International Journal for Housing Science and Its Applications
Publish August 10, 2025. Volume 46, Issue 4 Pages 6640-6647

https://doi.org/10.70517/ijhsa464564

Government housing policies and educational equity: how to promote educational opportunities for children from disadvantaged groups by improving housing conditions

Ruijun Ban[1,*]
[1] School of Marxism, Shaoxing University, Shaoxing, Zhejiang, 312000, China
Corresponding authors: (e-mail: 15532665836@163.com).

Abstract This paper explores the mechanism of government housing policy reforms on the educational equity of children from disadvantaged groups, and constructs a logistic regression model based on China Family Tracking Survey (CFPS) data to empirically test the role of the intensity of housing system reforms on the availability of educational opportunities. Among the core explanatory variables, the dummy variable for low-intensity housing system reform areas has an opportunity ratio of 0.502 ($p<0.01$) in Model 1 and 0.604 ($p<0.01$) in Model 2. Controlling other conditions constant, children with higher family socio-economic status are more likely to enroll in public schools, and children from one-child families are twice as likely to enroll in public schools than non-one-child children. The PSM-DID robustness test further verifies the non-randomness of the policy effect, and the study provides theoretical basis for optimizing the housing policy and promoting the balanced allocation of educational resources.

Index Terms housing policy, educational equity, disadvantaged children, logistic regression model, PSM-DID

I. Introduction

Housing and education are the most important concerns of households, and housing prices tend to exhibit the phenomenon of agglomeration of different tiers around educational resources, which in turn leads to spatial partitioning between rich and poor [1], [2]. At the same time, as high-income people monopolize high-quality education, their educational benefits are much greater than those of average-income households, further exacerbating social polarization through a continuous positive intergenerational cycle, which for developing countries reduces the efficiency of resource use and severely hampers the harmonious development of cities and societies [3]-[5].

As a result, globally, housing and education are often characterized by high housing prices in neighborhoods around high-quality schools, making it difficult for low-income families to move in. Compared with families with good incomes, low-income families have more difficulties in accessing educational resources, and children with rural households have difficulties in attending key schools in towns [6]-[9]. Educational equity is an important element of social equity, an extension of social equity in the field of education, and an important means and way to realize social equity [10]. If education itself is not fair, its function of promoting social equality cannot be realized, and may even regenerate social inequality.

With the rapid economic development and the gradual widening of the urban-rural gap, children from disadvantaged groups are facing more and more educational problems. Due to the limitations of family economic conditions and the unbalanced distribution of educational resources, these children are often unable to enjoy fair pre-school education resources, resulting in them facing more difficulties and challenges in their future learning life [11], [12]. Ensuring educational equity for children from disadvantaged groups is an important responsibility of the government. Such a status quo requires policy intervention by the state to narrow the education gap.

This paper first constructs a dynamic panel model to quantify the impact of housing policy intensity on the intergenerational elasticity of education. Second, it combines microdata to analyze the structural characteristics of educational opportunities for disadvantaged children, focusing on the differences in educational choices under joint effects. Logistic regression model analysis is utilized to explore the equity of educational opportunities for disadvantaged children under different intensities of housing reforms. Further analysis is conducted within low housing system reform regions to explore potential pathways to promote educational equity. Finally, the robustness of the findings is verified by the PSM-DID method.

II. Analysis of the impact of housing policy reforms on educational equity

The relevance of housing policy to educational equity has become an important topic in social policy research. Housing conditions affect children's educational opportunities through spatial distribution, resource accessibility, and household economic pressures, while policy interventions may indirectly regulate intergenerational mobility in education by changing the structure of the housing market. This paper analyzes the relationship between housing policy reform and educational equity in the context of China's housing system reform.

II. A.Modeling

This paper presents an estimated equation for the intergenerational elasticity of education based on regression coefficients as in equation (1):

$$edu_{i,p,t}^{c} = \beta_0 + \alpha_0 edu_i^f + \varepsilon \tag{1}$$

where i denotes the individual, p denotes the province, t denotes the birth year of the individual, and edu_i^c and edu_i^f denote the education level of the offspring and the parent, respectively. α_0 is the coefficient of intergenerational elasticity of education, and a larger value of α_0 indicates that the education of the offspring is more influenced by the education level of the parents.

When the housing system reform is introduced, α_0 changes according to the changes in the birth cohort and the intensity of the housing system reform, expressed as equation (2):

$$\alpha_0 = \beta_1 + \beta_2 rate_p \times I + \beta_3 rate_p + \beta_4 \times I \tag{2}$$

where $rate_p$ is the intensity of the housing system reform in province p and I is a dummy variable based on the division of individuals by year of birth.

Substituting equation (2) into (1) and considering the educational effect of housing system reform (coefficient η) and other factors X affecting offspring's education, this paper obtains a cross-sectional double-difference model based on the intensity of housing system reforms and individual birth cohort to examine intergenerational mobility in education, as in equation (3):

$$\begin{aligned} Edu_{i,p,t}^{c} = {} & \beta_0 + \beta_1 edu_i^f + \beta_2 edu_i^f \times rate_p \times I\left(1983 \le t \le 2000\right) \\ & + \beta_3 rate_p \times edu_i^f + \beta_4 I \times edu_i^f + \eta_1 rate_p \times I + \eta_2 rate_p \\ & + \eta_3 \times I + X_{ipt} + \lambda_p + \theta_t + \delta_m + \omega_{ipt} \end{aligned} \tag{3}$$

The triple interaction term coefficient β_2 is the central parameter of the paper, capturing the difference in the level of intergenerational mobility in education of affected individuals compared to unaffected individuals between different policy intensities. The X_{ipt} represents individual characteristic variables. Province fixed effects λ_p and birth cohort fixed effects θ_t absorb unobservable heterogeneity between provinces and birth cohorts, and δ_m controls for month-of-birth fixed effects and clusters standard errors all at the provincial level.

High social mobility encompasses both upward and downward mobility, and education, as an important channel for acquiring socio-cultural capital, is an important course for securing upward social mobility. Based on equation (4), this paper further examines the impact of housing system reform on intergenerational upward mobility in education.

$$\begin{aligned} Edu_{czp,i,p,t}^{i} = {} & \gamma_0 + \gamma_1 edu_i^f + \gamma_2 edu_i^f \times rate_p \times I\left(1983 \le t \le 2000\right) \\ & + \gamma_3 rate_p \times edu_i^f + \gamma_4 I \times edu_i^f + \tau_3 rate_p \times I \\ & + \tau_2 rate_p + \tau_3 \times I + X_{ipt} + \lambda_p + \theta_t + \delta_m + \omega_{ipt} \end{aligned} \tag{4}$$

where $Edu_{czp,i,p,t}^{i}$ indicates that the education level of the offspring is higher than or equal to the education level of the parent individual, and the rest of the variables are consistent with equation (3).

Although, we argue that the housing system reform is an exogenous institutional shock and for individuals it is not possible to fully predict what happens until the reform is implemented. However, in fact, the housing system reform is not completely random, and before 1998, the housing system reform has been carried out in some cities for pilot work, which makes the residents of some regions have a certain degree of psychological expectations of the housing system reform. Moreover, macro-factors such as the level of economic development of the region,

population density, and the State's financial resources for education all influence the intensity of the housing system reform and the ultimate level of education of individuals.

II. B.Selection of variables

In this paper, we select possible influencing factors from multiple dimensions, and select the independent variables that have a strong influence on the factors through stepwise regression on the accessibility and quality of educational resources at different stages. Afterwards, through least squares linear regression and geographically weighted regression, the selected independent variables and the corresponding dependent variables are regressed to determine the influence of the independent variables on the accessibility and quality of education resources in the global and local contexts. The technical route for analyzing the influencing factors in this paper is shown in Figure 1.

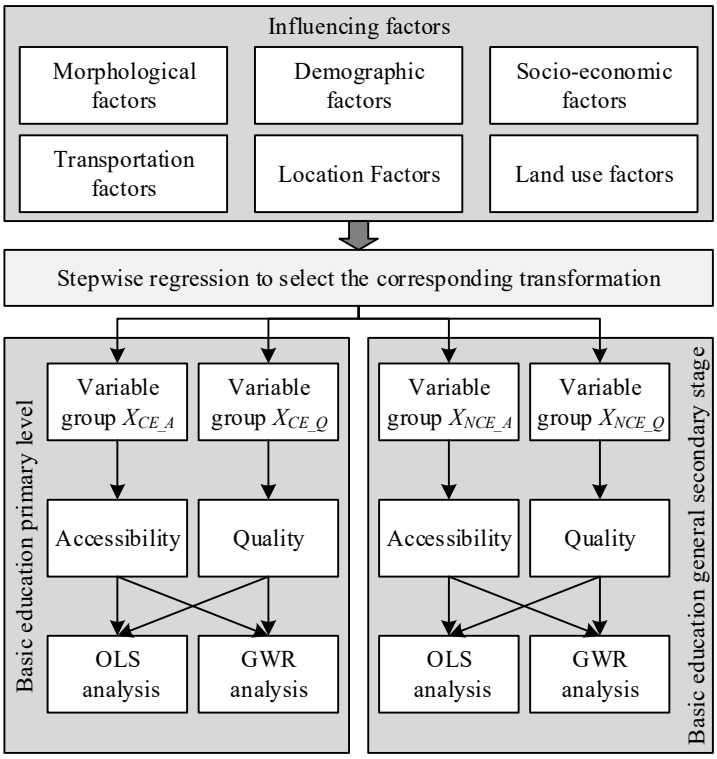

Figure 1: Technical Route for analyzing influencing factors

The selection of specific factors affecting educational equity is shown in Table 1, coding the variables in the different factor categories and factors separately. The explanatory variable was determined to be access to education for children from disadvantaged groups, the explanatory variable was the intensity of the housing system reforms, the individual characteristic variables were the gender of the child and whether or not the child was an only child, the parental characteristic variable was the level of education of the parents, and the household characteristic variable was the economic status of the household.

Table 1: Influencing factors correspond to selected variables

Variable type	Category coding	Variable name	Variable coding
Explained variable	A	Educational opportunities	A1
Explanatory variable	B	The intensity of the housing system reform	B1
Individual characteristic variable	C	Child gender	C1
		Whether an only child or not	C2
Parent characteristic variable	D	Father's educational attainment	D1
		Mother's educational attainment	D2
Family characteristic variable	E	Family economic situation	E1

III. Logistic regression-based analysis of educational equity for children from disadvantaged groups

III. A. Descriptive statistics

This paper uses the China Family Tracking Survey (CFPS) database, which not only covers 25 provinces and cities except Xinjiang, Tibet, Qinghai, Ningxia, Hainan, and Inner Mongolia, but also contains important information at the individual, family, and community levels, and the data samples are characterized by representativeness. Especially for the issue of intergenerational mobility in education, the database directly collects the education of respondents' parents, which largely reduces the selectivity bias caused by the fact that fathers and sons live separately. On the other hand, the survey involving educational attainment is relatively accurate, with fewer missing key variables, and the sample size can meet the research needs. This paper is based on the CFPS five-period data, and the initial CFPS data are processed as follows: first, matching the parent- and family-level data based on the individual codes in the CFPS data; second, screening individual rural left-behind children aged 3 to 18, i.e., children from vulnerable groups, in conjunction with the research questions and definitions; and, third, eliminating samples with missing key variables. This study ended up with 6022 valid samples.

III. A. 1) Overall situation

The results of the descriptive statistical analysis of the variables are shown in Table 2. The variable of access to education for children from disadvantaged groups corresponds to the question and the option of “Are you attending school now? (yes=1, no=0), the growth rate of commercial housing sales area is selected to reflect the intensity of the housing system reform, the gender of children and whether they are only children is assigned male/yes=1, female/no=0, the number of years of education is selected to reflect the level of parental education, and the family income is taken as logarithm.

The mean value of the explanatory variable A1 (children's access to education) is 0.796, indicating that about 79.6% of the children in the study sample are in school, but there is still a lack of access to education in 20.4% of the sample, and there may be structural variations in this proportion across regions. The mean value of the explanatory variable B1 (intensity of housing system reform) is 0.857. There is significant regional heterogeneity in the growth of commercial housing sales area, and the housing market in some regions is expanding at a much faster rate than the average, which may affect the accessibility of educational resources through the residential segregation effect. The mean values of individual characteristic variables C1 (gender of the child) and C2 (whether the child is an only child) are 0.543 and 0.486 respectively, which are close to the equilibrium of the demographic distribution. The mean values of parental characteristic variables D1 (father's years of education) and D2 (mother's years of education) are 6.287 and 5.082 years, respectively, with a standard deviation of more than 4 years, indicating that the sample covers a continuous spectrum from illiteracy to bachelor's degree and above, but the dispersion of the mother's education is more prominent. The mean value of the household characteristic variable E1 (log household income), 9.397, corresponds to a median raw income of about 10,985 yuan/month.

Table 2: Results of descriptive statistical analysis of variables

Variable	Mean value	Standard deviation
A1	0.796	0.297
B1	0.857	0.327
C1	0.543	0.186
C2	0.486	0.425
D1	6.287	4.863
D2	5.082	4.527
E1	9.397	1.032

III. A. 2) Analysis of parents' education and children's access to education

Since the education level of parents will largely affect the tutoring of their children's studies, those with higher education levels are more aware of the importance of educational opportunities and tend to have higher educational expectations of their children, all of which affect their children's school retention rate to a certain extent. Therefore, this paper investigates the school retention rate of children and the educational status of their parents. It is found that fathers are generally more educated than mothers, and the results of parental education and children's school retention rate are shown in Figure 2. The data show that as the parents' education level rises, their children's school

attendance rate gradually increases, reaching 45.24%, 62.58%, 73.96% and 81.38%, respectively, and the higher the parents' education level, the higher the possibility of their children's school attendance rate.

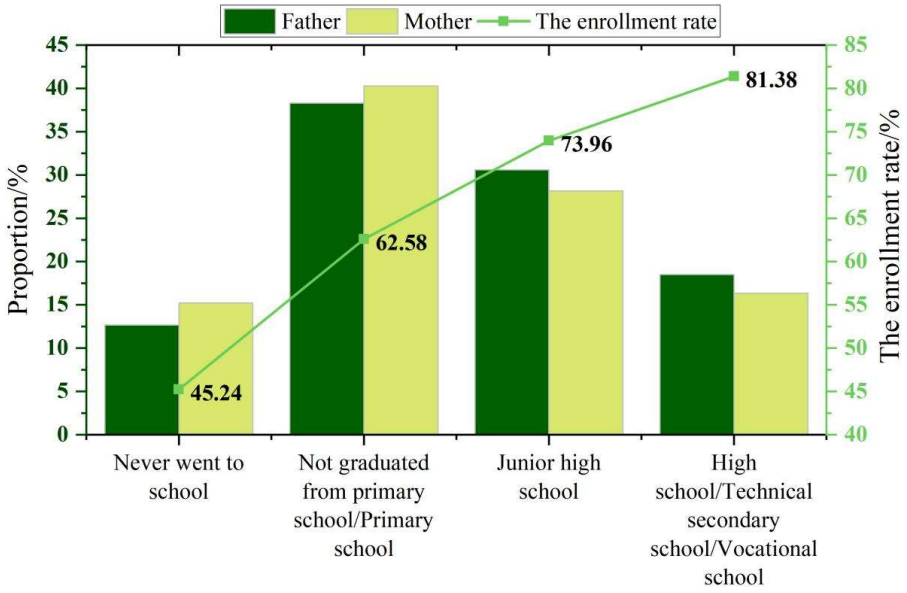

Figure 2: Results of parental education and children in school

III. A. 3) Analysis of household economic status and children's access to education

In this paper, we have done a detailed analysis of the data on family economic status and children's school attendance, and the results are shown in Figure 3. The better the family's economic status, the higher the children's school attendance rate basically is. The school attendance rates of their children in families whose economic status is lower (monthly family income less than 2,000 yuan), lower middle (monthly family income 2,000-7,000 yuan), middle (monthly family income 7,000-12,000 yuan), upper middle (monthly family income 12,000-20,000 yuan), and upper middle (monthly family income more than 20,000 yuan) are 46.35%, 58.27%, 58.27%, 69.28%, 77.83%, 85.27%, and 58.27%, respectively, 69.28%, 77.83% and 85.26% respectively. Families in the upper-middle and upper class of economic status have the highest rate of children attending school.

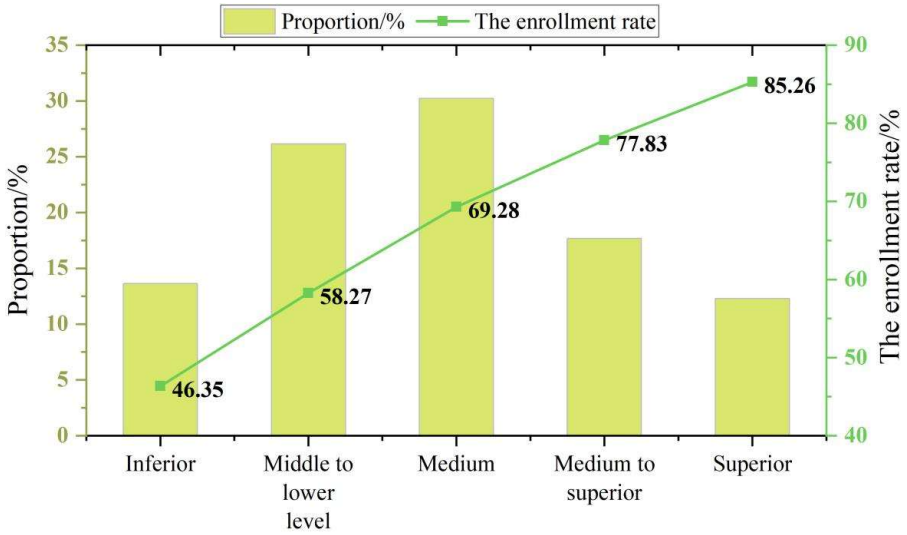

Figure 3: Family economic status and children's schooling

III. B. Comparison of Educational Equity under Different Intensities of Housing System Reforms

Logistic regression analyses comparing school choice of children in high-intensity housing system reform areas with those in low-intensity housing system reform areas are shown in Table 3, where "*" indicates significance at the 5% level of significance, "**" indicates significance at the 1% level of level of significance, and "***" indicates significant at the 0.1% level of significance. The dependent variable is school type, with public schools taken as 1 and private schools as the reference group. The independent variables include identity dummy variable, family economic background variable, etc. In this study, the family economic background variables: one is the direct use of the father's education and monthly family income variables, and the other is the use of a synthetic indicator of family socio-economic status, which is synthesized from parental education, family income and family property ownership according to the factor analysis method.

The results of the regression analysis show that among the core explanatory variables, the low-intensity housing system reform area dummy variable has an opportunity ratio of 0.502 ($p<0.01$) in Model 1 and 0.604 ($p<0.01$) in Model 2, suggesting that controlling for family socio-economic conditions and so on to remain unchanged, the opportunity ratio of low-intensity housing system reform children to enroll in public schools may be lower than that of high-intensity housing system reform area children are lower. In addition, the regression results also show that students with high socioeconomic status in their families and who are only children are more likely to enroll in public schools.

Table 3: Logistic Regression Analysis of School Selection Comparison

	Assignment	Model 1			Model 2		
		Coefficient	Standard error	Opportunity ratio	Coefficient	Standard error	Opportunity ratio
Intercept		-4.876***	0.747		-4.017***	0.452	
Low-intensity	Low-intensity=0	-0.804***	0.168	0.502	-0.612***	0.108	0.604
Gender	Female=0	-0.063	0.166	1.083	-0.697***	0.162	0.927
Father's educational attainment	Illiterates were the control group	0.202**	0.145	1.497	-0.062		
Monthly household income	Continuous variable (yuan)	0.518***	0.103	1.736			
Family SES	(1-6) Sequencing				0.072***	0.022	1.133
Only child	Non-only children were taken as the control group	0.902***	0.146	2.558	0.899***	0.168	2.482
The adjusted pseudo-R^2		0.302			0.319		

III. C. Comparison of Educational Equity within Low-Intensity Housing System Reform Regions

The results of the logistic regression analysis of children's school choice within the LVSR areas are shown in Table 4. The results show that, controlling for other things being equal, children with higher socio-economic status in the household are more likely to attend public schools. Similarly, there is a significant effect of the number of children in the family, all other things being equal (the burden of education is heavier for families with more children, and in addition to this economic factor, parents may place less emphasis on their children's education). Children in one-child families are twice as likely to be enrolled in public school as non-one-child children.

Table 4: Logistic Regression Analysis Results of Internal School Selection

	Model 1			Model 2		
	Coefficient	Standard error	Opportunity ratio	Coefficient	Standard error	Opportunity ratio
Intercept	-4.972***	0.836		-2.974***	0.402	
Gender	-0.033	0.167	1.083	-0.064	0.158	1.102
Father's educational attainment	0.185*	0.099	1.297			
Monthly household income	0.299**	0.145	1.506			
Family SES				0.082**	0.024	1.123
Only child	0.806**	0.193	1.999	0.796***	0.178	1.934
The adjusted pseudo-R^2	0.192			0.201		

III. D. PSM-DID based estimation

The intensity of housing system reform implementation in Chinese provinces is not completely random, it is also related to some key regional economic development indicators. Based on the benchmarking analysis and further considering the comparability of the samples, this paper conducts a robustness test of the benchmarking results using the PSM-DID method. The results of the placebo test are shown in Figure 4, where the density distribution curve of the spurious estimated coefficients is plotted by randomly generating the experimental group and conducting 1000 dummy policy regressions. The results show that the spurious estimated coefficients show an approximately normal distribution in the range of -0.8 to 0.8, with their peaks located near 0.00, indicating that the simulated values of the policy effects are highly concentrated in the no-intervention state under the random assignment of experimental groups, which verifies that the promotional effect of the housing system reforms on educational equity is not randomly generated.

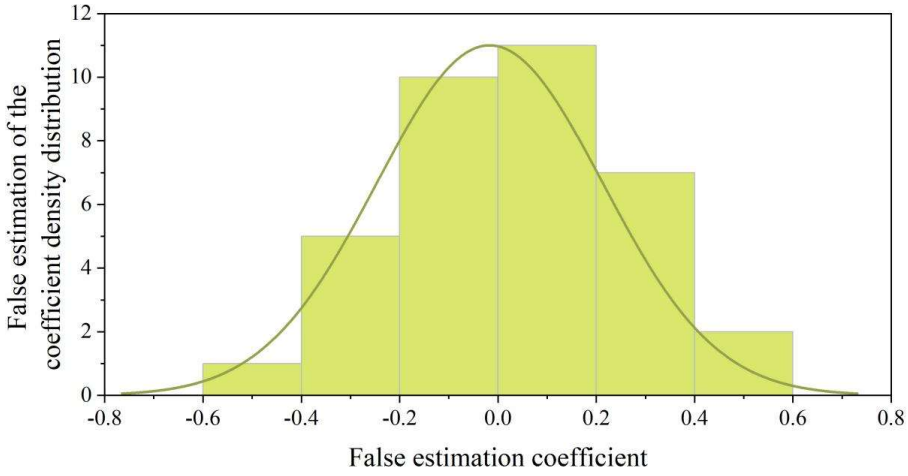

Figure 4: Placebo test results

IV. Conclusion

This paper uses quantitative modeling and microdata analysis to reveal the significant contribution of housing policy reforms to the educational equity of children from disadvantaged groups.

The results of descriptive statistics show that the data indicate that as parents' education level increases, their children's school attendance rate is gradually increasing, reaching 45.24%, 62.58%, 73.96%, and 81.38%, respectively. The school attendance rates of children from families with lower (monthly family income less than 2,000 yuan), lower middle (monthly family income of 2,000-7,000 yuan), middle (monthly family income of 7,000-12,000 yuan), upper middle (monthly family income of 12,000-20,000 yuan), and upper (monthly family income of more than 20,000 yuan) were 46.35%, 58.27%, 69.28%, 77.83%, and 69.28%, respectively, 69.28%, 77.83%, and 85.26%, respectively.

The results of regression analysis showed that among the core explanatory variables, the opportunity ratio of the dummy variables in the low-intensity housing system reform area was 0.502 ($P<0.01$) in model 1 and 0.604 ($P<0.01$) in model 2, indicating that the probability ratio of children in low-intensity housing system reform to attend public schools may be lower than that of children in high-intensity housing system reform areas under the condition of controlling for family socio-economic conditions. All other things being equal, children from families with higher socio-economic status are more likely to be enrolled in public schools. Similarly, children from one-child families are twice as likely to enroll in public schools as non-one-child children, all else being equal.

The PSM-DID estimates show that the spurious estimated coefficients are approximately normally distributed in the range of -0.8 to 0.8, with the peak located near 0.00, indicating that the simulated value of the policy effect is highly concentrated in the no-intervention state under random assignment of experimental groups, verifying that the promotion of educational equity by the reform of the housing system is not randomly generated.

References

[1] Zhang, J., Li, H., Lin, J., Zheng, W., Li, H., & Chen, Z. (2020). Meta-analysis of the relationship between high quality basic education resources and housing prices. Land Use Policy, 99, 104843.

[2] Wen, H., Xiao, Y., & Hui, E. C. (2019). Quantile effect of educational facilities on housing price: Do homebuyers of higher-priced housing pay more for educational resources?. Cities, 90, 100-112.

[3] Bustamante, A. S., Dearing, E., Zachrisson, H. D., & Vandell, D. L. (2022). Adult outcomes of sustained high-quality early child care and education: Do they vary by family income?. Child Development, 93(2), 502-523.
[4] Mashuri, S., Nasruddin, N., Judijanto, L., & Hariana, M. (2023). Impact analysis of economic factors, education, and access to resources on income gap in Yogyakarta. West Science Social and Humanities Studies, 1(06), 363-371.
[5] Leone, J., & Cascio, J. L. (2020). Income gaps: Education and inequality. Economics and Business Review, 6(4), 27-50.
[6] Owens, A. (2018). Income segregation between school districts and inequality in students' achievement. Sociology of education, 91(1), 1-27.
[7] Wen, H., Xiao, Y., & Zhang, L. (2017). School district, education quality, and housing price: Evidence from a natural experiment in Hangzhou, China. Cities, 66, 72-80.
[8] Song, Q., & Tan, C. Y. (2022). The association between family socioeconomic status and urban–rural and high-school attainment gaps: A logistic regression analysis of the China Family Panel Studies data. British Educational Research Journal, 48(6), 1102-1124.
[9] Zhang, D., Zhou, C., & Xu, W. (2020). Spatial-Temporal Characteristics of Primary and Secondary Educational Resources for Relocated Children of Migrant Workers: The Case of Liaoning Province. Complexity, 2020(1), 7457109.
[10] Levinson, M., Geron, T., & Brighouse, H. (2022). Conceptions of educational equity. AERA Open, 8, 23328584221121344.
[11] Taylor, H. (2018). Conceptualising and enforcing the right to quality education for minorities and disadvantaged groups: reflections on the Campaign for Fiscal Equity litigation. In Human Rights and Equality in Education (pp. 131-142). Policy Press.
[12] Charalambous, E., Kyriakides, L., & Creemers, B. P. (2018). Promoting quality and equity in socially disadvantaged schools: A group-randomisation study. Studies in Educational Evaluation, 57, 42-52.