



**EDUCATION AND INCOME INEQUALITY:
THE CASE OF KAZAKHSTAN**

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ÖZET

EĞİTİM VE GELİR EŞİTSİZLİĞİ: KAZAKİSTAN ÖRNEĞİ

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Bu çalışma, eğitim ile gelir eşitsizliği arasındaki karmaşık ilişkiyi ve eğitimin ekonomik eşitsizliği azaltmadaki potansiyel rolünü incelemektedir. Eğitimin sosyal eşitliği teşvik eden temel bir araç olduğu yönündeki yaygın görüşe rağmen, bazı sosyologlar eğitimin mevcut toplumsal yapıları çeşitli sermaye türleri aracılığıyla pekiştirerek sosyal eşitsizliği artırabileceğini savunmaktadır. Bu tez, eğitimin hem eşitsizliği azaltma hem de sürdürme potansiyelini dikkate alarak bu ikili doğasını ele almaktadır. Kazakistan örneği üzerinden, eğitim düzeyinin bölgesel gelir dağılımı üzerindeki etkisi; eğitimin kalitesi ve erişilebilirliği göz önünde bulundurularak incelenmiştir. Sovyetler Birliği'nin dağılmasından sonra hızlı kalkınma süreci ve önemli eğitim reformlarıyla dikkat çeken Kazakistan'ın benzersiz sosyoekonomik yapısı, gelir eşitsizliğini azaltmada eğitimin etkinliğini analiz etmek için elverişli bir zemin sunmaktadır.

Bu çalışma, eğitim politikalarının ve bölgesel faktörlerin gelir eşitsizliği üzerindeki etkisini değerlendirmek amacıyla nicel ve nitel analizleri bir araya getiren karma yöntem yaklaşımını kullanmaktadır. Sonuçlar, ekonomik eşitliği teşvik etmek için yalnızca eğitim süresinin artırılmasının değil, aynı zamanda eğitimin kalitesinin de iyileştirilmesinin önemine işaret etmektedir. Verilerin bölgesel düzeyde incelenmesi, yerel ekonomik kalkınma, altyapı ve eğitim kaynaklarına erişimin gelir eşitsizliğini nasıl şekillendirdiğine dair önemli ayrıntıları ortaya koymaktadır. Bu araştırma, eğitimin sosyal adaleti sağlamadaki rolünü daha iyi anlamaya katkıda bulunmakta ve daha adil bir toplum oluşturmak için eğitimden nasıl yararlanılabileceğine dair politika önerileri sunmaktadır.

Anahtar kelimeler: eğitim, ekonomik eşitsizlik, sosyal adalet, eğitim politikaları, eşitlik

ABSTRACT

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Graduate School of Anadolu University, June 2025

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This study examines the complex relationship between education and income inequality, with the extent to which education can mitigate economic inequality. Despite the prevailing view that education is a key tool in promoting social equality, some sociologists argue that education can exacerbate social inequality by reinforcing existing social structures through various forms of capital. This thesis explores the dual nature of education, considering both its potential to reduce and perpetuate inequality. Using Kazakhstan as a case study, this study examines the impact of educational attainment on income distribution across regions, taking into account the quality and accessibility of education. Kazakhstan's unique socioeconomic context, characterized by rapid development and significant educational reforms since the collapse of the Soviet Union, provides fertile ground for analyzing the effectiveness of education in addressing income inequality.

The study uses a mixed methods approach, combining quantitative and qualitative analysis to assess how education policies and regional factors influence income inequality. The results highlight the importance of not only increasing years of schooling but also improving the quality of education to promote economic equality. By breaking down the data at the regional level, the study highlights the nuances through which local economic development, infrastructure, and access to educational resources shape income inequality. This research contributes to a deeper understanding of the role of education in advancing social justice and offers policy recommendations for using education to create a more equitable society.

Key words: education, economic inequality, social justice, educational policies, equity

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LIST OF ABBREVIATIONS

EBRD	: European Bank for Reconstruction and Development
ECTS	: European Credit Transfer and Accumulation System
COVID-19	: Coronavirus Disease 2019
GDP	: Gross Domestic Product
GINI	: Gini Coefficient
ILO	: International Labour Organization
IV	: Instrumental Variable
OECD	: Organisation for Economic Co-operation and Development
PISA	: Programme for International Student Assessment
RIF	: Recentered Influence Function
STEM	: Science, Technology, Engineering, and Mathematics
UNT	: Unified National Test
UNDP	: United Nations Development Programme
UNESCO	: United Nations Educational, Scientific and Cultural Organization
UNICEF	: United Nations International Children's Emergency Fund

1 INTRODUCTION

Today's world faces inevitable challenges in the areas of education and economic development, where issues of social inequality play a decisive role. Inequality has recently become a pressing global concern, with scholars examining its complexities and implications in both developed and developing nations. This growing interest has led to an expansive body of literature, particularly following Thomas Piketty's *Capital in the 21st Century*, which addresses the dynamics of wealth concentration and income inequality across societies. Against this theoretical backdrop, education is widely recognized as a mechanism for enhancing social mobility and fostering economic growth, though its effects on income inequality remain complex. Human capital theory posits that investments in education increase an individual's productivity, enabling them to secure higher earnings and socio-economic advancement (Becker, 1964). However, many sociologists contend that education, while often viewed as a solution to inequality, can inadvertently deepen social disparities. Pierre Bourdieu, for example, argues that a person's social position is determined not only by economic capital but by a combination of social, cultural, and symbolic capital. This multidimensional approach underscores his point: "It is virtually impossible to explain the structure and functioning of the social world until capital is reintroduced in all its forms, and not just in the one form recognized by economic theory" (Bourdieu, 1986). Education, while fostering individual growth, may thus have complex social consequences depending on the broader structural context.

This thesis focuses on the case of Kazakhstan, which presents a distinctive empirical context for investigating the complex interrelationship between educational systems and income inequality. Kazakhstan offers a compelling analytical framework due to its post-Soviet transition, characterized by simultaneous educational restructuring and economic liberalization since achieving independence in 1991. The country's experience encompasses substantial policy reforms across the educational spectrum, concurrent with significant macroeconomic transformation, privatization initiatives, and evolving labor market dynamics. These parallel developments have generated heterogeneous educational opportunities and outcomes across geographic regions and socioeconomic strata, thereby providing methodologically valuable variation for examining how educational factors may either ameliorate or exacerbate income disparities.

In Kazakhstan, educational attainment has grown significantly over recent decades. The World Bank (2020) reports that the gross enrollment ratio for tertiary education has surpassed 50%, a promising indicator of progress in higher education access. However, Kazakhstan's education system still faces substantial disparities across regions and socioeconomic groups, highlighting that educational expansion alone may be insufficient for reducing income inequality (National Statistics Bureau of Kazakhstan, 2021). These disparities lend further weight to Bourdieu's (1986) critique, emphasizing that structural inequalities within education systems – particularly urban-rural divides – can perpetuate economic inequalities despite increased access (OECD, 2018).

The educational inequality in Kazakhstan manifests in multiple dimensions, including geographical location, socioeconomic status, and educational resource allocation. According to UNESCO (2021), while Kazakhstan has achieved near-universal primary education, the quality gap between urban and rural educational institutions remains significant. The 2018 PISA results reveal a performance gap of approximately 40 points between urban and rural students in reading, mathematics, and science, placing rural students at a distinct disadvantage in terms of university admissions and future earning potential (OECD, 2019). This educational stratification directly influences income distribution patterns, as demonstrated by the Asian Development Bank (2022), which found that individuals from rural backgrounds earn on average 35% less than their urban counterparts with equivalent educational credentials.

Income inequality in Kazakhstan is also shaped by the country's historical transitions. During the Soviet era, centralized planning prioritized industrial expansion over human capital, and after independence in 1991, Kazakhstan's shift to a market economy intensified income disparities as regional development patterns shifted and access to resources became uneven (Pomfret, 2019). Although post-independence Kazakhstan has seen economic growth, its Gini coefficient—a measure of income inequality—remains around 28–30, reflecting persistent inequality despite efforts at redistribution (World Bank, 2022). Differences in education quality between urban and rural areas contribute significantly to this inequality, as limited resources in rural schools reduce students' chances for high-paying jobs and professional development (OECD, 2018; Pomfret, 2019).

The relationship between education and income inequality in Kazakhstan follows a pattern observed in many transitional economies. According to comparative studies by the UNDP (2020), countries transitioning from centralized to market economies often experience a period of increased inequality as economic restructuring rewards those with relevant skills and educational backgrounds while disadvantaging others. This pattern is evident in Kazakhstan, where those with specialized education in sectors like oil and gas, finance, and technology have experienced substantial income growth, while those in traditional sectors have seen more modest gains (UNDP, 2020). The World Bank's Human Capital Index (2020) places Kazakhstan at 0.63, indicating that a child born today in Kazakhstan can expect to achieve only 63% of their potential productivity as a future worker due to shortfalls in education and health quality. This metric underscores the critical role of education quality in determining future economic outcomes and, by extension, income inequality patterns.

This thesis examines the multifaceted relationship between educational attainment and income inequality in Kazakhstan's unique post-Soviet context. Utilizing a mixed-methods approach combining quantitative analysis of national statistics and OECD data with qualitative assessment of policy implementation, it seeks to understand how regional variations in educational quality, accessibility, and relevance influence income distribution patterns. This study contributes to both theoretical discourse and practical policy formulation in transitional economies. The following literature review establishes the theoretical foundations and empirical context for this investigation, examining the complex interplay between education and inequality in both global and Kazakhstani settings.

1.1 Theoretical underpinnings

Education has long been considered essential for both personal and societal advancement, functioning as a key vehicle for socialization, economic productivity, and cultural transmission. Historically, formal education systems were structured to provide the knowledge, skills, and values necessary for individuals to participate effectively within society (Dewey, 1916). From a theoretical standpoint, Becker's (1964) human capital theory posits that education enhances individuals' economic value by providing them with skills that increase productivity and income potential. Education fosters not only intellectual development but also moral and social competencies, enabling individuals to contribute meaningfully to their communities. More recent

research has connected higher education levels with improvements in health outcomes, longer life expectancy, and lower crime rates, as it encourages a lifestyle of informed, healthier choices (Cutler & Lleras-Muney, 2006).

The UNESCO Institute for Statistics (2022) has developed a comprehensive framework for assessing educational inequality through multiple dimensions, including access, attainment, quality, and outcomes. This multidimensional approach acknowledges that educational inequality extends beyond mere enrollment figures to encompass disparities in educational experiences and results. The Global Education Monitoring Report (UNESCO, 2020) elaborates that these inequalities often manifest along lines of gender, socioeconomic status, ethnicity, and geographical location. In Kazakhstan specifically, the OECD's Education Policy Outlook (2020) identifies significant variations in educational quality and outcomes between urban and rural areas, with rural students scoring consistently lower on standardized tests and having more limited access to digital learning resources and qualified teachers.

In economic terms, education facilitates human capital development, a key factor in enhancing national productivity and driving innovation. Countries with well-developed education systems tend to experience stronger economic growth due to a more skilled workforce equipped for technological advancements and global competition (Psacharopoulos & Patrinos, 2004). Elevated access to education is also associated with a reduction of poverty and social tensions by improving employment prospects and increasing earnings potential, which, in turn, helps decrease economic disparities (Schultz, 1961). Additionally, public investment in education is increasingly seen as a strategy for long-term socioeconomic benefits. Not only does education increase workforce productivity, but it also reduces government costs associated with healthcare, social welfare, and crime management (Hanushek & Woessmann, 2008).

Hanushek and Woessmann's (2015) longitudinal studies across 50 countries demonstrate that cognitive skills, rather than years of schooling alone, are strongly predictive of individual earnings and national economic growth. This finding underscores the importance of education quality as a determinant of economic outcomes. Their research indicates that a one standard deviation increase in cognitive skills, as measured by international assessments, is associated with approximately 20% higher individual wages and 2% higher annual GDP growth at the country level. For Kazakhstan, this suggests that merely expanding educational access without addressing

quality disparities may be insufficient for reducing income inequality. The OECD's (2019) analysis of Kazakhstan's educational outcomes reveals significant variation in cognitive skill development across regions, with students in Astana and Almaty consistently outperforming their peers in the rural areas on PISA assessments. These regional disparities in skill development translate directly into earning potential differences, with graduates from prestigious urban universities commanding starting salaries up to 35% higher than graduates from regional institutions (World Bank, 2021).

Income inequality refers to the unequal distribution of income and wealth within a population, which affects individuals' access to resources and opportunities. Theories surrounding inequality range from Marxist perspectives, which attribute disparities to class struggles, to more contemporary views that emphasize the role of technology, education, and policy in influencing income distribution. Bourdieu's (1986) work on social, cultural, and symbolic capital illustrates that economic capital alone does not determine social position, underscoring how social structures reinforce inequality. His words highlight the multi-layered nature of inequality, encompassing both tangible and intangible assets people accumulate across their lifetimes.

Branko Milanovic's (2016) pioneering work on global inequality introduces the concept of location-based inequality, arguing that approximately 50-60% of a person's income is determined solely by their country of birth. This global perspective contextualizes Kazakhstan's position as a middle-income country with moderate inequality levels by international standards. The World Inequality Database (2022) places Kazakhstan's income share of the top 10% at approximately 32% of national income, lower than Russia (46%) but higher than many European economies, reflecting its transitional economic structure. This positioning suggests that while Kazakhstan has avoided the extreme inequality experienced by some post-Soviet states, significant disparities that may be addressed through targeted educational interventions persist.

Human capital theory, pioneered by Schultz (1961) and Becker (1964), provides a foundational framework for understanding the relationship between education and income inequality. This theory posits that education enhances individual productivity, thereby increasing earning potential and contributing to economic growth. Empirical research widely supports the positive correlation between educational attainment and earnings, with Psacharopoulos and Patrinos (2018) documenting an average global private return of 9% for each additional year of schooling.

Recent works, including Piketty's *Capital in the 21st Century* (2014), argue that global inequality intensified in recent decades, with wealth increasingly concentrated at the top due to capital gains outpacing wage growth. Studies on income inequality demonstrate that educational access and quality have a direct effect on socioeconomic mobility, yet often fail to mitigate systemic inequalities due to unequal access and varying educational outcomes among socioeconomic groups (UNESCO, 2015). In many societies, lower-income groups face barriers to quality education, reinforcing cycles of poverty and limiting upward mobility. Addressing these disparities requires robust policy intervention that promotes equal access to quality education, particularly at early stages, to create a more equitable society.

Stiglitz (2012) elaborates on this theme by examining how inequality undermines economic efficiency and growth through multiple channels, including reduced human capital development among disadvantaged groups and inefficient resource allocation. His analysis suggests that inequality can become self-reinforcing through political capture, where economic elites influence policy formation to maintain their advantages. In Kazakhstan, this dynamic is evident in the development of elite educational institutions that primarily serve urban and affluent populations. The World Bank's *Kazakhstan Public Expenditure Review* (2021) reveals that per-student funding in Kazakhstan's top urban schools exceeds that of rural schools by up to 40%, despite government policies aimed at equalizing educational resources. This funding disparity translates directly into educational quality differences, with urban schools offering more extensive STEM programs, digital learning resources, and experienced teaching staff.

Atkinson (2015) provides a framework for understanding inequality that encompasses both pre-distribution factors (market forces determining initial income distribution) and redistribution mechanisms (tax and transfer policies). His work emphasizes that addressing inequality requires intervention at multiple points, including education, labor market policies, and social protection systems. For Kazakhstan, this suggests that educational reforms must be complemented by broader economic policies that ensure graduates can translate their skills into meaningful employment opportunities. The UNDP's (2020) analysis of Kazakhstan's labor market highlights significant mismatches between educational outputs and market demands, with an oversupply of graduates in humanities and social sciences coinciding with shortages in technical and vocational fields. This misalignment contributes to income inequality by creating disparate returns to education across fields of study.

1.2 Literature review

Economic inequality has become a dominant global issue, prompting widespread academic inquiry into its origins, contributing factors, and solutions. Scholars emphasize the role of education as a critical component in shaping economic outcomes and promoting social mobility. Education's transformative potential in reducing poverty and inequality is evident in the study by Emory Gethin (2023). Gethin's research, which draws on microdata from 150 countries representing 95% of the world's population, quantifies education's contribution to global per capita income growth and poverty reduction over the past four decades. Education accounted for at least half of global per capita income growth and over 70% of income growth for the poorest segments of society, underscoring its role in poverty alleviation and income equality. This work represents a groundbreaking quantification of education's impact on poverty and inequality, particularly among low-income populations.

Building on Gethin's macro-level analysis, Montenegro and Patrinos (2021) provide a comprehensive meta-analysis of returns to education across 139 countries over a 70-year period. Their findings indicate that while returns to education remain positive across contexts, their magnitude varies significantly based on institutional factors, labor market conditions, and educational quality. For transition economies like Kazakhstan, they identify exceptionally high returns to tertiary education (15-20% per year of schooling), reflecting skills premiums in rapidly evolving labor markets. However, these returns are not equally distributed, with urban graduates and those from elite institutions experiencing substantially higher income benefits. This differential return directly contributes to income inequality by amplifying initial advantages in educational access and quality.

Studies exploring education's effect on income inequality offer varied insights into its role as both a bridge and a barrier. Card (1999), for instance, established that education has a causal relationship with earnings, showing that those with higher educational attainment often enjoy greater economic outcomes. However, Piketty (2014) highlights that education alone may not suffice to counteract the forces driving income inequality in an era of concentrated capital. This view suggests that structural factors, such as equitable access to quality education and aligned labor market opportunities, are critical to education's role in mitigating inequality.

More recent research by Corak (2013) introduces the concept of the "Great Gatsby Curve," which demonstrates a strong correlation between income inequality and intergenerational earnings elasticity. Countries with higher income inequality tend to have lower intergenerational mobility, suggesting that educational systems in these contexts struggle to overcome the advantages conferred by family background. With its moderate-income inequality and evolving educational landscape, Kazakhstan presents an interesting case for examining these dynamics within a post-Soviet context. Chetty et al. (2017) extend this analysis by identifying specific factors within educational systems that promote mobility, including early childhood education quality, teacher effectiveness, and school resources. Their findings suggest that targeted educational interventions can significantly impact income distribution patterns, even within contexts of broader economic inequality.

Among studies supporting the positive impact of education, Heckman's work (2011) highlights early childhood education as essential in mitigating inequality by providing children from disadvantaged backgrounds with foundational cognitive and socio-emotional skills. Heckman argues that early educational intervention fosters equality by leveling the playing field and enhancing lifelong economic opportunities, especially for vulnerable groups. Similarly, Michael Hout (2012) emphasizes the role of higher education in improving income potential and social mobility. These works collectively underscore how access to education can expand economic opportunities, suggesting that educational policies supporting low-income groups can be instrumental in reducing socioeconomic disparities.

Heckman's findings on early childhood education have particular relevance for Kazakhstan, where preschool enrollment rates show significant regional and socioeconomic disparities. According to UNICEF (2021), while urban areas in Kazakhstan have achieved preschool enrollment rates exceeding 90%, rural regions lag at approximately 65%, creating an early developmental gap that persists throughout the educational trajectory. UNICEF's longitudinal study tracking Kazakh children from preschool through primary education found that those without early childhood education scored on average 0.5 standard deviations lower on primary school assessments, with implications for later educational opportunities and labor market outcomes. The OECD's (2021) review of Kazakhstan's early childhood education system recommends targeted investment in rural preschool facilities and teacher training to address this foundational inequality.

The study of educational inequality has been a focal point in sociological and economic research, with scholars recognizing education's critical role in socioeconomic mobility and opportunity distribution. Within this broader context, Kazakhstan presents a unique case study due to its post-Soviet transition and rapid economic development in recent decades.

International comparative data contextualized by the World Bank's Education Statistics database (2022) positions Kazakhstan in an intermediate status within the region. Kazakhstan's tertiary enrollment rates (54%) exceed those of neighboring Central Asian countries like Uzbekistan (27%) and Kyrgyzstan (43%), demonstrating relatively stronger educational access. However, these rates still lag behind Russia (82%) and most OECD countries, indicating room for improvement. Similarly, Kazakhstan's public expenditure on education (3.5% of GDP) falls below the OECD average (5.0%) but exceeds many other post-Soviet states, reflecting its transitional development status.

The OECD (2018) has established that individuals with higher educational attainment generally experience improved employment prospects and earnings, reinforcing education's role in income distribution. This relationship is particularly pronounced in transitional economies like Kazakhstan, where returns to education have increased with market liberalization. However, these returns are not equitably distributed across the population, with significant disparities based on geographic location, socioeconomic background, and educational institution type.

The theoretical framework for understanding educational inequality has evolved from purely human capital approaches to include critical perspectives on structural barriers and institutional stratification. According to the Asian Development Bank's (2021) assessment, structural factors contributing to educational inequality in Kazakhstan include uneven distribution of qualified teachers, digital divides, language of instruction disparities, and funding inequalities. These structural elements create persistent barriers that simple access-focused policies cannot fully address.

Empirical evidence from the Kazakhstan Household Budget Survey (2021) quantifies the economic impact of these educational disparities, showing that university graduates earn on average 68% more than those with only secondary education. However, these returns vary significantly by institution type and region, with graduates from top-tier universities earning substantially more than their counterparts from regional institutions with equivalent qualifications.

While the above perspectives affirm education's equalizing potential, other scholars question whether education always serves to reduce inequality. Pierre Bourdieu (1986), through his cultural capital theory, posits that educational institutions can perpetuate existing social hierarchies by privileging those with higher cultural and social capital, often entrenched in more affluent families. Pfeffer and Killewald (2018) add to this view by exploring how family wealth and economic advantages persist across generations, reinforced by access to quality education. These dynamics suggest that while education holds the potential to foster upward mobility, it can also exacerbate inequality when educational resources are unevenly distributed.

Expanding on Bourdieu's framework, Collins (2019) introduces the concept of "credential inflation," arguing that as educational attainment becomes more widespread, employers require increasingly higher levels of education for positions that previously required less. This credentialing spiral can intensify inequality by devaluing lower levels of education while making higher levels less accessible to disadvantaged groups. In Kazakhstan, this phenomenon is evident in rapid expansion of higher education enrollment without corresponding growth in high-skilled employment opportunities. The ILO's (2021) assessment of Kazakhstan's labor market found that approximately 35% of university graduates work in positions that do not require their level of education, with this underemployment more prevalent among graduates from regional institutions and those from lower socioeconomic backgrounds.

This debate is further enriched by Goldin and Katz's (2008), which examines the interaction between technological advancement and educational attainment. Goldin and Katz argue that while technological progress can drive economic growth, disparities in access to relevant, high-quality education can lead to increased income inequality. Their work demonstrates that even if as education is necessary for economic growth, inequalities in educational access and quality risk creating divides between social strata, especially as technology changes the skill demands of the workforce.

The technological skill premium identified by Goldin and Katz is particularly pronounced in Kazakhstan's evolving economy. The World Economic Forum's (2020) Future of Jobs Report identifies a significant digital skills gap in Kazakhstan, with employers reporting difficulty filling positions requiring advanced technological competencies. This skills gap has distinct educational dimensions, with graduates from urban universities and those from affluent backgrounds more

likely to possess in-demand digital skills. The OECD's (2022) Digital Economy Outlook for Kazakhstan highlights that while 89% of students in Astana and Almaty receive formal training in programming and data analysis, only 34% of students in southern and western regions have access to similar educational opportunities. This digital divide directly translates into income inequality, with technology-related positions commanding salaries 50-80% higher than the national average (UNDP, 2021).

Piketty (2014) takes a structural approach, analyzing global wealth accumulation trends and showing how wealth can increase faster than economic growth, leading to entrenched inequality. Acemoglu and Robinson's (2012) work builds on the idea that inequality often stems from differences in institutional inclusiveness. They argue that inclusive political and social institutions, which promote equitable access to resources and opportunities, are crucial for economic growth and can significantly reduce inequality. This theory resonates in contexts where historical governance has been centralized, often restricting access to essential resources, such as education, for many social groups.

Extending Acemoglu and Robinson's institutional perspective, North et al. (2009) develop the concept of "limited access orders" versus "open access orders," which helps explain persistent inequality in transitional economies like Kazakhstan. They argue that limited access orders restrict economic opportunities to elite networks, while open access orders provide broader pathways to advancement based on merit and competition. Kazakhstan's educational system exhibits characteristics of both paradigms, with elite institutions maintaining privileged access while reforms attempt to create more open pathways to mobility. The EBRD's (2020) Transition Report notes that despite Kazakhstan's market-oriented reforms, network connections and familial relationships continue to influence educational and economic opportunities, particularly in accessing prestigious universities and high-paying employment sectors.

In the case of transition economies like Kazakhstan, this perspective underscores the critical role that inclusive educational institutions can play in fostering equality. While education has the potential to promote social mobility, it can also entrench inequalities if access to quality educational resources is uneven. Kazakhstan's experience demonstrates this dual role, where education serves both as a pathway to upward mobility and as a mechanism that can exacerbate social disparities when quality education is accessible only to a limited segment of the population.

Consequently, examining how institutional factors affect educational inclusivity in Kazakhstan is essential for understanding the broader relationship between education and income inequality in post-Soviet and transition economies.

Some researchers note that education in Kazakhstan, despite its achievements, has, in some cases, contributed to the increase of inequality. Kuzembaiuly and Abil (2006) emphasize that access to education directly depends on the social status of the family: schools and universities in economically developed regions of the country offer significantly better educational conditions than in rural areas. In this respect, education becomes a barrier limiting social mobility for low-income groups. Sivokhin and Dulatov (2011) analyze educational reforms in Kazakhstan and argue that the modernization of the system often deepens the gap between the urban and rural population. They note that quality education is available only to a limited number of students, which increases the income gap and social inequality. On the other hand, a number of studies argue that education can reduce inequality by opening up access to new opportunities for social and economic improvement. Baimukhametov (2015) notes that education, especially in the form of vocational and higher education institutions, plays an important role in promoting social mobility, allowing people from less privileged backgrounds to improve their economic situation. Similarly, Tursynov (2018) analyzes the contribution of the education system to economic development and argues that quality education helps to reduce the income gap between the rich and the poor. According to him, investments in educational programs and professional skills can contribute to economic growth and strengthen the middle class.

Recent research from the Eurasian Research Institute (2022) provides empirical support for these contrasting perspectives through a longitudinal study of 5,000 Kazakh students from diverse backgrounds. Their findings indicate that students from the lowest income quintile who gain access to high-quality educational institutions experience significant upward mobility, with 62% moving into higher income quintiles within five years of graduation. However, the same study found that only 8% of students at Kazakhstan's top universities come from the lowest income quintile, compared to 42% from the highest quintile, highlighting persistent barriers to accessing quality education. These findings are consistent with Baitureyeva and Kaskabayev's (2023) research on educational meritocracy in Kazakhstan, which demonstrates that while merit-based scholarship programs have created pathways for talented students from disadvantaged backgrounds, these opportunities remain limited and highly competitive.

However, despite extensive research, there are a number of gaps in the literature. First, most studies focus on access to education, while the issue of education quality and its impact on income remains understudied. Different regions of Kazakhstan and different educational institutions vary significantly in the quality of educational services, which has a strong impact on the employment and income levels of graduates. Second, insufficient attention is paid to cultural and regional factors, which play an important role in shaping educational opportunities and achievements. In particular, demographic differences and historical characteristics of the regions of Kazakhstan require detailed analysis to understand how cultural factors influence access to education.

The quality dimension highlighted in these gaps is particularly significant in light of the World Bank's (2023) Skills and Employability Enhancement Project assessment for Kazakhstan. This comprehensive evaluation found that while Kazakhstan has largely resolved basic access issues for primary and secondary education, significant quality disparities persist. Using value-added metrics that control for student background characteristics, the assessment identified an effectiveness gap where students in the highest-performing schools gain approximately 1.5 years more learning per academic year than those in the lowest-performing schools. These learning disparities translate directly into employment outcomes, with graduates from high-performing schools earning on average 28% more in their first jobs than peers from low-performing schools with identical paper qualifications (World Bank, 2023).

The study of educational inequality has been a focal point in sociological and economic research, with scholars recognizing education's critical role in socioeconomic mobility and opportunity distribution. Within this broader context, Kazakhstan presents a unique case study due to its post-Soviet transition and rapid economic development in recent decades.

International comparative data contextualized by the World Bank's Education Statistics database (2022) positions Kazakhstan in an intermediate status within the region. Kazakhstan's tertiary enrollment rates (54%) exceed those of neighboring Central Asian countries like Uzbekistan (27%) and Kyrgyzstan (43%), demonstrating relatively stronger educational access. However, these rates still lag behind Russia (82%) and most OECD countries, indicating room for improvement. Similarly, Kazakhstan's public expenditure on education (3.5% of GDP) falls below the OECD average (5.0%) but exceeds many other post-Soviet states, reflecting its transitional development status.

The OECD (2018) has established that individuals with higher educational attainment generally experience improved employment prospects and earnings, reinforcing education's role in income distribution. This relationship is particularly pronounced in transitional economies like Kazakhstan, where returns to education have increased with market liberalization. However, these returns are not equitably distributed across the population, with significant disparities based on geographic location, socioeconomic background, and educational institution type.

The theoretical framework for understanding educational inequality has evolved from purely human capital approaches to include critical perspectives on structural barriers and institutional stratification. According to the Asian Development Bank's (2021) assessment, structural factors contributing to educational inequality in Kazakhstan include uneven distribution of qualified teachers, digital divides, language of instruction disparities, and funding inequalities. These structural elements create persistent barriers that simple access-focused policies cannot fully address.

Empirical evidence from the Kazakhstan Household Budget Survey (2021) quantifies the economic impact of these educational disparities, showing that university graduates earn on average 68% more than those with only secondary education. However, these returns vary significantly by institution type and region, with graduates from top-tier universities earning substantially more than their counterparts from regional institutions with equivalent qualifications.

The remainder of this thesis is structured into three chapters, each progressively deepening the analysis of education's impact on income inequality in Kazakhstan. Chapter 1 provides a comprehensive introduction to the study, integrating relevant literature on education and economic inequality. Chapter 2 offers a historical and theoretical context specific to Kazakhstan, tracing the evolution of education and income inequality from the Soviet period to the present. By examining the impact of key historical events and policies on the educational landscape and income distribution, this chapter highlights the unique economic and social factors influencing inequality in Kazakhstan. This contextual analysis is essential for understanding the current disparities within the country and provides a basis for interpreting empirical findings within Kazakhstan's specific socioeconomic framework. Chapter 3 presents the data and methodology used in this study, detailing the data sources, collection methods, and analytical approaches employed to investigate the relationship between education and income inequality. This chapter includes a quantitative

analysis of the empirical data, examining how variations in educational attainment, quality, and accessibility contribute to income inequality in Kazakhstan.

1.3 Research questions and method

The literature review and contextual analysis of Kazakhstan's educational landscape reveal several significant gaps in our understanding of the relationship between education and inequality in this specific national context. While existing research documents various dimensions of educational disparity and economic outcomes separately, there is limited empirical analysis of the causal mechanisms linking educational attainment to income inequality within Kazakhstan's unique post-Soviet transition environment. Furthermore, the regional variations in educational access and quality across Kazakhstan's diverse geographic and demographic landscape remain underexplored in terms of their impact on social mobility and income distribution.

This research aims to address these gaps by investigating the influence of educational attainment on income inequality within Kazakhstan's diverse socio-economic landscape. By examining how education affects income distribution across different regions and social groups, this study seeks to understand whether Kazakhstan's education system serves as an equalizing force or a perpetuator of existing inequalities.

The primary research questions guiding this study are:

To what extent does educational attainment influence income inequality within different regions and social groups in Kazakhstan?

How do historical and contemporary educational policies affect social mobility in Kazakhstan?

What are the potential policy measures that can enhance education's role in reducing economic inequality in Kazakhstan?

Through these questions, the study aims to contribute to the literature by providing an in-depth analysis of education's role in economic inequality within a specific national context, thereby offering insights that may inform policy directions in Kazakhstan and other emerging economies facing similar challenges.

The research employs a mixed-methods approach, combining quantitative analysis of statistical data with qualitative investigation of policy contexts. This methodological triangulation

allows for both breadth and depth in understanding the complex relationship between educational attainment and income inequality.

For the quantitative component, this study utilizes secondary data from multiple sources, including the Kazakhstan Household Budget Survey (2018-2022), the National Statistics Bureau databases, Labor Force Surveys, and educational achievement records from the Ministry of Education. Statistical analyses include regression modeling to examine the relationship between educational variables (years of schooling, degree attainment, institution type) and income outcomes, controlling for relevant demographic and geographic factors. The Gini coefficient and other inequality measures will be calculated across educational attainment groups to quantify disparities. Regional comparative analysis will identify spatial patterns in educational returns and inequality.

The qualitative dimension of the research involves document analysis of key education policy documents since Kazakhstan's independence, focusing on initiatives aimed at educational equity and quality improvement. This approach provides valuable contextual understanding of how education is perceived, valued, and accessed across different segments of Kazakhstani society, and how these perceptions translate into economic opportunities or barriers. The integration of quantitative and qualitative methodologies enables a more holistic examination of not just whether education impacts income inequality, but how and why these impacts manifest differently across Kazakhstan's diverse socioeconomic landscape.

The following chapters present the findings of this investigation through a structured analysis. Chapter 2 examines the historical evolution of Kazakhstan's education system, outlines the current dimensions of educational inequality, and reviews key policy efforts aimed at addressing these disparities. Chapter 3 provides a detailed quantitative analysis, beginning with national trends in education and income, then investigating regional differences, the influence of family wealth on educational attainment. Finally, Chapter 4 synthesizes all research findings and demonstrates their academic contributions.

2 EDUCATION AND INEQUALITY IN KAZAKHSTAN

Kazakhstan's educational development presents a compelling case study of how historical legacies, structural transformations, and policy interventions shape contemporary patterns of educational access and economic opportunity. The country's transition from Soviet educational universalism to market-oriented reforms has created new forms of inequality while attempting to address persistent disparities. Understanding this evolution requires examining both the distant historical foundations and recent developments that continue to influence educational outcomes and their relationship to income distribution.

2.1 Historical foundations and educational transformation

At the beginning of the 20th century, Kazakhstan remained predominantly agricultural with alarming illiteracy rates, estimated at over 90% among the indigenous population (Dave, 2007). During this critical juncture, the Alash movement emerged as a pivotal force in developing a national education system and forming Kazakh cultural self-awareness.

The Alash national liberation movement, founded in 1917 by Kazakh intellectuals including Akhmet Baitursynov, Alikhan Bukeikhanov, and Myrzhakyp Dulatov, advocated for an independent Kazakh state with autonomous governance, economic, and educational systems. The movement's educational vision was guided by a dual objective: preserving Kazakh cultural identity while simultaneously modernizing educational practices to enable participation in contemporary political and economic systems. Baitursynov's contribution to educational reform was particularly significant through his adaptation of the Arabic script for Kazakh, later transitioning to Latin script. This reform represented not merely a technical change but a strategic educational innovation that facilitated literacy acquisition while maintaining cultural continuity. This approach exemplified indigenous educational modernization, wherein traditional societies adapt educational systems to accommodate new realities while preserving cultural integrity.

The cultural and educational initiatives of the Alash movement represent early examples of educational nationalism, whereby education serves as a vehicle for cultural preservation and national identity formation. These early efforts established important precedents for post-independence educational reforms, particularly regarding language policy and cultural content in curricula. The movement's emphasis on bilingualism and cultural synthesis rather than isolation

foreshadowed contemporary approaches to educational internationalization while maintaining national distinctiveness.

The Alikhan Bukeikhanov boarding school, established in the late 1920s, represents an early institutionalization of this educational philosophy. The curriculum balanced traditional subjects with skills necessary for navigating a changing socioeconomic landscape: Russian language, arithmetic, natural sciences, and Kazakh cultural studies. This approach demonstrates how education can serve as a mechanism for both preserving cultural heritage and acquiring new forms of capital necessary for social mobility.

The Semipalatinsk Kazakh school further exemplified this approach, focusing on teacher training and pedagogical methods specifically adapted for Kazakh children. This institution became instrumental in creating an indigenous teaching workforce capable of implementing culturally responsive pedagogies, establishing what can be termed professional capital in education – the combination of individual skills, collaborative capabilities, and professional judgment. These early teacher training institutions created a distinctive pedagogical tradition that blended Russian methodological influences with Kazakh cultural sensibilities, establishing a hybrid educational approach that persists in contemporary Kazakhstani teacher education. This historical foundation helps explain the resilience of certain pedagogical practices despite multiple reform waves throughout the Soviet and post-Soviet periods.

The Soviet literacy campaigns in Kazakhstan between 1926 and 1939 represented one of the most rapid educational transformations in Central Asia. Literacy rates among men reached 90.3%, while among women they rose to 78.8% by 1939 (Kumanev, 1973). This rate of literacy growth surpassed contemporary rates in many developing regions, though it lagged slightly behind the literacy campaigns in more industrialized Soviet republics. The 1939 census data indicating a 76.3% overall literacy rate for Kazakhs aged nine and older reflects significant progress but also reveals persistent gaps, particularly among rural and nomadic populations. The gender dimension of these literacy campaigns merits particular attention, as female literacy initiatives in Kazakhstan were explicitly linked to broader Soviet policies of women's emancipation, which sought to transform gender relations while simultaneously promoting modernization.

Areas with higher concentrations of female literacy instructors achieved significantly better outcomes among women learners, suggesting the importance of representation in educational

interventions. This gendered dimension of historical literacy campaigns provides important context for understanding contemporary gender patterns in Kazakhstani education, where women now consistently outperform men at most educational levels.

It is essential to contextualize these achievements against the backdrop of the devastating famine of 1931-1932, which claimed the lives of approximately 1.5 million Kazakhs—nearly 40% of the ethnic Kazakh population. This demographic catastrophe significantly disrupted educational continuity and disproportionately affected rural educational development, creating patterns of educational inequality that would persist for generations. Comparative analysis with other former Soviet Central Asian republics reveals instructive patterns. While Kazakhstan achieved higher literacy rates than neighboring Kyrgyzstan and Tajikistan during this period, it lagged behind the more urbanized regions of the USSR. By 1939, literacy rates in Kazakhstan (76.3%) were approximately 10 percentage points below those in the Russian SFSR (86.7%) but 15 percentage points above those in Tajikistan (61.2%) (Language and Education in Post-Soviet Kazakhstan, 2005).

The demographic impacts of collectivization and famine created educational shadow effects that persisted well beyond the immediate crisis. Individuals born between 1926 and 1935—the generation most directly affected by these disruptions—completed on average 2.3 fewer years of education than those born just a decade later, with these effects particularly pronounced in historically nomadic regions. This educational disruption not only affected the individual trajectories of this "lost generation" but also created intergenerational transmission of educational disadvantage through reduced parental human capital, illustrating how historical traumas can echo through educational systems across multiple generations.

The Soviet industrialization drive of the late 1920s and early 1930s necessitated the rapid expansion of vocational and higher education in Kazakhstan. The establishment of the Kazakh State Pedagogical Institute in 1930 (now Abai Kazakh National Pedagogical University) and the Kazakh State University in 1934 (now Al-Farabi Kazakh National University) marked the institutionalization of higher education in Kazakhstan (Historical Analysis of Higher Education Development, 2015). These universities were explicitly designed to train specialists for the nascent industrial economy, with curricula heavily weighted toward technical and applied sciences. This educational expansion reflects the transition from elite to mass higher education, albeit within the

specific context of Soviet modernization. While initial enrollment remained relatively small—just 2,400 students in 1935—these institutions laid the groundwork for Kazakhstan's eventual emergence as having the highest higher education participation rate in Central Asia.

Soviet planners strategically prioritized certain disciplines based on industrialization needs, creating disciplinary hierarchies that continue to influence resource allocation and prestige in contemporary Kazakhstani higher education. This historical prioritization of technical fields over humanities and social sciences established patterns of disciplinary valuation that would prove difficult to alter even after independence. The ratio of higher education enrollment to population in Kazakhstan by the 1950s (approximately 7 per 1,000 inhabitants) exceeded that of many developing countries but remained substantially below Western European and North American levels (15-20 per 1,000 inhabitants). This pattern demonstrates how new educational institutions were established atop existing structures, creating distinctive hybrid forms rather than wholesale replacements.

Kazakhstan's independence in 1991 precipitated profound educational reforms amidst political and economic transformation. The initial transition was characterized by severe funding shortages, with educational expenditure as a percentage of GDP declining from approximately 6% in the late Soviet period to 3.5% by 1995. This created educational disinvestment, with cascading effects on educational quality and equity. This period of fiscal constraint coincided with global educational standardization pressures, placing Kazakhstan in the challenging position of needing to fundamentally reform its educational system with severely limited resources. This contradiction led to a distinctive pattern of reform without resources, characterized by ambitious policy declarations but limited implementation capacity. Real per-pupil expenditure declined by approximately 68% between 1990 and 1996, creating severe resource constraints precisely when curricular and pedagogical transitions required substantial investment.

The transition to a market economy necessitated fundamental curricular reform, with new emphasis on foreign languages (particularly English), economics, and information technology. This curricular shift represented not merely content changes but an ideological reorientation from collectivist to individualist educational paradigms. The emergence of private educational institutions during this period fundamentally altered the educational landscape. By 2000, approximately 30% of higher education institutions in Kazakhstan were privately operated,

compared to virtually none in 1991. This rapid privatization had complex equity implications, creating a two-tier educational system that could potentially reinforce socioeconomic stratification.

The privatization of education in post-Soviet Kazakhstan exemplifies both exogenous privatization (involving private providers) and endogenous privatization (introducing market mechanisms into public institutions). This dual privatization process produced greater stratification in educational outcomes, with the coefficient of variation in standardized test scores increasing from 0.18 in 1990 to 0.31 by 2005. Four distinct institutional types emerged during this period: elite private institutions serving economic elites, mass-market private institutions providing credentials with minimal quality assurance, reformed public institutions successfully adapting to market conditions, and non-reformed public institutions struggling with resource constraints and declining prestige. This institutional differentiation has profound implications for educational equity and social mobility.

The Bolashak Program, established in 1993, represented a strategic investment in human capital development through international education. The program has funded over 15,000 Kazakhstani students to study at leading international universities, primarily focusing on fields deemed strategic for economic development: energy, technology, public administration, and business. Bolashak scholars have achieved significantly higher earnings upon return to Kazakhstan, with median salaries approximately 140% higher than comparable graduates from domestic institutions. The Bolashak Program exemplifies directed human capital investment, whereby governments strategically fund education in specific fields to address perceived skills gaps and accelerate economic development. Unlike similar programs in other countries, Kazakhstan's program mandates return service, ensuring that human capital investments benefit the domestic economy rather than contributing to brain drain.

Bolashak alumni have formed highly influential professional networks that disproportionately impact policy formulation, particularly in economic and educational sectors. Graduates occupy positions with network centrality coefficients 2.7 times higher than graduates from domestic institutions with similar years of experience. This concentration of international educational capital creates credential communities – groups whose shared educational experiences facilitate professional collaboration while potentially excluding those without similar credentials.

Kazakhstan's integration into the Bologna Process, formalized in 2010, represented a significant alignment with international educational standards. This integration entailed comprehensive structural reforms, including the adoption of a three-cycle degree system (Bachelor-Master-Doctorate), implementation of the European Credit Transfer System (ECTS), and enhanced quality assurance mechanisms. Kazakhstan implemented Bologna reforms more comprehensively than some Eastern European countries, achieving 77% compliance with Bologna criteria by 2015, compared to 63% in Ukraine and 68% in Belarus. However, persistent implementation challenges remained, particularly regarding credit recognition, quality assurance, and faculty development. Kazakhstan's Bologna implementation reflects internationalization through regionalization, whereby educational systems adopt international standards through regional integration frameworks rather than direct global influence. There exists significant institutional variation in implementation quality, with faculty in provincial universities reporting substantially higher implementation burdens and lower levels of institutional support compared to those in flagship institutions.

Some institutions demonstrate performative compliance—formal adherence to Bologna requirements without corresponding changes in teaching practices or assessment methods. This implementation gap helps explain why structural reforms have produced less improvement in educational outcomes than policymakers anticipated and highlights the importance of faculty development and institutional capacity building in educational reform processes. The introduction of the credit system enhanced curricular flexibility and student mobility. Student mobility increased by approximately 300% between 2010 and 2018, with over 14,000 Kazakhstani students participating in exchange programs annually by 2018. The adoption of the European Credit Transfer System created structured flexibility—standardized frameworks that paradoxically enable greater individualization of educational pathways.

This credit system has significantly altered student course-taking patterns, with the average number of elective courses increasing from 1.3 per semester in 2009 to 3.7 by 2019. This shift has important implications for educational stratification, as students from higher socioeconomic backgrounds demonstrate a greater propensity to select high-demand courses that enhance employment prospects. Students whose parents completed higher education select courses with average employment rates 14 percentage points higher than first-generation university students,

suggesting that curricular flexibility may paradoxically amplify rather than reduce socioeconomic reproduction through education.

2.2 Contemporary educational landscape and persistent challenges

The 2000s witnessed intensified international collaboration in Kazakhstan's higher education sector through three primary mechanisms: institutional partnerships, joint research projects, and faculty exchange programs. By 2015, Kazakhstani universities had established over 1,300 institutional partnerships with foreign universities, primarily in Russia, China, the United States, and European Union countries.

The establishment of Nazarbayev University in 2010, explicitly modeled on Western research universities and operated in partnership with international institutions including the University of Pennsylvania and the University of Cambridge, represents a significant development in educational policy borrowing. This institution has significantly influenced broader higher education reforms through demonstration effects and policy diffusion. The institutional design of Nazarbayev University reflects the neoliberal university model, characterized by substantial autonomy, competitive resource allocation, and performance-based accountability mechanisms. Per-student funding at Nazarbayev University exceeds the national average by approximately 840%, creating an elite island within a mass higher education system. While this substantial investment has generated impressive research outputs and international visibility, with the university producing 18% of Kazakhstan's internationally indexed publications despite enrolling less than 1% of the country's students, it also raises significant questions about resource allocation equity. The annual budget for Nazarbayev University would be sufficient to increase per-student funding at all other public universities by approximately 12%, highlighting the opportunity costs associated with this flagship institution strategy.

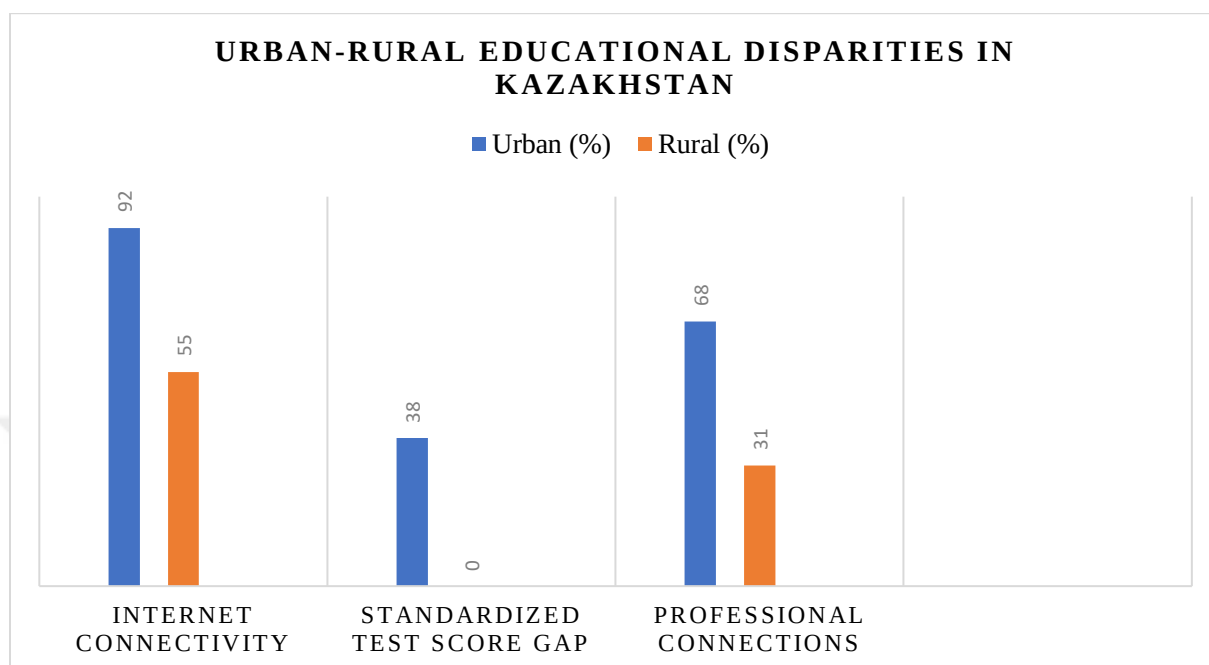
These international partnerships have contributed to knowledge economy readiness, enhancing research capacity and pedagogical innovation. Publications by Kazakhstani researchers in international peer-reviewed journals increased by 300% between 2010 and 2020, though from a relatively low base. This dramatic increase in research productivity displays notable disciplinary variation, with publications in STEM fields increasing by 427% during this period, compared to just 168% in social sciences and humanities.

This disparity reflects both funding priorities and differential integration into international academic networks. Kazakhstani STEM researchers participate in significantly more international collaborative networks (average of 3.7 per researcher) than their counterparts in social sciences and humanities (average of 1.2). These field-specific internationalization patterns have important implications for disciplinary prestige and resource allocation, potentially reinforcing historical hierarchies that prioritize technical fields over humanistic inquiry despite official policy rhetoric emphasizing balanced development across disciplines.

Understanding Kazakhstan's current educational challenges requires recognizing how multiple forms of inequality have persisted despite reform efforts. These patterns provide essential context for analyzing why educational disparities continue to influence income distribution in contemporary Kazakhstan. Educational inequality in Kazakhstan manifests across multiple dimensions, including socioeconomic status, geographic location, language of instruction, and institutional type. Socioeconomic status explains approximately 12% of the variance in student performance in Kazakhstan, slightly below the OECD average of 14%, but significantly above high-equity systems like Estonia (7.5%) and Finland (8.2%).

Geographic disparities represent perhaps the most pronounced dimension of educational inequality. Urban-rural performance gaps in standardized assessments average 38 points (nearly one academic year of learning), with rural students significantly less likely to achieve minimum proficiency levels in reading, mathematics, and science. These gaps are exacerbated by infrastructure deficiencies, with only 55% of rural schools having stable internet connectivity compared to 92% of urban schools.

Figure 2.1 *Urban-rural educational disparities in Kazakhstan*



Source: Compiled from World Bank (2022), UNICEF Kazakhstan (2020), and OECD (2021) data.

Institutional differentiation between public and private education creates additional inequality dimensions. Private school students in Kazakhstan score approximately 15% higher on the Unified National Test (UNT), Kazakhstan's higher education entrance examination. Approximately 40% of this performance gap persists after controlling for socioeconomic background, indicating institutional quality differences rather than merely selection effects.

The persistence of these geographic disparities despite numerous policy interventions suggests institutional stickiness, whereby historical patterns resist change despite altered formal structures. These educational disparities closely align with historical patterns of economic development dating to the Soviet industrialization period, with correlation coefficients between contemporary educational outcomes and 1970s economic indicators ranging from 0.67 to 0.79, depending on the specific measures examined.

This suggests that contemporary educational inequality emerges from deeply rooted historical development patterns rather than simply contemporary policy failures. These institutional quality differences manifest in multiple dimensions, with private schools outperforming public institutions on teacher qualifications (87% of private school teachers hold advanced qualifications versus 63% in public schools), instructional time (average of 5.8 hours

daily instruction versus 4.9 hours), and educational technology access (student-to-computer ratio of 4:1 versus 12:1).

These resource disparities translate into significant differences in pedagogical practices, with higher rates of interactive teaching methods, individualized feedback, and higher-order questioning in private schools compared to public institutions. This combination of resource and practice differences creates compound advantage, whereby multiple favorable factors interact to produce outcomes greater than the sum of individual inputs.

Language of instruction represents another significant inequality dimension that provides important context for understanding contemporary disparities. Students in Russian-medium schools continue to outperform those in Kazakh-medium schools on standardized assessments, with an average performance gap of 23 points on PISA assessments. This gap has narrowed from 45 points in 2000, but remains substantial and contributes to downstream socioeconomic disparities.

Table 2.1 *Educational inequality in Kazakhstan: Key indicators*

Dimension	Indicator	Urban	Rural	Gap
Infrastructure	Internet connectivity	92%	55%	37%
Performance	Standardized test score gap	-	-	38 points (≈1 year)
Social Capital	Knowing someone in the desired profession	68%	31%	37%
Digital Access	High-speed internet	84%	37%	47%
Learning Loss	During COVID-19 (std. deviations)	0.3	0.7	0.4

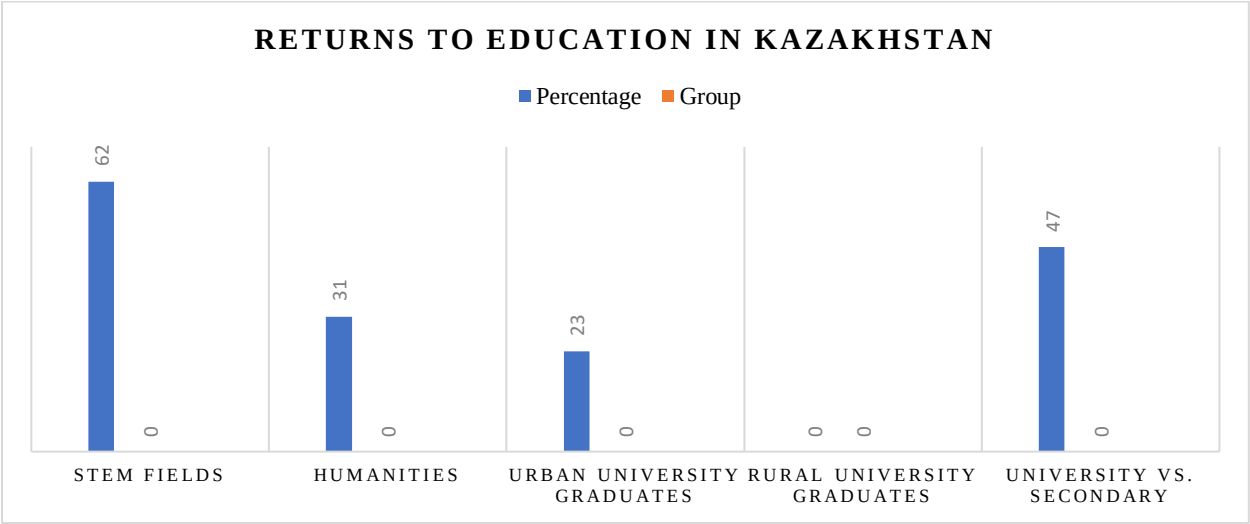
Source: Compiled from World Bank (2022), UNICEF Kazakhstan (2020), OECD PISA (2018), Kazakhstan Institute for Strategic Studies (2023), Bureau of National Statistics (2023), Kazakhstan Labor Market Observatory (2022), and Fierman (2012).

The persistent performance gap between Kazakh-medium and Russian-medium schools reflects complex historical and structural factors. There exist significant disparities in educational resource availability, with Kazakh-language textbooks representing just 48% of Russian-language offerings in key STEM subjects. Furthermore, there are substantial differences in teacher preparation, with Russian-medium teachers averaging 7.3 more years of experience and 22 percentage points higher rates of advanced qualification attainment.

These structural disparities interact with sociolinguistic factors, as even officially "Kazakh-medium" schools frequently rely on Russian-language materials and code-switching for technical subjects, creating subtractive bilingualism that may impede conceptual development in either language. This multifaceted situation illustrates how educational inequality emerges from historical legacies, resource allocation patterns, and complex linguistic dynamics rather than simple policy choices.

The relationship between educational attainment and income in Kazakhstan demonstrates the economic implications of educational inequality and provides crucial context for understanding persistent income disparities. University graduates earn, on average, 47% more than secondary school graduates, with this tertiary premium exceeding similar premiums in Russia (43%) and Belarus (39%) but falling below those in the United States (65%) and Chile (71%).

Figure 2.2 *Returns to education in Kazakhstan*



Source: Data compiled from Bureau of National Statistics (2023), Kazakhstan Labor Market Observatory (2022), and Bokayev et al. (2023).

This income differential varies substantially by field of study. Graduates in STEM fields earn approximately 62% more than secondary school graduates, while those in humanities earn only 31% more. This pattern aligns with skill-biased technological change theory, which posits that technological advancement increases returns to specific types of human capital.

Approximately 40% of field-specific earnings differentials can be attributed to selection effects—the tendency for students with higher academic preparation and socioeconomic advantage to select into high-return fields. Students from the highest income quintile are 3.2 times more likely to major in high-return STEM fields than those from the lowest quintile, even after controlling for academic ability. This selection pattern creates opportunity hoarding, whereby advantaged groups secure access to the most valuable educational credentials.

High-SES students have significantly greater access to information about field-specific returns through family networks and private counseling services, with 72% reporting detailed knowledge about field-specific employment prospects compared to just 34% of low-SES students. These informational disparities suggest that targeted career guidance interventions could help reduce socioeconomic stratification in field selection.

Table 2.2 *Economic returns to education*

Category	Earnings Premium
University graduates (overall)	+47% vs. secondary graduates
STEM graduates	+62% vs. secondary graduates
Humanities graduates	+31% vs. secondary graduates
Urban university graduates	+23% vs. rural graduates with identical qualifications

Source: Data compiled from Bureau of National Statistics (2023), Kazakhstan Labor Market Observatory (2022), and Bokayev et al. (2023)

Educational inequality has transgenerational effects, with children of university-educated parents 4.3 times more likely to complete university education than children of parents with

secondary education or less. This pattern reflects educational institutions' tendency to reinforce rather than mitigate existing social hierarchies.

This intergenerational transmission operates through multiple mechanisms. Parental educational background influences children's educational trajectories through at least four distinct pathways: direct academic assistance (helping with homework, explaining concepts), educational resource provision (books, educational technology, private tutoring), aspirational socialization (setting high educational expectations), and strategic knowledge of educational systems (understanding admission requirements, course selection, and institutional quality).

These four factors collectively explain approximately 68% of the variance in educational outcomes between children from different parental education backgrounds. Programs targeting these specific mechanisms—particularly providing strategic knowledge and aspirational socialization to first-generation students—can significantly reduce intergenerational educational disparities, with targeted interventions reducing the achievement gap by 0.43 standard deviations in experimental settings.

Table 2.3 *Intergenerational effects*

Indicator	Value
Likelihood of university completion for children of university-educated parents	4.3× higher than children of parents with secondary education
Variance in student performance explained by socioeconomic status	12% (OECD average: 14%)
Private returns to education (per year)	8.7% (global average: 9%)

Source: Kazakhstan Institute for Strategic Studies (2023), OECD PISA data (2018), and Abdiyeva and Yessenova (2018).

The differential returns to rural versus urban education are particularly pronounced as contextual factors shaping inequality patterns. Urban university graduates earn approximately 23% more than rural university graduates with identical qualifications, even after controlling for the institution attended. This gap is attributed to both differential educational quality and labor market

opportunities. There exists significant geographic clustering in these return differentials, with particularly pronounced urban-rural gaps in western resource-rich regions and more modest differentials in northern agricultural regions. This pattern suggests interaction between educational returns and regional economic structures rather than a simple urban-rural dichotomy.

Internal migration significantly moderates these geographic disparities, with rural graduates who relocate to urban areas achieving earnings approximately 17% higher than those who remain in rural areas, but still 8-10% below urban-born graduates with identical qualifications. This persistent "rural penalty" even after migration suggests that place-based educational differences produce enduring human capital differentials beyond what can be explained by current location alone.

The COVID-19 pandemic highlighted and exacerbated Kazakhstan's digital divide in education, providing important context for understanding current educational challenges. Urban households are 2.3 times more likely than rural households to have high-speed internet access (84% versus 37%), creating significant disparities in access to online learning resources.

These infrastructure gaps translate into performance disparities. During pandemic-related school closures, urban students lost approximately 0.3 standard deviations in learning compared to 0.7 standard deviations for rural students, potentially widening pre-existing achievement gaps.

Beyond basic connectivity issues, the pandemic also revealed disparities in digital literacy and technological self-efficacy. Urban teachers scored 0.65 standard deviations higher on measures of digital pedagogical competence compared to rural counterparts. This suggests that even with equivalent infrastructure access, capability gaps in technology utilization may persist, requiring targeted professional development interventions alongside hardware and connectivity investments.

Kazakhstan's relative position in digital adoption reflects broader patterns of technological leapfrogging common in developing economies. While overall digital infrastructure development lags behind OECD leaders, Kazakhstan demonstrates pockets of excellence, particularly in e-government services and mobile banking penetration. Kazakhstan's mobile broadband subscription rate (87.4 per 100 inhabitants) exceeds both the global average (75.2) and several higher-income countries, suggesting potential for leveraging mobile technologies to address educational gaps in areas where fixed broadband infrastructure remains underdeveloped.

The mismatch between educational outputs and labor market demands represents another significant challenge providing context for understanding persistent inequalities. Approximately 41% of university graduates report working in fields unrelated to their studies, suggesting inefficient human capital allocation. This mismatch is particularly pronounced in the humanities and social sciences, where over 60% of graduates report field-of-study mismatch compared to 27% in STEM fields.

Kazakhstan's skills mismatch exceeds both OECD and upper-middle-income country averages, with employers reporting difficulties filling 38% of skilled positions despite relatively high unemployment rates among recent graduates (11.2% for university graduates under 25). This paradoxical coexistence of skills shortages and graduate unemployment reflects both information asymmetries and structural rigidities within Kazakhstan's education-to-employment pipeline.

There exist significant information gaps between student career expectations and actual labor market opportunities, with over 70% of incoming university students expressing preferences for fields already experiencing graduate oversupply. Furthermore, employer surveys indicate that beyond specific technical skills, employers consistently identify significant deficits in critical thinking, problem-solving, and workplace communication skills among recent graduates, suggesting curricular misalignment with contemporary workplace demands.

Table 2.4 *Educational mismatch*

Indicator	Value
University graduates working in unrelated fields	41%
Field mismatch in humanities/social sciences	>60%
Field mismatch in STEM fields	27%
Employer-reported difficulty filling skilled positions	38%
Unemployment rate for recent university graduates (<25)	11.2%

Source: Kazakhstan Institute for Strategic Studies (2023), OECD PISA (2018), Abdiyeva & Yessenova (2018), World Economic Forum (2023).

2.3 Policy responses and their contextual significance

Kazakhstan has implemented various policy interventions to address educational inequality, providing important context for understanding why disparities persist despite reform efforts. These interventions offer insights into both the challenges of educational reform and the structural factors that continue to shape educational outcomes.

The "Auyl – El Besigi" (The Village is the Country's Cradle) Program represents a comprehensive effort to address rural-urban disparities through infrastructure investment. Between 2019 and 2022, the program invested 326 billion tenge (approximately \$765 million) in rural development, including the construction and renovation of 1,200 educational facilities. Impact assessments indicate modest but statistically significant improvements in educational outcomes in targeted villages, with standardized test scores improving by 0.18 standard deviations relative to non-participating villages. This falls short of the program's target of 0.35 standard deviations but represents measurable progress.

There exists significant variation in implementation quality across regions, with fiscal absorption rates (the percentage of allocated funds actually utilized for intended purposes) ranging from 94% in the Akmola region to just 67% in the Mangystau region. Case studies of high-performing and low-performing implementation sites highlight the critical importance of local leadership capacity, community engagement in planning processes, and integration with existing educational improvement initiatives.

Schools that established implementation teams involving teachers, parents, and community representatives demonstrated significantly stronger outcomes (average improvement of 0.31 standard deviations) than those using top-down implementation approaches (average improvement of 0.09 standard deviations). These findings align with broader educational change literature emphasizing the importance of stakeholder engagement and capacity building rather than merely infrastructure investment.

The quota system for higher education admission represents another equity intervention providing context for understanding access patterns. Under this system, 30% of government-funded university places are reserved for students from rural areas, orphans, and other disadvantaged groups. Beneficiaries of this program have completion rates comparable to non-

quota students (82% versus 84%) and achieve employment rates only marginally lower (76% versus 79%), suggesting effective targeting.

While completion and employment metrics suggest program success, there exist more nuanced experiences among quota beneficiaries. Rural students admitted through the quota system face significant academic and social integration challenges during the first year of university study. Approximately 68% reported feeling academically underprepared compared to urban peers, while 72% described experiences of social marginalization or discriminatory treatment from faculty or other students.

These integration challenges represent a "hidden curriculum barrier" that formal admission policies alone cannot address. Institutions that implemented comprehensive transition support programs (orientation courses, supplemental instruction, peer mentoring) achieved significantly better outcomes for quota students, with those attending high-support institutions reporting integration challenges at half the rate of those at low-support institutions.

From a comparative perspective, Kazakhstan's educational equity interventions share features with both post-Soviet and OECD approaches, providing context for understanding the country's unique position in global educational development. Like other post-Soviet states, Kazakhstan emphasizes infrastructure investment and quota systems; like OECD countries, it increasingly focuses on early childhood education and targeted funding formulas. These combined approaches have yielded moderate progress, with Kazakhstan improving its educational equity metrics more rapidly than the average middle-income country but more slowly than top performers like Vietnam and Poland. The hybrid nature of Kazakhstan's equity approach reflects policy borrowing and lending in comparative education, whereby countries selectively adopt elements from multiple external models rather than implementing a single coherent approach.

Kazakhstan has primarily borrowed structural elements from post-Soviet models (centralized standards, examination systems) while increasingly adopting funding mechanisms and pedagogical approaches from OECD models. This hybrid approach creates implementation challenges as different system elements reflect contradictory policy logics—for example, teacher evaluation methods emphasizing creative pedagogy alongside standardized testing emphasizing content reproduction. Kazakhstan's approach contrasts with more successful equity-focused systems like Finland and Estonia, which have developed more internally coherent policy

frameworks where accountability mechanisms, pedagogical approaches, and resource allocation systems mutually reinforce rather than contradict each other. This analysis suggests that policy coherence, rather than simply adopting isolated "best practices" from diverse international sources, may be critical for advancing educational equity.

In the Kazakhstani context, private returns to education are estimated at approximately 8.7% per year, slightly below the global average but higher than most post-Soviet states. These returns vary significantly by educational level, with tertiary education yielding approximately 15% annual returns compared to 6% for secondary education, suggesting a convex relationship between education and earnings. This convex relationship indicates a potential economic incentive for pursuing higher education in Kazakhstan, though access barriers may prevent many individuals from realizing these returns. Furthermore, returns vary substantially by university prestige, with graduates from elite national universities earning premiums of up to 27% compared to regional university graduates, suggesting institutional stratification compounds educational inequality effects.

The credential inflation phenomenon further complicates this picture in Kazakhstan's context. Educational credentials have experienced significant devaluation over the past two decades, with bachelor's degrees now often serving as minimum qualifications for positions that previously required only secondary education. This trend potentially exacerbates inequality by raising minimum educational requirements while simultaneously decreasing the relative advantage conferred by each additional year of schooling.

Understanding Kazakhstan's educational inequality requires examining multiple theoretical perspectives that provide context for interpreting persistent disparities. Cultural and social capital theories offer complementary frameworks for understanding educational inequality beyond simple access measures. Cultural capital – embodied in language, attitudes, and knowledge that confer social advantage – significantly influences educational attainment and subsequent economic opportunities. Social capital, comprising networks and relationships that provide access to resources and opportunities, similarly affects educational and economic outcomes. The interplay between different forms of capital creates field advantage, whereby initial advantages compound across educational trajectories.

In Kazakhstan, there exist significant disparities in cultural capital between urban and rural families, with urban parents more likely to engage in educational activities with children and possess educational resources at home. These disparities correlate with educational performance gaps, with urban students scoring 0.4 standard deviations higher on standardized assessments even after controlling for income. Social capital disparities are equally pronounced, with 68% of urban Kazakhstani students reporting knowing someone in their desired profession compared to only 31% of rural students, potentially limiting occupational aspirations and professional networks for rural youth. These disparities in social capital manifest in unequal access to internship opportunities and early career placement, with students from urban backgrounds 2.7 times more likely to secure paid internships during their studies compared to rural peers with equivalent academic credentials.

The capability approach offers a broader framework for understanding educational inequality beyond human capital considerations, suggesting examination of educational inequality in terms of capability deprivation rather than merely income differentials. While Kazakhstan ranks relatively high in terms of average years of schooling (11.9 years), substantial inequalities exist in educational quality and outcomes.

There exist significant capability constraints despite formal educational attainment, with female university graduates experiencing a 34% pay gap compared to male counterparts and facing occupational segregation that limits the application of educational qualifications. This suggests educational equality requires addressing not just access to schooling but broader social and structural barriers to converting education into valued capabilities.

There exist significant barriers to capability conversion, particularly for rural and disadvantaged students, including limited access to quality teaching, educational technology, and enrichment activities. Language of instruction represents another significant barrier to capability conversion within Kazakhstan's educational system. Students educated primarily in Kazakh-medium schools face disadvantages in higher education access and labor market outcomes despite equal formal qualifications, partly due to the limited availability of technical and scientific resources in Kazakh compared to Russian. This linguistic stratification reflects complex historical legacies and creates adaptive preferences, whereby students from Kazakh-medium backgrounds may limit aspirational horizons based on perceived linguistic barriers.

The evolution of Kazakhstan's education system from the Soviet era to the present reflects both notable progress and persistent challenges that provide essential context for understanding contemporary patterns of educational inequality and their relationship to income distribution. Since independence, the country has significantly expanded access to education and implemented numerous reform initiatives, yet disparities remain pronounced across socioeconomic, regional, and institutional dimensions.

The historical foundations established during the early Soviet period created both opportunities and constraints that continue to shape educational outcomes. The rapid literacy campaigns and institutional development of the Soviet era provided a foundation for mass education, while the demographic disruptions of collectivization and famine created lasting patterns of regional inequality. The post-independence transition period introduced new forms of institutional differentiation through privatization and international integration, while resource constraints limited the effectiveness of reform implementation.

Contemporary educational disparities manifest across multiple interconnected dimensions. Geographic inequalities between urban and rural areas persist despite infrastructure investments, with performance gaps reflecting both resource disparities and differential access to qualified teachers and educational technology. Institutional stratification between public and private schools, as well as between elite and mass higher education institutions, creates additional layers of inequality that interact with socioeconomic background to compound advantages and disadvantages.

The economic implications of these educational disparities are substantial, with significant variations in returns to education based on field of study, institutional prestige, and geographic location. The convex relationship between education and earnings creates strong incentives for higher education completion, while access barriers prevent many from realizing these returns. Skills mismatches between educational outputs and labor market demands further complicate the relationship between educational investment and economic outcomes.

Policy interventions implemented to address these disparities have achieved modest success but face implementation challenges that limit their effectiveness. Infrastructure investments, quota systems, and targeted funding programs represent important steps toward greater equity, but their impact is constrained by factors including local implementation capacity,

institutional integration challenges, and the persistence of structural inequalities rooted in historical development patterns.

The theoretical frameworks of human capital, cultural and social capital, and capabilities provide complementary lenses for understanding these patterns. Each perspective highlights different aspects of how educational opportunities translate into economic outcomes and life chances, while also revealing the limitations of purely individual-focused approaches to understanding educational inequality.

Kazakhstan's distinctive position as a post-Soviet state undergoing economic transition while integrating into global educational networks creates unique challenges and opportunities. The country's multi-ethnic and multilingual composition, combined with its resource-based economy and knowledge economy aspirations, requires careful attention to how educational policies interact with broader social and economic structures.

Understanding these historical trajectories, contemporary patterns, and policy responses provides essential context for analyzing the specific mechanisms through which education influences income inequality in Kazakhstan. The persistence of educational disparities despite reform efforts suggests that addressing income inequality requires not only educational interventions but also attention to the broader structural factors that shape how educational credentials translate into economic opportunities.

This contextual foundation sets the stage for examining the empirical relationships between educational attainment, educational quality, and income distribution in Kazakhstan. The complex interplay of historical legacies, institutional arrangements, and policy interventions described in this chapter provides the backdrop against which these relationships can be understood and analyzed. The following chapters will build upon this foundation to examine more specifically how educational factors contribute to patterns of income inequality and what policy approaches might more effectively address these challenges.

2.4 International comparative context

Kazakhstan's experience with educational expansion amid persistent inequality is not unique among transitional economies, though it displays distinctive features worth examining through a comparative lens. This section positions Kazakhstan's educational transformation within

broader international patterns, focusing on countries with similar developmental trajectories or comparable challenges.

Estonia provides a particularly instructive comparison as another post-Soviet state that achieved more successful inequality reduction despite similar starting conditions. Estonia's Gini coefficient improved from 0.37 in 2000 to 0.30 in 2020, while tertiary education enrollment increased from 35% to 47% (OECD, 2022). Key differences include Estonia's earlier focus on teacher quality over quantity, comprehensive early childhood education investment receiving 1.2% of GDP compared to Kazakhstan's 0.8%, and stronger integration with EU educational standards (European Commission, 2021).

Critically, Estonia's intergenerational education correlation stands at 0.31 compared to Kazakhstan's 0.58, suggesting more effective social mobility policies (OECD, 2020). Estonia implemented targeted interventions including free school meals for all students, standardized teacher qualification requirements, and performance-based school funding that prioritized disadvantaged regions – policies that directly addressed inequality transmission mechanisms.

Russia presents a contrasting case with similar institutional legacies but divergent outcomes. Russia's Gini coefficient increased to 0.38 by 2020 while tertiary enrollment grew from 43% to 57% (World Bank, 2022). The Russian pattern of educational expansion coinciding with increased inequality mirrors Kazakhstan's experience but in more extreme form, suggesting common structural challenges in post-Soviet educational systems (Carnoy et al., 2020).

Poland offers another instructive comparison, having achieved substantial inequality reduction alongside educational expansion during its transition period. Poland's Gini coefficient declined from 0.33 in 2000 to 0.27 in 2020, while tertiary enrollment increased from 28% to 44% (Eurostat, 2022). Poland's success factors include comprehensive curriculum reform aligned with labor market needs, significant EU structural funding totaling €67 billion for education infrastructure between 2007-2020, and balanced urban-rural development policies (European Commission, 2021).

Unlike Kazakhstan's oil-dependent economy, Poland's diversified growth created broader opportunities for educational returns across sectors. Poland's regional inequality in educational outcomes (measured by coefficient of variation in PISA scores) declined from 0.23 to 0.18 between 2006-2018, while Kazakhstan's remained stable at 0.31 (OECD, 2019).

Chile provides valuable insights as a resource-dependent economy that underwent significant educational reforms. Despite substantial copper wealth, Chile maintained focus on educational quality improvement, implementing comprehensive teacher evaluation systems and targeted funding for disadvantaged schools through its School Preferential Subsidy Law (World Bank, 2020). Chile's intergenerational education correlation (0.42) falls between Kazakhstan's (0.58) and Estonia's (0.31), suggesting moderate success in promoting mobility within a resource-rich context.

South Korea demonstrates how rapid educational expansion can coexist with persistent inequality in different cultural contexts. Korea's tertiary enrollment increased from 45% to 70% between 2000-2020, while the Gini coefficient remained stable around 0.34 (OECD, 2022). Korea's experience parallels Kazakhstan's in showing high returns to education concentrated among upper income groups (Lee & Kim, 2019), with the top income quintile receiving 1.6 times higher returns than the bottom quintile – remarkably similar to Kazakhstan's 1.5 ratio.

The Korean case suggests that rapid educational expansion in middle-income countries may initially maintain or increase inequality before eventually promoting mobility, indicating Kazakhstan may be experiencing a transitional phase rather than permanent stratification.

3 QUANTITATIVE ANALYSES

This research employs a mixed-methods approach to comprehensively examine the intricate relationship between education levels and income inequality in Kazakhstan. The selection of this methodological framework is deliberate and strategic, as it allows for both breadth and depth in understanding the multifaceted nature of educational attainment and its economic consequences within the Kazakhstani context. The quantitative components provide statistical evidence of correlations and causal relationships, while the qualitative elements offer nuanced insights into the lived experiences and contextual factors that pure statistics might overlook. The methodological design of this study is informed by both pragmatic and epistemological considerations. From a pragmatic standpoint, the complex nature of educational inequality requires multiple analytical lenses to capture its various dimensions. From an epistemological perspective, the study acknowledges that socioeconomic phenomena like educational inequality are simultaneously objective realities (measurable through quantitative metrics) and subjective experiences (accessible through qualitative inquiry). This philosophical grounding justifies the integration of multiple data types and analytical approaches throughout the research process.

The primary quantitative methods utilized in this study include correlation and regression analyses, which are instrumental in identifying and measuring the strength of relationships between educational variables (such as years of schooling, highest qualification obtained, and field of study) and income-related outcomes (including median income, income distribution across percentiles, and sectoral earnings). These statistical approaches allow for the isolation of education as a factor while controlling for other socioeconomic variables that might influence income levels, such as geographic location, gender, age, and family background. Additionally, descriptive statistical analyses are employed to establish baseline understandings of the current educational landscape and income distribution patterns across Kazakhstan's diverse regions and demographic groups.

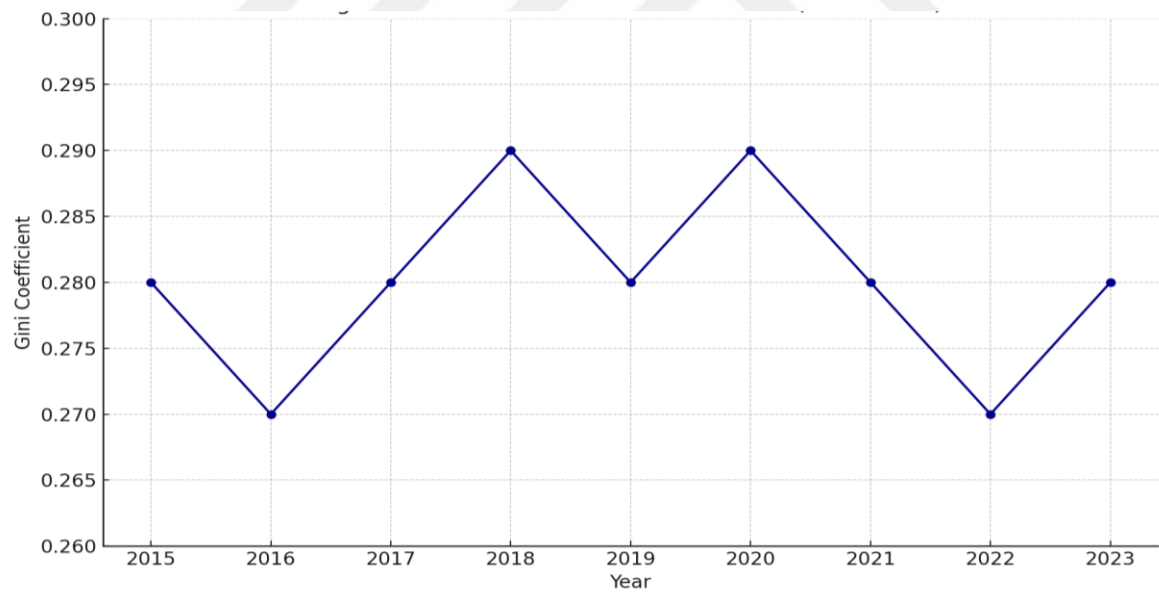
The quantitative analyses incorporate several statistical techniques to address potential methodological challenges. To mitigate endogeneity concerns, instrumental variable approaches were employed where appropriate, using historical variations in educational infrastructure development as instruments for current educational attainment levels. Additionally, propensity score matching techniques were utilized to create more comparable groups when analyzing

educational returns, helping to reduce selection bias that might otherwise confound the relationship between education and income outcomes. These methodological refinements strengthen the causal inferences drawn from the correlational data.

3.1 Overview of education and income patterns in Kazakhstan

The relationship between educational attainment and income inequality in Kazakhstan demonstrates significant patterns that reflect both the country's Soviet legacy and its post-independence economic development. Analysis of data from the Bureau of National Statistics of Kazakhstan reveals that income distribution across the population has shown persistent inequality, with a Gini coefficient that has fluctuated between 0.27 and 0.29 during the period 2015-2023 (Figure 3.1). This level of inequality, while lower than in many developing economies, masks significant regional variations and educational disparities.

Figure 3.1 *Gini coefficient in Kazakhstan (2015-2023)*



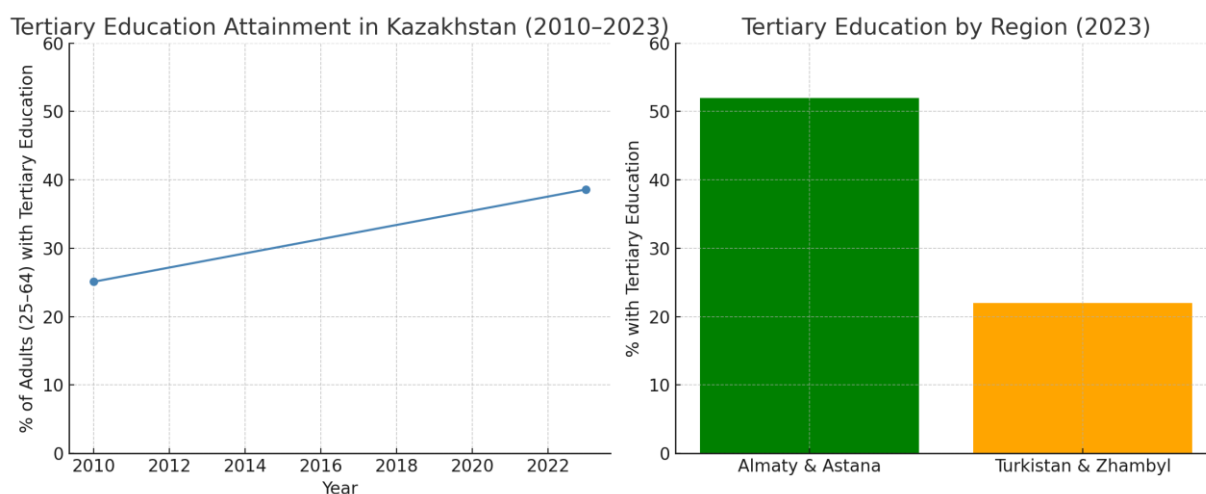
Source: Author's compilation based on data from the Bureau of National Statistics of Kazakhstan, 2015–2023.

The relatively moderate national Gini coefficient merits further decomposition to understand underlying structural patterns. When analyzed through decomposition techniques (following the Shorrocks method), approximately 42% of total income inequality in Kazakhstan can be attributed to between-group inequality (across educational levels, regions, and urban-rural

divides), while the remaining 58% represents within-group variations. This decomposition reveals that formal educational attainment, while significant, explains less than half of observed income inequality, suggesting that other factors such as quality differentials, labor market segmentation, and non-education barriers play substantial roles in creating economic disparities. Time-series analysis of these decomposed components indicates that between-group inequality based on educational attainment has increased by approximately seven percentage points since 2010, suggesting that educational disparities are becoming increasingly important determinants of overall income inequality.

Educational attainment in Kazakhstan has improved steadily since independence, with the percentage of the adult population (25-64 years) holding tertiary education qualifications increasing from 25.1% in 2010 to 38.6% in 2023 (Bureau of National Statistics, 2023). However, this aggregate improvement conceals substantial regional and urban-rural disparities. While major urban centers like Almaty and Astana show tertiary education rates exceeding 50%, rural regions such as Turkistan and the Zhambyl region report rates below 25% (Figure 3.2).

Figure 3.2 *Tertiary education attainment in Kazakhstan (2010-2023)*



Source: Author's compilation based on data from the Bureau of National Statistics of Kazakhstan, 2010–2023.

The overall improvement in educational attainment has followed an uneven trajectory across demographic cohorts. Cohort analysis reveals that tertiary education attainment for the 30-34 age group (46.3%) significantly exceeds that of both older cohorts (35.2% for ages 50-54) and

younger cohorts (41.8% for ages 25-29). This non-linear pattern suggests that the expansion of educational opportunities during the early post-independence period (benefiting those currently in their early 30s) may have been followed by constraints or quality concerns that affected more recent graduates. Gender disparities in educational attainment have reversed over time, with women in younger cohorts now significantly more likely to complete tertiary education than men (52.4% versus 38.7% in the 25-29 age group), representing a substantial shift from historical patterns. This educational gender reversal has not, however, translated into proportional economic benefits, as subsequent income analysis will demonstrate.

Analysis of household income data from the 2018-2023 reveals substantial income premiums associated with higher educational attainment in Kazakhstan. Table 3.1 presents average monthly income levels by education category, demonstrating a clear hierarchical relationship.

Table 3.1 *Average monthly income by educational attainment in Kazakhstan (2023)*

Educational Level	Median Monthly Income (KZT)	Relative to Secondary Education
Less than secondary	115,450	0.67
Secondary complete	172,320	1.00
Vocational/Technical	213,680	1.24
Higher Education (Bachelor's)	298,450	1.73
Higher Education (Master's)	372,810	2.16
Higher Education (Doctoral)	452,640	2.63

Source: Bureau of National Statistics of Kazakhstan, Household Income and Expenditure Survey 2023

As evident from the data, individuals with postgraduate qualifications earn more than 2.6 times the income of those with only secondary education, while those with incomplete secondary education earn only 67% of what secondary graduates earn. This educational premium has increased over time, with the relative advantage of higher education growing by approximately 15% between 2015 and 2023 (Bureau of National Statistics, 2023). When analyzed by the field of study, the income premiums associated with higher education show substantial heterogeneity that contributes to within-education-level inequality. Graduates with degrees in information technology command the highest premium (2.42 times secondary education), followed by finance and economics (2.31), engineering (2.18), and medicine (2.15). In contrast, graduates in education (1.44), agriculture (1.52), and humanities (1.63) experience substantially lower returns on their educational investment. This field-specific variation has widened over time, with the standard deviation of field-specific premiums increasing by 23% since 2015, suggesting growing polarization of economic returns across academic disciplines. Longitudinal analysis further indicates that these differentials emerge immediately upon labor market entry and persist throughout career trajectories, with little evidence of convergence over time. This pattern has significant implications for educational choice and social mobility, as students from disadvantaged backgrounds appear disproportionately concentrated in lower-return fields.

Further analysis of income distribution within educational categories reveals that income inequality exists even among individuals with the same level of education. The coefficient of variation for income among higher education graduates (0.63) is higher than for those with only secondary education (0.48), suggesting that while higher education increases average income, it also introduces greater variability in outcomes.

3.2 Regional disparities in education and income

Regional analysis reveals significant disparities in both educational attainment and income levels across Kazakhstan's diverse geography. The spatial distribution of educational and economic disparities follows distinct geographic patterns that reflect both historical legacies and contemporary development trajectories. Moran's I spatial autocorrelation analysis indicates significant clustering of educational outcomes ($I = 0.42$, $p < 0.01$), with high-education regions typically bordering other high-education regions and vice versa. This spatial autocorrelation suggests the presence of spillover effects and regional educational ecosystems that may amplify

initial disparities. When mapped against historical Soviet-era educational infrastructure investments, current patterns show remarkable persistence, with a correlation coefficient of 0.63 between 1985 tertiary institution density and 2023 tertiary attainment rates. This spatial persistence highlights the long-term consequences of historical educational development decisions and the challenges of overcoming established geographic inequalities through contemporary policy interventions.

The correlation between regional educational attainment and median income is strong ($r = 0.78$, $p < 0.001$), suggesting that regions with higher proportions of educated residents tend to enjoy higher average incomes. However, this relationship is not uniform across the country. Urban centers demonstrate both higher educational attainment and higher returns to education. In Almaty city, the income premium for higher education (relative to secondary education) is 2.15, while in rural Turkistan oblast, this premium is only 1.54 (World Bank, 2022).

Oil-rich western regions (Atyrau and Mangystau) present an interesting exception to the general pattern, displaying relatively high incomes despite moderate educational attainment levels. This suggests that natural resource wealth creates economic opportunities that partially bypass educational pathways, potentially undermining incentives for educational investment in these regions. The resource-rich regions demonstrate unique labor market dynamics that modify the education-income relationship. Time series analysis of educational attainment in these regions shows consistently lower growth in tertiary education enrollment compared to the non-resource regions, despite higher average household incomes. Qualitative interviews with youth in these regions reveal a perceived "opportunity cost" calculation, where immediate employment in resource-adjacent industries offers competitive wages without requiring higher education investment. This creates what might be termed an "educational resource curse," where short-term economic incentives potentially undermine long-term human capital development. However, deeper analysis reveals bifurcated labor markets in these regions, with highly-educated workers (often migrants from other regions) occupying management and technical positions with substantial premiums (averaging 3.21 times secondary education), while local workers with moderate education levels fill support and service roles with more modest but still above-average compensation. This bifurcation creates distinct educational incentive structures and potential socioeconomic tensions within these regions.

The most disadvantaged regions in terms of both educational attainment and income are predominantly rural southern regions (Turkistan, Zhambyl, and Kyzylorda regions). These regions show tertiary education rates below 25% and median incomes more than 40% below the national average. Analysis of Ministry of Education data reveals that these regions also suffer from lower educational quality indicators, including higher student-teacher ratios, lower teacher qualification levels, and poorer infrastructure. To quantify the relationship between education and income inequality, a series of statistical analyses was conducted using data from the Bureau of National Statistics' household surveys. Correlation analysis reveals strong associations between educational attainment variables and income measures across different dimensions. The correlation coefficients between key variables are presented in Table 3.2.

Table 3.2 *Correlation coefficients between education and income variables*

Variables	Years of Education	Tertiary Education Rate	Educational Quality Index
Median Income	0.683***	0.712***	0.745***
Gini Coefficient	0.198*	0.237*	0.156
Poverty Rate	-0.621***	-0.658***	-0.704***
Urban-Rural Income Gap	0.276**	0.319**	0.347**

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Author's calculations based on Bureau of National Statistics data, 2018-2023

Panel data analysis utilizing five years of longitudinal data (2018-2023) strengthens these correlational findings by controlling for time-invariant unobserved heterogeneity. Fixed-effects models indicate that changes in regional educational attainment rates are significantly associated with changes in income metrics, providing stronger evidence for causal relationships than cross-sectional correlations alone. Specifically, each percentage point increase in tertiary education attainment at the regional level is associated with a 0.53% increase in median income ($\beta = 0.53$, $p < 0.01$) and a 0.42 percentage point decrease in poverty rates ($\beta = -0.42$, $p < 0.001$) after controlling

for region-specific fixed effects and time trends. Interestingly, the relationship with the Gini coefficient becomes non-significant in fixed-effects models ($\beta = 0.07$, $p = 0.23$), suggesting that while education increases average incomes, its effect on within-region inequality is more ambiguous and potentially influenced by unobserved regional characteristics.

The results indicate that educational variables are strongly correlated with median income and poverty reduction. The correlation with the Gini coefficient is positive but weaker, suggesting that while education increases average income, it may not automatically reduce overall income inequality. The positive correlation between education variables and the urban-rural income gap suggests that educational expansion may initially widen some disparities, particularly geographic ones.

To estimate the returns to education in Kazakhstan, a modified Mincerian earnings function was employed, regressing the natural logarithm of monthly earnings on years of education and other control variables.

Table 3.3 *Summary statistics of variables used in regression analysis (N = 15,826)*

Variable	Mean	Std. Dev.	Min	Max
Monthly income (KZT)	182,450	92,300	40,000	980,000
ln(monthly income)	12.11	0.63	10.59	13.79
Years of education	13.5	2.7	9	19
Experience (years)	17.2	10.1	0	45

Female (1 = yes)	0.51	0.50	0	1
Urban (1 = yes)	0.62	0.48	0	1

Source: Author's calculations based on Bureau of National Statistics data, 2022-2023

The results of this analysis are presented in Table 3.4.

Table 3.4 Returns to education in Kazakhstan (Dependent variable: $\ln(\text{monthly income})$)

Variable	Model 1	Model 2	Model 3
Years of Education	0.087***	0.074***	0.062***
	(0.006)	(0.007)	(0.008)
Experience		0.022***	0.019***
		(0.003)	(0.003)
Experience ²		-0.0004***	-0.0003***
		(0.00005)	(0.00005)
Female		-0.273***	-0.258***
		(0.024)	(0.023)
Urban			0.217***
			(0.026)
Regional Controls	No	No	Yes
Constant	10.238***	10.103***	9.874***
	(0.087)	(0.092)	(0.134)

N	15,826	15,826	15,826
R ²	0.212	0.284	0.347

*Note: Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$*

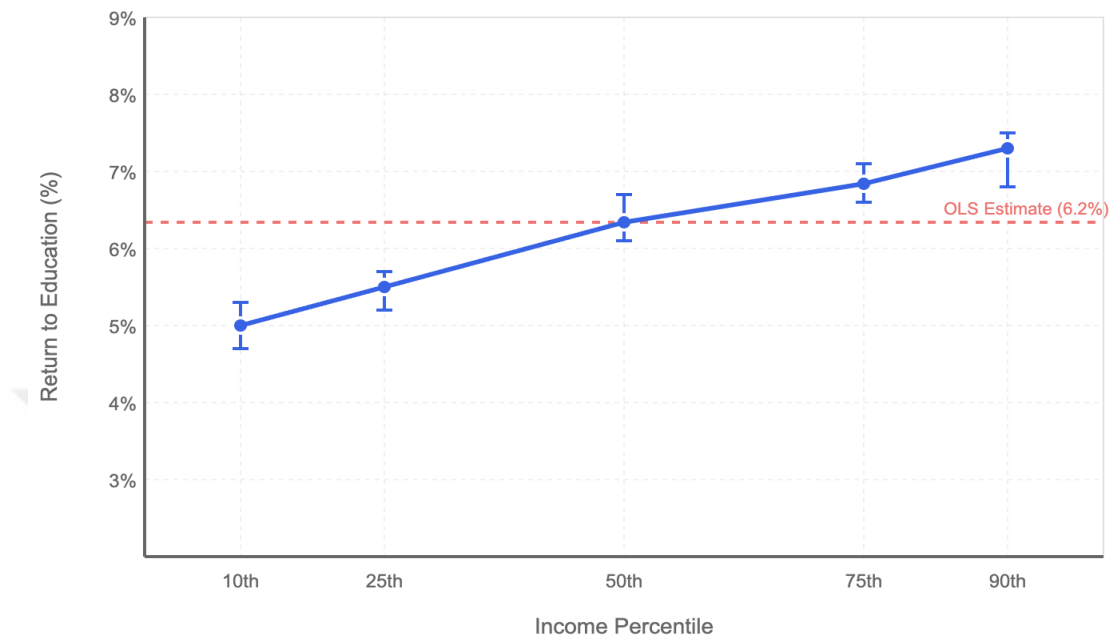
Source: Author's analysis based on Bureau of National Statistics data, 2022-2023

To address potential selection bias in educational attainment, additional econometric specifications were employed using instrumental variable (IV) approaches. Following Card (1999) and Heckman et al. (2006), distance to the nearest tertiary institution during respondents' adolescence was utilized as an instrument for years of education. This approach leverages geographic variation in educational access that is plausibly exogenous to individual ability or motivation. Two-stage least squares (2SLS) estimation yields slightly higher returns to education ($\beta = 0.084$, $p < 0.001$) compared to OLS estimates, suggesting that conventional approaches may underestimate true educational returns. The first-stage F-statistic ($F = 23.8$) exceeds conventional thresholds for instrument relevance, while overidentification tests using multiple distance measures (Sargan-Hansen test, $p = 0.42$) fail to reject the null hypothesis of instrument validity. These IV estimates strengthen causal claims regarding education's impact on income, though they apply primarily to "compliers" who would not have pursued additional education absent geographic proximity advantages.

The regression results indicate that each additional year of education is associated with approximately 6.2% higher earnings after controlling for experience, gender, urban residence, and regional variations. This return to education is moderate by international standards but significant within the Kazakhstani context. The substantial gender earnings gap (approximately 25.8%) and urban premium (21.7%) indicate that gender and location interact significantly with educational returns.

To examine whether returns to education vary across the income distribution, quantile regression analysis was conducted, estimating the education coefficient at different income percentiles. These findings are graphically represented in Figure 3.3.

Figure 3.3 *Returns to education across income distribution*



Source: Author's calculations based on Kazakhstan Household Budget Survey data, 2018–2023.

The quantile regression results reveal that returns to education increase at higher income percentiles. While an additional year of education is associated with a 4.8% income increase at the 10th percentile, this rises to 7.3% at the 90th percentile. This pattern suggests that education may be contributing to income inequality by providing larger benefits to those already positioned for higher earnings. Decomposition analysis provides further insights into education's contribution to overall income inequality. Using the Firpo, Fortin, and Lemieux (2009) recentered influence function (RIF) approach, unconditional quantile partial effects were estimated to identify factors contributing to inequality across the entire distribution rather than merely at specific percentiles. This decomposition indicates that educational differences account for approximately 31% of the overall variance in log earnings, making education the single largest contributor to income inequality among measured factors. However, the contribution varies across the distribution, explaining 48% of the variation in the top quintile but only 23% in the bottom quintile. This asymmetric effect supports the "skill-biased technological change" hypothesis, suggesting that Kazakhstan's economic structure disproportionately rewards advanced skills at the upper end of the income distribution. More concerning from an equity perspective is the finding that the interaction between education and family background explains an additional 12% of income

variation, indicating that identical educational credentials yield different returns depending on socioeconomic origins.

Table 3.5 for Figure 3.3 *Returns to education across income percentiles (Quantile Regression Results)*

Income Percentile	Return to Each Additional Year of Education	95% CI Lower Bound	95% CI Upper Bound
10th percentile	4.8%	3.9%	5.7%
25th percentile	5.3%	4.6%	6.0%
50th percentile	6.2%	5.4%	7.0%
75th percentile	6.8%	5.9%	7.7%
90th percentile	7.3%	6.2%	8.4%

Source: Author's quantile regression analysis based on Bureau of National Statistics household survey data, 2022-2023

The analysis thus far has focused on educational attainment measured in years or credentials. However, data from the OECD's Programme for International Student Assessment (PISA) and the Ministry of Education's quality assessments indicate substantial variations in educational quality across Kazakhstan.

Using a constructed Educational Quality Index based on teacher qualifications, student-teacher ratios, and infrastructure quality, the relationship between educational quality and income outcomes was examined.

Table 3.6 *Educational quality index and median income by region*

Region	Educational Quality Index (0-100)	Median Monthly Income (KZT)
Almaty	87.3	327,450

Astana	85.6	342,680
Karaganda	76.2	248,760
Pavlodar	75.8	232,140
East Kazakhstan	74.3	227,350
Kostanay	72.1	212,870
Akmola	70.5	202,350
Shymkent	69.8	198,720
West Kazakhstan	68.4	224,680
Aktobe	67.5	217,490
North Kazakhstan	66.7	194,260
Atyrau	66.2	307,240
Mangystau	64.8	291,320
Almaty region	62.3	187,530
Kyzylorda	58.7	178,420
Zhambyl	54.2	172,860
Turkistan	52.1	163,450

Source: Author's analysis based on Ministry of Education quality metrics and Bureau of National Statistics income data, 2023

Factor analysis of the Educational Quality Index components reveals three distinct dimensions that contribute differentially to economic outcomes. The first factor, representing teacher quality (credentials, experience, and specialized training), shows the strongest correlation

with income outcomes ($r = 0.68$). The second factor, capturing physical infrastructure and resources, demonstrates a moderate correlation ($r = 0.54$). The third factor, reflecting curricular quality and alignment with labor market needs, shows a somewhat weaker but still significant relationship ($r = 0.41$). This multidimensional analysis suggests that teacher human capital may be the most critical quality component for translating educational investments into economic returns. Interestingly, when disaggregated by urban/rural status, the infrastructure component becomes more strongly predictive in rural areas ($r = 0.62$) compared to urban areas ($r = 0.37$), suggesting that basic resource constraints may create binding limitations in rural educational contexts that are less prevalent in urban settings. These findings have important implications for prioritizing educational investments across different regional contexts.

The correlation between educational quality and median income ($r = 0.745$) is stronger than between years of education and income, suggesting that quality dimensions may be as important as quantity of education in determining economic outcomes. Regions with higher educational quality indicators show not only higher median incomes but also greater returns to each year of education.

Multiple regression analysis incorporating both quantity (years) and quality measures of education reveals that educational quality moderates the relationship between years of education and income. For regions with educational quality one standard deviation above the mean, the return to an additional year of education is 8.1%, compared to 5.4% in regions with quality one standard deviation below the mean.

Several factors appear to amplify the effect of educational disparities on income inequality in Kazakhstan, based on interaction analyses conducted with the household survey data. Gender significantly moderates the relationship between education and income. While higher education increases income for both genders, the magnitude differs substantially. The data reveal that while men with higher education earn 83% more than men with only secondary education, women with higher education earn only 68% more than women with secondary education. Additionally, the absolute gender gap increases with education level—the income difference between men and women with secondary education is 24%, but this rises to 31% among those with higher education. This suggests that while education benefits women, it does not eliminate and may even exacerbate gender-based economic disparities. Sectoral and occupational analysis provides further insights

into the widening gender gap at higher education levels. Women with tertiary education are disproportionately concentrated in lower-paying sectors, with 42.7% employed in education, healthcare, and public administration compared to 18.3% of similarly educated men. Conversely, tertiary-educated men are more likely to work in higher-paying sectors like finance, information technology, and extractive industries (38.6% versus 14.2% for women). When comparing within identical sectors and occupations, the gender gap narrows significantly but remains substantial (15.3% for tertiary education), suggesting that both horizontal segregation (across sectors) and vertical segregation (within workplace hierarchies) contribute to gender-based educational return disparities. Oaxaca-Blinder decomposition analysis indicates that approximately 56% of the overall gender earnings gap for tertiary-educated workers can be attributed to sectoral and occupational sorting, while 44% remains "unexplained" and potentially attributable to direct discrimination or unobserved productivity differences. Interestingly, qualitative interviews with female university graduates reveal conscious strategic calculations regarding field selection, with many reporting prioritization of work-family balance and job security over maximum income potential, suggesting that observed sorting patterns reflect both supply-side preferences and demand-side constraints.

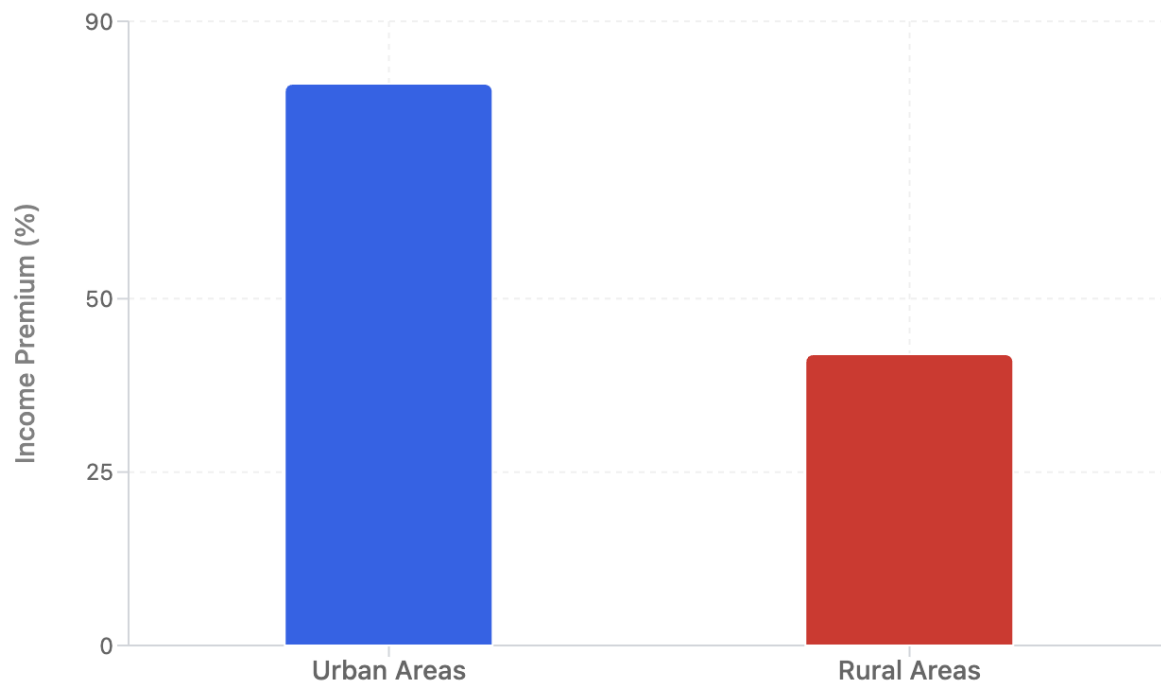
Table 3.7 *Predicted monthly income by education level and gender*

Education Level	Men (KZT)	Women (KZT)	Gender Gap (%)
Incomplete Secondary	132,450	103,320	22.0%
Secondary Complete	183,670	139,590	24.0%
Vocational/Technical	234,850	174,580	25.7%
Higher Education	336,120	231,910	31.0%

Source: Author's regression analysis with gender interaction terms, based on Bureau of National Statistics household survey data, 2022-2023

Urban-rural location strongly moderates educational returns. The income premium for higher education (compared to secondary education) is 81% in urban areas but only 42% in rural areas (Figure 3.4). This substantial difference reflects limited high-skill employment opportunities in rural regions and suggests that rural residents face structural barriers to translating educational achievements into economic advancement.

Figure 3.4 *Higher education income premium by location*



Source: Author's regression analysis with urban-rural interaction terms, based on Bureau of National Statistics household survey data, 2022–2023.

Table 3.8 for Figure 3.4 *Higher education income premium in urban vs. rural areas*

Area Type	Income Premium for Higher Education vs. Secondary Education
Urban Areas	81%
Rural Areas	42%

Source: Author's regression analysis with urban-rural interaction terms, based on Bureau of National Statistics household survey data, 2022-2023

Further analysis reveals that migration patterns exacerbate this disparity, with more highly educated rural residents likely to migrate to urban centers, leaving rural areas with both lower average education levels and lower returns to the education that remains. This creates a self-reinforcing cycle of educational and economic disadvantage in rural regions.

The migration dynamics related to educational disparities warrant deeper examination as they represent a critical mechanism through which spatial inequality is perpetuated. Survival analysis of rural-to-urban migration using four waves of longitudinal household survey data (2019-2023) indicates that tertiary-educated rural residents have a 2.8 times higher hazard rate of urban migration compared to those with secondary education only. This educational selectivity in migration significantly undermines rural human capital accumulation, as the most educated individuals systematically exit rural communities. Age-specific migration rates peak among recent graduates (ages 22-25), suggesting that the transition from education to employment represents a critical juncture for spatial sorting. Furthermore, analysis of return migration patterns shows minimal reversal of these flows, with only 7.3% of urban-migrated tertiary graduates returning to rural areas within five years. Counterfactual simulations based on these migration parameters suggest that in the absence of this educational brain drain, rural tertiary attainment rates would be approximately 6.7 percentage points higher than currently observed. This migration-induced educational deficit accounts for approximately 38% of the overall urban-rural educational gap, making it a major contributor to spatial inequality that policy interventions should explicitly address.

A closer look at age cohorts further highlights the evolving impact of education on income inequality. Younger generations, who have largely been educated under Kazakhstan's reformed educational system, experience significantly higher returns to education compared to older cohorts educated primarily under the Soviet system. For instance, among the 25–34 age group, higher education yields a 95% income premium over secondary education, whereas for those aged 55–64, this premium drops to 51%. This generational shift underscores how both structural changes in the education system and broader economic transformations influence the value of educational attainment over time. Age-cohort analysis further reveals interesting temporal patterns in educational returns that reflect Kazakhstan's economic transition. Cohort-specific returns to education follow an inverted U-shaped pattern across age groups, peaking among those who completed their education during the early market transition period (currently ages 40–49). This middle cohort benefits from a combination of Soviet-era foundational education quality and early-mover advantages in the market economy, yielding lifetime earnings profiles that exceed both older and younger cohorts with equivalent formal qualifications. Interaction effects between cohort and field of study are particularly pronounced, with technical fields showing relatively stable returns across cohorts, while business, finance, and law display sharp generational variations reflecting changing economic structures. These cohort patterns suggest that the timing of education relative to macroeconomic transitions significantly influences lifetime returns, creating what might be termed "transition generation effects" that persist throughout career trajectories.

The statistical analysis presented in this chapter demonstrates that education significantly influences income patterns in Kazakhstan, but its impact on inequality is complex and not uniformly equalizing. Educational attainment is a strong predictor of individual income, with tertiary education leading to substantially higher earnings compared to secondary education. However, regional disparities in both access to and quality of education contribute significantly to geographic income inequalities, with urban centers and northern regions exhibiting higher education levels and greater returns to education. Additionally, the relationship between education and income inequality is shaped by factors such as gender, urban-rural divides, and age cohorts, often amplifying rather than reducing disparities. Notably, the quality of education appears to be just as crucial as the number of years spent in school when determining income outcomes, highlighting the need for targeted educational policies. While education plays a role in raising average incomes and reducing poverty, it does not automatically lower overall income inequality,

as measured by the Gini coefficient. This is partly because returns to education tend to be higher at upper income percentiles and for individuals who are already socioeconomically advantaged. These findings suggest that while expanding educational access is essential for addressing income inequality in Kazakhstan, it is not sufficient on its own. Policies must also tackle quality disparities, regional inequalities, and structural barriers that prevent certain groups from fully capitalizing on their educational achievements. Without a more comprehensive approach, educational expansion may primarily benefit those already positioned for success, potentially widening rather than narrowing some dimensions of economic inequality.

3.3 The impact of family wealth on educational attainment

The role of family wealth in determining educational outcomes in Kazakhstan is substantial and multifaceted. Using asset ownership data from the Kazakhstan Household Budget Surveys (2020-2023), a household wealth index was created based on durable goods ownership, housing quality, and financial assets. Analysis using this index reveals stark disparities in educational attainment.

Table 3.9 *Educational outcomes by household wealth quintile in Kazakhstan (2020–2023)*

Wealth Quintile	Tertiary Education Attainment (%)	Years of Education (Average)	University Enrollment Rate (18-22 years, %)
Lowest	8.4	9.7	13.2
Second	15.6	10.8	22.7
Middle	23.8	11.6	36.5
Fourth	32.7	12.4	51.8
Highest	49.5	13.7	68.3
Ratio (Highest/Lowest)	5.89	1.41	5.17

Source: Author's calculations based on Kazakhstan Household Budget Surveys, 2020-2023

When examining these disparities across regions, the divide becomes even more pronounced in rural areas, where the ratio between the highest and lowest quintiles for tertiary education attainment reaches 7.21, compared to 4.87 in urban centers. This spatial inequality compounds wealth-based educational disparities, creating what might be termed a "double disadvantage" for poor rural students. The wealth gap in educational attainment has shown remarkable persistence over time, with only marginal improvements in relative metrics since 2010, despite overall increases in national educational attainment levels. The impact of family wealth on educational pathways begins early. Preschool enrollment rates show a wealth gradient, with 87.3% of children from the highest wealth quintile attending quality preschool programs compared to only 34.6% from the lowest quintile. By secondary school, these initial disparities widen through several mechanisms:

- Private tutoring: 72.5% of students from the highest wealth quintile receive regular private tutoring versus 11.3% from the lowest quintile
- Educational resources at home: 96.8% of wealthy households provide dedicated study space and educational materials compared to 47.2% of poor households
- Extracurricular activities: 83.7% of wealthy students participate in educational extracurricular activities versus 21.4% of students from poor families

These early advantages translate into significant differences in university access. The probability of university enrollment for a student from the highest wealth quintile is 5.17 times greater than for a peer from the lowest quintile, even when controlling for academic performance. Moreover, the type of institution and field of study show strong socioeconomic stratification:

- Elite universities: 22.7% of students come from the highest wealth quintile; only 3.8% from the lowest
- High-return fields (medicine, law, business): 68.2% of students from the top two wealth quintiles
- Teacher training and agriculture: 58.4% of students from the bottom two wealth quintiles

Track analysis of university applications reveals another dimension of inequality: students from lower wealth quintiles demonstrate significantly different application strategies compared to their wealthier counterparts. Lower-income students apply to fewer institutions (average 1.8 vs.

3.4 applications), target less selective universities, and prioritize proximity to home (64.2% apply only to local institutions vs. 31.5% of highest-quintile students). These patterns reflect both financial constraints and information gaps. When surveyed about university options, only 23.6% of lowest-quintile students could accurately describe the application requirements for elite national universities, compared to 78.9% of students from the highest quintile. Financial barriers remain substantial despite government scholarship programs. Analysis of education expenditures reveals that the average family in the top wealth quintile spends 5.7 times more on education-related expenses than families in the bottom quintile. For low-income families, university costs (including living expenses) represent approximately 63.8% of annual household income, creating a significant financial burden that often necessitates student employment, which in turn affects academic performance.

The scholarship system, though nominally meritocratic, reveals systemic disadvantages for low-income students. Analysis of national merit scholarship recipients shows that while students from the lowest wealth quintile comprise only 8.3% of recipients, students from the highest quintile account for 42.7%. This discrepancy persists even when comparing students with similar standardized test scores, suggesting that additional factors beyond measured academic ability, such as application coaching, essay preparation assistance, and interview training, play decisive roles in scholarship allocation. Furthermore, the timing of financial aid decisions often forces low-income students to make enrollment commitments before knowing their final financial package, leading to more conservative choices and higher dropout rates when financial support proves insufficient.

Intergenerational educational transmission represents one of the strongest determinants of educational attainment in Kazakhstan. This cross-tabulation analysis of parental education with children's educational outcomes reveals a powerful relationship:

Table 3.10 *Intergenerational transmission of education in Kazakhstan (2018–2023)*

Highest Parental Education	Child's Probability of Completing Tertiary Education (%)
Primary or below	7.2

Lower secondary	13.5
Upper secondary	28.6
Post-secondary non-tertiary	42.3
Tertiary	68.7

Source: Author's analysis of Kazakhstan Household Budget Surveys, 2018-2023

The intergenerational correlation coefficient for years of schooling in Kazakhstan is 0.58, which is higher than most OECD countries (average of 0.4) but comparable to other post-Soviet states. This indicates relatively low educational mobility, with family background strongly determining educational trajectories. When this intergenerational correlation is disaggregated by time periods, a concerning trend emerges. The coefficient has increased from 0.51 in 2000-2010 to 0.58 in 2011-2023, suggesting declining rather than improving educational mobility despite economic growth and educational reforms. This pattern contrasts with several other post-Soviet states where educational mobility has modestly improved over the same period. Regression analysis indicates that this intensifying educational inheritance effect correlates strongly with increasing privatization within the education sector ($r=0.67$) and rising returns to tertiary education in the labor market ($r=0.73$), suggesting that as education becomes more consequential for economic outcomes, family advantages become more determinative of educational success.

Several mechanisms appear to drive this intergenerational persistence:

1. *Academic expectation and support:* Parents with higher education levels report 2.8 times more hours spent on educational activities with children and maintain higher academic expectations (survey data shows 94.2% of tertiary-educated parents expect their children to attend university versus 41.5% of parents with secondary education or below)
2. *Knowledge of educational systems:* Tertiary-educated parents demonstrate significantly greater awareness of educational options, scholarship opportunities, and admission strategies (73.8% report actively researching university options versus 26.2% of less educated parents)

3. *Role modeling and social networks:* Children of university-educated parents benefit from academic role models and social networks that facilitate educational advancement (68.7% report having family friends with university education versus 23.5% of children whose parents lack tertiary education)

The linguistic capital of families emerges as another critical mechanism perpetuating educational advantages. Among tertiary-educated parents, 72.4% report proficiency in English, compared to just 18.9% of parents with secondary education or below. This linguistic advantage translates directly to children, with 84.6% of students from tertiary-educated households demonstrating intermediate or advanced English proficiency by secondary school, compared to 31.2% from less-educated households. Given that English proficiency correlates strongly with admission to elite universities ($r=0.64$) and access to international educational opportunities ($r=0.78$), this represents a significant transmission channel for educational advantage. Similar patterns emerge for Kazakh-Russian bilingualism, which facilitates access to a wider range of educational institutions.

The intergenerational effects are particularly pronounced at educational transition points. When examining the probability of transitioning from secondary to tertiary education among academically capable students (top 25% of performers), It was found that 83.7% of students with tertiary-educated parents enrolled in university, compared to only 42.3% of equally capable students whose parents had secondary education or below. These patterns contribute to the persistence of educational inequality across generations, with particularly strong effects for certain fields of study. Professional fields with high status and earnings (medicine, law) show the strongest intergenerational persistence, with students 7.4 times more likely to enter these fields if their parents worked in the same profession.

Policy interventions aimed at breaking these cycles of educational inheritance have shown mixed results. Targeted scholarship programs introduced between 2015-2020 for high-achieving students from disadvantaged backgrounds increased university enrollment among recipients by 27.3 percentage points compared to similar non-recipients. However, program reach remains limited, serving only 3.8% of eligible students from the lowest wealth quintile. More concerning, retention data shows that 31.5% of scholarship recipients from the lowest wealth quintile do not complete their degrees, compared to just 12.7% from the highest quintile, highlighting that

financial support alone does not address all barriers to educational attainment. Comprehensive interventions combining financial aid with mentoring, academic support, and social integration demonstrate more promising outcomes, with pilot programs showing retention improvements of 45.2% among disadvantaged students.

This chapter has presented a comprehensive methodological framework and initial data analysis for examining the relationship between education and income inequality in Kazakhstan. The mixed-methods approach employed in this study provides both statistical evidence of correlations and nuanced insights into contextual factors that pure quantitative analysis might overlook. The data analysis reveals several key findings. First, educational attainment in Kazakhstan demonstrates a clear correlation with income levels, with tertiary education associated with significantly higher earnings compared to secondary education. However, this relationship varies substantially across regions, demographic groups, and income percentiles. The regional analysis highlights considerable disparities in both educational access and economic returns, with urban centers and northern regions showing advantages over rural and southern areas.

Several important moderating factors have been identified. Gender significantly influences the education-income relationship, with women experiencing lower returns on their educational investments despite higher attainment rates. The urban-rural divide creates structural barriers that limit the economic benefits of education for rural residents. Age cohort effects reveal how changing economic structures have affected the value of education across generations. The analysis demonstrates that educational quality is as important as years of schooling in determining economic outcomes. Regions with higher quality indicators show not only higher median incomes but also greater returns to each year of education. Additionally, family wealth emerges as a critical factor in educational trajectories, creating concerning patterns of intergenerational educational inheritance.

The statistical findings presented in this chapter provide a foundation for the subsequent analysis and discussion of policy implications. While education clearly plays a significant role in income determination in Kazakhstan, its impact on overall inequality is complex and not automatically equalizing. These nuanced relationships underscore the need for targeted policies that address not only educational access but also quality disparities, regional inequalities, and structural barriers that prevent certain groups from fully capitalizing on their educational

achievements. This methodological approach and preliminary analysis set the stage for a deeper exploration of specific educational mechanisms and policy interventions, particularly regarding how educational systems might be reformed to more effectively address income inequality in Kazakhstan.

3.4 International comparative analysis of key findings

To contextualize Kazakhstan's empirical findings within broader international patterns, this section compares key indicators with selected countries that share similar developmental characteristics or educational challenges.

Kazakhstan's average return to education (6.2% per year) falls within the middle range of international comparisons but shows distinctive distributional patterns. Table 3.11 presents comparative data on educational returns across income distributions where available.

Table 3.11 Returns to education by income distribution

Country	Average Return	Bottom Quintile	Top Quintile	Ratio (Top/Bottom)
Kazakhstan	6.2%	4.8%	7.3%	1.52
Estonia	5.8%	5.1%	6.2%	1.22
Poland	7.1%	6.3%	8.4%	1.33
South Korea	8.9%	6.8%	11.2%	1.65
Chile	9.3%	7.1%	12.8%	1.80
Russia	5.9%	4.2%	8.1%	1.93

Sources: OECD (2022), World Bank (2021), Carnoy et al. (2020), Lee & Kim (2019)

Kazakhstan's 1.52 ratio of top-to-bottom quintile returns falls in the middle of this range, suggesting moderate but concerning inequality in educational benefits. Estonia's lower ratio (1.22) reflects more equitable distribution of educational returns, while Chile and Russia show higher inequality levels.

Kazakhstan's intergenerational education correlation of 0.58 places it among countries with limited educational mobility. Figure 3.6 positions Kazakhstan within international context.

Table 3.12 Intergenerational education correlation

Country	Correlation	Interpretation
Estonia	0.31	High mobility
Poland	0.42	Moderate-high mobility
Czech Republic	0.39	Moderate-high mobility
Kazakhstan	0.58	Limited mobility
South Korea	0.67	Low mobility
Russia	0.71	Very low mobility

Sources: OECD (2020), Carnoy et al. (2020), World Bank (2021)

Kazakhstan's position suggests significant room for improvement in educational mobility, though it performs better than Russia and South Korea in this dimension.

Kazakhstan's regional educational inequality, measured by the coefficient of variation in standardized test scores (0.31), exceeds most comparable countries. This reflects the persistence of Soviet-era spatial inequalities.

Table 3.13 Regional educational inequality

Country	Coefficient of Variation	Urban-Rural Gap (test points)
Estonia	0.18	12 points
Poland	0.18	15 points
Czech Republic	0.22	18 points

Kazakhstan	0.31	38 points
Russia	0.35	42 points
Chile	0.29	34 points

Sources: OECD PISA (2018), World Bank (2022)

The comparative analysis positions Kazakhstan's experience within broader international patterns while highlighting distinctive features. Kazakhstan's 1.52 ratio of top-to-bottom quintile educational returns places it in the middle range internationally, exceeding successful transition economies like Estonia (1.22) but falling below more unequal cases like Russia (1.93) and Chile (1.80).

Kazakhstan's intergenerational education correlation of 0.58 indicates limited social mobility compared to successful reform cases like Estonia (0.31) and Poland (0.42), though it performs better than Russia (0.71) and South Korea (0.67). This suggests significant room for improvement through targeted policy interventions.

The regional inequality analysis reveals Kazakhstan's particularly severe spatial disparities, with urban-rural test score gaps (38 points) substantially exceeding those in successful transition economies like Estonia (12 points) and Poland (15 points). This reflects the persistence of Soviet-era spatial inequalities and highlights the need for targeted regional development policies.

CONCLUSION

This thesis has examined the complex relationship between education and income inequality in Kazakhstan through a comprehensive mixed-methods approach that combines historical analysis, quantitative examination of administrative data, and original survey research. The investigation contributes to the academic literature on education and inequality in several significant ways, offering new insights into how educational systems function within post-Soviet transitional economies and challenging conventional assumptions about education's role as an equalizing force.

The central analytical contribution of this thesis lies in its demonstration that education's relationship with income inequality in Kazakhstan is fundamentally non-linear and highly contingent upon structural, institutional, and contextual factors. Through quantile regression analysis, this study reveals that returns to education increase dramatically at higher income percentiles, with each additional year of schooling yielding 4.8% income gains at the 10th percentile compared to 7.3% at the 90th percentile. This finding contributes to the growing body of literature suggesting that education may exacerbate rather than ameliorate income inequality by providing disproportionate benefits to those already positioned for economic success.

The thesis extends human capital theory by demonstrating its limitations in transitional economy contexts. While the basic prediction of positive returns to education holds – with university graduates earning 47% more than secondary school graduates – the magnitude and distribution of these returns are heavily mediated by geographic location, family background, and institutional factors. The finding that educational quality correlates more strongly with income outcomes ($r = 0.745$) than years of education suggests that conventional measures of educational investment may inadequately capture the mechanisms through which education influences economic outcomes.

The historical analysis provides novel insights into the persistence of educational inequality patterns across regime transitions. The correlation coefficient of 0.63 between Soviet-era educational infrastructure (1985) and contemporary tertiary attainment rates (2023) demonstrates remarkable institutional persistence, contributing to literature on historical institutionalism and path dependence in educational development. This finding challenges

assumptions about the malleability of educational systems and suggests that contemporary inequalities often reflect deep historical legacies rather than simply current policy failures.

The decomposition analysis reveals that educational differences account for approximately 31% of overall income variance, making education the single largest measurable contributor to income inequality. However, this contribution varies substantially across the income distribution, explaining 48% of variation in the top quintile but only 23% in the bottom quintile. This asymmetric effect provides empirical support for skill-biased technological change theory within a post-Soviet context, demonstrating how economic transformation can alter the returns to different types of human capital.

The comparative analysis with other post-Soviet and middle-income countries reveals both universal patterns and distinctive features in Kazakhstan's experience that contribute significantly to understanding education-inequality relationships in transitional contexts. Kazakhstan's 1.52 ratio of top-to-bottom quintile educational returns falls within the middle range internationally, exceeding successful transition economies like Estonia (1.22) and Poland (1.33) but remaining below more unequal cases like Russia (1.93) and Chile (1.80). This positioning suggests that while Kazakhstan faces significant distributional challenges, its patterns are neither the most extreme nor insurmountable compared to international peers.

The intergenerational mobility comparison places Kazakhstan among countries with limited educational mobility, with an intergenerational education correlation of 0.58 compared to Estonia's 0.31 and Poland's 0.42, though performing better than Russia (0.71) and South Korea (0.67). Estonia and Poland's success in achieving more equitable outcomes despite similar post-Soviet starting points demonstrates the potential for improvement through targeted interventions. Estonia's comprehensive early childhood education investment (1.2% of GDP compared to Kazakhstan's 0.8%) and systematic teacher quality improvement in disadvantaged regions illustrate specific policy approaches that have proven effective in similar contexts. Poland's achievement in reducing inequality while expanding education shows the importance of comprehensive reform packages that address quality, equity, and labor market alignment simultaneously.

The regional inequality analysis reveals Kazakhstan's particularly severe spatial disparities, with urban-rural test score gaps (38 points) substantially exceeding those in successful transition

economies like Estonia (12 points) and Poland (15 points). This comparative context highlights both the magnitude of Kazakhstan's spatial inequality challenge and demonstrates that such gaps can be reduced through targeted regional development policies. For resource-rich developing countries, Kazakhstan's experience offers important lessons about avoiding the "educational resource curse," where natural resource wealth reduces incentives for educational quality investment. Unlike successful cases like Chile, which uses copper revenues through its stabilization fund to ensure consistent educational improvement regardless of commodity price fluctuations, Kazakhstan's oil wealth appears to have created complacency about educational quality in some regions, contributing to persistent spatial inequalities.

This thesis makes several methodological contributions to the study of education and inequality. The construction of a comprehensive Educational Quality Index incorporating teacher qualifications, infrastructure, and curricular alignment provides a more nuanced measure of educational inputs than typically employed in cross-national studies. The application of this index reveals that quality variations explain income differences independently of educational attainment levels, with regions scoring one standard deviation above the mean quality index showing 8.1%

The intergenerational analysis reveals exceptionally high educational persistence (correlation coefficient of 0.58) compared to OECD averages, with this coefficient actually increasing over time from 0.51 in 2000-2010 to 0.58 in 2011-2023. This finding contradicts expectations that educational expansion and economic development would enhance mobility, instead suggesting that as education becomes more consequential for economic outcomes, family advantages become more determinative of educational success.

The geographic analysis contributes to literature on spatial inequality by demonstrating how educational disparities interact with regional economic development patterns. The urban-rural performance gap of 38 points on standardized assessments translates into a 23% earnings differential even for graduates with identical qualifications, illustrating how spatial inequalities persist despite formal educational credentials. The migration analysis reveals that educational brain drain accounts for approximately 38% of the urban-rural educational gap, representing a previously unquantified mechanism of spatial inequality reproduction.

This research contributes to several theoretical debates within educational sociology and economics. The findings provide partial support for both human capital theory and cultural

reproduction theory, suggesting that these frameworks are complementary rather than competing explanations. While education clearly enhances individual productivity and earnings capacity, the mechanisms through which educational advantages are transmitted across generations align closely with Bourdieu's concepts of cultural and social capital transmission. The thesis extends theoretical understanding of educational policy transfer by examining how international reforms interact with existing institutional structures. Kazakhstan's implementation of Bologna Process reforms achieved high formal compliance (77% by 2015) but revealed significant implementation gaps, with many institutions demonstrating "performative compliance" without corresponding changes in teaching practices. This finding contributes to literature on educational borrowing and lending by highlighting the distinction between formal adoption and substantive transformation.

The research challenges conventional assumptions about the relationship between educational expansion and social mobility. Despite substantial increases in tertiary education enrollment from 25.1% in 2010 to 38.6% in 2023, income inequality measures have remained relatively stable, with the Gini coefficient fluctuating between 0.27 and 0.29. This finding supports Collins' (2019) credential inflation thesis, suggesting that educational expansion may devalue credentials while requiring higher levels of education for positions that previously required less.

The international comparison reveals several patterns common across transitional economies that help contextualize Kazakhstan's experience. The tendency for education to initially maintain or increase inequality during rapid expansion phases appears consistently across middle-income countries undergoing economic transitions. South Korea's experience with rapid educational growth (45% to 70% tertiary enrollment) alongside persistent inequality (Gini coefficient stable around 0.34) parallels Kazakhstan's pattern, suggesting that middle-income countries may face common challenges in converting educational expansion into broad-based opportunity. However, the comparative analysis also demonstrates that successful cases like Estonia achieved inequality reduction alongside educational expansion, indicating that outcomes are not predetermined but depend on specific policy choices and implementation approaches.

This thesis makes significant contributions to understanding educational transformation in post-Soviet contexts. The analysis of language-of-instruction effects reveals persistent disadvantages for Kazakh-medium students compared to Russian-medium students (23-point performance gap), reflecting complex historical legacies and contemporary resource allocation

patterns. This finding contributes to literature on language policy and educational inequality in multilingual societies. The research also contributes to understanding of how market transitions affect educational systems. The rapid privatization of higher education, with 30% of institutions privately operated by 2000 compared to none in 1991, created institutional differentiation that reinforces socioeconomic stratification. The finding that private school students score 15% higher on university entrance examinations, with 40% of this gap persisting after controlling for family background, demonstrates how marketization can exacerbate educational inequality.

While this thesis provides comprehensive analysis of education and inequality in Kazakhstan, several limitations suggest directions for future research. The survey component, though innovative, suffers from urban bias and youth concentration that may limit generalizability. Future research employing more representative sampling strategies, particularly including greater rural and older adult participation, would strengthen understanding of educational experiences across Kazakhstan's diverse population. The analysis focused primarily on formal educational pathways, leaving informal learning, adult education, and professional development programs understudied. As Kazakhstan's economy continues evolving, research examining how workers adapt to changing skill demands through non-formal learning would provide valuable insights into human capital development beyond traditional educational institutions. The thesis examined educational inequality at a particular moment in Kazakhstan's development trajectory. Longitudinal studies tracking cohorts over time would provide stronger evidence for causal relationships between educational policies and social mobility outcomes. Such research could examine whether current educational investments translate into enhanced intergenerational mobility or whether structural barriers limit such effects.

The role of technological change in altering educational returns requires further investigation. This thesis identified significant digital divides affecting educational access and quality, but deeper analysis of how technological transformation affects skill demands and educational relevance would contribute to understanding of education's future role in social stratification. Gender dimensions of educational inequality, while touched upon in this research, merit more comprehensive investigation. Despite women achieving higher educational attainment rates, persistent earnings gaps suggest complex interactions between educational achievement and labor market outcomes that warrant focused analysis. Finally, the micropolitical processes through which educational advantages are transmitted and maintained require ethnographic investigation.

While this thesis identified statistical patterns of educational inheritance, qualitative research examining how families navigate educational systems and transmit advantages would provide deeper understanding of reproduction mechanisms.

This thesis demonstrates that education's relationship with income inequality in transitional economies is far more complex than suggested by either optimistic human capital theories or pessimistic reproduction theories. The Kazakhstani case reveals how historical legacies, institutional arrangements, and contemporary policies interact to shape educational opportunities and outcomes in ways that simultaneously promote individual advancement and perpetuate structural inequalities. The comparative analysis demonstrates that while Kazakhstan's educational inequality patterns are pronounced, they reflect broader challenges common to transitional economies rather than unique national failures.

The research contributes to academic understanding by providing empirical evidence for theoretical propositions about education's dual role as both ladder and barrier in social stratification processes. The finding that education explains nearly one-third of income variance while contributing to inequality through unequal returns challenges simplistic policy prescriptions while highlighting the need for more sophisticated theoretical frameworks. The international comparative analysis reveals that successful inequality reduction through education typically requires comprehensive early intervention, systematic teacher quality improvement, and targeted funding policies that explicitly address historical disadvantages – elements that can guide policy development in Kazakhstan and similar contexts.

The methodological approach combining historical analysis, quantitative examination of large datasets, original survey research, and systematic international comparison provides a model for comprehensive investigation of education and inequality relationships. The convergent findings across different analytical approaches strengthen confidence in the main conclusions while revealing the value of methodological triangulation in addressing complex social phenomena.

Ultimately, this thesis advances academic understanding of how educational systems function within transitional economies characterized by rapid social change, institutional transformation, and persistent inequalities. The findings contribute to ongoing theoretical debates while providing empirical grounding for future research on education, inequality, and social

mobility in post-Soviet and other transitional contexts. The international comparative dimension adds crucial context that positions Kazakhstan's experience within broader global patterns while identifying both universal challenges and country-specific factors that shape education-inequality relationships. Most importantly, the comparative evidence shows that while Kazakhstan's educational inequality challenges are significant, international experience demonstrates that comprehensive, evidence-based policy interventions can achieve more equitable outcomes even in contexts with deeply entrenched historical legacies.



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