Check for
updates

Poverty and Crime: New Evidence from a Nationwide Poverty Reduction Project in China

Huixin Dong[1] · Qingmin Hou[2]

Abstract
Whether reducing the poverty rate helps to curb the growth of crime rates does not have a definitive answer in the current literature. This study utilizes the context of poverty alleviation projects in 592 poverty counties across China in 2015. By employing the difference-in-differences method and combining county-level data from 2014 to 2020, we empirically investigates the causal relationship between poverty reduction and crime rates. The study finds that the poverty alleviation projects significantly reduce crime rates in the regions, with this inhibitory effect primarily observed in property-related crimes, such as theft and robbery. Further analysis reveals that the increase in per capita annual income level is the main mechanism behind these results, and there have a spillover effect of this project. These findings hold under a series of robustness tests such as placebo test and parallel trend. As the largest developing country in the world, this research provides policy implications for poverty reduction practices in other developing countries.

Keywords Crime Rate · Poverty · Income Effect · Developing Countries · Public Policy · Spillover Effect

Introduction

The relationship between poverty and crime has always been an important topic of interest in criminology and economics (Allen & Stone, 1999; Stretesky et al., 2004; Ross, 2020). According to Merton's strain theory of deviance, which argues that crime occurs when there aren't enough legitimate opportunities for people to achieve society's normal success goals, there is a "strain" between the goals and the means to achieve them, leading people to turn to crime to attain success. Economists also believe that there is a connection between poverty and crime, and they take crime as a obstructive factor of economic development (Mehlum et al., 2005).

✉ Qingmin Hou
   20100046g@connect.polyu.hk

1   Faculty of Economics, Dongbei University of Finance and Economics, Dalian, China

2   Faculty of Applied Mathematics, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong

Springer

Based on the theory above, a question arises: if governments implement poverty alleviation projects to improve the income level of a region, will it effectively reduce the crime rate in that area? If so, what are the primary mechanisms? Are these effects effective for all types of crimes? Although some studies have discussed the relationship between poverty and crime (Meloni, 2014; Chambru, 2020), most of them have not adequately addressed the endogeneity issue between poverty and crime (Song et al., 2020; Heilmann et al., 2021). Moreover, there is a lack of research specifically focusing on China in this context. As the world's largest developing country, China serves as an ideal laboratory for studying the aforementioned issues.

Reducing or eliminating poverty is a shared global challenge today, especially considering that the majority of impoverished individuals are concentrated in developing countries (Masron & Subramaniam, 2018). As the largest developing country in the world, China has achieved remarkable accomplishments in poverty alleviation in recent years (Song, 2012). According to United Nations data, China has contributed 70% to global poverty reduction since the 1990s. By international poverty standards(individuals living on less than $2.15 per day), China has reduced its rural impoverished population from 770 to 30 million over the past 40 years, significantly improving people's living standards.

Based on these reasons above, this study utilizes the poverty alleviation projects implemented by China in 592 poverty counties nationwide by the end of 2015 as the context to examine whether and why a significant reduction in poverty rates would lead to a notable decrease in crime rates (details of the project will be given in the later section). The remaining sections of this paper are organized as follows. First, we provide a literature review on past work related to our research. Second, We propose questions this study will answer. Third, a description of the data, research design and key variables will be given. Fourth, we will analyze and discuss the main results. Fifth, we conclude and provide policy implications, also acknowledge the limitations and talk about the directions that future researcher could proceed.

Literature Review

This paper contributes to the existing literature in the following ways. Firstly, we supplemented the relevant literature on poverty and poverty alleviation. Scholars have not only focused on the origins (Duong & Flaherty, 2023), causes (Singh & Jha, 2023), and measurement of poverty (Ogwang, 2022; Dang and Verme, 2023), but also on the social impacts it brings (Jalal et al., 2022). In addition, numerous studies have aimed to identify factors that can reduce the number of people living in poverty and improve the living standards of those in underdeveloped regions, such as infrastructure development (Zhang et al., 2023), digital transformation (Ding et al., 2023), and climate change (Chalise & Naranpanawa, 2023). Specifically, as the world's largest developing country, many studies have focused on China's poverty issues and poverty alleviation efforts (Han & Si, 2023; Su et al., 2023). Some relevant literature that closely related to this study has also assessed the social impacts of poverty alleviation policies (Khosla & Jena, 2022; Lou et al., 2023; Ma et al., 2022; Silva et al., 2023). But previous studies have not evaluated and analyzed the impacts of large-scale poverty alleviation projects in China, and we will fill this gap and offers insights into the social outcomes of such project.

Secondly, this study also contributes to the existing literature on crime. Previous research has discussed the causes (Ajzenman et al., 2023; Baryshnikova et al., 2022; Charlton et al.,

2022; Eren et al., 2022), impacts (Mitra & Shajahan, 2022; Muller & Schwarz, 2023; Pak & Gannon, 2023), and governance of crime (Arora, 2023; Castro & Tirso, 2023), as well as factors that can reduce crime rates, such as institutional factors like taxation (Lenhart, 2021), judiciary (Guerra & Nilssen, 2023), and property rights (Lawson, 2023), as well as natural and social factors(Allen, 2021; Lee et al., 2022; Tealde, 2022; Drugowick & Pereda, 2023). While previous literature has also examined the relationship between crime rates and poverty (Mehlum et al., 2005; Ross, 2020), there are two key limitations. First, it has not adequately addressed the issue of endogeneity between the two variables. Second, it has not specifically discussed the impact of poverty reduction on crime rates within the context of China, the largest developing country, and we will fill these gaps in this study.

Hypotheses and Refinement of Questions

Our core question is whether alleviating poverty will reduce the crime rate. However, there is a "chicken-egg" problem between poverty and crime. Without any external policy shocks or administrative control, the poor are more likely to commit crimes. Conversely, a region with a high crime rate will inevitably hinder the normal functioning of the economy and the improvement of people's living standards, which form a negative cycle. However, if the government takes various policies to improve the living standards and increase the income of people in a region, this cycle can move in a positive direction. When people's income levels rise, it reduces criminal behavior, and the reduction in criminal behavior further promotes economic development. Therefore, in the context of this study, we tend to assume that government poverty alleviation projects, while increasing income, will further reduce the crime rate.

In addition, we also want to answer another question: Is the decrease in crime rate symmetrical across different types of crimes? In other words, does an increase in income lead to a decrease in various types of crimes? Different types of crimes correspond to different criminal motives (Toby, 1962). For example, Merton's strain theory suggests that societal resources are limited, while human desires are unlimited. When individuals in society all strive for the same goals (such as high income or employment), and the resources provided by society are insufficient, those who are unable to acquire resources through legitimate way will feel frustrated, leading to the use of illegal means (crime) to acquire wealth. Additionally, criminologists also have proposed the anarchic crime theory, which suggests that crime occurs in situations of social disorder and low law enforcement efficiency. During economic downturns, individuals in socially disadvantaged areas may be driven by extreme helplessness and choose crime as a means to escape reality. Another perspective is the cultural factor emphasized by the neoclassical school of criminology, where the relative deprivation theory emphasizes emotional and internal reward-based criminal motives (Webber, 2007). Based on these theories, we want to investigate which types of crimes will decrease after the efforts to alleviate poverty.

Details of the Project

China's poverty alleviation efforts have a long history, but the earlier poverty alleviation projects were different from the current one. In the past, poverty alleviation projects were implemented nationwide without regional divisions (Qu, 2017), which posed challenges in studying the economic and social impacts of poverty reduction. However, unlike the past, the current poverty alleviation project is implemented in targeted counties.

The reason of why some parts of China are classed as non-impoverished and others impoverished is that substantial financial resources are allocated annually for transfer payments to impoverished areas. However, China has approximately 1,300 county-level administrative regions, and there is significant disparity in wealth among different counties (Zhang, 2021). For example, the living standards in the eastern coastal regions are significantly better than those in the western regions. Hence, the government needs to establish certain criteria to identify low-income areas with insufficient local government fiscal revenue. Financial subsidies are then provided to these counties to enhance their living standards.

After two years of design and planning, the corresponding poverty alleviation work began in the relating counties at the end of 2015. The time-line of this poverty alleviation project is presented in Table 1.

The scale and intensity of this poverty alleviation work are significant. According to official statistics, as of 2020, a total of 255,000 village-based work teams were dispatched nationwide, and a cumulative total of 2.9 million government and state-owned enterprise personnel were deployed to work in the selected counties. According to the requirements of official documents, these personnel were precisely matched with the corresponding impoverished counties, villages, and households, and carried out poverty alleviation work based on local and household characteristics.

Previous poverty reduction projects were mainly aimed at providing transfer payments to county-level governments which have limited fiscal revenue and unable to afford basic public infrastructure. However, the focus of this poverty reduction project is to transform the county's industrial structure, enhance the people's ability to create wealth, and eradicate poverty mindset. In other words, it emphasizes "teaching people to fish rather than just giving them fish". We consulted the government's official website and summarized the tasks of this poverty reduction project in Table 2.

Regarding the selection of impoverished counties, the official documents explicitly state that it was based on the per capita gross domestic product (GDP), per capita general budgetary revenue, and per capita net income of rural residents. Finally, a total of 592 impoverished counties were selected as targets based on these indicators (Appendix 1 provide more details about the classification of the county).

Data

Crime Rate Data

In this article, we have used two measures to assess crime rates: the number of criminal cases and the number of offenders. To examine whether there are differences in the changes of crime rates across different types of crimes, we further divided criminal cases

Table 1 The time-line of the poverty alleviation project

Time	Activities
2013.11–2014.2	Design and planning
2014.4–2014.6	Project preparation and resource allocation, selection of target counties
2015.12–2020	Implementation, monitoring and evaluation

Table 2 The details of the projects

Tasks	Details
Education	Improving the educational conditions in impoverished areas by providing free education, scholarships, student loans, etc., to enhance educational opportunities, improve the quality of education, and enhance the employment skills and competitiveness of the impoverished population
Medical	Establishing medical and sanitary institutions, providing free or low-cost medical services and medications to the impoverished population, strengthening management of chronic diseases, conducting health education, and improving the medical security level in impoverished areas
Industrial transformation	Developing industries suitable for the local area such as agricultural product processing and rural tourism that suit local conditions to provide employment opportunities and increase income, thereby helping the impoverished population achieve income growth and prosperity
Social security	Establishing a comprehensive social security system, including minimum living allowances, medical insurance, and pension insurance, to provide basic living security for the impoverished population and alleviate their burdens
Housing	Improving housing conditions in impoverished areas, providing safe, sanitary, and suitable living environments, and addressing the housing issues of the impoverished population
Ecology	Promoting ecological restoration and protection, developing the ecological economy, improving the ecological environment and sustainable utilization of resources in impoverished areas
Skill training	Providing vocational training and skill enhancement opportunities for the impoverished population, improving their employment and entrepreneurial capabilities
Public services	Enhancing the infrastructure construction in impoverished areas, including roads, water supply, electricity, and other basic public service facilities, to improve the living conditions and quality of life for the impoverished population

into four categories: property crimes, robbery and theft crimes, violent crimes, and intentional injury crimes. The motivation behind this classification is to explore the impact of poverty reduction programs on different crime motivations. Property crimes include robbery and theft crimes, but considering that robbery and theft may be more common in economically depressed areas with low income, we have separated them as a distinct category for regression analysis.

Since the poverty alleviation project implemented at the county level, official county-level crime rate data in China is not publicly available at present. Therefore, in this article, county-level crime rate data is obtained by aggregating national court verdicts published by the Supreme People's Court. The method of obtaining the crime rate data through court verdicts is reliable for the subsequent analysis in this article due to the following reasons.

Firstly, the Supreme People's Court of China has explicitly stipulated that, except for cases involving state secrets, personal privacy, crimes committed by minors, case end with mediation, and other specific types, all other cases should be made public and published on their official websites. Moreover, the verdicts published on these websites follow a standardized format, which facilitates the automated retrieval of a large amount of data using programs. Specifically, for each case, we obtained data such as location, time, and type of crime using automated programs. Previous studies have also utilized this measure of crime rate and have confirmed its reliability (Khan & Li, 2020).

One important point to note is that the public disclosure of court verdicts began in 2014. Therefore, a challenge for this article is the limited availability of pre-implementation data for the poverty alleviation project, which prevents us from conducting parallel trend analysis at the annual level. However, we can still analyze the crime rate data on a quarterly basis, which will be used for testing in subsequent sections.

County-level Data

We also need to include relevant data at the county level as control variables, including fiscal revenue, fiscal expenditure, population, and per capita GDP. The reason for using these variables as control variables is their association with the classification of poverty and non-poverty counties. If we do not control for these variables in the regression, the experimental group cannot be compared with the control group, and the regression results may be biased.

We determined the experimental group and control group based on the official list of impoverished counties. For other county-level data such as per capita gross domestic product (GDP), per capita general budgetary revenue, and per capita income of rural residents, we obtained them from multiple sources such as the China County Statistical Yearbook, EPS database(a commercial database that contains various micro and macro data), CEIC database(a commercial database contains economic data about most counties). These data have been widely used in research on China-related issues (Clay et al., 2021; Groh et al., 2022; Li et al., 2016).

It is important to note that county-level statistical data may have some missing values, so it was not possible to obtain complete data for all 592 impoverished counties. After excluding samples with missing data, the final analysis included 592 impoverished counties as the experimental group and 1,355 non-impoverished counties as the control group. In addition, to discuss the possible mechanisms in this article, we also utilized data on changes in people's income levels from the China Family Panel Studies (CFPS) survey, which provides information after the implementation of poverty alleviation policies (Buchmueller et al., 2021; Crossley et al., 2023; Cutler et al., 2022).

Other Relevant Data

In addition to the aforementioned variables, we also included other variables at the county level in the covariate balance test of the difference-in-differences model, such as industrial added value, employment, fixed asset investment, and student population. Furthermore, in the robustness test, we utilized indicators such as population mobility and income. Table 3 presents the names, definitions, and descriptions of these variables. In the subsequent sections of the research design, we will provide detailed explanations for the use of each variable.

Research Design

In the context of this article, the division between the experimental group and the control group is relatively clear; therefore, we will employ a difference-in-differences model for regression analysis. The difference-in-differences model has been widely used to analyze

Table 3 Description of variables

Name	Meaning	Description
Treat	Treatment status	Dummy variable, taking a value of 1 indicates that the county is a poverty county, while a value of 0 represents a non-poverty county
Post	After or before treatment	Dummy variable, taking a value of 1 if the time is after 2015 and 0 otherwise
Crime	Number of offenders	The total number of criminal offenders in the county
Case	Number of cases	The total number of criminal cases in the county
CrimeGrowth	Growth rate of offenders	The annual growth rate of offenders in the county compared to the previous year
CaseGrowth	Growth rate of cases	The annual growth rate of cases in the county compared to the previous year
PropertyCrime	Number of property crime	The percentage increase in the number of offenders involved in property crimes
RobberyCrime	Number of robbery crime	The annual growth rate of robbery offenders in the county compared to the previous year
ViolentCrime	Number of violent crime	The annual growth rate of violent offenders in the county compared to the previous year
InjuryGrowth	Number of injury crime	The annual growth rate of injury offenders in the county compared to the previous year
PropertyGrowth	Growth rate of property cases	The annual growth rate of property cases in the county compared to the previous year
RobberyGrowth	Growth rate of robbery cases	The annual growth rate of robbery cases in the county compared to the previous year
ViolentGrowth	Growth rate of violent cases	The annual growth rate of violent cases in the county compared to the previous year
InjuryGrowth	Growth rate of injury cases	The annual growth rate of injury cases in the county compared to the previous year
Fiscal	Fiscal income per capita	The average amount of general budgetary revenue per capita in the county
Population	Population density	The number of individuals per unit of area in the county
Expenditure	Fiscal expenditure per capita	The average amount of general budgetary expenditure per capita in the county
GDP	GDP per capita	The Gross Domestic Product per capita in the county
Income	Individual income	Total personal income for the current year
Mobility	Mobility of residents	The county population mobility index, which represents the proportion of the population in the county that migrates or moves elsewhere
VA-Primary	Value Added of the Primary Industry	The added value of the primary industry in the county during the current year
VA-Secondary	Value Added of the Secondary Industry	The added value of the secondary industry in the county during the current year
VA-Tertiary	Value Added of the Tertiary Industry	The added value of the tertiary industry in the county during the current year
Employee-Primary	Employees in the Primary Industry	The number of workers employed in the primary industry in the county during the current year

Table 3 (continued)

Name	Meaning	Description
Employee-Secondary	Employees in the Secondary Industry	The number of workers employed in the secondary industry in the county during the current year
Employee-Tertiary	Employees in the Tertiary Industry	The number of workers employed in the tertiary industry in the county during the current year
Investment	Fixed Asset Investment	The total amount of fixed asset investment in the county during the current year
Students	Students Enrolled	The number of primary and secondary school students enrolled in the county that year

1. In Appendix 2, we discussed the definition of poverty counties used in this article(the Treat variable) and the reasons for employing this particular definition. We also discuss the differences between the poverty definition used in this study and other commonly used definitions. 2. In Appendix 3, we discussed the limitations of the data used in this article

the impact of government policies. Specifically, we employ the following regression equation to study the causal relationship between poverty and crime rates.

$$Crime_{it} = \alpha + \beta Treat_i \times Post_t + X_{it} + \sigma_i + \theta_t + \varepsilon_{it} \tag{1}$$

In Eq. (1), $Crime_{it}$ represents the growth rate of crime of county i in year t, $Post_t$ is a dummy variable indicating whether the time is after 2015, $Treat_i$ takes 1 if the county belongs to experimental group. X_{it} represents the control variables that we need, σ_i and θ_t represent county and year fixed effects, respectively, while ε_{it} represents the disturbance term.

In an ideal scenario, if the experimental group and the control group were randomly selected, we could directly compare the results of the two groups to determine the causal relationship between them. However, in the context of this article, the selection of the experimental group and the control group is not entirely random; the experimental group is inherently more impoverished. Therefore, in order to accurately assess the impact of poverty reduction policies, it is necessary to follow the common practice in the literature. Prior to regression analysis, a covariate balance test is conducted on the experimental and control groups, and relevant variables are included in the regression equation as control variables. We use the following equation to conduct the covariate balance test between the experimental and control groups and set the final regression equation based on the test results.

$$Covariate_{it} = \alpha + \beta Treat_i + X_{it} + v_{it} \tag{2}$$

We are interested in the coefficient β which indicates whether the control group and experimental group have significant difference on a battery of pre-determined variables. Then we will set the final regression equation based on the results of balanced test. Table 4 presents the results of these tests. In Panel A, we first display four variables based on official grouping criteria. It can be observed that there are significant differences between the experimental and control groups in all four variables. Furthermore, in Panel B, we select additional variables for testing and examine the conditional differences between the two groups after controlling for the aforementioned four variables. We find that the experimental and control groups still exhibit noticeable differences in other variables, but achieve conditional balance after controlling for the selection criteria. Moreover, in Panel C, we examine the differences in the main dependent variables of this study between the two groups and find that they are also conditionally balanced.

Based on the results of the balance tests mentioned above, it is evident that there are differences between the experimental group and the control group. However, when we control for the government's classification criteria in the regression analysis, the experimental group and the control group no longer exhibit significant differences in other variables. Therefore, it is necessary to control for these classification criteria variables in the regression equation. Finally, the regression equation in this article is formulated as follows:

$$Crime_{it} = \alpha + \beta Treat_i \times Post_t + fiscal_{it} + population_{it} + expenditure_{it} + GDP_{it} + \sigma_i + \theta_t + \varepsilon_{it} \tag{3}$$

Analysis and Findings

We present the mean, standard deviation, and sample size of the main variables mentioned in the article in Table 5, and compare the experimental group and the control group. According to this table, there are two points that need to be noted. Firstly, in terms of the total number of criminals and cases, the control group has higher absolute values, which could be attributed

Table 4 Balance test

	experimental group	Control Group	Difference	Conditional Difference
	(1)	(2)	(3)	(4)
Panel A: Criteria				
Fiscal	1.426	3.543	2.117***	
	(0.047)	(0.062)	(0.043)	
Population	1.954	3.963	2.009***	
	(0.058)	(0.063)	(0.097)	
Expenditure	8.231	7.453	-0.778***	
	(0.193)	(0.123)	(0.023)	
GDP	2.037	4.854	2.817***	
	(0.032)	(0.083)	(0.116)	
Panel B: A battery of county-level variables				
VA-Primary	15.735	27.313	11.578***	-0.653
	(0.342)	(0.574)	(0.635)	(0.954)
VA-Secondary	28.742	85.753	57.011***	-0.463
	(0.842)	(2.789)	(2.643)	(0.367)
VA-Tertiary	60.753	102.764	42.011***	-0.654
	(3.764)	(5.643)	(2.952)	(0.691)
Employee-Primary	10.542	20.643	10.101***	-0.315
	(0.759)	(1.107)	(0.755)	(0.384)
Employee-Secondary	38.053	67.643	29.590***	2.765
	(1.643)	(2.951)	(3.287)	(3.865)
Employee-Tertiary	42.729	80.754	38.025***	3.860
	(4.221)	(3.876)	(4.753)	(2.905)
Investment	73.764	149.754	75.990***	-3.864
	(2.641)	(3.975)	(3.753)	(5.974)
Students	18.750	22.863	4.113***	0.263
	(0.864)	(0.964)	(1.015)	(0.963)
Panel C: Dependent variables				
Crime	374.735	200.873	173.862***	5.837
	(10.872)	(6.937)	(12.865)	(6.012)
Case	297.746	172.836	124.910***	5.361
	(9.973)	(8.931)	(10.382)	(7.930)
CrimeGrowth	0.274	0.460	-0.186***	0.003
	(0.023)	(0.051)	(0.051)	(0.081)
CaseGrowth	0.286	0.481	-0.195***	-0.001
	(0.031)	(0.069)	(0.063)	(0.082)

1. ***, **, * denotes 1%, 5%, and 10% significance levels, respectively, with robust t-statistics in parentheses. 2. The unit of value added of the three Industry is in 100 million yuan, the unit of students enrolled and employee is in hundred

to the higher population density in the control group. However, when considering the growth rates of crime rates, the experimental group shows a significant increase compared to the control group. Therefore, we will use both absolute values and growth rates of these variables as explanatory variables in subsequent analyses. Secondly, based on the per capita GDP, per capita fiscal revenue, and expenditure data, it is evident that the control group has better economic

Table 5 Descriptive statistics of main variables

Variable	Experimental		Control		Full sample		N
	Mean	SD	Mean	SD	Mean	SD	
Crime	169.612	153.616	351.904	337.913	282.831	295.736	13,034
Case	128.733	119.9741	238.291	250.035	213.937	223.390	13,034
CrimeGrowth	0.183	0.620	0.132	0.581	0.153	0.631	10,966
CaseGrowth	0.193	0.691	0.148	0.582	0.163	0.698	10,966
PropertyGrowth	0.192	0.841	0.147	0.595	0.163	0.742	10,966
RobberyGrowth	0.225	0.961	0.163	0.702	0.185	0.823	10,966
ViolentGrowth	0.224	1.067	0.142	0.863	0.173	0.946	10,966
InjuryGrowth	0.212	1.052	0.138	0.852	0.162	0.932	10,966
Fiscal	1.531	1.742	3.494	3.481	2.762	3.065	13,034
Population	1.862	2.083	3.639	3.012	3.139	2.863	13,034
Expenditure	9.183	5.863	7.976	5.472	8.421	5.638	13,034
GDP	22.431	12.963	50.381	35.731	39.974	32.837	13,034
Income	11.567	9.372	25.075	13.531	22.452	12.577	13,034
Mobility	0.642	0.242	0.743	0.345	0.693	0.290	13,034

1. The unit of GDP is in thousands of yuan, the unit of population is in hundreds of people per square kilometer, the unit of fiscal is in thousands of yuan, and the unit of expenditure is in thousands of yuan. 2. Except the growth rate, the span of variables are 2014–2020

conditions compared to the experimental group. This indicates that the selection criteria for the experimental and control groups are indeed related to the level of poverty.

According to Table 5, there are two points that need to be noted. Firstly, in terms of the total number of criminals and cases, the control group has higher absolute values, which could be attributed to the higher population density in the control group. However, when considering the growth rates of crime rates, the experimental group shows a significant increase compared to the control group. Therefore, we will use both absolute values and growth rates of these variables as explanatory variables in subsequent analyses.

Secondly, based on the per capita GDP, per capita fiscal revenue, and expenditure data, it is evident that the control group has better economic conditions compared to the experimental group. This indicates that the selection criteria for the experimental and control groups are indeed related to the level of poverty.

Main Results

Table 6 presents the baseline regression results of this study. Column 1 displays the regression results using annual data, showing a significant reduction in the annual growth rate of criminal activities after the implementation of the poverty alleviation project. Column 2 further controls for the linear time trend of the control variables (Goodman-Bacon, 2021), and finds that the coefficient remains significant. Finally, in column 3, regression is conducted using monthly data, and it still reveals a significant reduction in the growth rate of criminal activities due to the poverty alleviation project.

In addition, we also examined the dynamic effects of the poverty alleviation project on the growth of crime rates according to the literature (Sun & Abraham, 2021). Column 4 of

Table 6 Baseline results and dynamic effects

	(1)	(2)	(3)	(4)
Treat×Post	-0.143***	-0.117***	-0.201***	
	(0.041)	(0.033)	(0.021)	
2016				-0.063
				(0.047)
2017				-0.193***
				(0.045)
2018				-0.224***
				(0.047)
2019				-0.187***
				(0.036)
Linear Trend of the Criteria	No	YES	YES	YES
Data frequency	Year	Year	Month	Year
County FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
N	10,966	10,966	63,384	10,966
R2	0.327	0.339	0.159	0.337

1. We use the percentage increase of the offender as depended variable in the baseline results. 2. We take 2014 as the base time in linear trend. 3. Standard errors cluster at the county level. 4. ***, **, * denotes 1%, 5%, and 10% significance levels, respectively

Table 5 presents these results. It is found that the effect is not significant in the first year. This suggests that poverty reduction is a continuous process and may not have an immediate impact on crime rates initially. However, the effects gradually become evident after 2017. Finally, due to the limitations of annual data, we utilized quarterly data to examine the parallel trends between the experimental and control groups. Specifically, we tested the variation of the difference in crime growth rates between the two groups over time using the following equation:

Figure 1 presents parallel trends based on quarterly data (Based on the time-line in Table 1, we take the last quarter of 2015 as the base period), revealing that prior to the initiation of the poverty alleviation project, the regression coefficient fluctuates around zero, indicating no economic or statistical significant difference. However, after the project begins, the regression coefficient gradually becomes negative and attains statistical significance. This indicates that the difference in crime rates between the experimental group and the control group is indeed a result of the poverty alleviation project.

Changing the Measurement of Crime Rate

In the baseline results, we used the annual growth rate of the number of crimes as the dependent variable. In this section, we will first replace the dependent variable with the annual growth rate of the number of crime cases. Table 7 presents the relevant regression results, and it is found that using the annual growth rate of crime cases as the dependent variable does not significantly change the regression results. Then we take the number of offender and crime cases as dependent variable. Table 8 presents the relevant results, it can be observed that using the number of the offender and case as the dependent variable does not change the conclusions of the baseline regression.
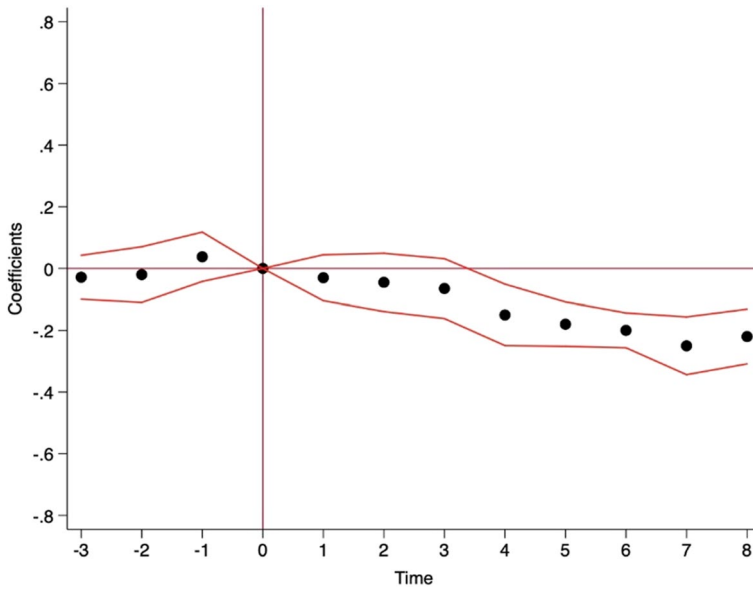
Fig. 1 Parallel trends

Changing the Control Group

In the previous analysis, we treated all non-poverty counties as the control group. However, there might be spillover effects of poverty alleviation efforts (Durlauf, 1994; Thome et al., 2013), meaning that the poverty reduction effects could simultaneously affect the crime rate in neighboring counties. If such effects exist, the estimation results may be biased (Berg et al., 2021). Therefore, we attempt to select control counties that are farther away from the treatment group(We use adjacency of two counties as the criterion. If two counties are adjacent, we exclude them from the control group. If they are not adjacent, we take them as part of the control group).

As a comparison, we also present the results using neighboring counties as the control group and non-neighboring counties as the control group simultaneously. In Table 9, columns (1) and (2) represent the regression results using neighboring counties as the control group, and it can be observed that both the statistical significance and economic significance decrease to some extent. However, the regression results using non-neighboring counties as the control group remain significant. This suggests that the poverty alleviation project indeed has a certain degree of spillover effect.

Considering Criminal Mobility

Since many criminal activities do not occur locally (Andresen, 2011; Freedman & Owens, 2016), it is possible that individuals from poverty counties migrate to non-poverty counties and engage in criminal behavior (Wilström & Torstensson, 1999). If such migration exists, the estimates presented earlier may be biased and could potentially underestimate

Table 7 Take the growth rate of crime cases as dependent variable

	(1)	(2)	(3)	(4)
Treat×Post	-0.128***	-0.161***	-0.195***	
	(0.014)	(0.042)	(0.029)	
2016				-0.083*
				(0.045)
2017				-0.190***
				(0.035)
2018				-0.201***
				(0.046)
2019				-0.197***
				(0.038)
Linear Trend of the Criteria	No	YES	YES	YES
Data frequency	Year	Year	Month	Year
County FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
N	10,966	10,966	63,384	10,966
R2	0.384	0.353	0.179	0.315

1. We take the growth rate of crime cases as dependent variable, the remaining settings are consistent with the baseline regression. 2. ***, **, * denotes 1%, 5%, and 10% significance levels, respectively

the crime rate growth in poverty counties. To address this issue, we ranked cities based on their population mobility and removed the 15 and 30 most active cities in terms of population mobility from the sample respectively (Huang & Deng, 2006).

Table 10 presents the corresponding regression results, and it is found that even after considering the cross-regional transfer of criminal behavior due to population mobility, the causal relationship between poverty and crime still exists.

Placebo test

Under the background of this study, the selected counties are treated as the experimental group, while the remaining counties are the control group. To test the robustness of the baseline results, we bootstrapping 1000 times and estimate them separately. By comparing the estimated results from bootstrapping with the original estimates, we can assess whether the original estimates are affected by omitted variables (Chetty et al., 2009). Following the approach of Chetty et al. (2009) and La Ferrara et al. (2012), this study conducts bootstrapping procedure while controlling for the unchanged proportion of treatment and control observations in the original sample. Figure 2 and 3 presents the results of the placebo test, where we find that the estimated coefficients from the random assignment show a normal distribution centered around zero, while the distribution of the true estimated coefficient differs significantly from bootstrapping results.

Table 8 Take the number of offender and crime cases as dependent variable

	Offender				Case			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat×Post	-0.126***	-0.153***	-0.189***		-0.119***	-0.127***	-0.177***	-0.085
	(0.029)	(0.035)	(0.042)		(0.018)	(0.020)	(0.018)	(0.049)
2016				-0.052				-0.085
				(0.049)				(0.049)
2017				-0.182***				-0.173***
				(0.037)				(0.024)
2018				-0.206***				-0.192***
				(0.049)				(0.031)
2019				-0.193***				-0.188***
				(0.052)				(0.025)
Linear Trend of the Criteria	No	YES	YES	YES	No	YES	YES	YES
Data frequency	Year	Year	Month	Year	Year	Year	Month	Year
County FE	YES	YES	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES	YES	YES
N	13,034	13,034	64,276	13,034	13,034	13,034	64,276	13,034
R2	0.387	0.352	0.189	0.331	0.374	0.323	0.162	0.329

Columns 1 to 4 use the number of offenders as the dependent variable, while columns 5 to 8 use the number of cases as the dependent variable, the rest of the settings are the same as the baseline regression. 2. ***, **, * denotes 1%, 5%, and 10% significance levels, respectively

Table 9 Changing the control group

	Adjacent		Not adjacent	
	(1)	(2)	(3)	(4)
Treat×Post	-0.096***	-0.086***	-0.154***	-0.159***
	(0.030)	(0.021)	(0.035)	(0.029)
Linear Trend of the Criteria	YES	YES	YES	YES
County FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
N	7364	7364	7885	7885
R2	0.397	0.401	0.372	0.365

1. Columns 1 and 2 represent the results when the control group are neighboring counties, while columns 3 and 4 represent the results when the control group are non-neighboring counties. 2. Columns 1 and 3 use the annual growth rate of the number of offenders as the dependent variable, while columns 2 and 4 use the annual growth rate of the number of cases. 3. ***, **, * denotes 1%, 5%, and 10% significance levels, respectively

Table 10 Control the mobility

	Top 15		Top 30	
	(1)	(2)	(3)	(4)
Treat×Post	-0.115***	-0.109***	-0.125***	-0.127***
	(0.027)	(0.020)	(0.037)	(0.040)
Linear Trend of the Criteria	YES	YES	YES	YES
County FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
N	10,239	10,239	9939	9939
R2	0.338	0.332	0.371	0.389

1. Columns 1 and 2 represent the results after excluding the top 15 cities in terms of mobility rankings, while columns 3 and 4 represent the results after excluding the top 30 cities in terms of mobility rankings. 2. Columns 1 and 3 use the annual growth rate of the number of offenders as the dependent variable, while columns 2 and 4 use the annual growth rate of the number of cases. 3. ***, **, * denotes 1%, 5%, and 10% significance levels, respectively

Income Effect

The goal of poverty alleviation is to increase income. In this section, we examine whether the poverty alleviation policy has significantly increased the income in poverty counties. Furthermore, we investigate whether income plays a decisive role in the relationship between poverty and crime rates. To answer that, we utilize data from the China Family Panel Studies (CFPS), which provides information on household and
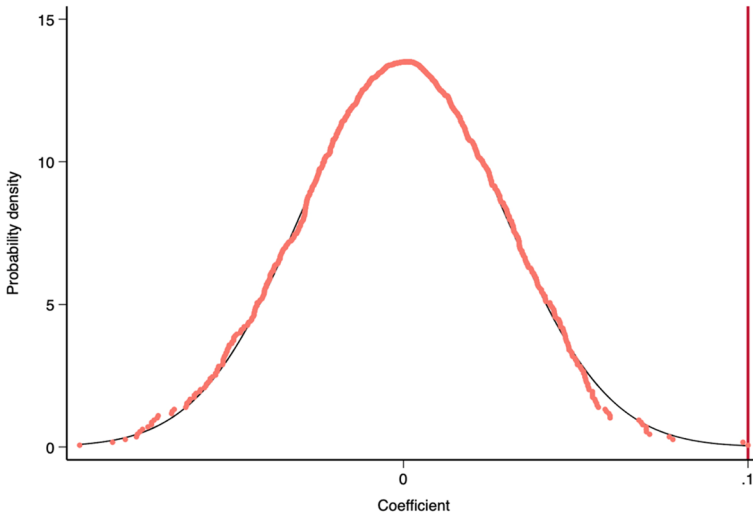
Fig. 2 Placebo test with growth rate of offenders as the dependent variable
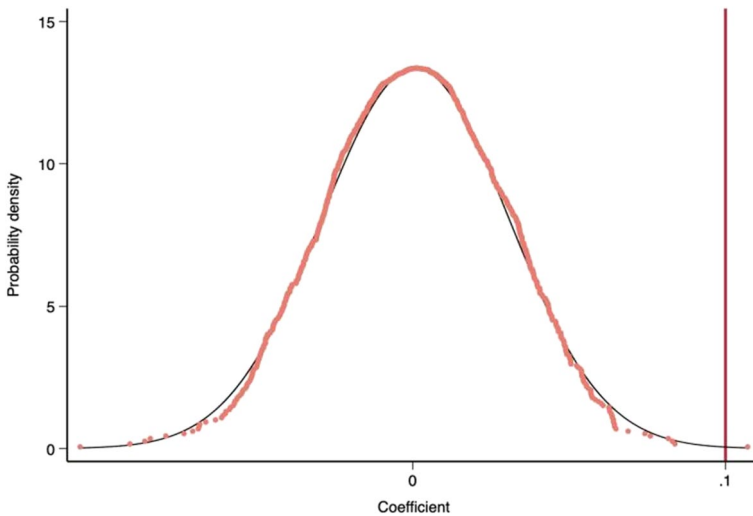

Fig. 3 Placebo test with growth rate of cases as the dependent variable

individual income levels (Flaaen et al., 2019). We integrate this data with the previous dataset (CFPS data does not cover all counties. Therefore, we can only match samples from 34 poverty counties and 51 non-poverty counties). Table 11 presents the regression results.

In column 1, it is found that the implementation of the poverty alleviation project significantly increases the annual income level of respondents in poverty counties. The coefficient indicates that, compared to the control group, the experimental group experiences an average increase of approximately 10% in per capita annual income. Furthermore, we add per capita annual income as a variable to the regression equation and regress it against

the growth of the number of offenders. Column 2 and 3 shows the regression results, it is observed that both the statistical and economic significance of the coefficient decrease. This suggests that the increase in per capita income after the implementation of the poverty alleviation project is indeed an important factor contributing to the reduction in crime rates. Finally, in columns 4 and 5, we use the growth rate of crime cases as the dependent variable and find similar results as mentioned above.

Subdivision of Crime Types

To further verify that the relationship between poverty and crime rates is a result of income level improvement, we further divide all crime cases into different types according to the literature(Wickramasekera et al., 2015;), including property crimes, robbery and theft, violent crimes, intentional injuries. We conduct separate regressions for each crime type. Table 12 presents the regression results. It can be observed that when the crime type is property crimes, the poverty alleviation project significantly reduces the growth rate of crime rates. However, when the crime type is non-property crimes such as violence and personal crimes, the suppression effect of the poverty alleviation project on the growth rate of crime rates is not significant. This once again highlights that the increase in income level in the experimental group is the main mechanism for the reduction in crime rates. Other non-property crimes did not decrease significantly due to the poverty alleviation project.

Conclusions

According to Merton's strain theory of deviance which argues that crime occurs when there aren't enough legitimate opportunities for people to achieve the normal success goals of a society. In such a situation there is a 'strain' between the goals and the means to achieve

Table 11 Mechanism

	Income	Offenders		Cases	
	(1)	(2)	(3)	(4)	(5)
Treat×Post	0.102***	-0.161***	-0.049	-0.104***	-0.051
	(0.018)	(0.017)	(0.042)	(0.015)	(0.050)
Income			-0.059***		-0.069***
			(0.010)		(0.013)
Linear Trend of the Criteria	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES
N	24,986	24,986	24,986	24,986	24,986
R2	0.757	0.493	0.502	0.473	0.481

1. We take the natural logarithm of the income level. 2. We used the 2016 and 2018 CFPS data, which reflect the annual income levels of the respondents in 2015 and 2017, respectively. 3. Columns 2 and 3 use the growth rate of the number of offenders as the dependent variable, while columns 4 and 5 use the annual growth rate of the number of cases. 4. Columns 3 and 5 include income level as a control variable in the regression Eq. 5. ***, **, * denotes 1%, 5%, and 10% significance levels, respectively

Table 12 Subdivision of Crime Types

	Property		Robbery and theft		Violent		Injuries	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat×Post	-0.157[***]	-0.163[***]	-0.169[***]	-0.182[***]	0.021	0.034	-0.012	-0.024
	(0.032)	(0.047)	(0.051)	(0.065)	(0.034)	(0.058)	(0.039)	(0.036)
Linear Trend of the Criteria	YES	YES	YES	YES	YES	YES	YES	YES
County FE	YES	YES	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES	YES	YES
N	10,966	10,966	10,966	10,966	10,966	10,966	10,966	10,966
R2	0.321	0.325	0.312	0.347	0.297	0.289	0.276	0.280

1. We employed two different measures of crime rates for each crime type. Specifically, columns (1), (3), (5), and (7) use the growth rate of the number of offenders as the dependent variable. Columns (2), (4), (6), and (8) use the growth rate of the number of cases as the dependent variable. 2. ***, **, * denotes 1%, 5%, and 10% significance levels, respectively

those goals, and some people turn to crime in order to achieve success. Therefore, this article, to some extent, provides empirical evidence for the aforementioned theories using China's poverty reduction projects as a background (poverty can lead to an increase in crime rates). Specifically, regarding the differences in this theory under the contexts of China and the United States (where the theory was originally applied to by Merton), we attempt to provide an analysis from the perspective of intergenerational social mobility. Relevant research suggests that due to differences in political systems, in the United States, people are more likely to have opportunities to achieve upward social mobility through their own efforts (maybe that's why we usually call US as "a land of opportunity") (Chetty et al., 2014; Corak, 2013). Therefore, the motivation for crime based on Merton's strain theory may be lower compared to China (Please note that Merton's strain theory defines poverty in terms of relative poverty, which is different from the absolute poverty used in this study, therefore the above discussion is merely a qualitative analysis).

The analysis in this article can be summarized in the following aspects. Firstly, the paper provides a detailed overview of the background of the poverty alleviation project. Due to the selection of the experimental and control groups in this project was not random, which may present significant challenges to the identification in this study. To address this problem, we reviewed relevant official documents of the project and find out the criteria for selecting the experimental group. Specifically, we find that the government use per capita GDP, per capita general budgetary revenue, and per capita net income of rural residents at the county as criteria for selecting the experimental group. By controlling for these variables, we can better estimate the causal relationship.

Secondly, we estimated the causal relationship between poverty and crime rates and found a significant decrease in crime rates among the experimental group after the implementation of the poverty alleviation project. Additionally, we demonstrated the dynamic effects of this process, revealing that the decline in crime rates gradually manifested approximately one year after the project's implementation. Lastly, we conducted a series of robustness tests and found that the aforementioned results remained economically and statistically significant when alternative dependent variables, data frequencies, and control groups were used in the robustness checks.

Thirdly, we conducted further analyses on the above results, including mechanism analysis and extended analysis. In the mechanism analysis, we found that the main pathway through which crime rates decreased was the increase in per capita income levels. In the extended analysis, we further categorized different types of crimes and found that the reduction in crime rates was primarily concentrated in property-related crimes, which shared the common characteristic of being motivated by monetary gain. However, we did not observe a significant decrease in violent crimes within the experimental group. By comparing the aforementioned results, it is evident that the national poverty reduction policies, by increasing per capita annual income, have subsequently led to a reduction in crime rates within the experimental group.

According to the analysis in this article, we propose the following policy recommendations. Firstly, based on China's poverty reduction experience, other developing and developed countries should formulate corresponding policies in education, healthcare, social security, industrial transformation, and public services to improve people's living standards while effectively reducing crime rates. It is particularly important to focus on increasing per capita income. Secondly, while the government is formulating policies to reduce crime rates, it should also consider different criminal motivations. The results of this article indicate that reducing the poverty rate alone cannot effectively reduce all types of crime rates. For example, the rates of violent crimes and intentional harm do not decrease due to a decrease in the poverty rate. Therefore, the government should match policies with different types of crimes and effectively reduce crime rates across various categories. For violent crimes and intentional harm, the government should establish an effective system for collecting and analyzing crime data, regularly monitor crime trends and patterns, conduct relevant research, and explore the causes and influencing factors of intentional harm and violent crimes. This will provide a scientific basis for policy formulation and implementation.

Thirdly, poverty reduction can have extensive spillover effects. Therefore, when government fiscal expenditures are limited, it is advisable to conduct widespread pilot projects nationwide, as China has done. This approach ensures that poverty reduction efforts are maximized within a certain fiscal expenditure range, yielding the best social effects. At the same time, pilot projects should emphasize flexibility and sustainability, taking into account local conditions and implementing specific policy measures accordingly. It is important to establish a policy evaluation mechanism to assess the effectiveness and outcomes of pilot projects in a timely manner and to summarize experiences and lessons. Based on the evaluation results, policies should be adjusted and improved promptly to ensure the effective implementation and long-term sustainability of poverty reduction policies.

This article also has several limitations. Firstly, this article focuses only on China, a developing country. It is unclear whether the research findings are applicable to other developing and developed countries, and whether the effects of poverty reduction policies are the same in different countries. Secondly, we do not know why there was no reduction in violent crimes and intentional harm, and we are unsure about which policies can effectively reduce these types of crimes. Thirdly, our data is at the county level and lacks individual-level data, which makes it difficult to study income distribution and inequality, as well as to understand the relationship between income, happiness, and crime. Fourthly, regarding the measurement of poverty, we only utilized the government's list and did not employ other measurement methods (such as infant mortality rate). However, different poverty measurement approaches may impact the empirical results.

Therefore, we look forward to future research primarily focusing on the following aspects. First, if individual-level data can be obtained, further research could be conducted on the relationship between poverty and crime rates, comparing and contrasting the

findings with those of this article, while also discussing the relationship between income distribution inequality and crime. Second, other researchers should evaluate the relationship between poverty reduction policies and crime rates in other developing and developed countries, comparing them with China, and discussing the differences while providing reasonable explanations. Third, based on the findings of this article, government policies that increase income primarily reduce property crimes, but have limited impact on violent crimes and intentional harm. Future research should also examine the effects of other government policies on crime rates, discuss whether these policies increase or decrease crime rates, and differentiate between different types of crimes. This will facilitate matching different policies with different types of crimes, enabling governments to implement tailored policies in different regions.

Appendix 1: Details about the classification criteria of the county

Fig. 4 Official document of the criteria for selecting poverty counties (Chinese version)

Figure 4 is the official document of the government that outlines the criteria for selecting poverty counties (Chinese version). We have annotated the key contents of the document with red lines. The corresponding translation and explanation is:

The official criteria for designating poverty counties have changed three times:

1. In 1986, counties with a per capita net income lower than 150 CNY for agricultural areas, 200 CNY for pastoral areas, and 300 CNY for revolutionary areas(implies that the county has experienced a war) were included in the national support range. These figures were calculated based on the average income of farmers in 1985.
2. In 1994, counties with a per capita net income exceeding 700 CNY, based on the average income of farmers in 1992, were all excluded, while counties with a per capita net income lower than 400 yuan were included.

3. In 2011, the criteria for poverty counties were based on indicators highly correlated with poverty levels, including per capita county-level gross domestic product (GDP), per capita county-level general budgetary revenue, and per capita net income of rural residents for the years 2007–2009. Any county with all three indicators below the average level of the western region during the same period was classified as a poverty county.

According to the translation and explanation above, we can see that the selection criteria for poverty counties include average annual income, per capita county-level GDP, and per capita county-level general budgetary revenue. These indicators can effectively reflect the poverty level of a county.

Appendix 2: The Definition of Poverty

How we measure poverty in quantitative analysis

In our study, we used the Did model to analyze the relationship between poverty and crime. Therefore, following the approach in relevant literature, poverty is treated as a binary variable in the model, taking the values of 1 or 0, representing the treatment group (poverty counties) and the control group (non-poverty counties), respectively. In other words, based on the aforementioned criteria, a county is classified as a poverty county if its income level and other specified criteria are below the national threshold.

Government's definition of poverty in this study and definitions in relevant literature

There are various definitions of poverty in existing research, such as infant mortality rate, absolute poverty, and relative poverty. Each research framework has its most appropriate standards. In our study, we need use the government's official definition to group poverty counties, as only through this approach can we accurately identify the relationship between poverty and crime rates. Specifically, in the context of our study, the government implements poverty alleviation policies based on its designated criteria. Therefore, it is necessary to use these criteria for classification to accurately identify the causal relationship between poverty reduction efforts and crime rates. If alternative criteria, such as infant mortality rate, were used, the treatment and control groups would be mixed, making it impossible to ascertain the effectiveness of the government's poverty reduction policies or determine the causal relationship between poverty reduction and crime rate reduction.

Limitations of the definition

The criteria for classifying poverty and non-poverty counties may have limitations. Firstly, the classification criteria are determined by the government based on China's specific conditions, which may introduce some subjectivity. Secondly, we are uncertain how the research results would change if the government used alternative criteria to classify poverty and non-poverty areas, such as using infant mortality rate.

The comparison of poverty measures

We have consulted relevant reports and literature and have found the globally accepted poverty definitions/measures provided by the World Bank and Ravallion:

1. The World Bank defines poverty in absolute terms. It defines extreme poverty as living on less than US$1.90 per day, and moderate poverty as less than $3.10 a day.
2. Ravallion et al. (2009) update the international "$1 a day" poverty line (1990) to $1.25.

According to the commonly used standards for absolute poverty, we can make a simple comparison with the poverty standards set by the Chinese government. In the 1990s, the Chinese government defined poverty counties based on a per capita income below 700 yuan, which, according to the exchange rate of the People's Bank of China (China's central bank) in 1990, is approximately 0.4 US dollars per day. This is considerably lower than Ravallion's international "dollar a day" poverty line (1990). In recent years, China has raised its standards for identifying the poverty population. Taking 2010 as an example, the individual poverty line was set at 2,300 yuan, which, when converted using the 2010 exchange rate between the Chinese yuan and the US dollar, is approximately 0.93 US dollars per day. This standard is closer to Ravallion's criteria but still slightly lower, particularly when compared to the World Bank's poverty line standards.

Absolute poverty and relative poverty

Another point should be noted is that based on the background of this study, when we say poverty in this article we are referring to absolute poverty. Relative poverty is closely linked to inequality and takes no account of real national income per head.

Appendix 3: Data Limitation

The data used in this paper are at the county level. If we want to discuss income inequality within counties, it would require individual-level data to show income distribution. Unfortunately, we currently do not have access to the individual-level data. The publicly available individual income survey data we can obtain, such as CGSS (Chinese General Social Survey), CSS (Chinese Social Survey), and CLDS (China Labor-force Dynamics Survey) only consist of sample sizes of tens of thousands of observations. If we group the observations by county to observe their distribution, there will be too few observations per county, making it challenging to observe their distribution and calculate inequality measures like the Gini coefficient (considering China's current 1,299 counties). The Chinese government has calculated the national-level Gini coefficient, and some studies have also estimated the Gini coefficient at the provincial level. However, these higher-level data cannot be matched with our research. Therefore, we must acknowledge that with the currently available data, we cannot further examine income distribution inequality within counties.

Code Availability Available from authors upon request.

Declarations

Conflict of Interest The authors declare no competing interests.

References

Ajzenman, N., Dominguez, P., & Undurraga, R. (2023). Immigration, Crime, and Crime (Mis)Perceptions. *American Economic Journal: Applied Economics, 15*(4), 142–176. https://doi.org/10.1257/app.20210156

Allen, R. C., & Stone, J. H. (1999). Market and public policy mechanisms in poverty reduction: The differential effects on poverty crime. *Review of Social Economy*, *57*(2), 156–173. https://doi.org/10.1080/00346769900000033

Allen, W. D. (2021). Crime, Universities and Campus Police. *Applied Economics, 53*(37), 4276–4291. https://doi.org/10.1080/00036846.2021.1899117

Andresen, M. A. (2011). Estimating the probability of local crime clusters: The impact of immediate spatial neighbors. *Journal of Criminal Justice, 39*(5), 394–404. https://doi.org/10.1016/j.jcrimjus.2011.05.005

Arora, A. (2023). Juvenile Crime and Anticipated Punishment. *American Economic Journal: Economic Policy, 15*(4), 522–550. https://doi.org/10.1257/pol.20210530

Baryshnikova, N., Davidson, S., & Wesselbaum, D. (2022). Do you feel the heat around the corner? The effect of weather on crime. *Empirical Economics, 63*(1), 179–199. https://doi.org/10.1007/s00181-021-02130-3

Berg, T., Reisinger, M., & Streitz, D. (2021). Spillover effects in empirical corporate finance. *Journal of Financial Economics, 142*(3), 1109–1127. https://doi.org/10.1016/j.jfineco.2021.04.039

Buchmueller, T. C., Levy, H., & Valletta, R. G. (2021). Medicaid Expansion and the Unemployed. *Journal of Labor Economics, 39*, S575–S617. https://doi.org/10.1086/712478

Castro, M., & Tirso, C. (2023). The impacts of the age of majority on the exposure to violent crimes. *Empirical Economics, 64*(2), 983–1023. https://doi.org/10.1007/s00181-022-02262-0

Chalise, S., & Naranpanawa, A. (2023). Potential Impacts of Climate Change and Adaptation in Agriculture on Poverty: The Case of Nepal. *Journal of the Asia Pacific Economy, 28*(4), 1540–1559. https://doi.org/10.1080/13547860.2021.1982194

Chambru, C. (2020). Weather shocks, poverty and crime in 18th-century Savoy. *Explorations in Economic History., 78*, 101353. https://doi.org/10.1016/j.eeh.2020.101353

Charlton, D., James, A., & Smith, B. (2022). Seasonal agricultural activity and crime. *American Journal of Agricultural Economics., 104*(2), 530–549. https://doi.org/10.1111/ajae.12260

Chetty, R., Hendren, N., Kline, P., Saez, E., & Turner, N. (2014). Is the United States still a land of opportunity? Recent trends in intergenerational mobility. *American Economic Review, 104*(5), 141–147.

Chetty, R., Looney, A., & Kroft, K. (2009). Salience and Taxation: Theory and Evidence. *The American Economic Review., 99*(4), 1145–1177. https://doi.org/10.1257/aer.99.4.1145

Clay, K., Muller, N. Z., & Wang, X. (2021). Recent Increases in Air Pollution: Evidence and Implications for Mortality. *Review of Environmental Economics and Policy., 15*(1), 154–162.

Corak, M. (2013). Income inequality, equality of opportunity, and intergenerational mobility. *Journal of Economic Perspectives., 27*(3), 79–102.

Crossley, T. F., Fisher, P., Low, H., & Levell, P. (2023). A Year of COVID: The Evolution of Labour Market and Financial Inequalities through the Crisis. *Oxford Economic Papers., 75*(3), 589–612. https://doi.org/10.1093/oep/gpac040

Cutler, D. M., Ghosh, K., Messer, K. L., Raghunathan, T., Rosen, A. B., & Stewart, S. T. (2022). A Satellite Account for Health in the United States. *American Economic Review., 112*(2), 494–533. https://doi.org/10.1257/aer.20201480

Dang, H.-A.H., & Verme, P. (2023). Estimating poverty for refugees in data-scarce contexts: an application of cross-survey imputation. *Journal of Population Economics., 36*(2), 653–679. https://doi.org/10.1007/s00148-022-00909-x

Ding, T., Li, Y., & Zhu, W. (2023). Can Digital Financial Inclusion (DFI) Effectively Alleviate Residents' Poverty by Increasing Household Entrepreneurship? An Empirical Study Based on the China Household Finance Survey (CHFS). *Applied Economics., 55*(59), 6965–6977. https://doi.org/10.1080/00036846.2023.2170971

Drugowick, P., & Pereda, P. C. (2023). Crime and economic growth: A case study of Manaus, Brazil. *Review of Development Economics., 27*(4), 2123–2148. https://doi.org/10.1111/rode.13020

Duong, K., & Flaherty, E. (2023). Does Growth Reduce Poverty? The Mediating Role of Carbon Emissions and Income Inequality. *Economic Change and Restructuring, 56*(5), 3309–3334. https://doi.org/10.1007/s10644-022-09462-9

Durlauf, S. N. (1994). Spillovers, Stratification, and Inequality. *European Economic Review, 38*(3–4), 836–845.

Eren, O., Lovenheim, M. F., & Mocan, H. N. (2022). The effect of grade retention on adult crime: Evidence from a test-based promotion policy. *Journal of Labor Economics, 40*(2), 361–395. https://doi.org/10.1086/715836

Flaaen, A., Shapiro, M. D., & Sorkin, I. (2019). Reconsidering the consequences of worker displacements: Firm versus worker perspective. *American Economic Journal: Macroeconomics., 11*(2), 193–227.

Freedman, M., & Owens, E. G. (2016). Your Friends and Neighbors: Localized Economic Development and Criminal Activity. *The Review of Economics and Statistics, 98*(2), 233–253.

Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics, 225*(2), 254–277. https://doi.org/10.1016/j.jeconom.2021.03.014

Groh, S., Karplus, V. J., & von Hirschhausen, C. (2022). Decentral electrification, network interconnection, and local power markets–An introduction. *Economics of Energy and Environmental Policy, 11*(1), 1–4.

Guerra, A., & Nilssen, T. (2023). Optimal sentencing with recurring crimes and adjudication errors. *Journal of Economics, 139*(1), 33–42. https://doi.org/10.1007/s00712-022-00813-8

Han, H., & Si, F. (2023). Capital assets and poverty transitions in rural China. *China Agricultural Economic Review, 15*(3), 563–579. https://doi.org/10.1108/CAER-07-2022-0140

Heilmann, K., Kahn, M. E., & Tang, C. K. (2021). The urban crime and heat gradient in high and low poverty areas. *Journal of Public Economics., 197*, 104408. https://doi.org/10.1016/j.jpubeco.2021.104408

Huang, Y., & Deng, F. F. (2006). Residential mobility in Chinese cities: A longitudinal analysis. *Housing Studies, 21*(5), 625–652.

Jalal, C. S. B., Frongillo, E. A., Warren, A. M., & Kulkarni, S. (2022). Subjective well-being and domestic violence among ultra-poor women in rural Bangladesh: Findings from a multifaceted poverty alleviation program. *Journal of Family and Economic Issues., 43*(4), 843–853. https://doi.org/10.1007/s10834-021-09801-4

Khosla, S., & Jena, P. R. (2022). Analyzing vulnerability to poverty and assessing the role of universal public works and food security programs to reduce it: Evidence from an Eastern Indian State. *Review of Development Economics., 26*(4), 2296–2316.

La Ferrara, E., Chong, A., & Duryea, S. (2012). Soap operas and fertility: Evidence from Brazil. *American Economic Journal: Applied Economics., 4*(4), 1–31. https://doi.org/10.2307/23269740

Lawson, K. (2023). Using Property Rights to Fight Crime: The Khaya Lam Project. *Journal of Economics and Finance., 47*(2), 269–302. https://doi.org/10.1007/s12197-023-09621-2

Lee, H. D., Boateng, F. D., Kim, D., & Maher, C. (2022). Residential stability and fear of crime: Examining the impact of homeownership and length of residence on citizens' fear of crime. *Social Science Quarterly (Wiley-Blackwell), 103*(1), 141–154. https://doi.org/10.1111/ssqu.13108

Lenhart, O. (2021). Earned income tax credit and crime. *Contemporary Economic Policy, 39*(3), 589–607. https://doi.org/10.1111/coep.12522

Li, P., Lu, Y., & Wang, J. (2016). Does flattening government improve economic performance? Evidence from China. *Journal of Development Economics, 123*, 18–37. https://doi.org/10.1016/j.jdeveco.2016.07.002

Lou, Y., Zhou, W., & Ma, Y. (2023). The Impact of Involvement in Targeted Poverty Alleviation on Corporate Investment Efficiency. *Economic Analysis and Policy, 79*, 418–434. https://doi.org/10.1016/j.eap.2023.06.023

Ma, J., Yang, L., & Hu, Z. (2022). A counterfactual assessment of poverty alleviation sustainability on multiple non-equivalent household groups. *Population Research and Policy Review, 41*(5), 1975–2000. https://doi.org/10.1007/s11113-022-09742-2

Masron, T. A., & Subramaniam, Y. (2018). Remittance and poverty in developing countries. *International Journal of Development Issues, 17*(3), 305–325.

Kahn, M. E., & Li, P. (2020). Air pollution lowers high skill public sector worker productivity in China. *Environmental Research Letters, 15*(8), 084003. https://doi.org/10.1088/1748-9326/ab8b8c

Mehlum, H., Moene, K., & Torvik, R. (2005). Crime induced poverty traps. *Journal of Development Economics, 77*(2), 325–340. https://doi.org/10.1016/j.jdeveco.2004.05.002

Meloni, O. (2014). Does poverty relief spending reduce crime? Evidence from Argentina. *International Review of Law & Economics., 39*, 28–38. https://doi.org/10.1016/j.irle.2014.05.002

Mitra, S., & Shajahan, A. (2022). Crime, elections, and political competition. *Review of Development Economics., 26*(4), 2394–2413. https://doi.org/10.1111/rode.12916

Muller, K., & Schwarz, C. (2023). From hashtag to hate crime: Twitter and antiminority sentiment. *American Economic Journal: Applied Economics, 15*(3), 270–312. https://doi.org/10.1257/app.20210211

Ogwang, T. (2022). The regression approach to the measurement and decomposition of the multidimensional Watts poverty index. *Journal of Economic Inequality, 20*(4), 951–973. https://doi.org/10.1007/s10888-022-09531-z

Pak, A., & Gannon, B. (2023). The effect of neighbourhood and spatial crime rates on mental wellbeing. *Empirical Economics, 64*(1), 99–134. https://doi.org/10.1007/s00181-022-02256-y

Qu, T. (2017). Poverty alleviation in China–plan and action. *China Journal of Social Work, 10*(1), 79–85.

Ravallion, M., Chen, S., & Sangraula, P. (2009). Dollar a day revisited. *The World Bank Economic Review, 23*(2), 163–184.

Ross, A. I. (2020). Vice, crime, and poverty: How the Western imagination invented the underworld. *American Historical Review, 125*(5), 1953–1954.

Silva, V. H. M. C., Mariano, F. Z., de Franca, J. M. S., & Firmiano, M. R. (2023). Evaluating the impact of an innovative anti-poverty program: Evidence using the generalized synthetic control method. *Applied Economics Letters, 30*(19), 2867–2871. https://doi.org/10.1080/13504851.2022.2110561

Singh, S. K., & Jha, C. K. (2023). Are financial development and financial stability complements or substitutes in poverty reduction? *European Journal of Finance, 29*(17), 2001–2031. https://doi.org/10.1080/1351847X.2023.2166864

Song, Y. (2012). Poverty reduction in China: The contribution of popularizing primary education. *China & World Economy., 20*(1), 105–122.

Song, Z., Yan, T., & Jiang, T. (2020). Poverty aversion or inequality aversion? The influencing factors of crime in China. *Journal of Applied Economics, 23*(1), 679–708. https://doi.org/10.1080/15140326.2020.1816130

Stretesky, P. B., Schuck, A. M., & Hogan, M. J. (2004). Space matters: An analysis of poverty, poverty clustering, and violent crime. *Justice Quarterly., 21*(4), 817–841.

Su, J., Tang, L., Xiao, P., & Wang, E. (2023). Multidimensional poverty vulnerability in rural China. *Empirical Economics, 64*(2), 897–930. https://doi.org/10.1007/s00181-022-02258-w

Sun, L., & Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics., 225*(2), 175–199. https://doi.org/10.1016/j.jeconom.2020.09.006

Tealde, E. (2022). The unequal impact of natural light on crime. *Journal of Population Economics., 35*(3), 893–934. https://doi.org/10.1007/s00148-021-00831-8

Thome, K., Filipski, M., Kagin, J., Taylor, J. E., & Davis, B. (2013). Agricultural spillover effects of cash transfers: What does LEWIE have to say? *American Journal of Agricultural Economics, 95*(5), 1338–1344.

Toby, J. (1962). Criminal motivation: A sociocultural analysis. *The British Journal of Criminology, 2*(4), 317–336.

Webber, C. (2007). Revaluating relative deprivation theory. *Theoretical Criminology, 11*(1), 97–120.

Wickramasekera, N., Wright, J., Elsey, H., Murray, J., & Tubeuf, S. (2015). Cost of crime: A systematic review. *Journal of Criminal Justice., 43*(3), 218–228. https://doi.org/10.1016/j.jcrimjus.2015.04.009

Wilström, P. O., & Torstensson, M. (1999). Local crime prevention and its national support: Organisation and direction. *European Journal on Criminal Policy and Research, 7*(4), 459–482.

Zhang, J. (2021). A survey on income inequality in China. *Journal of Economic Literature, 59*(4), 1191–1239.

Zhang, Y., Wu, Y., & Zhou, W. (2023). High-Speed railway and rural poverty alleviation. *Applied Economics, 55*(36), 4165–4176. https://doi.org/10.1080/00036846.2022.2126817