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Assessment of Poverty Levels in Kazakhstan: The Impact of Cash Income Deficiency

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ABSTRACT

Today, poverty remains a significant problem affecting various population groups and economic stability. Understanding the key determinants of poverty is an important prerequisite for developing effective poverty reduction strategies. This study aims to identify the relationship between the poverty level and the population's monetary income, as well as to assess the regional features of its spread in Kazakhstan. The methodology is based on an analysis of statistical data for 2001-2023 collected from official data from the Bureau of National Statistics of the Republic of Kazakhstan, the World Bank, and the United Nations. The article uses descriptive statistical methods to study the dynamics of poverty and correlation and regression analysis to identify the relationship between poverty and indicators such as average nominal income per capita, Gini coefficient, unemployment rate and household size. The results showed significant regional differences in poverty levels, with the highest poverty rates observed in the Turkestan region (9%) and the Abai region (8%). Regression analysis confirmed a significant impact of the cash income deficit on the poverty rate ($R2=0.86$, $p<0.01$). A high correlation between the poverty rate and the Gini coefficient (0.89) was revealed, indicating a significant impact of income inequality. The prospects for further research include an in-depth analysis of the impact of educational attainment on poverty, a study of the impact of digital financial technologies on household incomes, and an assessment of the effectiveness of government programs to reduce poverty.

KEYWORDS: Poverty, Cash Income Deficiency, Economic Inequality, Household Income, Economic Growth, Social Strategy, Social Policy

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Оценка уровня бедности в Казахстане: влияние дефицита денежных доходов

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АННОТАЦИЯ

Сегодня бедность остается значимой проблемой, затрагивающей различные группы населения и оказывающей влияние на экономическую стабильность. Понимание ключевых детерминантов бедности является важным условием для разработки эффективных стратегий ее снижения. Цель данного исследования – выявить взаимосвязи между уровнем бедности и денежными доходами населения, а также оценить региональные особенности ее распространения в Казахстане. Методология основана на анализе статистических данных за 2001-2023гг., собранные из официальные данные Бюро национальной статистики РК, Всемирного банка и Организации Объединенных Наций. В статье были применены методы описательной статистики для изучения динамики бедности, а также корреляционный и регрессионный анализ для выявления взаимосвязи между уровнем бедности и такими показателями, как средний номинальный доход на душу населения, коэффициент Джини, уровень безработицы и размер домохозяйства. Результаты показали значительные региональные различия в уровнях бедности, при этом самые высокие показатели бедности наблюдались в Туркестанской области (9%) и Абайском районе (8%). Регрессионный анализ подтвердил значительное влияние дефицита денежных доходов на уровень бедности ($R2=0.86$, $p<0.01$). Выявлена высокая степень корреляции между уровнем бедности и коэффициентом Джини (0,89), что указывает на значительное влияние неравенства доходов. Перспективы дальнейших исследований включают углубленный анализ влияния образовательного уровня на бедность, изучение воздействия цифровых финансовых технологий на доходы населения, а также оценку эффективности государственных программ по снижению бедности.

КЛЮЧЕВЫЕ СЛОВА: бедность, дефицит денежных доходов, экономическое неравенство, доходы домохозяйств, экономический рост, социальная стратегия, социальная политика

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INTRODUCTION

Poverty remains one of the most acute socio-economic problems in the modern world. Millions of people lack resources to meet basic needs, including food, shelter, medical care, and education. Poverty not only limits human opportunities but also negatively impacts the country's economic development, increasing social inequality and causing instability in society. Poverty manifests itself differently in different countries due to economic, political, and cultural factors. In developing countries, it is more often associated with low incomes and unemployment, while in developed countries, the focus is shifting to relative poverty and the gap in living standards between different segments of the population. In addition, poverty is multidimensional: in addition to financial instability, it includes a lack of access to education, healthcare, and other important social resources.

Poverty is one of the global socio-economic problems characterized by a lack of material resources and limited access to education, health care, and other important social services (Son, 2016). Modern research shows that increasing education contributes to household income growth and poverty reduction (Gomez-Méndez & Amornbunchornvej, 2024). At the same time, rising income inequality and environmental degradation may exacerbate poverty (Khan et al., 2022). Some authors point out that the digitalization of the economy and increased access to financial technologies is an important tool for fighting poverty (Xu, 2024). In addition, one of the most discussed solutions is the introduction of an unconditional basic income, which can help reduce poverty (Sumaila et al., 2024).

Various methodological approaches are used to assess the level of poverty. This study is devoted to analyzing the impact of the lack of cash income on the poverty level since the lack of financial resources due to many factors is one of the leading causes of poverty. There are many causes of poverty in Kazakhstan. This article assesses the correlation between several factors, comprehensively analyzing poverty in the country. The analysis aims to identify the key determinants of poverty in Kazakhstan, focusing on economic and social factors. The research considers how limited access to essential services contributes to the multidimensional nature of poverty in the country. The study's results help to formulate effective poverty reduction strategies by examining the relationship between cash income and poverty levels.

LITERATURE REVIEW

Poverty has become a problem that the leaders of every country must solve, and it is hotly debated among researchers and scientists. Before solving the problem of poverty, it is necessary to assess its level accurately. Scientists and international statistical organizations offer various methods for assessing poverty. For example, according to the World Bank (Smith, 1989), income below 2,15 USD per day is considered absolute poverty. In his work, Peter Townsend considered absolute poverty if the family income is below 50-60% of the median income. Subsequent works stated that poverty should be measured not only by material income but also by the need to take into account non-material values when measuring poverty.

It is also important to study the topic of poverty using individual countries as examples. Because different factors may affect poverty in each country. According to Gómez-Méndez and Amornbunchornvej (2024), increasing the level of education significantly increases household income and reduces poverty in all regions of Thailand. A study conducted on African countries (Amponsah et al., 2023) showed that increasing income inequality harms poverty, and increasing poverty worsens inclusiveness. This justifies the need for income diversification in the fight against poverty (Koiry et al., 2024). According to the study, multidimensional poverty decreased by an average of 0,095% for households with diversified incomes. Thus, income diversification can be a good solution to reduce multidimensional poverty at the household level.

The development of information and communication technologies (ICT) can also impact poverty. The spread of ICT, school education, and the growth of material well-being are important factors in eradicating poverty in developing countries. However, the impact of digitalization on poverty is not immediate and direct (Lechman & Popowska, 2022). Therefore, national and local governments and civil society should consider ICT a key element of their broader development strategies. Poverty can also be linked to a person's health. Pinilla-Roncancio et al. (2024) found that people with disabilities are poorer than people without disabilities and are more likely to become chronically poor over time.

A higher minimum wage can reduce poverty by reducing cash shortages. This conclusion is supported by the study (Arranz & García-Serrano, 2025). The results of its estimates show that the increase in the minimum wage contributed to higher income levels and a higher probability of exiting monetary poverty for households with minimum

wage recipients compared to other households. The results of the studies also showed that unconditional regular cash payments (basic income) to a particular segment or the entire population are important in the fight against poverty (Sumayla et al., 2024). Basic income has excellent potential in the fight against poverty, and it can support and stabilize the economy in times of crisis.

In developed countries, cash income may not significantly meet basic needs such as education, health care, and daily living. However, in countries like Nepal, cash income is significant. Lack of cash income causes some families to fall into long-term poverty, lacking access to basic education and health care, and even leading to tragic cases of suicide (Karki, 2024). Psychological vulnerability can also affect poverty (Alloush, 2024). There is a gap between urban and rural poverty in many countries. Rural poverty was high in the past due to a lack of funds, low production, and many economic and social factors. Studies have been conducted to bridge the gap between urban and rural poverty. One of them (Xu, 2024) argues that digital finance reduces the gap between urban and rural poverty among households.

Previous studies have shown that household income in China is associated with crop production and the adoption of advanced technology. Government policies also directly affect household income growth (Zhang & Dai, 2023). Although absolute poverty is declining, relative poverty in the country is increasing (Wan et al., 2021). In a study on the effectiveness of government policies in reducing poverty (Caamal-Olvera et al., 2022), the authors state that the first best policy is universal basic income, which can eliminate extreme poverty by 10,61% of GDP. Furthermore, the least effective policy is to transfer funds only to the elderly.

Growing poverty and income inequality negatively impact the environment of developing countries in Asia (Khan et al., 2022). Poverty alleviation is becoming a systemic problem. Growing environmental degradation is a significant obstacle to sustainable development, poverty reduction, and income inequality control. All countries should strive to eradicate poverty (Quiggin, 2022). Poverty alleviation is a continuous process in all countries of the world. It can be due to different factors depending on each country's geographical, industrial, and economic capabilities. Many factors contribute to poverty. Therefore, we consider several factors that can affect the poverty level in Kazakhstan.

The analysis of scientific research on the problem of poverty shows that it is a multifaceted phenomenon caused by various socio-economic, political, and technological factors. Research confirms that the key factors contributing to poverty reduction are higher education levels, diversification of income sources, and the development of digital technologies. At the same time, growing economic inequality and environmental degradation may exacerbate poverty. Thus, the fight against poverty requires an integrated approach that takes into account national specificities and a combination of various strategies, including the development of education, digital technologies, improvement of social policy, and measures to reduce inequality. In Kazakhstan, studying factors affecting poverty will make it possible to develop more effective mechanisms to support the population and strategies to overcome it.

RESEARCH METHODS

The study is based on the analysis of data obtained from official statistical sources, scientific publications, and international organizations. Main sources of information include data from the Bureau of National Statistics in the Republic of Kazakhstan and the World Bank, as well as the United Nations and publications in peer-reviewed journals. This helps to trace the dynamics of poverty in Kazakhstan over the past two decades and identify the main trends and factors influencing the population's economic situation.

Data is collected from various sources that provide both macroeconomic indicators and information on the social aspects of poverty. This article logically selects and comparatively analyzes quantitative data on poverty indicators in the regions of Kazakhstan (subsistence minimum, relative and absolute poverty, etc.) for the last 23 years, starting from 2001. After the data is collected, their statistical processing is carried out. The analysis begins with descriptive statistics, which examine the dynamics of poverty and identify key trends and features of the distribution of poverty by region and social groups.

For a comprehensive study of poverty, a three-step approach has been applied. This includes data collection, processing, analysis, and the formation of conclusions and recommendations. In the first stage, information is collected from various sources. The data is then cleaned and pre-processed, including descriptive statistical analysis and identification of long-term trends in poverty. Correlation and regression analysis are also used to identify key factors that contribute to poverty.

Figure 1 shows a diagram illustrating the stages of the study, from data collection and processing to the formation of conclusions and recommendations.

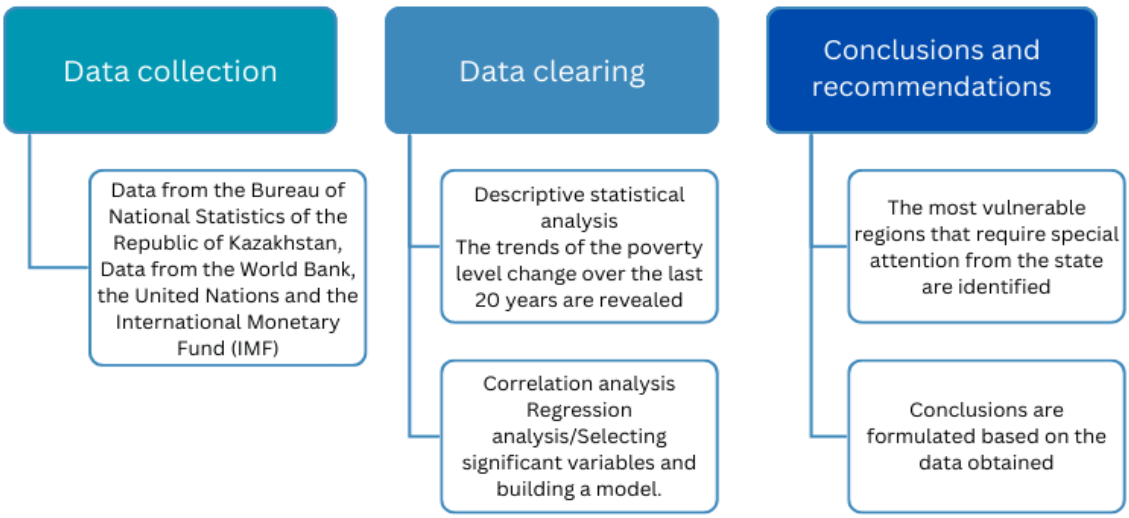

Figure 1. The main stages of poverty research

Correlation analysis is used to determine the degree of correlation between the level of poverty and various socio-economic indicators to identify patterns. The correlation of living standards indicators (poverty level, average nominal cash income per capita, return on assets, Gini index, average household size, and cash income deficiency) is calculated. The impact of the lack of cash income on poverty is estimated using a regression equation (1):

$$Y = b_0 + b_{1*}DCIP + \varepsilon \quad (1)$$

where:
Y – the poverty level;
DCIP – the deficiency of monetary income;
b_0 – the free term of the regression (intercept);
b_1 – the regression coefficient;
ε – the residual symbol.

The calculation of the cash income deficiency is based on the article, which cites the study (Hirsch, 2017; Omir, 2024). Here, the population's cash income deficiency (DCIP) is an indicator showing the lack of funds to meet the basic needs of the population living below the poverty line. DCIP is calculated by multiplying the number of people living in poverty ($N_{poverty}$) by the living wage, which is calculated by formula (2):

$$DCIP = LW * N_{poverty} \quad (2)$$

where:
DCIP – the deficiency of cash income of the population;
LW – the living wage;
$N_{poverty}$ – the population living in poverty.

Data for 2023 were processed and calculated for 20 regions of the Republic of Kazakhstan. The analysis examined differences in poverty levels by region, assessed the impact of economic factors, and formulated recommendations to reduce poverty and improve the well-being of the population. The proposed methodological approach provides a comprehensive picture of poverty assessment, identification of key patterns, and justification for effective strategies to reduce it. The results can be used to inform social and economic policy aimed at improving the quality of life for the population.

RESULTS

In Kazakhstan, the poverty level is determined by the share of the population whose income does not reach the subsistence minimum. In 2024, the subsistence minimum in Kazakhstan was set at 43,407 tenge. According to the Bureau of National Statistics of the Republic of Kazakhstan for 2023, the poverty level in Kazakhstan was 5,2%, which means that 5,2% of the population's income does not reach the subsistence minimum. Although this figure is relatively low compared to some developed countries, it may not fully reflect the actual poverty situation in the country. Real incomes of the population continue to fall, and the cost of food remains high, which may indicate that the real poverty level significantly exceeds official statistics and can reach twice the value.

In 1996, 34,6% of the population had incomes below the subsistence level, and in 2023 this figure dropped to 5,2%. The poverty rate in cities has always been lower than in rural areas, in 2023 the share of poor in cities was 4,1%, and in rural areas – 7%. The highest poverty rate was recorded in 2001, reaching 46,7% in urban areas and 59,4% in rural areas. Thus, 2001 can be used as a base year in our study. Despite improving the poverty situation in Kazakhstan in recent decades, continuing to reduce it, especially in rural areas, remains an important task.

In Figure 2, the poverty level in the regions of Kazakhstan in 2023 is measured by the percentage of the population living below the poverty line.

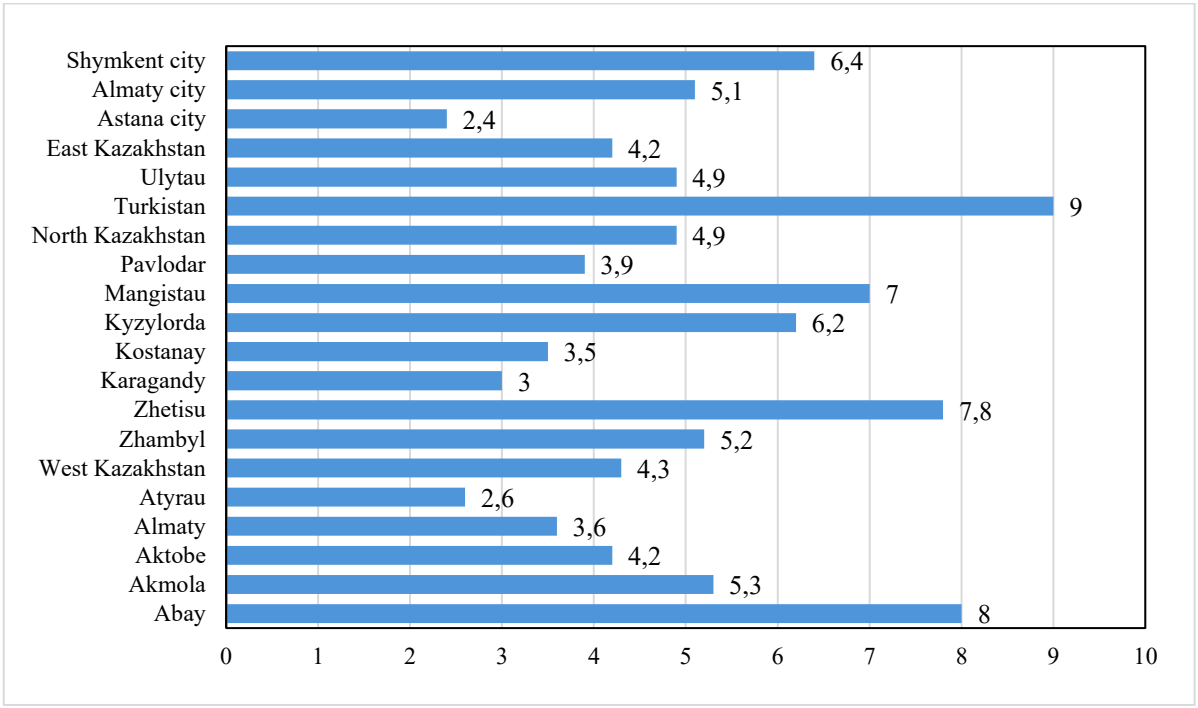

Figure 2. The poverty level in the regions of Kazakhstan for 2023

Note: compiled based on Bureau of National Statistics (2024)

The overall poverty level in the country is 5,2%. Among the regions, the highest poverty level is observed in the Turkestan region (9%) and Abay district (8%). Significant indicators were also recorded in the Zhetisu (7,8%) and Mangistau (7%) regions. The lowest poverty level was recorded in the Atyrau region (2,6%) and Astana city (2,4%). The average poverty value was observed in regions such as Akmola (5,3%), Aktobe (4,2%) and Almaty (3,6%). The poverty level in the East Kazakhstan and North Kazakhstan regions was 4,2% and 4,9%, respectively.

The cost of living varies from region to region. For example, according to 2023 data, the highest cost of living in the Mangistau region is 61,520 tenge. Next is 54,415 tenge in Astana city, 51,048 tenge in Almaty city , and 50,894 tenge in the East Kazakhstan region. From 45,000 to 50,000 tenge in 13 regions, and the lowest is 44,211 in the Kyzylorda region, 44,463 in the Aktobe region, 44,555 tenge in the Turkestan region, 44,605 tenge in the West Kazakhstan region (Table 1).

Table 1. Households with income below the poverty line, 2023

Region	Minimum subsistence level, on average per capita per month, tenge	Number of households, unit	Population in them, people	Share of population, in percent
Kazakhstan	48,738	180,678	1,035,620	5,2
Abay	47,828	9,863	48,752	8,0
Akmola	48,174	9,776	41,887	5,3
Aktobe	44,463	7,269	39,306	4,2
Almaty	48,836	7,530	55,648	3,6
Atyrau	47,060	2,419	18,426	2,6
West Kazakhstan	44,605	5,264	30,148	4,3
Zhambyl	46,601	9,901	63,734	5,2
Zhetisu	47,609	8,786	54,427	7,8
Karaganda	46,728	6,935	33,571	3,0
Kostanay	46,440	6,174	29,248	3,5
Kyzylorda	44,211	7,534	49,755	6,2
Mangistau	61,520	11,069	55,092	7,0
Pavlodar	47,774	5,542	29,183	3,9
North Kazakhstan	47,845	6,272	26,129	4,9
Turkestan	44,555	25,185	191,722	9,0
Ulytau	48,448	1,788	10,764	4,9
East Kazakhstan	50,894	6,564	30,843	4,2
Astana city	54,415	8,266	34,224	2,4
Almaty city	51,048	21,107	113,985	5,1
Shymkent city	47,768	13,434	78,776	6,4

Note: compiled based on calculations

According to the Bureau of National Statistics, there are 180,678 households (1,035,620 people) in Kazakhstan whose income does not reach the subsistence level. Among the regions, the most significant number of households is registered: 11,069 households (55,092 people) in the Mangistau region, 13,434 households (78,776 people) in the city of Shymkent, 21,107 households (113,985 people) in the city of Almaty, 25,185 households (191,722 people) in the Turkestan region. In 14 regions, 5,000-10,000 poor houses are registered. The smallest number of poor households is registered in the Atyrau region – 2,419 households (18,426 people) and the Ulytau district – 1,788 households (10,764 people). Thus, the analysis of poverty data in Kazakhstan in 2023 shows significant regional differences, demonstrating the need for a comprehensive approach to combating poverty that takes into account each region's specifics.

International organizations measure absolute and relative poverty. A fixed poverty line of 1.90 USD daily in purchasing power parity (PPP) set by the World Bank is used for absolute poverty. In 2022, the World Bank raised the poverty line to 2.15 USD due to rising worldwide food, clothing, and housing prices. Relative poverty is defined as a percentage of the median national income. Median income divides the population into two equal parts: half is above the median, and the other is below. For example, if the poverty level is 60% of the median income, then people with income below 60% of the median income are considered poor. According to the Bureau of National Statistics of the Ministry of Economy of the Republic of Kazakhstan, the average salary of workers in 2023 was 251,356 tenge, which is 23.12% more than in 2022 (204,149 tenge in 2022).

An analysis of poverty data in Kazakhstan from 2001 to 2023 shows significant changes across various indicators. The poverty line of 3,65 USD per day and 6,85 USD per day, according to PPP 2017 data, indicates a decrease in the share of the popula-

tion living below the absolute poverty line. In 2001, 12,8% of the population earned less than 3,65 USD per day, while in 2021, this figure dropped to 0,3%. Relative poverty also shows significant differences. In 2001, relative poverty was 16,4%, but by 2023 this figure will drop to 9,7%. This value is almost twice the poverty line based on the subsistence minimum, indicating that more people face financial difficulties than traditional poverty measures. Poverty peaked in 2001, when 74,5% of the population lived on less than 6,85 USD a day, and 46,7% had below 60% of the median income. Poverty has declined significantly since then, but rising prices for food, clothing, and housing indicate the need for further efforts to reduce poverty, especially in rural areas.

Thus, the data analysis from 2001 to 2023 highlights the importance of using absolute and relative poverty indicators to comprehensively understand the problem of poverty in Kazakhstan and address it effectively. A comparison of poverty and relative poverty shows the following differences: the poverty rate varies significantly by year, demonstrating a decrease from 2011 to 2018 and an increase from 2019 to 2023. This indicator shows the share of the population living below the poverty line in absolute terms. In addition, relative poverty remains relatively stable at 9,7-10,5%, indicating a stable share of the population with incomes below the national average (Figure 3).

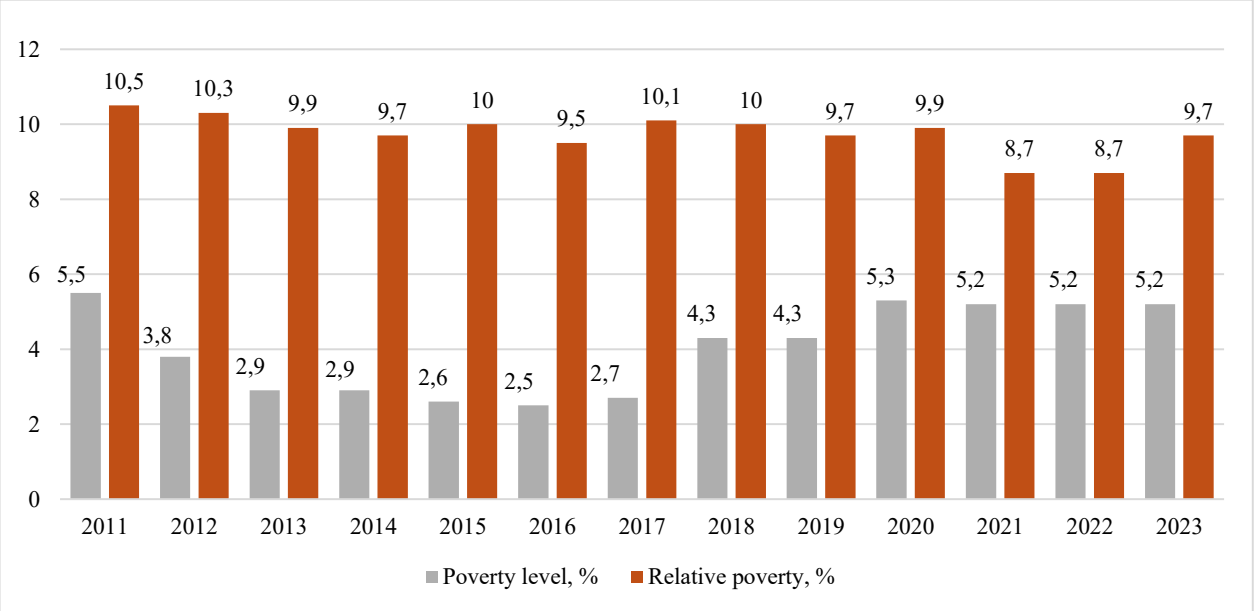

Figure 3. Poverty level and relative poverty in Kazakhstan for 2011-2023

Note: compiled based on Bureau of National Statistics (2024)

Relative poverty is always above the poverty line, indicating that many people have low incomes, even if they are not considered poor by official standards. Unlike the poverty rate, which fluctuates, relative poverty reflects persistent problems in income distribution, with a significant portion of the population remaining economically vulnerable.

Index-based assessment methods use various indicators to determine the level of poverty. One such index is the Human Poverty Index (HPI), developed by the United Nations and first presented in the 1997 Human Development Report. In 2010, this index was replaced by the Multidimensional Poverty Index (MPI).

When assessing the poverty of the population, it is necessary to consider the depth and severity of poverty. The depth of poverty, the shortfall in income to the subsistence minimum, shows the average deviation of the income level of household members from the specified criterion (subsistence minimum). Thus, the depth of poverty helps assess how much the lack of cash income affects people's lives. Next comes a complete description of the severity of poverty, which is the depth of poverty. It represents the average value of the squared deviations of the income deficiency share of household members from the established criterion.

The analysis of data on poverty and income of the Kazakhstani population for the period 2001-2023 shows significant changes in the standard of living and expense structure (Table 2).

Table 2. Socio-economic indicators of Kazakhstan for 2001-2023

Year	Nominal income, tenge	Monetary expenditure, tenge	Poverty depth, %	Poverty severity, %	Income to subsistence ratio, %	Real income index, %	Fund ratio, times	Gini index	Household size, people
2001	7670	4918	14,8	6,5	101,3	111,3	8,8	0,366	3,7
2002	8958	5671	13,3	5,5	108,6	110,3	8,1	0,328	3,6
2003	10533	6674	10,2	3,9	117,2	110,5	7,4	0,315	3,6
2004	12817	7500	8,3	2,9	123,6	113,8	6,8	0,305	3,5
2005	15787	8800	7,5	2,5	128	114,5	6,8	0,304	3,5
2006	19152	12602	3,9	1,3	163,2	111,7	7,4	0,312	3,4
2007	25226	15516	2,4	0,8	175,4	118,9	7,2	0,309	3,4
2008	32984	18324	2,3	0,7	162,1	111,8	6,2	0,288	3,3
2009	34282	19718	1,3	0,3	168,6	96,9	5,3	0,267	3,4
2010	39014,1	24460	1,1	0,3	193,9	106,3	5,7	0,278	3,4
2011	45918,1	28892	0,9	0,3	190,5	108,7	6,1	0,29	3,5
2012	51859,8	31886	0,5	0,1	200,7	107,5	5,8	0,284	3,5
2013	56452,8	34796	0,4	0,1	206,6	102,9	5,6	0,276	3,4
2014	62271,4	37131	0,4	0,1	205,9	103,4	5,7	0,278	3,4
2015	67321,3	38502	0,3	0,1	207	101,4	5,6	0,278	3,4
2016	76575,0	41847	0,4	0,1	204,5	99,3	5,6	0,278	3,4
2017	83709,8	46319	0,4	0,1	204,4	101,8	5,9	0,287	3,4
2018	93135	51197,7	0,7	0,2	196,6	105	6	0,289	3,4
2019	104282	55791	0,7	0,2	195,7	106,4	6	0,29	3,4
2020	116126	59701	0,8	0,2	185,8	104,3	5,9	0,291	3,4
2021	130616	67440	0,8	0,2	185,3	104	6	0,294	3,4
2022	157017	77602	0,8	0,2	181,8	104,5	5,7	0,285	3,4
2023	181855	89414,8	0,9	0,3	185,5	101,1	5,96	0,290	3,4

Note: compiled based on calculations

During the study period, nominal cash income per capita increased significantly: from 7,670 tenge in 2001 to 181,855 tenge in 2023. Cash expenses of the population also increased compared to 4,918 tenge in 2001 and amounted to 89,414.8 tenge in 2023. During this period, the depth and severity of poverty decreased significantly. The depth of poverty decreased from 14,8% in 2001 to 0,9% in 2023, and the poverty rate decreased from 6,5% to 0,3% over the same period. These indicators indicate a significant decrease in the country's extreme poverty level. The ratio of income spent on consumption to the standard of living increased, starting from 101,3% in 2001 and reaching 185,5% in 2023. This shows that the purchasing power of the population has improved. The real money income index shows fluctuations, increasing at the beginning of the period and decreasing in subsequent years, possibly due to inflation and other economic factors. The stock ratio and the Gini index tend to decrease social inequality. The fund provision ratio decreased from 8,8 in 2001 to 5,96 in 2023. The Gini index decreased from 0,366 in 2001 to 0,290 in 2023.

Analyzing the correlation between various poverty indicators and socio-economic factors in Kazakhstan allows us to draw several important conclusions (Table 3).

Table 3. Correlation coefficients between living standards and poverty indicators

Indicator	Factor (X1)	Factor (X2)	Factor (X3)	Factor (X4)	Factor (X5)	Factor (X6)	Factor (X7)
Poverty level, %	1						
Poverty depth, %	0,9824	1					
Poverty severity, %	0,9540	0,9773	1				
Average per capita nominal monetary income of the population, tenge	-0,7211	-0,7003	-0,6696	1			
Coefficient of funds, times	0,8399	0,8874	0,8068	-0,6091	1		
Gini index	0,8857	0,9044	0,8733	-0,5557	0,9108	1	
Average household size, people	0,7219	0,6918	0,7287	-0,4723	0,4667	0,6799	1
Cash deficiency	0,9311	0,9392	0,9172	0,9817	0,5265	0,7090	-3,3E-16

Note: compiled based on calculations

The poverty level is closely related to the depth (0,9824) and severity of poverty (0,9540), which indicates a close relationship between these indicators. This means that the depth and severity of poverty also increase with the poverty level. The depth of poverty (0,9773) and the intensity of poverty (0,9540) are closely related, which confirms that an increase in the depth of poverty leads to an increase in the poverty line.

The average nominal monetary income per capita is negatively related to the poverty rate (-0,7211), poverty depth (-0,7003), and poverty severity (-0,6696). This shows that the growth of the population's income helps reduce poverty's level, depth, and severity. The coefficient of monetary assets is positively correlated with the poverty rate (0,8399), poverty depth (0,8874) and poverty severity (0,8068), which indicates that the increase in income inequality is associated with the growth of poverty.

The Gini index also shows a strong positive correlation with the poverty rate (0,8857), poverty gap (0,9044), and poverty incidence (0,8733), confirming the relationship between income inequality and poverty. The average household size shows a positive correlation with the poverty rate (0,7219), poverty gap (0,6918), and poverty incidence (0,7287), which may indicate that larger households are more likely to be poor.

The deficiency of monetary income has a robust positive correlation with the poverty level (0,9311), poverty gap (0,9392) and poverty line (0,9172), as well as nominal income (0,9817). This highlights the importance of monetary income in assessing and combating poverty. The deficiency level also positively correlates with the ratio of funds (0,5265) and the Gini index (0,7090), indicating a link between income inequality and the deficiency of the money supply.

The results show that poverty in Kazakhstan is closely related to income inequality, the monetary income of the population, and the size of households. Increasing income and reducing inequality can significantly reduce the level, depth, and severity of poverty.

The regression analysis of the poverty and income deficiency data shows that the poverty ratio (2,2237) indicates a positive and significant relationship between poverty and other variables. The high t-statistic (8,5081) and very low p-value (0,0000) confirm this relationship is statistically significant. The confidence interval (1,6325 to 2,8150) indicates a high degree of confidence in this conclusion. The income deficiency coefficient (0,0728) also shows a positive and significant relationship between the poverty level and income deficiency. The high t-statistic (7,6609) and very low p-value (0,0000) confirm the statistical significance of this relationship. The confidence interval (0,0513 to 0,0943) shows the reliability of these findings. Both indicators have a very low p-value (0,0000), which means that the probability of accidental occurrence of these results is almost nonexistent. This confirms that the identified dependencies are statistically significant (see Table 4).

Table 4. Paired regression results

No.	Factor	R	R2	F-test – 4,84	t-test – 1,7959
1	X2	0,9311	0,8670	58,68	7,66

Note: compiled based on calculations

The analysis shows that both the poverty level and the lack of cash income are important factors affecting the economic well-being of Kazakhstan's population. It should be noted that an increase in the deficiency of cash income significantly impacts the growth of poverty. Reducing poverty requires reducing the income gap, such as raising wages, improving social support, and creating economic opportunities for vulnerable groups.

Next, the regression results are shown in Table 5.

Table 5. Paired regression coefficients

Factor	Coefficient	Standard Error	T-statistic	P-Value	Lower 95%	Upper 95%
Poverty	2,2237	0,2614	8,5081	0,0000	1,6325	2,8150
Cash income deficiency, billion tenge	0,0728	0,0095	7,6609	0,0000	0,0513	0,0943

Note: compiled based on calculations

In this study, the following paired regression equation was obtained using Excel and Gretl calculation programs: 2,2237 + 0,0728 * X2. Here, R = 0,93, R2 = 0,86, F = 58,68, and F-test = 4,84 show the equation's correctness. T-statistics, i.e. tX2 = 7,6609, with a critical value of T-test = 1,7959 according to the Student's criterion, indicate the statistical significance of the factor coefficients with a probability of 95%.

The data analysis on the deficiency of cash income of the population (DCIP) in Kazakhstan from 2013 to 2023 revealed a significant increase in this indicator, especially in large cities and economically important regions. Cities such as Almaty and Shymkent have seen a sharp increase in DCIP, which is associated with rapid urbanization and rising living costs. In rural areas, there is a tendency for the deficit to increase, which reflects economic difficulties and insufficient financing. Differences between regions highlight the need to develop and implement effective strategies and government support measures to reduce poverty and improve the population's quality of life.

According to the study results, over the past 10 years the share of the population whose income is below the subsistence level has increased from 2,9% to 5,2%. The relatively poor population is concentrated in the Turkestan (9%), Abay (8%), Zhetisu (7,8%), Mangistau (7%), Kyzylorda (6,2%) regions, as well as the city of Shymkent (6,4%), which indicates a high share of poverty in these regions. It is necessary to strengthen measures to reduce poverty in these areas. This requires a set of measures adapted to regional characteristics, including attracting investment in small and medium businesses, developing production infrastructure, providing high-quality education and stimulating economic growth through social support for vulnerable segments of the population.

Relative poverty, defined based on average incomes, remains higher than the absolute level and varies from 10.5% in 2011 to 9.7% in 2023. The wage gap must be reduced to reduce relative poverty, with the average income increasing from 25,479 tenge per month in 2011 to 73,883 tenge in 2023.

CONCLUSIONS

The purpose of this study was to analyze the impact of the cash income deficiency on poverty in Kazakhstan, as well as to identify key determinants of poverty, taking into account economic and social factors. The analysis examined quantitative indicators of poverty over the past 23 years, their relationship to income, inequality and household size, as well as international scientific approaches to the study of poverty. A literature review has shown that poverty is a multidimensional phenomenon that depends on income level and other factors. International studies confirm that raising the minimum wage, developing digital technologies and expanding financial inclusion contribute to reducing poverty. However, these measures are effective only when combined with a comprehensive government policy.

Diversification of income sources also reduces multidimensional poverty, especially among socially vulnerable groups.

Thus, the deficit of cash income of the population (DCIP) is an important indicator of the shortage of funds to meet the basic needs of the population living below the poverty line. This indicator is calculated as the product of the subsistence minimum and the number of people living in poverty, and it allows the scale of the economic problem to be assessed. DCIP is a key indicator of living standards and inequality in society. Analyzing this can help determine the effectiveness of social programs and develop strategies to improve the well-being of low-income groups.

Correlation analysis revealed a strong positive relationship between poverty and monetary income deficit and a negative relationship between poverty and average nominal income per capita. This confirms the hypothesis that an increase in household incomes reduces poverty, but at the same time the problem of uneven income distribution persists. Regression analysis confirmed the significant impact of cash income deficit on the poverty rate. The growing income gap increases the depth and severity of poverty, especially among large households. A high concentration of poor people in regions with low per capita incomes requires targeted government support measures.

Lack of cash income and poverty have long-term negative consequences for society, as they can lead to increased social inequality, increased crime, decreased education levels and deterioration of public health. Addressing the problem of poverty requires a comprehensive approach, such as creating new jobs, reducing the gap in income distribution, increasing education and literacy. Development of production, effective tax policy, high-quality and accessible education and health care, support for entrepreneurship, and state social support for the population help reduce income deficiency and poverty.

This study has identified the key determinants of poverty in Kazakhstan, but further research is needed to assess the problem better and develop effective strategies to reduce it. A promising area for future research is an in-depth analysis of multidimensional poverty, considering income and access to essential social services such as healthcare, education, and housing. This will make it possible to more accurately assess the actual poverty level and propose comprehensive measures to reduce it.

AUTHOR CONTRIBUTIONS

Conceptualization and theory: NK; research design: NK; data collection: NK; analysis and interpretation: NK; writing draft preparation: NK; supervision: NK; correction of article: NK; proofread and final approval of article: NK. All authors have read and agreed to the published version of the manuscript.

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