# Study on the Effect of Education on Poverty Reduction from the Perspective of Multidimensional Urban Poverty

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**Abstract**

For studies examining education's role in China's effort to reduce poverty, an understanding of the spatial and temporal dynamics of that country's poverty is crucial. The objective of this study is to collect MPI data for all provinces in China between 2007 and 2017, and then apply exploratory Spatiotemporal data analysis (ESTDA) to better understand the spatial and temporal dynamics of poverty in China. This research uses a panel vector autoregression (PVAR) model that integrates the human development method with the global indicator framework for Sustainable Development Goals (SDGs) to analyze the goal of China's general pro-education to identify the causes and solutions of the country's widespread economic hardship. The findings indicate the following: (i) Extreme poverty in China is caused by the country's high social gross participation rate and harvest ratio and reduced by its high per capita GDP, per capita social security expenditure, per capita global health expenditure, percentage of involvement in setting up a new collaborating health care scheme, per head of population education spending, and the total amount of institutions. (ii) From "2007 to 2017, province income poverty (IP), health poverty (HP), cultural poverty (CP), and multidimensional poverty decreased in China, while national poverty fell by 5.67% yearly".(iii) During the research period, the local geographical pattern of multidimensional poverty between provinces exhibited substantial spatial dynamics and a rise from the east to the center and west. The MPI decreased from northern and northeastern China to the surrounding regions throughout time.

**Keywords**: Poverty Reduction; Education Multidimensional Poverty; Spatio-temporal Dynamics; Poverty Measurement; Development Geography

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## Introduction

Overcoming poverty is one of humanity's top priorities. Recent years have seen significant contributions to global sustainable development from China's efforts to alleviate poverty via the implementation of methods and the formulation of objectives. Research and policy-making at the national level have shifted their attention to the assessment, tracking, and evaluation of collaborative poverty reduction techniques and their impact on reducing poverty in specific regions (Jin et al., 2020). Early analysis of poverty was based on economic, sociological, and political theories. When it comes to poverty, conventional wisdom rooted in the single-subject hypothesis has indeed been contested since the alternative capabilities theory was developed by developmental economics. To better understand the dynamics of poverty, researchers and practitioners alike are increasingly interested in systematically identifying the elements that either exacerbate or alleviate the problem. Poverty is a rich topic for study in geography, particularly in the field of development geography, due to its multidimensional nature, its spatial and temporal linkage, and its regional coordination (Shahabaz & Afzal, 2021). There is an emphasis on regional developmental convergence as a means of bettering people's lives, and study paradigms from economic growth, sociology of advancement, and industrial geographies are all included in this topic. This paves the way for long-term studies on alleviating poverty, which may then be used to inform policy decisions. Research models of differentiation, diffusion, and convergence have been used by development geographers since the 1940s to examine the spatial and temporal disparities across nations or areas in terms of economics, society, politics, and environment (Merfeld, 2019).Because unequal growth as a result of globalization has led to widespread disparities and poverty in many regions, researchers in the West have mostly focused on poverty in development geography. Several hypotheses, such as the regional development pole concept, the vicious cycle of poverty theory, the geographic dual structural economic theory, and the polarization trickle-down-effect hypothesis, have emerged from research analyzing geographical disparities in open systems with an emphasis on income growth. Recent empirical case studies conducted by development geographers corroborate the role that these geographical elements play in defining comparative advantages in explaining production volatility in economically disadvantaged regions(Mody & Bhoosreddy, 1995). These studies have also investigated the impact of poverty on the geographical scale, shown how barriers to labor mobility contribute to geographical poverty traps and addressed a variety of other issues related to spatial poverty, including the impact of slums and informal settlements. The outcomes have facilitated efforts to lessen poverty and boost human well-being. Because of its focus on spatial action, development geography has also gained widespread recognition among policymakers and academics. There has been a remarkable expansion of knowledge on the location of poverty in China in recent years. With the complex bodies as a foundation, researchers have employed information technology and statistical approaches to quantify multidimensional poverty, map its geographical variations, and investigate its exact principle (Ren et al., 2018). From the perspective of geographical capital, several geographers have examined geographical poverty indicator systems and developed a multidimensional framework for structural research into the topic of spatial poverty. Despite the pressing need to achieve regional parity as part of China's grand strategy, research into effective methods of alleviating poverty has trailed far behind. There has been a failure to take advantage of theoretical poverty analysis and to use development geography's capacity to account for geographical heterogeneity, diffusion, and integration. Despite the importance of maintaining regional balance to China's national strategy, research on sustainable poverty reduction has lagged far behind. The theoretical advantages of poverty analysis and the diversity, dispersion, and incorporation of socioeconomic geographies are not properly used (Liu & Wang, 2019). On this foundation, an indicator system for multidimensional poverty supervision assessment is developed that works well in modern China (Garg, 2020). By assessing poverty across several dimensions, we may better understand the spatial and temporal dynamics of poverty in different areas of the country, which can serve as a theoretical foundation for more effective national efforts to combat poverty (Deng et al.,

2021). It may also be used as a resource for making decisions that will aid in the long-term viability of a certain area.This research uses a panel vector autoregression (PVAR) model that integrates the human development method with the global indicator framework for Sustainable Development Goals (SDGs) to analyze the goal of China's general pro-education to identify the causes and solutions of the country's widespread economic hardship. The objective of this study is to collect MPI data for all provinces in China between 2007 and 2017, and then apply exploratory Spatiotemporal data analysis (ESTDA) to better understand the spatial and temporal dynamics of poverty in China

## Literature Review

Wang et al. (2022) examined multidimensional poverty and its dynamics in rural China during 2010–2018. These large-scale, long-term, and multi-perspective results could offer new insights for the government to further consolidate poverty-reduction results while giving China's experience to other developing countries. The targeted poverty alleviation program has a considerable influence on multidimensional poverty eradication, and the MPI is declining faster in 2016–2018 than in 2010–2014. Using data from the nationally representative China Household Income Project (CHIP) from 2013 and 2018, Gao et al. (2022) analyzed how receiving rural Dibao affects severely multidimensional impoverished children. Water, sanitizing facilities, housing, education, health, information, and consumer durables are the seven dimensions that make up the multidimensional poverty index. In the era of poverty alleviation following 2020, it is suggested by Shen and Li (2022) that a suitable multidimensional framework for identifying poverty should be created. It is also indicated that in China's new governance system for eradicating poverty, targeted development strategies should be created with a greater emphasis on the poverty of special groups like children and the elderly. Wang (2022) used the Alkire-Foster (AF) multidimensional poverty measurement method with data from the 2011 China Health and Nutrition Survey (CHNS) to explore the empirical connections and differences between these two types of poverty. It also attempts to examine the theoretical relationship between income poverty and multidimensional poverty. According to Ullah and Majeed (2022), the spatial autoregressive technique is used to examine how institutional quality affects district-level multidimensional poverty and human development. The district-level multidimensional poverty and human development are further divided into the direct and indirect effects of institutional quality by the spatial autoregressive model. Nawab et al. (2022) suggested utilizing the Alkire-Foster method to quantify MPI along with the factors that have affected MPI over the years from 2007 to 2018. The only available data, obtained from four rounds of a multiple indicators cluster survey, was used to account for every MPI component. Wang et al. (2022) looked at geographic differences in child multidimensional poverty in China from 2010 to 2016, spatial autocorrelation analysis was used. Next, Markov chain analysis was used to forecast the trend of child poverty. Barati et al. (2022) goal was to (a) develop a local index to assess the multidimensional nature of poverty in rural Iran, (b) develop a suitable index to assess the livelihood strategy of rural households (LSI), and (c) look into the relationship between poverty and livelihood strategy. Rath (2022) provided an alternate method for identifying and addressing urban-poverty in the Global South. It highlights the necessity to take into account poverty and vulnerability interconnections, rural-urban linkages, and other urban specific factors that distinguish urban poverty as a different category of study by drawing inspiration from the normative debate and empirical realities. Qi et al. (2022) examine the geographical inequality of multidimensional poverty and its determinants in poverty-stricken areas of China between 2014 and 2018 using the multidimensional poverty indicator system and the poverty monitoring data.

## Methodology

Study area and data ananlysis

According to the Decision on "Winning the Battle Against Poverty, all of China's rural poor

would have been formally eliminated from poverty by 2020 (< 2300 yuan a year)". The current efforts to alleviate poverty in the nation are at a crucial juncture. After absolute poverty has been eradicated, the fight against relative poverty will continue. To effectively track and address poverty, sensitive indicators must be developed, and a strategy to alleviate poverty is essential for avoiding individuals from relapsing into poverty. This report provides a critical evaluation of major problems in poverty-reduction studies and policy at the national level. The goal is to serve as a model for China's poverty reduction plan and to help those who have escaped poverty via education keep from sliding back into it.

For the sake of completeness, all provinces in China were treated as independent variables. Information was gathered on the areas' environmental history, population density, natural catastrophe risk, economic growth, social safety net, health, and rate of urbanization. Information on China's population, economy, and non-agricultural output as well as its social security system, gross dependence ratio, healthcare expenditures, education budget, and university count can all be found in the country's official statistical annual report (2008–2018). Failed agricultural yields were gathered from the China Rural Statistical Yearbook (2008-2018). Disease rates, hospital counts, percentages of rural inhabitants enrolled in new cooperative medical programs, and urban populations covered by health insurance were all culled from the China Health and Family Planning Statistical Yearbook (2008-2018). Data on research and development funding came from China. The information was then refined into provincial panel datasets for study.

The need of improving economic efficiency and social coherence is education since it increases the worth and productivity of the labor force, which lifts the poor out of poverty. The term "multidimensional poverty" refers to the range of disadvantages that poor people face everyday, including poor health, a lack of education, subpar living conditions, lack of power, low-quality employment, the fear of violence, and residing in hazardous environments, among others. Figure 1 depicts the flow of the proposed methodology.
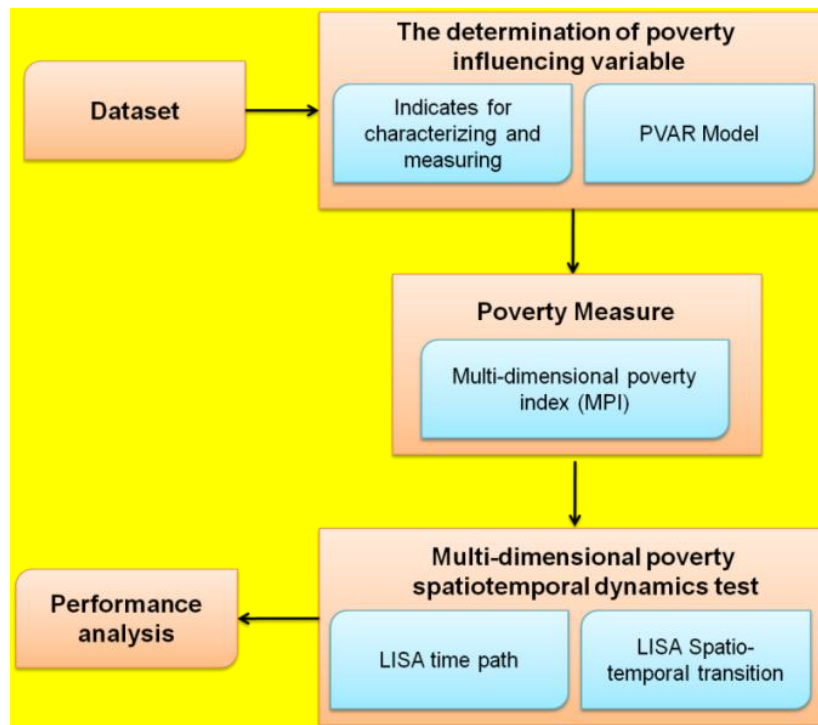


Figure 1. Flow work of the proposed methodology

The determination of poverty-influencing variables

Panel Data Vector Autoregressive Model (PVAR)

The panel data vector autoregressive model (PVAR) was used in this research to determine that education influences the decrease of poverty. To study the dynamic interaction between several variables, this model integrates the panel data model with the conventional vector autoregressive technique. As a result, it combines the benefits of both standard VAR models and panel data analysis, and it not only successfully addresses the issue of panel member heterogeneity but also eliminates the need to adhere to the long-term series requirements of VAR models. The PVAR model differs from other panel data models' settings. It regards all factors as endogenous variables rather than separating them into endogenous and exogenous categories and takes into account how lag variables affect other variables in the model. Additionally, the PVAR model is a better technological choice for researching macroeconomic dynamics and is crucial for examining the economic issues that arise in groups made up of various areas. When compared to the time series VAR model, the PVAR has a less stringent requirement on this time series' duration. By integrating the dynamic panel model's concentration on individual diversity with VAR's attention on variable interactions, it not only tackles the inherent problem but also more properly reflects the fluid reaction relationships between variables. Equation 1 below represents the PVAR model.

$$\delta_{i,t} = \lambda_0 + \sum_{j=1}^{k} \lambda_j \delta_{i,t-j} + \mu_i + o_i + \varepsilon_{i,t} \tag{1}$$

where $\delta_{i,t}$ is a matrix of a repressor, $\delta_{i,t-j}$ is an overview of contributing factors, $\lambda_0$ and $\lambda_j$ are overviews of factors involved, $\mu_i$ is the province-by-province disparity in poverty, a panel regression factor, $o_i$ with time-independent impact component, and $\varepsilon_{i,t}$ is a word for a random disruption (Charfeddine & Kahia, 2019).

Indicators for characterizing and measuring

National capacity growth and improvement should be at the center of any evaluation of progress are emphasized. The term "poverty" encompasses not only a lack of financial resources but also a decline in health and an absence of formal education. These factors are often measured by the following three metrics: yearly savings per capita, illness prevalence, and literacy rate. These indicators are useful for tracking trends, but they are not sufficient for a complete description of poverty (Ahmed & Aatiqa, 2020). Indicator system for monitoring and measuring poverty; establishing a method for identifying elements that relieve and create poverty in China across the "income poverty (IP), health poverty (HP), and cultural poverty (CP)" aspects. A new perspective may be gained by applying development geography to the task of choosing indicators with which to assess the convergence of poverty, means of subsistence, and technological advancement. This article utilizes the "yearly savings rate, the death rate from infectious diseases, and the literacy rate as indices of the IP, HP, and CP, respectively". A possible set of poverty assessment indicators (Table 1) is developed by combining current discoveries in research on poverty and statistical data in China with the indicator systems provided in the study (Chen et al., 2018).

Table 1. Poverty measurement indicators

| | Income poverty A | Health poverty B | Cultural poverty C |
|---|---|---|---|
| Indicator (yuan per person)/ | $A_0$ Annual savings rate per person /lnPSD | $B_0$ Sickness prevalence rate (‰ )/ln*IDI* | $C_0$ Illiteracy rate (%)/lnIR |

| | Income poverty A | Health poverty B | Cultural poverty C |
|---|---|---|---|
| Symbol | | | |
| Indicator (yuan per person)/ Symbol | $A_1$ GDP on a per-person basis/ln GDP | $B_1$ Health care spending on a per capita basis/lnPPHE | $C_1$ Per capita education expenditure /lnPEF |
| | $A_2$ Non-farm business as a percentage of the total (%)/lnIS | $B_2$ Hospitals per 10,000 population /lnPHOS | $C_2$ Number of universities (unit) /lnHEDU |
| | $A_3$ The cost of state welfare programs on a per capita rate /lnPSSE | $B_3$ The level of interest in the proposed rural health care cooperative program (%)/lnNCMS | $C_3$ Student-teacher ratio (%)/lnSTR |
| | $A_4$ Gross dependence ratio in society (%)/lnGDR | $B_4$ Ratio of city dwellers with medical coverage (%)/lnUHI | $C_4$ Per capita research and development (R&D) expenditure/lnPRD |
| | $A_5$ Yield to calamity ratio (%)/nFCA | $B_5$ Forest blanketing the landscape (%)/lnFCR | $C_5$ Funding per capita for cultural undertakings /lnPMCE |
| Meaning | Indicates low-income conditions | Indicative of widespread health inequities | Stands for the impoverishment of culture |
| | Measures the state of the area's economy | Evidence of the officials to universal health coverage | Identifies the level of monetary commitment to public institutions of learning |
| | Identifies patterns in area industry and employment | Reflects accessibility to basic public health services in the region | Identifies the extent to which one has pursued higher education |
| | Describes the quality of social security benefits provided to locals | An indicator of the degree to which rural areas are covered by healthcare | Accounts for the allocation of teaching staff among regions |
| | Describes the strain placed on the worker | Describes the extent to which inhabitants are provided with essential | Identifies the level of support for local development and |

| | Income poverty A | Health poverty B | Cultural poverty C |
|---|---|---|---|
| | | healthcare care | research. |
| | Correlates with the probability of and susceptibility to natural disasters | Conveys the state of a local ecosystem | Describes the quality of free, publicly-provided cultural programs for the general |

Poverty measure

This study employs the polyhedron technique for measuring multi-dimensional poor so that the assessment units' relative poverty lines may be compared.

Multidimensional poverty index (MPI)

Integrating several elements and indicators into a single measuring framework is essential for assessing Multidimensional Poverty Index (MPI). Recently, the polyhedron approach for computing the complete index has been presented. It allows for more computational flexibility and enables more expressive visualizations than competing approaches(Deng et al., 2021). In this work, the MPI is the volume of a polyhedron, defined as the length of a straight line from the origin to each vertex and normalized to a single number. When determining the poverty index, it is important to account for the attribute weights of various indicators due to variations in the relative relevance of the dimensions and indicators used in the assessment process(Salihu & Zayyanu Iyya, 2022). The MPI's underlying equation 2 may be stated as follows:

$$MPI_{-V} = \frac{1}{6}\sin\alpha(w_B \times a_B \times w_C \times a_C + ... + w_D \times a_D \times w_B \times a_B) \times (w_A \times a_A + w_E \times a_E) \quad (2)$$

Where $a_A - a_E$ have all been markers' standardized levels, $w_A - w_E$ show the importance of every indication, and α is indeed the tilt created by two nearby indications.

Multidimensional poverty's spatiotemporal dynamics traits

Development geography research is focused on topics like the balanced improvement of quality of life as well as the geographical coordination of poverty reduction. Here, the goal is to describe the dynamics underlying poverty inside the evaluation units of examination on a geographical and temporal scale (Dong et al., 2020). To understand the dynamics of multidimensional poverty throughout China's provinces, this study presents an exploratory ESTDA approach. It then illustrates the laws of progression through time and the distinctive features of the geographical pattern of poverty between provinces (Li, 2021).

LISA time path

By including time in LISA analysis, the association features of provincial multidimensional poverty in local space over time may be shown to change and evolve. The length and thirstiness of the dynamic track are examples of local space geometry properties. Equation 3 contains the required expressions.

$$\Gamma_i = \frac{n\sum_{t=1}^{T-1} d(L_{i,t}L_{i,t+1})}{\sum_{i=1}^{n}\sum_{t=1}^{T-1} d(L_{i,t}L_{i,t+1})}, n = 30 \quad (3)$$

$$D_i = \frac{\sum_{t=1}^{T-1} d(L_{i,t}L_{i,t+1})}{d(L_{i,1},L_{i,T})} \quad (4)$$

Where $\Gamma_i$ is the length and $D_i$ is tortuosity, $d(L_{i,t}, L_{i,t+1})$ indicates the

country's path length $i$ between years $t$ and $t+1$, and $L_{i,t}$ is a country's status $i$ year shown on the Lange scatter graph $t$. The duration of a $\Gamma_i$ time path for the province's poverty index increases as $i$ increases, indicating greater lower dimensional dynamics. A lower value of $\Gamma_i$ denotes a more secure and stable spatial configuration, while $\Gamma_i$ >1 indicates the contrary, $i$ that perhaps the country's mean moving range is greater than the state median. While a lower $D$ enotes a more steady trend of local geographic dependency $i$, a bigger $D_i$ shows that the dynamic route of the poverty in province $i$ is much more twisted, demonstrating a much more dynamic local texture reliance. The dynamical route of provincial $i$ is more twisted than the state average when $D_i$ >1, but else it is the reverse(Guo et al., 2020).

LISA Spatiotemporal transition

It is explored more deeply, in four categories, how local spatial interactions between neighborhoods change over time. Type I denotes a lack of change in the provided province and its neighbors through time; Type II is a change limited to the province itself; Type III, is a change limited to the neighborhood; and Type IV, is a change affecting both the province and its neighbors. Type IV(1) is a subset of Type IV(2), while Type IV is the other main (Li et al., 2020). The latter suggests that they are all travelling in separate directions, the former demonstrates that the province and its neighbors are all moving in the same direction (Wang et al. 2018; Akmam et al. 2019).

## Results

Creating a mechanism for evaluating and monitoring poverty

In the first place, we established that a two-lag order for model estimating is best based on the "Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), and the Hannan-Quinn Information Criterion (HQIC)". The "generalized method of moments (GMM)" was then used to determine the nature of the relationships between the variables. Figure 2 depicts the impulse response function (IRF), which was used to investigate the dynamic relationship between the factors and poverty across all dimensions. At the provincial level in China, the variables that contribute to and alleviate poverty were finally recognized.
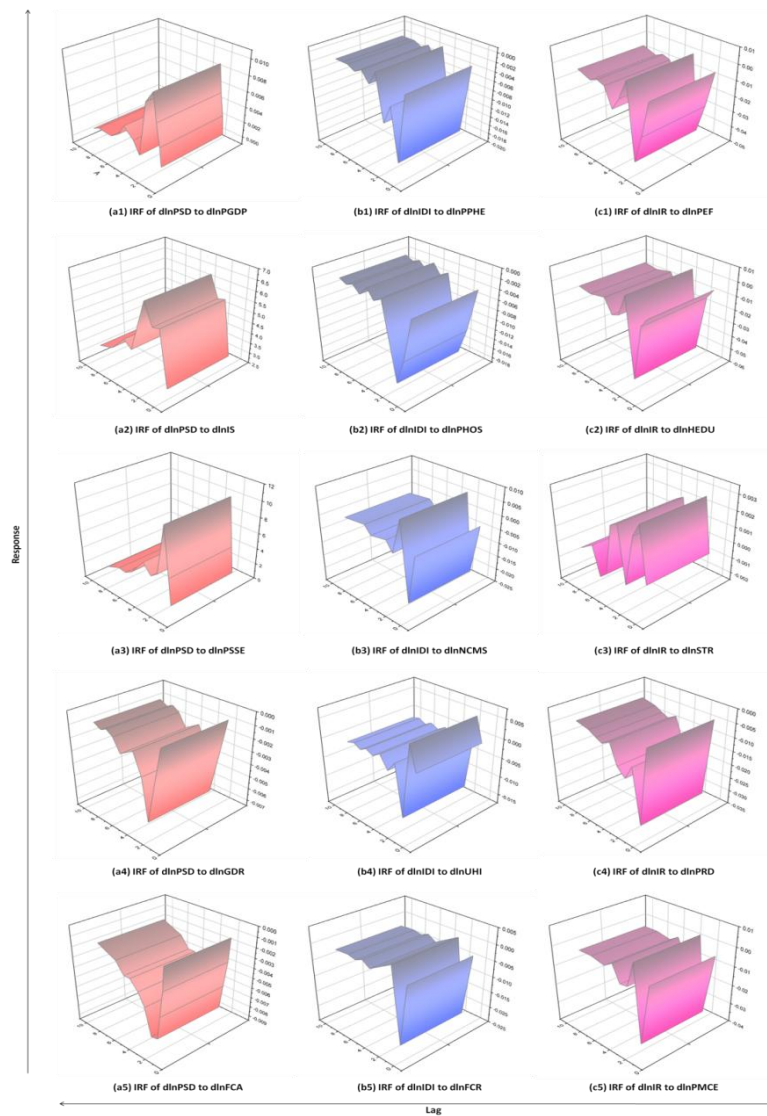
Figure 2. Results of variables' impulsive responses to multidimensional poverty indicators

Figure 2 shows that the lags in the societal gross dependency ratio and the harvest ratio in the second period had a negative impact of 1% on financial revenue per capita. A common characteristic of factors contributing to low income was that their cumulative influence gradually diminished with time. Annual savings rates were significantly affected by both GDP per capita & state pensions expenditure per capita within IP variables, which is encouraging since both variables help alleviate poverty. For example, the HP indicators of public health spending per capita, the number of hospitals per thousand people, the rate of involvement in the setting up of a new cooperative Medicaid program, and vegetation reportage all had significant negative and restrictive impacts on the overall effect of the trend transformation, while the CP visual clues of schooling spending per capita, the number of universities, research and development funding per capita, as well as funding for based on culture undertakings all seem to have significant positive effects.

Poverty supervision and evaluation indicator system

Each indicator's effect on the poverty metric was evaluated using equal-weighted variance decomposition for a more nuanced look at the data. According to Figures 3(a), (b), and (c), the

primary driving force behind changes in yearly per capita savings, illness incidence rate, and rate of internal ignorance has decreased with time. Over time, the influence of outside factors on these factors increased, reaching a plateau by the fifth period. When looking at the variance decomposition findings over all 10 time periods, we see that the numbers changed very little in the latter six compared to the first four. To statistically examine the impacts of several variables on poverty, we analyzed data from the fifth period. Using the 12 indicators of crop-to-disaster ratio, per capita GDP, per capita social security spending, per capita education spending, the multitude of colleges, the social gross number of dependents, and percentage of participation in the setting up of new cooperatives, the Chinese government established poverty measurement supervision and evaluation markers at the provincial level, as shown in figure 3d. Using these metrics, China's provincial governments will have a better foundation for dynamically supervising and measuring poverty across several dimensions. Figure 3 depicts that outcomes from analyzing poverty indicators' variances (a) Variance decomposition of IP, (b)Variance decomposition of HP, (c) Variance decomposition of CP and (d) Variance decomposition of MPI to other variables.

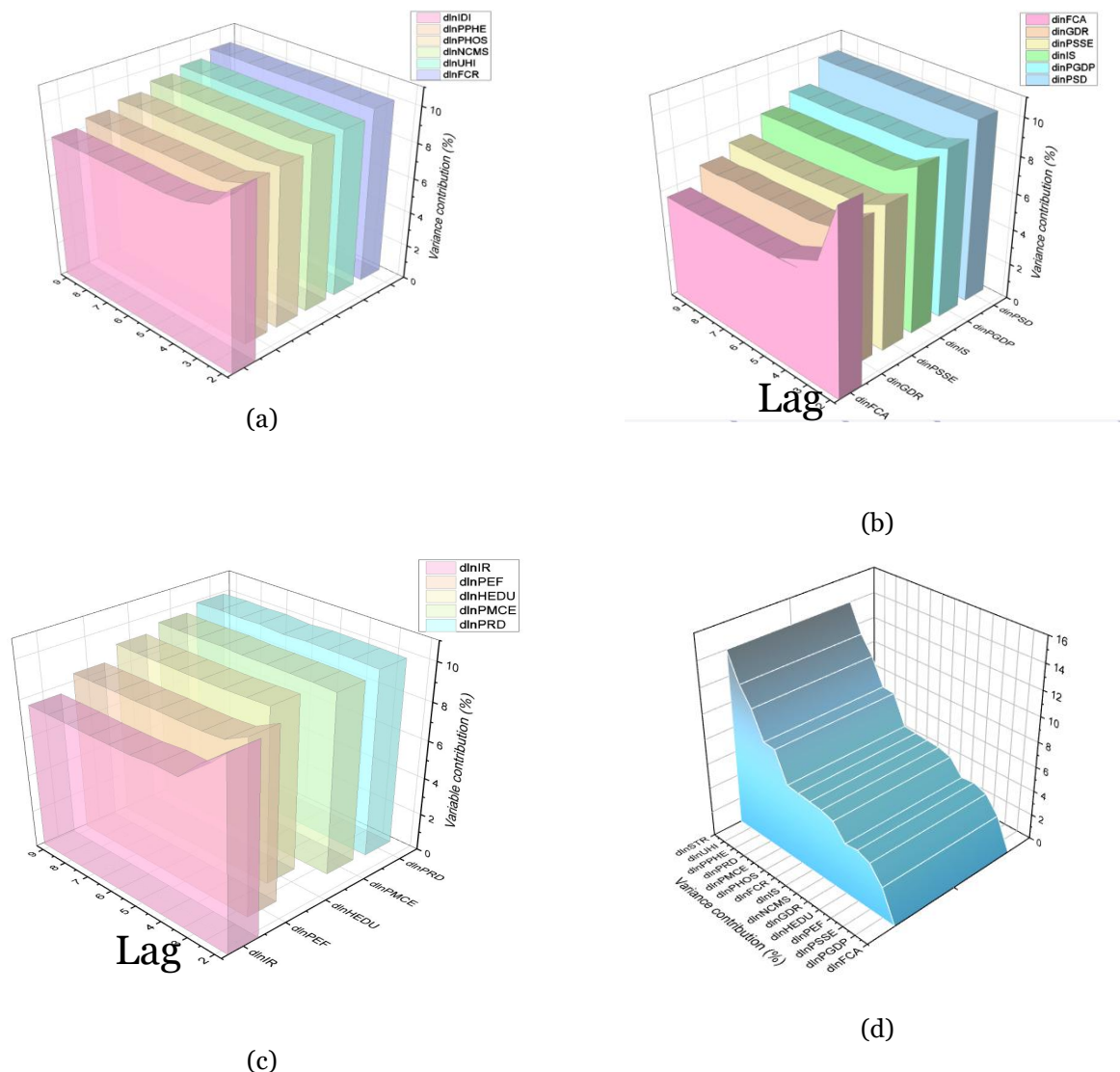

Figure 3. Outcomes from analyzing poverty indicators' variances [(a) Variance decomposition of IP, (b)Variance decomposition of HP, (c) Variance decomposition of CP and (d) Variance

decomposition of MPI to other variables

Findings from a comprehensive analysis of poverty

Results of comprehensive measurement of multidimensional poverty

"China's provincial MPIs were estimated for 2007, 2012, and 2017" using formula (2) to more accurately represent the poverty status in each province as shown in figure 4.
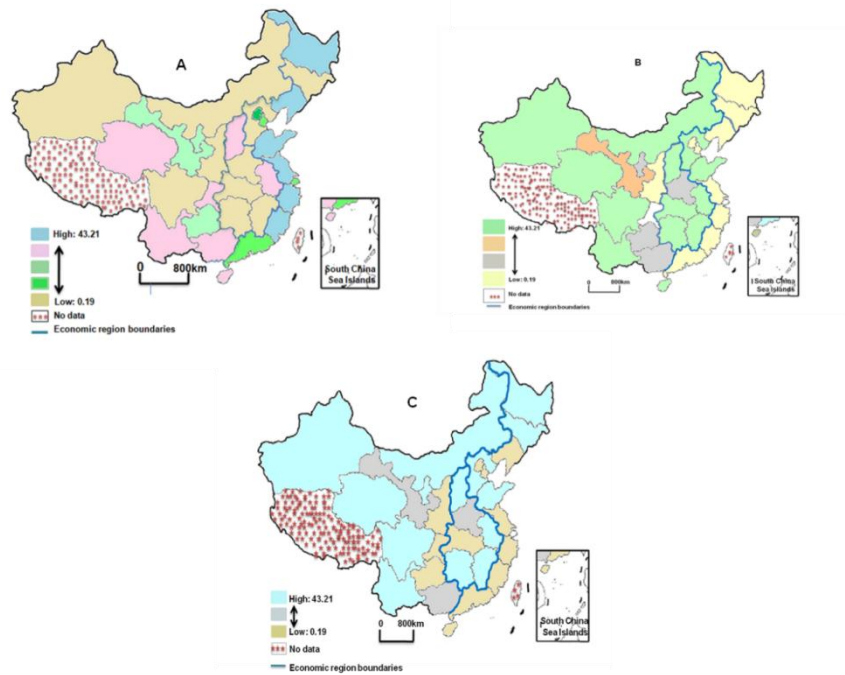


Figure 4. Outcomes of China's multidimensional poverty assessment projects in 2007–2012 and 2017

During the period of research, the MPI was the greatest in the western provinces, then in the central provinces, and particularly in the eastern provinces, where the distribution mirrored the geography of the land by gradually increasing from east to northwest. Simultaneously, the wealth gap between the west and the east and the center shrank (Slamet et al, 2022). Using this indicator, we can see that national multidimensional poverty has been decreasing at a rate of 5.67 percent per year between 2007 and 2017. Since the targeted poverty reduction plan was put into place in 2012, poverty rates have been falling at an annual pace of 7.22%. Despite this, there was still a large disparity and geographic polarization of regional poverty in China's multidimensional poverty. Extreme poverty was more prevalent in certain provinces than in others.
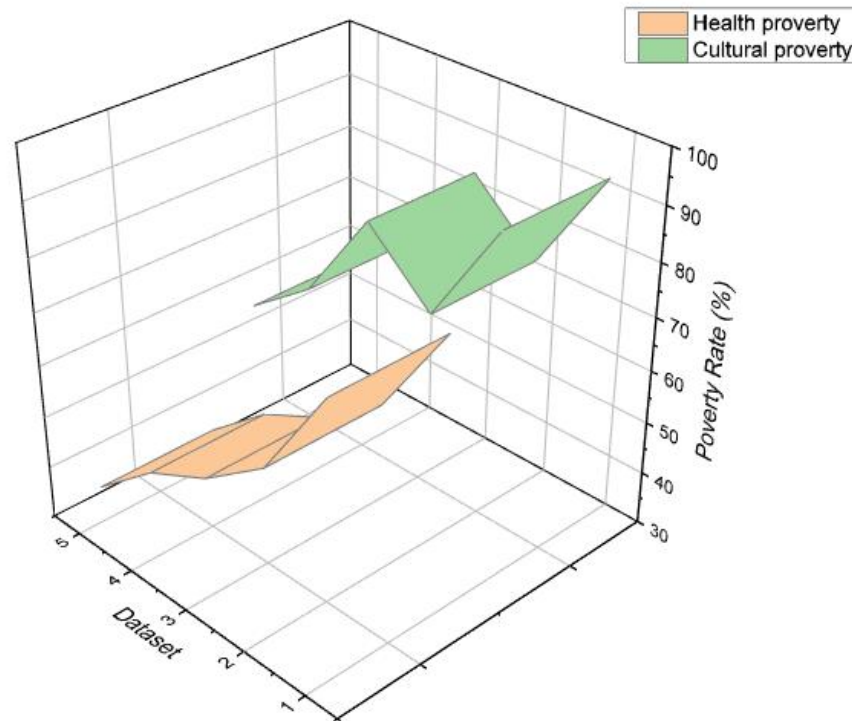
Figure 5. Impact of the poverty rate

Figure 5 depicts the impact of the poverty rate. Conditional analysis, which compares China's sustainable growth with similar cultures and health, is used to give a different viewpoint on the tremendous reduction in poverty that China has achieved. According to the study, cultural poverty has a greater impact on health poverty. Students from low-income families do much worse on measures of their vocabulary, communication abilities, and assessments of their knowledge of numbers and their ability to focus. In addition, they perform worse than their competitors in families with higher incomes in terms of academics, athletics, and cooperative play. By restricting access to things that determine a person's standard of living, such as clean air and water, utilities, safe communities to learn, live, and work, and adequate nutrition and healthy meals, poverty has a negative impact on one's health. Poverty's appearance and means of escaping are influenced by culture. On a global basis, these cultural disparities are still present. Both directly and indirectly, through its interactions with poverty and the factors that promote or inhibit it, culture has an impact on poverty.

Variables of the regional and temporal evolution of poverty

Trends in the temporal and spatial dynamics of multidimensional poverty

Figure 6 from the LISA dataset depicts the temporal evolution of provincial MPI throughout the research period, with provinces having a time path larger than 1 accounting for 43.33 percent. This indicates that local patterns of multidimensional poverty followed an evolutionary rule over time. The lengths of "Guizhou, Qinghai, and Xinjiang in the western areas were larger than 1.25, indicating that their local spatial structures were extremely dynamic, the time path reveals an increasing tendency from the eastern to the middle and western regions". Provinces in the east, such "Beijing, Shanghai, Tianjin, and Shandong", had shorter time path movements than the western provinces, with lengths of less than 0.8. The provinces along the eastern coast are experiencing rapid "economic growth, a wealth of natural resources, and relatively low rates of absolute poverty, all of which contribute to a very stable local spatial structure of poverty".
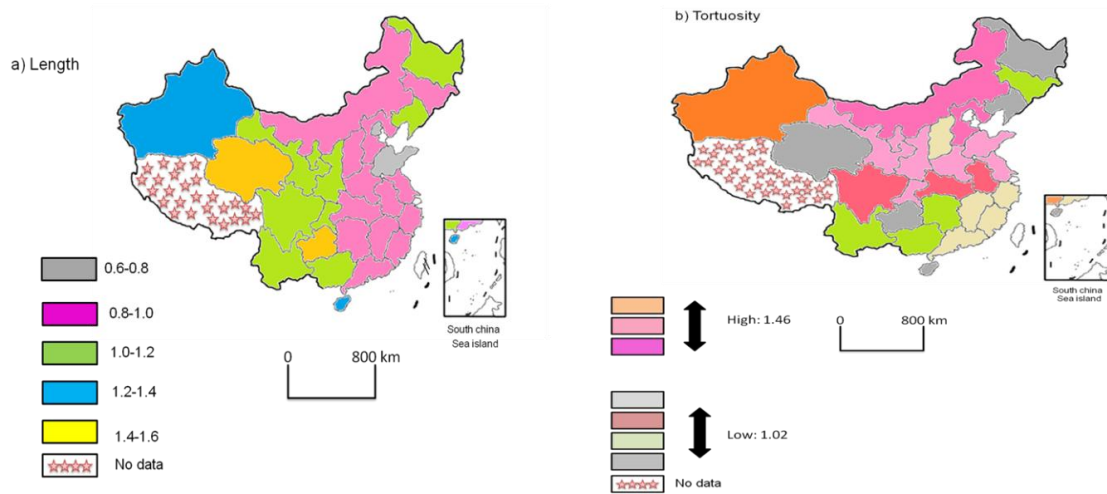
Figure 6. China-wide map showing where various geometric elements of the LISA flight route may be found

Figure 6 demonstrates that tortuosity was more than 1 everywhere, with a general decreasing tendency from the far north and far east of China to the rest of the world. This demonstrates the strong temporal and geographical dependencies of MPI within each province (Selamat et al., 2022). Some of China's most tortuous provinces are in the northeast, on the island of Hainan, and in the western province of Qinghai, and this variation reflects the region's evident transitions and interactions with its neighbors. Multidimensional poverty in these less tortuous provinces showed a steady, shifting direction and a geographical dependency, and they were dispersed over the junction of central, northwest, and southwestern China.

Territories of poverty incidence at the local level

We examined the transmission qualities of various local geographical linkages in poverty incidence across Chinese provinces utilizing Spatiotemporal transitions modeling. Type I transition provinces made up 83.33 percent of all provinces between 2007 and 2011, 80 percent between 2012 and 2017, and 73.33 percent between 2007 and 2017, revealing a path dependency of multidimensional poverty distribution across China's provinces. The stability of poverty in provinces like "Yunnan, Gansu, Qinghai, Ningxia, Xinjiang", and others where continuously impoverished regions are concentrated is a major barrier to China's integrated poverty reduction efforts (Gatdet, 2021). Provinces undergoing Type II transition made up 23.33 percent of the total from 2007 to 2017, and they were concentrated in the middle and western regions, indicating that the local spatial correlation structure of poverty was less in these areas compared to the east (Shahabaz & Afzal, 2021). A total of zero provinces had a Type IV transition and just one province saw a Type III transition during the period under review. To promote high-quality poverty reduction in extremely deprived places, the national poverty reduction plan should strengthen the coordination mechanism for poverty reduction across regions, as shown by the share of provinces with four transition categories (Shadia et al., 2021). Also, keep in mind that the general change of Type II provinces has made them crucial in driving the shift in China's multidimensional poverty and that poverty reduction programs need greater focus as a result.

With the end of primary absolute poverty in China in 2020, the fight to reduce poverty in the country will enter a new phase. China's anti-poverty program faces new challenges as relative poverty emerges as a major issue in the country's post-poverty reduction period. In this new epoch, developmentally-oriented poverty reduction efforts will shift their emphasis from addressing the immediate need for food and clothes to minimizing the likelihood of falling back into poverty.

Therefore, researchers will shift their attention and energy toward investigating the different features, levels of diffusion, and convergence modes of sustainable lifestyles and development in economically depressed regions, rather than the existing theoretical paradigm of poverty reduction. Reducing poverty is a multifaceted, systemic endeavor that adapts to new contexts as they arise in place, time, and development. This includes but is not limited to the fields of economics, politics, culture, geography, society, and psychology. Uncertain risks in the external environment, such as climate change and trade tensions, are only part of the problem when it comes to China's efforts to reduce poverty sustainably; the country also faces several other obstacles, such as the transition to new models of economic growth and tightening environmental regulations. As a result, fostering investigation into methods of reducing poverty via the lens of development geography in China may serve as a springboard for cross-disciplinary study with direct application to the problem at hand.

## Conclusion

The purpose of China's general pro-education strategy is to discover the reasons and solutions for the nation's pervasive economic difficulty. To better understand the features of multidimensional poverty's Spatiotemporal dynamics, this article employs a human development approach and the global indicator framework for SDGs to uncover variables influencing poverty in China. According to these results, we may make the following assertions:

A. Using GMM and IRF studies, we traced the causes and effects of poverty in China, identifying both indications of improvement and worsening. Except for the share of non-agricultural businesses, the share of urban inhabitants with health insurance, and the student-teacher ratio, all other variables are substantially associated with poverty. Two indicators, the social gross dependency ratio and, crop-to-disaster ratio were major contributors to poverty, while the remaining sixteen indicators, such as the GDP per capita, the rate of ability to participate in the new rural cooperative medical scheme, and the per capita education expenditure, were found to be major contributors to alleviating poverty.

B. The overall disparity in poverty across the provinces was demonstrated to have shrunk throughout the research period, with all four measures of poverty (IP, HP, CP, and MPI) exhibiting substantial decreasing trends. There was obvious internal polarization of multidimensional poverty, and in certain areas, the three measures of poverty did not converge. China's current condition of multidimensional poverty is indicative of the temporal and geographical disparity across provinces, which has resulted in a coupling connection with patterns of regional economic space divergence.

C. Provinces in China have been shown to have different levels of multidimensional poverty. "The local spatial structure of the MPI was particularly dynamic in western provinces, making it challenging to rapidly shift the geographical status of multidimensional poverty in various provinces. The growth of multidimensional poverty in China's northeast was also shown to be inversely correlated with that in the country's central and western regions". The agricultural provinces have all closely together. Coordinated initiatives across provinces should become the future focal point for long-term poverty alleviation.

China's absolute poverty has already ended in 2020, and the fight to reduce poverty has entered a new phase. In China's post-poverty alleviation period, relative poverty will pose a significant problem and place new expectations on its anti-poverty program. In this new era, development-oriented approaches to poverty reduction will put more emphasis on reducing the danger of falling back into poverty rather than addressing issues with culture and health. In this study of multidimensional poverty, we discussed the strengths and weaknesses of the multidimensional poverty measurement method and index, and provided a plan of action on how to select suitable measurement methods based on our country's national conditions, providing a foundation for future study of multidimensional poverty.

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