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Catch up with my husband as I can: Women's decision-making power consequences of China's poverty alleviation relocation program

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ABSTRACT

This paper examines the impact of a large-scale poverty alleviation relocation program in China on women's intra-household decision-making power. Specifically, we investigate how the timing of relocation affects this power by analyzing household survey data from 2019 and 2021. We employ an instrumental variable strategy to address potential reverse causality and selection bias. Our findings suggest that relocation has a significant positive effect on women's relative decision-making power within households, which is largely due to increased control over decisions concerning their children's education and social events. This impact is sustained and strengthens with longer durations of relocation. Mechanism analysis reveals that the relative increase in women's decision-making power is primarily driven by the reduction of contracted woodland in relocated households and changes in women's off-farm wages.

1. Introduction

Poverty is believed to be a root cause of gender inequality and poverty alleviation programs are crucial to empowering poor women (Balboni et al., 2022; Ghatak, 2015). When economic development reduces poverty and improves the welfare of the public, women's conditions tend to improve more than their male counterparts, which helps narrow the gender gap (Duflo, 2012). Despite an increasing number of randomized control trials evaluating a wide range of policy interventions attempted to improve women's empowerment, the empirical results have been mixed, with insignificant effects in some cases (Banerjee et al., 2015; Jayachandran et al., 2023; Kochar et al., 2022). In reality, poor women often find themselves trapped in a low-level equilibrium where poverty and low levels of empowerment reinforce each other. This puzzle is at the heart of the rich literature on poverty trap theory (Balboni et al., 2022; Bandiera et al., 2017), and raises a key question of whether poverty alleviation programs can truly empower poor women or whether such traps are too deeply entrenched to overcome.

This paper evaluates the role of a large-scale poverty alleviation policy in China in improving women's intra-household decision-making power – a crucial aspect of women's empowerment. During the latter half of the 2010s, China's Poverty Alleviation Relocation Program (PARP) relocated over 9.6 million individuals living below the poverty line from inhospitable areas to better settlements across around 1,400 counties in 22 provinces. It is important to note that county-level governments had the discretion to determine when the relocation would take place.[1] Using this plausibly exogenous assignment of targeted households to resettlements, we can identify the effect of relocation on women's intra-household decision-making power. However, the potential concerns of endogeneity including reverse causality and selection bias about households' decisions on relocation present a pervasive identification challenge in determining the causal effect of relocation on outcome variables (Bazzi et al., 2016; Nakamura et al., 2021). To address these issues, we employ an instrumental variable (IV) strategy, which capitalizes on the fact that households are more likely to opt for relocation when they attend more mobilization meetings organized by the village committee.

Our 2SLS estimate shows that married women from relocated households experienced a rise in their relative decision-making power

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[1] China's distinctive political hierarchy is a nested multi-tier administrative system (central government-province-prefecture-county-town), and the decision-making power of a certain level government rely heavily on its political hierarchy (Jia et al., 2021).

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relative to those who did not relocate. Moreover, the 2SLS estimate exceeds the baseline OLS estimate, indicating that women's intra-household decision-making power may in turn affect their households' decisions on relocation, leading to a downward bias. Further analysis shows that this increase in women's intra-household decision-making power was largely due to their greater control over decisions concerning their children's education and social events. We conduct several robustness checks, which confirmed our main finding and added to its credibility.

We lay out four hypotheses based on the observed patterns in the context of PARP that may contribute to the impact of relocation on married women's decision-making roles. The first hypothesis, "income autonomy", assumes that relocation may affect married women's threat points and outside options by altering their absolute and relative off-farm wage income. The second hypothesis, "property rights", posits that relocation may impact married women's relative decision-making power within the household by influencing their land rights, as local governments reallocated or reclaimed the contracted lands of participants in PARP. The third hypothesis, "relaxing budget constraints", argues that relocation could alleviate the financial constraints on women by providing greater access to microcredit. Finally, the fourth hypothesis, "freeing up women's time", asserts that relocation may enhance access to the nearest county seat, resulting in saved time for married women in home production (such as housework and caregiving) and an increase in their employment opportunities (Rubiano-Matulevich and Viollaz, 2019; Dinkelman and Ngai, 2022).

Our findings indicate that the relocation process can influence women's role in decision-making within the household primarily through income autonomy and property rights. First, women's absolute off-farm wage income is positively correlated with their intra-household decision-making power. Furthermore, the relative income mechanism suggests that if a woman earns more than her husband, the off-farm wage gap between them can positively impact her relative decision-making power within the household, and vice versa. Therefore, it is apparent that women's economic independence and job opportunities are key drivers in enhancing their bargaining power within the household (Majlesi, 2016; Qian, 2008). Secondly, the unintended effects of relocation improved women's intra-household decision-making power under scenarios of shrinking household contracted land, especially the contracted woodland in mountainous areas. This finding aligns with the extensive literature on women's property rights, which highlights the importance of improving women's land rights and control over other household assets to augment their bargaining power within the household (Bhalotra et al., 2019; Field, 2007; Menon et al., 2014). Finally, our study provides some suggestive evidence that relocation may also enhance access to nearby county seats and microcredit, although these mechanisms appear to play a less important role in improving women's intra-household decision-making power within the context of PARP.

Our study first contributes to the literature on the impacts of relocation or internal migration. Previous studies have utilized experimental and quasi-experimental variation to identify the effect of relocation on various outcomes such as income, education, health, and intergenerational outcomes (Busso et al., 2013; Chetty and Hendren, 2018; Chyn, 2018; Nakamura et al., 2021). For instance, Chetty et al (2016) found that the Moving to Opportunity (MTO) policy in the U.S. increased college attendance and earnings for children who relocated to a lower-poverty neighborhood before age 13. In developing countries, studies have primarily focused on the effects of relocation programs on agricultural productivity and food security (Bryan et al., 2014; Mueller et al., 2014). Bazzi et al. (2016) found that Indonesia's Transmigration Program resulted in higher rice productivity one to two decades later in villages that assigned migrants from regions with more similar agro-climatic endowments, primarily driven by crop adjustments and linguistic similarity. The latest studies evaluating the effects of China's PARP are restricted to income effects among program participants, with less attention paid to other household outcomes (Zhang et al., 2023). Our study demonstrates that relocation can significantly affect married women's intra-household decision-making power by altering their job opportunities and the household's contracted land rights, contributing a unique perspective to the literature.

Second, this paper is closely linked to the extensive literature on women's intra-household decision-making power. While the impact of changes in intra-household decision-making power on various household outcomes is well-documented, there has been comparatively little empirical research into the determinants of women's relative decision-making power within the household (Chiappori and Mazzocco, 2017). One strand of literature has identified that increased labor market opportunities for women, relative to men, are associated with improvements in their intra-household decision-making power and other household outcomes (Browning and Chiappori, 1998; de Brauw et al., 2021; Kim and Benjamin, 2021).[2] For instance, Majlesi (2016) finds that increasing demand for female labor in Mexico's manufacturing sector improves women's decision-making power and children's health. Our paper builds on this strand of literature by examining the labor market mechanism. Our empirical findings suggest that changes in women's absolute and relative off-farm wages resulting from relocation can enhance their intra-household decision-making roles. Moreover, the results reveal that the land property right is another critical mechanism through which PARP affects women's intra-household decision-making power. As such, our study complements existing research on the determinants of women's intra-household decision-making power and contributes to understanding changes in a broad range of household outcomes as the balance of household decision-making power.

Finally, our study also adds to the literature evaluating China's poverty alleviation programs. Prior research has shown that China's *8–7 Plan* results in significant increases in income and consumption for rural households (Meng, 2013; Park and Wang, 2001). Recently, Zhang et al (2023) employed a DID approach and discovered that PARP significantly increased participant households' income by 9.61 % and the income effect was mainly driven by the increase in wage income. However, relatively little is known about the unintended effects of China's poverty alleviation programs due to a lack of data. Direct measures of intra-household decision-making power are rare, especially in developing countries (de Brauw et al., 2021). This paper fills this gap by constructing an aggregate measure of women's relative decision-making power and identifying the causal effect of PARP on women's decision-making power within households. Our findings can help optimize anti-poverty schemes, especially those aimed at empowering poor women.

The rest of this study proceeds as follows. Section 2 provides the context of China's poverty alleviation relocation program. Section 3 describes our survey and data. Section 4 outlines our empirical strategy and Section 5 presents our estimation results of the effects of relocation on women's relative decision-making power within households. Section 6 discusses potential channels and our interpretation of the causal relationship between relocation and women's intra-household decision-making power. Section 7 analyzes the heterogeneous effects and the final section concludes.

2. Background: China's poverty alleviation relocation program

As an important component of China's poverty alleviation strategy, PARP aims to relocate poor people from remote, inhospitable areas to

[2] Other literature also investigates the determinants of women's intra-household decision-making power from the perspective of women's non-labor income, education, property rights and extra-household environment changes such as marriage markets (Calvi, 2020; Thomas, 1990, 1993).

better locations.[3] The trial of PARP can be traced back to a type of ecological migration known as the *Diaozhuang Migration* in the 1980s, which was the earliest organized PARP in China.[4] Building on the success of the pilot counties, China's central government unveiled the *8–7 Plan*, the first national poverty alleviation plan, in 1993 (Meng, 2013). Subsequently, China's PARP was gradually expanded to other provinces in a planned and organized manner. Official statistics reveal that from 2001 to 2015, the central government invested 36.3 billion RMB (i.e., approximately 5.26 billion US dollars) in the program, relocating 6.8 million impoverished people.[5]

Our study focuses on the latest and most intensive period of the PARP, implemented in 22 provinces from 2016 to 2020. As shown in Figure A1, after 2015, most of the remaining poor people were clustered in inland and mountainous regions. From 2016 to 2020, over 9.6 million people living in inhospitable areas were relocated out of poverty, with a budget of approximately 600 billion RMB (86.99 billion US dollars) allocated for the program.[6] The scale of this PARP wave was much larger than the Transmigration Program in Indonesia, which aimed to address overpopulation concerns in rural Java and Bali while developing the Outer Islands (Bazzi et al., 2016).[7]

The stylized facts of the PARP define it as a *conditional* voluntary relocation program. First, the villager's committee screened and verified the eligibility of households, who should be identified as poor households (IPH),[8] before their applications for relocation were sent to and checked by the Leading Group Office of Poverty Alleviation and Development (LGOPAD) in the county. Second, the timing of relocation was primarily determined by local governments, which was arguably not related to households' relocation decisions. Appendix Figure A2 provides some suggestive evidence that the formulation of relocation plans (including relocation timing) and the selection of resettlement sites predominantly rested with higher levels of government, village committees, or in collaboration between village committees and farmers. Only a small share of relocation decisions were made by farmers. Third, while households targeted for the PARP were given the option to participate voluntarily, they can also choose to withdraw their applications for relocation even after approval with full exemption (Zhang et al., 2023). In other words, PARP only relocated eligible households who opted for relocation.

Note that various supportive measures were put in place in the relocation destinations to assist relocated households, taking into account the characteristics of their relocation and the scale of the resettlement. One such assistance was the poverty alleviation workshops, which created job opportunities for relocated individuals with working abilities. These workshops had flexible working hours, making them particularly beneficial for the elderly and homemakers (Zhang et al., 2023). Importantly, workers received training in these workshops to enhance their vocational skills and improve their financial capacity. In general, these job opportunities could have a significant impact on the earning potential of female workers, which we will discuss in greater detail in the following sections. Another notable improvement in resettlement communities is their proximity to the county seat compared to their origin villages. The resettlements were equipped with better infrastructure, transportation (e.g. improved road density), and public services such as schools and hospitals.

PARP may change the titling of contracted land belonging to relocated households in their origin village. Although relocated households still have the right to occupy and use the contracted land in origin villages, the long distance between their new resettlement and the origin village may prompt them to rent out their land (Zhang et al., 2023).[9] Local governments also respect the decision of relocated households to quit their contracted land rights. These facts suggest that the link between relocated households and their contracted lands may be weakening, which could have important implications for women's relative decision-making power within households.

In addition to these general features, there was also considerable heterogeneity in the types of relocation. Eligible households can opt for either collective or dispersed relocation. Those who chose collective relocation were provided with free public housing allocated by local governments,[10] while those who chose dispersed relocation received a housing voucher to purchase or build a new house in a preferred location within the county.[11] Furthermore, eligible households can participate either in urban or rural relocation depending on the natural endowments of the locals and their comparative advantages. For example, skilled laborers with higher educational attainment were encouraged to relocate to towns, industrial parks, and tourist attractions (referred to as urban relocation), while those with strong agricultural skills were advised to relocate to new villages (referred to as rural relocation).[12]

3. Data

3.1. Survey

The dataset used in this study was obtained from a longitudinal survey of rural poor households under the PARP scheme. The purpose of the survey was to evaluate the impact of the PARP on the welfare of relocated households across counties. The baseline survey, launched in 2016 by Renmin University of China, employed a stratified random

[3] Note that China also implements other types of poverty alleviation programs generally including educational, financial, industrial, and infrastructural poverty alleviation programs (Zhang et al., 2023).

[4] In 1983, the severe water shortage drove the "three West" areas (Dingxi and Hexi district in Gansu Province and Xihaigu district in Ningxia Hui Autonomous Region) to implement the relocation. *Diaozhuang Migration* is a kind of ecological migration, which relocates villagers collectively (at the village level) from inhospitable areas to places with better environmental conditions. In the 1980s, there were no areas implementing poverty alleviation relocation programs in China except the "three West" areas.

[5] 1 US$= 6.897 RMB in 2020. Data is from the Statistical Bulletin of the PRC on National Economic and Social Development in 2020. https://www.stats.gov.cn/tjsj/zxfb/202102/t20210227_1814154.html.

[6] Information above is from the State Council Information Office of the PRC. Poverty Alleviation: China's Experience and Contribution. https://www.scio.gov.cn/zfbps/ndhf/44691/Document/1701663/1701663.htm. In Chinese.

[7] The Transmigration Program was conducted by the Indonesia government, which relocated two million migrants from rural Java and Bali to new created rural settlements in the Outer Islands from 1979 to 1988. The program provided households with free transport to new settlements and two hectare farm plots assigned by lottery.

[8] The identification of IPHs was mainly based on four dimensions (net household income per capita, tuition fee burden, healthcare burden and housing conditions) and were conducted by local officers in each village. The information of all IPHs were recorded in the National Poverty Alleviation and Development Information System (NPADIS) which was established by the central government.

[9] An official report about PARP suggests that many relocated households rent out their contracted land and woodland in the origin village to the village collective after moving away, which facilitates land consolidation of contracted land and mountainous forests and contributes to benefits for relocated households in the long term. https://www.gov.cn/xinwen/2020–12/03/content_5566758.htm.

[10] To restore the ecological environment of origin villages, houses of relocated households in origin villages were reclaimed into farmland or orchards with the consent of relocated households.

[11] The housing voucher is a fixed amount of subsidy which approximately equals to the construction cost of 25 square meters in each county. Although the location of the new house is determined by the household, it cannot be located in the origin village.

[12] The introduction of relocation types comes from the National Development and Reform Commission. China's Poverty Alleviation Relocation Policy. https://www.ndrc.gov.cn/fzggw/jgsj/dqs/sjdt/201803/t20180330_1050716.html?code=&state=123.

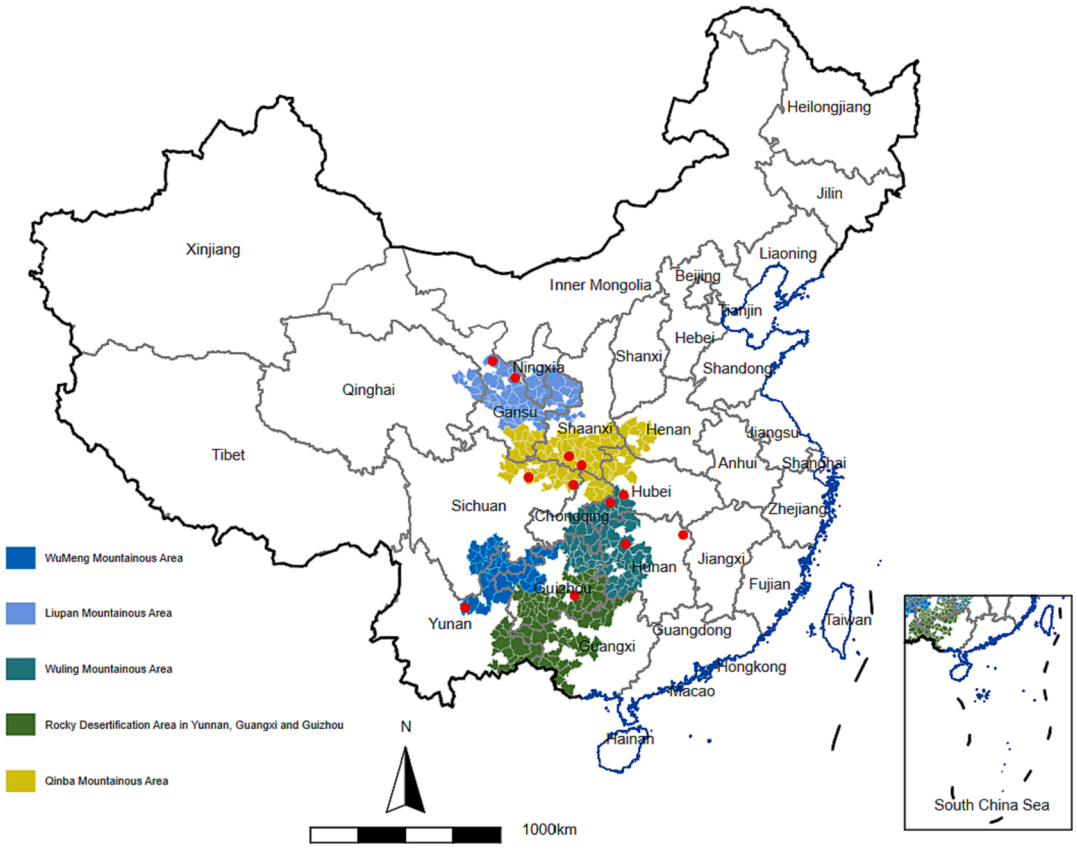

Figure 1. Geographical distribution of sample counties *Note*: The regions shaded in different colors represent five contiguous areas of extreme poverty designated in 2012, while the red circles represent the 16 sample counties. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

sampling strategy to select sample households. First, our team selected eight provinces that had the largest number of population to be relocated. Within each province, we randomly selected two counties that implemented the PARP.[13] These sixteen counties were representative of the national poverty distribution. As depicted in Figure 1, fifteen of them were located in five contiguous areas of extreme poverty[14] and only one was justified as a National Poor County outside the area. Second, we selected two or three townships in each county subject to the relocation scale and time and then randomly selected three administrative villages in each township.[15] Finally, we randomly selected twenty households from each administrative village using the households' roster. Notably, all sampled households in the baseline survey had been included in the relocation plan, indicating the geographic, transportation, and development conditions should be comparable for these households.[16] Follow-up waves were conducted for those relocated households and resettlement communities as well as those to be relocated and origin villages in 2017, 2019, and 2021.

Our survey collected detailed information about the individuals, households, origin villages of relocated households, and resettlement communities. The household questionnaire included modules on demographics, household income and expenditure, contracted land (including farmland, woodland, and grassland), livelihood assets (such as productive and consumption assets), and housing conditions. A distinguishing aspect of this survey was its comprehensive coverage of relocation types (collective or dispersed relocation), relocation attributes (urban or rural relocation), the timing of relocation, and the construction and supportive measures of the resettlement community (such as job opportunities, skill training, financial support, and community management). Figure 2 presents the distribution of relocation years ranging from 2015 to 2020. For those relocated households, around two-fifths (39.09 %) and a bit more than one-third (34.02 %) of households relocated in 2017 and 2018, respectively; while 16.27 % relocated before 2016 and 10.61 % relocated after 2019. Appendix Table A1 presents descriptive statistics of the supportive measures enjoyed by households across different relocation types and attributes. The findings reveal distinct emphases within different relocation types and attributes. For example, among households opting for collective relocation, a higher proportion experienced returns to assets, and they had a higher average transfer income. However, a larger proportion of households choosing dispersed relocation benefited more from skill training, irrespective of whether the beneficiary was the household, the husband, or the wife.

In 2019 and 2021, our team designed additional modules to delve into the dynamics of intra-household decision-making. The survey asked the household respondents about the household members responsible for decision-making across a set of 6 outcomes. Specifically, the questions were as follows: who primarily made the decisions on 1) the purchase of durable goods and housing, 2) the purchase of daily goods, 3)

[13] These provinces are Hubei, Hunan, Guangxi, Sichuan, Guizhou, Yunan, Shaanxi and Gansu.

[14] The five contiguous areas of extreme poverty depicted in Figure 1 are Wuling Mountain area, Yunnan, Guangxi and Guizhou rocky desertification area, Qinba Mountain area, Wumeng Mountain area and Liupan Mountain area.

[15] The term "village'' in this paper refers to an administrative village, which comprises one or more groups of villagers.

[16] Zhang et al (2023) restricts the sample to identified poor households and compares the participants in the PARP with non-participants who are otherwise identically impoverished. But there is significant difference in pre-PARP household characteristics between the participant households and non-participant households.

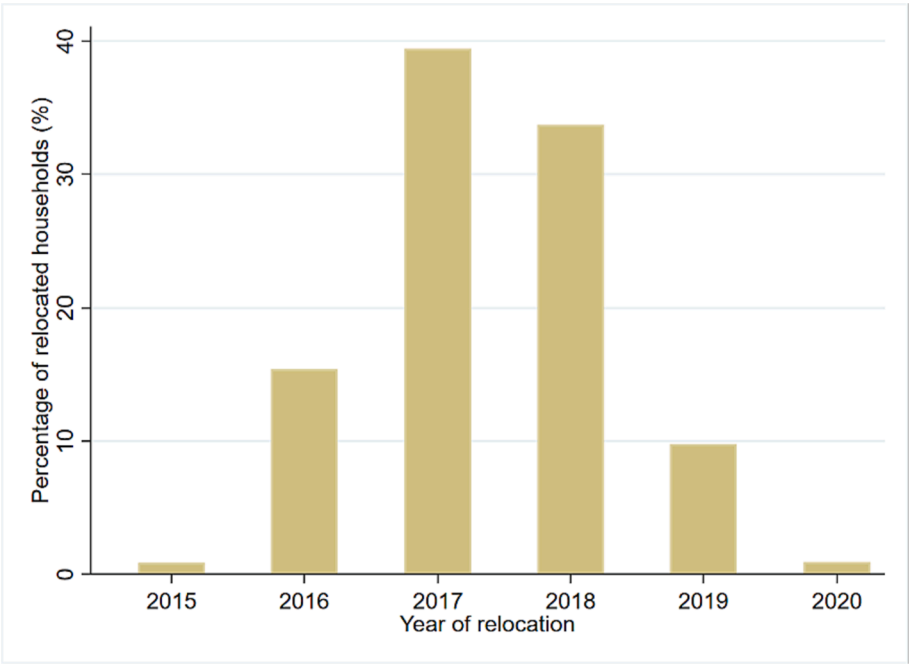

Figure 2. Distribution of relocation year of relocated households *Note*: households relocated before 2015 were incorporated into 2015. Data source: author's survey data.

grocery shopping and cooking, 4) chores, 5) children's education, and 6) social events (e.g., weddings, funerals, etc.). By examining the responses to these questions, we can explore the effect of relocation on women's relative decision-making power within households. We also gathered data on local socioeconomic characteristics for both the origin villages and resettlement communities.

3.2. Sample

We applied several restrictions to form our sample. First, we confined our data to the 2019 and 2021 waves, as the decision-making power module was only conducted in these two years. Second, we excluded households that have benefited from similar poverty alleviation policies.[17] These policies include the renovation program for dilapidated houses (*Wei Fang Gai Zao*), the development of the scenic countryside, and the reconstruction of original residences. We also excluded households that were initially eligible but became ineligible during the PARP program's progress.[18] Next, our sample was limited to married household heads and their spouses, as our dependent variable focused on women's relative decision-making power within households. After discarding observations with missing information, we obtained a sample of 1,938 observations from 969 households over two years, across 134 origin villages and 153 resettlement communities and villages.[19]

3.3. The definition and descriptive statistics of variables

Table 1 presents the definition and descriptive statistics of the variables utilized in the study. The outcome variable is women's aggregate relative decision-making power index (RDMP), which is defined as the number of household decisions made by the wife minus those made by her husband employing the approach of Majlesi (2016). The extent of women's involvement in decision-making across diverse domains serves as a direct measurement of their influence and negotiating authority within households and questions about women's role in household decisions are extensively used in constructing the decision-making index in related literature (Ambler et al., 2021; Kochar et al., 2022).[20] Notably, household decisions may be made by either of the spouses, jointly, or by someone else. When a decision is made jointly by both spouses, we consider it a decision made by both. However, if someone else makes the

[17] The aim of these poverty alleviation policies is also to improve the living conditions of impoverished households. The effect of PARP on household outcomes may be confounded if we don't exclude households polluted by these policies.

[18] There are some inaccurate identification problems due to unclear standards and lax procedures in the early years of the implementation of targeted poverty alleviation strategy. For example, some quota of IPHs were occupied by wealthy households and village cadres, which is a kind of elite capture (Han and Gao, 2019). Therefore, the IPH list is adjusted every year to enhance the accuracy of poverty identification.

[19] The household-level data employed in this paper is balanced in light that we have only two rounds of survey data and all our regressions control household fixed effects. The number of resettlement communities and villages is a bit larger than that of origin villages because many households chose dispersed relocation with a larger choice set of destinations. There are 83 relocated households we don't know where they relocated to.

[20] There are numerous ways to measure women's bargaining power within households. For instance, Banerjee et al. (2015) have constructed an index for women's empowerment, calculated as an equally weighted average of z-scores for 16 social outcomes. These outcomes include levels of spending on education and expenditure, teenage girls' and teenage boys' school enrollment, and counts of female children under one year and one- to two-years-old (besides indicators reflecting women's involvement in making decisions on diverse household items). Although these variables might provide insights into the dynamics of the household decision-making process, some of the included variables could also be outcomes influenced by shifts in women's bargaining power within the household (Kim and Benjamin, 2021; Majlesi, 2016). To avoid potential misconceptions, we choose to solely use the direct measures of decision-making to ensure greater clarity.

Table 1
Summary statistics.

Variables	Definition	Full sample	Treatment group	Control group	Difference
		(1)	(2)	(3)	(4)=(2)-(3)
Dependent Variables					
Women's aggregate relative decision-making power (RDMP)	The number of decisions made by the wife minus the number of decisions made by the husband	−2.145	−2.099	−2.405	0.307**
		(2.208)	(2.168)	(2.406)	(0.140)
Women's relative decision-making power over purchasing durable goods and house	1 = made by the wife, 0 = made by the husband or made jointly	−0.624	−0.613	−0.687	0.074
		(0.709)	(0.716)	(0.661)	(0.045)
Women's relative decision-making power over purchasing daily goods	1 = made by the wife, 0 = made by the husband or made jointly	0.170	0.174	0.148	0.026
		(0.919)	(0.917)	(0.933)	(0.059)
Women's relative decision-making power over grocery shopping and cooking	1 = made by the wife, 0 = made by the husband or made jointly	−0.569	−0.553	−0.660	0.107**
		(0.739)	(0.748)	(0.683)	(0.047)
Women's relative decision-making power over chores	1 = done by the husband or jointly, 0 = done by the wife or jointly	−0.369	−0.370	−0.364	−0.006
		(0.860)	(0.857)	(0.874)	(0.055)
Women's relative decision-making power over children's education	1 = made by the wife, 0 = made by the husband or made jointly	−0.073	−0.066	−0.117	0.051
		(0.920)	(0.921)	(0.917)	(0.059)
Women's relative decision-making power over social events	1 = made by the wife, 0 = made by the husband or made jointly	−0.679	−0.671	−0.725	0.054
		(0.655)	(0.659)	(0.627)	(0.042)
Independent variable of interest					
Relocate	1 = yes, 0 otherwise	0.850	1.000	0.000	
		(0.357)	(0.000)	(0.000)	
Number of relocation mobilization meetings	Number	8.572	9.112	5.369	3.726***
		(7.177)	(7.470)	(3.942)	(0.449)
Individual and Household Characteristics					
Age of the husband	Year	55.713	55.45	57.19	−1.741**
		(11.289)	(11.220)	(11.582)	(0.712)
Age of the wife	Year	52.588	52.42	53.55	−1.13
		(11.610)	(11.519)	(12.090)	(0.733)
Education years of the husband	Year	5.471	5.529	5.142	0.386*
		(3.313)	(3.279)	(3.490)	(0.209)
Education years of the wife	Year	3.632	3.756	2.925	0.830***
		(3.373)	(3.375)	(3.277)	(0.212)
Health status of the husband	1 = be healthy, 2 = have diseases (mental, heart, chronic, et al), 3 = be disabled	1.456	1.447	1.508	0.062
		(0.615)	(0.609)	(0.649)	(0.039)
Health status of the wife	1 = be healthy, 2 = have diseases (mental, heart, chronic, et al), 3 = be disabled	1.458	1.457	1.461	0.004
		(0.591)	(0.595)	(0.569)	(0.037)
Party membership of the husband	1 = member of CCP, 0 otherwise	0.054	0.054	0.051	−0.003
		(0.225)	(0.226)	(0.220)	(0.014)
Party membership of the wife	1 = member of CCP, 0 otherwise	0.013	0.012	0.017	0.005
		(0.112)	(0.108)	(0.129)	(0.007)
Cadre status of husband	1 = cadre, 0 otherwise	0.039	0.037	0.047	−0.010
		(0.194)	(0.190)	(0.213)	(0.012)
Cadre status of wife	1 = cadre, 0 otherwise	0.007	0.007	0.010	−0.004
		(0.084)	(0.081)	(0.101)	(0.005)
Gender of the interviewee	1 = male, 0 = female	0.656	0.651	0.681	−0.030
		(0.475)	(0.477)	(0.467)	(0.030)
Age of the interviewee	Year	53.904	53.610	55.580	−1.973**
		(13.108)	(13.233)	(12.257)	(0.827)
Family size	Number	4.758	4.739	4.864	−0.125
		(1.626)	(1.603)	(1.750)	(0.103)
Proportion of children	Percentage	15.619	15.81	14.51	1.304
		(17.257)	(17.286)	(17.079)	(1.089)
Proportion of children aged ≤ 6 years	Percentage	3.684	3.656	3.846	−0.191
		(8.915)	(8.808)	(9.521)	(0.895)
Proportion of children aged 7–15 years	Percentage	9.631	9.734	9.047	0.687
		(14.174)	(14.256)	(13.702)	(0.563)
Whether the household is an identified poor household	1 = yes, 0 otherwise	0.965	0.969	0.939	0.030***
		(0.185)	(0.173)	(0.240)	(0.012)
Observations		1938	1647	291	

Note: Standard deviations (columns 1, 2, 3) and standard errors (column 4) are in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.
Data source: author's survey data.

decision, it is not attributed to either spouse.

To ensure the robustness of our results, we also use alternative measures of women's relative decision-making power, including an index derived from principal component analysis, the mean score of six decision items outlined in subsection 3.1, and an index that describes women's status within the household. For the purpose of our study, we define households that have relocated before the survey year as the treatment group, while those that have not relocated yet serve as the control group.

The control variables include 1) husband and wife's characteristics: age, educational attainment, health status, political status, and cadre

status; 2) interviewee's age and gender[21]; 3) household characteristics including family size, the proportion of children under six years old, the proportion of children aged seven to fifteen, and whether the household is an IPH. Descriptive statistics for the full sample are presented in column 1 of Table 1, while columns 2 and 3 show the statistics for the treatment and control groups, respectively.

As Table 1 shows, the average score of women's relative decision-making power index is −2.145 (out of a maximum score of 6), which suggests that wives make approximately two fewer decisions on average than their husbands. Furthermore, women's aggregated relative decision-making power is significantly higher for households that have relocated compared to those that have not. Women's relative decision-making power over five out of six activities, except chores, is also higher for relocated households, consistent with the pattern of women's aggregate relative decision-making power.

Table 1 also unveils some noteworthy characteristics of impoverished households. First, the average age of sampled husbands and wives is above 50 years, which is higher than the age reported in the related literature. Prior studies have largely concentrated on women's decision-making power in early age cohorts, disregarding the fact that women's bargaining power and well-being may decline after their prime age (Anderson and Ray, 2010; Calvi, 2020). Second, the average educational attainment for both the husband and wife is approximately 5.5 years and 3.6 years, respectively. This suggests that, on average, neither of them has completed their compulsory education in China.[22] Third, the percentage of husbands or wives with the status of Chinese Communist Party membership (CCP) and cadre is less than 5 percentage points. Fourth, the average family size is approximately 4.8, with an average proportion of children accounting for 16 percentage points. Almost all sampled households (96.5 %) are identified as poor households, implying that both relocated and non-relocated households are relatively comparable in terms of their socioeconomic status.[23]

Note that husbands and respondents in the treatment group are significantly younger compared to those in the control group. Additionally, the treatment group displays significantly higher levels of educational attainment for both the husband and wife, and a greater proportion of households identified as poor than the control group. Overall, there are a dozen of covariates. It is acceptable that the statistics of five covariates exhibit significant differences between the treatment and control groups. To mitigate the selection bias arising from these observables, all regressions control for these covariates.

4. Empirical strategy

To investigate the effect of relocation on (married) women's relative decision-making power, we use the following basic specification:

$$RDMP_{ivt} = \beta_0 + \beta_1 Relocate_{ivt} + \beta_2 X_{ivt} + \delta_i + \varepsilon_{ivt} \quad (1)$$

where $RDMP_{ivt}$ represents the woman's aggregate relative decision-making power within household i in village v and year t, which is defined as the number of household decisions made by the wife minus those made by her husband. $Relocate_{ivt}$ is the treatment variable, which equals one if household i in village v has relocated to the new community or village in year t, and zero otherwise. X_{ivt} is a vector of control variables. Here, individual-level controls include age, educational attainment, health status, party membership, and cadre status of both the wife and the husband. Household-level controls include family size, household age composition (proportion of children aged below six years and the proportion of children aged between seven and fifteen years), and a dummy variable indicating whether household i is an identified poor household. δ_i represents the household fixed effects, which absorb unobservable time-invariant heterogeneity that may affect the household's decision-making process. ε_{ivt} is the error term clustered at the origin village level.[24] Given that there are two rounds of survey data, the empirical specification is exactly the first-difference version of equation (1).

The primary parameter of interest is β_1, which captures the average effect of relocation on (married) women's aggregate relative decision-making power within households. However, the relocation decision may not be exogenous due to reverse causality and potential selection effects (Bazzi et al., 2016; Nakamura et al., 2021). In the execution of PARP, the government respected targeted households' relocation willingness and only relocated eligible households who voluntarily chose to relocate. This means that targeted households have the discretionary power to determine whether to relocate or not. For example, if households with higher bargaining power for women are more likely to sort into relocation than those with lower bargaining power for women, the possible result that women of relocated households may have a higher decision-making power than those of non-relocated households is not caused by relocation.[25]

To address this challenge, we employ an instrumental variable (IV) strategy that is plausibly exogenous to the unobserved characteristics of sampled households and individuals. Specifically, we instrument $Relocate_{ivt}$ using the number of meetings to mobilize the eligible households to join the PARP before the survey year. During these gatherings, the cadres of the village committee explain the relocation policies in detail, including the housing subsidy, land rights, job opportunities, better amenities, as well as other poverty alleviation policies and projects in the destination areas. Furthermore, the eligible households could consult more about the PARP with the village cadres. Put simply, the aim of the mobilization meetings is to persuade eligible households to consider relocation and potentially change their relocation intentions.[26] In this context, the first-stage regression in our IV strategy is presented as follows:

$$Relocate_{ivt} = \alpha_0 + \alpha_1 Mobilize_{vt} + \alpha_2 X_{ivt} + \delta_i + \varepsilon_{ivt} \quad (2)$$

[21] A growing literature has shown that men and women interpret questions differently and cannot reach consensus about wives' involvement in decision-making (Ambler et al., 2021; Majlesi, 2016). For example, a woman indicates that she is involved in a certain decision-making process but her husband does not because she hides some resources and actions from her husband (Aker et al., 2016). Therefore, we control the age and gender of the interviewee to mitigate the measurement error of the decision-making index.

[22] From the year of 1986, the compulsory education in China is to finish the secondary schooling (nine years) (Fang et al., 2012).

[23] Although the PARP mainly target IPHs, some non-IPH households could participate in the program via the "Accompanying Relocation'' policy.

[24] While PARP eligibility hinged on household characteristics and was not determined by village characteristics, the geographic clustering of poverty depicted in Figure A1 indicates that village characteristics may be predetermined factors that were correlated to a household's probability of falling into poverty. Considering that there might be within-village correlations of participation in the PARP, we cluster standard errors at the original village level (Cameron and Miller, 2015).

[25] This argument is plausible, especially when combined with the emipircal result in Table 4. This table indicates that about half of the improvement in women's decision-making power is driven by their increased control over children's education. If the resettlement communities have more and better educational institutions and resources, households where women have higher decision-making power would be more likely to relocate.

[26] We thank an anonymous reviewer for pointing this out. A higher frequency of mobilization meetings could indicate heightened emphasis by the government on PARP. Column 1 of Appendix Table A3 shows that the correlation between the cumulative number of mobilization meetings in the origin villages and the total number of poverty alleviation policies in resettlement sites is positive and significant when controlling for the village and resettlement fixed effects. This correlation reveals that more mobilization meetings might correspond with a greater number of implemented policies and projects in resettlement sites, which may serve as an important reason for these meetings being effective in mobilizing the relocation of eligible households.

Table 2
The effect of relocation on women's aggregate relative decision-making power index.

	OLS		2SLS	
	Main	Main	Second stage	First stage
	(1)	(2)	(3)	(4)
Relocate	0.310*	0.497***	1.404***	
	(0.169)	(0.156)	(0.537)	
Mobilize				0.020***
				(0.005)
Mean of the control group	−2.405	−2.405	−2.405	−2.405
Controls	Yes	Yes	Yes	Yes
County fixed effect	Yes	No	No	No
Household fixed effect	No	Yes	Yes	Yes
F statistic	–	–	17.0382	–
R^2	0.1250	0.7035	0.0197	0.6634
Adjusted R^2	0.1099	0.3961	0.0100	0.3144
Number of households	969	969	969	969
Observations	1938	1938	1938	1938

Note: The set of controls includes characteristics of couples, households, and interviewees as described in Section 3. Standard errors clustered at the village level are reported in parentheses. The F statistic is the Kleibergen-Paap Wald F statistic of the weak instrument test. The significance levels of 1%, 5%, and 10% are denoted by ***, **, and *, respectively.
Data source: author's survey data.

where $Mobilize_{vt}$ represents the cumulative number of mobilization meetings before survey year t in the villager group v. Intuitively, these mobilization meetings are not directly related to women's intra-household decision-making power, but there should be a positive correlation between these meetings and the likelihood of households' relocation. The coefficient α_1 thus captures the exogenous variation in the likelihood of relocation for targeted households.

5. Results

5.1. OLS results

Table 2 first reports OLS estimates of equation (1), using the described set of explanatory variables as well as county (column 1) and household fixed effects (column 2). The estimated coefficients on the *Relocate* variable are positive and statistically significant in both columns. Furthermore, the estimated coefficient on the *Relocate* variable in column 2 is larger in magnitude and more precisely estimated. This indicates that the omitted (time-invariant) individual or household characteristics, such as attachment to the origin locations, may be correlated with both relocation and women's intra-household decision-making power.[27] To avoid potential downward bias, the following analysis uses household fixed effects rather than county fixed effects.

5.2. 2SLS results

The validity for our instrument variable requires that the cumulative number of mobilization meetings of the village committee is correlated with the propensity to relocate for sampled households but uncorrelated with any characteristics that may affect women's relative decision-making power within households. For the correlation condition between the endogenous variable of Relocate and IV, Figure A3 depicts the distribution of the cumulative number of mobilization meetings for relocated and non-relocated households, respectively. On average, relocated households attended around 9 mobilization meetings, whereas non-relocation households attended an average of only 5 meetings. The distribution of cumulative mobilization meetings among non-relocated families exhibited a noticeable right-skewed pattern, with a prominent peak at 4 meetings. In contrast, the distribution among relocation households appeared more even, featuring with a peak at 6 meetings. Column 4 of Table 2 further reports estimates of the first-stage regression, where *Relocate* is regressed on *Mobilize* conditional on a set of controls and household fixed effects. The first-stage coefficient α_1 of *Mobilize* is significantly positive at 1 % level, which means that for each additional mobilization meeting, the probability of relocation will increase by 2 percent of sampled households. Moreover, the Kleibergen-Paap Wald F-statistic attains a value of 17.04, which implies that the IV is strongly correlated with the relocation decision, and should not be considered weak.

To get an asymptotically consistent estimator, it is critical to ensure that the instrument be orthogonal to unobservables correlated with changes in women's relative decision-making power within households. Although this assumption cannot be directly tested (Conley et al., 2012; Miguel et al., 2004), we mitigate this concern by relying on exogenous variation in the number of relocation mobilization meetings held by the village committees. However, there remain a number of other reasons why the exclusion restriction may not be satisfied. First, the cumulative number of mobilization meetings may be endogenous to village-level characteristics, such as natural conditions, demographic characteristics, and economic development. These village-level characteristics may directly affect women's relative intra-household decision-making power. To address this issue, we examine whether these factors affect the frequency of mobilization meetings, and report the results in Appendix Table A2. We find that only one of these variables (the average wage of local skilled workers) has estimated coefficients on them that are statistically significant, making our IV strategy more convincing. Second, the mobilization meetings may affect some unobservable individual or household characteristics, other than the household's intention to relocate. For example, women's future employment expectations could be affected by these mobilization meetings, consequently affecting their intra-household decision-making power. Although we don't have data that could directly capture changes in women's employment expectations, we provide some suggestive evidence to alleviate this concern. We merge the mobilization meeting data in the origin village with information on poverty alleviation policies in resettlements using the household identifier and explore the correlation between them. In Appendix Table A3, we observe a significant correlation between the number of mobilization meetings in origin villages and the total number of poverty alleviation policies implemented in resettlements (column1 of Table A3), but this correlation is not significant with regards to poverty alleviation policies that target women (column 2 of Table A3). This indicates that the context of mobilization meetings may not be exclusively oriented toward women; instead, it targets the entire household. Therefore, we argue that the mobilization meetings are unlikely to affect women's employment expectations solely, thereby mitigating concerns that changes in women's employment expectations may have had a direct effect on their relative decision-making power via mobilization meetings.

Column 3 of Table 2 reports the two-stage least squares (2SLS) estimate. The estimated coefficient of the *Relocate* variable under 2SLS is statistically significant and positive.[28] More specifically, for relocated households with higher exposure to mobilization meetings, the relative

[27] The strong attachment of relocated households to origin locations may lead to the defiance of relocation (Nakamura et al., 2021). A relative increase in women's bargaining power within households can also weaken the family's ties to the origin community, indicating household's attachment level is correlated with women's decision-making power (Luke and Munshi, 2011). Note that, without considering household's attachment to origin locations, the OLS estimated results will be biased towards zero.

[28] To ensure robustness, we also employ the treatment effects model to address the selection bias that may arise from unobservable variables (Maddala, 1983). The estimated coefficient of the *Relocate* variable using the treatment effect model is consistent with 2SLS estimate and upon request.

Table 3
Relocation effect using phasing-in nature of the program.

	Restricted to relocated household		Restricted to collective relocation	
	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)
Relocate	0.481***	1.443***	0.512***	1.291***
	(0.155)	(0.531)	(0.164)	(0.460)
Mean of the control group	−2.412	−2.412	−2.412	−2.412
Controls	Yes	Yes	Yes	Yes
Household fixed effect	Yes	Yes	Yes	Yes
F statistic	–	15.9988	–	14.4831
R^2	0.6943	0.0186	0.6899	0.0427
Adjusted R^2	0.3768	0.0084	0.3648	0.0303
Number of households	921	921	743	743
Observations	1842	1842	1486	1486

Note: Columns 1–2 only keep households who relocated before 2021, and columns 3–4 further restrict samples to relocated households who chose collective relocation. The set of controls includes characteristics of couples, households, and interviewees as described in Section 3. Standard errors clustered at the village level are reported in parentheses. The F statistic is the Kleibergen-Paap Wald F statistic of the weak instrument test. The significance levels of 1%, 5%, and 10% are denoted by ***, **, and *, respectively.
Data source: author's survey data.

decision-making power of women was approximately 1.404 larger than that of non-relocated households, conditional on controls and household fixed effects. So using the −2.4 among the control group as a baseline, the balance would increase to −1. In other words, instead of the husband making two more decisions than the wife (or close to 2.5), the husband only makes one decision more than the wife. The estimate suggests that relocation can significantly enhance women's decision-making power within the household, reducing the bargaining power gap between spouses.

The OLS estimate of the *Relocate* variable in column 2 is much smaller in magnitude. This suggests that the OLS estimate is biased downward even after controlling for household fixed effects. This downward bias also aligns with the prior argument indicating the potential selection bias - households with higher relative decision-making power of women tend to sort into relocation. Furthermore, the measurement error arising from the subjective nature of our dependent variable could also introduce an attenuation bias that shrinks the OLS estimate towards zero (Angrist and Krueger, 2001; Griliches, 1986).

5.3. Robustness checks of the baseline results

We conduct several further robustness checks. First, given that relocated and non-relocated households may differ systematically, we utilize the phase-in nature of PARP and restrict to households that relocated before 2021 to estimate the relocation effect. Columns 1 and 2 of Table 3 compare households that relocated early with those that have not relocated, using the OLS and 2SLS estimates, respectively. With this restriction, the estimated coefficient on the *Relocate* variable is similar in magnitude to the corresponding results in Table 2.

Second, as mentioned in Section 2, collective relocation differs from dispersed relocation in that the timing of collective relocation is largely dependent on the construction process of resettlement communities, while dispersed relocation doesn't have this feature. This feature creates arguably more exogenous variation in the timing of relocation for households that opt for collective relocation (Zhang et al., 2023). To account for this, we further restrict our sample to households that chose collective relocation and re-estimate our baseline results. The estimated coefficient on the *Relocate* variable in columns 3 and 4 of Table 3 remains robust. Notably, the estimated coefficient on the *Relocate* variable in column 3 under the OLS estimation exhibits a slightly larger magnitude compared to that in column 2 of Table 2. In contrast, the estimated coefficient on the *Relocate* variable in column 4 under the 2SLS estimation is smaller than that in column 3 of Table 2. The changes in the estimated coefficient on the *Relocate* variable also correspond to the fact that the household's relocation decision is more exogenous in the scenario of collective relocation as opposed to dispersed relocation.

Third, to address the potential measurement error in our dependent variable, we further construct alternative measures of women's relative decision-making index. Appendix Table A4 reports the estimates obtained using the OLS and 2SLS methods for several alternative indices of women's relative decision-making power. In all cases, the estimated coefficients on the *Relocate* variable are positive and statistically significant (with the exception of the index that omits children's education in the 2SLS estimation). Furthermore, the 2021 survey retrospectively collected women's status within the household before and after the relocation for all sampled households, which can serve as a proxy for women's intra-household decision-making power. Appendix Table A5 presents the estimates of the relocation effect on women's household status. The results again indicate that the relocation significantly improves women's status within the household, consistent with our main results in Table 2.[29]

Fourth, to address potential bias resulting from time-variant unobservables, we employ the method proposed by Oster (2019), building on the work of Altonji et al (2005). In column 1 of Appendix Table A6, we report the selection ratio, which exceeds one, indicating that selection on unobservables would need to be nearly 5 times stronger than selection on observables to nullify the treatment effect, which is implausible given that we control for a large set of covariates. Moreover, the estimated treatment bound in column 2 confirms that the selection on unobservables is unlikely to drive our baseline results. This is consistent with the fact that 96.5 percent of the sampled households are classified as poor, which face heavy financial constraints that make it difficult for them to relocate without the assistance of PARP (Zhang et al., 2023). Therefore, bias arising from time-varying unobservables is not a major endogeneity concern in this study.

Finally, relocation may have potential spillover effects on women's relative decision-making power in the control group because relocation can disrupt the traditional social ties that connected relocated households with their original villages. For example, if households with weaker ties are more inclined to relocate, the relocation process might inadvertently reinforce the traditional social networks within the control group. Consequently, relocation may have a detrimental effect on women's relative decision-making power within households that have not relocated and the effect of relocation on women's relative decision-making power might be overestimated. To alleviate this potential bias, we focus exclusively on non-relocated households and explore any spillover effects. First, we employ measures of the proportion of households or population that have relocated in the origin village to proxy the extent of exposure to relocation among households in the control group. The findings presented in columns 1–2 of Appendix Table A7 indicate that these exposure measures have no statistically significant effects on women's relative decision-making power within households that have not relocated. Second, we indirectly measure the strength of social networks by using a dummy variable that indicates whether a household belongs to the most common surname in the origin village, as suggested by Bai et al. (2021). The estimated result reported in column 3 of Table A7 shows that although there appears to be a negative correlation between the household's most common surname status and women's relative decision-making power within the household, this relationship is not statistically significant. Therefore, the concerns regarding potential spillover effects are not substantial enough to bias our baseline results.

[29] Considering the variable of women's household status is a count variable, we also report the Poisson regression result in Table A5.

Table 4
The effect of relocation on women's relative decision-making power over six decisions.

	purchase of durable goods and house		purchase of daily goods		grocery shopping and cook		not doing chores		children's education		social events	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Relocate	0.087	0.204	0.094	0.492	0.095*	−0.039	0.083	−0.467*	0.085	0.709***	0.054	0.471**
	(0.056)	(0.193)	(0.065)	(0.303)	(0.053)	(0.191)	(0.083)	(0.256)	(0.062)	(0.256)	(0.042)	(0.184)
Mean of the control group	−0.687	−0.687	0.148	0.148	−0.660	−0.660	−0.364	−0.364	−0.117	−0.117	−0.725	−0.725
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F statistic	–	16.8644	–	16.8644	–	16.8644	–	16.8644	–	16.8644	–	16.8644
R^2	0.6748	0.0291	0.6562	0.0052	0.7028	0.0217	0.6278	−0.0247	0.7256	−0.0244	0.7033	−0.0053
Adjusted R^2	0.3377	0.0195	0.2997	−0.0047	0.3946	0.0120	0.2420	−0.0348	0.4412	−0.0345	0.3956	−0.0153
Number of households	969	969	969	969	969	969	969	969	969	969	969	969
Observations	1938	1938	1938	1938	1938	1938	1938	1938	1938	1938	1938	1938

Note: The set of controls includes characteristics of couples, households, and interviewees as described in Section 3. Standard errors clustered at the village level are reported in parentheses. The F statistic is the Kleibergen-Paap Wald F statistic of the weak instrument test. The significance levels of 1 %, 5 %, and 10 % are denoted by ***, **, and *, respectively.
Data source: author's survey data.

5.4. Decomposition of changes in women's relative decision-making power

It is possible to argue that a positive change in women's aggregate relative decision-making power may not necessarily mean an increase in women's decision-making status within households. The importance of different decisions varies, and women may take control of more decisions that are less important (such as those related to chores, grocery shopping, and cooking) at the expense of giving up power over more crucial ones (Majlesi, 2016). To address this concern and investigate which decisions are more likely to be affected by relocation, we re-estimate the effect of relocation on women's relative decision-making power over six activities using OLS and 2SLS, respectively.

Table 4 illustrates how relocation impacts women's relative decision-making power across six activities. With one exception, the estimated coefficients on the *Relocate* variable are not both negative and statistically significant (except the decision regarding not doing chores under 2SLS estimation). This suggests that there is no evident strategic exchange of decisions between spouses. Of particular interest is that women's relative decision-making power goes up over children's education by 0.709 points (column 10); in other words, about half of the average effect is attributable to decisions about children's schooling. Existing literature suggests that women are more inclined to allocate resources toward public goods and services compared with men due to their altruistic tendencies (Becker, 1976; Brown, 2009; Duflo and Udry, 2004). In this case, a relative increase in mothers' decision-making power over their children's education could lead to more investment in education. This can have positive implications for human capital accumulation, the upward mobility of the next generation, and poverty reduction in the long run (Chetty et al., 2016; Duflo, 2012, Menon et al., 2014).

Another interesting finding is that relocation significantly improves women's relative decision-making power over social events, as shown in column 12. Lack of decision-making power over social events, such as weddings and funerals, is often regarded as a key contributor to women's disempowerment, particularly in less developed areas (Leight and Liu, 2016; Malapit et al., 2019). Literature has revealed that out-migration weakens the traditional network at the origin (Luke and Munshi, 2011; Munshi and Rosenzweig, 2009). As a result, relocation may disrupt the social network of the origin village where men dominate intra-household decision-making and interactions with external relationships, largely due to matrimonial traditions. Therefore, relocation can be also regarded as a means of reshaping social networks, while simultaneously challenging entrenched patriarchal norms in rural China.

However, it seems that there is no significant improvement in women's relative decision-making power over another important item - the decision-making power over purchasing durable goods and housing (as seen in columns 1 and 2), suggesting that sampled households respond to relocation asymmetrically across various important decisions. One possible explanation for this is that men may have strategically ceded control of some important decisions to avoid potential conflicts with their wives, while remaining dominant in overall household decision-making (Luke and Munshi, 2011).

The estimates reported in columns 5–8 provide some suggestive insights into the persistence of gender norms subsequent to relocation. First, women's relative decision-making power over grocery shopping and cooking has not been improved but decreased after relocation, albeit statistically insignificant.[30] Second, it appears that women's engagement in household chores tends to increase after relocation. Grocery shopping, cooking, and doing chores are often considered women's responsibilities, and the estimates of the decision-making power over these two activities indicate that the traditional gender norm, at least in terms of domestic work, may be persistent after relocation (Bertrand et al., 2015; Wang, 2014). As households relocate to more developed locations, their increased involvement in the labor market might contribute to the enhancement of market-driven gender divisions of labor. Consequently, this evolution could exacerbate women's domestic burden within the relocated households.

6. Mechanism analysis

The previous section indicates that relocation has a causal effect on boosting women's relative decision-making power within households. In this section, we delve deeper into the underlying mechanisms through which relocation may alter women's relative decision-making power. We augment our baseline specification (1) by incorporating mechanism variables in the following regression:

$$RDMP_{ivt} = \theta_0 + \theta_1 Relocate_{ivt} + \theta_2 Mechanism_{ivt} + \theta_3 X_{ivt} + \delta_i + \varepsilon_{ivt} \quad (3)$$

Where $Mechanism_{ivt}$ denotes the array of potential mechanisms hypothesized to explain this relocation effect: 1) increasing income autonomy measured by women's absolute and relative wage income; 2)

[30] Another reason to explain the insignificant coefficient of column 5 and 6 is that women's decision-making power over grocery shopping and cook is already quite high. Our survey data has shown that 72.28% of decisions over grocery shopping and cook are made by wives. Therefore, there is limited room for further augmentation of this decision-making power.

Table 5
Mechanism analysis.

	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)	OLS (9)	2SLS (10)	OLS (11)	2SLS (12)	OLS (13)	2SLS (14)
Relocate	0.497***	1.404***	0.469***	1.327**	0.490***	1.465**	0.480***	1.199**	0.431***	1.238**	0.369**	1.370**	0.311*	1.090
	(0.156)	(0.537)	(0.161)	(0.544)	(0.159)	(0.611)	(0.151)	(0.537)	(0.163)	(0.571)	(0.167)	(0.540)	(0.169)	(0.663)
Absolute income			0.008	0.006									0.002	0.000
			(0.005)	(0.005)									(0.005)	(0.006)
Relative income1					0.033*	0.024							0.028	0.026
					(0.017)	(0.018)							(0.019)	(0.019)
Relative income2					−0.028*	−0.038**							−0.027	−0.036*
					(0.016)	(0.017)							(0.017)	(0.019)
Farmland							0.007	0.018					−0.012	0.003
							(0.054)	(0.053)					(0.056)	(0.056)
Woodland							−0.066***	−0.065***					−0.063***	−0.063***
							(0.023)	(0.023)					(0.023)	(0.023)
Grassland							0.013	0.026					0.017	0.027
							(0.028)	(0.029)					(0.030)	(0.030)
Microcredit									0.323**	0.207			0.308**	0.216
									(0.144)	(0.173)			(0.153)	(0.174)
Distance to county seat											−0.202**	−0.059	−0.197*	−0.090
											(0.099)	(0.127)	(0.100)	(0.136)
Mean of the control group	−2.407	−2.407	−2.407	−2.407	−2.407	−2.407	−2.407	−2.407	−2.407	−2.407	−2.407	−2.407	−2.407	−2.407
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F statistic	–	19.1420	–	19.0137	–	17.5617	–	19.6818	–	19.7153	–	23.2603	–	23.7890
R^2	0.7032	0.0199	0.7039	0.0240	0.7050	0.0216	0.7059	0.0374	0.7044	0.0288	0.7047	0.0208	0.7102	0.0510
Adjusted R^2	0.3967	0.0112	0.3975	0.0148	0.3991	0.0119	0.4003	0.0273	0.3985	0.0196	0.3991	0.0116	0.4060	0.0386
Number of households	969	969	969	969	969	969	969	969	969	969	969	969	969	969
Observations	1938	1938	1938	1938	1938	1938	1938	1938	1938	1938	1938	1938	1938	1938

Note: The absolute income represents the proportion of off-farm wage income that is contributed by the wife in the household. Relative income1, relative income2, farmland, woodland, grassland, and distance to county seat are all taken in logarithms. The set of controls includes characteristics of couples, households, and interviewees as described in Section 3. Standard errors clustered at the village level are reported in parentheses. The F statistic is the Kleibergen-Paap Wald F statistic of the weak instrument test. The significance levels of 1%, 5%, and 10% are denoted by ***, **, and *, respectively.

Table 6
Heterogeneous analysis by duration.

	OLS (1)	2SLS (2)
Duration_1	0.432	0.712*
	(0.276)	(0.380)
Duration_2	0.452***	0.421*
	(0.163)	(0.225)
Duration_3	0.898***	1.096***
	(0.280)	(0.407)
Duration_4	0.432*	0.489
	(0.236)	(0.302)
Duration_5	1.171***	1.622***
	(0.332)	(0.471)
Mean of the control group	−2.405	−2.405
Controls	Yes	Yes
Household fixed effect	Yes	Yes
F statistic	–	7.9347
R^2	0.7071	0.0544
Adjusted R^2	0.4009	0.0431
Number of households	969	969
Observations	1938	1938

Note: Duration_1 refers to one year after the relocation, Duration_2 refers to two years after the relocation, Duration_3 refers to three years after the relocation, Duration_4 refers to four years after the relocation, and Duration_5 refers to five or more years after the relocation. The reference group is non-relocated households in the survey year whose duration is zero. The set of controls includes characteristics of couples, households, and interviewees as described in Section 3. Standard errors clustered at the village level are reported in parentheses. The F statistic is the Kleibergen-Paap Wald F statistic of the weak instrument test. The significance levels of 1 %, 5 %, and 10 % are denoted by ***, **, and *, respectively.
Data source: author's survey data.

changing property rights measured by household's contracted land; 3) relaxing budget constraints quantified by household's access to microcredit; and 4) freeing up women's time gauged by the distance to the nearest county seat. Therefore, we could assess the extent to which these mechanism variables mediate the impact of relocation on women's relative decision-making power by analyzing the estimated coefficient θ_2 and checking variations in the estimated coefficient of $Relocate_{ivt}$, represented as θ_1, in comparison to β_1 in equation (1).[31] In Appendix Table A8, we present summary statistics of all mechanism variables. The household fixed effects and all covariates controlled in equation (3) remain consistent with those in equation (1).

6.1. Increasing income autonomy: Changes in women's absolute and relative wage income

Changes in women's absolute wage income. To investigate the impact of relocation-induced changes in women's absolute wage income on their relative decision-making power, we measure the proportion of off-farm wage income that is contributed by wives in the household. Our findings show that, on average, women in the treatment group earn 2284 yuan more per year than their counterparts in the control group. This figure is even higher than women's average off-farm wage income in the control group.

Columns 1 and 2 of Table 5 replicate the baseline result we originally displayed in columns 2 and 3 of Table 2.[32] Columns 3 and 4 additionally control for the share of the wife's absolute non-farm wage income. The estimated coefficient on the *Relocate* variable declines slightly, compared with the baseline estimation in columns 1 and 2. Meanwhile, the estimated coefficient of *log*(*absoluteincome*) is positive, indicating that the increase in the share of women's absolute non-farm wage income is associated with an increase of her relative decision-making power within households.

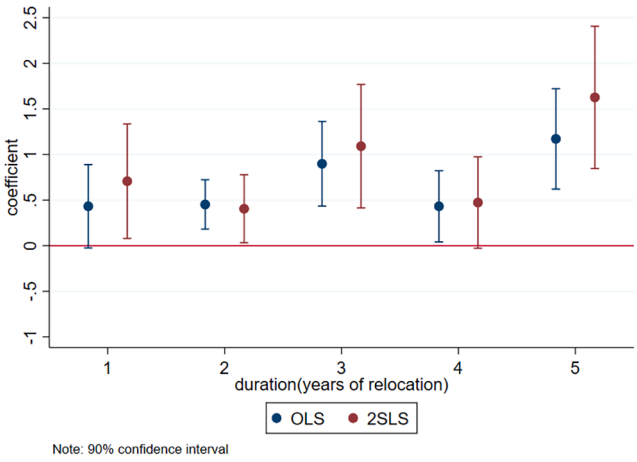

Figure 3. The heterogeneous effect of relocation durations *Note*: The reference group is non-relocated households in the survey year whose relocation duration is zero. Households relocated more than 5 years are classified as *duration five*. Data source: author's survey data.

Table A11 provides additional insights into the origins of off-farm jobs for women. We find that, across the full sample, relocated households and non-relocated households, self-seeking, and referrals through personal networks (through friends or relatives) are the primary means of securing off-farm jobs for women. However, compared to women in non-relocated households, those in relocated households are more likely to obtain employment through governments, enterprises, and cooperatives. This suggests that local government, enterprises, and cooperatives are actively creating job opportunities for women in relocated households.

Changes in women's relative wage income. Literature on the household bargaining model highlights the impact of relative income on a couple's bargaining position (Bertrand et al., 2015; Blau and Kahn, 2017). Table A8 shows that the average income of wives in both the treatment and control groups is lower than that of their husbands. However, there are some households where the wife earns more than her husband. Accordingly, we define the wife's relative wage income as the difference between her annual off-farm wage income and her husband's. We further categorize this into two groups: *relativeincome*1 when the wife earns no less than her husband, and *relativeincome*2 when the husband earns more than his wife.

Controlling for the wife's relative off-farm wage income, columns 5 and 6 of Table 5 indicate that the coefficient on *log*(*relativeincome*1) is positive, while the coefficient on *log*(*relativeincome*2) is negative. This suggests that only when the wife earns more than her husband can her relative income increase her decision-making power within households.[33] Empirical evidence has shown that an increase (or decrease) in

[31] The premise that the mechanism variables can mediate the impact of relocation on women's relative decision-making power is that relocation will directly affect these mechanism variables. Therefore, we conduct a first-step analysis to examine the effect of relocation on these mechanism variables. The estimated results are presented in Appendix Table A9, which reveals that relocation has a significant effect on all mechanism variables when using 2SLS estimation, except the distance to the county seat. The signs of all estimated coefficients of the *Relocate* variable are consistent with the reasoning we discussed in the main text.

[32] We also report the estimated coefficients for all covariates to explore their role in explaining the relocation effect on women's relative decision-making power. However, recognizing the substantial volume of Table 5, we have opted to present the regression results for the independent variables in Appendix Table A10.

[33] However, the estimated coefficient of *Relocate* is nearly unchanged, possibly due to the offsetting effect of *relativeincome*1 and *relativeincome*2.

Table 7
Heterogeneous analysis by relocation type and wife's off-farm employment status.

	(1) OLS	(2) 2SLS	(3) OLS	(4) 2SLS	(5) OLS	(6) 2SLS
Relocation	0.497**	1.428*	0.511***	1.599***	0.527***	1.725***
	(0.215)	(0.767)	(0.163)	(0.584)	(0.162)	(0.629)
Relocation × Urban	−0.000	−0.074				
	(0.275)	(0.457)				
Relocation × Wife_employment			−0.496	−2.746	−0.503	−2.617
			(0.459)	(3.170)	(0.461)	(3.208)
Wife_employment			0.739*	2.757	0.768*	2.678
			(0.443)	(2.984)	(0.447)	(3.019)
Husband_employment					−0.083	−0.209
					(0.144)	(0.163)
Mean of the control group	−2.405	−2.405	−2.405	−2.405	−2.405	−2.405
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
F statistic	–	9.6386	–	6.4616	–	6.3608
R^2	0.7035	0.0203	0.7046	0.0106	0.7047	0.0063
Adjusted R^2	0.3961	0.0106	0.3977	0.0003	0.3972	−0.0046
Number of households	969	969	969	969	969	969
Observations	1938	1938	1938	1938	1938	1938

Note: The set of controls includes characteristics of couples, households, and interviewees as described in Section 3. Columns 5–6 additionally control the husband's off-farm employment status. The F statistic is the Kleibergen-Paap Wald F statistic of the weak instrument test. Standard errors clustered at the village level are reported in parentheses. The significance levels of 1%, 5%, and 10% are denoted by ***, **, and *, respectively.
Data source: author's survey data.

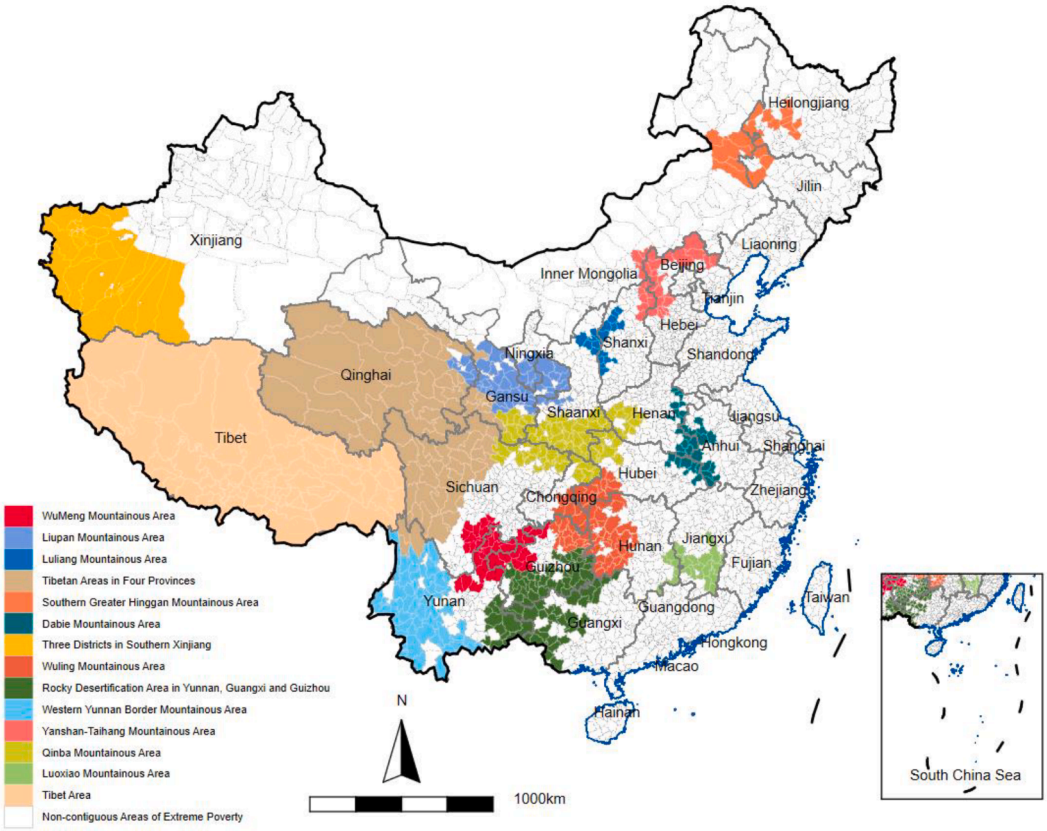

Figure A1. Map of contiguous areas of extreme poverty *Note*: 14 contiguous areas of extreme poverty designated in 2012 are denoted by regions shaded in different colors. The identification of these 14 contiguous poor areas is based on several county-level indicators that are highly related to the degree of poverty, such as per capita GDP, per capita fiscal general budget revenue, and rural per capita net income of the county from 2007 to 2009.

women's relative wage income can enhance (or undermine) their decision-making power within households and their outside options (Danquah et al., 2021; Duflo and Udry, 2004; Lundberg et al., 1997). Furthermore, the distribution of the income share earned by the wife also matters. For instance, Bertrand et al. (2015) observed that the distribution of the bargaining power within the household shifted sharply when the wife's income exceeds her husband's.

6.2. *Changing property rights: Reductions in contracted land*

A well-established literature on intra-household bargaining power also focuses on the effect of women's asset ownership, particularly land

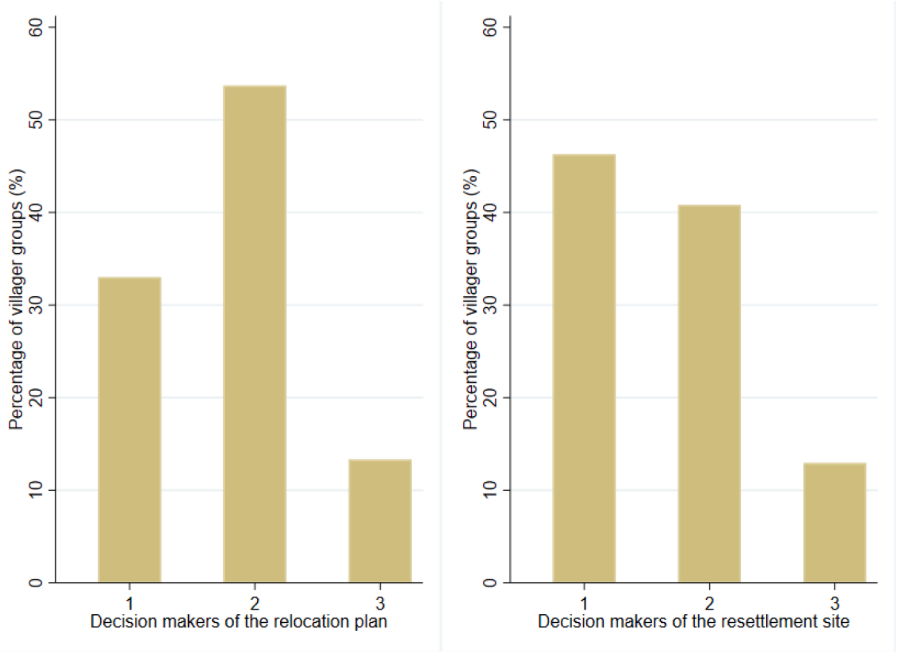

Figure A2. Distribution of decision-makers involved in relocation-related issues *Note*: The left and right subfigures illustrate the distribution of decision-makers involved in determining the relocation plan and resettlement site for the villager group, respectively. 1 represents that relocation-related issues are decided directly by higher levels of government, 2 represents that these issues are made either directly by village committees or jointly by village committees and farmers, and 3 represents that these issues are decided by farmers themselves.

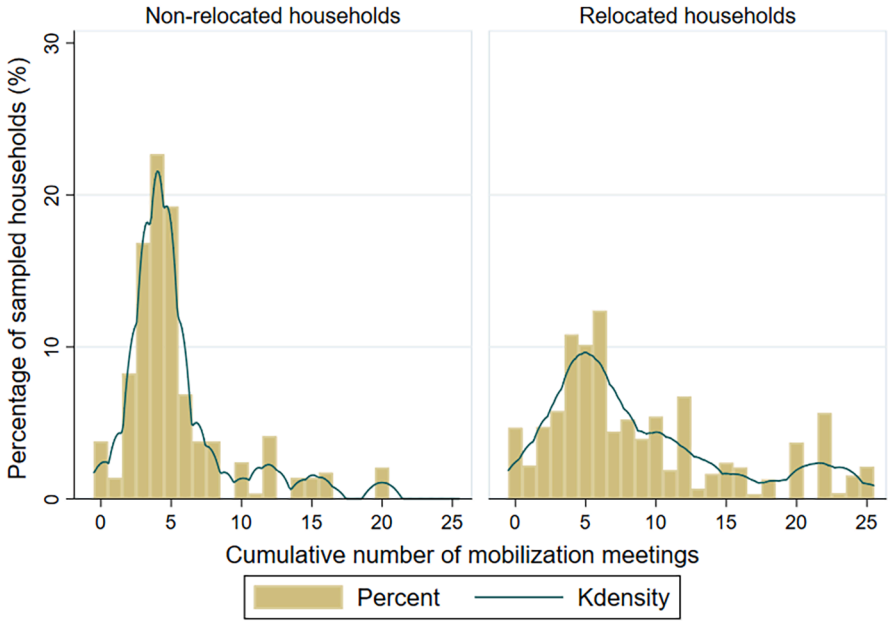

Figure A3. Distribution of the cumulative number of mobilization meetings *Note*: Households who attended the mobilization meetings more than 25 times were capped at 25 times and subsequently grouped into the final bin. The kernel function is epanechnikov.

rights, on their intra-household decision-making power (Calvi, 2020; Deininger and Castagnini, 2005; Doss, 2013). The existing evidence suggests that enhancing women's control over land can increase their economic independence and bargaining power within the household (Allendorf, 2007; Menon et al., 2014; Wang, 2014; Zhang and Chan, 1999). While we cannot identify which household member controls the contracted land due to data limitations, we can still shed light on the impact of land rights on women's decision-making power by examining three variables: the area of contracted farmland, woodland, and grassland.

Columns 7 and 8 of Table 5 report the effect of relocation on the household's contracted land. Interestingly, the estimated coefficient on *Log*(*woodland*) is negative and statistically significant, suggesting the area of contracted woodland is negatively associated with women's intra-household decision-making power. As depicted in Figure 1, the sampled counties are clustered in mountainous regions. This distinctive natural setting gives rise to a prominent pattern: the majority of contracted land held by sampled households was woodland due to the land

Table A1
Supportive measures for different groups of relocated households.

	Collective relocation		Dispersed relocation		Difference
	N (1)	Mean (2)	N (3)	Mean (4)	Mean (5)=(2)-(4)
Industrial projects	1346	0.495	301	0.459	0.036
Production supports	1346	0.289	301	0.372	−0.083***
Returns to assets	1346	0.192	301	0.057	0.135***
Job opportunities	1346	0.018	301	0.030	−0.012
Skill training: household	1346	0.397	301	0.465	−0.069**
Skill training: husband	1346	0.239	301	0.326	−0.087***
Skill training: wife	1346	0.124	301	0.166	−0.042*
Access to broadband	1326	0.509	296	0.493	0.015
Total transfer income	1344	6206.269	301	4569.215	1637.055***
	Urban relocation		Rural relocation		Difference
	N (6)	Mean (7)	N (8)	Mean (9)	Mean (10)=(7)-(9)
Industrial projects	631	0.489	1016	0.487	0.003
Production supports	631	0.194	1016	0.374	−0.18***
Returns to assets	631	0.278	1016	0.099	0.179***
Job opportunities	631	0.027	1016	0.017	0.010
Skill training: household	631	0.317	1016	0.467	−0.149***
Skill training: husband	631	0.173	1016	0.306	−0.134***
Skill training: wife	631	0.116	1016	0.142	−0.026
Access to broadband	619	0.558	1003	0.474	0.084***
Total transfer income	630	6850.041	1015	5321.216	1528.825***

Note: The government-supported industrial development projects include supports for planting (such as fruits, medicinal materials, vegetables, tea, cash crops, etc.), breeding, and rural tourism. The production supports include technical training, information services, means of production services, sales services, transportation services, and credit services across different agricultural production links. Returns to assets primarily come from the dividends from land, capital, agricultural machinery, and other assets. Job opportunities mainly refer to working on industrial development projects. The transfer income includes relief funds, subsistence allowances, poverty subsidies, ecological compensation, etc. The significance levels of 1%, 5%, and 10% are denoted by ***, **, and *, respectively.

endowment, which served as a vital resource for sustenance prior to their relocation. With the PARP facilitating households away from these mountainous areas, there was a corresponding reduction in contracted woodland. Conversely, there is no sufficient evidence showing that the contracted farmland and grassland can directly affect women's intra-household decision-making power, which is indicated by the insignificant coefficients on *Log*(*farmland*) and *Log*(*grassland*).[34] Furthermore, the estimated coefficient on the *Relocate* variable declines by 14.6 percentage points under 2SLS. In other words, the reduction in contracted woodland plays an important role in explaining the relocation effect on women's intra-household decision-making power.

These results are consistent with literature revealing that China's rural land management policy has posed a threat to the land rights of rural women, particularly those who are married, thus hindering their empowerment and well-being within households (Hare et al., 2007;

[34] The insignificant effect of reductions in contracted grassland may be explained by the fact that the majority of sampled households did not contract grassland as indicated in Table A12. Despite a notable decrease of 9.364 *Mu* in the total area of contracted grassland for relocated households compared with those not, it is noteworthy that approximately 92.65 percent of households in the treatment group and 88.97 percent of households in the control group did not contract any grassland as indicated in Table A12. This aligns with the geographical context of sampled counties which were located in mountainous areas rather than grassland areas.

Table A2
Determinants of the cumulative number of relocation mobilization meetings.

	OLS (1)	Poisson (2)
Log(area)	−0.145	−0.121
	(0.256)	(0.248)
Log(elevation)	−0.875	−1.227
	(1.300)	(1.589)
Hills	2.248	1.969
	(1.419)	(1.375)
Plateau	0.627	5.245
	(2.559)	(4.087)
Number of disasters	0.215	0.179
	(0.234)	(0.166)
Log(loss of disaster)	0.023	0.012
	(0.102)	(0.090)
Log (population)	−0.964	−0.939
	(0.987)	(0.909)
Proportion of the first surname	0.001	0.009
	(0.037)	(0.042)
Number of ethnic minorities	−0.710	−0.866
	(0.838)	(0.876)
Log(wage of unskilled worker)	−2.107	−1.690
	(3.082)	(2.630)
Log(wage of skilled worker)	4.710*	4.697**
	(2.464)	(2.180)
County fixed effects	Yes	Yes
R^2	0.2492	–
Adjusted R^2	0.2089	–
Log pseudolikelihood	–	−1774.5184
Observations	492	492

Note: The dependent variable is the cumulative number of mobilization meetings of the villager group in the years 2019 and 2021. The local natural conditions include total area, elevation, terrain, cumulative number, and loss of natural disasters of the villager group. The mountain terrain is the reference group which is omitted in the regression. The local demographic characteristics include the total population, the proportion of the population with the first surname, and the number of ethnic minorities of the villager group. The local economic conditions include wages of skilled workers and wages of unskilled workers in the survey year. Standard errors clustered at the village level are reported in parentheses. The significance levels of 1%, 5%, and 10% are denoted by ***, **, and *, respectively.
Data source: author's survey data.

Table A3
Correlations between mobilization meetings and poverty alleviation policies.

	Number of policies (1)	Number of policies favoring women (2)
Mobilize	0.170**	0.075
	(0.084)	(0.065)
Village FE	Yes	Yes
Resettlement FE	Yes	Yes
R^2	0.5991	0.6221
Adjusted R^2	0.4739	0.5039
Observations	579	579

Note: This table utilizes a subsample of households that relocated to collective resettlements, which collected detailed information on various poverty alleviation policies. The dependent variable in column 1 represents the total number of poverty alleviation policies, including industry support, agriculture and breeding support, tourism support, poverty alleviation workshop, cooperative establishment, e-commerce establishment, entrepreneurial support, skills training, public job provisioning, labor service export, microcredit support, medical aid, education subsidies, asset dividends, as well as minimum living allowances. The dependent variable in column 2 represents the total number of poverty alleviation policies favoring women, including industry support, tourism support, poverty alleviation workshops, e-commerce establishment, entrepreneurial support, skills training, public job provisioning, and microcredit support. Policies such as agriculture and breeding support, as well as labor service export are more targeted at male labors based on our observations.
Data source: author's survey data.

Table A4
Robustness to alternative indices of women's relative decision-making power.

	PCA		Mean index		Omit children's education		Omit chores and grocery shopping	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Relocate	0.096*	0.530***	0.083***	0.228**	0.412***	0.661	0.320**	1.875***
	(0.050)	(0.198)	(0.026)	(0.090)	(0.136)	(0.434)	(0.157)	(0.661)
Mean of the control group	−0.068	−0.068	−0.401	−0.401	−2.289	−2.289	−1.381	−1.381
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F statistic	–	16.8644	–	16.8644	–	16.8644	–	16.8644
R^2	0.7245	0.0059	0.7035	0.0217	0.6799	0.0309	0.7300	−0.0089
Adjusted R^2	0.4389	−0.0040	0.3961	0.0120	0.3481	0.0213	0.4501	−0.0189
Observations	1938	1938	1938	1938	1938	1938	1938	1938

Note: Columns 1 and 2 use principal component analysis to calculate the decision-making index. Columns 3 and 4 use the mean index for the six decision items. Columns 5 and 6 omit decisions over children's education whose response rate is below 90%. Columns 7 and 8 omit decisions over chores as well as grocery shopping and cooking. The set of controls includes characteristics of couples, households, and interviewees as described in Section 3. The F statistic is the Kleibergen-Paap Wald F statistic of the weak instrument test. Standard errors clustered at the village level are reported in parentheses. The significance levels of 1%, 5%, and 10% are denoted by ***, **, and *, respectively.
Data source: author's survey data.

Zhang et al., 2004).[35] Consequently, the reduction of land rights resulting from relocation can potentially empower rural women living in poverty.

6.3. Relaxing the budget constraint: Improving access to microcredit

A number of studies examining women's empowerment have investigated the impact of increased access to financial resources, such as microcredit, on their empowerment (Banerjee et al., 2015; Kochar et al., 2022). Building on this thread of literature, we introduce a variable measuring access to microcredit, which is a dummy variable indicating whether the household borrowed small loans for poverty alleviation in the last year. This enables us to explore the potential financial mechanisms through which relocation influences women's decision-making role within households.

The estimates in columns 9 and 10 of Table 5 show that access to microcredit plays a non-trivial role in explaining the relocation effect. However, the estimated coefficient on the *Microcredit* variable is not statistically significant, nor positive, when using 2SLS estimation. Despite this, compared to column 2, the estimated coefficient on the *Relocate* variable declines by approximately 11.82 percentage points in column 10. This finding suggests that improved access to microcredit for poor households is an important mechanism through which PARP can enhance women's intra-household decision-making power. Although the petty loans didn't target women, our estimate shows that improving poor households' access to microcredit will disproportionately benefit women and promote their intra-household decision-making power, in line with the evidence on reducing constraints faced by poor households (Duflo, 2012).

6.4. Freeing up women's time: Improving access to county seats

A wide range of literature has established that gender inequality is largely fueled by the differential time use patterns between women and men, especially in developing countries (Duflo, 2012; Rubiano-Matulevich and Viollaz, 2019). By saving women's time spent on housework and caregiving through various approaches, their likelihood of labor market participation can increase (Greenwood et al., 2005; Dinkelman and Ngai, 2022). Correspondingly, improving households' access to the nearest county seat through PARP can have substantial effects on time use and outside options for women, but not necessarily men. As such, we employ changes in the distance from the nearest county seat to proxy shifts in time allocation and investigate whether the time allocation mechanism holds true.

Columns 11 and 12 of Table 5 examine the role of access to the nearest county seat as a mediating factor. The estimated coefficient on *Log*(*distancetocountyseat*) confirms that the farther the distance from the

Table A5
The effect of relocation on women's household status.

	OLS	Poisson		2SLS	
	Main	Main	ATE	Second stage	First stage
	(1)	(2)	(3)	(4)	(5)
Relocate	0.129***	0.019***	0.127***	0.130*	
	(0.046)	(0.007)	(0.045)	(0.068)	
Mobilize					0.020***
					(0.005)
IMR					
Mean of the control group	−2.405		−2.405	−2.405	−2.405
Controls	Yes	Yes	Yes	Yes	Yes
County fixed effects	No	No	No	No	No
Household fixed effects	Yes	Yes	Yes	Yes	Yes
F statistic	–	–	–	16.8644	–
R^2	0.9942	–	–	0.0453	0.6632
Adjusted R^2	0.9882	–	–	0.0358	0.3140
Log pseudo-likelihood	–	−3585.273	–	–	–
Number of households	969	969	969	969	969
Observations	1938	1938	1938	1938	1938

Note: The dependent variable is women's household status ranging from 0 to 10. Column 2 reports the coefficient based on the Poisson pseudo-likelihood regression and column 3 reports the corresponding average marginal effect of *relocate*. The set of controls includes characteristics of couples, households, and interviewees as described in Section 3. Standard errors clustered at the village level are reported in parentheses. The F statistic is the Kleibergen-Paap Wald F statistic of the weak instrument test. The significance levels of 1%, 5%, and 10% are denoted by ***, **, and *, respectively.
Data source: author's survey data.

[35] In 1998, the Land Management Law granted farmers 30-year land contracts of land use right with the village collective to enhance the security of land tenure, while land ownership is at the village collective (Chari et al., 2021). In 2013, China has launched a new round of land-rights reform which extends farmers' land use contracts for another 30 years. It is a caveat that these reforms have largely ignored gender equality of land allocation and exacerbated the uncertainty about women's land use and inheritance rights. Specifically, a growing number of China's rural women have lost the use right of their contracted lands coincident with marrying (Hare et al., 2007; Zhang et al., 2004).

Table A6
Oster test: Robustness to time-variant unobservables.

Parameter assumptions	$\beta = 0$, Rmax $= 1.3\ \tilde{R}^2$ (1)	$\delta = 1$, Rmax $= 1.3\ \tilde{R}^2$ (2)
Estimation	δ 4.98816	"True" β bound [0.49731, 0.80977]

Note: Columns 1 and 2 report the estimated selection ratio and the treatment bound, respectively. The Rmax, with unobservables and observables included, is assumed to be 1.3 times the $\tilde{R}^2$ of the regression with a full set of controls, as suggested by Oster (2019). Household fixed effects are included in both restricted and unrestricted estimations.
Data source: author's survey data.

Table A7
Spillover effect on non-relocated households.

	RDMP (1)	RDMP (2)	RDMP (3)
Prop. of relocated households	0.002		
	(0.004)		
Prop. of relocated population		−0.004	
		(0.005)	
Whether most common surname			−0.171
			(0.374)
Controls	Yes	Yes	Yes
Village fixed effects	Yes	Yes	Yes
R^2	0.4913	0.4919	0.4471
Adjusted R^2	0.2860	0.2867	0.2252
Observations	227	227	242

Note: The samples in this table are restricted to non-relocated households. The set of controls includes characteristics of couples, households, and interviewees as described in Section 3. Standard errors clustered at the village level are reported in parentheses. The significance levels of 1%, 5%, and 10% are denoted by ***, **, and *, respectively.
Data source: author's survey data.

nearest county seat, the lower the intra-household decision-making power of married women. This implies that improving access to county seats may have a disproportionate impact on women's time use patterns (Becker, 1965; Bardasi and Wodon, 2005; Pollak and Wachter, 1975). However, when using 2SLS estimation in column 12, the estimated coefficient on *Log*(*distancetocountyseat*) is not statistically significant, and the point estimate on the *Relocate* variable remains robust and is quantitatively comparable to the baseline estimates in column 2. Therefore, changes in time allocation for women in relocated households do not appear to be a dominant mechanism through which relocation affects women's aggregate relative decision-making power.

Columns 13 and 14 of Table 5 incorporate all mechanism variables, and the estimated coefficient on the *Relocate* variable decreases to approximately 1, with the 2SLS estimate no longer significant. Specifically, the point estimate of *Log*(*woodland*) remains negative and statistically significant under both OLS and 2SLS specifications, indicating that the property right mechanism is crucial in medicating the relocation effect on women's intra-household decision-making power. Moreover, the estimated coefficient of *Log*(*relativeincome2*) remains negative and statistically significant under the 2SLS estimation, while the estimated coefficients of *Microcredit* and *Log*(*distancetocountyseat*) becomes insignificant anymore. In other words, these empirical results suggest that property rights and off-farm wages (especially women's relative income) are non-negligible mechanisms that contribute to the increase of women's relative decision-making power within households.

7. Heterogeneity analysis

In this section, we explore several potential sources of heterogeneity in the relocation effects on women's relative decision-making power within households. Specifically, We first investigate whether the impact of relocation varies by relocation duration. We then examine the heterogeneous effects of relocation attributes (urban or rural relocation) and women's off-farm employment status. Appendix Table A8 provides the definition and descriptive statistics of these heterogeneous variables.

7.1. Heterogeneous effects by relocation durations

For households that have been relocated, the number of years since they relocated varies, ranging from 2015 to 2020. Table 6 presents the heterogeneous effects of the durations of relocation, with non-relocated households used as the reference group. The estimated coefficients of *Duration*_2, *Duration*_3, and *Duration*_5 are significantly positive under both OLS and 2SLS estimations, indicating that the effect of relocation on women's intra-household decision-making power persists even after five years. On the other hand, the point estimate of *Duration*_1 is only significant at a 10 % level under the 2SLS estimation, implying that relocation may not have an immediate effect on women's relative decision-making power within households.

Figure 3 further illustrates the estimated coefficients from Table 6, with the blue line and red line representing OLS and 2SLS estimations, respectively. The dynamic pattern depicted shows that the effect of relocation on women's intra-household decision-making power increases as the duration of relocation grows. This finding is consistent with the poverty trap theory and implies that relocated households may break free from the low-level equilibrium, leading to an improvement in women's relative decision-making power within the household.[36]

7.2. Heterogeneous effects by relocation attributes

As outlined in Section 2, eligible households can participate either in urban or rural relocation. Appendix Table A13 indicates that there are significant disparities in relocation attributes among the sampled provinces. Specifically, Guizhou, Guangxi, Hunan, and Gansu exhibit a greater prevalence of urban relocation, while Yunan, Sichuan, Hubei, and Shaanxi have a higher incidence of rural relocation. Overall, approximately 10 percentage points more relocated households participated in rural relocation than urban relocation.

Column 1 and 2 of Table 7 presents the OLS and 2SLS estimation, respectively. The finding indicates a significant and positive impact of participating in rural relocation on women's relative decision-making power, as evidenced by the coefficient on the *Relocate* variable. However, the interaction term between *Relocate* and *Urban* is insignificant and negative, suggesting that there appear to be no significant differences in the relocation effect on women's relative decision-making power between urban and rural relocation. This aligns with the information provided in section 2, which highlights that eligible households were encouraged to relocate based on their comparative advantages. The supportive measures are tailored to match the distinctive attributes of relocation and the comparative advantages of households. As indicated in Appendix Table A1, a higher proportion of households choosing rural relocation benefited from agricultural production support and corresponding skill training compared to their counterparts within the urban relocation group, while households choosing urban relocation have higher levels of property income, transfer income, and broadband penetration. Moreover, this finding is also in line with Zhang et al.'s (2023) empirical results and the Roy model framework (Borjas, 1987; Roy, 1951), which both demonstrate that rural households with a

[36] The temporary fall of the effect in *Duration*_2 and *Duration*_4 may arise from the existing balance of the intra-household decision-making power. It may take time for PARP to produce stable impacts on women's relative decision-making power.

Table A8
Summary statistics of mechanism and heterogeneous variables.

Variables	Definition	Full sample (1)	Treatment group (2)	Control group (3)	Difference (4)=(2)-(3)
Wife's off-farm employment status	1 = wife engaged in off-farm employment; 0 otherwise	0.231	0.254	0.100	0.155***
		(0.422)	(0.436)	(0.300)	(0.027)
Off-farm wage income of the wife	Yearly wage income (Yuan)	4081.990	4424.078	2140.345	2283.733***
		(9,264.880)	(9481.859)	(7650.637)	(587.899)
Share of wife's off-farm wage income	Wife's off-farm wage income divided by household income * 100 (%)	6.602	7.115	3.689	3.426***
		(14.911)	(15.129)	(13.265)	(0.947)
Husband's off-farm employment status	1 = husband engaged in off-farm employment; 0 otherwise	0.437	0.466	0.275	0.191***
		(0.496)	(0.499)	(0.447)	(0.032)
Off-farm wage income of the husband	Yearly wage income (Yuan)	9724.807	10196.899	7045.276	3151.623***
		(15,155.752)	(15248.620)	(14350.820)	(962.784)
Off-farm wage gap between the couple	Off-farm wage income of the wife minus off-farm wage income of the husband (Yuan)	−5642.817	−5772.822	−4904.931	−867.890
		(14,623.929)	(14673.410)	(14342.450)	(931.360)
Total area of farmland	*Mu* [a]	10.384	9.750	13.980	−4.231***
		(11.758)	(11.205)	(13.987)	(0.743)
Total area of woodland	*Mu*	22.286	21.799	25.051	−3.252
		(47.381)	(48.277)	(41.905)	(3.018)
Total area of grassland	*Mu*	2.267	0.864	10.228	−9.364***
		(19.786)	(5.950)	(48.424)	(1.243)
Whether have microfinance	1 = Yes, 0 otherwise	0.158	0.172	0.080	0.092***
		(0.365)	(0.377)	(0.271)	(0.023)
Distance to the nearest county seat	Km	48.500	47.714	52.964	−5.250**
		(33.839)	(34.391)	(30.181)	(2.152)
Relocation attribute	1 = urban relocation; 0 = rural relocation	–	0.383	–	–
		–	(0.486)	–	–
Observations		1938	1647	291	

Note: [a] 1 *Mu* = 0.067 ha. Standard deviations (columns 1, 2, 3) and standard errors (column 4) are in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.
Data source: author's survey data.

Table A9
Effect of relocation on mechanism variables.

	Absolute income (1)	Relative income 1 (2)	Relative income 1 (3)	Farmland (4)	Woodland (5)	Grassland (6)	Microfinance (7)	Distance to county seat (8)
Panel A: OLS estimate								
Relocate	2.533**	1.347***	1.635***	−0.119	−0.241	−0.515*	0.177***	−0.589***
	(1.038)	(0.326)	(0.432)	(0.086)	(0.336)	(0.272)	(0.054)	(0.136)
R^2	0.7357	0.6738	0.7046	0.7656	0.7608	0.5851	0.5720	0.8594
Adjusted R^2	0.4629	0.3371	0.3995	0.5236	0.5138	0.1567	0.1299	0.7141
Panel B: 2SLS estimate								
Relocate	8.721**	6.529***	6.380***	−1.132***	−3.797**	−1.844**	0.676***	−0.134
	(3.963)	(1.501)	(1.469)	(0.430)	(1.881)	(0.908)	(0.157)	(0.340)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F statistics	19.1420	19.1420	19.1420	19.1420	19.1420	19.1420	19.1420	19.1420
R^2	−0.0031	−0.1744	−0.1090	−0.1221	−0.1609	−0.0415	−0.1126	0.0529
Adjusted R^2	−0.0120	−0.1848	−0.1189	−0.1321	−0.1712	−0.0507	−0.1225	0.0445
Number of households	967	967	967	967	967	967	967	967
Observations	1934	1934	1934	1934	1934	1934	1934	1934

Note: The absolute income represents the proportion of off-farm wage income that is contributed by the wife in the household. Relative income1, relative income2, farmland, woodland, grassland, and distance to county seat are all taken in logarithms. The set of controls includes characteristics of couples, households, and interviewees as in Table 5. Standard errors clustered at the village level are reported in parentheses. The significance levels of 1%, 5%, and 10% are denoted by ***, **, and *, respectively.

comparative advantage could benefit from relocation by increasing their wage income.[37]

7.3. Heterogeneous effects by women's off-farm employment status

Based on the theory of household bargaining power, women's decision-making power is determined by threat points, which refer to the counterfactual utilities she could receive outside of the marriage (Kim and Benjamin, 2021; Manser and Brown, 1980). Therefore, even if married women do not participate in off-farm work, their relative decision-making power may still be affected by the increased options available to them outside of the marriage as a result of relocation.

Table 7 investigates the impact of relocation on the intra-household decision-making power of married women who engage in off-farm employment versus those who do not. The estimates in columns 3 and 4 confirm the main effect of relocation on the relative decision-making power of married women. However, it seems that there is no difference in the positive effect of relocation on the decision-making power between married women who participate in off-farm employment and those who do not, as indicated by the insignificant coefficient of the interaction term between *Relocate* and *Wife_Empolyment*.

To further verify the robustness of our findings, we incorporated the husband's off-farm employment status into our analysis in columns 5

[37] Zhang et al (2023) only discusses the difference of collective and dispersed relocation, without considering the urban–rural difference in the relocation effect on participants' income.

Table A10
Estimated results for other covariates in the mechanism analysis.

	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)	OLS (9)	2SLS (10)	OLS (11)	2SLS (12)	OLS (13)	2SLS (14)
Age of husband	0.027	0.022	0.026	0.023	0.025	0.019	0.030	0.027	0.026	0.023	0.028	0.023	0.029	0.025
	(0.027)	(0.026)	(0.027)	(0.026)	(0.028)	(0.026)	(0.027)	(0.026)	(0.027)	(0.026)	(0.027)	(0.026)	(0.027)	(0.026)
Age of wife	0.032	0.018	0.031	0.019	0.031	0.016	0.028	0.018	0.031	0.019	0.030	0.017	0.025	0.016
	(0.023)	(0.024)	(0.023)	(0.025)	(0.023)	(0.025)	(0.022)	(0.024)	(0.023)	(0.024)	(0.023)	(0.024)	(0.022)	(0.024)
Education years of husband	0.029	0.029	0.023	0.024	0.025	0.026	0.033	0.032	0.030	0.029	0.029	0.029	0.029	0.030
	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.034)	(0.034)
Education years of wife	0.001	−0.010	0.003	−0.007	0.004	−0.005	0.007	−0.001	−0.001	−0.009	−0.000	−0.010	0.009	0.003
	(0.030)	(0.029)	(0.030)	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)	(0.030)	(0.030)	(0.030)	(0.029)	(0.030)	(0.029)
Politic status of husband	−0.131	−0.203	−0.139	−0.207	−0.128	−0.188	−0.198	−0.258	−0.193	−0.234	−0.121	−0.202	−0.233	−0.268
	(0.582)	(0.598)	(0.578)	(0.594)	(0.576)	(0.599)	(0.561)	(0.574)	(0.594)	(0.602)	(0.579)	(0.598)	(0.566)	(0.579)
Politic status of wife	0.686	0.782	0.658	0.756	0.666	0.746	0.799	0.877	0.707	0.784	0.705	0.790	0.787	0.843
	(0.838)	(0.859)	(0.827)	(0.850)	(0.811)	(0.845)	(0.804)	(0.823)	(0.862)	(0.870)	(0.835)	(0.860)	(0.795)	(0.816)
Cadre status of husband	−0.497	−0.583*	−0.484	−0.569	−0.476	−0.556	−0.467	−0.541	−0.521	−0.589*	−0.492	−0.584*	−0.462	−0.521
	(0.336)	(0.345)	(0.338)	(0.347)	(0.336)	(0.344)	(0.329)	(0.334)	(0.328)	(0.339)	(0.330)	(0.344)	(0.317)	(0.327)
Cadre status of wife	−0.408	−0.409	−0.419	−0.418	−0.521	−0.505	−0.458	−0.469	−0.380	−0.391	−0.404	−0.408	−0.526	−0.545
	(0.542)	(0.513)	(0.546)	(0.518)	(0.555)	(0.519)	(0.539)	(0.510)	(0.547)	(0.518)	(0.523)	(0.509)	(0.531)	(0.508)
Familysize	0.185*	0.145	0.187*	0.148	0.190*	0.160	0.174	0.142	0.145	0.124	0.173	0.141	0.132	0.127
	(0.108)	(0.108)	(0.107)	(0.109)	(0.106)	(0.107)	(0.106)	(0.107)	(0.112)	(0.112)	(0.107)	(0.108)	(0.109)	(0.109)
Prop of children	0.001	0.002	0.002	0.002	0.003	0.003	0.000	0.001	0.002	0.002	0.001	0.002	0.002	0.002
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Prop of children aged $\leq$ 6 years	−0.019	−0.018	−0.019	−0.018	−0.020	−0.019	−0.018	−0.018	−0.017	−0.017	−0.019	−0.018	−0.017	−0.017
	(0.014)	(0.015)	(0.014)	(0.015)	(0.014)	(0.015)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)	(0.014)
Prop of children aged 7–15 years	0.004	0.004	0.004	0.004	0.003	0.004	0.003	0.003	0.004	0.004	0.003	0.004	0.001	0.002
	(0.011)	(0.012)	(0.011)	(0.012)	(0.011)	(0.012)	(0.011)	(0.012)	(0.011)	(0.012)	(0.011)	(0.012)	(0.011)	(0.011)
IPH	−0.613	−0.704*	−0.577	−0.672	−0.603	−0.687*	−0.575	−0.653	−0.642	−0.712*	−0.622	−0.709*	−0.585	−0.647
	(0.463)	(0.418)	(0.464)	(0.420)	(0.461)	(0.413)	(0.458)	(0.423)	(0.468)	(0.426)	(0.452)	(0.413)	(0.451)	(0.418)
Gender of interviewee	−0.384**	−0.399**	−0.377**	−0.393**	−0.378**	−0.403**	−0.391**	−0.402**	−0.374**	−0.391**	−0.371**	−0.395**	−0.362**	−0.389**
	(0.158)	(0.157)	(0.159)	(0.157)	(0.163)	(0.161)	(0.161)	(0.159)	(0.159)	(0.157)	(0.157)	(0.156)	(0.165)	(0.163)
Age of interviewee	−0.011	−0.010	−0.011	−0.009	−0.012	−0.010	−0.010	−0.009	−0.011	−0.010	−0.010	−0.009	−0.010	−0.010
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
R^2	0.7032	0.0199	0.7039	0.0240	0.7050	0.0216	0.7059	0.0374	0.7044	0.0288	0.7047	0.0208	0.7102	0.0510
Adjusted R^2	0.3967	0.0112	0.3975	0.0148	0.3991	0.0119	0.4003	0.0273	0.3985	0.0196	0.3991	0.0116	0.4060	0.0386
Number of households	969	969	969	969	969	969	969	969	969	969	969	969	969	969
Observations	1938	1938	1938	1938	1938	1938	1938	1938	1938	1938	1938	1938	1938	1938

Note: This table presents the estimated results for the independent variables utilized in the mechanism analysis. The independent variables are the same to those outlined in the note of Table 5. The significance levels of 1%, 5%, and 10% are denoted by ***, **, and *, respectively.
Data source: author's survey data.

Table A11
Sources of non-farm jobs for women.

	Full sample		Women of relocated households		Women of non-relocated households	
	Frequency	(%)	Frequency	(%)	Frequency	(%)
1. Find by oneself, friends, or relatives	294	65.48	273	65.00	21	
2. Provided by the government	77	17.15	72	17.14	5	
3. Provided by enterprises and cooperatives	35	7.80	35	8.33	0	0.00
4. Part-time or home-based	22	4.90	21	5.00	1	
5. Find through intermediaries and advertising	14	3.12	14	3.33	0	0.00
6. Other sources	7	1.56	5	1.19	2	6.90
Observations	449		420		29	

Note: We divide sources of women's non-farm jobs into six groups. Jobs provided by governments include public welfare positions, food-for-work, and government-organized outside work. Jobs provided by enterprises and cooperatives include jobs in poverty alleviation workshops, local enterprises, and local cooperatives.
Data source: author's survey data.

Table A12
Land absence conditions.

	Treatment group		Control group	
	Frequency	Proportion (%)	Frequency	Proportion (%)
No Farmland	28	1.70	4	1.38
No Woodland	574	34.87	89	30.69
No Grassland	1,525	92.65	258	88.97
Observations	1646		290	

Table A13
Relocation type by province.

Relocation type by province				
Province	Urban relocation		Rural relocation	
	Frequency	Proportion (%)	Frequency	Proportion (%)
Guizhou	198	100	0	0
Yunnan	3	1.41	210	98.59
Sichuan	8	3.10	250	96.90
Guangxi	185	100	0	0
Hubei	11	6.04	171	93.96
Hunan	129	66.84	64	33.16
Gansu	185	62.93	109	37.07
Shaanxi	57	27.27	152	72.73
Total	776	44.80	956	55.20

Data source: author's survey data.

and 6. The results were comparable to those in columns 3 and 4, implying that the effect of relocation on the wife's relative decision-making power within the household may be unrelated to her husband's off-farm employment status in our particular context. This may be not surprising given the relatively low percentage of individuals engaged in off-farm employment for both spouses (as indicated by the sample data, only 23.12 % of women and 43.70 % of men participated in off-farm employment for at least one month). Overall, the heterogeneous analysis of women's off-farm employment status is consistent with the household bargaining power theory, which places greater emphasis on outside options than on actual employment status when explaining variations in women's intra-household decision-making power.

8. Conclusion

This paper provides empirical evidence that PARP can significantly affect women's intra-household decision-making power, which is consistent with the prediction of the poverty trap theory. Using a longitudinal survey of China's Poverty Alleviation Relocation Program that aimed to relocate poor households to more favorable areas locations, we identify the causal effect of relocation on women's relative decision-making power within households by exploiting variations in the phase-in nature of relocation. Our 2SLS result reveals a significant positive effect of relocation on women's intra-household decision-making role, particularly for decisions over children's education, social events, and daily goods purchases. Robustness checks employing alternative measures of decision-making power index and models corroborate these results.

We explore rich mechanisms underlying the relocation effect on women's relative decision-making power within households, finding that the reduction of households' contracted woodland is the primary driver. This reduction can loosen the tight link between rural households and land. The changes in women's absolute and relative wage income, improved access to microcredit and better access to nearby county seats may also be important mechanisms through which the relocation effect can work. Furthermore, our heterogeneous analysis reveals that the relocation effect is persistent over time, but there seems to be no significant difference in the relocation effect between urban- and rural-relocated households and between women who participated in off-farm work and those who did not.

The effectiveness of policies that incentivize households to move to opportunity in the developed world has been debated for decades. However, less is investigated about the effects of various relocation programs in developing countries. By examining an unprecedented poverty alleviation relocation program in rural China, this study provides insightful evidence of the positive effects of relocation programs on women empowerment, particularly for ultra-poor households. Furthermore, there may exist a catching-up effect in reducing persistent poverty, and poverty alleviation relocation can disproportionately benefit poor women within households, even if they are not the program's primary target. Finally, our paper also echoes policies emphasizing the importance of conferring property rights, particularly land rights, and job opportunities to poor women.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Appendix A

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