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The impact of population migration on public educational resource allocation between urban and rural areas

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Abstract. The allocation of public educational resources between urban and rural areas is one of the major topics in education research and is largely influenced by population shifts. Therefore, this study systematically reviews the burdens on urban educational resources, the impact on rural education, and the effects of two-way migration between urban and rural areas and illustrates the impact of population migration on urban-rural public educational resource allocation. To address these problems, this study proposes an optimization path that links population and resources with the utilization of big data. It also points out that it is necessary to promote the coordinated urban-rural development strategy, advance school consortium models, and drive the progress of rural schools by leveraging urban school resources. Government departments should increase fiscal transfer payments, gradually deepen the household registration reform, and ease restrictions on migrant children taking high school and college entrance exams in their places of residence. Aimed to promote education equality and improve education quality and effectiveness, this study proposes relevant suggestions.

Keywords: population migration, educational resource allocation between urban and rural areas, optimization path.

1. Introduction

As China sails on the new journey of building a modern socialist country in all respects, it is essential to advance the modernization of the national governance system and governance capacity. Balancing the allocation of public educational resources between urban and rural areas is not only a core issue of education equality but the demonstration of governance capacity of a country. The accessibility and quality of educational are directly associated with equal opportunities across society. However, the persistent urban-rural education gap and the intergenerational transmission of capability poverty will further exacerbate social inequality. Among them, population migration is a key variable of educational resource allocation. The demand for education and the selection of education services drives the supply and distribution of educational resources. Therefore, it is of great significance to promote the coordination between population shift and educational resources, thereby achieving the equal allocation of educational resources. As 2024 marks a pivotal year for building China into a leading country in education, population shift, and the optimization of educational resource allocation have emerged as one of the top ten frontier topics in education research. China has proposed adjusting the regional allocation of educational resources in alignment with population dynamics and building a basic public education service system that corresponds to these changes. This policy direction reflects the profound, systemic challenges that population structure shifts pose to the overall allocation of educational resources.

As the modernization of education advances in recent years, multiple research has been carried out on public educational resources in urban and rural areas and population shifts. Current research focuses more on the education gap between urban and rural areas, the supply-demand imbalance in regional educational resources, and the optimization path for educational resource allocation. In terms of the education gap between urban and rural areas, a longitudinal study reveals that between 1995 and 2014, the urban-rural education gap did not follow the expected Kuznets inverted U-shaped convergence [1]. Instead, it continued to widen due to the unidirectional and elitist nature of population migration, a phenomenon revealing the complex interplay between urbanization and the allocation of educational resources [1]. An empirical study based on provincial panel data indicates that between 2003 and 2019, the index that measures urban-rural education inequality decreased by 0.39, which is mainly attributed to population migration and household registration system reform jointly driven by industrialization and urbanization [2]. Some scholars, from a predictive perspective, drew on data from the Seventh National Population and the results show that the number of students enrolled in compulsory education exhibits a declining trend and there is a significant disparity between

urban and rural areas [3]. In addition, the trend of population shift demonstrates that from 2023 to 2035, the main changes in the demand for compulsory education resources will lie in teacher allocation, funding investment, and school buildings [3].

In terms of the supply-demand imbalance in regional educational resources, a study reveals the differentiated impact of school-age population shifts on public education services across regions [4]. This study argues that in areas with population growth, the main contradiction is the tension between school seats supply and fiscal investment, while in areas with population decline, the core issues lie in resource reallocation and quality improvement [4]. Some scholars also analyze the supply level of educational resources in the southwest region of China and find that altitude, population density, local fiscal revenue, and per capita income of rural residents are positively correlated with the supply level of educational resources, while the proportion of ethnic minority population and urbanization rate produce negative impact on the supply of educational resources [5]. This indicates that the supply-demand imbalance of educational resources in the southwest region of China is influenced by natural geographical conditions and socio-economic factors [5].

In terms of the optimization path of educational resource allocation, an empirical study takes Sichuan Province as an example, argues that the allocation of educational resources at the county level must fully take into account population mobility during the urbanization process, and proposes to establish a dynamic adjustment mechanism for educational resources [6]. It is also found that the integrated online-offline education model, leveraging the capabilities of information and communications technology (ICT) in resource delivery, can transfer quality resources of developed regions into less developed regions [7]. This has significantly improved the high school graduation rate in less developed regions and further promotes education balance [7]. Some scholars note that educational resources in urban and rural areas can be optimized through policy prioritization, technology empowerment, cooperation with social forces, and other measures, and community engagement should be continuously strengthened to achieve education equality [8].

Overall, substantial research has explored the relationship between population migration and the allocation of urban-rural public educational resources. However, some problems remain unresolved at this stage. A number of studies focus on specific provinces or cities and lack systematic analysis of the overall condition of urban-rural public educational resource allocation across China. They remain insufficient in fully capturing general patterns, and the perspectives tend to be fragmented. To fill this gap, this study systemically organizes the impact of population migration on the allocation of public educational resources in urban and rural areas.

2. The impact of population migration on urban-rural educational resources

2.1. Pressure on urban educational resources

Population migration leads to a shortage of school seats. The continuous population migration poses significant challenges to urban educational resources. Among these challenges, the problem of school seats shortage stands prominent. A large number of migrant workers' children have moved into cities, causing a sharp increase in the demand for school enrollment, but the supply of educational resources has struggled to keep pace. As the first special economic zone (SEZ) in China, Shenzhen has attracted massive migrant workers, whose children have long been a focus of attention. In 2014, Shenzhen fully implemented the points-based enrollment policy for public schools. Under this policy, a unified points system is applied to both children with Shenzhen household registration and those without it but who meet the eligibility criteria. Only those whose scores reach a certain threshold are granted school seats. It guarantees children's legitimate rights to education and promotes education equality. Nevertheless, it reflects the scarcity of school seats. The intense competition among children without Shenzhen household registration has forced many families to choose private schools or send their children to schools in their place of household registration. This often results in both the increased family's financial burden and the child's psychological burden.

Population migration places burdens on teachers. Population migration has led to the continuous expansion of class sizes in urban schools, making the phenomenon of oversized classes widespread. According to regulations set by the Shanghai Education Reform Commission, primary school classes should not exceed 45 students and middle school classes should not exceed 50. However, in practice, some regions still exceed these limits. For example, in a primary school in Shanghai, it is common to see classes with more than 50 students. Oversized classes not only increase teachers' workload but also affect teaching effectiveness since it is difficult for teachers to give individual attention to each student's learning. The increased number of students means that teachers need to spend more time on class management, homework grading, and communication with school and parents. It prevents teachers from making personalized guidance and increases the rate of teacher burnout to some extent.

As the scale of urban education extends, the dilution of educational resources has become a serious issue. The quality of urban education decreases due to the extension of urban education and the lack of qualified teachers at newly established branch schools is a typical example. To cope with the pressure of school seats shortage, many cities are actively establishing new branch schools. However, these schools often face a shortage of qualified teachers. Due to the lack of experienced faculty, the quality of education at new branch schools often falls short of that at the main campus.

2.2. The impact on rural educational resources

Population migration forces the closure and consolidation of certain schools. In some rural areas, the population outflow and declining student enrollment have resulted in a student shortage in certain schools. To optimize the allocation of educational resources and prevent the phenomenon of empty schools, some local governments closed and consolidated schools. For example, in certain countries of Gansu Province, due to the shift of young laborers towards cities, the number of students in rural schools dropped sharply and it is difficult to maintain basic education activities at some remote teaching sites. "Single teacher" teaching sites began to emerge. Subsequently, those teaching sites were closed by local governments, and students were transferred to nearby central schools. This, to some extent, integrates educational resources and enhances their utilization. However, this measure has also brought about many new problems: students in remote areas face longer commutes to school, increasing transportation risks; some families struggle to afford the additional travel costs due to the greater distance, making it difficult for their children to attend school; consolidated schooling has also led to oversized classes, which compromises teaching quality and adds pressure to school management.

Population migration results in idle resources. One of the specific demonstrations of idle resources is the vacant rural school buildings. With the sharp decline in student numbers and the closure and consolidation of schools, a significant portion of school buildings and teaching facilities become obsolete and unused. For example, in Cuijiazhuang Village, Xin'an County, Henan Province, many school buildings were left unused due to the closure and consolidation of schools. Although the local government has transformed them into nursing homes for the revitalization of idle educational resources, it shows the mismatch between educational resources and actual demands. A population return or a rebound in educational demand could pose challenges to restoring school buildings to their original functions. This highlights the importance of establishing a dynamic adjustment mechanism for educational resources.

The loss of teaching staff presents a major challenge for rural education. The policy of special post teachers in China refers to the public recruitment of graduates, who are assigned to teach in rural schools. It is a specialized policy designed to support compulsory education in rural areas in the middle and western regions of China. Although it aims to mitigate teacher shortages and imbalanced structures in rural areas, it faces the problem of low retention rates. Most special post teachers choose to leave after completing the service term and pursue better development opportunities in urban schools or developed regions. The migratory bird-style movement makes it difficult for rural areas to retain high-quality teachers. It not only undermines the quality of education in rural schools but also prevents the establishment of a stable teaching workforce, further exacerbating the shortage of educational resources in these regions.

2.3. Special impact of two-way migration

Population migration results in an education gap for children. Due to restrictions on household registration, economic pressure, or other causes, children of migrant workers have to return home and are widely trapped in the dilemma of education gaps. Urban education focuses on the cultivation of comprehensive qualities and innovative abilities, along with diverse curricula and teaching methods. On the contrary, rural education suffers from relatively limited resources, a shortage of qualified teachers, poor infrastructure, and a lack of curricular diversity. Meanwhile, the versions of textbooks used in urban and rural areas may differ, resulting in inconsistent teaching progress. In addition, it is difficult for returning children to quickly adapt from diverse teaching methods such as group discussions and hands-on inquiry to the traditional lecture-based model commonly used in rural education. This could lead to a decline in learning motivation and school performance. In addition, most returning children become left-behind children after moving back from urban areas. Due to the lack of parental companionship, these children face gaps in emotional support. At the same time, they suffer from significant psychological imbalances on account of school factors.

As the rural revitalization strategy deepens and the cost of urban life surges, a wave of starting businesses back in rural areas has emerged. Being aware of the profound change in the demand for educational resources in rural areas, returning urban migrants are inclined to impose higher quality standards on rural education and promote the restructuring of rural education ecology. In a village of Guizhou Province, returnee entrepreneurs have noted a gap between local educational resources and expectations for rural children's education; public kindergartens often fall short in terms of curriculum, teaching staff, and facilities. Therefore, they spontaneously established privately-run kindergartens, which introduce advanced educational philosophy and management models from urban cities, improve curriculum quality, and offer rural children new options for high-quality education. This reflects the new expectations of returning urban migrants regarding education and injects fresh momentum into the reform and development of rural education, prompting education authorities to place greater emphasis on the optimized allocation of educational resources.

3. Discussion on optimization paths

3.1. Dynamic adjustment mechanism

Relevant departments should establish a coordinated mechanism linking population and resources to monitor population shifts in real time. Big data technologies should be utilized to integrate data from departments such as health and education to construct prediction models, establish school-age population forecasting systems, and plan the layout and construction of schools. For example, Chengdu has precisely planned school locations and sizes using communities as planning units and taking into account factors such as population density, mobility trends, and transportation geography. It ensures the demand-based allocation of educational resources and satisfies current needs while reserving space for future development. It has effectively avoided the underutilization or shortage of resources.

3.2. Urban-rural coordination strategy

School consortium models should be promoted by leveraging the leading role of flagship schools within the consortium and having prestigious urban schools take over the management of rural schools, thereby promoting the development of rural education. A typical example is the Hangzhou education community. Within this community, urban schools send management teams and key teachers to rural schools, regularly dispatching teachers from prestigious schools for rotation and exchange, while rural schools send staff to top schools for job shadowing and learning. By sharing curriculum resources and research outcomes, seamless integration between urban and rural education can be achieved. It can effectively expand access to quality educational resources, narrow the urban-rural education gap, and promote balanced development in education across regions. Meanwhile, some scholars argue that the implementation of innovative teaching methods, such as remote and digitalized learning, can also narrow the urban-rural education gap [9]. The "internet + education" model should be utilized to bring new energy to rural education and make up for the teacher shortage in rural schools. The online cloud class of Liangshan, Sichuan serves as an outstanding example. It integrates advanced virtual reality (VR) technology and 5G internet and establishes an online teaching platform, allowing renowned urban teachers to teach via live online teaching. It enables rural students to interact with teachers and submit assignments in real time and facilitates joint classes for students in Chengdu and Liangshan, effectively addressing the shortage of qualified teachers in rural areas.

3.3. Suggestions for policy support

The government should leverage the fiscal function and enhance the capacity for fiscal transfer payments. The central government should establish a special support fund to assist areas with high left-behind children density, provide living subsidies to eligible left-behind and disadvantaged children, care for their well-being, safeguard their legal rights, and ensure their healthy development. In addition, a study finds that people with rural household registration have 2.3 fewer years of education than those with urban household registration on average [10]. After controlling other variables, household registration status still has a significant impact on educational attainment [10]. Another study indicates that although migrant workers' children attend urban schools, they are unable to access quality resources due to restraints of household registration, which highlights the impact of systemic barriers on the allocation of educational resources [11]. Therefore, the household registration system reform should be deepened to address systematic barriers and ease restrictions on migrant children by allowing them to take high school and college entrance examinations in their current place of residence. This will ensure that they have equal access to opportunities for further education and promote social equality.

4. Suggestions and challenges

The aforementioned optimization paths provide insightful solutions to the pressure on educational resources caused by population migration. However, there are some challenges during the implementation process.

Firstly, the establishment of a coordinated mechanism linking population and resources requires interdepartmental collaboration to integrate relevant data. Potential differences in data formats or management standards impose significant challenges on the integration of data from departments such as health and education. Unified data standards and interface specifications should be established and a data-sharing platform with strong compatibility should be developed, which requires a high level of data technology.

Secondly, as part of the urban-rural coordination strategy, the consortium education model calls for top urban schools to contribute quality teachers and administrative resources to support rural schools. It not only increases the operation costs of urban schools but also brings about fragmentation of teaching quality and dilution of resources in a short term. Meanwhile, frequent commutes between urban and rural schools will increase the workload of teachers from top urban schools, affecting classroom order subsequently. Remote education sharing poses a significant challenge to the network infrastructure in rural

areas. Online teaching in some remote areas has encountered difficulties due to weak network signals, which affects the effectiveness of online teaching. Meanwhile, a study shows that the hybrid synchronous classroom model may affect the learning attitudes of local students, as they might feel that the remote students are taking away the teacher's attention [12]. To solve these problems, governments should increase fiscal investment to improve coordinated development between urban and rural areas, provide targeted subsidy support for consortium-affiliated schools, and accelerate the construction of rural network infrastructure to ensure the stability and reliability of remote education.

Thirdly, the implementation of policy support is confronted with challenges imposed by the complexity of society and the system. Regarding the fiscal transfer payments, it is essential to establish a scientific and equitable fund allocation mechanism, thereby preventing unjust distribution or misuse of funds and ensuring that the resources are effectively directed toward left-behind and disadvantaged children. Meanwhile, the reform of the household registration system involves the adjustment of multiple interests, making it highly complex and difficult to implement. The balance between the rights of migrant children and the maintenance of urban order should be achieved. If restrictions on migrant children taking high school and college entrance examinations in their current place of residence are eased, it might trigger dissatisfaction among urban residents over the local education resources being squeezed. Therefore, the reform of the household registration system should be proceeded step by step. Meanwhile, the government should further expand the supply of educational resources to mitigate public anxiety.

5. Conclusion

This study analyzes and discusses the challenges brought by population migration on the allocation of educational resources between urban and rural areas and presents the following findings and conclusions. Firstly, population migration leads to insufficient school seats, increased burden on teachers, and diluted resources in urban schools, which are manifested as the difficulty migrant children face in accessing education. It is coupled with the surging demand for urban school enrollment and has led to an imbalance between supply and demand. The oversized classes in urban schools have also reflected that teachers are under immense pressure. Meanwhile, the expansion of urban educational resources has resulted in diluted resources. The newly established branch schools lack relevant resources, which further affects the education quality. Secondly, population migration disturbs rural educational resources. Although the closure and consolidation of rural schools have facilitated resource integration, it introduces new problems for students commuting to school. The transformation of idle school buildings and facilities also demonstrates the lag in the allocation of educational resources. The loss of the teaching workforce results in unstable rural education staffing, and the low retention rate of special post teachers shows the challenge of retaining high-quality teachers. Thirdly, the two-way population migration between urban and rural areas causes challenges including education gaps for returning children and the shifting needs of returning urban migrants. Returning children are faced with education gaps and difficulties in adapting from urban education to rural education while returning urban migrants who start businesses raise new demands for education quality. Regarding these problems, this study proposes suggestions including a dynamic adjustment mechanism, urban-rural coordination strategy, and policy support. In the future, studies can focus on the long-term impact of population structure changes on education planning, especially the challenges brought by declining birth rates and population aging. This will better aid in meeting the demand for future social development.

References

[1] Huang, W. (2016) The Mechanism Analysis and Countermeasures of Widened Gap among Urban-Town-Rural Educational Attainment (1995-2014) -Based on SEP Analysis Framework. *Education & Economy,* (05), 12-22.

[2] Guo, Y. and Li, X. (2024) Regional Inequality in China's Educational Development: An Urban-Rural Comparison. *Heliyon,* 10, e26249.

[3] Li, W., Yang, S. and Xu, J. (2024) Forecasting and Planning for the Demand of Urban and Rural Compulsory Education Resources in China under the Background of Population Change. *Modern Distance Education Research,* 36, 63–73.

[4] Wu, Z. and Wang, Q. (2025) Constructing a Basic Public Education Service Supply Mechanism Coordinated with Population Changes. *Journal of Northeast Normal University (Philosophy and Social Sciences),* (02), 1-10.

[5] Guo, Y.Z., Zhou, Y. and Liu, Y.S. (2020) The Inequality of Educational Resources and Its Countermeasures for Rural Revitalization in Southwest China. *Journal of Mountain Science,* 17, 304-315.

[6] Wang, Y., Li, Z. and Xu, H. (2025) Research on the Adjustment and Optimization Paths of Basic Public Education Resources at the County Level under Population Structure Evolution: A Case Study of Sichuan Province. *Social Science Research,* (02), 114–120.

[7] Li, W.X. and He, T.T. (2023) Blended Classroom Teaching Equalizes Educational Inequality. *Education and Information Technologies,* 28, 4453–4474.

[8] Song, Z. (2023) Disparity in Educational Resources Between Urban and Rural Areas in China. *Journal of Advanced Research in Education,* 2, 64–69.

[9] Wood, R.M. (2023) A Review on Education Differences in Urban and Rural Areas. *International Research Journal of Educational Research*, 14, 1-3.

[10] Wu, X. (2011) The Household Registration System and Rural-Urban Educational Inequality in Contemporary China. *Chinese Sociological Review,* 44, 31-51.

[11] Zhang, D.D., Li, X. and Xue, J.J. (2021) Education Inequality Between Rural and Urban Areas of the People's Republic of China, Migrants' Children Education, and Some Implications. *Asian Development Review,* 32, 196-224.

[12] Yang, J., Yu, H. and Chen, N.S. (2019) Using Blended Synchronous Classroom Approach to Promote Learning Performance in Rural Area. Computers & Education, 103619.) Cointegration of Event-Related Potential (ERP) Signals in Experiments with Different Electromagnetic Field (EMF) Conditions. *Health*, 2, 400-406.