The Impact of Digital Infrastructure on Rural Household Financial Vulnerability: A Quasi-Natural Experiment from the Broadband China Strategy

Supplementary Materials

Table S1. Multivariate imputation.

	Observations per *m*			
Variables	Complete	Incomplete	Imputed	Total
Gender	32,378	0	0	32378
Age	32,378	0	0	32378
Age2	32,378	0	0	32378
Marriage	32,378	0	0	32378
Education	32,116	0	0	32378
Health	29,838	262	262	32378
Pension	32,378	0	0	32378
House_size	32,378	0	0	32378
House_old	32,357	21	21	32378
House_child	32,357	21	21	32378
House_asset	30,917	1,461	1,461	32378
House_income	32,094	284	284	32378
House_machinery	32,378	0	0	32378
Institution	32,378	0	0	32378

Note: Complete + Incomplete = Total; Imputed is the minimum across m of the number of filled-in observations.

Table S1 presents the missing values for the control variables in the multiple imputation process. The variable with the largest number of missing values is *House_asset*, with 1,461 missing observations, representing approximately 4.51% of the total sample size (32,378). Therefore, the missing data in this study is not substantial and is unlikely to introduce sample selection bias.

Table S2. Descriptive statistics of different groups.

Variables	Post = 0			Post=1		
	(1) Treatment group	(2) Control group	(3) *diff*	(4) Treatment group	(5) Control group	(6) *diff*
HFV	0.8269	0.8358	0.0089	0.7085	0.7626	0.0541***
	(0.0196)	(0.0070)		(0.0196)	(0.0099)	
Gender	0.5893	0.5832	-0.0061	0.5887	0.5926	0.0039
	(0.0094)	(0.0055)		(0.0109)	(0.0037)	
Age	50.044	50.420	0.3766	51.055	50.572	-0.4827
	(0.3026)	(0.1067)		(0.2637)	(0.1675)	

Age2	2,694.6	2,737.1	42.780	2,896.2	2,779.6	-16.657
	(30.598)	(10.926)		(27.171)	(17.012)	
Marriage	0.8696	0.8630	-0.0066	0.8596	0.7987	-0.0609*
	(0.0074)	(0.0026)		(0.0067)	(0.0045)	
Education	2.3176	2.3389	0.0213	2.4375	2.4511	0.0136
	(0.0269)	(0.0113)		(0.0222)	(0.0140)	
Health	3.1757	3.2116	0.0359	3.1118	3.0906	-0.0212
	(0.0278)	(0.0097)		(0.0244)	(0.0142)	
Pension	0.4299	0.4702	0.0403	0.5277	0.4842	-0.0435
	(0.0137)	(0.0110)		(0.0196)	(0.0156)	
House_size	3.9471	4.0039	0.0568	3.8149	3.8170	0.0021
	(0.0408)	(0.0148)		(0.0369)	(0.0227)	
House_old	0.1575	0.1688	0.0113	0.1544	0.1587	0.0042
	(0.0062)	(0.0023)		(0.0057)	(0.0034)	
House_child	0.0982	0.1007	0.0024	0.1464	0.1450	-0.0014
	(0.0036)	(0.0013)		(0.0039)	(0.0023)	
House_asset	258,305	268,649	-10,344*	392,796	378,837	-13,958
	(6,335.2)	(10,574)		(18,678)	(13,375)	
House_income	43,249	42,304	-944.75	50,760	49,782	-978.41
	(1,767.1)	(714.01)		(1,130.7)	(713.79)	
House_machinery	2043.1	1900.10	-192.9	3849.6	3274.6	-575.05**
	(58.635)	(55.757)		(132.48)	(128.68)	
Institution	43.596	42.104	-1.4921	30.577	32.695	2.1180
	(1.0706)	(0.5545)		(0.9848)	(0.5589)	
Observations	2,078	17,121		2,727	7,912	

Note: The mean of each variable is reported, with standard deviation in parentheses; *, **, and *** denote significant at the 10%, 5%, and 1% levels respectively. Columns (3) and (6) indicate whether there is a significant difference between the treatment group and the control group (t test), where column (3) is the difference between (2) and (1), and column (6) is the difference between (5) and (4).

Table S2 presents the statistical results for both the treatment and control groups. Columns (1) and (2) report the results for the pre-intervention period, before the implementation of the Broadband China policy; columns (4) and (5) display the results for the post-intervention period, after the policy was implemented; and columns (3) and (6) show the t-test results for the differences between the experimental and control groups.

First, regarding the dependent variable, HFV, when Post=0 in the base period, there is no significant difference in household financial vulnerability between the experimental and control groups. However, during the experimental period, the financial vulnerability of rural households in the experimental group is significantly lower than that of the control group at the 1% significance level.

Second, for most control variables, there are no significant differences between the experimental and control groups. While a few variables, such as the mechanization level of rural households, show significant differences, these differences remain stable before and after the implementation of the Broadband China policy and do not affect the model results.

Table S3. Dynamic effect of the Broadband China policy on household financial vulnerability: event study estimates.

	(1)OLogit
Variables	HFV
pre_3	0.067
	(0.052)
pre_2	-0.038
	(0.028)
o.pre_1	-
current	-0.023
	(0.027)
post_1	-0.076**
	(0.038)
post_2	-0.033
	(0.027)
post_3	0.037
	(0.043)
post_4	-0.058*
	(0.031)
post_5	0.018
	(0.050)
Constant	0.827***
	(0.007)
Controls	Yes
Province FE	Yes
Year FE	Yes
Observations	29,830
Pseudo R-squared	0.010

Note: Standard errors in parenthesis are clustered at the household level. *, **, and *** denote significant at the 10%, 5%, and 1% levels respectively.

Table S3 reinforce the finding that supports the parallel trend assumption, showing that the coefficients for pre_3 and pre_2 are not significant before the Broadband China policy was implemented.