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Lagging behind the Joneses: Relative Deprivation and Household Consumption in Rural China

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Abstract: Based on the Chinese Family Panel Studies (CFPS) 2010–2018, this article investigates how relative deprivation influences household consumption in rural China. High-dimensional fixed-effects (HDFE), the instrumental variable (IV), and causal mediation analysis (CMA) are leveraged to estimate the causal effect and mechanisms. Results show that relative deprivation reduces survival-oriented consumption of food, development-oriented consumption of transportation, telecommunication, and education, as well as enjoyment-oriented of durable goods, and increases survival-oriented consumption of residence and development-oriented consumption of healthcare and medical services. Mechanism analysis indicates that relative deprivation decreases household consumption through the anticipated effect and increases it through a cognitive trap effect. On the whole, the anticipated effect prevails over the cognitive trap effect.

Keywords: relative deprivation; rural consumption; income uncertainty; precautionary savings; cognitive ability

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1. Introduction

Different household consumption patterns reflect different consumption habits and are closely related to household utility. This means that consumption determines not only a household's economic wellbeing but also its physical and mental health [1]. Household under-consumption is usually regarded as an obstacle to sustained economic development, particularly in rural China [2]. China's consumption rate has been stagnant for a long time and lags behind the global average. During 2000–2020, China's average consumption rate was 53.94%, well below the global average of 74.40% (for more details, see Figure 1). Facing the challenges of anti-globalization and COVID-19, China has turned to stimulating domestic consumption, particularly rural household consumption, to achieve common prosperity and sustained economic growth, one of the key goals among the Sustainable Development Goals (SDGs). To achieve this goal, China has proposed the dual circulation strategy, which is domestic-demand-oriented. China's No. 1 Central Document in 2021 further requires comprehensive promotion in rural consumption, especially in durable consumer goods for rural residents. This will subsequently influence household economic wellbeing and health status at the micro level.

However, it remains unclear why rural households in China are unwilling to consume. This unwillingness has restricted not only the release of China's consumption potential but also the improvement of household wellbeing and health [3]. Numerous studies have been conducted to explore the factors restricting rural household consumption. One of the most popular views holds that income plays a key role in promoting consumption [4,5]. Existing studies on consumption indicate that both absolute income and relative income are responsible for consumption [6,7]. The former translates into consumption increases [8], while the latter plays a vital role in determining household consumption. Relative deprivation, characterized as "lagging behind the Joneses", arises from relative income and income inequality and is closely connected to household consumption [9–11].
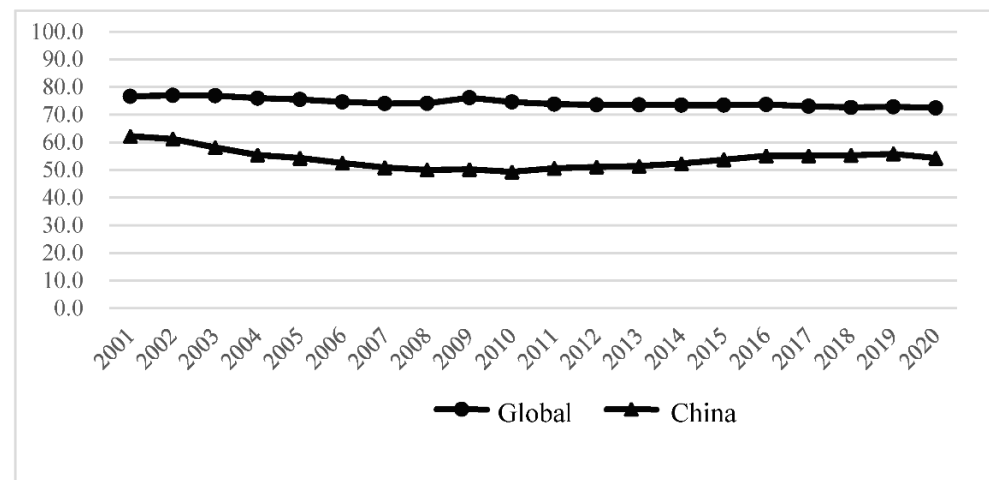
Figure 1. Proportions of final consumption expenditure of GDP globally and in China. Data source: World Bank.

Still challenged by income inequality, China witnessed a national income Gini coefficient of 0.468 in 2020 (Data sources National Bureau of Statistics of China (http://www.stats.gov.cn. accessed on 10 October 2021)) and a relative poverty rate of 24.39% in 2018, under a poverty line of 60% of median income [12]. Moreover, the 2018 Report on the Development of China's Rural Households shows that the Gini coefficient of rural China increased from 0.450 in 2011 to 0.537 in 2017, much higher than the international baseline of 0.4. China's consequent relative deprivation will definitely affect household economic behavior and consumption, adversely affecting households' economic wellbeing and health conditions, especially in disadvantaged rural areas. It is therefore imperative to concentrate on the impact and underlying mechanisms of relative deprivation on rural household consumption in China. In addition, household consumption should cover a variety of expenditure sub-categories as well as the total household expenditure.

It has been widely discussed how relative income or income inequality influences household consumption [13,14]. Previous research has looked into the inequality-consumption link, along with contributing factors, such as housing price, return to education, social security, as well as sex ratio [15,16]. Most of the research is from the macro perspective, despite the fact that micro influencing mechanisms are essential to reveal the underlying logic. Jin et al. (2011) aimed to explore the potential mechanism behind inequality and consumption from the micro perspective. Specifically, Jin et al. (2011) proposed that social status plays an important role in mediating the impact of inequality on household consumption [17]. Unfortunately, they failed to consider the role of relative deprivation. Different from relative income and income inequality, relative deprivation can capture not only the characteristics of relative income and income inequality but also the features of poverty, especially at the county level [18]. This study aims to contribute to narrowing the gap in this regard.

Against this background, this article focuses on how relative deprivation, characterized as "lagging behind the Joneses", influences household consumption in rural China. It stands out from previous studies in the following aspects. First, it supplements the research on the relationship between relative deprivation and household consumption. As stated above, existing literature mostly focuses on relative income or income inequality and household consumption [15,19–21]. Few researchers have investigated relative deprivation on household consumption except Zhang & Pak (2022), but the latter did not cover rural areas [22]. This article supplements the limited literature on relative deprivation and its impact on household consumption in rural China.

Second, previous studies usually link relative deprivation with conspicuous consumption but fail to further analyze how relative deprivation influences different kinds of household consumption as well as total consumption, which is key for China's economic transformation. This article enriches current studies with an analysis framework regarding

how relative deprivation impacts various kinds of consumption. Then it provides empirical evidence based on five rounds of the CFPS data during 2010–2018.

Third, this study identifies the causal relationship between relative deprivation and household consumption in rural China. The instrumental variable (IV) method is adopted to causally estimate how relative deprivation influences household consumption. Furthermore, causal mediation analysis (CMA) is adopted to address endogeneity while empirically assessing the influencing mechanisms, which were usually ignored before.

Finally, previous studies mostly conducted research on relative deprivation on its own, which rarely reflects the inherent relationship between relative deprivation and household consumption. In this regard, this article further examines county-level relative deprivation, which can not only reduce errors caused by endogeneity but also provide feasible solutions for governments to stimulate county-level consumption.

The remaining parts of this article are organized as follows. Section 2 presents the theoretical mechanism behind relative deprivation and household consumption. Section 3 describes the empirical research design. Section 4 shares the empirical results. Section 5 sheds some light on policy implications and future research. Section 6 is a brief conclusion.

2. Materials

2.1. Maslow's Hierarchy of Needs and Consumption Classification

According to Maslow's hierarchy of needs, there are five categories of human needs, that is, physiological, safety, love and belonging, esteem, and self-actualization needs. Those needs form a strict hierarchy where higher needs start to appear when lower needs are sufficiently satisfied [23].

As Maslow's theory is too strict to be empirically tested, it is further organized into three levels: the basic level of physiological and safety needs, the second level of needs for attention and recognition, and the top level of needs for independence and self-actualization [24,25]. According to Maslow's hierarchy of needs, household consumption can be divided into survival-, development- and enjoyment-oriented consumption [26,27], which correspond to various needs (see Figure 2). Survival-oriented consumption covers expenditures on food, clothing, and residence. Development-oriented consumption refers to expenditures on education, transportation and telecommunication, as well as healthcare and medical services, while enjoyment-oriented consumption includes expenditures on household facilities and services plus culture and recreation [28].
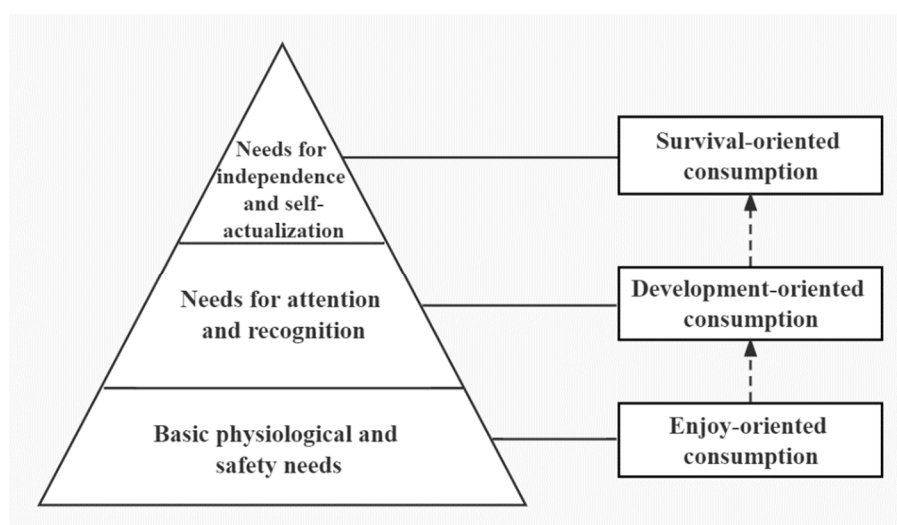

Figure 2. Maslow's hierarchy of needs and consumption classification.

2.2. *Relative Deprivation and Household Consumption*

2.2.1. Anticipated Effect

Consumers have higher expectations for future expenditures in an environment of high expectation uncertainty, which will force them to adjust current savings and consumption and adopt so-called precautionary savings [29]. Relatively deprived people in rural China are mostly engaged in agricultural or informal non-agricultural sectors. Those in agricultural sectors are greatly affected by the climate and natural disasters, leading to greater income uncertainty. For those in non-agricultural sectors, additionally, the lack of security leads to further income uncertainty. People in both sectors are more likely to increase precautionary savings, which means increasing current savings and reducing consumption [30]. In addition, the inadequate social security, including the backwardness of rural education, medical care, and housing systems, will intensify the income uncertainty among the relatively deprived groups. This will not only reduce their enjoyment- and development-oriented consumption, but also possibly survival-oriented consumption. Our hypotheses are as follows, based on these discussions:

Hypothesis 1a (H1a): *Relative deprivation will reduce household consumption.*

Hypothesis 1b (H1b): *Relative deprivation reduces household consumption by increasing income uncertainty, which is called the anticipated effect.*

2.2.2. Cognitive Trap Effect

According to the social cognitive theory, relative deprivation, the "lagging behind the Joneses", may induce individuals to fall into the poverty trap, where relatively deprived people may make short-sighted and irrational economic decisions, especially on household consumption. Specifically, relative deprivers are more likely to suffer from pressure and negative emotions due to chronic exposure to disadvantaged economic and social environments [31]. When the cognitive load is heavy, relative deprivers are vulnerable to problems such as the scarcity mindset, cognitive control loss, short-term preference, and excessive risk aversion. Relative deprivation results in a series of irrational consumer behavior decisions, which is in line with previous findings [32,33]. As Banerjee et al. have claimed, being deprived reduces people's cognitive capacity and brings irrational consumption. Such consumption caused by the cognitive trap is particularly evident in consumption on residence and health care and medical services, which is usually large and rigid, particularly in relatively deprived households in rural China. In terms of expenditures on residence, those households are likely to be trapped by excessive consumption and increase expenditures on residence, which is not only large and rigid, but also obvious and conspicuous. In addition, short-term preference and excessive risk aversion make relative deprivers too conservative to consider the long-term consequences of their consumption behavior. For example, they go for tobacco and avoid medical treatment; more often than not, minor illnesses develop into serious illnesses. As a consequence, they have to bear high medical expenses for serious illnesses which drag them into a vicious circle of disease-induced poverty [34,35]. Accordingly, we have the following hypotheses.

Hypothesis 2a (H2a): *Relative deprivation will increase household consumption.*

Hypothesis 2b (H2b): *Relative deprivation increases household consumption by damaging cognitive ability, which is called the cognitive trap effect.*

3. Methods

3.1. Data

Our data comes from CFPS and the China County Statistical Yearbook during 2010–2018. The CFPS is hosted by the Institute of Social Science Survey (ISSS) of Peking University and collects data at the individual, household, and community level. 25 provinces, municipalities, and autonomous regions in China are covered in the CFPS dataset [36]. To focus on rural samples, we selected rural area data according to the urban-rural status defined by the National Bureau of Statistics of China. After matching individual-, household-, and community-level data, we have obtained 24,436 samples.

3.2. Models

3.2.1. Benchmark Model

According to the relative income hypothesis, household consumption is determined by not only absolute income but also relative income and subsequent relative deprivation [7,8,37,38]. Yet there are serious endogenous problems between relative deprivation and household consumption. To reduce estimated errors caused by endogeneity, we use the incidence of relative deprivation at the region level to represent relative deprivation. To assess the impact of relative deprivation on household consumption, the high-dimensional fixed-effect (HDFE) model is applied, which contains multiple levels of fixed effects. The HDFE model is specified as follows:

$$\text{Consumption}_{iq} = \sigma RD_i + \gamma \text{Income}_i + X_i\beta + \mu_i \tag{1}$$

where i indicates household, and q indicates consumption type. $\text{Consumption}_{r_{iq}}$ refers to expenditures on household consumption on the qth commodity or service of the ith household. RD_i denotes the incidence of relative deprivation in the county where the ith household is located in rural China. Income_i represents the absolute income of the ith household, which is controlled to avoid the estimation errors. Additionally, X_i represents other control variables at the householder, household, county, and province levels. μ_i is the error term. We first estimate Equation (1) using the HDFE model, which enables multiple-level stationary effects. As stated above, there may be endogeneity issues caused by reverse causality. The distribution of consumption resources may in turn affect the human and material capital of the household, thus affecting the relative deprivation [39]. To further deal with endogeneity concerns, we use the IV model to estimate the regression results. According to Hanandita et al. [40] and Akobeng [41], rainfall is selected as the IV for relative deprivation. In rural China, rainfall determines local agricultural production and household income, which may subsequently influence relative deprivation. Given that household consumption is greatly determined by income, rainfall can only influence household consumption by income-based relative deprivation. In other words, rainfall is exogenous as it cannot directly influence household consumption through other channels, satisfying the exclusion restriction [42]. Therefore, rainfall can serve as the IV for relative deprivation at the county level.

3.2.2. Causal Mediation Analysis Model

Mediation analysis has been widely used to test mechanisms, but it is often questioned due to the failure to resolve endogeneity issues. Luckily, the causal mediation analysis (CMA) model can help [43]. CMA enables estimating the mediation effects causally with one instrument. Rainfall_i refers to annual rainfalls in the ith county. Specifically, as Equations (2) and (3) display, standard 2SLS is first used to estimate α_3, which represents the causal effect of relative deprivation on the mediator. RD_i and X_i are defined as above. $\hat{RD}_i$ is estimated by RD_i in Equation (2). Additionally, Rainfall_i is further used to instrument Mediator_i conditioned on RD_i in Equations (4) and (5). α_{5m} and α_{5rp} are estimated

by the 2SLS regression, while RD_i serves as a conditioning variable. $\hat{Mediator}_i$ is estimated by $Mediator_i$ in Equation (4).

$$RD_i = \alpha_2 Rainfall_i + X_i\beta + \mu_i \tag{2}$$

$$RD_i = \alpha_2 Rainfall_i + X_i\beta + \mu_i \tag{3}$$

$$Mediator_i = \alpha_{4ra} Rainfall_i + \alpha_{4rp} RD_i + X_i\beta + \mu_i \tag{4}$$

$$Consumption\_r_{iq} = \alpha_{5m}\hat{Mediator}_i + \alpha_{5rp} RD_i + X_i\beta + \mu_i \tag{5}$$

3.3. Variable

3.3.1. Rural Household Consumption

CFPS provides household consumption expenditures on food, clothing, residence, household facilities and services, healthcare and medical services, transportation and telecommunication, as well as education, culture, and recreation. As mentioned previously, expenditures on food, clothing, and residence are survival-oriented; those on education, transportation and telecommunication, and healthcare and medical services are development-oriented, while those on household facilities and services as well as culture and recreation are enjoyment-oriented. Yet the statistical dimension of expenditures on household facilities and services as well as culture and recreation vary from year to year. Therefore, we refer to Liu et al. [44] and select the expenditure on durable goods, such as car and home appliances, to represent enjoyment-oriented consumption.

3.3.2. Relative Deprivation

As mentioned above, relative deprivation, represented by "lagging behind the Joneses", appears as the incidence of relative deprivation at the region level. When it comes to relative deprivation, there is always a debate on how to choose a reference group and measure relative deprivation [45,46]. Most researchers emphasize income comparison with everyone else within the same reference group with higher incomes, such as Income Rank and the Yitzhaki Index [45,47]. Yet the usual practice is to compare the average in the reference group, especially in terms of regional relative deprivation. Those relatively deprived are usually trapped in a relatively low-income position and unlikely to earn more than a limited proportion of those with a mean or median income in society. Some research also uses the multidimensional poverty index (MPI) measured by UNDP and OPHI to measure relative deprivation. Yet such indicators are more suitable for illustrating the features of relative deprivation in a different dimension. When assessing the influences of relative deprivation, applying MPI would make the analysis out of focus while a single multidimensional index fails to capture the nature of relative deprivation. And a single-dimension index, especially in terms of income, can solve this problem. A concern is that relative deprivation at the individual level is closely connected to consumption and may bring reverse causality. To solve this problem, we first choose a proportion of relatively deprived households at the county level in rural China and then choose rainfall as the IV for relative deprivation. Therefore, referring to previous studies [48–50], we first perform calculations at the household level, which is assigned as 1 if a household has an income 40% lower than that of the median of rural residents and is assigned as 0 otherwise. To calculate relative deprivation at the county level, we calculate the proportion of relatively deprived households within a county in rural China. Likewise, the relative deprivation line is replaced with 50% of the median income in the robustness test.

3.3.3. Mechanism Variables

As discussed above, relative deprivation may affect household consumption through an anticipated effect caused by income uncertainty and a cognitive trap effect caused by cognitive ability. Income uncertainty and cognitive ability can be represented as follows.

Income uncertainty. Referring to Zhou [51], income can be decomposed into permanent and transitory components and expressed as the following equation.

$$\ln(\text{Income}_i) = Z_{1i}\alpha + \pi_i \tag{6}$$

where Income_i is the net income of the ith household. Z_{1i} indicates factors influencing income, including householders' characteristics such as age, gender, marital status, education, health and ethnicity, household characteristics such as family size, labor force, the number of children, the number of adults with chronic diseases, the number of healthy adults, total assets, and years of education per capita. $Z_{1i}\alpha$ represents permanent income and the error term, π_i represents temporary income. And income uncertainty (IU_i) is defined as follows:

$$\text{IU}_i = \begin{cases} -\pi_i^2, & \pi_i < 0 \\ \pi_i^2, & \pi_i \geq 0 \end{cases} \tag{7}$$

Cognitive ability. Referring to Blums et al. [52], we use the ability test in CFPS in 2014 and 2018 to measure cognitive ability. Individuals with high scores in the mathematics module are regarded as having a higher ability of cognition.

3.3.4. Control Variables

A set of control variables are added to reduce the estimation bias resulting from omitted variables. According to previous literature [53,54], we apply control in terms of gender, age, education, marital status, party membership, ethnicity, income, household size, and the number of elderly people and healthy adults. In addition, we also control the county-level night light index, which can capture social-economic impacts in the county. And we add regional dummy variables for eastern and western areas and time dummy variables for years 2010, 2012, 2014, and 2016 to control regional and time effects. Descriptive statistics of the variables are displayed in Table 1.

Table 1. Descriptive statistics of variables.

Variable	Description	Mean	Std. Dev.
Dependent variable			
ln_cons_total	Logarithm of the total household expenditure	9.99	0.93
ln_cons_food	food	8.88	0.99
ln_cons_clo	clothing	6.19	2.27
ln_cons_resi	residence	6.47	2.74
ln_cons_tran	transportation and telecommunication	7.37	1.3
ln_cons_edu	education	3.97	4.04
ln_cons_heal	health care and medical services	6.71	2.52
ln_cons_dur	durable goods	2	3.27
Key variable			
RD	Proportion of relatively deprived households within a county (%)	18.75	11.53
Mechanism variable			
IU	Income uncertainty, calculated by Equations (6) and (7)	−0.09	1.51
CA	Cognitive ability, represented by math ability score of the householder	14.80	10.17
Control variable			
Gend	Gender of the householder (1 = male, 0 = female)	0.63	0.48
Age	Age of the householder (years)	5.11	1.34
Education	Householder's educational level (0 = primary school or below, 1 = junior middle school or above)	0.36	0.48
Marri	Householder's marital status (1 = married, 0 = unmarried)	0.87	0.34
Party	Whether the householder is a CPC member (0 = No, 1 = Yes)	0.08	0.27
Ethnic	Householder's ethnic group (1 = Han, 0 = else)	0.81	0.39
Income	Logarithm of the household's per capita income (2010 constant CNY)	8.42	1.29
Size	Household size	3.95	1.93
Elder	Number of the elderly within a household	0.79	0.88
Heal	Number of healthy adults within a household	1.96	1.40
ANLI	Average nighttime light index at the county level	9.16	12.25

4. Results

4.1. Results of the Benchmark Analysis

Tables 2 and 3 list the benchmark regression results of the HDFE and IV models, respectively. The coefficient of ln_cons_total in column (1) in Table 2 is in line with that

in Table 3, both of which are significantly negative at the *p* = 0.01 level. This means relative deprivation poses a negative effect on the total household expenditure. Besides, in terms of different kinds of household consumption, the coefficients of ln_cons_food, ln_cons_tran, ln_cons_edu, and ln_cons_dur are significantly negative at the *p* = 0.01 level as shown in columns (2), (5), (6), and (8) in Tables 2 and 3. The results reveal that relative deprivation has negative impacts on the household expenditure on food, transportation and telecommunication, education, and durable goods. The coefficient of ln_cons_clo is significantly negative in Table 2 with HDFE estimation while insignificantly negative in Table 3 with IV estimation. Moreover, the coefficients of ln_cons_resi and ln_cons_edu are significantly negative in columns (4) and (7) in Table 2 based on HDFE estimation but significantly positive in Table 3 based on IV estimation. The inconsistent results may be caused by serious reverse causality. The wealthy households are more likely to spend more on clothing, residence, and healthcare and medical services. Such households have more social, human, and financial capital and are less likely to fall into relatively deprived traps [55]. This means that IV estimation results are more credible. The IV estimation results in columns (4) and (7) in Table 3 show that relative deprivation may positively affect household expenditure on residence as well as healthcare and medical services. To test the validity of this instrument, we display the value of 1st-stage F statistic, revealing the first-stage relationship between rainfall and relative deprivation. As Table 3 shows, IV is strong with the value of the 1st-stage F statistic larger than 10. Table A1 in Appendix A also reveals that rainfall is significantly negatively connected to relative deprivation (for more details, see Table A1 in Appendix A). Therefore, support has been found for H1a and H2a.

Table 2. Results of the baseline regressions: HDFE model.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ln_cons_total	ln_cons_food	ln_cons_clo	ln_cons_resi	ln_cons_tran	ln_cons_edu	ln_cons_heal	ln_cons_dur
RD (40% of median income)	−0.007 ***	−0.007 ***	−0.012 ***	−0.008 ***	−0.007 ***	−0.021 ***	−0.021 ***	−0.012 ***
	(−12.36)	(−12.17)	(−8.84)	(−6.44)	(−9.20)	(−8.61)	(−12.11)	(−4.99)
Householder-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Household-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
County-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Region-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Constant	8.445 ***	7.401 ***	4.417 ***	1.610 ***	5.751 ***	5.189 ***	4.291 ***	6.085 ***
	(136.42)	(106.87)	(31.54)	(11.97)	(70.04)	(20.72)	(24.28)	(24.24)
N	24,436	24,413	24,390	24,436	24,371	24,412	24,435	18,946

Note: Robust standard errors in parenthesis. * *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01.

Table 3. Results of baseline regressions: IV model.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ln_cons_total	ln_cons_food	ln_cons_clo	ln_cons_resi	ln_cons_tran	ln_cons_edu	ln_cons_heal	ln_cons_dur
RD (40% of median income)	−0.077 ***	−0.170 ***	−0.024	0.226 ***	−0.094 ***	−0.105 ***	0.076 ***	−0.259 ***
	(−9.01)	(−11.34)	(−1.40)	(8.93)	(−7.85)	(−2.93)	(3.36)	(−7.41)
Householder-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Household-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
County-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Region-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Constant	10.918 ***	13.120 ***	4.850 ***	−6.649 ***	8.808 ***	8.136 ***	0.879	14.937 ***
	(35.24)	(23.99)	(7.84)	(−7.14)	(20.54)	(6.31)	(1.07)	(11.35)
1st-stage F stat.	144.07	143.517	142.028	144.07	144.793	143.552	144.069	123.957
N	24,436	24,413	24,390	24,436	24,371	24,412	24,435	18,946

Note: Robust standard errors in parenthesis. * *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01.

4.2. Robustness Test

Given the complexity of relative deprivation and the biodiversity of its measurement, there would be different incidences of relative deprivation based on various deprivation lines, thus influencing the estimation results. Therefore, we conduct robustness checks mainly by changing the relative deprivation line. First, we replace the relative deprivation line with 50% of the median rural household income. Results based on IV estimation are displayed in Table 4. It is revealed that the significance and direction of the estimated coefficients are in line with those in the baseline results, indicating that the previous results

are robust. Moreover, the coefficients become smaller than the baseline results, revealing that the higher the relative deprivation line is, the smaller the impact of relative deprivation on household consumption. Additionally, an F statistic larger than 10 also validates IV.

Table 4. Results of the robustness test (50% of the median income): IV model.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ln_cons_total	ln_cons_food	ln_cons_clo	ln_cons_resi	ln_cons_tran	ln_cons_edu	ln_cons_heal	ln_cons_dur
RD (50% of the median income)	−0.053 ***	−0.116 ***	−0.016	0.155 ***	−0.064 ***	−0.072 ***	0.052 ***	−0.168 ***
	(−9.74)	(−12.85)	(−1.41)	(9.64)	(−8.34)	(−2.95)	(3.39)	(−7.94)
Householder-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Household-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
County-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Region-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Constant	10.489 ***	12.175 ***	4.715 ***	−5.383 ***	8.294 ***	7.549 ***	1.305 *	13.130 ***
	(43.01)	(29.71)	(8.98)	(−7.36)	(24.07)	(6.95)	(1.89)	(13.19)
1st-stage F statistic	192.027	190.973	188.91	192.027	191.73	191.635	192.026	172.773
N	24,436	24,413	24,390	24,436	24,371	24,412	24,435	18,946

Note: Robust standard errors in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Second, we further replace the relative deprivation line with 60% of the median rural household income. Table 5 presents IV estimates, where the coefficients of the total expenditure and various expenditures are consistent with the results in the baseline regressions. The results are highly robust in terms of significance and direction. Furthermore, coefficients are getting smaller than results under the relative deprivation line with 40% and 50% of the median rural household income. The table also shows that relative deprivation has an even smaller impact on household consumption with a further enhanced relative deprivation line. In addition, the IV is still valid with F statistic larger than 10.

Table 5. Results of the robustness test (60% of the median income): IV model.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ln_cons_total	ln_cons_food	ln_cons_clo	ln_cons_resi	ln_cons_tran	ln_cons_edu	ln_cons_heal	ln_cons_dur
RD (60% of the median income)	−0.039 ***	−0.086 ***	−0.012	0.114 ***	−0.047 ***	−0.053 ***	0.038 ***	−0.126 ***
	(−10.43)	(−15.14)	(−1.40)	(10.79)	(−8.83)	(−2.97)	(3.44)	(−8.40)
Householder-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Household-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
County-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Region-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Constant	10.140 ***	11.406 ***	4.607 ***	−4.356 ***	7.871 ***	7.075 ***	1.651 ***	12.152 ***
	(51.64)	(38.22)	(10.18)	(−7.74)	(28.14)	(7.63)	(2.82)	(14.66)
1st-stage F statistic	304.69	302.946	298.303	304.69	303.458	303.965	304.689	267.806
N	24,436	24,413	24,390	24,436	24,371	24,412	24,435	18,946

Note: Robust standard errors in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Finally, we enhance the relative deprivation line to the median rural household income, and IV estimated results are displayed in Table 6. Similar to previous results, Table 6 also indicates that relative deprivation poses significantly negative effects on household expenditures on food, transportation and telecommunication, education, and durable goods as well as on total household expenditure. Moreover, relative deprivation has significantly positive influences on expenditures on residence and healthcare and medical services with a valid IV. Similarly, relative deprivation has a reduced influence on household consumption at a higher relative deprivation line with reduced coefficients in Table 6.

4.3. Results of the CMA Model

According to previous analysis, the mechanisms behind relative deprivation and household consumption include the anticipated effect and cognitive trap effect. As mentioned earlier, relative deprivation may prohibit household consumption through the anticipated effect while promoting household consumption through the cognitive trap effect. The baseline results show that relative deprivation may reduce household expenditures on food, transportation and telecommunication, education, and durable goods as well as the total household expenditure, which may be due to the anticipated effect. Relative deprivation, moreover, may increase household expenditures on residence and

healthcare and medical services, which may be due to the cognitive trap effect. The CMA model is used to test transmission mechanisms, and results are outlined as Tables 7 and 8. Table 7 shows that IU plays a significantly negative role in mediating the relationship between RD and ln_cons_total, ln_cons_food, ln_cons_tran, ln_cons_edu, and ln_cons_dur. Therefore, the role of the anticipated effect in mediating relative deprivation and household consumption is verified, particularly in expenditures on food, transportation and telecommunication, education, and durable goods as well as the total. Table 8 shows that CA plays a significantly positive role in mediating the relationship between RD and ln_cons_resi as well as ln_cons_heal. Consequently, the role of the cognitive trap effect in mediating relative deprivation and household consumption is proved, particularly in expenditures on residence and healthcare and medical services. Additionally, IV proves to be valid with 1**- and 2**- stage F statistic values in the CMA model larger than 10. The results give support for H1b and H2b.

Table 6. Results of the robustness test (median income): IV model.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ln_cons_total	ln_cons_food	ln_cons_clo	ln_cons_resi	ln_cons_tran	ln_cons_edu	ln_cons_heal	ln_cons_dur
RD (median income)	−0.023 ***	−0.050 ***	−0.007	0.067 ***	−0.028 ***	−0.031 ***	0.023 ***	−0.081 ***
	(−11.17)	(−18.71)	(−1.40)	(12.40)	(−9.34)	(−2.99)	(3.50)	(−8.87)
Householder-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Household-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
County-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Region-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Constant	9.804 ***	10.657 ***	4.498 ***	−3.365 ***	7.455 ***	6.615 ***	1.984 ***	11.376 ***
	(62.35)	(52.05)	(11.80)	(−8.19)	(33.14)	(8.51)	(4.08)	(16.25)
1 **-stage F statistic	677.381	675.487	671.575	677.381	677.307	676.958	677.384	550.948
N	24,436	24,413	24,390	24,436	24,371	24,412	24,435	18,946

Note: Robust standard errors in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 7. Results of the anticipated effect: CMA model.

	(1)	(2)	(3)	(4)	(5)
	ln_cons_total	ln_cons_food	ln_cons_tran	ln_cons_edu	ln_cons_dur
Indirect effect of IU	−0.072 ***	−0.167 ***	−0.089 ***	−0.086 ***	−0.255 ***
	(−4.95)	(−5.29)	(−4.82)	(−2.74)	(−4.72)
Household-fixed effect	Yes	Yes	Yes	Yes	Yes
Householder-fixed effect	Yes	Yes	Yes	Yes	Yes
County-fixed effect	Yes	Yes	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	Yes	Yes
Region-fixed effect	Yes	Yes	Yes	Yes	Yes
1 **-stage F stat.	213.751	213	215.182	213.057	160.39
2 **-stage F stat.	65.792	65.265	65.059	65.586	70.85
N	24,436	24,413	24,371	24,412	18,946

Note: Robust standard errors in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 8. Results of the cognitive trap effect: CMA model.

	(1)	(2)
	ln_cons_resi	ln_cons_heal
Indirect effect of CA	0.288 ***	0.100 ***
	(4.12)	(3.37)
Household-fixed effect	Yes	Yes
Householder-fixed effect	Yes	Yes
County-fixed effect	Yes	Yes
Year-fixed effect	Yes	Yes
Region-fixed effect	Yes	Yes
1 **-stage F stat.	213.624	213.615
2 **-stage F stat.	44.544	44.542
N	13,851	13,851

Note: Robust standard errors in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure 3 depicts the influencing mechanism between relative deprivation and various kinds of household consumption.
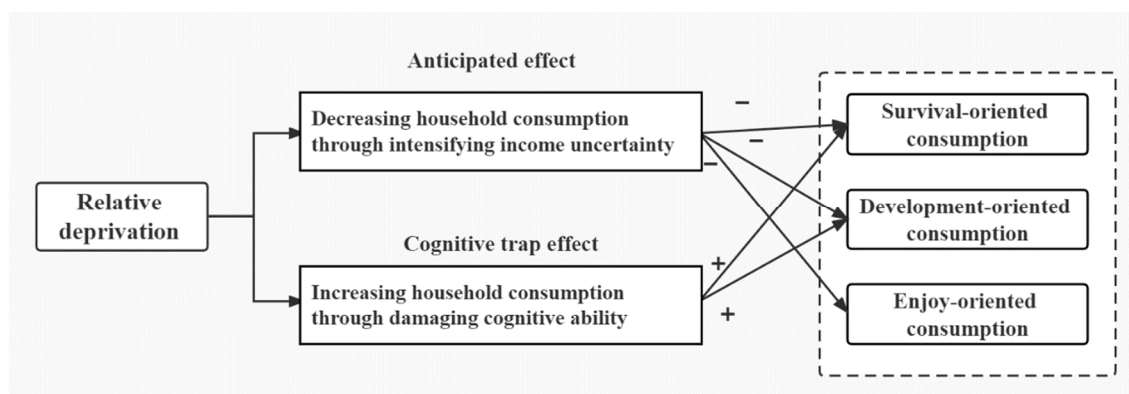
Figure 3. The influencing mechanism of relative deprivation on household consumption.

5. Discussion

The present study investigates how county-level relative deprivation influences various kinds of household consumption, with data from the CFPS and the China County Statistical Yearbook during 2010–2018. HDFE, IV, and CMA are used to causally test the relationship and mechanisms behind county-level relative deprivation and household consumption.

Relative deprivation is the first to be found that can stimulate survival-oriented consumption represented by expenditures on residence and development-oriented consumption represented by expenditures on healthcare and medical services, though it is revealed that county-level relative deprivation reduces the total household expenditures. Besides, relative deprivation has a negative impact on survival-oriented consumption represented by expenditures on food, development-oriented consumption represented by expenditures on transportation and telecommunication as well as education, and enjoyment-oriented consumption represented by expenditures on durable goods. These findings are consistent with previous studies [27,56,57]. Our study extends current literature on a certain household expenditure to cover household consumption, which includes not only the total expenditure, but also the sub-classified kinds of expenditures on consumption.

Secondly, it is worth noting that county-level relative deprivation increases household consumption on residence and healthcare and medical services through the cognitive trap effect. The cognitive trap caused by relative deprivation induces people to overspend on residence. It is particularly common in rural China, where the "house-building craze" has lasted for a long time. Interestingly, most of the participants involved in this craze work outside and leave their well-decorated houses in the villages [58]. Besides, irrational consumption decisions on health resulting from relative deprivation makes people underestimate the consequence of mild illnesses, and they are easily caught up in unhealthy habits. These people usually invest inadequately in health and tend to suffer from major illnesses, which are highly expensive. Such consumption patterns are unsustainable, as they damage rural households' economic wellbeing and health. Moreover, they may squeeze out other kinds of consumption.

The third important finding indicates that relative deprivation reduces household consumption by intensifying the anticipated effect of income uncertainty. This finding is also in line with previous research [59–61]. Such research states that relatively deprived people are more likely to suffer economic uncertainty and a subsequent fear of lagging behind, which intensifies precautionary savings and reduces household consumption. The anticipated effect highlights income uncertainty accompanying relative deprivation, which may hamper people's wellbeing and health.

Our findings have significant policy implications. First, the Chinese government has to address rural relative deprivation at the county level and further release the consumption potential of rural residents. This will not only improve the economic wellbeing and health conditions of the rural households but will also effectively expand domestic demands and promote sustained economic growth. Second, it is necessary to launch cognitive

skills training targeted at the relatively deprived groups in rural areas as well as provide economic assistance; with such training, rural households would be less likely to fall into the cognitive trap and could consume reasonably. Third, it is necessary to take advantage of digital finance to support the rural credit market and reduce income uncertainty to ensure smoothing consumption. In addition, it is a matter of urgency to strengthen social security to reduce precautionary savings. More specifically, policy-related housing, education, and healthcare should be targeted at the deprived groups. This can improve their consumption power and willingness and thereby wellbeing and health.

The current research has several limitations which need to be addressed in further studies. First, relative deprivation in this article is one-dimensional and is calculated based on income, which fails to reflect other dimensions. Therefore, it is necessary to carry out relevant research in multiple dimensions, especially those (non-monetary) related to food deprivation (caloric reduction) and food restriction (limited access to some foods). Besides, relative deprivation in wealth will be an interesting topic worth discussing. Second, we have explained the impact of relative deprivation on household consumption through the anticipated effect and cognitive trap effect. Further analysis can be carried out to seek other explanation mechanisms, such as the role of social norms. For example, it would be interesting to assess whether relative deprivation could influence household consumption through social comparison. Finally, future research can focus on the impact of relative deprivation on the weight of expenditure on household income, which differs from expenditure. Moreover, research areas can be extended to cover more urban use cases.

6. Conclusions

Based on the data from CFPS and the China County Statistical Yearbook during 2010–2018, we provide new evidence on the impact of county-level relative deprivation on household consumption. HDFE, IV and CMA are applied to causally investigate the impact and underlying mechanisms of relative deprivation on household consumption. Results show that county-level relative deprivation reduces the total household expenditures. On the one hand, relative deprivation poses a negative effect on survival-oriented consumption represented by expenditures on food, development-oriented consumption represented by expenditures on transportation and telecommunication as well as education, and enjoyment-oriented consumption represented by expenditures on durable goods. On the other hand, relative deprivation poses a positive effect on survival-oriented consumption represented by expenditures on residence and development-oriented consumption represented by expenditures on healthcare and medical services. Furthermore, mechanism analysis shows that relative deprivation reduces household consumption through the anticipated effect while promoting household consumption via the cognitive effect. This result helps us better understand the relationship between county-level relative deprivation and various kinds of household consumption. The findings have important policy implications for meeting rural households' survival-, development-, and enjoyment-oriented consumption needs, which are essential for their well-being and health.

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Data Availability Statement: The data presented in this study are available on http://www.isss.pku.edu.cn/cfps/ accessed on 10 October 2021.

Appendix A

Table A1. Results of the first regression in the IV model.

	(1)
	RD (40% of the Median Income)
IV (rainfall)	−0.217 ***
	(−15.73)
Householder-fixed effect	YES
Household-fixed effect	YES
County-fixed effect	YES
Region-fixed effect	YES
Constant	42.732 ***
	(74.39)
N	24,436

Note: Robust standard errors in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

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