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Inclusive finance development and intergenerational income mobility: evidence from China

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This study examines the impact of inclusive finance development on intergenerational income mobility at the household micro-level using panel data from the China Family Panel Studies (CFPS) between 2016 and 2020. The empirical findings reveal that the development of inclusive finance significantly reduces intergenerational income transmission between offspring and parents, thus enhancing regional income mobility. Mechanism analysis indicates that inclusive finance can improve intergenerational income mobility by facilitating investments in human capital, advancing occupational levels, and enhancing financial literacy. Further heterogeneity analysis shows that the promoting effects of inclusive finance are stronger for females, low-income individuals, those with low social capital, individuals aged 25 and above, and offspring residing in urban areas and regions with higher levels of marketization. This study offers a novel perspective on the research of income mobility among residents and expands the scope of welfare assessment related to inclusive finance. It reveals the relationship between the development of inclusive finance and intergenerational income mobility, which is crucial for a comprehensive understanding of inclusive finance development in China and the prevention of class solidification.

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Introduction

Since the reform and opening up, China has experienced rapid economic growth, but the development strategy of "let some people get rich first" has also been accompanied by an exacerbation of income inequality. This inequality has caused a widening wealth gap, resulting in clear identity and class differences. In the process of generational succession, phenomena such as the "second generation of the rich" and the "second generation of the poor" have emerged, highlighting the lack of intergenerational income mobility and reflecting the "Matthew effect". Fan et al. (2021) confirmed that intergenerational income mobility has been weakening in China during the economic development transition, and that it is at a relatively low level internationally. The stronger the intergenerational income mobility, the weaker the intergenerational income correlation, indicating a limited impact of parental factors on children's income and a greater likelihood of upward mobility for individuals at the bottom of the income scale (Checchi and Peragine 2010; Wang and Wan 2015). Conversely, a lack of intergenerational income mobility may give rise to negative attitudes such as "education is useless" and "efforts are ineffective" among the offspring of low-income families, which may result in a tendency to abandon efforts. It may also lead to a lack of crisis awareness and reduced efforts among the offspring of high-income families. These factors can result in the wastage of human resources, a reduction in economic efficiency, and a hindrance to long-term economic development (Marrero and Rodriguez 2013; Aiyar and Ebeke 2020). Furthermore, the absence of intergenerational income mobility may give rise to conflict between high- and low-income groups and social instability, and may even result in China becoming trapped in the "middle-income trap". Therefore, it is of great practical significance to pay attention to the inequality of opportunity in the process of income distribution, to study intergenerational income mobility in depth, and to explore effective strategies for maintaining high intergenerational income mobility.

The enhancement of the inclusivity of the financial system is regarded as a key factor in promoting equal economic opportunities (Dabla-Norris et al. 2021). Becker and Tomes (1979) identified that the challenges low-income families face in accessing financial resources are a primary reason for their low intergenerational mobility. Subsequent studies have further suggested that financial constraints not only restrict low-income households' investment in productive capital but also significantly affect educational intergenerational mobility. The lack of collateral and the "wealth threshold" in financial markets result in more pronounced financial constraints for low-income households (Flug et al. 1998), which, in turn, limit their investment in education. The studies conducted by Carneiro and Heckman (2002), and Yang and Qiu (2016) demonstrate that financial constraints not only significantly impact the educational attainment of children in low-income families but also serve as a key factor contributing to the lower return on education for these children. In this context, the promotion of inclusive finance, which is characterised by its inclusive and sharing attributes, provides an effective pathway to alleviate financial constraints among low-income families. This initiative holds the promise of enhancing intergenerational educational mobility and subsequently fostering economic equal opportunity.

The concept of "inclusive finance" was introduced by the United Nations in 2005 and has since garnered a response from numerous countries. Inclusive finance refers to a financial system that enables all societal strata and groups to access formal financial services widely and effectively (Allen et al. 2016). In contrast to traditional finance, inclusive finance emphasizes financial equity and focuses on equal opportunity. Its goal is to provide financial services to vulnerable groups, often referred to as the "long tail" population, at affordable and commercially sustainable cost. Empirical research indicates that financial inclusion can significantly stimulate economic growth (Sarma and Pais 2011; Dupas and Robinson 2013). Furthermore, inclusive finance also addresses income distribution concerns, striking a balance between efficiency and equity. First, inclusive finance can play a role in poverty reduction (Beck et al. 2007; Chibba 2009). Second, inclusive finance can improve income distribution while promoting economic growth, facilitating inclusive growth. Dimova and Adebowale (2017) indicated that the development of inclusive finance can increase the income of urban and rural residents and reduce the welfare gap between urban and rural areas. In recent years, academic discussions surrounding inclusive finance and income inequality have gained widespread attention. Existing research has focused on whether inclusive finance can promote poverty reduction (Burgess and Pande 2005; Dong et al. 2024), alleviate income inequality (Kling et al. 2020), and narrow the urban-rural income gap (Huang and Zhang 2020). However, there is limited literature investigating the impact of inclusive finance on intergenerational income mobility. If inclusive finance can reduce the "path dependency" of offspring groups on parental income, it can better facilitate income mobility.

Therefore, this study attempts to utilize large-scale household microdata to comprehensively investigate the impact of regional inclusive finance development on intergenerational income mobility among residents. In comparison with existing research, the potential marginal contributions of this study include: Firstly, within the context of China's comprehensive promotion of common prosperity, empirically examining the influence of regional inclusive finance development on individual intergenerational income mobility in China. The exploration arises from the current rigid social mobility in China, the development goal of common prosperity, and the economic context of inclusive finance development. This study supplements the analysis of factors influencing intergenerational mobility, expands the relevant literature on the micro-level welfare effects of inclusive finance, and holds significant theoretical and practical implications. Secondly, this study discusses the potential mechanisms through which inclusive finance impacts intergenerational income mobility among residents and further analyses the heterogeneous effects of regional inclusive finance on individual intergenerational income mobility. This provides valuable policy insights for governments and decision-makers to enhance social mobility.

The subsequent sections of the paper are organized as follows. Section 2 provides a comprehensive review of the pertinent literature; Section 3 presents the empirical model and introduces the employed data; Section 4 empirically evaluates the influence of financial inclusion on the realization of intergenerational upward income mobility among offspring, and elucidates the operative mechanism; Section 5 discusses cohort heterogeneity; and Section 6 concludes the entire paper, presenting corresponding policy recommendations.

Literature review

Intergenerational income mobility. Although the Gini coefficient remains the most widely used metric for assessing income inequality, it captures disparity along only a single dimension and therefore fails to convey the full scope of wealth differences. Research on income distribution must consider not only static income inequality but also dynamic income inequality, which refers to income mobility[1]. Examining income mobility is crucial for analysing changes in income distribution (Bárcena-Martin

et al. 2024). Moreover, compared to horizontal intra-generational income mobility, vertical intergenerational mobility significantly mirrors the fairness and openness of opportunities pertaining to wealth transmission across generations within the same household (Fan et al. 2021). Even if a significant income disparity exists within a society, high intergenerational income mobility enables low-income individuals to ascend the social ladder through their efforts, resulting in a "tunnel effect" that mitigates large income gaps. Conversely, a lack of intergenerational income mobility may result in pronounced social stratification, with low-income groups possessing diminished expectations of upward mobility, thereby exacerbating the potential for social conflicts.

The empirical research on intergenerational income mobility encompasses a range of topics, including the measurement of intergenerational income mobility, the examination of intergenerational income mobility trends and international comparisons, and the investigation into the factors influencing intergenerational income mobility. The existing literature typically employed intergenerational income elasticity (IGE) as a metric to assess intergenerational income mobility (Becker and Tomes 1979; Solon 1992; Haider and Solon 2006; Deng et al. 2013; Chetty et al. 2014; Yan and Deng 2021). This study also adopts this indicator. The decrease in intergenerational income elasticity indicates an increase in intergenerational income mobility and a fairer society. Fan et al. (2021) confirmed the continuous rise in intergenerational income elasticity in China since the implementation of marketization reforms in 1979, and proposed three potential factors that could influence intergenerational income persistence in China, namely, structural changes in marketization, economic development, and public policies. Researchers have primarily investigated the intergenerational transmission of income by examining genetic (Behrman and Taubman 1989; Das and Sjocren 2002), family-related, and environmental factors. Among these factors, family characteristics primarily encompass human capital, social capital, and physical capital (Aizer and Currie 2014; Diewald et al. 2015; Yang and Qiu 2016), while environmental factors mainly involve government expenditure (Mayer and Lopoo 2008; Huang et al. 2024), public education policies (Tang et al. 2021; Biasi 2023), and social insurance systems (Goldthorpe 2013). Undoubtedly, these contributions have enriched our understanding of the determinants of intergenerational mobility. However, a crucial aspect that has not been fully addressed is the potential role of inclusive financial development in enhancing such mobility.

Inclusive finance and household income growth. The imperfections in traditional financial markets, such as information asymmetry and high transaction costs, result in restricting the access of the poor to formal financial services, hindering their ability to escape poverty. For instance, under conditions of an underdeveloped credit market, households at the lower tail of the income distribution struggle to access education investments and entrepreneurial capital through formal channels (Banerjee and Newman 1993). To address this market failure, financial inclusion has emerged as a transformative policy framework characterized by expanded service penetration and tailored financial instruments targeting vulnerable demographics. A growing consensus in development economics literature substantiates the poverty-alleviation effects of inclusive financial systems, which have been widely recognized as instrumental in reducing inequality metrics, poverty incidence, and stimulating economic growth (Jeanneney and Kpodar 2011; Neaime and Gaysset 2018; Ahmad et al. 2023). As the adverse effects of financial exclusion become increasingly apparent, countries worldwide have identified the expansion of financial inclusion as one of the key objectives for sustainable development (Demirguc-Kunt et al. 2018). Inclusive finance also represents a critical component for China in advancing financial development and deepening efforts.

In terms of regional economic growth, Kim (2016) discovered that financial inclusion fosters economic growth by mitigating income inequality. Kim et al. (2018) conducted an investigation into the correlation between inclusive finance and economic growth within the Organization of Islamic Cooperation (OIC) countries with a relatively elevated degree of financial exclusion. Van et al. (2021) also found that inclusive finance has a significant role in promoting economic growth in emerging markets. Furthermore, with the integration of digital technologies such as big data, blockchain, and cloud computing into the financial sector, many scholars have undertaken research on the impact of digital inclusive finance on household income. The majority of studies affirm the positive role of digital inclusive finance in boosting household income (Lian et al. 2023; Zhang et al. 2024).

In terms of the poverty reduction effects of inclusive finance, Park and Mercado (2018) provided macro-level evidence demonstrating the positive impact of inclusive finance on reducing poverty and income inequality, based on cross-national data from 37 developing Asian economies, including China. Li (2018) employed the Data Set of Chinese Household Finance Survey (CHFS) to investigate the primary debt motivations of relatively impoverished households from the perspectives of income comparison and household financial decision-making. The study indicated that the tunnel effect serves as the primary incentive for relatively impoverished households to access the credit market. Consequently, inclusive finance has generated positive economic impacts on poverty-stricken groups, rather than leading to persistent poverty. The empirical findings of Álvarez-Gamboa et al. (2021), based on Ecuadorian data, also confirmed this conclusion. The positive role of the tunnel effect is particularly evident in developing countries and economies in transition, where, with the advancement of inclusive finance, expanded access to financial services can enable these households to seize educational and entrepreneurial opportunities, thereby augmenting incomes and mitigating poverty.

Inclusive finance and household income inequality. The academic community has not yet reached a consensus on the relationship between inclusive finance and income inequality. Some scholars maintain that the advancement of inclusive finance has expanded economic opportunities for disadvantaged groups, potentially mitigating intergenerational sustainability of relative income and fostering improvements in income distribution and income inequality reduction (Becker and Tomes 1979; Lacalle-Calderon et al. 2019). According to Kapoor (2014), inclusive finance is regarded as an equalizer that can act positively in reducing the poverty rate and improving the urban-rural dichotomy, all while maintaining efficiency and emphasizing equity. Demir et al. (2022) consistently demonstrated that inclusive finance serves as a potent instrument to mitigate income inequality within countries and facilitate inclusive growth, using cross-country panel data. However, some scholars have arrived at the opposite conclusion as the development of inclusive finance may harbor structural issues leading to adverse effects (Koh et al. 2020). At the micro-level, financial markets might exhibit an "elite capture" mechanism where credit resources are monopolized by a select few elites (DeHaan and Sturm 2017), subjecting broader populations to financial repression and rendering inclusive finance initiatives imbalanced and insufficiently effective. Additionally, other scholars indicate that the relationship

between inclusive finance development and household income inequality follows an inverted-U (Kuznets) curve, with inequality initially increasing before declining in later stages (Greenwood and Jovanovic 1990; Huang and Zhang 2020).

In conclusion, recent years have seen extensive research in academia on inclusive finance and digital inclusive finance. However, most studies have primarily focused on the impact of inclusive finance on individual income enhancement, urban-rural income disparities, or intra-generational income inequality, only reflecting static income inequality. In contrast, the influence of inclusive finance on intergenerational income mobility, which represents dynamic income inequality remains insufficiently explored. Notably, the research frontier has begun to exam the intergenerational effects of financials reform and digital finance. For example, a quasi-natural experiment exploiting U.S. banking deregulation showed that deregulation significantly increased educational attainment and occupational status among children from low-income households, suggesting that financial inclusion policies can promote upward intergenerational mobility (Kampanelis et al. 2024). Utilizing China Family Panel Studies (CFPS) data and the Peking University Digital Financial Inclusion Index (PKU-DFIIC), Yang et al. (2024) identify that digital financial inclusion enhances intergenerational income mobility by lowering entrepreneurial financing barriers, though with diminishing marginal effects in rural regions. Furthermore, Yan et al. (2024) highlighted that digital finance can effectively interrupt the intergenerational transmission of poverty by improving household financial literacy and risk-management capabilities, although its efficacy is constrained by the completeness of regional digital infrastructure.

While these studies have expanded our understanding of the relationship between financial inclusion and intergenerational mobility, they still remain several limitations. First, existing literature predominantly focuses on the intergenerational effects of digital finance, lacking a systematic exploration of the mechanisms underlying traditional inclusive finance. Second, current research has yet to fully reveal the potential transmission channels and heterogeneous characteristics of the impact of inclusive finance on intergenerational mobility, particularly lacking in-depth exploration of differential effects on vulnerable groups such as women and individuals with low social capital.

In light of these considerations, this study employs large-scale household microdata from China, matching with regional indicators of inclusive finance development, and seeks to contribute in the following areas. First, by constructing a three-dimensional indicator system encompassing the penetrability, accessibility, and utility of inclusive finance, this study is the first to disentangle the differential effects of various dimensions of traditional inclusive finance on intergenerational mobility, thereby enriching the literature on inclusive finance and household welfare. Second, it innovatively reveals the mechanisms of human capital investment and occupational advancement, while systematically examining the heterogeneous effects of inclusive finance on vulnerable groups such as women and individuals with low social capital, providing empirical evidence for targeted policy-making. These findings not only extend the welfare evaluation framework of inclusive finance but also offer a more specific policy perspective for breaking the cycle of intergenerational poverty.

Methodology and data

Econometric model specification. This study extends the intergenerational income mobility models of Becke and Tomes (1979, 1986) and Solon (2004) by incorporating the regional financial inclusion variable and constructing the econometric regression model presented below:

$$Income_{i,j,t} = \alpha + \beta_1 Fincome_{i,j,t} + \beta_2 FI_{i,j,t-1} + \beta_3 Fincome_{i,j,t} FI_{i,j,t-1} + \gamma X_{i,j,t} + \theta_j + \mu_t + \varepsilon_{it} \quad (1)$$

Where the dependent variable, $Income_{i,j,t}$, is the is the logarithm of the income of individual i in region j during the t-th year. $Fincome_{i,j,t}$ is the logarithmic income of the father of the individual i. $FI_{i,j,t-1}$ represents the level of inclusive financial development in the region j of the i-th individual in the lag phase of the t-th year. $X_{i,j,t}$ is a set of control variables, including individual characteristics and family characteristics. α, β and γ are the estimated parameters in the model, while θ_j and μ_t represent region and year fixed effects, respectively.

The intergenerational income elasticity is denoted as $\beta_1 + \beta_3 FI_{i,j,t-1}$, while β_3 signifies the effect of inclusive finance on this elasticity. A negative value for β_3 implies that as the level of inclusive finance increases, the intergenerational income elasticity decreases, indicating that the advancement of inclusive finance mitigates intergenerational income inequality. Conversely, a positive β_3 suggests that with increasing levels of inclusive finance in a region, the intergenerational income elasticity escalates, indicating that the development of inclusive finance impedes intergenerational income flow and exacerbates intergenerational income inequality.

Data collection. The empirical data used in this study are derived from the China Family Panel Studies (CFPS), a comprehensive survey conducted by the China Social Science Survey Centre (ISSS) at Peking University in 2010. The CFPS adopts a stratified sampling method, encompassing 25 provinces, cities, and autonomous regions, and targeting a representative sample size of 16,000 households. The dataset provides comprehensive information on each family, encompassing individual demographic characteristics, income variables of the offspring and the father, and family-related characteristics. This provides a data guarantee for accurately assessing intergenerational income elasticity and facilitates exploration of influencing factors. In this study, we utilize the sample survey data of 2016, 2018, and 2020[2]. To ensure the rationality of income measurement, this study excludes offspring younger than 16 years old and fathers older than 60 years old[3], that is, retaining the labour force, and finally obtains 3636 samples of the unbalanced panel. In addition, the data related to inclusive finance indicators at the regional level are derived from the "China Statistical Yearbook", "Regional Financial Operation Report", and the CSMAR over the years from 2016 to 2020.

Variable measurement

Dependent variable. The dependent variable refers to the income of offspring. This study employs the total personal income obtained from the three rounds of the CFPS survey, as a proxy variable for individual income, which mainly includes income from wages and salaries. Firstly, we eliminate the samples with no response to the "total personal income" option from both the parent and offspring samples. Subsequently, the 1% samples with the lowest and highest incomes of both father and offspring are winsorized to mitigate the influence of aberrant income, which often arises from transient shocks or measurement errors. Furthermore, in the empirical analysis, the income variables are logarithmically transformed.

Independent variables. The core explanatory variable in this study is the inclusive finance index (*FI*). Numerous studies have been

Table 1 Indicator system for inclusive finance index.

Dimensions	Indicators	Indicator unit
Penetration	Number of financial institutions per 10,000 people	A / ten thousand individuals
	Number of financial employees per 10,000 people	A / ten thousand individuals
	Number of financial institutions per 10,000 square kilometers	A / ten thousand square kilometers
	Number of financial employees per 10,000 square kilometers	A / ten thousand square kilometers
Accessibility	Deposit balance for financial institutions (per capita)	Ten thousand Yuan/person
	Loan balance of financial institutions (per capita)	Ten thousand Yuan/person
Utility	Deposit balances of financial institutions /GDP	dimensionless
	Loan balances of financial institutions /GDP	dimensionless
	Insurance density	Yuan/person
	Insurance depth	%

conducted to measure the level of inclusive finance development, wherein scholars commonly adopt a multidimensional and multi-indicator approach rather than relying on a single indicator. Drawing on the China Inclusive Finance Indicators Analysis Report (2018) issued by the People's Bank of China and the measurement frameworks used by previous researches (Sarma and Pais 2011; Park and Mercado 2018; Hu et al. 2021; Shen et al. 2024; Kebede et al. 2024), this study constructs an indicator system for the inclusive finance index from three dimensions: financial service penetration, accessibility, and utility (refer to Table 1). The inclusive finance index is subsequently computed by integrating the coefficient of variation method with the Euclidean distance method[4]. The detailed methodology is outlined below.

1. Calculation of the inclusive finance index: Owing to differences in the measurement units across indicators, raw data normalization is required before computing the composite index to ensure data comparability and consistency:

$$d_{pj} = \frac{A_{pj} - m_{pj}}{M_{pj} - m_{pj}} \tag{2}$$

where A_{pj} denotes the observed value of the j-th indicator within dimension p for a given region $(p = 1, 2, 3, \mathrm{j} = 1, \cdots, \mathrm{q})$, m_{pj} and M_{pj} represent its minimum and maximum values, respectively, and d_{pj} is the normalized, dimensionless indicator value bounded between 0 and 1 $(0 \le d_{pj} \le 1)$.

The Euclidean distance between the measured values of each dimension and their optimal counterparts is subsequently calculated, with all distances aggregated into a composite metric through the following formalization:

The inclusive finance index for each dimension is defined as

$$FI_p = 1 - \frac{\sqrt{\sum_{j=1}^{q} w_{pj}^2 \left(1 - d_{pj}\right)^2}}{\sqrt{\sum_{j=1}^{q} w_{pj}^2}} \tag{3}$$

The composite Inclusive Finance Index is then computed as

$$FI = 1 - \frac{\sqrt{\sum_{p=1}^{3} w_p^2 \left(1 - FI_p\right)^2}}{\sqrt{\sum_{p=1}^{3} w_p^2}} \tag{4}$$

where d_{pj} denotes the normalized value of the j-th indicator within dimension p, w_{pj} is the weight of that indicator, and w_p is the weight assigned to dimension p. Both FI_p and FI lie in the interval [0,1], with larger values indicating higher levels of inclusive finance development.

2. Weight determination.:

(1) **Indicator weights within each dimension**. The coefficient of variation for the j-th indicator in dimension p is calculated as

$$CV_{pj} = s_{pj} / \overline{d_{pj}} \tag{5}$$

where s_{pj} denotes the standard deviation and $\overline{d_{pj}}$ the mean of the normalized indicator values d_{pj}. The weight assigned to each indicator within dimension p is then given by

$$w_{pj} = CV_{pj} / \sum_{j=1}^{q} CV_{pj} \tag{6}$$

(2) **Weights across dimensions**. The coefficient of variation for the inclusive finance index of dimension p is computed as

$$CV_p = s_p / \overline{d_p} \tag{7}$$

where s_p and $\overline{d_p}$ are the standard deviation and mean of the dimension specific index FI_p, respectively. The dimension weight is then determined by

$$w_p = CV_p / \sum_{j=1}^{q} CV_p \tag{8}$$

Here, w_{pj} is the weight of indicator j in the calculation of FI_p, and w_p is the weight of FI_p in the composite index FI.

Control variables. In selecting control variables, the study accounts for both individual micro-characteristics and the regional macro-environment. At the individual level, controls include offspring's age and its square, gender, educational attainment, household registration status, health status, as well as the father's age and its square (Fan et al. 2021; Yan and Deng 2021; Yan and Gao 2024; Yu et al. 2025). At the regional level, regional per-capita GDP is included to capture the level of economic development, while local government education expenditure as a share of GDP is used to reflect public investment intensity in education. The latter variable influences intergenerational human capital accumulation by improving school quality and optimizing teacher resource allocation (Yang and Qiu 2016). The descriptive statistics for each variable are presented in Table 2. It is worth noting that the average value of the inclusive financial development index in the sample period is 0.183, indicating that the degree of "inclusiveness" in the development of inclusive finance in most regions still needs improvement. The existing literature indicated that the progression of inclusive finance in China is characterized by substantial regional disparities and a multipolar distribution, with the eastern region exhibiting a relatively higher degree of development in this regard (Zhu et al. 2019).

Empirical results

Baseline regression. The benchmark regression analyses the impact of financial inclusion on intergenerational mobility by examining the inclusive financial composite index and its

Table 2 Summary statistics.

Variable	N	Mean	Std. Dev.	Min	Max
Income	2332	9.688	2.641	0	12.206
Fincome	2332	9.045	3.398	0	11.918
FI	2332	0.183	0.176	0.033	0.780
Penetration	2332	0.151	0.201	0.011	0.880
Accessibility	2332	0.159	0.223	0.000	1.000
Utility	2332	0.272	0.178	0.043	1.000
Age of offspring	2332	26.271	4.349	16	38
Gender of offspring (male=1)	2332	0.608	0.488	0	1
Education of offspring	2332	11.669	4.359	0	19
Household registration of offspring (Non-agricultural = 1)	2332	0.259	0.438	0	1
Health level of offspring (Values 1-5)	2332	3.524	0.970	1	5
Age of father	2332	51.770	4.559	36	60
Regional GDP per capita (logarithmic)	2332	10.935	0.457	10.135	12.011
Local educational financial capacity	2332	0.038	0.015	0.021	0.076

Table 3 Baseline results.

Variables	Dependent variable: Income			
	(1)	(2)	(3)	(4)
Fincome * FI	−0.218**			
	(0.101)			
Fincome * Penetration		−0.216***		
		(0.073)		
Fincome * Accessibility			−0.181*	
			(0.099)	
Fincome * Utility				-0.143
				(0.121)
Fincome	0.135***	0.128***	0.124***	0.136***
	(0.034)	(0.031)	(0.031)	(0.043)
FI	17.829*			
	(9.901)			
Penetration		8.445		
		(13.089)		
Accessibility			−2.329	
			(10.662)	
Utility				3.100
				(2.795)
Individual Control Variable	Yes	Yes	Yes	Yes
Provincial Control Variable	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Observations	2332	2332	2332	2332
R^2	0.171	0.170	0.170	0.169

The robust standard error is in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

sub-dimensional indicators. As shown in column (1) of Table 3, inclusive finance significantly promotes residents' income at a 10% level, which is consistent with previous literature (He et al. 2022; Das and Chatterjee 2023). The coefficient of the interaction term between parental income and the inclusive finance index (*Fincome*FI*) is estimated at –0.218 and is statistically significant at the 5% level, indicating that the development of inclusive finance reduces intergenerational dependence and enhances income mobility. Based on the estimated coefficient, a one standard deviation increase in the inclusive finance index (SD = 0.176) leads to a 3.8% reduction in intergenerational income elasticity ($\triangle IGE = \beta_3 \times SD = -0.218 \times 0.176 \approx -0.038$). To further illustrate the policy implications of this effect, it is compared with existing estimates of policy interventions: for instance, Huang et al. (2020), using Chinese provincial data, find that a 10% increase in government spending reduces IGE by approximately 0.01. By inference, the effect of a one standard deviation increase in the inclusive finance index in this study is equivalent to that of a 38% increase in government spending ($(0.038/0.01) \times 10\%$).

From the regression results of the financial inclusion sub-dimension indicators in columns (2)-(4) of Table 3, the interaction coefficient between each indicator and the father's income (*Fincome*) remains statistically significantly negative, indicating that financial inclusion promotes intergenerational income mobility in all dimensions. However, the financial service penetration coefficient has a higher absolute value and significance on the supply side than the accessibility and utility coefficients, indicating that the supply dimension of financial inclusion is currently playing a role in promoting intergenerational income mobility, while there is still insufficient effectiveness in the accessibility and usability dimensions. This suggests that there may be policy opportunities beyond the welfare benefits that supply-side measures, such as establishing financial service outlets or increasing the number of financial employees, can bring to the offspring group. Some groups may face the problem of "financial exclusion". If financial institutions can strengthen the promotion of financial products and accurately reach the target customer groups, it will correspondingly improve their financial knowledge and meet their capital needs, thereby contributing to intergenerational income mobility and effectively showcasing the merits of inclusivity.

Mechanism analysis. Following the mechanism testing approach of Chen et al. (2020) and Achard et al. (2025), this study uses the offspring's human capital investment, occupational status, and financial literacy as dependent variables to further examine the potential transmission pathways through which inclusive finance promotes intergenerational income mobility. The first consideration is whether financial inclusion promotes investment in education. In the absence of a developed credit market, the tail groups are unable to borrow money for educational purposes, severely limiting their career development. The development of inclusive finance provides these groups with abundant credit channels, enabling individuals to enhance their skills and qualifications. Furthermore, the accumulation of human capital also facilitates offspring to achieve a "class leap" and break the "intergenerational transmission" (Restuccia and Urrutia 2004). To validate the above mechanism, this study employs the "years of education for offspring" as a measure of human capital investment level and utilizes a two-way fixed-effects model for estimation. Columns (1) to (3) in Table 4 present the regression results for the full sample and for subgroups based on parental education (junior high school or below vs. high school or above). The coefficients of inclusive finance are positive across all groups, indicating that inclusive finance promotes human capital accumulation among offspring. However, the statistical significance varies by group: the effect is stronger and more significant for children of less-educated parents, while it is weaker and statistically insignificant for those with more-educated parents. Additionally, the effect of inclusive finance fails to reach statistical significance in the full sample regression, possibly stemming from

Table 4 Results of the mechanism analysis.

Variables	Child human capital			Agricultural employment	Agricultural employment	Financial literacy
	All	Low parental education	High parental education			
	(1)	(2)	(3)	(4)	(5)	(6)
FI	22.504	37.932*	6.135	−1.115*	−1.026*	0.305***
	(16.543)	(22.812)	(24.548)	(0.647)	(0.620)	(0.069)
Paternal agricultural employment					0.117***	
					(0.022)	
Paternal agricultural employment * FI					−0.252***	
					(0.051)	
Individual Control Variable	Yes	Yes	Yes	Yes	Yes	Yes
Provincial Control Variable	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	No
Province FE	Yes	Yes	Yes	Yes	Yes	No
Observations	2306	1163	1143	2306	2306	6730
R^2	0.301	0.249	0.218	0.097	0.133	0.014

The robust standard error is in parentheses. *** and * indicate statistical significance at the 1% and 10% levels, respectively. As financial literacy data is only available from the 2018 survey, fixed effects are not included in the analysis of column (6).

the ample resources available in households with highly educated parents, limiting the marginal impact of inclusive finance on their offspring's human capital investment and thereby diluting the overall effect. In contrast, households with less-educated parents rely more heavily on external financial resources to support their children's educational investment. Inclusive finance, by alleviating credit constraints within these households, precisely empowers disadvantaged groups, demonstrating a policy effect akin to extending a helping hand to those in need.

In addition, another possible channel of impact is a boost to non-agricultural employment for the offspring. Relevant literature has shown that occupational inheritance between generations inhibits intergenerational income mobility and social class improvement to some extent (Shi et al. 2010). However, the development of inclusive finance can promote non-agricultural employment and achieve occupational upward mobility. Specifically, the development of inclusive finance can help to relieve the difficulties of credit-constrained small enterprises and broaden their financing channels, thus expanding the scale of production and operation and promoting non-farm employment for the offspring. In addition, inclusive finance can also provide support for the younger generation's education, vocational training, and other aspects of investment, thereby improving their knowledge structure and employment abilities to adapt to economic structural adjustments and easing structural unemployment problems (Ding et al. 2018). In order to test the above hypotheses, we take "whether the offspring are engaged in agricultural work" as the explanatory variable, and use the panel fixed effects model for analysis. As depicted in Column (4) of Table 4, the development of regional inclusive finance can significantly enhance the likelihood of non-agricultural employment for offspring groups, and is statistically significant at the 10% level. The results in column (5) further demonstrate that inclusive finance can effectively break the intergenerational transfer of disadvantaged occupational status from parents to the younger generation. This shows that inclusive finance can enhance intergenerational income mobility by facilitating offspring's career development, and that in the future, the breadth and depth of inclusive finance should be further improved, and efforts should be made to remove the obstacles to occupational mobility between urban and rural areas, so as to disrupt the intergenerational transmission of low income through a positive synergy between inclusive finance and occupational mobility.

While the first two channels emphasize access to financial resources, this study additionally incorporates financial literacy as a complementary mechanism to expand the potential transmission pathways through the lens of financial cognitive abilities. Utilizing three objective questions widely used to measure individuals' financial literacy included in the 2018 CFPS survey (Xie and Fu 2024), covering compound interest calculations, inflation, and risk awareness, the respondents' financial literacy is quantified based on the number of correct answers given, with 1 point awarded for each correct response and 0 points for incorrect ones. After data cleaning, a final sample of 6,730 valid observations is retained. As financial literacy data is only available for 2018, a cross-sectional data model is employed, controlling for individual characteristics and provincial variables, with standard errors clustered at the provincial level. The results, reported in column (6) of Table 4, show that the coefficient of the inclusive finance index is significantly positive at the 1% level, suggesting that the development of inclusive finance significantly enhances individual financial literacy. Inclusive finance, through expanding the coverage of financial services, enhances the cognitive abilities of low-income households related to financial concepts such as compound interest and risk diversification. The improvement in financial literacy further optimizes household financial decisions (such as educational investment allocation and entrepreneurial financing choices), breaking the "short-sightedness" in decision-making among low-income groups due to a lack of financial knowledge, thereby enhancing intergenerational mobility (Lamboglia and Stacchini 2025). The financial literacy channel complements the other two pathways and reinforces their effects by enhancing individuals' financial decision-making capabilities.

Endogeneity treatment. Given that financial inclusion development (*FI*) is a regional-level variable, the individual variables hardly affect the regional variables, so the regression model is unlikely to have a reverse causality problem. However, endogeneity concerns may still arise due to omitted variables (such as regional infrastructure development, people's aversion to risk) and measurement errors (the financial inclusion index). In this study, we choose the number of banks in each region in 1937 (during the Republican period) as an instrumental variable for "financial inclusion" to mitigate the endogenous issue. This selection is motivated by the fact that the number of banks in the

Table 5 Estimation results of 2SLS regression.

Variables	Dependent variable: Income			
	Second stage regression results			
	(1)	(2)	(3)	(4)
Fincome * FI	−4.393**			
	(2.144)			
Fincome * Penetration		−3.014*		
		(1.708)		
Fincome * Accessibility			−2.657**	
			(1.271)	
Fincome * Utility				0.106
				(0.366)
Individual Control Variable	Yes	Yes	Yes	Yes
Provincial Control Variable	Yes	Yes	Yes	Yes
First-stage F statistic	62.61	100.88	67.32	69.31
LM statistic	46.340	71.118	47.312	94.494
(*p*-value)	(0.000)	(0.000)	(0.000)	(0.000)
Cragg–Donald Wald F statistic	31.029	81.171	40.068	86.076
Observations	2050	2050	2050	2050

The robust standard error is in parentheses. ** and * indicate statistical significance at the 5% and 10% levels, respectively.

Table 6 Results of quantile regression.

Variables	Dependent variable: Income				
	q = 0.10	q = 0.30	q = 0.50	q = 0.70	q = 0.90
	(1)	(2)	(3)	(4)	(5)
Fincome * FI	−0.290*	−0.173*	−0.051	−0.054	−0.020
	(0.156)	(0.092)	(0.038)	(0.033)	(0.043)
Fincome	0.119***	0.118***	0.022**	0.025***	0.019*
	(0.038)	(0.022)	(0.009)	(0.008)	(0.010)
FI	43.286***	3.792	-0.705	-3.328	-0.326
	(16.812)	(9.706)	(4.082)	(3.478)	(4.572)
Individual Control Variable	Yes	Yes	Yes	Yes	Yes
Provincial Control Variable	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Observations	2332	2332	2332	2332	2332
Pseudo R^2	0.302	0.093	0.089	0.095	0.117

The robust standard error is in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Republic of China era represents the historical financial foundation of the region and correlates with the current state of financial inclusion development; there is no direct correlation between the number of banks during the Republic of China era and the current intergenerational income mobility, thus satisfying the exclusive conditions of instrumental variables.

In the 26th year of the Republic of China, the Economic Research Office of the Bank of China compiled the National Banking Yearbook, meticulously documenting the number of banks (including headquarters and branches) in each region. This study aggregates these data to the provincial level, and employs 2SLS estimation for analysis. To ensure the exclusivity of the instrumental variables, additional historical regional characteristics were controlled for, including the number of Jinshi (successful candidates in the imperial examinations) during the Ming and Qing dynasties and a dummy variable indicating the presence of port cities. These variables proxy for historical educational attainment and openness, respectively, to account for persistent regional heterogeneity. The estimated results of column (1) in Table 5 show that the first-stage F statistics are greater than the critical empirical value 10, that is, there is a strong statistical correlation between financial inclusion and the instrumental variable. The Cragg-Donald Wald F statistic is 31.029, which is greater than the Stock-Yogo critical value of 16.38 at the 10% significance level, thus rejecting the null hypothesis of a weak instrument. In addition, the Kleibergen-Paap rk LM statistic rejects the null hypothesis at the 1% significance level, that is, the instrumental variable satisfies the identifiability. Specifically, the estimated coefficient on the interaction term (*Fincome*FI*) remains significantly negative (-4.393)[5] at the 5% level, corroborating the findings of the baseline model, which suggests that the development of financial inclusion has a catalytic effect on intergenerational income mobility. Analysing the sub-indices, both the penetration index and availability index significantly promote intergenerational mobility, which is consistent with the benchmark conclusion, except for the validity coefficient index.

Heterogeneity and robustness analysis

Heterogeneity analysis

Offspring income heterogeneity. Since OLS is a mean regression model that captures the average impact of financial inclusion on intergenerational income mobility, it provides limited insights. Considering that the impact of financial inclusion on intergenerational income mobility may vary depending on individual income levels, we further use quantile regression to examine the effect of financial inclusion development on intergenerational income mobility at different quantiles of offspring income. Columns (1)-(5) of Table 6 display the results of regressions at the 10% quantile, 30% quantile, 50% quantile, 70% quantile, and 90% quantile, respectively, which show that there are significant differences in the impact of financial inclusion on intergenerational income elasticity at different income levels. Specifically, the impact of financial inclusion on income mobility is particularly pronounced for offspring groups around the 10% and 30% quantiles (the coefficient of the interaction term is statistically significant), highlighting its inclusive character of "giving a helping hand". However, the impact on income mobility is not statistically significant for the offspring groups located around the 50%, 70% and 90% quantiles. Overall, inclusive finance has a stronger promoting effect on low-income groups, thereby more effectively enabling upward mobility among the most disadvantaged and disrupting the intergenerational transmission of poverty.

The observed heterogeneity is consistent with the pro poor theoretical expectations of inclusive finance. Low-income households are often subject to more severe credit constraints; by providing affordable financial services, inclusive finance is found to significantly alleviate their human capital investment bottlenecks (such as education or vocational training), thereby enhancing intergenerational mobility. In contrast, high income groups typically possess established channels for accessing financial resources, limiting the facilitating role of inclusive finance in their human capital investments or occupational mobility (Kling et al. 2020). Additionally, the intergenerational income persistence among higher-income families stems more from non-market resource transmission. For example, research

Table 7 Sub-sample estimation results under different levels of household social capital.

Variables	Dependent variable: Income	
	Low social capital	High social capital
	(1)	(2)
Fincome * FI	−0.309*	−0.097
	(0.174)	(0.123)
Fincome	0.220***	0.040
	(0.051)	(0.046)
FI	42.949	7.387
	(16.659)	(12.558)
Individual Control Variable	Yes	Yes
Provincial Control Variable	Yes	Yes
Year FE	Yes	Yes
Province FE	Yes	Yes
Observations	1125	1207
R^2	0.216	0.167

The robust standard error is in parentheses. *** and * indicate statistical significance at the 1% and 10% levels, respectively.

Table 8 Sub-sample estimation results for offspring of different genders.

Variables	Dependent variable: Income	
	Male	Female
	(1)	(2)
Fincome * FI	−0.205	−0.165*
	(0.166)	(0.170)
Fincome	0.150***	0.092*
	(0.046)	(0.051)
FI	20.224	20.286
	(13.389)	(14.631)
Individual Control Variable	Yes	Yes
Provincial Control Variable	Yes	Yes
Year FE	Yes	Yes
Province FE	Yes	Yes
Observations	1418	914
R^2	0.186	0.182

The robust standard error is in parentheses. *** and * indicate statistical significance at the 1% and 10% levels, respectively.

by Yan and Deng (2021) and Yan and Gao (2024) reveals that in China, the intergenerational resource transmission in higher-income families relies more on the social capital of the preceding generation (such as family business networks and political resources) and educational privileges. Therefore, the incremental resources provided by inclusive finance have limited marginal effects on the offspring of higher-income households.

Social capital heterogeneity. The policy effect of inclusive finance is also expected to vary with differences in household social-capital endowments. In line with measurement methodologies from prior research (Cao et al. 2022; Zhang and Zhao 2024), the logarithms of household transportation/communication and social expenditure is employed as proxy variables. Transportation and communication expenditures reflect the intensity of external linkages, while social expenditures capture investments in maintaining social ties; together, they measure the "network breadth" and "relationship depth" of household social capital (Yuan et al. 2022). Household social capital is ranked in ascending order, with the median as the dividing point to split the sample into high- and low-social-capital groups. The results of the sub-sample regressions indicate that financial inclusion has a significant impact on enhancing intergenerational income mobility for households with low social capital, while the effect is not statistically significant for households with high social capital. This outcome may be attributed to the strong correlation between social capital and a household's capacity to secure resources through informal channels (Chen and Zhou 2024). When facing traditional financial exclusion, low-social capital households are confronted with greater difficulty obtaining funds from informal sources such as relatives, friends, and private lenders. The development of inclusive finance provides an alternative path for these groups to access resources, increasing their likelihood of obtaining formal funding, and, in turn, enhancing the effect of intergenerational income mobility. In contrast, high-social capital groups have abundant informal financing channels, leading to a limited impact of inclusive finance. The results in Table 6 and Table 7 show that the development of inclusive finance in China exhibits a considerable degree of "pro-poorness", which is conducive to narrowing the income gap between different groups.

Gender-based offspring heterogeneity. Empirical evidence suggests that gender disparities in intergenerational income mobility are widespread across countries, particularly in developing and transitional economies (Bevis and Barrett 2015; Fan et al. 2021; Yan and Gao 2024). Hence, we additionally examine whether the income mobility-enhancing effects of financial inclusion varies across genders. The coefficient estimation results in Table 8 illustrate that inclusive finance significantly enhances intergenerational income mobility among female offspring groups, while it does not have a significant impact on the intergenerational income mobility of male offspring groups. As discussed earlier, inclusive finance promotes upward income mobility by facilitating educational investment. When households face binding credit constraints, limited resources tend to be allocated to offspring with higher expected returns (Becker and Tomes 1986). Influenced by traditional gender norms in China, male offspring are often regarded as primary economic contributors, resulting in a gender bias in educational investment (Yan and Deng 2021). This "son preference" generates two structural consequences: first, female offspring face tighter budget constraints and exhibit higher marginal returns to educational investment; second, male offspring, having already received prioritized investment, have relatively saturated room for educational improvements. Inclusive finance, by providing external financial resources, alters households' marginal investment decisions. As liquidity constraints are relaxed, previously suppressed educational demand for females is more likely to be realized, leading to significant policy response differences. This finding suggests that inclusive finance helps families increase their human capital investments in female individuals, thereby enhancing the labor market performance of women and narrowing the gender wage gap.

Regional marketization heterogeneity. Consider further whether the impact of financial inclusion on income mobility varies depending on the level of regional marketization. The allocation of financial resources by financial institutions is susceptible to non-market factors, for example, local governments may provide loan support to state-owned enterprises by interfering in the credit decisions of banks, thus exacerbating the financing constraints of other non-state-owned enterprises, impeding the efficient allocation of financial resources and making it difficult to fulfil the role of inclusive finance in promoting income mobility. To capture this variation, provinces are categorized into regions of high and low marketability, using the median of the annual marketization index as the demarcation. Table 9 depicts the

Table 9 Sub-sample estimation results at different levels of marketisation.

Variables	Dependent variable: Income	
	Low marketization	High marketization
	(1)	(2)
Fincome * FI	0.620	−0.234**
	(1.285)	(0.108)
Fincome	0.024	0.149***
	(0.147)	(0.046)
FI	-0.537	18.509*
	(27.715)	(11.957)
Individual Control Variable	Yes	Yes
Provincial Control Variable	Yes	Yes
Year FE	Yes	Yes
Province FE	Yes	Yes
Observations	1013	1319
R^2	0.158	0.191

The robust standard error is in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 10 The age-cohort heterogeneity of offspring.

Variables	Dependent variable: Income	
	Aged under 25	Aged 25 and over
	(1)	(2)
Fincome * FI	−0.227	−0.242*
	(0.152)	(0.126)
Fincome	0.174***	0.115**
	(0.061)	(0.044)
FI	45.140**	3.487
	(17.896)	(12.059)
Individual Control Variable	Yes	Yes
Provincial Control Variable	Yes	Yes
Year FE	Yes	Yes
Province FE	Yes	Yes
Observations	831	1475
R^2	0.123	0.201

The robust standard error is in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 11 Sub-sample estimation results by urban and rural areas.

Variables	Dependent variable: Income	
	Urban	Rural
	(1)	(2)
Fincome * FI	−0.180**	0.666
	(0.091)	(0.546)
Fincome	0.077	0.108
	(0.048)	(0.080)
FI	9.116	6.066
	(10.764)	(25.061)
Individual Control Variable	Yes	Yes
Provincial Control Variable	Yes	Yes
Year FE	Yes	Yes
Province FE	Yes	Yes
Observations	1432	770
R2	0.135	0.258

The robust standard error is in parentheses. ** indicates statistical significance at the 5% level.

results of the sub-sample regressions at different levels of marketisation. It can be seen that the impact of financial inclusion on intergenerational mobility is not statistically significant in regions with a low level of marketization, whereas the coefficient of the interaction term is significantly negative at the 10% level in regions with a high level of marketization. This suggests that higher levels of marketization create a more conducive environment for financial inclusion to play the role of promoting income mobility.

This difference can be attributed to changes in resource allocation mechanisms. According to market transition theory (Nee 1996) and the research by Xu et al. (2018), in highly marketized regions, resource allocation relies more on market mechanisms, with human capital replacing political capital as a key factor determining income, creating institutional space for the role of inclusive finance. Specifically, in regions with a high level of marketization, the synergistic effect of inclusive finance with market mechanisms is more prominent. First, marketization attenuates the direct influence of family background on offspring income (for example, by reducing household-registration barriers and dismantling occupational monopolies), thereby strengthening the capacity of inclusive finance to promote equal opportunity. Second, market-driven occupational upgrading (such as the increase in non-agricultural employment opportunities) complements the financial support provided by inclusive finance, enabling the younger generation to break free from the occupational and income constraints of their parents. However, in less marketized regions, financial resource allocation is more prone to distortions due to administrative intervention, thereby undermining the inclusivity of inclusive finance. This finding echoes Xu et al. (2018), who document a close relationship between the degree of marketization and the effectiveness of financial instruments, and underscores the need for complementary reforms to realize the full potential of inclusive finance.

Offspring age cohort heterogeneity. Considering that younger offspring are in the early stages of their careers, their current income may not yet reflect their long-term income potential. Following Yan and Deng (2021), we further examine the heterogeneity by age cohort. The sample is stratified into two subgroups using 25 years as the age threshold. As shown in Table 10, the interaction between inclusive finance and parental income is significantly negative for the cohort aged 25 and above, indicating that inclusive finance substantially reduces intergenerational income elasticity within this group. By contrast, the interaction coefficient is negative but not statistically significant for those younger than 25, which may be attributable to the greater income volatility of early-career individuals that can mask underlying intergenerational associations. This pattern is consistent with life-cycle income theory, according to which earnings become more stable and more representative of long-run economic status as individuals age. The results imply that the beneficial effect of inclusive finance on intergenerational mobility is more pronounced among age groups with relatively stable incomes. Thus, the core findings of this study are primarily driven by older and more stable cohorts, and the credibility of the core conclusions is thereby strengthened.

Urban-rural heterogeneity. Given the urban–rural dichotomy as a fundamental characteristic of China's economic structure, an additional examination is conducted to determine whether the effect of inclusive finance on intergenerational income mobility

differs across urban and rural areas. The subsample regression results are presented in Table 11. In the urban subsample, the coefficient of the interaction term between inclusive finance development (*FI*) and parental income (*Fincome*) is significantly negative at the 5% level, indicating that inclusive finance significantly enhances intergenerational income mobility among urban households. By contrast, the interaction term is statistically insignificant in the rural subsample, suggesting that inclusive finance has not yet exerted a significant promoting effect on intergenerational income mobility in rural areas.

This discrepancy may stem from systematic differences in economic structure, human capital, and social resources between urban and rural areas. Urban areas generally benefit from better educational resources, denser business information networks, and more developed entrepreneurial environments. Urban residents tend to have higher levels of education and stronger capabilities for market participation and investment. When provided with credit support through inclusive finance, urban households are more likely to allocate funds toward productive investments with higher returns or toward human capital accumulation. These investments can effectively translate into higher offspring income and upward occupational mobility, thereby facilitating upward intergenerational mobility. In rural areas, however, educational resources are relatively limited, industrial structure is less diversified, and high-value employment and entrepreneurial opportunities are scarce. Even when financial resources are accessible through inclusive finance, rural households may primarily use these funds for consumption smoothing (e.g., addressing unexpected expenditures such as medical expenses, weddings, and funerals) or traditional agricultural production activities. These types of expenditures yield low marginal returns and play a weak role in breaking the intergenerational transmission of income. Consequently, the effect of inclusive finance on promoting income mobility in rural areas remains insignificant.

Table 12 Results of robustness test.

Variables	Dependent variable: Income		
	(1)	(2)	(3)
Fincome*FI	−0.293**	−0.233**	−0.242**
	(0.130)	(0.107)	(0.103)
Fincome	0.163***	0.105***	0.147***
	(0.040)	(0.031)	(0.036)
FI	30.565**	−2.040	17.812*
	(14.130)	(5.423)	(10.232)
Individual Control Variable	Yes	Yes	Yes
Provincial Control Variable	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Province FE	Yes	Yes	Yes
Observations	2704	3630	2306
R^2	0.200	0.123	0.164

The robust standard error is in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Robustness tests

Using mother's income as a proxy for parental income. The previous analysis, which solely used the father's income as a proxy for parental income (*Fincome*), may have inadvertently disregarded the influence of mothers in intergenerational income transmission. Consequently, an endeavor was undertaken to substitute the father's income with that of the mother for robustness testing. The data preprocessing steps were essentially the same as in the previous section, excluding offspring younger than 16 years old and the sample of mothers older than 55 years old, resulting in a final sample of 1,513. As seen from the regression results in column (1) of Table 12, the estimated coefficient of the interaction term remains significantly negative at the 5% statistical level, suggesting that the basic conclusion that inclusive financial development increases intergenerational income mobility remains robust.

Using income bracket as proxy for income level. Conditional on parental income, the expected value of a child's income is linear in the child's percentile rank (Chetty et al. 2014). Thus, a child's income percentile more accurately reflects economic status than does the absolute income level. Because the percentile measure captures an individual's relative position within the income distribution, it is less sensitive to short-term fluctuations and is more representative of long-run economic standing. Consequently, a robustness test is conducted by substituting the offspring's income with an indicator of the offspring's income status. Specifically, the income of offspring and fathers is processed separately within their respective generational cohorts, sorted in ascending order, and then grouped into quintiles with assigned values ranging from 1 to 5. These quintiles serve as proxy variables for measuring intergenerational income. The regression results in column (2) of Table 12 reveal a significantly negative estimated coefficient on the interaction term (*Fincome*FI*) at the 5% statistical level. This implies that inclusive financial development increases the likelihood of upward mobility for offspring from lower-income households.

Incorporating digital finance into inclusive finance index. Given that the original indicator system primarily assesses the service capability of traditional inclusive finance, against the backdrop of rapid digital technological advancements, to further reflect the digitalization trend within inclusive finance, this study considers incorporating digital finance sub-indicators into the original indicator system. Based on the updated framework comprising 11 sub-indicators, the inclusive finance index is recalculated and the baseline regression model is re-estimated. Specifically, the computation method for the inclusive finance index remains consistent with previous analyses, while the newly added digital component is proxied by the Digital Inclusive Finance Index. The index, jointly compiled by the Digital Finance Research Centre of Peking University and Ant Financial Services Group, provides a scientifically rigorous and reliable depiction of the current state of China's digital inclusive finance development. As observed from the regression results in column (3) of Table 12, the estimated coefficient on the interaction term for the father's income (*Fincome*FI*) remains significantly negative at the 5% level, thereby indicating robustness of previous conclusions.

Alternative measures for inclusive finance. To test the robustness of the findings to different measurements of the Inclusive Finance Index, we use equal weighting and Principal Component Analysis (PCA) as alternative methods to recalculate the inclusive finance index. Subsequently, we re-estimated the baseline regression model. As shown in Supplementary Table S1, the interaction terms between inclusive finance and parental income remain significantly negative under both alternative specifications, confirming the robustness of the baseline results.

Extending sample interval. To further examine the temporal sensitivity of the research findings, the sample period is extended to 2012–2020, with the baseline model re-estimated. As shown in Supplementary Table S2, the coefficient of the interaction term

(*Fincome*FI*) remains significantly negative and statistically significant, consistent with the baseline results. The regression based on the extended sample thus provides additional support for the robustness of the core conclusions of this study.

Incorporating elderly parental sample. The previous analysis focused on the working-age group, excluding fathers above the age of 60 from the sample, which may have underestimated the intergenerational transmission of non-labor income (such as transfer income and property income). To examine the potential impact of sample restrictions, this study further includes elderly fathers (aged over 60) in the sample for robustness checks. Results in Supplementary Table S3 reveal that the coefficient of the interaction term (*Fincome*FI*) remains largely consistent with the baseline regression results, indicating the continued robustness of the core conclusions.

Conclusions and discussions

This study examines the impact of inclusive finance development on micro-level intergenerational income mobility using panel data from the China Family Panel Studies (CFPS) covering 2016, 2018, and 2020. The research findings reveal that the advancement of inclusive finance in regions has notably reduced the intergenerational income transmission between offspring and parents and enhanced overall income mobility, with these results holding under a battery of robustness checks. Specifically, the penetration dimension representing the supply side of financial services emerges as the primary driver that promotes intergenerational income mobility, while the role of the accessibility and utility dimensions remains insufficient. Mechanism analysis indicates that inclusive finance significantly increases intergenerational income mobility by promoting human capital accumulation, optimizing occupational structure, and enhancing financial literacy. Furthermore, the promotive effect of inclusive finance is more pronounced among females, low-income groups, and individuals with low social capital. Moreover, a stronger effect is observed for individuals aged 25 and above, whose incomes are relatively stable, in contrast to younger cohorts. Geographically, the effect is more significant in highly marketized regions and urban areas, compared to their less marketized and rural counterparts. These findings furnish empirical support for the viability of leveraging inclusive finance to promote social mobility. Accordingly, the following policy recommendations are proposed:

First, the precision and inclusiveness of inclusive finance should be enhanced with a focus on alleviating the structural constraints faced by vulnerable groups. To address the financial exclusion experienced by low-income families and individuals with limited social capital, big data techniques may be employed to identify unmet demand. In underdeveloped regions, specialized financial products such as “education poverty alleviation loans” and “skills enhancement loans” are to be developed, and financial services are to be linked with vocational training. For example, rural youth may be supported through a combination of educational financing and non-agricultural employment matching. Moreover, particular attention should be given to enhancing intergenerational mobility opportunities for female offspring by establishing women’s entrepreneurship funds and optimizing flexible repayment mechanisms, thus unlocking the potential of female human capital. With respect to younger cohorts, whose incomes tend to fluctuate markedly in the early stages of their careers, repayment obligations should be adjusted dynamically in accordance with career progression so that short-term debt burdens do not impede long-term mobility. Finally, financial literacy initiatives should be intensified to mitigate myopic decision-making patterns stemming from cognitive limitations among disadvantaged groups.

Second, the coordinated, multidimensional development of inclusive finance should be advanced, with shortcomings in accessibility and utilization efficiency being addressed. Although the penetration of inclusive finance, such as branch network coverage, has been improved, the actual delivery efficiency of financial resources remains constrained by urban-rural and regional imbalances. Digital technology applications should be intensified in underdeveloped western and rural regions, such as through blockchain-based credit assessment systems that integrate smallholder operational data to lower financing thresholds. Financial institutions should be incentivized to develop context-specific products like agricultural supply chain financing instruments, directly embedding capital flows into production cycles of microenterprises and farming households to enhance targeting precision. In eastern developed regions, the diversity of financial products should be optimized to meet the differentiated needs of new urban residents and flexible workers, thereby avoiding extensive expansion that prioritizes scale over quality.

Third, institutional coordination and regional adaptation strategies should be deepened to fully realize the promoting effect of inclusive finance on intergenerational income mobility. Policy design must account for regional differences in marketization levels and urban-rural structures, adopting differentiated implementation pathways. In urban and highly marketized areas, efforts should be concentrated on refining market mechanisms and enhancing the efficiency of financial services. For example, data sharing between financial institutions and employment service platforms could be promoted to incorporate offspring’s career development potential into credit assessments, thereby improving the targeting of capital allocation. Meanwhile, the development of targeted entrepreneurial loan products and flexible repayment schemes for groups such as women and new urban residents should be encouraged to strengthen their resilience to economic fluctuations. In rural and less marketized regions, policy should focus on building a supportive ecosystem that integrates finance with local industrial development and governance. Specific measures include reforming the performance evaluation criteria of financial institutions by increasing the weight of indicators such as the share of agricultural loans, small and micro enterprise loans, and first-time borrowers, so as to incentivize credit allocation toward underserved segments. Additionally, inclusive finance should be deeply embedded into local industrial policies by developing supply-chain financing models tailored to agricultural and rural specialty industries, thus enhancing the productive use of capital. Finally, accelerating rural digital financial infrastructure and financial-literacy programs, together with cross-regional integration of financial systems, will help mitigate accessibility barriers caused by geographical isolation and institutional fragmentation.

However, several limitations of this study should be acknowledged. First, although the analysis confirms the short-term effects of inclusive finance on intergenerational mobility, it may not fully capture the long-term dynamics of intergenerational mobility due to the relatively short panel time span. Future research could extend the temporal scope to explore longer-term trajectories, particularly as China’s inclusive financial policy framework becomes more mature. Second, given the higher proportion of younger individuals in the sample, this study is more inclined to capture the early intervention effects of inclusive finance on intergenerational mobility. Future investigations employing longer time-series data may provide deeper insights into its sustained impact. Relatedly, income volatility among the younger generation may serve as a mechanism for the transmission of intergenerational inequality: households with higher incomes

may provide their children with a buffer against negative shocks, thereby reducing income volatility and offering their children a more stable development path. In contrast, children from disadvantaged backgrounds may face higher volatility, which in turn hinders their long-term planning and investment. Whether inclusive finance can reduce income volatility and thus enhance mobility is a highly compelling question, and we plan to investigate this in future studies using longer panel data. Finally, the sample is largely concentrated on the working-age population, with limited consideration of the intergenerational transmission of non-labor income, which may lead to an underestimation of intergenerational elasticity. Future research could incorporate wealth-related data, such as real estate and equity holdings, to examine the effects of inclusive finance on multidimensional intergenerational mobility.

Data availability

The datasets analysed in this article are available from the corresponding author upon reasonable request.

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Notes

1 The study of income mobility is typically divided into two categories: intra-generational mobility and inter-generational mobility. Intra-generational mobility pertains to the changes in an individual's income over their lifetime, while inter-generational mobility focuses on the shifts in income between parent and child generations, which serves as the primary research perspective of this study.

2 Currently, the publicly available data of the China Family Panel Studies (CFPS) has been updated to 2020. This study utilizes data from three waves spanning 2016 to 2020, primarily based on considerations of the policy-driven context. These years coincide with the implementation of China's first national inclusive finance strategy, The Plan for Advancing the Development of Inclusive Finance (2016–2020). During this period, the effective integration of policy guidance and market mechanisms facilitated a transition in inclusive finance from broad-based expansion to targeted empowerment. For instance, targeted poverty alleviation loans supported more than 90 million individuals. As such, this timeframe offers a unique research window for studying the impact of inclusive finance development on intergenerational mobility in China, allowing for in-depth analysis.

3 Notably, the measurement of intergenerational income mobility may be affected by transitory income fluctuations. The sample of this study is restricted to the working-age population, which partly excludes groups with unstable income sources. Furthermore, we recognize that younger individuals often face higher income volatility in the early stages of their careers. To capture the non-linear variation trend of income over the life cycle, age and its squared term are controlled for in all regression models of this study. Additionally, in the Heterogeneity analysis section, heterogeneity by age cohort is examined to assess whether the effect of inclusive finance varies with income stability.

4 In addition, the robustness checks employ both the equal-weight method and Principal Component Analysis (PCA) as alternative measures of the inclusive finance index.

5 Based on the nature of local causal effects of instrumental variables, the absolute values of the coefficients of the interaction terms (Fincome*FI) and the financial inclusion index in the second-stage regression results will be larger than the OLS estimates.

References

Ahmad AH, Green CJ, Jiang F, Murinde V (2023) Mobile money, ICT, financial inclusion and growth: how different is Africa?. Econ Model 121: 106220. https://doi.org/10.1016/j.econmod.2023.106220

Aizer A, Currie J (2014) The intergenerational transmission of inequality: maternal disadvantage and health at birth. Science 344(6186):856–861. https://doi.org/10.1126/science.1251872

Aiyar S, Ebeke C (2020) Inequality of opportunity, inequality of income and economic growth. World Dev 136: 105115. https://doi.org/10.1016/j.worlddev.2020.105115

Allen F, Demirgüç-Kunt A, Klapper L, Peria MSM (2016) The foundations of financial inclusion: understanding ownership and use of formal accounts. J Financ Intermed 27:1–30. https://doi.org/10.1016/j.jfi.2015.12.003

Álvarez-Gamboa J, Cabrera-Barona P, Jácome-Estrella H (2021) Financial inclusion and multidimensional poverty in Ecuador: a spatial approach. World Dev Perspect 22: 100311. https://doi.org/10.1016/j.wdp.2021.100311

Banerjee AV, Newman AF (1993) Occupational Choice and the Process of Development. J Polit Econ 101:274–299. https://doi.org/10.1086/261876

Bárcena-Martin E, Silber J, Zhang Y (2024) Measures of relative and absolute convergence and pro-poor growth with an illustration based on China (2010-2018). China World Econ 32:1–41. https://doi.org/10.1111/cwe.12524

Beck T, Demirgüç-Kunt A, Levine R (2007) Finance, inequality and the poor. J Econ Growth 12(1):27–49. https://doi.org/10.1007/s10887-007-9010-6

Becker GS, Tomes N (1979) An equilibrium theory of the distribution of income and intergenerational mobility. J Polit Econ 87(6):1153–1189. https://doi.org/10.1086/260831

Becker GS, Tomes N (1986) Human capital and the rise and fall of families. J Labor Econ 4(3):S1–S39. https://doi.org/10.1086/298118

Behrman JR, Taubman P (1989) Is schooling "mostly in the genes"? Nature-nurture decomposition using data on relatives. J Polit Econ 97(6):1425–1446. https://doi.org/10.1086/261661

Bevis LEM, Barrett C (2015) Decomposing intergenerational income elasticity: The gender-differentiated contribution of capital transmission in rural Philippines. World Dev 74:233–252. https://doi.org/10.1016/j.worlddev.2015.04.010

Biasi B (2023) School finance equalization increases intergenerational mobility. J Labor Econ 41:1–38. https://doi.org/10.1086/718980

Burgess R, Pande R (2005) Do rural banks matter? Evidence from the Indian social banking experiment. Am Econ Rev 95(2):780–795. https://doi.org/10.1257/0002828054201242

Cao D, Zhou Z, Liu G et al. (2022) Does social capital buffer or exacerbate mental health inequality? Evidence from the China Family Panel Study (CFPS). Int J Equity Health 21: 75. https://doi.org/10.1186/s12939-022-01642-3

Carneiro P, Heckman JJ (2002) The evidence on credit constraints in post-secondary schooling. Econ J 112:705–734. https://doi.org/10.1111/1468-0297.00075

Checchi D, Peragine V (2010) Inequality of opportunity in Italy. J Econ Inequal 8(4):429–450. https://doi.org/10.1007/s10888-009-9118-3

Chen X, Zhou Q (2024) Social capital, financial lending, and household income-An empirical study from China. J Knowl Econ 15:16096–16121. https://doi.org/10.1007/s13132-023-01723-w

Chen Y, Fan ZY, Gu XM et al. (2020) Arrival of Young Talent: The Send-Down Movement and Rural Education in China. Am Econ Rev 110(11):3393–3430. https://doi.org/10.1257/aer.20191414

Chetty R, Hendren N, Kline P, Saez E (2014) Where is the land of opportunity? The geography of intergenerational mobility in the United States. Q J Econ 129(4):1553–1623. https://doi.org/10.1093/qje/qju022

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. Am Econ Rev 104(5):141–147. https://doi.org/10.1257/aer.104.5.141

Chibba M (2009) Financial inclusion, poverty reduction and the Millennium Development Goals. Eur J Dev Res 21:213–230. https://doi.org/10.1057/ejdr.2008.17

Dabla-Norris E, Ji Y, Townsend RM, Filiz Unsal D (2021) Distinguishing constraints on financial inclusion and their impact on GDP, TFP, and the distribution of income. J Monetary Econ 117:1–18. https://doi.org/10.1016/j.jmoneco.2020.01.003

Das M, Sjocren T (2002) The inter-generational link in income mobility: Evidence from adoptions. Econ Lett 75(1):55–60. https://doi.org/10.1016/S0165-1765(01)00587-0

Das S, Chatterjee A(2023) Impacts of ICT and digital finance on poverty and income inequality: A sub-national study from India. Inf Technol Dev 29(2-3):378–405. https://doi.org/10.1080/02681102.2022.2151556

DeHaan J, Sturm J-E (2017) Finance and income inequality: a review and new evidence. Eur J Polit Econ 50:171–195. https://doi.org/10.1016/j.ejpoleco.2017.04.007

Demir A, Pesqué-Cela V, Altunbas Y, Murinde V (2022) Fintech, financial inclusion and income inequality: a quantile regression approach. Eur J Financ 28(1):86–107. https://doi.org/10.1080/1351847X.2020.1772335

Demirguc-Kunt A, Klapper L, Singer D, Ansar S, Hess J (2018) The Global Findex Database 2017: measuring financial inclusion and the fintech revolution. World Bank. https://doi.org/10.1596/978-1-4648-1259-0

Deng Q, Gustafsson B, Li S (2013) Intergenerational income persistence in urban China. Rev Income Wealth 59(3):416–436. https://doi.org/10.1111/roiw.12034

Diewald M, Schulz W, Baier T (2015) Intergenerational downward mobility in educational attainment and occupational careers in west Germany in the twentieth century. Eur Sociol Rev 31(2):172–183. https://doi.org/10.1093/esr/jcv010

Dimova R, Adebowale O (2017) Does access to formal finance matter for welfare and inequality? Micro level evidence from Nigeria. J Dev Stud 54(9):1534–1550. https://doi.org/10.1080/00220388.2017.1371293
Ding H, Qin C, Shi K (2018) Who benefit from government-led microfinance projects? Evidence from rural China. J Comp Econ 46(4):1253–1272. https://doi.org/10.1016/j.jce.2018.08.001
Dong X, Cui R, Bai X, Liu K (2024) Can digital inclusive finance reduce household poverty? Evidence from the China Household Finance Survey. Int Rev Econ Financ 96: 103603. https://doi.org/10.1016/j.iref.2024.103603
Dupas P, Robinson J (2013) Savings constraints and microenterprise development: evidence from a field experiment in Kenya. Am Econ J-Appl Econ 5(1):163–192. https://doi.org/10.1257/app.5.1.163
Fan Y, Yi J, Zhang J (2021) Rising intergenerational income persistence in China. Am Econ J-Econ Polic 13(1):202–230. https://doi.org/10.1257/pol.20170097
Flug K, Spilimbergo A, Wachtenheim E (1998) Investment in education: do economic volatility and credit constraints matter?. J Dev Econ 55(2):465–481. https://doi.org/10.1016/S0304-3878(98)00045-5
Goldthorpe JH (2013) Understanding and misunderstanding-social mobility in Britain: the entry of the economists, the confusion of politicians and the limits of educational policy. J Soc Policy 42(3):431–450. https://doi.org/10.1017/S004727941300024X
Greenwood J, Jovanovic B (1990) Financial development, growth, and the distribution of income. J Polit Econ 98(5):1076–1107. https://doi.org/10.1086/261720
Haider S, Solon G (2006) Life-cycle variation in the association between current and lifetime earnings. Am Econ Rev 96(4):1308–1320. https://doi.org/10.1257/aer.96.4.1308
He C, Li A, Li D, Yu J (2022) Does digital inclusive finance mitigate the negative effect of climate variation on rural residents' income growth in China?. Int J Environ Res Pub He 19(14):8280. https://doi.org/10.3390/ijerph19148280
Hu Y, Liu C, Peng J (2021) Financial inclusion and agricultural total factor productivity growth in China. Econ Model 96:68–82. https://doi.org/10.1016/j.econmod.2020.12.021
Huang X, Huang S, Shui A (2024) Government spending and intergenerational income mobility: evidence from China. J Econ Behav Organ 191:387–414. https://doi.org/10.1016/j.jebo.2021.09.005
Huang Y, Zhang Y (2020) Financial inclusion and urban-rural income inequality: long-run and short-run relationships. Emerg Mark Financ Tr 56(2):457–471. https://doi.org/10.1080/1540496X.2018.1562896
Jeanneney SG, Kpodar K (2011) Financial development and poverty reduction: can there be a benefit without a cost?. J Dev Stud 47(1):143–163. https://doi.org/10.1080/00220388.2010.506918
Kampanelis S, Chronopoulos D, Wilson JOS (2024) Finance and intergenerational mobility: evidence from US banking reforms. J Econ Behav Organ 226: 106683. https://doi.org/10.1016/j.jebo.2024.106683
Kapoor A (2014) Financial inclusion and the future of the Indian economy. Futures 56(10):35–42. https://doi.org/10.1016/j.futures.2013.10.007
Kebede J, Selvanathan S, Naranpanawa A (2024) Financial inclusion and monetary policy effectiveness in a monetary union: heterogenous panel approach. Econ Transit I Chang 32:779–805. https://doi.org/10.1111/ecot.12402
Kim DW, Yu JS, Hassan MK (2018) Financial inclusion and economic growth in OIC countries. Res Int Bus Financ 43:1–14. https://doi.org/10.1016/j.ribaf.2017.07.178
Kim JH (2016) A study on the effect of financial inclusion on the relationship between income inequality and economic growth. Emerg Mark Financ Tr 52(2):498–512. https://doi.org/10.1080/1540496X.2016.1110467
Kling G, Pesqué-Cela V, Tian L, Luo D (2020) A theory of financial inclusion and income inequality. Eur J Financ 28(1):137–157. https://doi.org/10.1080/1351847X.2020.1792960
Koh SGM, Lee GHY, Bomhoff EJ (2020) The income inequality, financial depth and economic growth nexus in China. World Econ 43:412–427. https://doi.org/10.1111/twec.12825
Lacalle-Calderon M, Larru JM, Garrido SR, Perez-Trujillo M (2019) Microfinance and income inequality: new macrolevel evidence. Rev Dev Econ 23(2):860–876. https://doi.org/10.1111/rode.12573
Lamboglia S, Stacchini M (2025) On the drivers of financial literacy: the role of intergenerational mobility. Empir Econ 68:667–695. https://doi.org/10.1007/s00181-024-02657-1
Li L (2018) Financial inclusion and poverty: the role of relative income. China Econ Rev 52:165–191. https://doi.org/10.1016/j.chieco.2018.07.006
Lian X, Mu Y, Zhang W (2023) Digital inclusive financial services and rural income: Evidence from China's major grain-producing regions. Financ Res Lett 53: 103622. https://doi.org/10.1016/j.frl.2022.103622
Marrero GA, Rodríguez JG (2013) Inequality of opportunity and growth. J Dev Econ 104:107–122. https://doi.org/10.1016/j.jdeveco.2013.05.004
Mayer SE, Lopoo LM (2008) Government spending and intergenerational mobility. J Public Econ 92(1-2):139–158. https://doi.org/10.1016/j.jpubeco.2007.04.003
Neaime S, Gaysset I (2018) Financial inclusion and stability in MENA: evidence from poverty and inequality. Financ Res Lett 24:230–237. https://doi.org/10.1016/j.frl.2017.09.007
Nee V (1996) The emergence of a market society: changing mechanisms of stratification in China. Am J Sociol 101(4):908–949. https://doi.org/10.1086/230784
Park CY, Mercado R (2018) Financial inclusion, poverty, and income inequality. Singap Econ Rev 63(1):185–206. https://doi.org/10.1142/S0217590818410059
Pascal A, Sabina A, Riccardo G et al. (2025) Local exposure to refugees changed attitudes to ethnic minorities in the Netherlands. ECON J 667. https://doi.org/10.1093/ej/ueae080
Restuccia D, Urrutia C (2004) Intergenerational persistence of earnings: The role of early and college education. Am Econ Rev 94(5):1354–1378. https://doi.org/10.1257/0002828043052213
Sarma M, Pais J (2011) Financial inclusion and development. J Int Dev 23(5):613–628. https://doi.org/10.1002/jid.1698
Shen Q, Wu R, Pan Y et al. (2024) Explaining and modeling the impacts of inclusive finance on CO2 emissions in China integrated the intermediary role of energy poverty. Humanit Soc Sci Commun 11:82. https://doi.org/10.1057/s41599-023-02595-w
Shi X, Liu X, Nuetah A, Xin X (2010) Determinants of household income mobility in rural China. China World Econ 18:41–59. https://doi.org/10.1111/j.1749-124X.2010.01188.x
Solon G (1992) Intergenerational income mobility in the United States. Am Econ Rev 82(3):393–408. https://www.jstor.org/stable/2117312
Solon G (2004) A model of intergenerational mobility variation over time and place. In: Corak M (ed) Generational income mobility in north America and Europe. Cambridge University Press, Cambridge, p 38-47
Tang L, Sun S, Yang W (2021) Does government education expenditure boost intergenerational mobility? Evidence from China. Int Rev Econ Financ 74:13–22. https://doi.org/10.1016/j.iref.2021.02.001
Van LT-H, Vo AT, Nguyen NT, Vo DH (2021) Financial inclusion and economic growth: an international evidence. Emerg Mark Financ Tr 57(1):239–263. https://doi.org/10.1080/1540496X.2019.1697672
Wang C, Wan GH (2015) Income polarization in China: trends and changes. China Econ Rev 36:58–72. https://doi.org/10.1016/j.chieco.2015.08.007
Xie P, Fu K (2024) Financial literacy and digital product consumption - An analysis based on CFPS data. Financ Res Lett 68: 105977. https://doi.org/10.1016/j.frl.2024.105977
Xu W, Pan Z, Wang G (2018) Market transition, labor market dynamics and reconfiguration of earning determinants structure in urban China. Cities 79:113–123. https://doi.org/10.1016/j.cities.2018.02.029
Yan W, Deng X (2021) Intergenerational income mobility and transmission channels in a transition economy: evidence from China. Econ Transit Inst Change 30(1):183–207. https://doi.org/10.1111/ecot.12278
Yan W, Gao S (2024) Family background and intergenerational mobility in a transition economy: Evidence from China. J Asian Econ 92: 101720. https://doi.org/10.1016/j.asieco.2024.101720
Yan Z, Xiao J, Sun Q (2024) Moving up toward sustainable development: digital finance and income mobility. Sustain Dev 32:5742–5763. https://doi.org/10.1002/sd.2996
Yang J, Qiu M (2016) The impact of education on income inequality and intergenerational mobility. China Econ Rev 37:110–125. https://doi.org/10.1016/j.chieco.2015.12.009
Yang X, Zhang L, Hong X, Li W (2024) Can digital financial inclusion facilitate intergenerational income mobility? Evidence from China. J Comp Econ 52:951–962. https://doi.org/10.1016/j.jce.2024.09.001
Yu X, Cai S, Yang X et al. (2025) Social status, hukou conversion and upwards class mobility: Evidence from Chinese rural-urban migrants. Humanit Soc Sci Commun 12:404. https://doi.org/10.1057/s41599-024-04305-6
Yuan M, Chen YQ, Hao W et al. (2022) Does social capital promote health?. Soc Indic Res 162:501–524. https://doi.org/10.1007/s11205-021-02810-8
Zhang C, Zhu Y, Zhang L (2024) Effect of digital inclusive finance on common prosperity and the underlying mechanisms. Int Rev Financ Anal 91: 102940. https://doi.org/10.1016/j.irfa.2023.102940
Zhang Y, Zhao W (2024) Social capital's role in mitigating economic vulnerability: understanding the impact of income disparities on farmers' livelihoods. World Dev 177: 106515. https://doi.org/10.1016/j.worlddev.2023.106515
Zhu B, He J, Zhai S (2019) Does financial inclusion create a spatial spillover effect between regions? Evidence from China. Emerg Mark Financ Tr 55:980–997. https://doi.org/10.1080/1540496X.2018.1518779

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L.T.: conceptualization; methodology; project administration; resources; funding acquisition; supervision; validation. M.C.: conceptualization, methodology, investigation, validation, software, writing–original draft. Y.T. (Corresponding Author): conceptualization, methodology, investigation, formal analysis, validation, writing–original draft, supervision, writing–review & editing.

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The authors declare no competing interests.

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