



KYOTO UNIVERSITY

NRE Discussion Papers No. 2026-02

April 2026

Division of Natural Resource Economics, Graduate School of Agriculture, Kyoto University

Early-life exposure to Mao-era rural collective labor persistently  
reshapes how people invest in social capital

Yunze Han and Kei Kajisa

April 2026

**Discussion Papers**

Natural Resource Economics Discussion Papers are preliminary research reports by members of the GSA-NRE Kyoto University circulated for comments and suggestions. They have not been externally peer-reviewed or been subject to the review by the editorial board. All rights are reserved by the authors.



Faculty/Graduate School of  
**AGRICULTURE**  
KYOTO UNIVERSITY

**Division of Natural Resource Economics**

Kitashirakawa Oiwake-cho, Sakyo-ku, Kyoto 606-8502, Japan

# **Early-life exposure to Mao-era rural collective labor persistently reshapes how people invest in social capital**

Yunze Han<sup>1\*</sup> and Kei Kajisa<sup>1</sup>

<sup>1</sup> Division of Natural Resource Economics, Graduate School of Agriculture, Kyoto University, Oiwake-cho, Kitashirakawa, Sakyo-ku, Kyoto 606-8502, Japan

\* Corresponding author: Yunze Han

E-mail: han.yunze.57i@st.kyoto-u.ac.jp

## **Abstract**

People can invest in social capital in different ways, but whether life experiences shape such choices remains unclear. Leveraging the Mao-era sent-down movement, which temporarily relocated millions of urban youths to rural areas for collective labor, we determine whether formative experiences durably reshape social capital investment and related outcomes later in life. Drawing on historical accounts, together with psychological and neuroscientific insights, we use a fuzzy regression discontinuity design and China Family Panel Studies data. We find that being sent down reduced money-based investments while increasing communication-based social capital investments. Contrastingly, multiple social capital-related outcomes were unchanged, including perceived relationship quality and access to help, implying that exposed and unexposed individuals maintained similarly strong social ties through different investment strategies, regardless of differences in later-life demographic or socioeconomic characteristics. Our findings provide evidence on experience effects in social behavior; differences in life experiences are a potential source of social-behavioral heterogeneity.

Past experiences can have enduring effects on behavior. Prior work has highlighted two channels by which these effects manifest. The external-constraint channel operates when experiences change later-life conditions—for example, exposure to a recession during graduation can worsen long-run career prospects and earnings—thereby affecting behavior<sup>1</sup>. Conversely, the internal channel operates when experiences reshape preferences, beliefs, or psychological states, generating behavioral differences even among individuals facing similar later-life conditions<sup>2,3,4</sup>. This internal channel is often referred to as experience effects<sup>3</sup>.

Research on experience effects has focused largely on financial and political behavior. In terms of finance, exposure to recessions can lower willingness to take risks and reduce stock-market participation even decades later<sup>5</sup>; early-career unemployment can induce pessimism about future finances and depress consumption even after incomes recover<sup>6</sup>. In the political domain, exposure to strong civic norms in adolescence predicts a stronger intention to vote later into adulthood<sup>7</sup>. Notably, these patterns persist after extensive controls for later-life demographic and socioeconomic characteristics, suggesting that they reflect an internal channel (experience effects).

However, evidence of experience effects in social behavior remains comparatively limited. Social-behavioral heterogeneity is ubiquitous and may have important consequences for societal outcomes such as cooperation and the stability of social networks<sup>8,9</sup>. Understanding the sources of this heterogeneity is therefore an important issue. A natural question is whether preferences for social behavior—rather than being fixed or purely innate—are shaped by variation in life experiences across individuals.

Motivated by this question, we focus on experience effects in social capital investment—the efforts people make to build and maintain social ties<sup>10,11,12,13</sup>. Social capital investment is closely linked to individual well-being and has received growing attention in recent work<sup>14,15,16,17</sup>. Some studies have found that experiences can meaningfully affect local cooperation and generalized trust<sup>18,19,20</sup>, reflecting broader levels of social capital. Yet it remains unclear how experiences shape the individual-level investment behaviors through which social capital is built. In practice, people can invest in social capital in various ways, including spending money (e.g., buying gifts for others) or devoting time and effort (e.g., sending messages, making phone calls, or spending time in person)<sup>21,22</sup>. Accordingly, our first research question is whether variation in life experiences affects individuals' preferences and choices across social capital investment modes. If it does, a further question is whether such changes across modes have distinct implications for different dimensions of social capital-related outcomes, such as perceived relationship quality and access to help when needed. These questions broaden the scope of research into experience effects in social behavior, suggesting they may be one source of social-behavioral heterogeneity.

We address these questions using a unique historical episode, the Mao-era sent-down movement, in which urban youths were sent to rural areas for collective labor. The movement began as a small-scale, voluntary program in 1955–1967 but was expanded drastically into a large-scale, compulsory campaign in 1968. In the latter phase, more than 16 million urban youths were sent to the countryside. The campaign ended in the late 1970s, at which point most participants returned to their origin cities.

During resettlement, these sent-down youths engaged in collective labor under conditions of severe material deprivation<sup>23</sup>. These intense experiences could leave long-lasting imprints on preferences and psychological states<sup>3</sup>. Studies using rigorous causal designs have found that sent-down youths differ significantly in several psychological measures and economic preferences (e.g., lower mental health and greater risk aversion), but few long-run impacts on socioeconomic characteristics (e.g., income or education) have been found<sup>20,24,25,26</sup>. This pattern suggests that the sent-down movement provides a plausible setting in which to explore experience effects in preferences and choices in social behavior, which remain underexplored in the literature. We therefore investigate how the experiences of sent-down youths shape their social capital investment later in life.

We proceed in four steps. First, mapping historical accounts of the sent-down movement to relevant findings in the psychology and neuroscience literature, we develop hypotheses about which modes of social capital investment should be affected and in what direction. In particular, we justify our expectation that exposure to the sent-down movement would reduce money-based social capital investments and increase communication-based social capital investments. Second, the probability of being sent down jumps at the 1946 birth-cohort cutoff (the first year affected by the large-scale compulsory phase of the movement which began in 1968), so that individuals born just before and just after the cutoff are as good as randomly exposed to different probabilities of being sent down, creating a quasi-experimental setting (Fig. 1). We therefore use a fuzzy regression discontinuity (FRD) design to test these predictions. We also examine whether sent-down exposure affects social capital-related outcomes, as explained earlier. Third, to support an experience-effect interpretation of our second-step estimates, we investigate whether later-life demographic and socioeconomic characteristics exhibit discontinuities at this cutoff. Fourth, we conduct a set of robustness checks. Our analysis uses data from the 2010 wave of the China Family Panel Studies (CFPS).

(Fig. 1)

We find that, consistent with our predictions, exposure to the sent-down movement reduced money-based social capital investments but increased communication-based social capital investments. Interestingly, we find no evidence that exposure affected social capital-related outcomes, suggesting that exposed and unexposed individuals maintained similarly strong social ties, albeit through different means of investment. Importantly, these effects were not explained by differences in observed demographic or socioeconomic characteristics, supporting an experience-effect interpretation. We then discuss three broader implications. First, differences in how people socialize may partly reflect differences in formative experiences. Second, social capital can be maintained through multiple investment modes, which may make it resilient to shocks: A shock can shift investment composition without necessarily changing outcomes. Third, because differences in preferred investment modes may exist among individuals, our results caution against using a single investment indicator as a proxy for social capital, as has sometimes been done in prior work.

## Results

### Predictions for investment modes

During rural resettlement, sent-down youths were exposed to severe material deprivation and intensive collective labor—two defining features of this formative experience. In that period, earnings were tied to work points. Because sent-down youths lacked agricultural skills, they often earned fewer points and thus substantially less income than local villagers. Under such scarcity, even small snack items such as candy could be perceived as a luxury (China Daily, “Mixed memories of ‘Zhiqing’”, 15 June 2004, [https://www.chinadaily.com.cn/english/doc/2004-06/15/content\\_339579.htm](https://www.chinadaily.com.cn/english/doc/2004-06/15/content_339579.htm)). In addition, sent-down youths were deeply embedded in large collective production teams, spending prolonged periods doing physically demanding work<sup>23,27</sup>. Based on insights from the neuroscience and psychology literature, we develop hypotheses about how these formative experiences could have shaped individuals’ choice of social capital investment modes.

**Material deprivation and money-based social capital investments.** Spending money can trigger activation in brain regions associated with negative affect, a reaction often described as the “pain of paying”<sup>28,29</sup>. While this reaction is common, it appears stronger among people from poorer backgrounds<sup>30</sup>. Related evidence in social science similarly links early-life hardship to a stronger preference for maintaining financial liquidity, implying a greater tendency to hold rather than spend cash<sup>6,31</sup>. We therefore predict that sent-down exposure reduces money-based social capital investments later in life.

**Collective living and communication-based social capital investments.** Experiencing life in larger social groups is closely linked to social communication later in life. Neuroscience experiments using macaque monkeys have shown that living in a larger group can strengthen neural systems supporting social cognition<sup>32</sup>; human neuroimaging has shown consistent correlational patterns<sup>33</sup>. This may make social communication more natural and less difficult. Related evidence in social science also shows that early-life exposure to larger peer groups is associated with better communication skills<sup>34,35</sup>. We therefore predict that sent-down exposure increases communication-based social capital investments later in life.

### Validity of the FRD design

To estimate the causal effects of sent-down exposure, we use an FRD design based on the 1946 cohort cutoff, as described above. Our FRD design relies on the assumption that individuals are as good as randomly assigned to sent-down exposure around the cutoff. Several institutional features of the campaign support this assumption. First, the movement was a top-down mandatory policy, leaving individuals with no choice over whether or where to relocate<sup>36</sup>. Second, internal migration in China was tightly restricted at the time, which limited the scope for residential self-selection<sup>36</sup>. Third, the announcement of the campaign came abruptly, offering people little chance to adjust

their behavior in advance<sup>25</sup>. Consistent with these features, prior work has reported no discontinuities in baseline demographic and family-background characteristics around the 1946 cutoff, suggesting limited scope for selection bias<sup>25</sup>.

As an additional validity check, we test for manipulation of the running variable. If manipulation were present, the density of observations would be likely to exhibit a discontinuity at the cutoff<sup>37</sup>. However, Fig. 2 shows no statistically detectable discontinuity, further supporting the validity of the FRD design.

(Fig. 2)

### **Effects on social capital investment modes**

Table 1 reports the estimated effects of sent-down exposure on the choice of social capital investment modes. We find evidence consistent with the abovementioned predictions in two outcomes: gift expenditure (the total value of cash and in-kind gifts over the year before the survey) and messaging frequency (monthly message-sending frequency), reflecting money-based and communication-based investment modes, respectively.

FRD analyses are commonly reported using optimal bandwidths<sup>38</sup>. The optimal bandwidths here are 11.58 for gift expenditure and 8.33 for messaging frequency. For comparability, we report results using a common bandwidth of 10 for both outcomes, so that the two estimates are based on an identical local sample, enhancing the interpretability of shifts in investment modes. This bandwidth lies approximately midway between the two optimal values and is close to each of them.

At the cutoff, gift expenditure drops by 1,213.40 RMB per year, while messaging frequency increases by 9.90 messages per month. Relative to the corresponding local-sample means (2,988 RMB and 12.70 messages per month), both discontinuities are sizable. Dividing these jumps by the corresponding jump in sent-down probability yields local average treatment effects (LATEs) of -5,989.83 RMB for gift expenditure and 26.86 messages per month for messaging frequency. These results indicate that, later in life, sent-down youths prefer a different mode of social capital investment, substituting communication for monetary contributions, consistent with our prediction.

(Table 1)

We also report results using the optimal bandwidths for each investment mode (11.58 and 8.33, respectively; Supplementary Table S1); the resulting estimates are similar. We further assess bandwidth sensitivity in Supplementary Table S2 and find that the estimates are stable in sign and significance across a range of bandwidths, indicating that our estimates are robust to bandwidth choice.

### **Further analyses of communication-based social capital investments**

The discontinuity in messaging frequency in Table 1, by itself, does not fully establish an increase in communication-based social capital investments. We therefore conduct further analyses to address related concerns.

**What messaging frequency captures.** While we interpret messaging frequency primarily as evidence of day-to-day interpersonal interactions for socialization, one

concern is that messages may in fact be work-related (e.g., related to understanding task instructions or reporting to superiors). However, individuals near the cutoff in our data were already retired at the time of the survey, making it unlikely that messaging reflected work-related communication.

**Internal validity of messaging frequency.** Another concern is the high nonresponse rate for the messaging question ( $n=289$ ). If nonresponses were related to sent-down exposure, the estimated effect could be biased. Supplementary Fig. S1 plots the response probability across birth cohorts and shows no statistically detectable discontinuity at the cutoff, suggesting that sent-down exposure is not associated with lower response rates to the messaging question. This finding alleviates concerns about internal validity arising from missing data.

**External validity of messaging frequency.** Nonresponse to the messaging question also raises concerns about external validity. Because our claim centers on a shift in the mode of social capital investment, the messaging measure needs to be broadly representative of the local sample around the cutoff, to allow a meaningful comparison with gift expenditure. Otherwise, the estimated increase in messaging could simply reflect the subset of respondents who answered the messaging question; interpreting it as evidence of a shift in investment mode would be problematic. First, we assess whether nonresponse reflects an inability to answer or simply item skipping. In the local sample used in Table 1, mobile phone ownership is around 70% and illiteracy was virtually nonexistent at the time of the survey, suggesting that most respondents were capable of answering the question. Moreover, mobile phone ownership is smooth at the cutoff (Supplementary Fig. S2), indicating no discontinuity in basic access to communication tools. Second, we apply inverse probability weighting to reweight the FRD estimates to improve representativeness. We estimate each respondent's probability of answering the messaging question using observed characteristics (e.g., income and education) and weight observations by the inverse of this predicted response probability. The inverse probability weighting-adjusted FRD estimates closely resemble the unweighted results and remain statistically significant (Supplementary Table S3), suggesting that the messaging subsample is broadly representative of respondents with the ability to answer the question.

**Accounting for respondents without mobile phones.** We acknowledge that about 30% of respondents in the local sample report not owning a mobile phone and may therefore be genuinely unable to respond to the messaging question. To address this, we take a step back and re-estimate the impact of sent-down exposure on gift expenditure within the subsample of mobile phone owners. As shown in Supplementary Table S4, gift expenditure still declines significantly at the cutoff. Thus, even if we cannot fully resolve concerns about respondents without mobile phones, we still observe the shift in investment modes among mobile phone owners. Furthermore, we explore whether respondents without mobile phones exhibit changes in offline social communication. Supplementary Table S5 reports estimates for weekly social time, measured as hours spent on social activities per week, in the subsample of respondents who do not own a mobile phone. We find a statistically significant positive jump at the cutoff. However, the corresponding LATE estimate is statistically insignificant owing to the relatively

weak first-stage jump in this subsample. While not conclusive, the pattern is suggestive of increased offline communication among non-mobile owners and provides additional support for the broader interpretation of a shift in social capital investment mode.

**Displacement effects.** A related concern is that the increase in messaging frequency may reflect displacement from other forms of communication rather than an overall increase in communication-based social capital investments. To assess this, Supplementary Table S6 reports FRD estimates for three alternative communication outcomes in the full sample—calling frequency, weekly social time, and the number of friends on QQ (a major online messaging platform in China at the time of the survey). We find no statistically significant declines in these measures, suggesting that the rise in messaging is not driven by a shift away from other communication modes.

### **Effects on social capital-related outcomes**

In contrast to the clear shifts in social capital investment behavior, we find no evidence that sent-down exposure affects individuals' social capital outcomes. Panel A of Fig. 3 reports subjective indicators. We observe no statistically significant differences in individuals' self-rated relationship quality, suggesting that being sent down did not change how well-connected respondents perceived themselves to be later in life. Likewise, views about the importance of social ties—i.e., whether social connections matter more than personal ability, or whether family ties are essential for success—also show no statistically detectable discontinuities at the cutoff, suggesting that being sent down did not diminish individuals' incentives to rely on relationships.

Panel B of Fig. 3 turns to more objective indicators of realized support, measured by whether respondents actually received help when facing concrete needs such as borrowing money, receiving care when sick, or finding assistance when looking for a job. Again, we find no statistically significant effects on these outcomes.

Taken together, these results suggest that the sent-down movement reshaped how individuals invest in social capital, without measurably changing downstream outcomes. This evidence supports the interpretation that sent-down exposure led individuals to maintain similarly strong social ties (relative to those who were not sent down), albeit through different means of investment.

(Fig. 3)

### **Ruling out later-life conditions as an alternative explanation**

Our interpretation is that the observed behavioral differences stem from internal preference changes. A possible alternative explanation, however, is that these differences instead reflect discontinuities in later-life demographic or socioeconomic characteristics. We therefore test whether later-life demographic and socioeconomic characteristics exhibit any discontinuities at the cutoff; the absence of such discontinuities would rule out this concern.

Fig. 4 reports the estimated discontinuities for a set of individual characteristics, including income, education, number of siblings, social organization membership, and body mass index. None of these variables shows a statistically significant jump at the

cutoff, consistent with prior studies documenting that sent-down experience had only minor long-run impacts on socioeconomic conditions<sup>24,25</sup>. Moreover, respondents around the cutoff were about 64 years old at the time of the survey, which does not correspond to any relevant age-based policy threshold in the Chinese context. These patterns suggest that individuals on either side of the cutoff likely faced similar budget constraints and relative prices when investing in social capital, and that differences in investment choice are therefore more likely to reflect differences in preferences, supporting the experience-effect interpretation. For example, individuals are unlikely to have substituted communication for monetary spending simply because they became poorer, but rather because early experience durably reshaped their preferences.

(Fig. 4)

### **Robustness analyses**

To assess robustness, we have already reported above (i) validity checks for the FRD design (Fig. 2), (ii) robustness analyses on bandwidth choice (Supplementary Tables S1, S2), and (iii) robustness analyses on several concerns related to our communication-based investment measure (Supplementary Tables S3–S6; Supplementary Figs. S1, S2). We now conduct two additional robustness checks to strengthen the credibility of our core findings in Table 1, as described below.

**Placebo cutoff test.** We conduct placebo tests using alternative birth-cohort cutoffs. Specifically, we re-estimate the FRD effects using 1944, 1945, 1947, and 1948 as placebo cutoffs (rather than 1946). As shown in Supplementary Fig. S3, we find no statistically significant effects at any placebo cutoff. This result alleviates concerns that our findings reflect spurious discontinuities arising from local fitting, chance fluctuations, or other nearby cohort-specific factors, since shifting the cutoff to nearby years does not produce similar discontinuities.

**Excluding the 1946 cohort.** We re-estimate the effects on social capital investment after excluding individuals born in 1946. This check serves two purposes. First, although 1946 is the earliest cohort subject to the sent-down movement, those born early in the year may have belonged to the previous school cohort that was not yet subject to compulsory rural assignment. Excluding the 1946 cohort therefore mitigates concerns about potential misclassification around the cutoff. Second, it helps verify that the effects reported in Table 1 are not driven by any other idiosyncratic features of the 1946 cohort. As shown in Supplementary Table S7, the estimates remain similar in sign and statistical significance to those in Table 1.

### **Discussion**

This study examined how early-life exposure to China's sent-down movement influenced long-term patterns of social capital investment. Drawing on historical accounts of the movement and insights from the psychology and neuroscience literature, we predicted that this formative experience would reduce money-based social capital investments while increasing communication-based social capital investments. Using

an FRD design, we found evidence consistent with these predictions. Furthermore, we detected no corresponding changes in multiple dimensions of social capital-related outcomes, such as perceived relationship quality and reported access to help when needed. One interpretation is that investment modes are at least partly substitutable: Individuals who reduce one mode of investment may compensate by increasing another, thereby maintaining similar relational outcomes. We found little evidence that these patterns can be attributed to differences in later-life conditions, strengthening an experience-effect interpretation. Our findings thus extend evidence on experience effects to social capital investment behavior and point to formative experiences as one potential source of persistent social-behavioral heterogeneity.

With respect to cohort differences in social capital investment modes, some literature has documented such differences and attributed them primarily to exogenous “technological change.” For example, advances in mobile communication have enabled younger cohorts to rely more heavily on mediated interaction to sustain and expand social connections<sup>39,40</sup>. This perspective is important, but our findings point to a complementary channel: Cohort differences in investment modes may also stem from differential exposure to historical events.

Our findings also suggest that social capital may be resilient because it can be maintained through multiple investment modes. In our setting, even if a shock shifts individuals’ preferences across investment modes, they still achieve comparable outcomes despite reallocating their investments. More broadly, the extent of such resilience may depend on the degree of substitutability across investment modes in a given social environment. Where substitution is easier, preference shifts may be less likely to translate into changes in outcomes.

Notably, while some empirical studies proxy individuals’ social capital level with a single investment indicator (e.g., gift expenditure), our findings caution that variation in a single indicator may reflect heterogeneity in preferences for that investment form, rather than differences in the overall level. If gift expenditure declines while communication increases, underscoring a single proxy may bias the results.

Despite these findings, some limitations need to be noted. In our data, sent-down exposure is observed only as a binary indicator, without information on what individuals actually experienced during their sent-down years. This limitation has two implications. First, although most sent-down youths participated in rural collective labor, a minority were assigned to non-manual roles such as teaching<sup>36</sup>. While this unobserved variation may introduce measurement error, it is more likely to lead us to underestimate the effect (by diluting treatment intensity within the exposed group) than to overestimate it. Second, the lack of detailed assignment information prevents us from examining potentially informative heterogeneity within the treated group. For example, effects may differ depending on whether individuals were sent to relatively poorer versus richer destinations, or to rice-growing versus non-rice-growing areas. (Rice cultivation typically requires more coordination than that of many dryland crops<sup>41</sup>.) These possibilities are substantively important, and we view them as a promising direction for future work.

## Methods

### Empirical strategy

We aim to identify the causal effect of sent-down experience on social capital investment behaviors and outcomes. As discussed in the Introduction, the probability of being sent down changes discontinuously at the 1946 birth-cohort cutoff, providing a quasi-experimental setting for an FRD design. Formally, the LATE of sent-down experience at the cutoff can be expressed as follows:

$$LATE = E[y_1 - y_0 | x = c] = \frac{\lim_{x \downarrow c} E[y | x] - \lim_{x \uparrow c} E[y | x]}{\lim_{x \downarrow c} E[D | x] - \lim_{x \uparrow c} E[D | x]}$$

where  $x$  is the running variable (birth year);  $c$  is the cutoff point (1946);  $y_1$  and  $y_0$  denote the potential outcomes with and without the sent-down experience; and  $D$  is a binary indicator for treatment status. This Wald estimator captures discontinuous change in the outcome normalized by the jump in treatment probability. We estimate the FRD using local linear regressions on either side of the cutoff.

### Data source

We use data from the 2010 wave of the CFPS, a nationally representative household survey in China. The survey includes retrospective information on whether respondents experienced the sent-down movement and on their hukou status at age 12 (hukou refers to China's household registration system, classified as either agricultural or non-agricultural), together with measures of current social capital and socioeconomic characteristics. Because the sent-down policy targeted urban youths, we restrict the sample to individuals who reported holding non-agricultural hukou at age 12.

The CFPS records several measures related to social capital investment behavior. Among them, our main evidence comes from gift expenditure and messaging frequency, which reflect monetary and communication-based forms of investment, respectively. Regarding gift expenditure, the survey records respondents' annual spending on gifts to others. Respondents were asked "What was the total value of all gifts (in kind) and cash gifts you gave others over the past year?" measured in RMB. We retain only responses below 30,000 RMB, excluding 9 out of 1,200 observations with implausibly large values. Because this item appears in the household questionnaire, it reflects household-level gift expenditure; accordingly, in analyses using this measure, standard errors are clustered at the household level.

As for messaging frequency, respondents were asked: "During non-holiday periods, how frequently do you send messages?," with answers recorded on a four-point scale: (1) occasionally, (2) a few times per month, (3) a few times per week, and (4) almost every day. For ease of interpretation, we convert these categories into approximate monthly message frequencies of 1, 5, 15, and 28, respectively. This transformation does not affect the sign or statistical significance of the estimates.

In addition to investment-related measures, the CFPS contains a set of variables related to individuals' social capital-related outcomes. These include subjective indicators such as self-rated relationship quality, beliefs about the importance of social

ties relative to personal ability, and views on whether family connections are essential for success. It also records whether respondents received help when facing concrete needs such as borrowing money, receiving care when sick, or obtaining assistance when looking for a job.

Exact variable definitions, questionnaire wording, and descriptive statistics are reported in Supplementary Table S8.

### **Data availability**

The data used in this study are from the CFPS, conducted by the Institute of Social Science Survey, Peking University. CFPS public-use data are available to registered users through the official CFPS data platform. In accordance with CFPS data-sharing regulations, the authors are not permitted to publicly share the original or modified CFPS data on journal websites. Researchers can access the data directly through the official CFPS registration and download system.

### **Code availability**

Code used in this study will be available from the corresponding author upon publication.

## References

1. Oreopoulos, P., von Wachter, T. & Heisz, A. The short- and long-term career effects of graduating in a recession. *Am. Econ. J. Appl. Econ.* **4**, 1–29 (2012).
2. McGaugh, J. L. The amygdala modulates the consolidation of memories of emotionally arousing experiences. *Annu. Rev. Neurosci.* **27**, 1–28 (2004).
3. Malmendier, U. Experience effects in finance: foundations, applications, and future directions. *Rev. Finance* **25**, 1339–1363 (2021).
4. Kyle, K. M., Ford, B. Q. & Willroth, E. C. Personality trait change across a major global stressor. *Pers. Soc. Psychol. Bull.* **51**, 1716–1730 (2025).
5. Malmendier, U. & Nagel, S. Depression Babies: Do Macroeconomic Experiences Affect Risk Taking? *Q. J. Econ.* **126**, 373–416 (2011).
6. Malmendier, U. & Shen, L. S. Scarred Consumption. *Am. Econ. J.: Macroecon.* **16**, 322–355 (2024).
7. Campbell, D. E. *Why We Vote: How Schools and Communities Shape Our Civic Life* (Princeton Univ. Press, Princeton, 2006).
8. Fischbacher, U., Gächter, S. & Fehr, E. Are people conditionally cooperative? Evidence from a public goods experiment. *Econ. Lett.* **71**, 397–404 (2001).
9. Dakin, R. & Ryder, T. B. Reciprocity and behavioral heterogeneity govern the stability of social networks. *Proc. Natl Acad. Sci. USA* **117**, 2993–2999 (2020).
10. Granovetter, M. S. The strength of weak ties. *Am. J. Sociol.* **78**, 1360–1380 (1973).
11. Bourdieu, P. The forms of capital. In *Handbook of Theory and Research for the Sociology of Education* (ed. Richardson, J. G.) 241–258 (Greenwood Press, New York, 1986).
12. Schiff, M. Social capital, labor mobility, and welfare: The impact of uniting states. *Ration. Soc.* **4**, 157–175 (1992).
13. Putnam, R. D. *Bowling Alone: The Collapse and Revival of American Community* (Simon & Schuster, New York, 2000).
14. Kawachi, I., Kennedy, B. P., Lochner, K. & Prothrow-Stith, D. Social capital, income inequality, and mortality. *Am. J. Public Health* **87**, 1491–1498 (1997).
15. Fafchamps, M. & Gubert, F. The formation of risk sharing networks. *J. Dev. Econ.* **83**, 326–350 (2007).
16. Shen, J. & Bian, Y. The causal effect of social capital on income: a new analytic strategy. *Soc. Netw.* **54**, 82–90 (2018).
17. Chetty, R. et al. Social capital I: measurement and associations with economic mobility. *Nature* **608**, 108–121 (2022).
18. Bauer, M. et al. Can war foster cooperation? *J. Econ. Perspect.* **30**, 249–274 (2016).
19. Schwerter, F. & Zimmermann, F. Determinants of trust: the role of personal experiences. *Games Econ. Behav.* **122**, 413–425 (2020).
20. Ball, S., Ge, S., Smith, A., Wang, W. & Zhang, X. Youth reeducated: The economic preference impacts of China’s sent-down movement. *J. Econ. Behav. Organ.* **244**, 107496 (2026).
21. Shoji, M., Aoyagi, K., Kasahara, R., Sawada, Y. & Ueyama, M. Social capital formation and credit access: evidence from Sri Lanka. *World Dev.* **40**, 2522–2536

(2012).

22. Chen, X. et al. Measuring social capital investment: Scale development and examination of links to social capital and perceived stress. *Soc. Indic. Res.* **120**, 669–687 (2015).
23. Zhou, X. & Hou, L. Children of the Cultural Revolution: the state and the life course in the People's Republic of China. *Am. Sociol. Rev.* **64**, 12–36 (1999).
24. Xie, Y., Jiang, Y. & Greenman, E. Did send-down experience benefit youth? A reevaluation of the social consequences of forced urban–rural migration during China's Cultural Revolution. *Soc. Sci. Res.* **37**, 686–700 (2008).
25. Gong, J., Lu, Y. & Xie, H. The average and distributional effects of teenage adversity on long-term health. *J. Health Econ.* **71**, 102288 (2020).
26. Liang, Y. & Dong, J. The impact of the send-down experience on the health of elderly Chinese women: Evidence from the China family panel studies. *Int. Rev. Econ. Finance* **78**, 377–389 (2022).
27. Muscolino, M. S. Transform the land, train the youth: water and soil conservation teams and state-induced migration in mid-1960s China. *J. Chin. Hist.* **5**, 311–331 (2021).
28. Knutson, B., Rick, S., Wimmer, G. E., Prelec, D. & Loewenstein, G. Neural predictors of purchases. *Neuron* **53**, 147–156 (2007).
29. Rick, S. I., Cryder, C. E. & Loewenstein, G. Tightwads and spendthrifts. *J. Consum. Res.* **34**, 767–782 (2008).
30. White, S. F., Nusslock, R. & Miller, G. E. Low socioeconomic status is associated with a greater neural response to both rewards and losses. *J. Cogn. Neurosci.* **34**, 1939–1951 (2022).
31. Hu, J., Li, A. & Luo, Y. CEO early life experiences and cash holding: evidence from China's Great Famine. *Pac. Basin Finance J.* **57**, 101184 (2019).
32. Sallet, J. et al. Social network size affects neural circuits in macaques. *Science* **334**, 697–700 (2011).
33. Powell, J., Lewis, P. A., Roberts, N., Garcia-Fiñana, M. & Dunbar, R. I. M. Orbital prefrontal cortex volume predicts social network size: an imaging study of individual differences in humans. *Proc. R. Soc. B* **279**, 2157–2162 (2012).
34. Oksman, E. et al. Associations between early childcare environment and different aspects of adulthood sociability: the 32-year prospective Young Finns Study. *Front. Psychol.* **10**, 2060 (2019).
35. Kanamori, K. et al. Group childcare has a positive impact on child development from the Japan Environment and Children's Study. *Sci. Rep.* **14**, 29550 (2024).
36. Chen, Y., Fan, Z., Gu, X. & Zhou, L.-A. Arrival of young talent: the send-down movement and rural education in China. *Am. Econ. Rev.* **110**, 3393–3430 (2020).
37. Cattaneo, M. D., Jansson, M. & Ma, X. Manipulation testing based on density discontinuity. *Stata J.* **18**, 234–261 (2018).
38. Imbens, G. & Kalyanaraman, K. Optimal bandwidth choice for the regression discontinuity estimator. *Rev. Econ. Stud.* **79**, 933–959 (2012).
39. Campbell, S. W. & Kwak, N. Mobile communication and social capital: an analysis of geographically differentiated usage patterns. *New Media Soc.* **12**, 435–451

(2010).

40. Barbosa Neves, B., Fonseca, J. R., Amaro, F. & Pasqualotti, A. Social capital and Internet use in an age-comparative perspective with a focus on later life. *PLoS One* **13**, e0192119 (2018).
41. Talhelm, T. et al. Large-scale psychological differences within China explained by rice versus wheat agriculture. *Science* **344**, 603–608 (2014).

**Acknowledgements**

The authors are grateful to participants at the 20th East Asian Economic Association International Conference for their helpful comments and suggestions, and especially to the discussant, Ma. Christina F. Epetia (Bangko Sentral ng Pilipinas), for valuable comments, and to the session chair, Fumiharu Mieno (Kyoto University), for helpful feedback. The authors are also grateful to Yan Chen (University of Michigan) for helpful discussions at an earlier stage of this research.

**Funding**

Yunze Han discloses support for the research of this work from the Japan Science and Technology Agency (JST) SPRING Program [grant number JPMJSP2110].

**Author contributions**

Y.H. conceived the study, conducted the analysis and wrote the first draft of the manuscript. K.K. provided guidance on the study, contributed to the interpretation of the results and revised the manuscript.

**Competing interests**

The authors declare no competing interests.

# Table

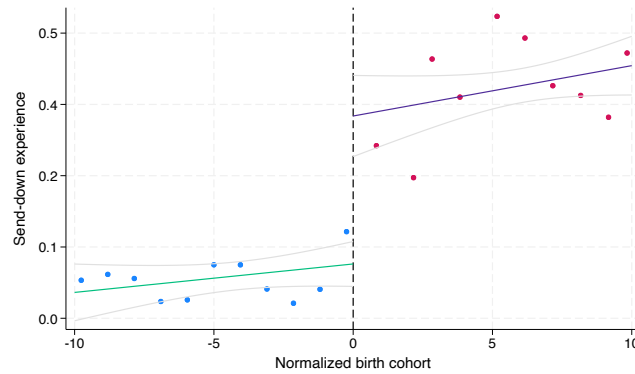
Table 1. Estimated effects of the send-down experience on social capital investment behavior.

|                               | Gift expenditure<br>(RMB per year) | Messaging frequency<br>(times per month) |
|-------------------------------|------------------------------------|------------------------------------------|
| Jump in Outcome               | -1213.40**<br>(580.15)             | 9.90***<br>(3.74)                        |
| Jump in Send-Down Probability | 0.20***<br>(0.04)                  | 0.37***<br>(0.10)                        |
| Fuzzy RD Estimate (LATE)      | -5989.83**<br>(2979.52)            | 26.86**<br>(12.45)                       |
| Sample size                   | 1191                               | 289                                      |

Note: \*\*, \*\*\* indicating statistical significance at the 5%, 1% levels, respectively. Standard errors are reported in parentheses. Issues related to sample attrition are addressed in the main text and in the robustness checks.

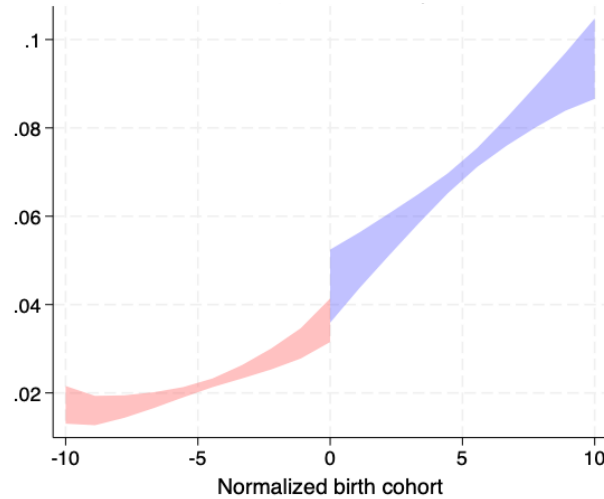
## Figures

**Fig. 1: Discontinuity in participation in the send-down movement.**



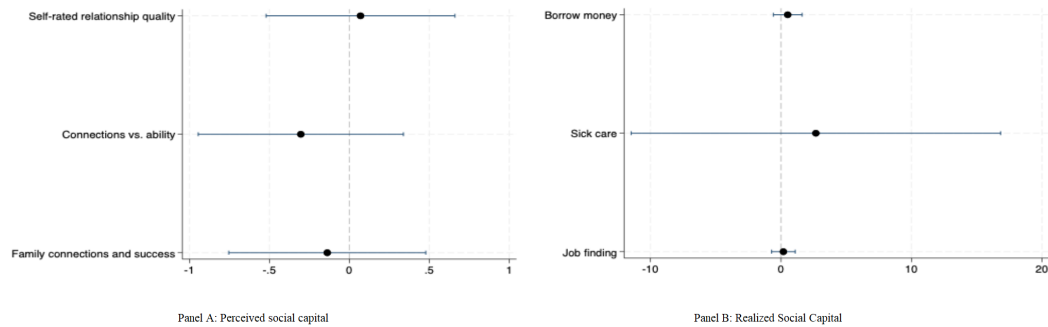
Note: The y-axis plots the probability of having send-down experience. The x-axis shows the normalized birth cohort, with 0 corresponding to the 1946 cutoff (vertical dashed line). Dots show cohort-bin means, and solid lines plot fitted trends on each side of the cutoff (95% confidence bands in grey). The figure shows a clear jump in send-down exposure at the cutoff, motivating a fuzzy regression discontinuity design. Data are from the 2010 wave of the China Family Panel Studies (CFPS).

**Fig. 2: Density test for running variable at the cutoff.**



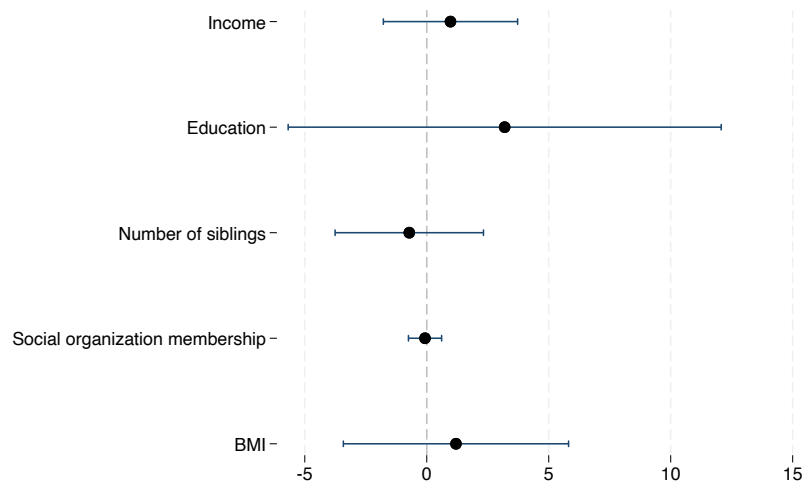
Note: The figure plots estimated cohort density around the 1946 cutoff (the running variable is normalized so that 0 corresponds to the cutoff). Shaded areas show 95% confidence intervals for the estimated density on each side of the cutoff. We find no statistically detectable discontinuity in density at the cutoff, suggesting no evidence of manipulation of the running variable around the cutoff.

**Fig. 3: Effects of send-down exposure on social capital-related outcomes.**



Note: Points show fuzzy RD estimates (LATEs) at the 1946 birth-cohort cutoff, and horizontal bars indicate 95% confidence intervals. Panel A reports subjective indicators, including self-rated relationship quality, beliefs about whether connections matter more than ability, and whether family ties are essential for success. Panel B reports realized support, measured by whether respondents received help when facing concrete needs, including borrowing money, care when sick, and help finding a job. Across outcomes, estimates are statistically indistinguishable from zero.

**Fig. 4: Smoothness of later-life conditions at the cutoff.**



Note: The figure plots estimated discontinuities at the 1946 birth-cohort cutoff for a set of later-life individual characteristics, including income, education, number of siblings, social organization membership, and BMI. Points denote point estimates and horizontal bars indicate 95% confidence intervals. None of these covariates shows a statistically detectable discontinuity at the cutoff, supporting the smoothness of later-life conditions around the threshold.

## Supplementary Information

Supplementary Table S1 reports the estimated effects of send-down experience on social capital investment using optimal bandwidths. The results remain statistically significant and consistent in direction and magnitude.

Supplementary Table S1. Estimated effects of the send-down experience on social capital investment behavior using optimal bandwidth.

|                               | Gift expenditure        | Messaging frequency |
|-------------------------------|-------------------------|---------------------|
| Jump in Outcome               | -1071.42**<br>(530.17)  | 10.74***<br>(4.00)  |
| Jump in Send-Down Probability | 0.22***<br>(0.04)       | 0.29***<br>-0.10    |
| Fuzzy RD Estimate (LATE)      | -4862.68**<br>(2463.59) | 37.64**<br>(19.16)  |
| Sample size                   | 1348                    | 201                 |

Note: \*\*, \*\*\* indicating statistical significance at the 5%, 1% levels, respectively. Standard errors are reported in parentheses. The optimal bandwidths used in the estimation are 11.58 and 8.33.

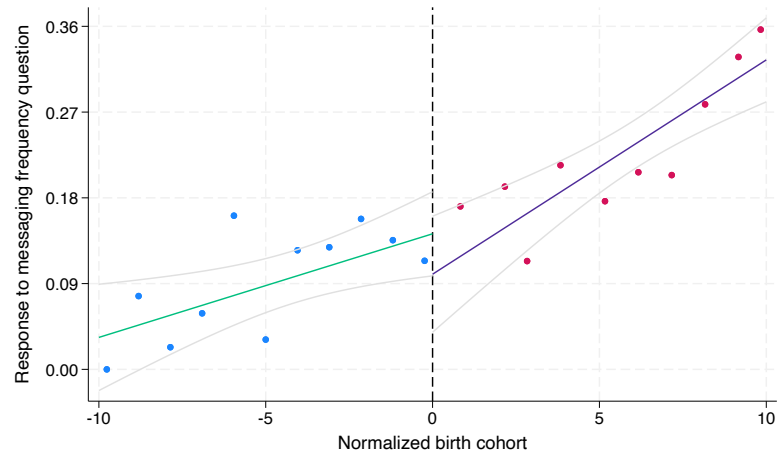
Supplementary Table S2 reports fuzzy RD estimates using alternative bandwidths ( $\pm 6$ ,  $\pm 8$ ,  $\pm 10$ ,  $\pm 12$ , and  $\pm 14$ ). Across all specifications, the estimated effects on gift expenditure remain negative and statistically significant (Panel A) and the effects on messaging frequency remain positive and significant (Panel B). While bandwidth choice affects the scale of the LATEs, the two outcomes continue to move together in a stable way across bandwidths. Panel C summarizes this co-movement by plotting a substitution rate—the change in messaging frequency divided by the absolute change in gift expenditure—which remains approximately constant at around 0.005. We do not attach standalone economic meaning to this ratio; it is reported only as an intuitive summary showing that the relative magnitudes of the two effects are not sensitive to bandwidth choice.

Supplementary Table S2. Sensitivity of the estimated effects to bandwidth choice.

| Bandwidth                     | 6                      | 8                      | 10                      | 12                     | 14                     |
|-------------------------------|------------------------|------------------------|-------------------------|------------------------|------------------------|
| Panel A. Gift expenditure     |                        |                        |                         |                        |                        |
| Jump in Outcome               | -1598.45*<br>(828.70)  | -1403.77**<br>(678.32) | -1213.40**<br>(580.15)  | -1041.10**<br>(521.29) | -915.32*<br>(480.02)   |
| Jump in Send-Down Probability | 0.16***<br>(0.06)      | 0.17***<br>(0.05)      | 0.20***<br>(0.04)       | 0.22***<br>(0.04)      | 0.24***<br>(0.04)      |
| Fuzzy RD Estimate (LATE)      | -9723.55*<br>(5676.32) | -8276.52*<br>(4345.44) | -5989.83**<br>(2979.52) | -4663.70*<br>(2385.61) | -3790.54*<br>(2012.84) |
| Panel B. Messaging frequency  |                        |                        |                         |                        |                        |
| Jump in Outcome               | 12.44**<br>(5.07)      | 10.87***<br>(4.09)     | 9.90***<br>(3.74)       | 8.99**<br>(3.50)       | 8.19**<br>(3.34)       |
| Jump in Send-Down Probability | 0.26**<br>(0.11)       | 0.27**<br>(0.11)       | 0.37***<br>(0.10)       | 0.38***<br>(0.05)      | 0.38***<br>(0.05)      |
| Fuzzy RD Estimate (LATE)      | 48.18*<br>(27.18)      | 40.40*<br>(21.43)      | 26.86***<br>(12.45)     | 23.54**<br>(9.59)      | 21.79**<br>(9.27)      |
| Panel C. Substitution rate    |                        |                        |                         |                        |                        |
| Substitution rate             | 0.005                  | 0.005                  | 0.004                   | 0.005                  | 0.006                  |

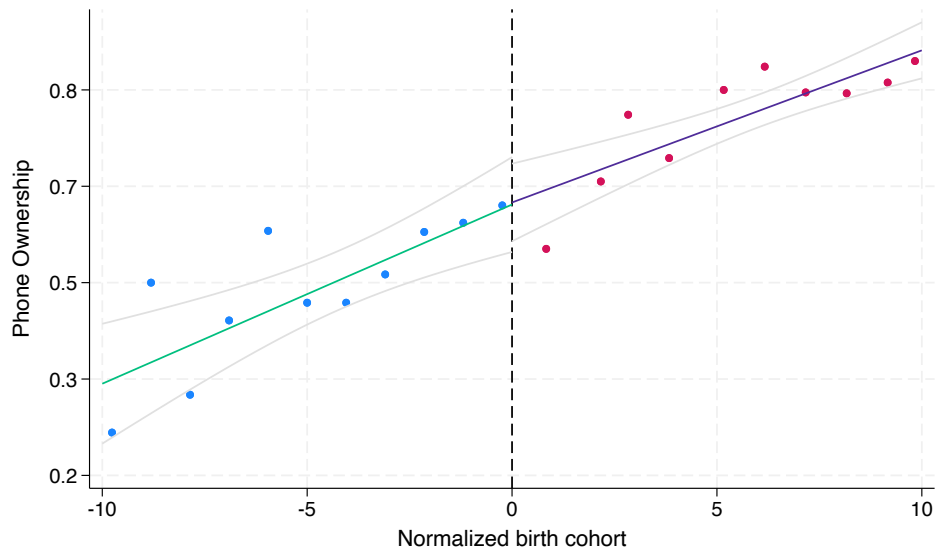
Note: \*, \*\*, \*\*\* indicating statistical significance at the 10%, 5%, 1% levels, respectively. Standard errors are reported in parentheses.

**Supplementary Fig. S1. Smoothness of response to 'Messaging Frequency' question.**



Note: The y-axis plots the probability of responding to the messaging-frequency question. The x-axis shows the normalized birth cohort, with 0 corresponding to the 1946 cutoff. Dots show cohort-bin means, and solid lines plot fitted trends on each side of the cutoff (95% confidence bands in grey). No statistically detectable discontinuity is observed at the cutoff, suggesting that sent-down exposure is not associated with lower response rates to the messaging-frequency question.

**Supplementary Fig. S2: Smoothness of phone ownership at the cutoff.**



Note: The y-axis plots the probability of mobile phone ownership. The x-axis shows the normalized birth cohort, with 0 corresponding to the 1946 cutoff. Dots show cohort-bin means, and solid lines plot fitted trends on each side of the cutoff (95% confidence bands in grey). No statistically detectable discontinuity is observed at the cutoff, indicating no discontinuity in basic access to communication tools.

Supplementary Table S3 reports the IPW-adjusted fuzzy RD estimates. Specifically, we weight

each observation by the predicted probability of responding to the messaging frequency question, estimated using a set of characteristics: birth year, income, education, number of siblings, social organization membership, and BMI. Results remain statistically significant.

Supplementary Table S3. Robustness: IPW-Fuzzy RD ( $\pm 10$ -year window)

|                     | Coefficient | s.e.  | p-value |
|---------------------|-------------|-------|---------|
| Messaging frequency | 30.32       | 13.21 | 0.02    |

Notes: N = 233. Weighted by the predicted probability of response to the messaging frequency question (based on covariates including birth year, income, education, number of siblings, social organization membership, and BMI).

Supplementary Table S4 reports the RD estimate on gift expenditure among mobile phone owners. The effect remains negative and statistically significant.

Supplementary Table S4. Effect of the send-down movement on gift expenditures among mobile phone owners.

|                               |                         |
|-------------------------------|-------------------------|
| Jump in Outcome               | -1569.84**<br>(736.89)  |
| Jump in Send-Down Probability | 0.36***<br>(0.03)       |
| Fuzzy RD Estimate (LATE)      | -4423.93**<br>(2087.86) |
| Sample size                   | 843                     |

Note: \*\*, \*\*\* indicating statistical significance at the 5%, 1% levels, respectively. Standard errors are reported in parentheses.

Supplementary Table S5 reports RD estimates using weekly social time as the outcome, restricted to individuals who do not own a mobile phone. The outcome shows a significant jump at the cutoff, though the estimated LATE is statistically insignificant due to a weaker first-stage effect.

Supplementary Table S5. Effect of the send-down movement on social time (hours/week) among individuals without mobile phones.

|                               |                  |
|-------------------------------|------------------|
| Jump in Outcome               | 2.76**<br>(1.36) |
| Jump in Send-Down Probability | 0.12*<br>(0.06)  |
| Fuzzy RD Estimate (LATE)      | 23.88<br>(16.90) |
| Sample size                   | 459              |

Note: \*, \*\* indicating statistical significance at the 10%, 5% levels, respectively. Standard errors are reported in parentheses.

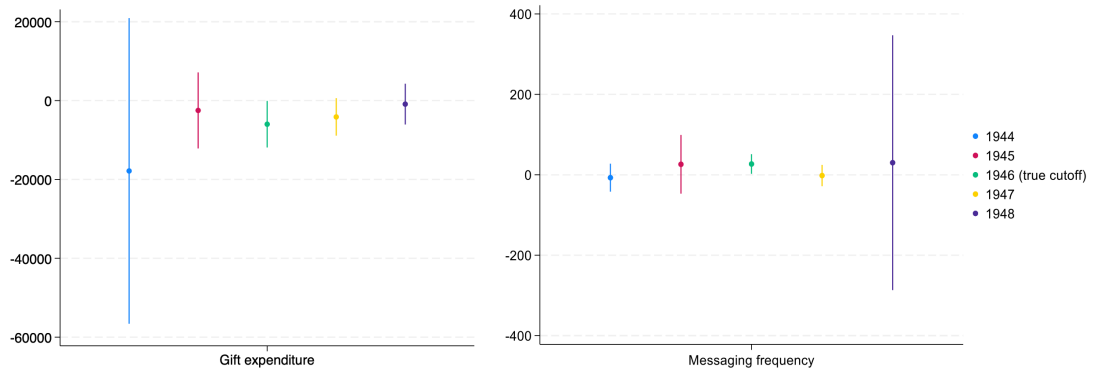
Supplementary Table S6 reports RD estimates for three alternative communication measures: calling frequency, weekly social time, and the number of QQ friends. We find no evidence of displacement effects.

Supplementary Table S6. Effects of the send-down movement on other forms of communication.

|                               | Calling frequency | Social time<br>(hours/week) | Number of QQ friends |
|-------------------------------|-------------------|-----------------------------|----------------------|
| Jump in Outcome               | -0.48<br>(1.99)   | 0.56<br>(0.86)              | 20.58**<br>(9.36)    |
| Jump in Send-Down Probability | 0.24***<br>(0.05) | 0.19***<br>(0.04)           | 0.42***<br>(0.14)    |
| Fuzzy RD Estimate (LATE)      | -2.00<br>(8.26)   | 2.92<br>(4.53)              | 48.94*<br>(25.44)    |
| Sample size                   | 1019              | 1481                        | 75                   |

Note: \*, \*\*, \*\*\* indicating statistical significance at the 10%, 5%, 1% levels, respectively. Standard errors are reported in parentheses.

**Supplementary Fig. S3. Placebo cutoff test.**



Note: The figure plots estimated FRD effects at alternative birth-cohort cutoffs from 1944 to 1948 for gift expenditure (left panel) and messaging frequency (right panel). Points denote point estimates, and vertical bars indicate 95% confidence intervals. Only the true cutoff at 1946 yields statistically significant effects, whereas placebo cutoffs do not show statistically detectable discontinuities, supporting the causal interpretation of the main findings.

Supplementary Table S7 reports RD estimates after excluding individuals born in 1946. The results remain statistically significant, indicating that the main findings are not driven by potential idiosyncratic values associated with the 1946 cohort.

Supplementary Table S7. Estimated effects of the send-down experience on social capital investment behavior after dropping the 1946 cohort.

|                               | Gift expenditure        | Messaging frequency |
|-------------------------------|-------------------------|---------------------|
| Jump in Outcome               | -1418.19**<br>(573.93)  | 8.09**<br>-3.97     |
| Jump in Send-Down Probability | 0.25***<br>(0.05)       | 0.45***<br>-0.12    |
| Fuzzy RD Estimate (LATE)      | -5614.64**<br>(2449.76) | 17.93*<br>-9.84     |
| Sample size                   | 1127                    | 280                 |

Note: \*, \*\*, \*\*\* indicating statistical significance at the 10%, 5%, 1% levels, respectively. Standard errors are reported in parentheses.

Supplementary Table S8 reports the definitions and descriptive statistics of the main variables used in the analysis.

Supplementary Table S8: Summary statistics.

|                                           | Definition                                                                                                                                                             | Mean  | S.D.  | Obs  |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|------|
| <i>Treatment</i>                          |                                                                                                                                                                        |       |       |      |
| Send-down                                 | Whether the respondent was a Send-down Youth (1 = Yes, 0 = No)                                                                                                         | 0.31  | 0.46  | 1484 |
| <i>Social capital investment behavior</i> |                                                                                                                                                                        |       |       |      |
| Gift expenditure                          | Total value of all gifts given to others over the past year (in RMB)                                                                                                   | 2988  | 3146  | 1191 |
| Messaging frequency                       | Usual frequency of sending text messages to others per month                                                                                                           | 12.69 | 11.47 | 289  |
| <i>Social capital outcomes</i>            |                                                                                                                                                                        |       |       |      |
| <i>Panel A: Perceived social capital</i>  |                                                                                                                                                                        |       |       |      |
| Self popularity                           | How would you rate your personal relationships with others? (1 = good, 0 = not good)                                                                                   | 0.75  | 0.44  | 1482 |
| Connections vs. ability                   | Agreement with the statement: 'In today's society, social connections are more important than personal ability' (1 = agree, 0 = disagree)                              | 0.77  | 0.42  | 1374 |
| Family connections and success            | Agreement with the statement: 'The most important factor for a person's success is whether they or their family have privileged social ties' (1 = agree, 0 = disagree) | 0.77  | 0.42  | 1373 |
| <i>Panel B: Realized Social Capital</i>   |                                                                                                                                                                        |       |       |      |
| Borrow money                              | Whether someone helped when the respondent needed to borrow money (1 = yes, 0 = no)                                                                                    | 0.99  | 0.12  | 207  |
| Sick care                                 | Whether someone helped when the respondent was sick (1 = yes, 0 = no)                                                                                                  | 0.92  | 0.28  | 122  |
| Job finding                               | Whether someone helped when the respondent was looking for a job (1 = yes, 0 = no)                                                                                     | 0.76  | 0.43  | 49   |
| <i>Other variables</i>                    |                                                                                                                                                                        |       |       |      |
| Income                                    | Individual annual income (in 10,000 RMB)                                                                                                                               | 1.17  | 2.39  | 1484 |
| Education                                 | Years of education                                                                                                                                                     | 10.72 | 6.26  | 1484 |
| Number of Siblings                        | Total number of brothers and sisters                                                                                                                                   | 3.36  | 2.00  | 1426 |

|                                      |                                                                                                 |       |      |      |
|--------------------------------------|-------------------------------------------------------------------------------------------------|-------|------|------|
| Social<br>organization<br>membership | Membership in any social organization (e.g., political<br>party, labor union) (1 = Yes, 0 = No) | 0.48  | 0.50 | 1484 |
| BMI                                  | Body Mass Index                                                                                 | 23.42 | 3.83 | 1484 |

Data source: CFPS 2010 survey wave.

Note: This table includes respondents with birth years in the range [1936, 1956], corresponding to a symmetric bandwidth of 10 years around the cutoff (1946). Bandwidth choice will be discussed in the main text.