

A Blessing or a Substitute? Evaluating the Impact of Public Pensions on Family Support in Rural China

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Abstract. Facing severe rural aging and declining family eldercare, China introduced the New Rural Pension Scheme (NRPS) in 2009. This paper uses fuzzy RDD and 2SLS with CHARLS 2011–2020 data to examine how public pensions affect intergenerational financial transfers. We find a strong crowding-out effect: pension income reduces children's monetary support by around 63.6%. Grandchild care cannot offset this substitution effect. The crowding-out impact rises with the number of adult children and is only significant for elderly men. Bandwidth and placebo tests confirm the results. Formal pensions substitute informal family support, which provides targeted policy implications for rural old-age security.

Keywords: Family Elderly Support, New Rural Pension Scheme, Intergenerational Transfers.

1. Introduction

China's rural population is aging at an unprecedented pace, with the share of residents aged 60 and above projected to exceed 30% by 2035. For decades, old-age support in rural China has rested almost entirely on the family, rooted in the cultural norm of filial piety and the historical absence of a formal social safety net. Yet rapid urbanization, rural-to-urban labor migration, and shrinking family size have placed mounting pressure on this informal arrangement and raised serious concerns about the welfare of the rural elderly.

In response, the Chinese government launched the New Rural Pension Scheme (NRPS) in 2009. The program offers a basic monthly benefit to rural residents aged 60 and above who satisfy minimum contribution requirements, and now covers more than 500 million people, making it one of the largest pension expansions in history. While the policy is designed to alleviate old-age poverty and supplement family support, a fundamental empirical question remains: does public pension income substitute for, or complement, private intergenerational transfers from adult children?

This question has direct implications for the design and evaluation of the NRPS. Under the altruism framework of Becker (1974), parents and children act as a unified welfare-maximizing unit, so an exogenous increase in the elderly's income should mechanically reduce children's transfers — a crowding-out effect. By contrast, the exchange model of Cox (1987) views intergenerational transfers as the implicit price of services such as grandchild care, which implies an ambiguous or even crowding-in relationship if pensions enable elderly parents to provide more services. The net effect is therefore an empirical question, and one whose answer determines how much of each pension dollar actually accrues to the elderly versus how much is offset by reduced family transfers.

Identifying this effect is challenging because pension receipt is endogenous — those who participate likely differ systematically from those who do not. We exploit the statutory age-60 eligibility cutoff for NRPS benefits within a fuzzy regression discontinuity design (RDD), instrumenting actual pension receipt with eligibility status in a two-stage least squares (2SLS) framework. Our analysis draws on five waves of the China Health and Retirement Longitudinal Study (CHARLS) covering 2011 to 2020, yielding 5,706 individual-year observations on rural residents aged 55 to 65.

We document three principal findings. First, NRPS pension receipt causes a substantial reduction in children's financial transfers — roughly 63.6% in our baseline specification — providing strong evidence of a crowding-out effect. Second, we find no support for the grandchild-care-mediated exchange channel: the interaction between pension receipt and care provision is positive but statistically insignificant. Third, the crowding-out effect is highly heterogeneous: it intensifies sharply

with the number of adult children, consistent with “responsibility dilution” or sibling free-riding within larger families, and it is concentrated among elderly men, with no statistically significant effect detected for elderly women. These results are robust to alternative bandwidths and to placebo cutoffs at ages 57 and 63.

The remainder of the paper proceeds as follows: Section 2 describes the data, Section 3 the identification strategy, Section 4 the empirical results, and Section 5 concludes.

2. Data and Descriptive Statistics

2.1 Data Source and Sample Selection

The data is from the China Health and Retirement Longitudinal Study (CHARLS), a nationally representative longitudinal survey of Chinese residents conducted by the National School of Development at Peking University. We employ five waves of the survey spanning 2011 to 2020, which covers the full implementation period of the New Rural Pension Scheme (NRPS) in rural China.

We apply the following sample selection criteria to construct our analytical sample:

Restrict the sample to respondents with official rural household registration (*hukou*).

Limit the age range to 55 to 65 years old, forming a baseline bandwidth of ± 5 years around the 60-year-old statutory eligibility threshold for NRPS benefits. This specification aligns with standard regression discontinuity design (RDD) practices, balancing statistical power and the minimization of confounding age-related trends.

Exclude observations with missing values for core variables, including pension receipt status, intergenerational financial transfers, and pre-specified control variables.

After cleaning the data, our final baseline sample consists of 5,706 individual-year observations, consistent with the sample size used in our empirical analysis. For the mechanism analysis of grandchild care, we use a subsample of 3,101 observations with non-missing data on grandchild care provision.

2.2 Variable Definition and Measurement

2.2.1 Core Dependent Variable

Our primary outcome variable is $\ln(\text{facmt})$, the total annual financial assistance transferred from adult children to their elderly parents. We apply a logarithmic transformation to mitigate the skewness of transfer amounts and reduce the influence of extreme values.

2.2.2 Core Independent and Mechanism Variables

pension: A binary treatment variable equal to 1 if the respondent receives monthly benefits from the NRPS, and 0 otherwise.

Care: A binary indicator equal to 1 if the respondent provides regular care for their grandchildren, and 0 otherwise.

Eligible: A binary instrumental variable equal to 1 if the respondent’s age is 60 or older (the statutory NRPS eligibility threshold), and 0 otherwise.

2.2.3 Control Variables

To isolate the causal effect of pension receipt on intergenerational transfers, we include a comprehensive set of control variables that may correlate with both pension eligibility and children’s transfer behavior:

gender: A binary variable equal to 1 if the respondent is female, and 0 if male.

married: A binary variable equal to 1 if the respondent is currently married and cohabiting with a spouse, and 0 otherwise.

ADL: An index measuring the respondent’s ability to perform basic Activities of Daily Living, a standard metric of physical health status for the elderly

income: The total annual income of the respondent's household, controlling for household economic conditions that shape intergenerational transfer decisions.

nChildren: The number of the respondent's living adult children, which directly affects the scale of potential intergenerational financial support.

education: The respondent's educational attainment, measured by years of schooling, controlling for human capital and socioeconomic status that may correlate with pension participation and intergenerational relationship dynamics.

2.3 Descriptive Statistics

The table (Exhibit 1) below presents the descriptive statistics for all key variables in our baseline sample. The average value of the core dependent variable $\ln(\text{facmt})$ is 1.593, and nearly 48.2% of the sample receives NRPS pension benefits. The sample is nearly evenly split by gender (53.3% female), with an average of 3 living children per respondent and an average of 4.12 years of schooling, consistent with the demographic characteristics of rural elderly in China.

3. Research Design and Identification Strategy

We employ a fuzzy RDD framework with a two-stage least squares (2SLS) estimator as our core empirical strategy. Unlike a sharp RDD where treatment status is fully determined by the cutoff, the fuzzy RDD accounts for incomplete compliance: not all individuals above age 60 receive pension benefits, and a small share of individuals below the cutoff receive benefits due to implementation lags.

We use the binary eligibility indicator $\text{Eligible}(\text{age} \geq 60)$ as the instrumental variable (IV) for endogenous pension receipt. This instrument satisfies two core validity conditions: Relevance: The 60-year-old cutoff has a strong, statistically significant effect on pension receipt (verified in the first stage). Exclusion Restriction: The age cut-off only affects children's intergenerational transfers through its impact on pension receipt, as no other national policies create a discontinuous change in elderly income or support at exactly age 60.

3.1 First Stage (Instrument Relevance)

We first estimate the effect of the eligibility cutoff on pension receipt:

$$P_i = \pi_0 + \pi_1 \cdot Z_i + f(\text{Age}_i - 60) + X_i\gamma + \mu_{\text{prov}} + u_i \quad (1)$$

Where:

P_i : Binary pension receipt indicator for individual i ;

Z_i : Instrumental variable Eligible , equal to 1 if individual i is aged 60 or older, 0 otherwise;

$f(\text{Age}_i - 60)$: A linear polynomial function of the centered age variable (the difference between the respondent's age and the 60-year-old cutoff), with separate slopes for observations above and below the cutoff to flexibly control for smooth age trends;

X_i : Vector of control variables defined in Section 3.2.3;

μ_{prov} : Province fixed effects;

u_i : Idiosyncratic error term.

The coefficient π_1 captures the jump in pension receipt probability at the 60-year-old cutoff. A positive and significant π_1 confirms the relevance of the instrument.

3.2 Second Stage (Causal Effect Estimation)

We then estimate the causal effect of pension receipt on intergenerational transfers using the fitted value of pension receipt from the first stage:

$$Y_i = \beta_0 + \beta_1 \cdot \hat{P}_i + f(\text{Age}_i - 60) + X_i\delta + \mu_{\text{prov}} + \varepsilon_i \quad (2)$$

Where:

Y_i : Core dependent variable $\ln(\text{facmt})$, the logarithm of intergenerational financial transfers;

$\hat{P}_i$: Fitted value of pension receipt from the first stage regression;

All other variables are defined identically to the first stage.

The coefficient of primary interest is β_1 , which measures the local average treatment effect (LATE) of pension receipt on intergenerational transfers. A negative and significant β_1 indicates a crowding-out effect (pensions reduce children's financial support).

Table 1. Pension Effects on Rural Intergenerational Support (2SLS)

	Scheme 1	Scheme 2
	First Stage	Second Stage
VARIABLES	Pension	Log Transfers
Eligible	0.363*** (0.019)	
Age (60=0)	0.078*** (0.003)	0.195*** (0.064)
Age2	0.008*** (0.000)	0.004 (0.006)
Gender	-0.042*** (0.008)	-0.287*** (0.094)
Married	0.012 (0.013)	0.675*** (0.144)
ADL	-0.002 (0.004)	0.034 (0.041)
Income	0.000*** (0.000)	-0.000 (0.000)
nChildren	0.002 (0.004)	0.679*** (0.044)
Education	0.013*** (0.004)	0.211*** (0.047)
Pension		-1.010** (0.498)
Constant	0.447 (0.280)	1.593 (1.593)
Observations	5,706	5,706
R-squared	0.678	0.081
Province FE	YES	YES

Note: Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

3.3 Mechanism Test for Crowding-In via Grandchild Care

To test whether pension-enabled grandchild care triggers reciprocal financial support from children, we augment our baseline specification with an interaction term between pension receipt and grandchild care, using a two-way fixed effects model:

$$Y_{it} = \beta_1 \text{Pension}_{it} + \beta_2 \text{Care}_{it} + \beta_3 (\text{Pension}_{it} \times \text{Care}_{it}) + X_{it}\gamma + \alpha_i + \lambda_t + \varepsilon_{it} \quad (3)$$

Where:

Y_{it} : Logarithm of intergenerational transfers for individual i in year t ;

$\text{Pension}_{it} \times \text{Care}_{it}$: Interaction term between pension receipt and grandchild care provision;

α_i : Individual fixed effects, controlling for all time-invariant individual and household characteristics;

λ_t : Year fixed effects, controlling for national macroeconomic shocks and policy changes over time.

The coefficient β_3 is the key parameter for the crowding-in mechanism. A positive and significant β_3 supports the intergenerational exchange hypothesis.

Table 2. Pension Effects with Grandchild Care Interaction (2SLS)

	Scheme 1	Scheme 2	Scheme 3
	(1)	(2)	(3)
VARIABLES	First Stage pension	First Stage interaction	Second Stage
Eligible	0.335*** (0.029)	-0.246*** (0.017)	
Eligible × Care	0.021 (0.020)	0.784*** (0.013)	
Grandchild Care	-0.013 (0.012)	0.038*** (0.007)	0.316 (0.198)
Age (60=0)	0.079*** (0.004)	0.044*** (0.003)	0.190** (0.092)
Age2	0.008*** (0.001)	0.004*** (0.000)	-0.001 (0.007)
Gender	-0.040*** (0.011)	-0.015* (0.008)	-0.388*** (0.125)
Married	0.015 (0.014)	0.002 (0.010)	0.684*** (0.151)
ADL	-0.004 (0.006)	0.002 (0.004)	0.034 (0.054)
Income	0.000** (0.000)	0.000** (0.000)	-0.000 (0.000)
nChildren	0.003 (0.005)	0.004 (0.004)	0.734*** (0.055)
Education	0.008 (0.006)	0.005 (0.004)	0.186*** (0.060)
Pension			-1.032 (0.751)
Pension × Care			0.280 (0.305)
Constant	0.128*** (0.043)	0.046*** (0.015)	2.238 (2.231)
Observations	3,101	3,101	3,101
R-squared	0.679	0.746	0.103
Province FE	YES	YES	YES

Note: Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4. Empirical Results

4.1 Baseline Results

The figure (Exhibit 2) plots age against the probability of receiving a public pension, using a fuzzy regression discontinuity (RD) design with an exogenous cutoff at age 60. The horizontal axis represents age, and the vertical axis shows the average pension receipt probability for each age group. Blue dots represent binned means, constructed via mimicking-variance binning (50 bins below age 60 and 219 bins above) to allow for finer inspection of the post-threshold trend. Fourth-order

polynomial trends are fitted separately on each side of the cutoff (orange for ages below 60, green for ages 60 and above) using a uniform kernel for local estimation.

A sharp, visually clear jump in pension receipt occurs precisely at age 60. The probability is nearly zero just before the cutoff and rises abruptly to almost one immediately after. This pattern provides clear graphical evidence that age 60 strongly predicts pension eligibility, thereby satisfying the relevance condition for a fuzzy RD design.

This figure (Exhibit 3) presents two-stage least squares (2SLS) estimates of whether public pension receipt crowds out financial support from children. Column (1) shows the first-stage results. Eligibility ($\text{age} \geq 60$) increases the probability of pension receipt by 36.3 percentage points ($\text{coef.} = 0.363$, $p < 0.10$). Column (2) reports the second-stage results. The estimated effect of pension receipt is -1.010 ($p < 0.10$), implying that receiving a pension reduces children's financial support by approximately 63.6%. Control variables carry expected signs: support increases with age, marriage, number of children, and education, and is lower for female elders.

The results provide robust evidence of a strong crowding-out effect, indicating that access to public pension substantially reduces private intergenerational transfers.

We test whether grandchild care moderates the pension's crowding-out effect by estimating a model that includes a care indicator and its interaction with pension receipt. Because pension receipt and the interaction are endogenous, we estimate a two-stage least squares (2SLS) model with two first-stage regressions (Exhibit 4).

The instruments are strong: eligibility ($\text{age} \geq 60$) raises pension receipt by 33.5 percentage points. For the interaction term, both instruments—eligibility and $\text{eligibility} \times \text{care}$ —are jointly significant, with the latter large (0.784) and marginally significant, satisfying the relevance condition.

Second-stage results show no evidence of a crowding-in mechanism. The coefficient on pension receipt is negative (-1.032) and insignificant. The interaction term ($\text{pension} \times \text{care}$) is positive (0.280) but also insignificant, indicating no differential effect for caregivers.

These findings do not support the hypothesis that grandchild care mitigates the pension's crowding-out effect via compensating financial transfers. The crowding-out effect remains strong and is not explained by this intergenerational exchange channel. And why does the crowding-in mechanism fail? We may offer some possible reasons. First, the modest pension is insufficient to make elderly parents economically independent, so grandchild care remains an obligation rather than a bargaining chip. Second, in rural norms, grandchild care is expected as a duty, not a favor, so children feel no debt to repay. Third, adult children themselves face heavy economic constraints from migration and raising their own children, limiting their capacity to increase transfers. Consequently, the crowding-out effect remains uncompensated by any reciprocal transfer triggered by grandchild care.

4.2 Robustness Check

Bandwidth Sensitivity Analysis:

Using a ± 3 -year bandwidth, the crowding-out effect of pension receipt remains statistically significant and negative. The coefficient (-3.61) is larger in magnitude than the baseline estimate (-1.01), indicating a stronger effect near the cutoff. Control variables retain signs and significance consistent with the main specification.

The pension effect remains significant when the bandwidth is narrowed, confirming the robustness of crowding-out. In contrast, the interaction term (capturing a potential crowding-in channel) stays insignificant with a large standard error (0.491), offering no support for such a mechanism.

When the interaction is included, the pension coefficient itself becomes insignificant due to standard-error inflation (from 1.43 to 2.33), a typical consequence of added multicollinearity, but this does not undermine the overall evidence of crowding-out (Exhibit 5).

Placebo Tests:

We perform a placebo test (Exhibit 6) to assess the validity of the RD design by shifting the cutoff to ages 57 and 63—neither of which is the actual policy threshold. As shown in the table, the estimated

effects of pension eligibility on children's financial support are statistically insignificant at both placebo cutoffs (coefficient = 0.396, $p > 0.1$ at age 57; coefficient = -1.176, $p > 0.1$ at age 63). These results confirm that the significant effect observed at the true cutoff age 60 is driven by the pension policy itself, rather than by underlying age trends or other confounding factors.

4.3 Heterogeneity Analysis

Number of Living Children:

The sample ($N = 34,741$) has a mean of 2.38 and a median of 2 living children. The distribution is right-skewed (skewness = 0.97) and leptokurtic (kurtosis = 5.02), with 42.17% of elders having exactly 2 children (IQR: 2–3).

Adding the interaction term $\text{pension} \times \text{hchild}$ to the IV model shows that the crowding-out effect is significantly stronger for elders with more children. The interaction coefficient is negative and statistically significant.

On a log-scale, each additional child increases the crowding-out effect by about 33%. In percentage terms, pension receipt reduces children's financial support by approximately 38% for elders with one child, 55% for those with two children, and 68% for those with three children.

This result (Exhibit 7) contradicts the hypothesis that more children weaken crowding-out through intensified exchange. Instead, it aligns with mechanisms such as responsibility dilution or free-riding among siblings in larger families, where each child feels less obligated to provide support.

Elderly Gender:

The sample is nearly gender-balanced (51.25% female, 48.75% male), allowing for meaningful subgroup analysis. Table XX presents separate estimates for men and women. Among older men, receiving a pension reduces children's financial support by approximately 75.6% ($p < 0.10$), indicating a strong crowding-out effect. In contrast, the effect for women is negative but insignificant (coef. = -0.634, $p > 0.10$), showing no statistically significant crowding-out.

This gender gap may reflect women's greater involvement in grandchild care, which could partly offset crowding-out or differing intra-household gender roles. Support to mothers is rooted in emotion and obligation (e.g., past caregiving, stronger bonds), making it less substitutable by pension income. Support to fathers is more instrumental and exchange-based, so when fathers receive their own pension, children feel justified in reducing transfers. Control variables (age, marital status, number of children, education) show positive associations for both genders, with generally larger magnitudes for men.

5. Conclusion

Using a fuzzy RDD that exploits the statutory age-60 NRPS eligibility cutoff, we estimate the causal effect of pension receipt on children's financial support to elderly parents in rural China. The pension produces a robust crowding-out effect, reducing children's transfers by approximately 64%, with no evidence of an offsetting crowding-in channel via grandchild care. The effect intensifies with the number of adult children and is concentrated among elderly men.

These results align with the altruistic family-transfer model and suggest that, in rural China, public pensions and private support function more as substitutes than as complements. The face-value transfer of the NRPS therefore overstates the net income gain to the rural elderly, since a substantial share of each pension dollar is offset by reduced contributions from adult children. The redistributed flexibility likely accrues to working-age children, meaning the NRPS effectively functions as an income-support program for working-age rural families as well as their parents.

5.1 Policy Implications

Several policy implications follow. First, pension benefit levels should be calibrated with crowding-out explicitly in mind: to raise the consumption of the rural elderly by a given amount, the gross benefit must be set higher to account for the partial offset from family transfers.

Second, our heterogeneity results suggest scope for more targeted support. The crowding-out effect is weakest, and the net welfare gain to the elderly therefore largest, in small families and among elderly women — a useful guide for prioritizing means-tested top-ups where the marginal welfare return per public yuan is highest.

Third, we find little evidence that the pension weakens the implicit value of grandchild care. Complementary policies that formally reward intergenerational caregiving — social-security caregiving credits, subsidized rural eldercare, or co-residence incentives — could reinforce rather than displace family support, especially in mitigating the responsibility-dilution dynamic we observe in larger families.

Finally, the gender asymmetry warrants attention. That elderly women do not experience a statistically significant decline in transfers — combined with their well-documented role as primary providers of grandchild care — suggests the welfare incidence of the NRPS depends on non-monetary forms of intergenerational exchange that current program design does not formally recognize.

5.2 Limitations and Future Research

Several limitations point to avenues for future research. Our fuzzy RDD estimates capture a local average treatment effect at the age-60 threshold and may not generalize to elderly cohorts well above the cutoff. We also cannot fully disentangle altruistic from strategic motives, nor observe in-kind transfers that may move opposite to the financial transfers we measure. Extending the analysis to longer-run outcomes — elderly consumption, health, and the reallocation of resources within multigenerational households — would deepen our understanding of how formal pension provision interacts with family-based old-age support.

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References

- [1] Ning, M., Liu, W., Gong, J., et al. (2019). Does the new rural pension scheme crowd out private transfers from children to parents? Empirical evidence from China. *China Agricultural Economic Review*, 11(2), 411–430.
- [2] Becker, G. S. (1965). A theory of the allocation of time. *The Economic Journal*, 75(299), 493–517.
- [3] Barro, R. J. (1974). Are government bonds net wealth? *Journal of Political Economy*, 82(6), 1095–1117.
- [4] Cox, D. (1987). *Motives for private income transfers*. The University of Chicago Press, 5084–5097.
- [5] Chen, X., Eggleston, K., & Sun, A. (2018). The impact of social pensions on intergenerational relationships: Comparative evidence from China. *The Journal of the Economics of Ageing*, 12, 225–235.