



# Welfare Effects of Township Consolidation Policies in Shrinking Counties: Intergenerational Heterogeneity and Public Service Accessibility

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**Abstract.** The policy of removing townships and merging towns is an important administrative means for China to cope with the population contraction of counties, but its impact on the welfare of residents still lacks a systematic assessment. This study takes the contracted county area where the evacuation of townships and towns was implemented from 2005 to 2020 as the research object. Using county-level panel data and public service facility spatial data, the double difference (DID) method is used to evaluate the causal effect of the withdrawal policy on the accessibility of residents' public services, and focuses on intergenerational heterogeneity. The study found that the withdrawal policy generally significantly reduced the accessibility of residents' public services ( $ATT=-0.34$ ,  $p<0.001$ ), but the intergenerational difference was significant - the elderly group ( $\geq 60$  years old) suffered the greatest negative impact ( $ATT=-0.52$ ), and their medical and administrative service travel distance increased by 5.2 kilometers and 6.3 kilometers respectively; the educational accessibility of the child group was particularly prominent (the travel distance increased by 3.1 kilometers); the working-age population was least affected. Spatial analysis shows that the accessibility of administrative services has deteriorated the most, and the decline in market accessibility is the most limited. The conclusion of the study shows that the policy of removing townships and merging towns has produced significant unfairness in welfare distribution while pursuing administrative efficiency. The design of compensation mechanism for disadvantaged groups should become the core topic of policy optimization.

**Keywords:** Township consolidation; shrinking counties; public service accessibility; intergenerational heterogeneity; welfare effects.

## 1 Introduction

Since the mid-1990s, China has been implementing the policy of abolition of townships and towns on a large scale, aiming to streamline grass-roots administrative institutions, reduce administrative operating costs, and optimize the allocation of public resources [1]. As of 2020, the number of townships in the country has been reduced from more than 47,000 in 1995 to about 31,000, with more than one-third of the reduction [2]. The

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implementation of this policy is particularly concentrated in shrinking counties, because the loss of population has led to a sharp decline in the service efficiency of the original administrative units, and integration is regarded as an inevitable choice for efficiency optimization [3].

However, is efficiency-oriented administrative integration necessarily accompanied by welfare losses? This issue is still controversial in academic circles and policy practice. Supporters believe that withdrawal can concentrate limited public resources and improve the quality of service supply [4]. Critics pointed out that the withdrawal has led to the physical evacuation of grass-roots public service facilities (schools, health centers, administrative service windows), increasing the travel cost of residents, and causing a disproportionate burden on rural residents with inconvenient transportation and the elderly group with limited mobility [5,6].

There are two key gaps in the existing research. First, most studies focus on the administrative efficiency or economic growth effect of the withdrawal, and lack a direct measurement of residents' welfare, especially the causal assessment of the core welfare dimension of public service accessibility [7]. Second, intergenerational heterogeneity is seriously ignored - the demand structure and travel capacity of different age groups for public services are significantly different, but few studies have been studied to examine the distribution effect of withdrawal from an intergenerational perspective [8].

This study uses county-level panel data from 2005 to 2020 to identify the causal effect of the policy of removing townships and merging towns on the accessibility of residents' public services, and focuses on the intergenerational heterogeneity of the elderly, working age and children. The study aims to answer: (1) What is the overall effect of the withdrawal policy on the accessibility of public services? (2) Is there a significant difference in the welfare impact of different generational groups? (3) Which kind of public services are most seriously damaged in accessibility?

## 2 Literature Review

### 2.1 Research Context of the Policy of Withdrawing Townships and Merging Towns

The removal of townships and towns belongs to the category of administrative boundary restructuring, which has theoretical commonality with municipal consolidation and county consolidation in the international comparative perspective [9]. Swianiewicz [10] systematically reviews the experience of municipal mergers in European countries, pointing out that the tension between the benefits of efficiency and the cost of democracy is the core dilemma of such reforms. In Nordic countries, mergers are usually accompanied by clear terms of service guarantee; while in developing countries, service compensation mechanisms are often lacking [4].

In the Chinese context, the study of the removal of townships and towns mainly focuses on three aspects. First, the administrative cost effect. Li et al. [1] show that the consolidation has significantly reduced grass-roots administrative expenditure, but the savings are lower than expected. The second is the economic growth effect. Tang and Hewings [11] used county-level panel data to find that it has a short-term positive effect

on non-agricultural economic growth, but the long-term effect is weakened. The third is the social impact. Hannum et al. [5] reveal the negative impact of school consolidation on rural educational accessibility. However, the above research focuses on a single dimension and lacks a comprehensive assessment of the accessibility of multi-dimensional public services.

## 2.2 Public Service Accessibility and Space Equity

Public service accessibility is the core indicator of spatial equity, usually measured by travel time, travel distance or facility coverage [12]. In shrinking areas, population loss causes an imbalance in the supply and demand of public facilities, which may trigger a "service withdrawal spiral": population decline, facility closure, service accessibility decline, more population migration [6,13].

Neutens et al. [12] pointed out that the distribution effect of accessibility has significant social stratification characteristics - low-income groups, the elderly population and children suffer disproportionate losses of accessibility due to transportation disadvantages. Talen [14] applies the theory of spatial equity to the evaluation of public facilities, emphasizing the Rawls principle of justice of "maximizing the accessibility of the weakest groups". In the context of the withdrawal of townships and towns, this theoretical framework requires researchers to go beyond the overall average effect and pay attention to intergenerational distribution justice.

## 2.3 Research Progress on Intergenerational Heterogeneity

Intergenerational heterogeneity focuses on the differentiated response of different age groups under the impact of policies. In the field of public services, the elderly have a high demand for medical and administrative services, the ability to travel is weak, and there are few alternative choices [8]. The educational needs of children have rigid characteristics, and the withdrawal of schools directly increases the distance and safety risks to school [5]. The working-age population usually has strong travel ability and more market-oriented alternative channels [15].

However, the research on incorporating the intergenerational perspective system into the evaluation of administrative division adjustment in the existing literature is extremely limited. This study tries to fill this gap and reveal the intergenerational distribution effect of the withdrawal policy through the DID estimation of age groups.

# 3 Methodology

## 3.1 Research Design and Data

The research adopts a double difference (DID) design, taking the shrinking county area that implemented the evacuation of townships and towns between 2005 and 2020 as the processing group, and the shrinking county area that has not been abolished and merged in the same period as the control group. The definition of shrinking counties is based

on the data of the sixth and seventh censuses, and the county-level units with a population change rate of  $\Delta P < -5\%$  are selected. The final sample includes 287 counties in the processing group and 342 counties in the control group, forming a 15-year unbalanced panel.

As shown in Figure 1, the research framework includes four links: policy intervention identification, public service accessibility measurement, welfare effect DID estimation and intergenerational heterogeneity analysis.

The data sources include: (1) the administrative division change data of the Ministry of Civil Affairs, which is used to identify the exact time of the withdrawal event; (2) the national education statistics, health statistics yearbook and administrative service center catalog data, which are used to locate public service facilities; (3) Baidu map road network data, which is used to calculate travel time and distance; (4) census age structure data, which is used to build intergenerational grouping.

### 3.2 Accessibility Measurement

For the residential settlements in each county-level unit, calculate the weighted average travel distance of the nearest educational facilities (primary school/junior high school), medical facilities (health center/community health service center), administrative service facilities (township government/convenience service center) and market facilities (trade market/commercial center) respectively:

$$A\_k = \sum_i (w_i \times d_{ik}) / \sum_i w_i \quad (1)$$

Among them, where  $A\_k$  is the accessibility index of Class K facilities,  $w_i$  is the population weight of settlement  $i$ , and  $d_{ik}$  is the road network distance (kilometers) from settlement  $i$  to the nearest Class K facility.

The comprehensive accessibility index is weighted by the standardized scores of four types of facilities:

$$CA = \sum_k (\alpha_k \times A\_k^{\text{std}}) \quad (2)$$

Among them, where  $\alpha_k$  is the weight coefficient of various facilities, which is determined by the entropy weight method.

### 3.3 Double Difference Model

The benchmark DID model is set as follows:

$$CA\_it = \beta_0 + \beta_1 \text{Treat\_i} \times \text{Post\_it} + \gamma X\_it + \mu_i + \lambda_t + \varepsilon\_it \quad (3)$$

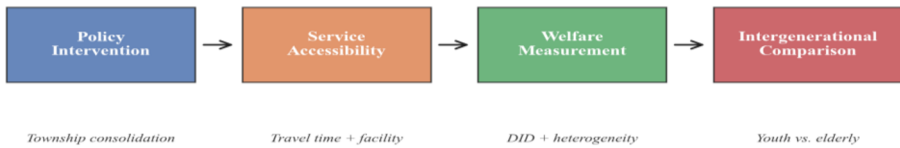
Among them, where  $CA\_it$  is the comprehensive accessibility index of county  $i$  in  $t$  year,  $\text{Treat\_i}$  is the virtual variable of the processing group,  $\text{Post\_it}$  is the virtual variable of the period after the withdrawal incident,  $X\_it$  is the control variable vector (including population density, per capita fiscal revenue, highway density and urbanization rate),  $\mu_i$  is the county fixed effect, and  $\lambda_t$  is the year fixed effect. The core parameter  $\beta_1$  is the average processing effect (ATT) of the withdrawal policy.

### 3.4 Intergenerational Heterogeneity Analysis

Divide the sample into three subgroups according to the age structure, and estimate the model (3) respectively to identify intergenerational differences:

$$CA_{it}^g = \beta_0^g + \beta_1^g \text{Treat}_i \times \text{Post}_{it} + \gamma^g X_{it} + \mu_i^g + \lambda t^g + \varepsilon_{it}^g, g \in \{\text{elderly, working-age, children}\} \quad (4)$$

In addition, the comprehensive accessibility index is decomposed into four sub-indicators (education, medical care, administration, and marketing) and DID estimates are carried out to identify which type of service has the most serious accessibility damage.



**Fig. 1.** Analytical framework for welfare effect assessment of township consolidation.

## 4 Results

### 4.1 Overall Welfare Effect

The results of the benchmark DID estimate show that the policy of evacuation of townships and towns significantly reduces the comprehensive public service accessibility of shrinking counties ( $\beta_1 = -0.34$ ,  $p < 0.001$ ), that is, the accessibility of residents of the retreating counties has decreased by an average of 0.34 standard deviation relative to the control group. The parallel trend test confirms that there is no significant accessibility difference trend between the processing group and the control group before the policy is implemented.

### 4.2 Intergenerational Heterogeneity

Figure 2 shows the welfare effect estimated by sub-group DID. There is significant heterogeneity between generations:

The elderly group ( $\geq 60$  years old) suffered the greatest welfare loss ( $ATT = -0.52$ ,  $p < 0.001$ ). As shown in Table 1, the average travel distance of medical services increased by 5.2 kilometers, and the travel distance of administrative services increased by 6.3 kilometers. The elderly group has a high demand for these two types of services and has limited travel capacity, and the increase in distance caused by withdrawal poses a substantial obstacle to their daily life.

The welfare loss of children ( $< 18$  years old) has also reached a significant level ( $ATT = -0.41$ ,  $p < 0.001$ ). The deterioration of educational accessibility is particularly prominent. Recently, the average travel distance of primary schools/junior high schools

has increased by 3.1 kilometers. The withdrawal of schools not only increases the cost of commuting time, but also aggravates the safety risk of left-behind children.

The working-age population (18-59 years old) is the least affected (ATT=-0.18,  $p < 0.01$ ), and their strong mobility and market-oriented alternative channels partially offset the negative impact of facility evacuation.

### 4.3 Classification Service Accessibility Effect

The sub-item estimate shows that the deterioration in the accessibility of administrative services is the largest (ATT=-0.56,  $p < 0.001$ ), mainly due to the significant reduction of administrative service windows after the withdrawal of township governments. Educational accessibility (ATT=-0.47,  $p < 0.001$ ) and medical accessibility (ATT=-0.38,  $p < 0.001$ ) are second. The decline in market accessibility is the smallest (ATT=-0.22,  $p < 0.05$ ), indicating that the market-oriented operation characteristics of commercial facilities make them have a certain resilience to administrative withdrawal.

The comparative analysis of rural residents and township residents further reveals that the welfare loss of rural residents (ATT=-0.43,  $p < 0.001$ ) is much greater than that of township residents (ATT=-0.15, not significant), the latter benefiting from the service cluster effect because it is close to the merged new central town.

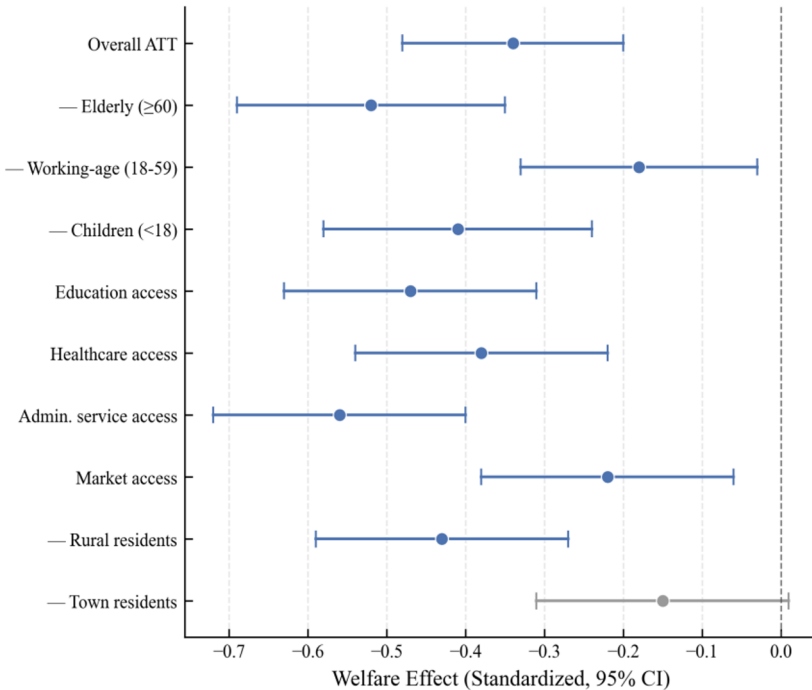


Fig. 2. Welfare effects of township consolidation by subgroup and service type.

**Table 1.** DID estimation results across intergenerational subgroups.

Variable	Full Sample	Elderly	Working-age	Children
Consolidation (ATT)	-0.34***	-0.52***	-0.18**	-0.41***
Education distance	2.4 km↑	—	1.8 km↑	3.1 km↑
Healthcare distance	3.7 km↑	5.2 km↑	2.9 km↑	3.4 km↑
Admin. service distance	4.1 km↑	6.3 km↑	3.5 km↑	—
Observations	12,846	3,921	6,428	2,497
R <sup>2</sup>	0.412	0.387	0.445	0.361

## 5 Discussion

The findings of this study reveal the triple welfare paradox of the policy of withdrawing townships and merging towns. First, the paradox of efficiency and fairness: although the withdrawal and merger improves the efficiency of administrative operation <sup>[1]</sup>, it is at the expense of the service accessibility of marginalized groups. This finding echoes Swianiewicz <sup>[10]</sup>'s discourse on the "efficiency-democracy" tension of European municipal mergers, but it is more acute in the shrinking regions of developing countries.

Second, the paradox of intergenerational injustice: the negative effects of policies are highly unevenly distributed between generations. The elderly and children - precisely the people who are most dependent on public services and have the weakest ability to travel - have suffered the greatest welfare loss. This result supports Neutens et al. <sup>[12]</sup>'s theoretical proposition that "traffic disadvantage amplifies service disadvantage" and provides empirical support for Talen <sup>[14]</sup>'s framework of spatial justice.

Third, the paradox of urban-rural differentiation: the withdrawal should have narrowed the gap between urban and rural services, but in fact it has widened the accessibility gap between townships and rural areas. Township residents benefit from the accumulation of services, and rural residents are damaged by the evacuation of facilities, forming a spatial polarization pattern of "center benefits and peripheral damage" <sup>[13]</sup>.

Based on the above findings, this study puts forward three policy recommendations: (1) establish a welfare impact assessment mechanism before the withdrawal, and integrate the accessibility of vulnerable groups as a constraint into the decision-making framework; (2) supporting mobile service supply (such as mobile medical vehicles and agency service points) after the withdrawal and implementation to make up for the accessibility gap of the evacuation of fixed facilities; (3) design differentiated transportation subsidy plans according to intergenerational demand differences.

The research has the following limitations: First, the quality of public services is not included in the analysis framework, and the improvement of accessibility is not necessarily equivalent to the improvement of service quality. Second, the identification of the time of withdrawal and merging depends on the record of administrative documents, and there may be a certain time delay deviation. Third, the study does not consider the dynamic adjustment effect of new facilities after the withdrawal and merger.

## 6 Conclusion

This study takes the shrinking county as the research field, and adopts the double difference method to systematically evaluate the causal effect of the policy of withdrawing townships and merging towns on the accessibility of residents' public services and its intergenerational heterogeneity. The core findings include: (1) The withdrawal policy generally significantly reduces the accessibility of public services, with an average effect of 0.34 standard deviations. (2) Intergenerational heterogeneity is significant. The elderly group bears the largest welfare loss (ATT=-0.52), followed by children (ATT=-0.41), and the working-age population is the least affected (ATT=-0.18). (3) The accessibility of administrative services has deteriorated most seriously, and the market accessibility is relatively stable due to commercial resilience. (4) The welfare loss of rural residents is much greater than that of township residents, which has exacerbated the unfairness of urban and rural space.

The theoretical contribution of this study is to introduce the intergenerational heterogeneity perspective system into the welfare evaluation of administrative division adjustment. The empirical contribution is to provide a quantitative basis based on accessibility indicators for the optimization of the withdrawal and merger policy of China's shrinking counties. Future research can be expanded in the following directions: refine the analysis scale to village-level units, introduce service quality indicators to build an accessibility-quality comprehensive evaluation system, and post-evaluation of the effect of compensation policies after the withdrawal.

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