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The Impact of "Broadband China" Policy on Rural Household Consumption

Shufen Fu

School of Economics and Statistics, Guangzhou University, Guangzhou 510006, China

Abstract

Investigating the changes of rural household consumption behavior in the internet era is of great guiding significance to expanding domestic demand and accelerating the construction of a new development pattern. Based on the official data of rural households in China from 2013 to 2021 and the quasi-natural experiment of the "Broadband China" policy, this paper constructs a difference-in-differences (DID) model to evaluate its impact on rural household consumption. The research shows that: first, after the implementation of the policy, rural household consumption decreased significantly. Second, the policy has a more significant inhibitory effect on the consumption of low-income families and low-skilled labor groups.

Keywords

"Broadband China" Policy; Difference-in-Differences Model; Rural Household Consumption.

1. Introduction

China is at the historical intersection of the digital economy and rural revitalization. The "Broadband China" policy, a strategic public infrastructure initiative launched in 2013, has played a crucial role in breaking information barriers and stimulating economic development. By the end of 2021, all administrative villages in China had achieved broadband access, with the rural internet penetration rate rising from 28.1% in 2013 to 57.6% in 2021[1].

While mainstream theory and empirical studies often highlight the positive impacts of such policies on economic growth(B.G. Han, P.F. Zhu, 2014)[2] and employment(M. Yang, X.X. Liu, Z.R. Li, 2024)[3],the effect on household consumption, particularly in rural areas, remains underexplored. The contribution of consumption to China's economic growth has strengthened in recent years, yet the household consumption rate remains lower than in many developed countries. Furthermore, the consumption gap between urban and rural residents persists. This raises critical questions: Does the "Broadband China" policy differentially affect urban and rural consumption? Is there a structural imbalance in its policy dividends?

Existing literature has paid limited attention to the micro-consumption effects of this policy, especially in rural contexts. This paper aims to fill this gap by empirically examining the impact of the "Broadband China" policy on rural household consumption levels using a DID approach. The study finds that the policy significantly suppresses rural household consumption overall, with more pronounced effects on low-income and low-skilled households.

2. Literature Review

2.1. Determinants of Household Consumption

The factors influencing household consumption have been extensively studied. Key theories include the life-cycle and permanent income hypotheses, which emphasize income level and structure. Liquidity constraints and precautionary savings motives, driven by income

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uncertainty and inadequate social security, are also significant inhibitors of consumption, particularly in developing countries. Demographic structure(K.H. Liu, 2016)[4], digital technology adoption(Z.C. Yin, Z.Y. Qin, A. Zhang, 2024)[5] and consumption habits(Y.N. Huang, Q.Q. Zong, 2014)[6] further shape consumption behavior.

2.2. Economic and Social Effects of the "Broadband China" Policy

Research on the "Broadband China" policy has focused on its macroeconomic and social effects, such as promoting economic growth(B.G. Han, P.F. Zhu, 2014)[2], narrowing income inequality(Y. Chen, S.F. Wang, X.L. Li, 2022)[7], improving labor market outcomes(H.B. Xia, Y.B. Liu, Z.L. Shen, 2021)[8], and facilitating industrial upgrading(Q.S. Ma, L.Y. He, E.Y. Yuan, 2021)[9]. However, direct research on its impact on household consumption, especially from a micro perspective and with a focus on rural heterogeneity, is scarce. One study found a positive effect on urban household consumption(Z.C. Yin, Z.Y. Qin, A. Zhang, 2024)[5], but rural areas were not covered.

3. Theoretical Analysis and Research Hypotheses

The impact of digital infrastructure like the "Broadband China" policy may be asymmetric between urban and rural areas due to differences in resource endowments, human capital, and institutional environments. Urban households, with better education and access to digital finance, may leverage the internet for income generation and consumption smoothing. In contrast, rural areas, constrained by lower skills, entrenched habits, and weaker financial inclusion, might not fully capture these digital dividends. Behavioral theories suggest consumption is also influenced by precautionary motives and mental accounting. Therefore, the net effect on rural consumption is ambiguous a priori but likely heterogeneous.

Based on the above, this paper proposes the following hypotheses:

H1: The "Broadband China" policy has a negative impact on rural household consumption.

H2: The impact of the "Broadband China" policy on rural household consumption is heterogeneous across income and education levels.

4. Empirical Models and Data

4.1. Model Specification

To examine the policy's causal effect, we employ a DID model:

$$\text{Ln\_HH\_Cons umption}_{ict} = \beta_0 + \beta_1 Post_t \times Treat_{c(i)} + \beta_2' X_{ict} + \mu_i + \lambda_t + \varepsilon_{ict} \quad (1)$$

Where lnConsumptionict is the log of real total household consumption for household subscripts i, c, and t denote home, home city, and time. The core explanatory variable is Postt×Treatc(i) (hereinafter referred to as DID term), which indicates the variability at the individual level, that is, whether the individual city is located in the experimental group of "broadband China" policy, reflects the variability at the time level, indicating whether the policy starts to be implemented at t time. It is a control variable at individual, household and city levels. Individual level control variables included demographic variables such as age, education, and marriage. Household and regional levels control household income and urban GDP per capita respectively. and are individual and time fixed effects. is a random perturbation term. In order to mitigate the influence of city level correlation factors on DID coefficient estimation, standard error clustering is set at city level. Even in pilot cities, individuals do not necessarily

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actually use the Internet, thus representing intention-to-treat (ITT) effects and not overestimating true effects.

4.2. Data and Variables

The analysis uses rural household data from China official data from 2013 to 2021, combined with city-level macroeconomic data. The sample is restricted to household heads. Key variables are:

Explained Variable: Log of real total household consumption (deflated to 2013).

Core Explanatory Variable: The DID term ($Post_t \times Treat_{c(i)}$).

Control Variables: Age, education, marital status, and political affiliation of the household head; log of real household income; log of city-level GDP per capita.

After processing, the final sample comprises 29,644 observations. Descriptive statistics are shown in Table 1.

Table 1. Descriptive Statistics of Rural Samples

Variable	Obs	Mean	Std. Dev.	Min	Max
Ln_HH_Consumption	29,644	10.33	0.96	3.88	15.80
DID	29,644	0.29	0.45	0	1
Education	29,644	2.57	1.00	1	8
Age	29,644	57.29	11.85	17	113
Married	29,644	0.98	0.14	0	1
Party Member	29,644	0.13	0.33	0	1
Ln_HH_Income	29,644	9.83	1.46	-5.78	16.15
Ln_City_GDP_pc	29,644	10.97	0.60	9.47	15.61

5. Empirical Analysis

5.1. Benchmark Regression

Table 2 presents the benchmark regression results. Column (1) includes only fixed effects, and Column (2) adds control variables. The coefficient of the DID term is negative and significant at the 10% level, indicating that the "Broadband China" policy reduced rural household consumption by approximately 9% on average, supporting H1.

Table 2. Baseline Regression Results

Dep. Var.: Ln_HH_Consumption	(1)	(2)
DID	-0.0982*	-0.0903*
	(0.0538)	(0.0485)
Controls	No	Yes
Household FE	Yes	Yes
Year FE	Yes	Yes

Continued Table 2. Baseline Regression Results

Dep. Var.: Ln_HH_Consumption	(1)	(2)
City-clustered SE	Yes	Yes
Observations	29,644	29,644
Adjusted R^2	0.647	0.669

*Note: Robust standard errors in parentheses; *** p<0.01, **p<0.05,*p<0.10

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5.2. Parallel Trend Test

The validity of the DID approach relies on the parallel trend assumption. We conduct an event-study analysis, using the period before the policy as the base. Figure 1 shows that the pre-treatment coefficients are not statistically significant, satisfying the parallel trend condition. The negative effect appears and becomes significant several periods after the policy implementation, suggesting a lagged impact.

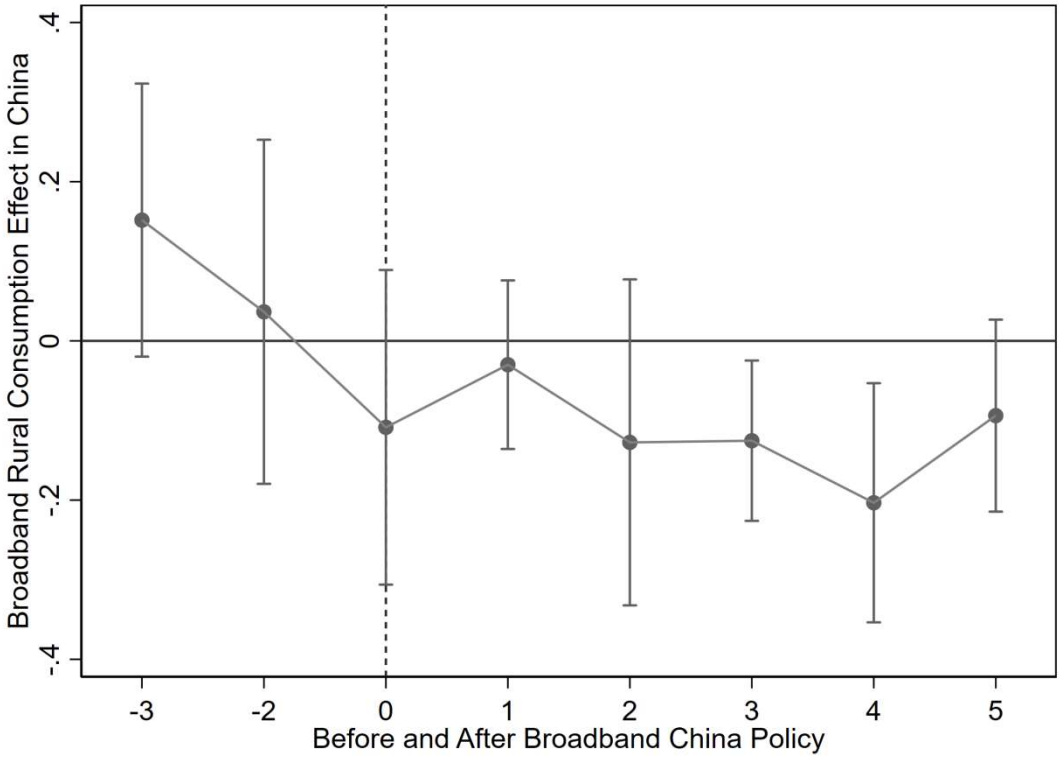

Figure 1. Parallel Trend Test for Rural Households

5.3. Heterogeneity Analysis

Table 3 explores heterogeneous effects by income and education. The sample is split at the median for income and between low-educated (below high school) and high-educated groups. The results show that the negative consumption effect is concentrated and statistically significant only among low-income households (-14.8%) and low-educated households (-8.9%). The coefficients for high-income and high-educated groups are negative but insignificant. This supports H2, indicating that the policy's suppressive effect is more pronounced for vulnerable groups within rural areas.

Table 3. Heterogeneity Analysis by Income and Education

Dep. Var.: Ln_HH_Consumption	High Income	Low Income	High-Skilled	Low-Skilled
DID	-0.0484	-0.1479***	-0.0283	-0.0894*
	(0.0511)	(0.0552)	(0.0749)	(0.0516)
Controls	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
City-clustered SE	Yes	Yes	Yes	Yes
Observations	14,825	14,819	3,451	25,192
Adjusted R^2	0.598	0.652	0.648	0.673

*Note: Robust standard errors in parentheses; *** p<0.01, **p<0.05,*p<0.10

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This paper investigates the impact of the "Broadband China" policy on rural household consumption. Using a DID model based on rural household data from 2013 to 2021, we find that the policy significantly suppresses the consumption level of rural households overall. Furthermore, this inhibitory effect exhibits clear heterogeneity: it is primarily driven by low-income and low-educated rural households, while the impact on higher-income or higher-educated rural households is not statistically significant.

6. Conclusion

These findings suggest that the digital dividends of the "Broadband China" policy may not have been evenly distributed within rural areas in its early stages. Potential mechanisms could include increased precautionary savings due to job displacement in traditional sectors, or a failure to translate improved connectivity into sufficient income growth for vulnerable groups. The policy implies that while promoting digital infrastructure, complementary measures-such as digital skills training for low-skilled groups, support for rural e-commerce entrepreneurship, and strengthening the social safety net-are essential to ensure that digitalization benefits all rural residents and stimulates domestic consumption.

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