ORIGINAL RESEARCH ARTICLE

Agricultural payment mechanisms, medical cost anxiety, and income mobility in China

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Abstract

This study investigates the relationship between agricultural payment mechanisms, medical cost anxiety, and income mobility in China. The study made use of the World Bank (2021) Global Financial Inclusion data. Utilizing a range of figures to visually represent data trends and relationships, the study reports how agricultural payment mechanisms relate to income mobility while accounting for the impact of medical cost anxiety. The findings reveal that while agricultural payments positively affect income mobility, their effectiveness is significantly dampened by the presence of high medical expenses. Households that receive agricultural payments but face substantial healthcare costs tend to experience limited upward mobility compared to those with lower medical expenditures. The study concludes that to improve income mobility in rural China, policy interventions must address both agricultural productivity and healthcare affordability. A dual approach that integrates agricultural subsidies with healthcare reforms is recommended, focusing on expanding access to affordable healthcare, reducing out-of-pocket expenses, and strengthening social safety nets. *(Afr J Reprod Health 2024; 28 [9]: 179-188).*

Keywords: agricultural payment mechanisms, medical cost anxiety, income mobility, household welfare

Résumé

Cette étude examine la relation entre les mécanismes de paiement agricole, l'anxiété liée aux coûts médicaux et la mobilité des revenus en Chine. L'étude a utilisé les données de la Banque mondiale (2021) sur l'inclusion financière mondiale. En utilisant une série de chiffres pour représenter visuellement les tendances et les relations entre les données, l'étude montre comment les mécanismes de paiement agricole sont liés à la mobilité des revenus tout en tenant compte de l'impact de l'anxiété liée aux coûts médicaux. Les résultats révèlent que même si les paiements agricoles affectent positivement la mobilité des revenus, leur efficacité est considérablement atténuée par la présence de frais médicaux élevés. Les ménages qui reçoivent des paiements agricoles mais sont confrontés à des coûts de santé importants ont tendance à connaître une mobilité ascendante limitée par rapport à ceux dont les dépenses médicales sont moindres. L'étude conclut que pour améliorer la mobilité des revenus dans les zones rurales de la Chine, les interventions politiques doivent aborder à la fois la productivité agricole et l'accessibilité financière des soins de santé. Une double approche intégrant les subventions agricoles aux réformes des soins de santé est recommandée, en se concentrant sur l'élargissement de l'accès à des soins de santé abordables, la réduction des dépenses personnelles et le renforcement des filets de sécurité sociale. *(Afr J Reprod Health 2024; 28 [10]: 179-188).*

Mots-clés: mécanismes de paiement agricole, anxiété liée aux coûts médicaux, mobilité des revenus, bien-être des ménages

Introduction

China's rapid economic transformation over the past few decades has significantly altered the landscape of its agricultural sector, healthcare system, and social mobility. As the nation grapples with the complexities of modernization, understanding the interplay between agricultural payment mechanisms, medical cost anxiety, and income mobility becomes crucial. Agricultural payment mechanisms, which include subsidies, direct payments, and other financial incentives, are designed to support farmers and stabilize the agricultural economy[1-6]. However, these mechanisms can have unintended consequences on rural households, particularly concerning their health expenditures and overall economic mobility.

Medical cost anxiety refers to the stress and uncertainty faced by individuals and families regarding their ability to afford healthcare. In China, where healthcare costs have been rising sharply, this anxiety can deter individuals from seeking necessary

medical attention, leading to adverse health outcomes[7-10]. The Chinese healthcare system has undergone significant reforms aimed at increasing access and affordability; however, disparities persist, particularly in rural areas where agricultural income remains low[11-14.] This situation creates a precarious balance between agricultural income and health-related expenses, impacting overall income mobility for rural households.

Income mobility, which is the ability of individuals or families to improve their economic status over time, is a critical indicator of economic opportunity and social equity. In China, income mobility is often influenced by various factors including education, employment opportunities, and access to healthcare[15-17]. The relationship between agricultural payments and income mobility is particularly pronounced in rural communities where farming is a primary source of livelihood. When agricultural payments are insufficient or poorly targeted, they may fail to alleviate poverty or promote upward mobility[18-20]. Conversely, effective payment mechanisms can provide a safety net for farmers, allowing them to invest in better healthcare and education for their families. The intersection of these three elements—agricultural payment mechanisms, medical cost anxiety, and income mobility—presents a complex challenge for policymakers in China. As the government continues to implement reforms aimed at improving the welfare of its rural population, understanding how these factors interact is essential for crafting effective policies. Research has shown that addressing medical cost anxiety through improved healthcare financing can enhance income mobility by reducing the financial burden on families[21]. Furthermore, enhancing agricultural payment mechanisms can provide a more stable income base for rural households, enabling them to invest in health and education.

Methods

Data description

This study made use of the World Bank Global Financial Inclusion data 2021[22]. This data by the World Bank, is renowned as one of the most extensive databases worldwide focusing on financial inclusion. Serving as the sole global demand-side data source, it enables comprehensive global and regional cross-country analyses, offering a detailed and multidimensional view of how people engage in saving, borrowing, payments, and managing financial risks[22]. In this study, we used the 2021 version of the data, which were gathered by the World Bank[22] through national representative surveys involving approximately 128,000 adults across over 120 economies. This latest edition builds upon previous versions from 2011, 2014, and 2017, introducing new metrics that assess financial health and resilience, alongside more detailed data on digital payment adoption.

In most developing economies, Global Findex data have traditionally been collected through face-to-face interviews[22]. Surveys are conducted face-to-face in economies where telephone coverage represents less than 80% of the population or where in-person surveying is the customary methodology. However, because of ongoing COVID-19 related mobility restrictions, face-to-face interviewing was not possible in some of these economies in 2021[22]. Phone-based surveys were therefore conducted in 67 economies that had been surveyed face-to-face in 2017. These 67 economies were selected for inclusion based on population size, phone penetration rate, COVID-19 infection rates, and the feasibility of executing phone-based methods where Gallup would otherwise conduct face-to-face data collection, while complying with all government issued guidance throughout the interviewing process. Gallup takes both mobile phone and landline ownership into consideration. Data weighting was used to ensure a nationally representative sample for each economy[22]. Final weights consist of the base sampling weight, which corrects for unequal probability of selection based on household size, and the poststratification weight, which corrects for sampling and nonresponse error. Poststratification weights use economy-level population statistics on gender and age and, where reliable data are available, education or socioeconomic status[22]

The sample size for China, which as a focus of this study consists of 3,500 respondents, specifically targeting adults who are household heads[22]. This demographic focus is particularly relevant as household heads typically have decision-making authority and are more likely to possess detailed knowledge of their household's financial activities, including agricultural payments and

healthcare expenditures. By concentrating on this group, the study aims to capture a comprehensive and accurate picture of how agricultural payment mechanisms and medical cost anxiety affect income mobility within rural Chinese households. The sample was selected to ensure a broad representation of various socio-economic backgrounds, regions, and levels of income, allowing for the analysis to reflect the diverse circumstances encountered by rural households across China[22]. This approach enables the study to explore patterns and differences in income mobility and the impact of medical costs across various segments, enhancing the generalizability of the findings. The large sample size also contributes to the robustness of the analysis by providing a statistically significant base from which to draw conclusions and detect nuanced relationships within the data.

Operationalisation of variables/indicators

The Global financial inclusion database is a comprehensive dataset that contains detailed data regarding age of the respondents, saving and borrowing behaviours, payment mechanisms, and risk management behaviours. The database provides insights into how people access and use financial services, including bank accounts, digital payments, and credit. As a way of data management, we recoded the data based on our objectives. Therefore, how the variables we engage are operationalised and given below.

Agricultural payments: Agricultural payments are measured through four distinct indicators to capture the various forms of payments respondents may have received. The first indicator simply assesses whether or not the respondent received any form of agricultural payment, coded as 1 for "Yes" and 0 for "No." This binary measure provides a general view of payment receipt among the participants. The second indicator delves into the method of payment, focusing on whether the respondent received the agricultural payment directly into a bank account. This variable is similarly coded as 1 for "Yes" if the payment was deposited into an account and 0 for "No." By distinguishing this mode of payment, we gain insights into the prevalence of bank account usage for agricultural payments.

  The third indicator evaluates if the respondent received the payment in cash, a common

payment method in many rural or agricultural settings. Cash receipt is also coded with 1 for "Yes" and 0 for "No," highlighting the accessibility and flexibility of cash transactions in agricultural payments. Lastly, the fourth indicator examines whether the respondent received an agricultural payment through a card. As with the other measures, the coding for this variable is 1 for "Yes" and 0 for "No." This indicator reflects the usage of modern payment systems in agricultural transactions, offering a broader perspective on payment methods used by respondents.

Medical cost anxiety: In this study, medical cost anxiety is operationalized as a measure of financial concern related to healthcare expenses among respondents. Specifically, it reflects the level of worry respondents feel about their ability to afford medical costs. We categorized respondents into three distinct groups based on their reported levels of anxiety:

Very worried: This group includes individuals who express high levels of concern about medical expenses, suggesting that they perceive significant financial strain due to potential or existing medical costs. This category indicates a heightened state of financial insecurity and possibly an ongoing struggle to meet healthcare expenses.

Somewhat worried: Respondents in this category have moderate concerns about medical costs. While they may have some anxiety regarding their ability to afford healthcare, it is not as intense as the first group. These individuals may have some financial resources to manage healthcare expenses, though they remain cautious about potential future costs.

Not worried at all: This group consists of individuals who report no financial worries related to medical costs. This lack of concern suggests a level of financial stability and confidence in their ability to afford medical care if needed. These respondents likely have adequate resources or support systems to cover healthcare expenses without significant strain. By examining these categories, we aim to gain insights into how varying levels of medical cost anxiety correlate with other factors, such as agricultural payment mechanisms and income mobility, to understand broader financial patterns in China.

Income mobility: Income mobility in this study is assessed by examining the distribution of households across five income quintiles within the economy. These quintiles are defined as follows: *Poorest 20%* - This quintile represents households in the lowest income bracket, constituting the bottom fifth of the income distribution. These households have the least financial resources and are typically the most economically vulnerable. *Second 20%* - Households in this group have slightly higher incomes than those in the poorest quintile but still face economic challenges. They represent the second lowest fifth of the income distribution.

Middle 20%: Positioned at the median of the income spectrum, this quintile includes households with average income levels, often referred to as the middle class. *Fourth 20%* – Households in this quintile fall just below the highest income group. They generally have above-average financial stability and resources. *Richest 20%* – This quintile consists of households with the highest income levels, occupying the top fifth of the income distribution. These households often have significant economic advantages and greater financial security. This categorization allows for a nuanced analysis of income mobility, revealing shifts within and between these quintiles over time.

Method of estimation: This study utilizes a descriptive analysis approach augmented with visual figures to capture key data trends and relationships. The descriptive analysis allows for an in-depth exploration of the characteristics of agricultural payments, medical costs, and income mobility, providing a foundational understanding of how these variables interact. Through the use of figures, the study visualizes the distribution and impact of agricultural payments across various income groups, offering insights into how such payments correlate with income changes over time. Medical cost anxiety is also examined visually, highlighting the burden of healthcare expenses and its variation among different household demographics. This approach helps clarify the extent to which medical expenses may offset the positive effects of agricultural payments on income mobility. The figures also aid in identifying patterns that might be obscured in purely statistical analysis. Additionally, trend lines within these figures reveal how the presence of medical costs modifies the effect of agricultural payments on household economic status, showcasing a dampened income mobility trajectory in households facing high medical expenses.

Ethical consideration

Not applicable as the study made use of no human or animal subjects. The study made use of Global Financial Inclusion (Global Findex) Database 2021 by the World Bank, which can be downloaded from the link https://doi.org/10.48529/658q-rq03.

Results

Characteristics of the respondents

The study sample includes respondents from various age groups, reflecting a diverse cross-section of the population. Among these, 18.4% are in the 15-24 age group, suggesting a notable presence of young adults who may be in the early stages of their careers or education. The sample also includes older individuals, with 17.8% of respondents aged 45-54 and 7.3% aged 55 and above. This age distribution allows the study to capture a range of experiences related to agricultural payment mechanisms and medical cost anxiety, which can vary significantly across different stages of life. In terms of educational attainment, the data reveals that 19.5% of respondents completed primary school or less. This group represents individuals who may face limitations in accessing higher-paying jobs and opportunities for upward mobility due to their lower levels of formal education. A substantial portion, 45.5%, completed secondary school, indicating that nearly half of the respondents possess basic educational qualifications, which may provide them with entry-level skills relevant to various sectors, including agriculture.

Furthermore, 34.9% of respondents have attained tertiary education or higher. This higher educational attainment level is associated with better job prospects and a greater ability to navigate complex financial and healthcare systems. By incorporating this range of educational backgrounds, the study can better understand how educational attainment influences perceptions and experiences related to agricultural payments and medical cost anxiety in rural China.
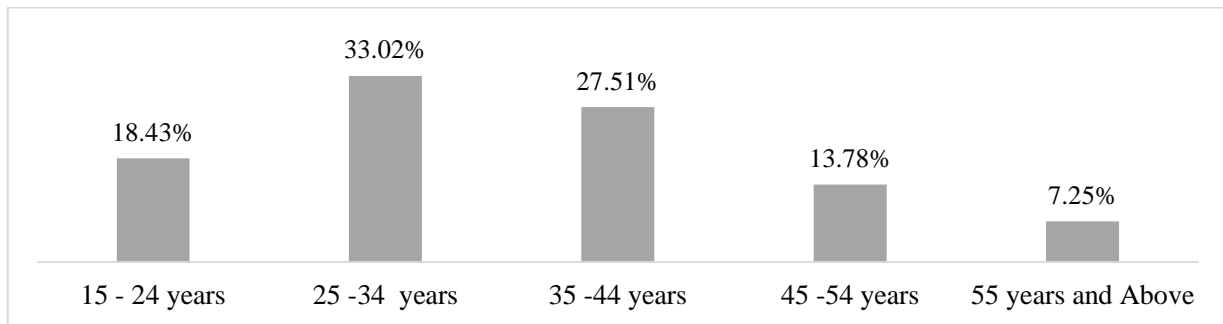
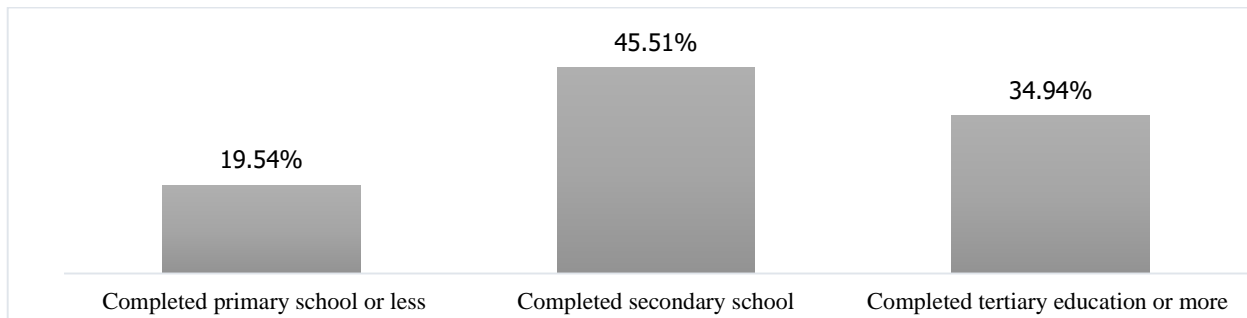**Figure 1:** Percentage age distribution of the respondents

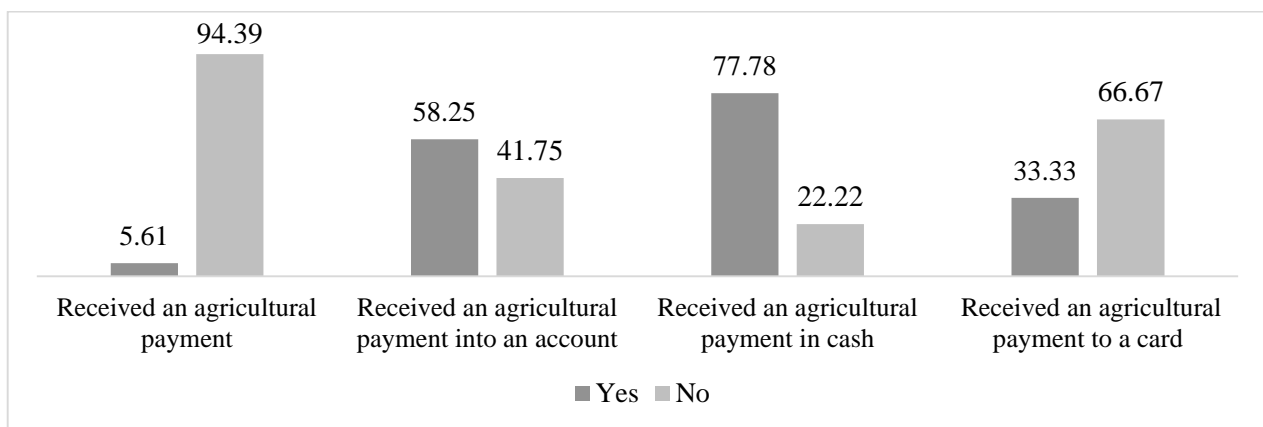**Figure 2:** Educational level of the respondents

Figure 3: Agricultural payment mechanisms

Agricultural payment mechanism

The findings reveal a stark contrast in the overall receipt of agricultural payments as presented in figure 3. Only 5.6% of respondents indicated that they received an agricultural payment, while a substantial 94.4% reported not receiving any payments at all. This low percentage raises concerns about the reach and effectiveness of agricultural support programs. It suggests that many farmers may be operating without the financial assistance that could help improve their productivity, invest in better technology, or mitigate the impacts of economic fluctuations.

A notable 58.3% of respondents reported receiving payments directly into their bank accounts, while 41.7% did not.
This indicates a growing trend toward formal banking channels for agricultural payments, which can enhance transparency and security.
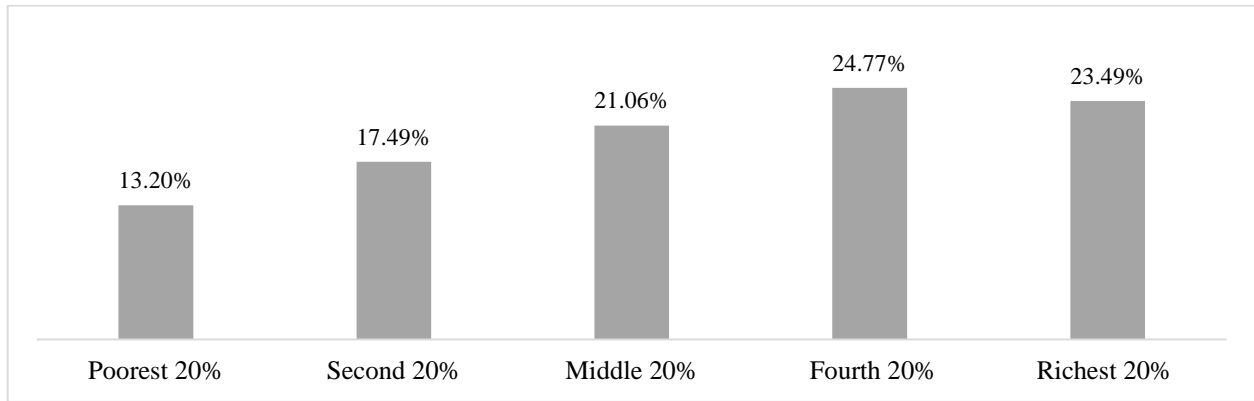
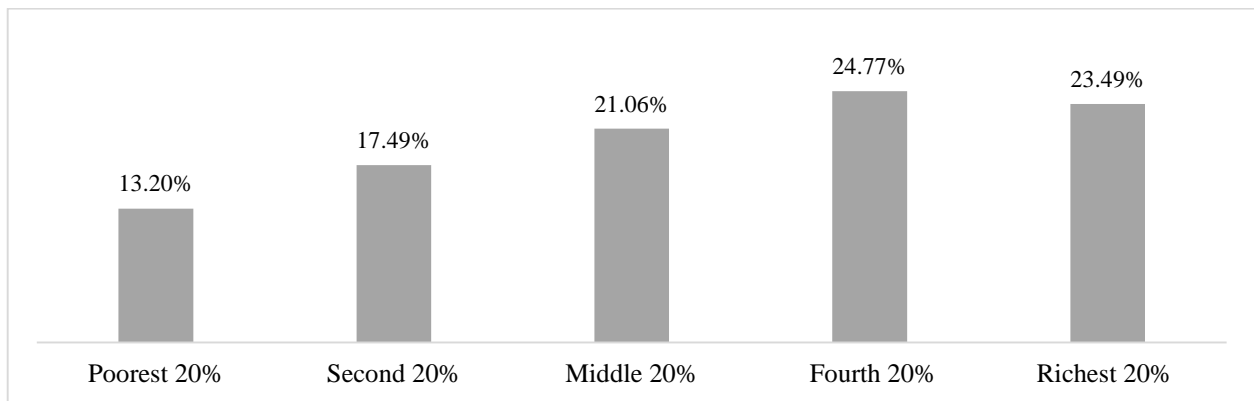**Figure 4:** Financially worried due to medical cost

Figure 5: Income quintile of the household

However, the fact that a significant portion still does not receive payments this way may highlight barriers to banking access, such as geographical limitations or lack of financial literacy among farmers. The data shows that a remarkable 77.8% of respondents received payments via mobile phone, with only 22.2% opting out of this method. This high percentage reflects the increasing penetration of mobile technology in rural areas, allowing for quicker and more convenient transactions. Mobile payments can facilitate immediate access to funds, enabling farmers to make timely purchases for seeds, equipment, or other necessities. This method also suggests a shift towards digital finance solutions, which can be particularly beneficial in regions where traditional banking infrastructure is lacking. Conversely, only 33.3% of respondents received payments in cash, while 66.7% did not. This lower percentage may indicate a move away from cash transactions, which can be less secure and harder to track. However, it also raises questions about the

adequacy of cash payments as a support mechanism, especially for farmers who might prefer immediate liquidity for day-to-day expenses. The data presents several implications for policymakers and agricultural support programs. The very low overall rate of agricultural payment receipt (5.6%) suggests a need for enhanced outreach and awareness campaigns to inform farmers about available support options. Many may not be aware of existing programs or may face bureaucratic hurdles that prevent them from accessing funds.

Moreover, the preference for mobile payments indicates an opportunity to leverage technology to improve access to agricultural financing. Policymakers could consider partnerships with mobile service providers to develop tailored solutions that ensure farmers receive timely payments and can easily manage their finances through mobile platforms. Moreover, the reliance on bank accounts and mobile phones highlights the importance of financial literacy programs aimed at

helping farmers navigate these systems effectively. Training on how to manage digital payments could empower farmers to take full advantage of available resources, thereby enhancing their income mobility and reducing medical cost anxiety.

Medical cost anxiety

The data on financial worry due to medical costs (see figure 4) reveals a nuanced perspective on the economic pressures faced by individuals, particularly in contexts where healthcare expenses can significantly impact household finances. The statistics indicate that 25.1% of respondents are "very worried," 38.9% are "somewhat worried," and 37.4% are "not worried at all." This distribution highlights varying levels of concern regarding medical expenses and suggests a complex relationship between health and financial stability. The fact that 25.1% of respondents are "very worried" about medical costs indicates a substantial portion of the population feels acute anxiety regarding potential healthcare expenses. This concern may stem from several factors, including high out-of-pocket costs, inadequate health insurance coverage, or previous experiences with unexpected medical bills. Individuals in this category may fear that a health crisis could lead to significant financial hardship, potentially resulting in debt or even bankruptcy.

Conversely, the 38.9% who are "somewhat worried" suggest a more moderate level of concern. This group may recognize the potential for medical costs to disrupt their financial stability but might feel somewhat secure due to factors such as having insurance, savings, or a stable income. Their worry could also reflect a general awareness of rising healthcare costs and the unpredictability of health issues rather than an immediate threat to their financial well-being. The 37.4% of respondents who are "not worried at all" may represent individuals with robust financial resources, comprehensive health insurance, or a strong support system that alleviates concerns about medical expenses. This group might also include younger individuals or those in good health who perceive medical costs as a distant concern rather than an imminent threat.

These findings have significant implications for policymakers and healthcare providers. The substantial percentage of individuals expressing worry about medical costs underscores the need for reforms aimed at increasing healthcare affordability and access. High levels of concern can lead to delayed medical care, as individuals may avoid seeking treatment due to cost fears, ultimately worsening health outcomes and leading to higher long-term expenses. Moreover, the data highlights the importance of financial literacy and planning in mitigating these worries. Educational programs focused on financial management and understanding healthcare costs could empower individuals to make informed decisions about their health and finances. Encouraging savings specifically earmarked for healthcare can also provide a buffer against unexpected expenses.

Income mobility in china

Poorest 20% (13.2%): This group has the lowest percentage of households moving up to a higher income quintile. A low mobility rate suggests that many households in this quintile remain stuck in poverty, facing barriers such as lack of access to education, job opportunities, and resources. Second 20% (17.5%): Slightly higher mobility compared to the poorest quintile indicates that some households are able to improve their economic situation, but the increase is modest. This suggests that while there are some opportunities for advancement, they may still be limited. Middle 20% (21.1%): This group shows a significant increase in mobility. Households in this category might have more access to resources that enable upward movement, such as better job prospects or educational opportunities. However, the increase is not drastic, indicating that while there is some mobility, it may not be sufficient for all.

Fourth 20% (24.8%): The highest mobility rate among the lower four quintiles suggests that households in this category are more likely to move up into the richest quintile. This could be due to various factors such as increased income opportunities, investments in education, or economic conditions favouring upward mobility. Richest 20% (23.5%): Interestingly, this group has a high percentage of households moving down to lower quintiles, which may indicate that wealth is not entirely stable. Economic downturns, poor investment decisions, or health crises can impact even the wealthiest households.

The data indicates a positive trend in income mobility as you move from the poorest quintile to the richest. However, the poorest households show the

least mobility, highlighting persistent inequality and challenges faced by low-income families. The relatively low percentages in the lower quintiles suggest systemic barriers that prevent upward movement. These can include limited access to quality education, discrimination, and economic instability. The higher mobility rates in the middle and upper-middle quintiles indicate that with the right policies—such as improved access to education, job training programs, and support for low-income families—there could be potential for greater upward mobility across all income levels.

Discussion

The findings regarding agricultural payment mechanisms align with existing literature highlighting the challenges farmers face in accessing financial support. For instance, studies by Binswanger-Mkhize[23] emphasize that low participation rates in agricultural payment programs can be attributed to lack of awareness and bureaucratic hurdles, which mirrors the 5.6% payment receipt rate found in the current data. Furthermore, the preference for mobile payments, with 77.8% of respondents utilizing this method, supports the work of Aker and Mbiti[24] who argue that mobile technology can significantly improve financial inclusion in rural areas. Their research indicates that mobile payments enhance access to funds and reduce transaction costs, which is crucial for smallholder farmers. The reliance on bank accounts for payments, reported by 58.3% of respondents, underscores findings by Demirgüç-Kunt *et al.*[25] which highlight the importance of formal banking systems in facilitating agricultural financing. However, the 41.7% not receiving payments via bank accounts raises concerns about financial literacy and access, as noted by McKee *et al.*[26]

The findings indicating that 25.1% of respondents are "very worried" about medical costs align with previous research highlighting the financial burden of healthcare on households. For instance, a study by Collins *et al.*[27] found that nearly 40% of Americans faced difficulties in paying medical bills, demonstrating widespread financial anxiety. Similarly, Himmelstein et al[.28] reported that medical debt is a leading cause of bankruptcy, underscoring the severe implications of healthcare expenses on financial stability. The 38.9% who are

"somewhat worried" reflect a growing trend documented by the Kaiser Family Foundation[29] which noted that many individuals express concern about potential out-of-pocket costs despite having insurance coverage. This suggests that even insured individuals remain vulnerable to financial strain due to high deductibles and co-payments.

Conversely, the 37.4% who are "not worried at all" may represent those with robust financial resources or comprehensive insurance, as noted by Soni *et al.*[30] who emphasized that socioeconomic status significantly influences perceptions of healthcare affordability. Overall, these findings highlight the persistent concern regarding medical expenses and the need for policy reforms aimed at enhancing healthcare affordability and accessibility[31, 32.] The findings on income mobility align with existing literature that highlights persistent barriers faced by low-income households. Research indicates that individuals in the lowest income quintile experience significant challenges in moving upward, often due to limited access to education and economic opportunities. Chetty *et al.*[33] found that neighbourhoods with better resources and schools can significantly enhance mobility prospects for low-income families. Moreover, the data showing higher mobility rates in the middle and upper-middle quintiles supports the notion that economic stability and access to opportunities can facilitate upward movement. According to Corak[34] intergenerational mobility is influenced by factors such as family income and educational attainment, which are more accessible to those in higher quintiles. Conversely, the notable percentage of wealthy households moving down suggests economic volatility, consistent with Piketty's[35] observations on wealth inequality and its fluctuations. This indicates that while some households ascend economically, others may face downward mobility, emphasizing the need for policies that promote stability and equitable access to resources across all income levels.

Strength and weakness

The use of figures provides a clear and concise way to present complex data, making it easier for readers to grasp key trends, relationships and patterns in the data. This is based on the fact that figures simplify the interpretation of results, particularly when

dealing with large datasets or complex statistical relationships, aiding in better comprehension. These figures allow for effective comparison between different variables, such as agricultural payments, medical cost anxiety, and income mobility, facilitating a more nuanced understanding of their interactions. In other words, visual aids enhance the communication of findings to both academic and non-academic audiences, making the research more accessible.

On the other hand, some of the limitations is that figures may not capture all the nuances of the data, such as underlying assumptions or variations that are better explained through detailed statistical analysis. The quality of figures depends on the accuracy and reliability of the underlying data, any errors or biases in the data collection process could be magnified in the figures. Also, figures representing static snapshots might not fully capture the dynamic nature of income mobility, medical cost anxiety or the impact of agricultural payments over time.

Conclusion

In conclusion, the study reveals that while agricultural payment mechanisms play a crucial role in supporting rural households, their potential to enhance income mobility is constrained by the persistent issue of medical cost anxiety. The findings suggest that any policy aimed at improving income mobility in rural China must address both agricultural productivity and healthcare affordability.

To enhance the effectiveness of agricultural payments in promoting income mobility, the study recommends a dual policy approach that integrates agricultural subsidies with healthcare reforms. This could involve expanding access to affordable healthcare services in rural areas, reducing out-of-pocket expenses, and enhancing social safety nets. By doing so, the government can alleviate medical cost anxiety, allowing agricultural payments to more effectively contribute to upward income mobility.

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