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ARTICLE

The Role of Education in Urbanization: An Empirical Study Based on China's Provincial-Level Panel Data from 2005 to 2020

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***Abstract**: Urbanization is a crucial factor in economic growth and common prosperity and thus an inevitable pathway to a nation's modernization. To achieve the goal of common prosperity of Chinese society as a whole, it is imperative to enhance the education level of its farmers, accelerate the construction of the new countryside, and develop modern, large-scale agriculture, so as to liberate more farmers from the agricultural labor and allow them to enter the secondary and tertiary sectors of economy that provide higher incomes. This study seeks to verify the promotional effect of education on the urbanization level by utilizing the provincial-level panel data from 2005 to 2020 in China. The two-way fixed effects model is adopted in the analysis. Research findings include that: (i) Investment in education has substantial promotional effects on the urbanization level; (ii) Economic growth and technological advancement significantly advances the progression of urbanization; (iii) The development level of the region can moderate the impact of education on urbanization.*

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***Keywords**: Education, Urbanization, Two-way Fixed Effects Model, Panel Threshold Regression*

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Introduction

Education is one of the major drivers for Urbanization. Educational Advancement leads to the increased agricultural productivity, liberating more farmers from agricultural labor, who can move to cities or start up their own businesses in towns, thus promoting the development of towns. In the meantime, the enhanced quality of education contributes to the improvement of comprehensive competence of individuals, facilitating the migration of the rural population and its adaptation to urban life. Existing research largely used the average years of education as a proxy variable for the development level of education, with few studies focusing on the impact of investment in education on the urbanization level. Research into the relation between investment in education and urbanization is of significant practical implications, potentially providing relevant evidence for policy makers.

Analysis Framework

Push-Pull-Mooring Migration Model

The push and pull theory is an important theory in population migration research, which describes human migration as the result of joint effects of the push from the native place and the pull from the targeted destination (Dorigo & Tobler, 1983). Mooring factors refer to the intervening obstacles, both personal and social, that undermine the migration intention of individuals and retain them in the original residence. They are related to personal needs for stable life, psychology, and relationships. To choose to migrate, the individual needs to forgo the stable state of life.

Paths of the Impact of Education on the Urbanization Level

Drawing on Bruce Moon's push-pull-mooring migration model, this study analyzed the three paths through which education affects the urbanization level: (i) Educational development helps boost the productivity of rural areas, so reducing the demand for agricultural labor and increasing the migration intention of rural population; (ii) Educational development offsets the effect of mooring factors on the migration of individuals to certain extent, thus promoting the urbanization of the population; (iii) Education contributes to enhancing the attraction of the city and strengthening its convergence effect, so increasing the pull of urban areas in terms of migration.

Research Design

Variables and Sources of Data

Dependent Variable

This study used the urbanization rate of permanent residents as the proxy variable for the urbanization level of each province, measured by the statistical caliber of urban permanent residents/total permanent residents.

Core Independent Variable

The average years of education of the labor force served as the core independent variable to represent the quantitative characteristics of a region's stock of human capital. Investment in education was the proxy variable for the region's overall quality of education. The study derived data in this regard from the *China Educational Expenditures Statistical Yearbook,* which includes various types of educational expenditures such as national fiscal education funds, publicly budgeted education funds, organizational investment, and social donations in each province. Investment in education is proportionate to the size of the population of the region. Given that, this study calculated the per capita educational expenditure by dividing total educational expenditure with the population of registered residence, which entered the model for regression.

Control Variables

Control variables for this study included per capita regional gross domestic product (GDP), the number of patents, the industrial structure optimization index, the proportion of foreign direct investment (FDI) in GDP, and the proportion of total import and export in GDP.

Results of the Analysis

i. Regression Results Based on the Core Independent Variable as a Quantitative Index

Without incorporating any control variable, the average years of education had no significant impact on the level of urbanization. With control variables included, the average years of education in test and those of the next year still had no effect on the urbanization rate. Among aforementioned control variables, only per capita GDP and the number of patents had significantly positive impacts on the urbanization level. The average schooling years of the year after the next significantly affected the urbanization rate.

ii. Regression Results Based on Both the Quantitative and Qualitative Indexes

The per capita educational expenditure had a significantly positive effect on the urbanization rate. The per capita GDP and the number of patents could remarkably and positively impact the urbanization level. At the same time, the average years of education, the proportion of FDI in GDP, and the share of import and export in GDP had no substantial effect on the urbanization level.

iii. Non-linear Relation between Education and Urbanization

When other conditions controlled, the lower the city's economic growth rate, technological level, and industrial structure optimization index, the more promotional effect the education expenditure had on urbanization.

Conclusion

Using provincial-level panel data from 2005 to 2020 in China, this study examined the impact of education on urbanization, taking into consideration the quantity and quality dimensions of education. Based on the analysis results, it reached conclusions as follows: (i) The quality of education is more fundamental to the rise of urbanization level than the stock of human capital; (ii) Economic growth and technological advancement can significantly advance the progression of urbanization; (iii) The development level of the region can moderate the promotional effect of education on urbanization..

Reference

Dorigo, G. & Tobler, W. (1983). Push-pull migration laws. Annals of the Association of American Geographers, 73(01):1-17.

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NEWSLETTER

How Cooperation and Competition Affect Student Academic Performance and Wellbeing

By Wang, Y. & Xu, Z.
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DUE to the emergence of positive psychology and education, increasing attention has been paid to student physical and mental development and character building in addition to their academic performance. Schools have made efforts to encourage cooperative learning behavior in students. Research also shows that students display better academic performance, more positive peer relationships, and stronger senses of belonging to the school in a cooperative learning environment. On the other hand, there are intense competitions among students in a school setting. A reasonable amount of competition is seen as a motivational factor in student learning, with positive effects on student academic achievements. Also, competitions with explicit, proper goals may bring excitements and enjoyment to individuals.

A scientific view of the relation between cooperation and competition contributes to students' positive attitudes towards them and the healthy development of their character. This study utilizes data from the PISA to conduct systematic research into the impact of cooperative and competitive behaviors on student academic performance and wellbeing, with the purpose of providing guidelines for fostering appropriate spirit of cooperation and competition in students. Research findings reveal that:

- In terms of gender differences, boy students perceived more cooperation and competition than girl students, achieving lower in reading but higher in mathematics and science and with higher levels of life satisfaction and self-efficacy as well as stronger senses of purpose in life.
- By dividing cooperative and competitive behavior into high- and low-ranks by their respective mean values, students were classified into four groups lableled: (A) high cooperation/high competition; (B) low cooperation/high competition; (C) high cooperation/low competition; (D) low cooperation/low competition. Group A had good academic results, a high level of life satisfaction and self-efficacy, and a strong sense of purpose in life. Group B had the highest academic achievement but the lowest level of life satisfaction, along with a weak sense of purpose in life and low self-efficacy. Group C had low academic results but a high level of life satisfaction, high self-efficacy, and explicit life purpose. Group D achieved the lowest academic performance with a low level of

life satisfaction, a weak sense of purpose in life, and the lowest self-efficacy.

- The more competitive behavior a student perceived at school, the better their reading, mathematics, and science achievements. The more cooperative behavior a student perceived at the school, the higher level of life satisfaction, stronger sense of purpose in life, and higher self-efficacy they had.
- The positive effects of competitive behavior on student reading, mathematics, and science literacy would weaken with the increase in cooperative behavior. The positive impacts of cooperative behavior on student life satisfaction, life purpose, and self-efficacy would strengthen with the boost in competitive behavior.

Hence, the article proposes suggestions as follows.

i. Recognize the importance of cooperative behavior to student healthy development. The school should encourage teachers to integrate cooperation education into instruction and class management to create more opportunities for interpersonal communication and collaboration for students to foster solidarity and cooperative behaviors in them.
ii. Properly evaluate the motivational role of competitive behavior. Direction and education targeted at specific competitive behavior should be provided to students for cultivating a correct view of competition, to avoid the adverse effect of peer comparison.
iii. Pay attention to the interaction between cooperative and competitive behavior. Both cooperation and benign competition should be encouraged to keep students motivated in learning and to afford them more opportunities for self-development and social and emotional growth.

Source: Educational Science Research, 2023; 2023(07):68-76.

NEWSLETTER

Does Virtual Reality Help Reduce Learners' Cognitive Load? A Meta-Analysis Based on 23 Experimental and Quasi-Experimental Studies

By Wang, G., Song, J., & Tian, L.
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AS educational technology advances, virtual reality (VR) has garnered widespread attention in academia. Extensive empirical research has been undertaken on the effect of VR on cognitive load, despite no consistent conclusion having been reached. This article is a meta-analysis of 23 empirical studies, seeking to examine the impact of VR on cognitive load moderated by variables such as the discipline, education phase, and intervention duration. Analysis results include:

- Overall, VR has a moderate mitigation effect on cognitive load.
- There is no disciplinary difference in the effect of VR on cognitive load. The effect remains undetermined in the fields of medical education, natural science, and humanities.
- The impact of VR on cognitive load remains basically constant in different intervention durations.
- The higher the frequency of intervention, the weaker the impact of VR.
- VR exhibits a significant mitigation effect on cognitive load under the task-driven teaching approach.
- There is no prominent difference in the effects of differential types of VR, such as immersive VR and desktop VR, on cognitive load.
- VR contributes to alleviating cognitive load in all application scenarios, with the most significant effect occurring in manipulative learning, followed by that in social and observational learning.

Based on the research findings, discussions are focused on the following aspects:

i. VR facilitates learners processing information through multiple channels of senses, so expanding the restricted work memory capacities and lowering cognitive load.

ii. VR poses the most significant effect on cognitive load in engineering disciplines, which requires visualized learning scenarios to support students' hands-on manipulation and grasp of learning content. VR has the potential to make abstract concepts more concrete, encourage autono-

mous inquiry and repetition of exercises in learners, thus reducing cognitive load.

iii. Regarding the intervention duration and frequency, VR can most effectively mitigate cognitive load when the application time is less than 30 minutes or when it is adopted in one single application. That is because the memory and metabolism of the hippocampus will be enhanced due to the novelty effect of VR, activating cognitive patterns and maximizing their use, and as a result, alleviating cognitive load.

iv. Task-driven teaching approaches emphasize learning through doing and the importance of the agency of students in learning. VR allows students a mixed scenario that combines virtual and real worlds, encouraging active exploration and problem solving in them. That assists in student knowledge construction and reducing cognitive load.

v. The type of VR technology has little effect on VR's impact on cognitive load. This finding may be due to the incomplete data and the high receptivity of technology on the part of the subjects in the experiments.

vi. VR is more advantageous in manipulative learning settings because VR-assisted simulation environments may facilitate students' mastery of abstract concepts as well as supporting their repeated manipulation and timely acquisition of feedback, thus promoting personalized learning that helps lower cognitive load.

Source: Open Education Research, 2023; 29(04):110-120.

NEWSLETTER

How Proactive Personality Impacts Knowledge Sharing among Primary and Secondary Teachers: The Roles of Work Engagement and Organizational Innovative Climate

By Zheng, J., Gao, Y., & Fu, X.
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KNOWLEDGE Sharing is an important means for knowledge generation, accumulation, and innovation of schools and plays a significant role in alleviating teachers' work pressures and upgrading their professional competence. Personality traits of teachers are key factors relating to their psychology and attitudes towards knowledge sharing. This article draws on the job demands-resources theory to examine how proactive personality affects knowledge sharing among primary and secondary teachers and identify the mediating effect of teacher work engagement and the moderating effect of the organizational innovative climate. The purpose of the study is to provide guidance for schools' knowledge management and equalization of educational resources.

Research findings show that:

i. Proactive personality poses a positive impact on teacher knowledge sharing behavior. Teacher work engagement mediates the relation between proactive personality and knowledge sharing behavior. Teachers with highly proactive personality are more likely to meet job demands by integrating personal and organizational resources and increase engagement in work, consequently enhancing knowledge sharing behavior.

ii. The organizational innovative climate can effectively moderate the relation between work engagement and knowledge sharing in teachers. To be more concrete, the positive effects of work engagement on knowledge sharing tend to strengthen as the organizational innovative climate intensifies. In other words, the organizational innovative climate generates more resources necessitated by teachers' knowledge sharing activities. In addition, the mediating effect of work engagement on the relation between work engagement and knowledge sharing in teachers is significantly moderated by the organizational innovative climate.

The article suggests that primary and secondary schools should emphasize the importance of proactive personality of teachers in the functioning of personal work resources in their education and instruction management; that schools should give teachers who exhibit more proactive behavior positive feedback and incentives to encourage front-line teachers to integrate their professional development with the improvement of education quality of the school; and that they should create an ideal climate to promote inter-teacher exchange and sharing of teaching expertise and techniques.

Source: Teacher Education Research, 2023;35(03):66-73.

NEWSLETTER

The Impact of Physical Exercise on Adolescent Academic Performance: An Empirical Analysis Based on the China Education Panel Survey 2014-2015

By Li, C.
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DUE to the traditional idea of "academic development outweighing physical activity" and the public misunderstanding of the effect of physical exercise on student academic performance, physical exercise is typically given the lowest priority in Chinese educational system. This has substantially restricted the time allotted to physical activity in teenagers, posing a negative impact on adolescent physical and mental health. This article is a systematic analysis of the influence of physical exercise on teenager academic achievement and the potential influence mechanism, based on data from the China Education Panel Survey 2014-2015.

The study finds that:

i. Both standardized test scores and parental evaluation results show that the number of times of physical exercise per week is positively correlated with adolescent academic performance, indicating that physical activity is not only beneficial for their physical fitness but also for their cognitive attainment.

ii. Socio-psychological factors such as psychological state, education expectations, confidence in the future, and academic resilience act as a robust mediator for the relation between physical exercise and academic performance among adolescents. Physical fitness may play a mediating role, though not a stable one. Physical stamina does not play a mediating role, likely because Chinese basic education overly emphasizes student cognitive ability and is intensely competitive.

Therefore, in the Chinese context, physical exercise helps improve adolescents' academic performance through its impact on their socio-psychological state rather than their physical stamina and fitness. Strengthened academic resilience, alleviated stressful emotions, and improved mental health are the direct results brought on by physical exercise. Educational authorities, schools, and families should foster a more balanced view of "aca-

demic development and physical activity" and place more importance on adolescent physical exercise while conducting investment and resource distribution in education which is traditionally centered around student academic achievement.

Source: Education Research Monthly, 2023; 2023(06):67-74.

NEWSLETTER

Neighborhood Effects, Family Capital, and Adolescents' Compulsory Education Outcomes

By Fang, C.
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THE State Council of China's release of the "Decision on Intensifying the Reform of Urban Housing System" in 1994 initiated the market-oriented reform of housing for urban residents. The reform has caused the increased disparities between different types of communities. Education production functions establishes the peer effect (community group effect) as one the four factors in student development. Despite extant extensive studies on the relationships between neighborhood effects and family capital and adolescent academic performance, there remains room for further research on this topic. This article is an empirical analysis of the impact of neighborhood effects and family capital on teenagers' compulsory education outcomes, based on the China Education Panel Survey's data from academic years of 2013-2014 and 2014-2015.

Research findings include that:

i. Neighborhood effects and family capital have positive impacts on teenagers' compulsory education outcomes. Observable factors such as family financial and cultural capital play dominant roles in the disparities in student academic outcomes at the compulsory education level.
ii. The conditional quantile regression results showed that there was an N-shape relation between heterogeneous characteristics of neighborhood effects and the increase in cognitive quantiles. Among adolescents with similar observable characteristics, factors such as advantaged neighborhood effects as a result of residence in a private property community and disadvantaged family background aggravated the inequality in compulsory education outcomes on the range of low to high cognitive quantiles. Disparities in compulsory education outcomes induced by community-related neighborhood effects bore an explicit feature of the "sticky floor effect." Individual-, family-, community-, and school-related explanatory variables also contributed to the gaps in compulsory education outcomes at differential cognitive quantiles.
iii. Neighborhood effects of the private property community had the potential to increase adolescents' cognitive ability by 0.047-0.061 standard points. Analytical results of heterogeneous characteristics of neighborhood effects drew a consistent conclusion with the conditional quantile

regression on the impact of neighborhood effects on compulsory education outcomes at different cognitive quantiles.

The study puts forward recommendations as follows.

- Under the principal of "enrollment in the nearest school," the educational authorities should promote the implementation of multi-school district policy, which will increase the number of schools each neighborhood can reach and boost the opportunities for teenagers from underprivileged families to access high-quality compulsory education.
- Utilize peer effects and neighborhood effects to support disadvantaged adolescents in advancing their academic level and improving their education outcomes.
- Education departments should formulate and execute the teacher-rotation system within the school district to alleviate the disparities in compulsory education outcomes caused by uneven distribution of high-quality educational resources between schools.

Source: Education & Economy, 2023; 39(03):35-44.

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