i=1}^{n} \left[\left(\frac{x_i}{\lambda}\right)^{\alpha} - 1 \right], \alpha \neq 0,1, \\ \frac{1}{n} \sum_{i=1}^{n} \left[\log \frac{\lambda}{x_i} \right], \alpha = 0 \\ \frac{1}{n} \sum_{i=1}^{n} \left[\left(\frac{x_i}{\lambda}\right) log \left(\frac{x_i}{\lambda}\right) \right], \alpha = 1 \end{cases} \quad (2)$$

For a population of size n, a typical income distribution is a vector $x = (x_1, x_2, ..x_n)$, where $x_i \geq 0$ is the well-being of household i. Where, α=0 reproduces the Theil mean logarithmic deviation and α=1 reproduces the Theil entropy index of inequality, for α =2, the indicator converts into half the squared coefficient of variation. GE class values are responsive to fluctuating values of α which catches the variances of well-being at different parts of the well-being distribution. The measures mainly used for are 0, 1 and 2, however they accept other real values. A lesser value of 0 produces the GE index extremely responsive to variations in the poorer end of the well-being distribution, though a greater value like 2 produces the GE index responsive at the higher end of the well-being distribution. Where λ(x) (or simply λ) is the mean wellbeing and n is number of households.

The weight assigned to the inequality of subgroup i in the decomposition of the family I is given by

$$w_i(\underline{\lambda}, \underline{n}) = \frac{n_i}{n} \left(\frac{\lambda_i}{\lambda}\right)^{c} \quad (3)$$

The sum of weights across subgroups becomes unity only when α=0,1. So, overall, the within-group component in the decomposition is not a weighted average of subgroup inequality levels.

Zheng (2007a) confirmed that the decomposable group of inequality indices satisfying the unit consistency axiom is a two-parameter extension of the one parameter generalized entropy class. According to the unit consistency axiom, ordinal inequality rankings remain unaffected when incomes are expressed in different units (Zheng, 2007a, 2007b). Based on decomposable inequality measures the following hypotheses are tested for Kazakhstan:

H1: The inequality among rural households is different than among urban households.

H2: Between inequality among different districts are higher compared to other types of between inequality.

H3: The inequality measures are more sensitive in upper tails of distribution.

Econometric estimation

In order to estimate the effect of the district level inequality on well-being of households the ordinary least squares approach is applied for the following semi-logarithmic model for the pooled sample of 2018-2021.

$$\log(y_{it}) = \alpha + \beta_1 GE_{it} + \beta_2 z_{it} + \\ +\beta_3 s_{it} + \varepsilon_{it}, i = 1, n; t = 1,4 \ (4)$$

Where $\log(y_{it})$ is a logarithm of per capita income of household i in period t adjusted by inflation rate, GE_{it} is the Generalized Entropy index of the district inequality for household i in period t, z_{it} –is the vector socio-demographic characteristics of the head of household in household i in period t, s_{it} is the vector of dummy variables related to provinces (regions) for household i in period t, ε_{it} is the error term. As the socio–demographic variables the following have been applied: subjective estimation of health satisfaction, age, employment status, marital status, gender, education, household size, number of children under age 18 and location in rural area. Based on regression analysis the following hypothesis will be tested:

H4: The district inequality is negatively associates with well-being of households.

Results and Discussion

The tables below reflect the empirical estimations based on KHBS for 2018-2021. The Table 2 presents estimates of Generalized Entropy indexes for the whole Kazakhstan, rural and urban areas, which are separately evaluated based on per

capita income of households. It indicates the decline of inequality measures in 2020, however with further increase in 2021. Also, the *GE* indexes are higher for α=2 compared to α=0. This fact illustrates that inequality is more sensitive in upper tails of income distribution compared to lower tails of income distribution. Moreover, the inequality between rural households were greater than between urban households at the start of the period, though with reducing variances in late period even becoming lesser in 2021. This can be explained by the changes in Targeted Social Assistance (TSA) policies such as the increase in a threshold for TSA from 50% to 70% of subsistence minimum from the last quarter of 2019 and the introduction of family oriented social assistance for low income and large families with children in 2020. We can see the effects of these policies on more equal distribution of incomes among rural households compared to urban one.

Table 2 – Generalized entropy indexes of inequality for whole Kazakhstan: patterns and trends

Kazakhstan			Rural			Urban		
α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2
2018								
14.9	15.1	18.7	14.2	14.5	18.7	13.5	13.7	16.4
2019								
16.3	15.5	18.7	15.5	14.9	18.5	15.8	14.9	17.5
2020								
12.5	12.8	15.7	12.1	12.4	15.2	11.9	12.2	14.8
2021								
14.3	14.5	19.3	13.2	12.9	14.8	14.4	14.8	21
Note – compiled by the authors based on KHBS data.								

The GE index decomposes inequality for three spatial zones – the rural/urban, the regions and districts of Kazakhstan. The Table 3 illustrates the decomposition of Generalized entropy indexes for α=1. As we can observe from the Table 3 shares of between inequalities in total inequality are not high and declining from 7.2 percent to 2.8 percent for between rural and urban areas. The contribution of between inequality to total inequality is higher for regions it around 10 percent. However, we can observe that the contribution of between district inequality on total inequality is large, consist of 20.7 percent in 2021. Therefore, we are planning to look how district inequality associates with well-being of households.

We have estimated based on KHBS data from 2018-2021 the GE indexes for the district inequalities and constructed the variable GE and assigned for each household the corresponding district inequality levels measured by GE at α=1 (in other word Theil's Entropy index). The table 4 presents the results of OLS regressions for the pooled sample of households of 2018-2021. The column 1 of Table 4 illustrates the regression estimates including district inequality and regional effects on log of per capita income of households, so location in Astana and Almaty cities, Karaganda, Kostanay, Mangystau, North Kazakhstan and East-Kazakhstan regions positively and significantly associates with well-being of households.

Table 3 – Decomposition of inequality in Kazakhstan – patterns and trends

Patterns	Trends											
	2018			2019			2020			2021		
	Between	Within	Share	Between	Within	Share	Between	Within	Share	Between	Within	Share
Rural/Urban	1.08	13.9	**7.2**	0.6	14.9	**3.9**	0.5	12.3	**3.9**	0.4	14.1	**2.8**
Region	1.6	13.5	**10.6**	1.4	14.1	**9.03**	1.43	11.3	**11.2**	1.5	13	**10.3**
District	3.2	11.8	**21.1**	3.2	12.3	**20.7**	3	9.7	**23.4**	3	11.5	**20.7**
a Share of between inequality in total inequality across the different pattern in the given year Note – compiled by the authors based on KHBS data												

Table 4 – OLS regressions of log of per capita income for pooled sample of 2018-2021

VARIABLES	**Whole Kazakhstan**				**Rural**	**Urban**
	1	**2**	**3**	**4**	**5**	**6**
GE District Inequality	-0.458***	-0.0553	-0.466***	-0.606***	-0.735***	0.106
	(0.0686)	(0.0441)	(0.0447)	(0.0694)	(0.0748)	(0.0898)
Location (reference category is Akmola region)						
Aktobe	-0.093***		-0.029***	-0.033***	-0.141***	0.103***
	(0.0133)		(0.0110)	(0.0110)	(0.0154)	(0.0153)
Almaty	-0.133***		-0.078***	-0.078***	-0.108***	-0.070***
	(0.015)		(0.011)	(0.013)	(0.017)	(0.019)
Atyrau	-0.108***		-0.003	-0.005	-0.077***	0.071***
	(0.015)		(0.013)	(0.013)	(0.018)	(0.017)
West Kazakhstan	-0.026*		0.024**	0.024**	-0.065***	0.125***
	(0.014)		(0.012)	(0.012)	(0.015)	(0.019)
Zhambyl	-0.253***		-0.166***	-0.171***	-0.228***	-0.105***
	(0.013)		(0.012)	(0.011)	(0.015)	(0.017)
Karaganda	0.132***		0.132***	0.072***	0.043***	0.196***
	(0.013)		(0.011)	(0.026)	(0.016)	(0.016)
Kostanay	0.086***		0.052***	-0.066***	0.010	0.098***
	(0.013)		(0.011)	(0.019)	(0.015)	(0.015)
Kzylorda	-0.188***		0.025**	0.020*	0.003	0.002
	(0.013)		(0.012)	(0.012)	(0.016)	(0.018)
Mangystau	0.186***		0.311***	0.156***	0.268***	0.346***
	(0.014)		(0.012)	(0.027)	(0.018)	(0.016)
Pavlodar	0.014		0.016	0.016	-0.007	0.044***
	(0.013)		(0.011)	(0.011)	(0.015)	(0.015)
North Kazakhstan	0.058***		-0.003	-0.005	-0.060***	0.058***
	(0.014)		(0.011)	(0.012)	(0.016)	(0.017)
Turkestan	-0.416***		-0.178***	-0.207***	-0.233***	-0.142***
	(0.015)		(0.013)	(0.015)	(0.017)	(0.019)
East Kazakhstan	0.073***		0.008	0.005	-0.106***	0.131***
	(0.013)		(0.011)	(0.011)	(0.0153)	(0.015)
Astana city	0.277***		0.190***	0.385***		0.239***
	(0.014)		(0.012)	(0.043)		(0.015)
Almaty city	0.215***		0.033***	0.106***		0.081***

Continuation of the table

VARIABLES	Whole Kazakhstan				Rural	Urban
	1	2	3	4	5	6
	(0.014)		(0.011)	(0.038)		(0.014)
Shymkent city	-0.192***		-0.246***	-0.250***		-0.157***
	(0.014)		(0.014)	(0.012)		(0.015)
Head of HH and HH characteristics						
Health satisfaction		0.011***	0.013***	0.013***	0.014***	0.012***
		(0.00119)	(0.00120)	(0.00121)	(0.00181)	(0.00162)
Age		-0.004***	-0.003***	-0.003***	-0.005***	-0.001
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age squared		9.5e-5***	9.0e-5***	8.7e-5***	0.0001***	6.4e-5***
		(8.55e-06)	(8.30e-06)	(8.02e-06)	(1.17e-05)	(1.09e-05)
Employed		0.127***	0.109***	0.105***	0.0778***	0.138***
		(0.005)	(0.005)	(0.005)	(0.007)	(0.006)
Self-employed		0.126***	0.153***	0.151***	0.152***	0.154***
		(0.008)	(0.008)	(0.009)	(0.013)	(0.012)
Male		0.012**	0.008*	0.010**	0.004	0.012*
		(0.005)	(0.005)	(0.005)	(0.007)	(0.006)
Married		0.046***	0.044***	0.044***	0.061***	0.037***
		(0.005)	(0.005)	(0.005)	(0.008)	(0.007)
High education		0.201***	0.211***	0.211***	0.242***	0.191***
		(0.005)	(0.005)	(0.005)	(0.008)	(0.006)
HH size		-0.041***	-0.037***	-0.037***	-0.036***	-0.040***
		(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
Number of children under age 18		-0.165***	-0.168***	-0.168***	-0.157***	-0.179***
		(0.003)	(0.003)	(0.003)	(0.004)	(0.005)
Rural		-0.126***	-0.106***	-0.103***		
		(0.004)	(0.005)	(0.005)		
Almaty city*GE				-0.541*		
				(0.303)		
Astana city*GE				-1.482***		
				(0.337)		
Mangystau*GE				1.392***		
				(0.249)		
Karaganda*GE				0.494**		
				(0.206)		
Kostanay*GE				1.074***		
				(0.171)		
Turkestan*GE				1.044***		
				(0.258)		
Constant	11.08***	11.16***	11.12***	11.13***	11.11***	10.99***
	(0.012)	(0.023)	(0.024)	(0.025)	(0.035)	(0.033)
Observations	46 474	46 272	46 272	46 272	21 457	24 815
R-squared	0.082	0.356	0.395	0.397	0.362	0.390

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1
Note – compiled by the authors based on KHBS data

However, the district inequality, location in Aktobe, Almaty, Atyrau, West-Kazakhstan, Zhambyl, Kzylorda, Turkestan regions and Shymkent city negatively and significantly associates with well-being of households. The column 2 illustrates the outcomes for our regression, which contains the district level inequality and socio-economic variables for the household and its head. The district inequality negatively correlated with well-being of households, the head of household, who is more satisfied with health, employed, self-employed, married, male and have university degree is positively correlated with well-being of household. Having additional children under age 18, bigger household size and setting in rural region are negatively correlates with log of per capita income of households. The column 3 of Table 4 depicts the estimation of regression model including all factors such as district inequality, regional variables and socio-demographic variables. The results illustrate that the district inequality is one of the main negative and significant contributor to the well-being of households. Other factors affecting on well-being of households are the same as in columns 1 and 2, except location in West-Kazakhstan, Kzylorda and North Kazakhstan regions, where after including socio-demographic characteristics of households the signs changed to opposite values.

The model in column 4 includes the same control variables as in column 3, however the interactive variables are added such as products of regions on district inequality. Interestingly, now the location of households in Almaty and Astana cities negatively associates with well-being of households controlling all other socio-demographic characteristics of households. Furthermore, controlling the district inequality positively correlates with well-being of households in Turkestan region. The columns 5 and 6 demonstrate the outcomes only for rural and urban households independently. Thus, for some regions the effects of rural and urban areas on well-being of households are dissimilar: Aktobe, Atyrau, West Kazakstan, North Kazakhstan and East Kazakhstan. So, the oil-rich western regions Atyrau, Aktobe and West Kazakhstan regions have some positive associations with well-being in urban areas and location in rural areas of these regions associated negatively with well-being of households. However, the overall effects of the above mentioned regions without disaggregation into rural/ urban has negative correlates with well-being of households. Interestingly to note that location in Mangystau region, where the violent labour conflict happened in 2011 (Zhanaozen district) and the starting point of protests in January of 2022, indicate a positive association with well-being of households overall for whole region, both for urban and rural parts and controlling for district inequality, including all other socio-demographic factors. The contribution of district inequality on well-being becomes positive for urban households, but it is not significant.

Conclusion

Based on Kazakhstan Household Budget Surveys for the period of 2018-2021 Generalized Entropy indexes of inequality are evaluated for Kazakhstan. Which illustrates the decline of inequality from 2018-2020 with minor growth in 2021. Moreover, GE indexes at $\alpha=2$ is greater than at $\alpha=0$ indicating the distributions are more sensitive in upper tails of income distribution. The inequality among rural households were higher than among urban households at the beginning of the period, however the gaps in inequality between rural and urban households declined in later period even becoming lower in 2021. This can be enlightened by the changes in Targeted Social Assistance (TSA) policies such as the increase in a threshold for TSA from 50% to 70% of subsistence minimum from the last quarter of 2019 and the introduction of family oriented social assistance for low income and large families with children in 2020. We can observe the impact of these policies on more equal distribution of incomes among rural households compared to urban one.

The decompositions of GE indexes by the following spatial zones, such as rural/urban, the regions and districts illustrate that a contribution of between inequalities to overall inequality is higher among districts of Kazakhstan. Based on pooled cross-sections of KHBS from 2018-2021 the regression analysis used to estimate the effects of district inequality, the regions and socio-demographic characteristics of households on well-being of households. The results reveal that district inequality, location in Almaty, Zhambyl, Turkestan regions, Shymkent city and rural areas controlling

for social-demographic characteristic of households negatively associates with well-being of households.

The regression estimates of the district inequality on well-belling of households statistically significant and negative, controlling for socio-demographic and regional characteristics except for urban households. The head of household, who is more satisfied with health, employed, self-employed, married man, with upper level of education is positively correlated with well-being of households. Having additional children under age 18, greater household size and setting in rural area are negatively correlated with log of per capita income of households. The presence of interactive variables such as the district inequality with regions demonstrate that now setting of households in wealthy provinces like Almaty and Astana city affects negatively on well-being of households, though the location in Turkestan region affects positively on well-being of households.

The results indicate that the decline of inequality in rural areas due to the impact of TSA policies related to more vulnerable to poverty households conducted at the end of 2019 and 2020 years. Which can indicate a distributional impact of social assistance policies in rural part of Kazakhstan. Moreover, location in more affluent (by GRP per capita) cities such as Almaty and Astana negatively associates with well-being of households due to the district inequality. The results suggest the following policy recommendations: to pay more attention on the district inequalities in conducting the regional policy, which can impact on well-being of households; to reduce the district inequality in different districts of Almaty and Astana cities by creating new job places for youth, improving the social infrastructure in districts far from the city center.

In terms of future research, scholars could focus on other factors in depth that can contribute to inequality of income distributions. For instance, they could investigate the factors can impact on district inequality and if there is a difference across Kazakhstani regions.

Funding

This research has been funded by the Science Committee of the Ministry of Education and Science of the Republic of Kazakhstan (Grant No. AP23487405).

Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

Due to signing of the agreement on non-distribution of primary data, the processed data file can be presented upon the request.

Acknowledgments

The authors are grateful for the Bureau of National Statistics of Agency for Strategic planning and reforms of the Republic of Kazakhstan for providing the data.

References

1. Agyire-Tettey, F., Ackah, C. G., & Asuman, D. (2018). An unconditional quantile regression based decomposition of spatial welfare inequalities in Ghana. The Journal of Development Studies, 54(3), 537–556.

2. Asain Development Bank. (2023). REGIONAL WELL-BEING ACROSS KAZAKHSTAN Harnessing Survey Data for Inclusive Development (Issue June). https://doi.org/http://dx.doi.org/10.22617/SPR230209

3. Asian Development Bank (ADB). (2021). Joint Government of Kazakhstan and the Asian Development Bank, Knowledge and Experience Exchange Program, Phase 4.

4. Azam, M. (2012). A distributional analysis of social group inequality in rural India. Journal of International Development, 24(4), 415–432.

5. El-Hodiri, M., Kudasheva, T., & Kunitsa, S. (2015). Methods of measurement of socio-geographical inequality in Kazakhstan, a consequence to the distribution of oil development. Journal of Economic Sociology, 3(1), 7–23.

6. Fortin, N., Lemieux, T., & Firpo, S. (2011). Chapter 1 – Decomposition Methods in Economics. In Handbook of Labor Economics (Vol. 4, pp. 1–102). https://doi.org/10.1016/S0169-7218(11)00407-2

7. Hassine, N. B. (2015). Economic inequality in the Arab region. World Development, 66, 532–556.

8. Ifcher, J., Zarghamee, H., & Graham, C. (2019). Income inequality and well-being in the U.S.: evidence of geographic-scale- and measure-dependence. The Journal of Economic Inequality, 17(3), 415–434. https://doi.org/10.1007/s10888-018-9404-z

9. Bureau of National Statistics. (2024) Indicators of poverty and inequality by region. Retrieved from https://stat.gov.kz/en/industries/labor-and-income/stat-life/dynamic-tables/

10. Lu, W., & Horlu, G. S. A. (2017). Economic well-being of rural farm households in Ghana: A perspective of inequality and polarisation. Journal of Rural Studies, 55, 248–262. https://doi.org/https://doi.org/10.1016/j.jrurstud.2017.08.013

11. Mahdzan, N. S., Zainudin, R., Sukor, M. E. A., Zainir, F., & Wan Ahmad, W. M. (2019). Determinants of Subjective Financial Well-Being Across Three Different Household Income Groups in Malaysia. Social Indicators Research, 146(3), 699–726. https://doi.org/10.1007/s11205-019-02138-4

12. Mastronardi, L., & Cavallo, A. (2020). The Spatial Dimension of Income Inequality: An Analysis at Municipal Level. In Sustainability (Vol. 12, Issue 4). https://doi.org/10.3390/su12041622

13. Nguyen, B. T., Albrecht, J. W., Vroman, S. B., & Westbrook, M. D. (2007). A quantile regression decomposition of urban–rural inequality in Vietnam. Journal of Development Economics, 83(2), 466–490.

14. Nurlanova, N. K., Satybaldin, A. A., Bekturganova, M. A., & Kireyeva, A. A. (2018). Spatial distribution of economic growth and inequality: Kazakhstan's experience. Journal of Asian Finance, Economics and Business, 5(3), 169–178. https://doi.org/10.13106/jafeb.2018.vol5.no3.169

15. Nurlanova, N. K., Satybaldin, A. A., Brimbetova, N. Z., & Kireyeva, A. A. (2019). Reduction of economic disparities in the regions of Kazakhstan based on inclusive development. Journal of Asian Finance, Economics and Business, 6(2), 299–307. https://doi.org/10.13106/jafeb.2019.vol6.no2.299

16. Rodríguez-Pose, A., Bartalucci, F., Kurmanov, B., Rau, G., & Nigmetov, K. (2024). Assessing Regional Inequalities in Kazakhstan through Well-Being. Asian Development Review, 1–34.

17. Sermagambet, U., Satpayeva, Z., Smagulova, G., Urban, W., & Yessenzhigitova, R. (2022). Socio-economic inequality in Kazakhstani regions: Assessment and impact on regional development management. Problems and Perspectives in Management, 20(3), 487–500. https://doi.org/10.21511/ppm.20(3).2022.39

18. Shorrocks, A F. (1980). The Class of Additively Decomposable Inequality Measures. Econometrica, 48(3), 613–625. https://doi.org/10.2307/1913126

19. Shorrocks, Anthony F. (1984). Inequality Decomposition by Population Subgroups. Econometrica, 52(6), 1369–1385. https://doi.org/10.2307/1913511

20. Sommet, N., & Elliot, A. J. (2022). The effects of U.S. county and state income inequality on self-reported happiness and health are equivalent to zero. Quality of Life Research, 31(7), 1999–2009. https://doi.org/10.1007/s11136-022-03137-8

21. Thu Le, H., & Booth, A. L. (2014). Inequality in V ietnamese Urban–Rural Living Standards, 1993–2006. Review of Income and Wealth, 60(4), 862–886.

22. Turganbayev, Y., & Diener, A. C. (2018). Kazakhstan's evolving regional economic policy: assessing strategies of post-socialist development. Eurasian Geography and Economics, 59(5–6), 657–684. https://doi.org/10.1080/15387216.2019.1586559

23. Zheng, B. (2007a). Inequality orderings and unit consistency. Social Choice and Welfare, 29(3), 515–538.

24. Zheng, B. (2007b). Unit-consistent decomposable inequality measures. Economica, 74(293), 97–111.

Information about authors:

Kudebayeva Alma (corresponding author) – PhD, Associate Professor at the Department of Economics, KIMEP University (Almaty c., Kazakhstan, email: almak@kimep.kz);

Ann-Mari Sätre – PhD, Professor at Institute for Russian and Eurasian Studies, Uppsala University; (Uppsala c., Sweden, email: ann-mari.satre@ires.uu.se).

Авторлар туралы мәлімет:

Кудебаева Алма Қажытайқызы (корреспондент автор) – PhD, КИМЭП Университеті Экономика кафедрасының қауымдастырылған профессоры (Алматы қ., Қазақстан, эл. пошта: almak@kimep.kz);

Анн-Мари Сэтре – PhD, Уппсала университетінің Ресей және Еуразиялық Зерттеулер Институтының профессоры (Уппсала қ., Швеция, эл.пошта: ann-mari.satre@ires.uu.se).

Received: 4 October 2024
Accepted: 10 December 2024