Spillover effects of children's political status on elderly parents' health in China

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ABSTRACT

Background Due to the sustained increases in life expectancy over the past half century, the elderly today will receive supports from their children for a longer period than ever before. Therefore, understanding the spillover effects of children's socioeconomic status on parents' health becomes increasingly important for both scholars and policy makers.

Methods The Ordinary Least Squares regression is applied to the China Health and Retirement Longitudinal Study 2011, a national representative dataset including approximately 10 000 households and 17 600 middle-aged and elderly respondents. The Sobel test is used to examine the mediation role of social integration.

Results The elderly who have a cadre child reported better health (coefficient=0.1347; 95% CI 0.067 to 0.202), had fewer activities of daily living (ADLs) limitations (coefficient=−0.1289; 95% CI −0.216 to −0.042) and were more socially integrated (coefficient=0.2321; 95% CI 0.103 to 0.361). Such effects are mainly driven by the parents of higher-ranking cadres. For the parents of higher ranking cadres, the Sobel test suggests that 12.6% of the total effects on self-reported health and 21.9% of the total effects on ADL limitations are mediated by the increase in parents' social integration.

Conclusion The findings suggest positive spillover effects of children's political status on parents' health. The benefits of having a cadre child are at least equivalent to the rural–urban gap in health and even stronger for the parents of higher ranking cadres. One potential explanation for such spillover effects is that a child's political status can improve parents' community involvement and social interactions.

INTRODUCTION

A large number of studies have shown that the benefits of high socioeconomic status (SES) on health can spill over to other family members, but more than 95% of previous studies focused only on the transmission from parents to children.[1–3] The other way, from children to parents, is still understudied.[4] Until recently, the association between children's education and parents' health has been investigated by only a few studies, most of which find significantly positive correlations[5–8] with the exception of one Swedish study.[9] However, the upward intergenerational transmissions of the other dimensions (eg, occupation and social capital) of SES on physical health are almost untouched by researchers.

Because of the sustained increase in life expectancy in the past half century, the spillover effects from adult children to elderly parents become increasingly important both for scholars and policy makers. For example, the life expectancy at age 60 years in China increased from 11.1 years in 1965 to 19.6 years in 2015. The elderly today on average receive supports from their children for a longer period than ever before.

Political status is one dimension of social capital and it is especially of value in developing countries. As an old Chinese saying goes: 'when a man gets to the top, all friends and relations get there with him'. In China, political status is traditionally considered as family-owned capital rather than as a personal achievement. On the other side, the recruitment of government employees in China is extremely competitive, as it is in many other countries such as UK, Canada and the USA. Since the enforcement of the Civil Servant Law in 2006, all applicants have to pass an open written examination and several rounds of interview to get a position in the government. There are 12 administrative ranks in the bureaucratic system of Chinese government. A high level cadre typically has more power than a low level one.

A number of studies have shown that people are rewarded for their relationships with a government cadre.[10–12] For example, having a cadre parent is associated with a 15% premium in the first job offer salary among recent college graduates in China.[13] The next question is, besides economic benefits, does kinship with a government cadre also improve health? A recent study shows that political connection has a positive effect on cognitive functioning.[14] To our knowledge, this work is one of the earliest studies investigating the spillover effects of children's political status on parents' physical health.

This study also further explores the mechanisms generating such effects. As shown in figure 1, we propose two possible channels: monetary transfer from children and parents' social integration. Government employees typically receive a stable monthly salary and thus they are more likely to provide economic supports to parents on a regular basis, and the amount of economic resources has been confirmed as an important determinant of an elderly person's health.[15 16]

Social integration is also a potential pathway for spillover effects. A recent branch of literature suggests that social integration plays an important role in determining health.[17–22] We expect that the parents of cadre children should be more socially integrated than others. On one side, with the halo of a child's political status, parents would be more comfortable and more confident in daily interactions. On the other side, having a cadre child also creates incentives for relatives and neighbours to
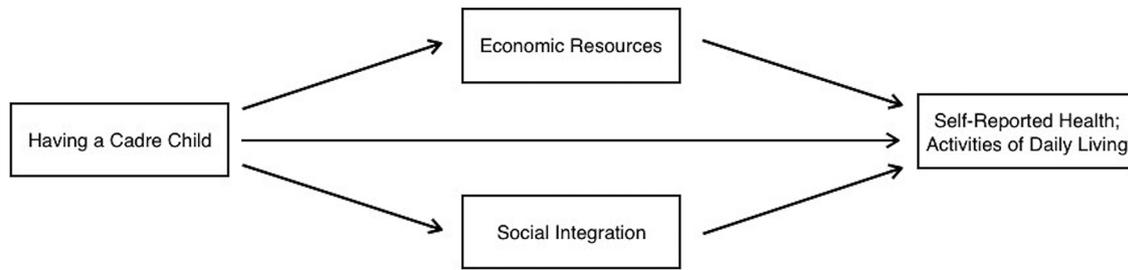
Figure 1 The theoretical framework.

enhance relationships with them, because being tied with people of high political status is beneficial in China.[11 12]

The spillover effects also depend on the administrative rank of cadre children. They should be stronger for the parents of higher ranking cadres than for the parents of lower ranking cadres. Higher ranking cadres tend to earn higher wages and control more political power and have typically been working in the government for a longer period; thus, their parents have had longer exposure to their political status.

With the China Health and Retirement Longitudinal Study (CHARLS) data, this study uses Ordinary Least Squares (OLS) regressions to explore how children's political status is associated with the physical health of elderly parents.

METHODS
Data
The sample is from the CHARLS, a publicly available survey data managed by Peking University. As a sister study of the Health and Retirement Study, the CHARLS programme has collected a nationally representative sample of Chinese residents aged 45 years and older.[23] When an individual who is 45 years or older is sampled, his or her spouse is automatically included without regard to age. The sample includes approximately 10 000 households and 17 352 respondents in 27 provinces. As the baseline survey, the 2011 wave of CHARLS has best national representativeness, while the following waves start to suffer from mortality selection. That is, the dropouts in following waves are not random, and replenishment with new respondents may not fully compensate for the loss of representativeness. Thus, we conduct our cross-sectional regressions with the 2011 wave sample. We also repeat our analyses with the 2013 wave sample and get almost identical results.

The measurements of outcomes
Health is measured with two indicators: self-reported health (SRH) and activities of daily living limitations (ADL limitations). Compared with ADL limitations, SRH is more comprehensive and also more subjective.[24 25] In the survey, respondents were asked, 'How would rate your health? Would you say your health is very good, good, fair, poor, or very poor?' We transformed the five options into numeric scores ranging from 1 ('very poor') to 5 ('very good') to get the SRH indicator. The ADL limitations indicator is used to capture overall physical function. Respondents were asked whether they had difficulty in performing a specific daily activity because of a health problem. If the answer is yes, then this term will be scored 1. We construct the ADL indicator limitations by summing up scores in all 10 questions related to the functioning of daily activities (including dressing, bathing, eating, getting into or out of bed, using the toilet, controlling urination and defecation, doing house chores, preparing for hot meals, shopping for groceries and managing money).

The measurement of child's political status
The child's political status is measured by whether the child is a government employee and at what rank. The proportion of the elderly that have at least one child working as a government cadre in our sample is 4.9%. Following the approach of a political study,[26] we further classify all cadre children into two categories: lower ranking ('Ke' level and below) and higher ranking ('Chu' level and above). 'Ke' and 'Chu' officials, who represent the majority of the Chinese bureaucracy, often hold specific power locally. If a respondent has more than one cadre child, we use the category of the highest ranking one.

The measurement of social integration
The indicator of social integration is a weighted sum of a respondent's answers about his or her involvements and frequencies of the following five social activities in the past month: (1) interacted with friends; (2) played Mah-jong, chess or cards or went to a community club; (3) provided help to family, friends or neighbours who do not live with you and who did not pay you for help; (4) went to a sport, social or other kind of club; and (5) took part in a community-related organisation. The answer for each activity is transformed into a value ranging from 0 to 3, according to its frequency in the past month (none=0; not regularly=1; almost every week=2; almost daily=3). Therefore, the aggregated indicator can range from 0 to 15. The highest value of this variable in our sample is 12.

Other covariates
We control for several variables of individual characteristics such as age, gender, marital status, education in years, the number of living children, and the number of chronic diseases. There are four categories for marital status: married or cohabiting, unmarried, divorced and widowed. About 87% of the sample are married or cohabiting, and 10.6% are widowed. Individuals in the status of 'unmarried' or 'divorced' are relatively rare. Thus, we use 'married or cohabiting' as the reference group and construct dummy variables for the other three. The respondents were also asked about whether they had been diagnosed by a doctor as having a chronic disease. There are 14 chronic diseases, such as hypertension, diabetes and cancer on the list of the questionnaire. A couple of variables of community characteristics, including whether the community in located in a plain area and whether the roads in the community are paved, are included in our regressions.

A variable of 'local-elite' status is constructed to exclude the influence of parent's own career success. More specifically, an elderly parent is counted as local elite if he or she satisfies any of the following criteria: former government employee, former village head, former manager in a firm and self-employed entrepreneur with annual income above the average of self-employed group. To examine the effects from the channel of economic

Table 1 Variable definition and statistical summary

Variable	Definition	Mean	Std.	Obs.
Self-reported health	Very good=5; good=4; fair=3; poor=2; very poor=1.	2.999	0.902	13 486
Activities of daily living limitations	The number of ADL limitation problems (from 0 to 10).	0.367	1.260	17 352
Cadre child	If the respondent has at least one child working as a cadre in the government=1; otherwise=0.	0.049	–	17 352
Lower ranking	If the cadre child holds an administrative rank of 'Ke' level or below=1; otherwise,=0.	0.026	–	17 352
Higher ranking	If the cadre child holds an administrative rank of 'Chu' level or above=1; otherwise=0.	0.024	–	17 352
Professional child	If the respondent has at least one child holding a professional title without administrative rank=1; otherwise=0.	0.012	0.291	17 352
Manager child	If the respondent has at least one child who works as manager but does not have administrative rank in his or her work units=1; otherwise=0.	0.093	0.291	17 352
Social integration	The frequency of social interactions.	1.287	1.790	17 352
Age	The age of elderly respondent in years.	59.047	10.127	17 321
Age square	The square of age.	–	–	17 321
Female	If the elderly respondent is female=1; If male=0.	0.479	–	17 340
Unmarried	If the elderly respondent is unmarried=1; otherwise=0.	0.009	–	17 352
Divorced	If the elderly respondent is divorced=1; otherwise=0.	0.013		
Widowed	If the elderly respondent is widowed=1; otherwise=0.	0.106		
Education	The education of the elderly respondent in years.	5.293	4.339	17 322
Number of living children	The number of living children of the elderly respondent.	2.643	1.448	17 352
Depression	The number of depressive symptoms (from 0 to 8).	2.268	1.938	17 352
Chronic diseases	The number of chronic diseases that the elderly respondent has been diagnosed with (from 0 to 14).	1.362	1.393	17 352
Log of financial assets	The logarithm of family financial assets.	4.003	5.666	16 416
Local elite	If the elderly respondent was former government employee, former village head, former manager in firm or self-employed entrepreneur with an annual income above the average level of the self-employed group=1; otherwise=0.	0.050	0.219	17 352
Rural	If the elderly respondent is living in the rural (yes=1).	0.767	–	17 352
Plain area	Whether the community is in a plain area (yes=1).	0.958	–	17 318
Paved road	Whether the roads in community are paved (yes=1).	0.447	–	17 352

resources, we include the amount of monetary transfer from children in our regression models.

To check whether the effects are from political capital or other dimensions of occupational status, we also conduct dummy variables indicating whether an elderly person has a child working as professional or manager without administrative rank. For example, if the respondent has a child who holds a profession title without administrative rank, then the dummy variable 'professional child' equals 1. Otherwise, it equals 0. Table 1 shows the definition and statistical description of each variable.

Data analysis

The method used for data analyses is the OLS regression. The specification of our empirical model is:

$$SRH_i \ (or \ ADLL_i) = \beta_0 + \beta_1 \ Cadre \ Child_i + \gamma X_i + \varepsilon_i.$$

The dependent variable is either the self-reported health SRH_i or the indicator of ADL limitations $ADLL_i$. The explanatory variable $Cadre \ Child_i$ is a dummy indicating whether the respondent has a cadre child or not (if yes=1; otherwise =0). X_i are a variety of other covariates. We also perform regressions with the subsamples separately to examine the difference between higher ranking and lower ranking cadre children. We use the statistical software STATA V.13.0 (StataCorp, 2012) to conduct regression analyses.

To examine whether promoting social integration is among the mediators of the spillover effects, we change the dependent variable and run the following regression:

$$SI_i = \beta_0 + \beta_1 \ Cadre \ Child_i + \gamma X_i + \varepsilon_i$$

where SI_i is respondent's social integration.

The age distribution of elderly parents is different across groups. For example, the parents of higher ranking cadres are older than the parents of lower ranking cadres and also other elderly parents. In such case, the estimation could be sensitive to minor changes in the specification because conventional regression methods heavily rely on extrapolation.[27] In order to avoid the potential bias caused by invalid extrapolation, a matching approach based on age is employed. That is, we construct control groups by subsampling from the sample of parents who do not have any cadre children. The subsampling weight $w(a)$ is calculated as follows:

$$w(a) = \Pr \left[age_i = a | CC_i^k = 1 \right].$$

If an elderly parent i has a k type cadre child, then $CC_i^k = 1$, otherwise $CC_i^k = 0$. Here k can be h (higher ranking cadre) or l (lower ranking cadre). We conduct regression analyses with the matching sample for robustness.

We then perform a Sobel test to estimate how much of the spillover effect is mediated through the channel of social integration. The Sobel test is widely used for investigating whether

Table 2 Estimates of OLS regression for having a cadre child on health: full sample

	(1)	(2)
	Self-reported health	**ADL limitations**
	Coefficient (95% CI)	**Coefficient (95% CI)**
Having a cadre child (yes=1)	0.1347*** (0.067 to 0.202)	−0.1289*** (−0.216 to −0.042)
Local elite	0.1848*** (0.114 to 0.255)	−0.0040 (−0.091 to 0.083)
Female (yes=1)	0.0288* (−0.002 to 0.060)	0.0186 (−0.021 to 0.059)
Age in years	0.0087 (−0.005 to 0.022)	−0.1689*** (−0.187 to −0.151)
Age square	−0.0001** (−0.000 to −0.000)	0.0016*** (0.001 to 0.002)
Unmarried (yes=1)	−0.1074 (−0.264 to 0.049)	0.1538 (−0.041 to 0.348)
Divorced (yes=1)	0.0224 (−0.104 to 0.149)	−0.0053 (−0.167 to 0.156)
Widowed (yes=1)	0.1057*** (0.057 to 0.155)	−0.0682** (−0.134 to −0.002)
Education in years	0.0123*** (0.008 to 0.016)	−0.0157*** (−0.021 to −0.010)
The number of chronic diseases	−0.2217*** (−0.232 to −0.211)	0.1366*** (0.123 to 0.150)
Depression	−0.0813*** (−0.089 to −0.074)	0.0257*** (0.016 to 0.036)
Log of financial assets	0.0126*** (0.010 to 0.015)	−0.0151*** (−0.018 to −0.012)
The number of living children	−0.0023 (−0.014 to 0.010)	−0.0137* (−0.029 to 0.002)
Money from children	0.0210 (−0.014 to 0.056)	0.0273 (−0.021 to 0.075)
Living in plain area (yes=1)	0.0042 (−0.014 to 0.022)	−0.0125 (−0.036 to 0.011)
Paved road (yes=1)	−0.0072 (−0.029 to 0.015)	0.0061 (−0.023 to 0.035)
Rural (yes=1)	−0.1175*** (−0.158 to −0.077)	0.0657** (0.013 to 0.118)
Constant	3.2579*** (2.836 to 3.680)	4.5044*** (3.941 to 5.067)
Province dummies	Yes	Yes
Observations	12 540	16 131
R-squared	0.244	0.137

95% CI shown in parentheses.
***P<0.01, **P<0.05, *p<0.1.
OLS, Ordinary Least Squares.

one factor is among the mediating mechanisms that translate a stimulus into a response.[28 29] It is basically a specialised t-test used for examining whether the effect of the independent variable has a statistically significant reduction after including the mediator in the model.

In the introduction, we also hypothesise that economic resources could be among the channels mediating the spillover effects, but the correlation between the monetary transfer from children and elderly parents' health is found to be weak. Moreover, only a small proportion (about 10%) of the respondents reported that they had received money from children in the past year. This suggests that the monetary transfers from children to parents is either less important in determining health or under-reported in the survey. For example, due to a sense of self-esteem, some parents may not like to report monetary transfer even though they actually have received. Given that the potential sample selection in the reporting of monetary transfer, we do not conduct mediation analysis on this channel but treat it as a control.

RESULTS
The effects of having a cadre child on health
Table 2 reports the results of OLS regressions with the full sample. As shown in column 1, on average, the parents of cadre children report significantly better health. The coefficient of our key explanatory variable is 0.1347 (95% CI 0.067 to 0.202), which suggests that the effect of having a cadre child is even greater than the rural–urban gap (coefficient= −0.1175; 95% CI −0.158 to −0.077).

From column 2, we can see that the parents of cadre children also have fewer ADL limitations (coefficient=−0.1289; 95% CI −0.216 to −0.042). At the same time, the coefficient of the variable 'money from children' is not statistically significant in column 1 as well as in column 2.

The coefficients of control variables are similar to those in peer studies[30–32]: a wealthy urban-educated respondent without depression and chronic diseases has better health than others. The coefficients of 'unmarried' and 'divorced' dummies are not statistically significant partially because the proportions of 'unmarried', and 'divorced' respondents are only 0.9% and 1.3% correspondingly. A 'local-elite' who was more successful in their career than were their peers also tends to be healthier.

The role of cadre child's administrative rank
To examine the role of a cadre child's administrative rank, we reconduct the regressions above with two subsamples separately and present results in table 3. The higher ranking subsample excludes the parents of lower ranking cadres, and the lower ranking subsample excludes the parents of higher ranking cadres. A stronger spillover effect was found on the SRH of higher ranking cadres' parents (coefficient=0.1558; 95% CI 0.056 to 0.256); about 50% higher than the effect of having a lower ranking cadre (coefficient=0.1109; 95% CI 0.019 to 0.203). The pattern is similar if we replace the independent variable with the variable of ADL limitations. The coefficient of having a higher ranking cadre is −0.2506 (95% CI −0.377 to −0.124), while the coefficient of having a lower ranking cadre is −0.124.

Table 3 Estimates of OLS regression for having a cadre child on health: by administrative rank

	(1)	(2)
	Lower ranking	**Higher ranking**
	Coefficients (95% CI)	**Coefficients (95% CI)**
Panel A: self-reported health		
Having a cadre child (yes=1)	0.1109** (0.019 to 0.203)	0.1558*** (0.056 to 0.256)
Local elite	0.1860*** (0.115 to 0.257)	0.1899*** (0.119 to 0.261)
Female (yes=1)	0.0273* (−0.004 to 0.059)	0.0338** (0.002 to 0.065)
Age in years	0.0073 (−0.006 to 0.021)	0.0080 (−0.006 to 0.022)
Age square	−0.0001* (−0.000 to 0.000)	−0.0001** (−0.000 to −0.000)
Unmarried (yes=1)	−0.1078 (−0.264 to 0.049)	−0.1080 (−0.264 to 0.048)
Divorced (yes=1)	0.0255 (−0.102 to 0.153)	0.0237 (−0.103 to 0.150)
Widowed (yes=1)	0.1012*** (0.051 to 0.151)	0.1066*** (0.057 to 0.156)
Education in years	0.0125*** (0.008 to 0.017)	0.0118*** (0.008 to 0.016)
The number of chronic diseases	−0.2221*** (−0.233 to −0.211)	−0.2231*** (−0.234 to −0.212)
Depression	−0.0816*** (−0.089 to −0.074)	−0.0813*** (−0.089 to −0.074)
Log of financial assets	0.0122*** (0.010 to 0.015)	0.0127*** (0.010 to 0.015)
The number of living children	−0.0015 (−0.014 to 0.010)	−0.0014 (−0.013 to 0.011)
Money from children	0.0201 (−0.022 to 0.063)	0.0183 (−0.017 to 0.054)
Constant	0.0008 (−0.017 to 0.019)	0.0025 (−0.016 to 0.021)
Community-level controls	Yes	Yes
Province dummies	Yes	Yes
Observations	12 258	12 228
R-squared	0.243	0.245
Panel B: ADL limitations		
Having a cadre child (yes=1)	−0.0376 (−0.156 to 0.081)	−0.2506*** (−0.377 to −0.124)
Local elite	−0.0105 (−0.098 to 0.077)	−0.0028 (−0.090 to 0.085)
Female (yes=1)	0.0183 (−0.022 to 0.059)	0.0172 (−0.023 to 0.057)
Age in years	−0.1724*** (−0.191 to −0.154)	−0.1685*** (−0.187 to −0.150)
Age square	0.0016*** (0.001 to 0.002)	0.0016*** (0.001 to 0.002)
Unmarried (yes=1)	0.1488 (−0.045 to 0.343)	0.1467 (−0.047 to 0.340)
Divorced (yes=1)	−0.0190 (−0.181 to 0.143)	−0.0099 (−0.171 to 0.151)
Widowed (yes=1)	−0.0630* (−0.129 to 0.004)	−0.0876*** (−0.154 to −0.021)
Education in years	−0.0154*** (−0.021 to −0.010)	−0.0158*** (−0.021 to −0.010)
The number of chronic diseases	0.1351*** (0.121 to 0.149)	0.1332*** (0.119 to 0.147)
Depression	0.0265*** (0.017 to 0.036)	0.0284*** (0.018 to 0.038)
Log of financial assets	−0.0149*** (−0.018 to −0.012)	−0.0150*** (−0.018 to −0.012)
The number of living children	−0.0173** (−0.033 to −0.002)	−0.0156** (−0.031 to −0.000)
Money from children	0.0285 (−0.029 to 0.086)	0.0241 (−0.024 to 0.072)
Constant	−0.0117 (−0.035 to 0.012)	−0.0120 (−0.036 to 0.012)
Community-level controls	Yes	Yes
Province dummies	Yes	Yes
Observations	15 753	15 721
R-squared	0.139	0.137

95% CI shown in parentheses.
***p<0.01, **p<0.05, *p<0.1.
ADL, activities of daily living; OLS, Ordinary Least Squares.

much lower and statistically insignificant (coefficient=−0.0376; 95% CI −0.156 to 0.081).

Social integration: a potential mediator

The estimates of OLS regression for having a cadre child on social integration are reported in table 4. According to column 1, parents of government cadres are more socially integrated than other elderly parents (coefficient=0.2321; 95% CI 0.103 to 0.361), and

the positive spillover effects are stronger and more significant for the parents of higher ranking cadres (coefficient=0.4091; 95% CI 0.221 to 0.597) than for the parents of lower ranking cadres (coefficient=0.0768; 95% CI −0.099 to 0.252).

Table 4 Estimates of OLS regression for having a cadre child on social integration

Independent variable	(1)	(2)	(3)
Social integration	Full sample	Lower ranking	Higher ranking
	Coefficients (95% CI)	Coefficients (95% CI)	Coefficients (95% CI)
Having a cadre child (yes=1)	0.2321*** (0.103 to 0.361)	0.0768 (−0.099 to 0.252)	0.4091*** (0.221 to 0.597)
Local elite	0.1857*** (0.057 to 0.314)	0.1694** (0.040 to 0.299)	0.2054*** (0.076 to 0.335)
Female (yes=1)	−0.1122*** (−0.172 to −0.053)	−0.1077*** (−0.167 to −0.048)	−0.1137*** (−0.174 to −0.054)
Age in years	0.0013 (−0.025 to 0.028)	−0.0022 (−0.029 to 0.025)	−0.0052 (−0.032 to 0.022)
Age square	−0.0000 (−0.000 to 0.000)	0.0000 (−0.000 to 0.000)	0.0000 (−0.000 to 0.000)
Unmarried (yes=1)	−0.1381 (−0.426 to 0.150)	−0.1332 (−0.420 to 0.154)	−0.1462 (−0.434 to 0.141)
Divorced (yes=1)	−0.0876 (−0.327 to 0.152)	−0.0866 (−0.326 to 0.153)	−0.0988 (−0.338 to 0.141)
Widowed (yes=1)	0.1919**** (0.094 to 0.289)	0.1914*** (0.093 to 0.290)	0.1985*** (0.100 to 0.297)
Education in years	0.0332**** (0.025 to 0.041)	0.0323*** (0.024 to 0.040)	0.0330*** (0.025 to 0.041)
The number of chronic diseases	0.0199* (−0.001 to 0.040)	0.0205* (−0.000 to 0.041)	0.0189* (−0.002 to 0.040)
Depression	0.0103 (−0.004 to 0.025)	0.0101 (−0.005 to 0.025)	0.0089 (−0.006 to 0.024)
Log of financial assets	0.0288*** (0.024 to 0.034)	0.0281*** (0.023 to 0.033)	0.0291*** (0.024 to 0.034)
The number of living children	−0.0219* (−0.045 to 0.001)	−0.0177 (−0.041 to 0.006)	−0.0238** (−0.047 to −0.001)
Money from children	0.1992*** (0.128 to 0.270)	0.2030*** (0.118 to 0.288)	0.1996*** (0.128 to 0.271)
Living in plain area (yes=1)	−0.0351** (−0.070 to −0.000)	−0.0323* (−0.067 to 0.003)	−0.0341* (−0.069 to 0.001)
Paved road (yes=1)	−0.0381* (−0.082 to 0.005)	−0.0366 (−0.080 to 0.007)	−0.0314 (−0.075 to 0.013)
Rural (yes=1)	−0.4020*** (−0.480 to −0.324)	−0.3972*** (−0.476 to −0.318)	−0.3801*** (−0.459 to −0.301)
Constant	1.3540*** (0.519 to 2.189)	1.4727*** (0.633 to 2.313)	1.5135*** (0.672 to 2.355)
Province dummies	Yes	Yes	Yes
Observations	16 131	15 753	15 721
R-squared	0.073	0.070	0.074

95% CI shown in parentheses.
***p<0.01, **p<0.05, *p<0.1.

Regression analyses and Sobel test with matching subsamples

Because the age distribution is significantly different across groups, we employ a matching strategy to construct suitable control groups. That is, we draw 4000 respondents randomly from those who do not have cadre child, and the subsampling weights are based on the age distribution of the parents of lower ranking cadres. A similar process is also conducted for the parents of higher ranking cadres. We compare the age distribution of each matching subsample with the actual age distribution of corresponding treatment group in figure 2.

Table 5 shows the estimates of OLS regression with the new matching subsamples. Compared with the original regressions, the regressions with matching samples have higher R-squared values but smaller and less significant coefficients. The differences in coefficients between original and matching regressions are relatively larger for the lower ranking subsample. However, in general, the patterns of the results do not change. It suggests that our findings are not that sensitive to minor changes in model specification.

We conduct Sobel tests on lower ranking and higher ranking subsamples respectively and report the results in table 5. Social integration is confirmed among the mediating factors for the spillover effects only in the higher ranking sample (SRH: z-score=2.659; ADL limitations: z-score=−3.437) but not in the lower ranking sample (SRH: z-score=−0.536; ADL limitations: z-score=−0.498). For the higher ranking sample, about 12.6% of the spillover effects on SRH and 21.9% of the spillover effects on ADL limitations are mediated through the channel of social integration.

DISCUSSION

This study joins the recent debate on whether there exists an intergenerational transmission of health from children to parents. Most previous studies have found positive spillover effects. However, a very recent study in Sweden adopts the instrumental variable approach to identify the causal effects of children's schooling on parents' longevity and found no statistically significant change.[9] This raises a question why the spillover effects from children to parents are found only in some countries but not in others. A possible explanation is that the strength of such spillover effects also depends on cultural context and institutional arrangements.

For example, we expect that the spillover effects should be more influential in China than in Sweden. First, filial piety is considered one of the fundamental ethics in Chinese societies, and children are expected to take on the responsibility of caring for their parents.[33] Second, the elderly care industries are less developed, and the welfare system is not sufficiently generous in China. In the short term, neither market nor state is able to substitute for the role of family in caring for the elderly.

Our estimates can be biased due to problems of omitted variables, endogeneity or sample selection. For example, it is possible that political status does not matter, and the beneficial spillover effect is caused by some other characteristics of cadre children. To take this possibility into account, we examine whether the parents of professional children and manager children have better outcomes as well. As shown in table 6, the coefficients are only statistically significant for the parents of cadre children.

Moreover, about 23% of the respondents in CHARLS did not answer the question on SRH. This is partially because
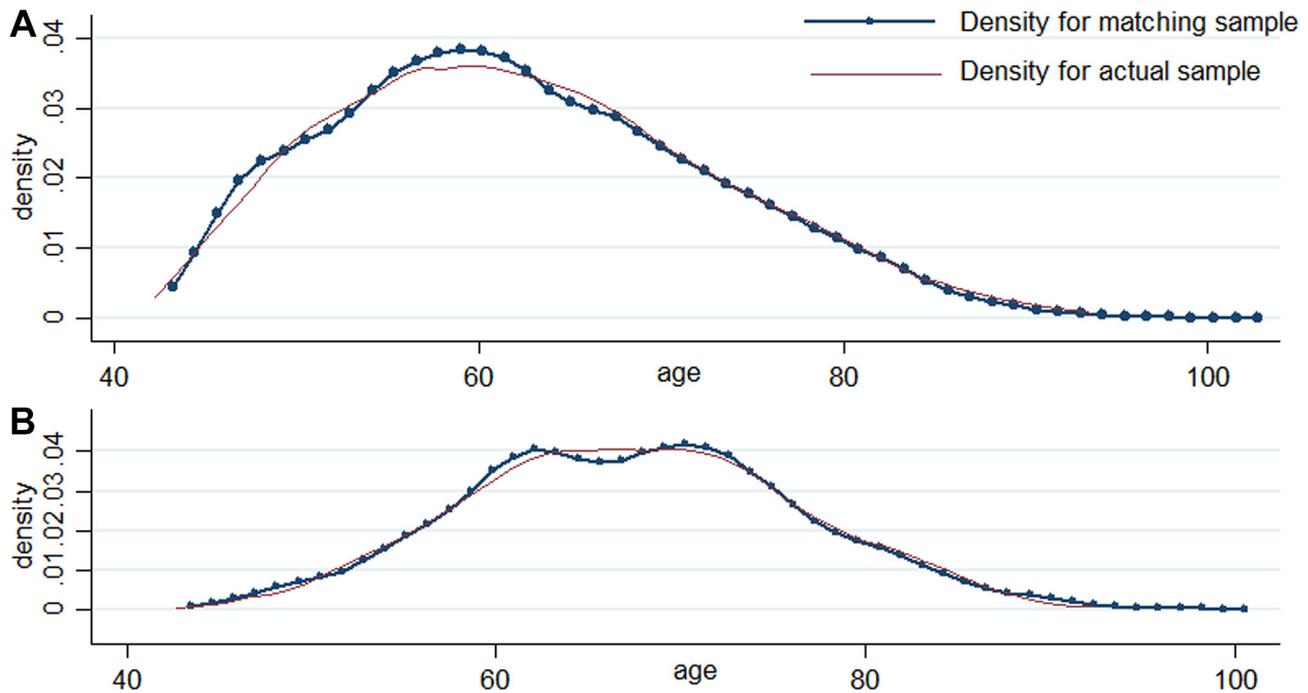
Figure 2 The age distributions of the parents of cadres and corresponding matching sample.

some questionnaires were answered by other individuals in the family who were not able to answer questions related to the respondent's subjective feeling. An imputation strategy is used to examine how much our estimates could be biased by potential sample selection due to these missing values. That is, we impute the missing values with answers randomly drawn

Table 5 Estimates of OLS regression with matching subsamples

	(1)	(2)	(3)	(4)	(5)	(6)
	Self-reported health		**ADL limitations**		**Social integration**	
	Original	**Matching**	**Original**	**Matching**	**Original**	**Matching**
Panel A: lower ranking						
Coefficient (95% CI)	0.1109** (0.019 to 0.203)	0.0836* (−0.012 to 0.179)	−0.0376 (−0.156 to 0.081)	−0.0353 (−0.170 to 0.099)	0.0768 (−0.099 to 0.252)	0.0495 (−0.133 to 0.232)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12 258	3145	15 753	4080	15 753	4080
R-squared	0.243	0.246	0.139	0.165	0.069	0.101
Sobel test of mediation for social integration						
	Total effect	**Direct effect**	**Indirect effect**	**Proportion of total effect that is mediated**		
Self-reported health	0.088*	0.09*	−0.002	−2.7%		
ADL limitations	−0.038	−0.035	−0.004	9.6%		
Panel B: higher ranking						
Coefficient (95% CI)	0.1558*** (0.056 to 0.256)	0.1466*** (0.042 to 0.251)	−0.2506*** (−0.377 to −0.124)	−0.1829** (−0.347 to −0.019)	0.4091*** (0.221 to 0.597)	0.3797*** (0.181 to 0.579)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12 228	3145	15 721	4080	15 721	4080
R-squared	0.245	0.246	0.137	0.165	0.074	0.101
Sobel test of mediation for social integration						
	Total effect	**Direct effect**	**Indirect effect**	**Proportion of total effect that is mediated**		
Self-reported health	0.147***	0.128**	0.019***	12.6%		
ADL limitations	−0.19**	−0.148*	−0.041***	21.9%		

95% CI shown in parentheses.
***p<0.01, **p<0.05, *p<0.1.
ADL, activities of daily living; OLS, Ordinary Least Squares.

Table 6 Estimates of OLS regression for having a professional child or a manager child

	(1)	(2)	(3)
Panel A: self-reported health			
Having a cadre child (yes=1), (95% CI)	0.1347*** (0.067 to 0.202)		
Having a professional child (yes=1)		0.0554 (−0.080 to 0.210)	
Having a manager child (yes=1)			0.0284 (−0.023 to 0.080)
Other controls	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Observations	12 540	12 540	12 540
R-squared	0.244	0.242	0.242
Panel B: ADL limitations			
Having a cadre child (yes=1), (95% CI)	−0.1289*** (−0.216 to −0.042)		
Having a professional child (yes=1), (95% CI)		−0.0529 (−0.239 to 0.134)	
Having a manager child (yes=1), (95% CI)			−0.0470 (−0.118 to 0.024)
Other controls	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Observations	16 131	16 131	16 131
R-squared	0.137	0.136	0.136

95% CI in parentheses.
***P<0.01, **P<0.05, *p<0.1.
ADL, activities of daily living; OLS, Ordinary Least Squares.

Table 7 Estimates of OLS regression on self-reported health with imputed data

	(1)	(2)	(3)	(4)	(5)	(6)
Independent variable:	All		Lower ranking		Higher ranking	
Self-reported health	Original	Imputed data	Original	Imputed data	Original	Imputed
Having a cadre child (yes=1), (95% CI)	0.1347***(0.067 to 0.202)	0.0963***(0.029 to 0.164)	0.1109** (0.019 to 0.203)	0.0705 (−0.023 to 0.164)	0.1558***(0.056 to 0.256)	0.1225** (0.023 to 0.222)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12 540	16 166	12 258	15 788	12 228	15 756

Standard errors in parentheses.
***p<0.01, **p<0.05, *p<0.1.
ADL, activities of daily living; OLS, Ordinary Least Squares.

from the subsample who have answered this question and add a dummy variable indicating whether the observation answered the question of SRH into regressions. As shown in table 7, the coefficients remain statistically significant though coefficients become smaller compared with the estimates with the original data.

This study still has some limitations that could be covered by further studies. First, because there is almost no temporal variation of children's political status in the short term, we only use cross-sectional information for estimation. After the CHARLS has conducted more follow-up surveys, it will be possible to perform a longitudinal study and get more convincing findings. Second, the full picture of the mechanism generating the spillover effects is still not clear. We find that social integration is one part of the mechanism but monetary transfer is not. However, the channel of social integration only mediates at most one-fifth of the total effects. Further studies could explore other parts of the mechanism. Third, our study supports the existence of the upward intergenerational transmission of health. In this case, how does it contribute to the persistent stratification of health in later life? This is a question that has strong policy implications but is not easy to answer.

What is already known on this subject

► More than 95% of previous studies on intergenerational transmission only investigate the spillover effects from parents to children. The other way, which transmits from children to parents, is understudied. Some scholars have more recently begun to investigate the effects of adult children's schooling on parents' health, but a conclusive answer has not yet been found.

What this study adds

► This is the first study to investigate the association between children's political status and parents' physical health. Using a nationally representative sample of 17 500 middle-aged and old individuals in China, we find positive spillover effects from children to parents. We propose that promoting social integration is among the mechanisms generating such spillover effects, and then confirm the role of social integration mediation with a Sobel test.

CONCLUSION

Using the CHARLS data, this study finds that the political status of adult children is positively associated with elderly parents' self-reported health and activities of daily living. Such effects are especially significant for parents of higher-ranking cadres. Further mediation analyses suggest that promoting social integration is among the channels mediating such beneficial spillover effects.

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