Supplementary Material A

Table A1. MZ_{α} **test for unit root (Ng and Perron, 2001)**

	Level	First difference
US current account balance with China	–1.613	–15.747**
Life expectancy gap	–7.913	–9.243*
Growth rate difference in real domestic demand	–9.897	–10.606*
Real exchange rate	–2.917	–17.152**
VIX	–7.942	–15.828**
Relative SMC-to-GDP ratio	–6.077	–14.428**
Growth rate difference in working-age population	–13.849	–28.053**
Difference in fiscal balance-to-GDP ratio	–3.455	–13.027*

Similar to Table 1, the null hypothesis of a unit root is tested. The results remain unchanged if we use the MZ_t test, which was also developed by Ng and Perron (2001). The autoregressive spectral method with the detrending by the generalized least squares method is used, and the lag length of the regression is selected by the modified Akaike information criterion. The test includes a linear trend and a constant term for variables in levels and a constant term for variables in first differences. The results remain unchanged if the test includes only a constant term for variables in levels. ** and * indicate significance at the 1% and 5% levels, respectively.

Supplementary Material B

Table B1. Robustness checks using the DOLS method

	Nonlinear impact of life expectancy gap (x_1)		
Control variables	x_1	x_1^2	Threshold of x_1
(A) Annual data			
None (basic model)	–1.131** [0.207]	0.176** [0.033]	3.223
(B) Quarterly data			
None (basic model)	–1.333** [0.290]	0.204** [0.042]	3.288
x_2	–1.233** [0.187]	0.192** [0.027]	3.217
x_3	–1.557** [0.283]	0.248** [0.046]	3.134
x_4	–1.288** [0.229]	0.195** [0.033]	3.299
x_5	–1.127** [0.291]	0.171** [0.043]	3.292
x_6	–1.495** [0.355]	0.238** [0.060]	3.146
x_7	–1.294** [0.264]	0.197** [0.038]	3.279
x_2, x_3	–1.554** [0.221]	0.250** [0.036]	3.106
x_2, x_4	–1.245** [0.141]	0.192** [0.021]	3.237
x_2, x_5	–1.205** [0.179]	0.188** [0.027]	3.203
x_2, x_6	–1.279** [0.257]	0.203** [0.043]	3.144
x_2, x_7	–1.312** [0.179]	0.202** [0.026]	3.241
x_3, x_4	–1.564** [0.239]	0.251** [0.040]	3.114
x_3, x_5	–1.425** [0.320]	0.228** [0.053]	3.130
x_3, x_6	–1.628** [0.305]	0.267** [0.052]	3.048
x_3, x_7	–1.688** [0.208]	0.277** [0.035]	3.046
x_4, x_5	–1.149** [0.245]	0.173** [0.036]	3.313
x_4, x_6	–1.380** [0.297]	0.216** [0.050]	3.193
x_4, x_7	–1.190** [0.156]	0.182** [0.022]	3.263
x_5, x_6	–1.291** [0.323]	0.208** [0.053]	3.106
x_5, x_7	–1.134** [0.274]	0.174** [0.040]	3.262
x_6, x_7	–1.440** [0.329]	0.229** [0.055]	3.143
x_2, x_3, x_4	–1.451** [0.231]	0.231** [0.040]	3.140
x_2, x_3, x_5	–1.363** [0.256]	0.218** [0.042]	3.120
x_2, x_3, x_6	–1.586** [0.262]	0.260** [0.044]	3.053
x_2, x_3, x_7	–1.791** [0.239]	0.293** [0.041]	3.056
x_2, x_4, x_5	–1.219** [0.153]	0.189** [0.023]	3.226
x_2, x_4, x_6	–1.224** [0.193]	0.191** [0.032]	3.204
x_2, x_4, x_7	–1.211** [0.140]	0.187** [0.020]	3.235
x_2, x_5, x_6	–1.251** [0.226]	0.200** [0.037]	3.127
x_2, x_5, x_7	–1.256** [0.184]	0.195** [0.027]	3.220

(Continued on the next page)

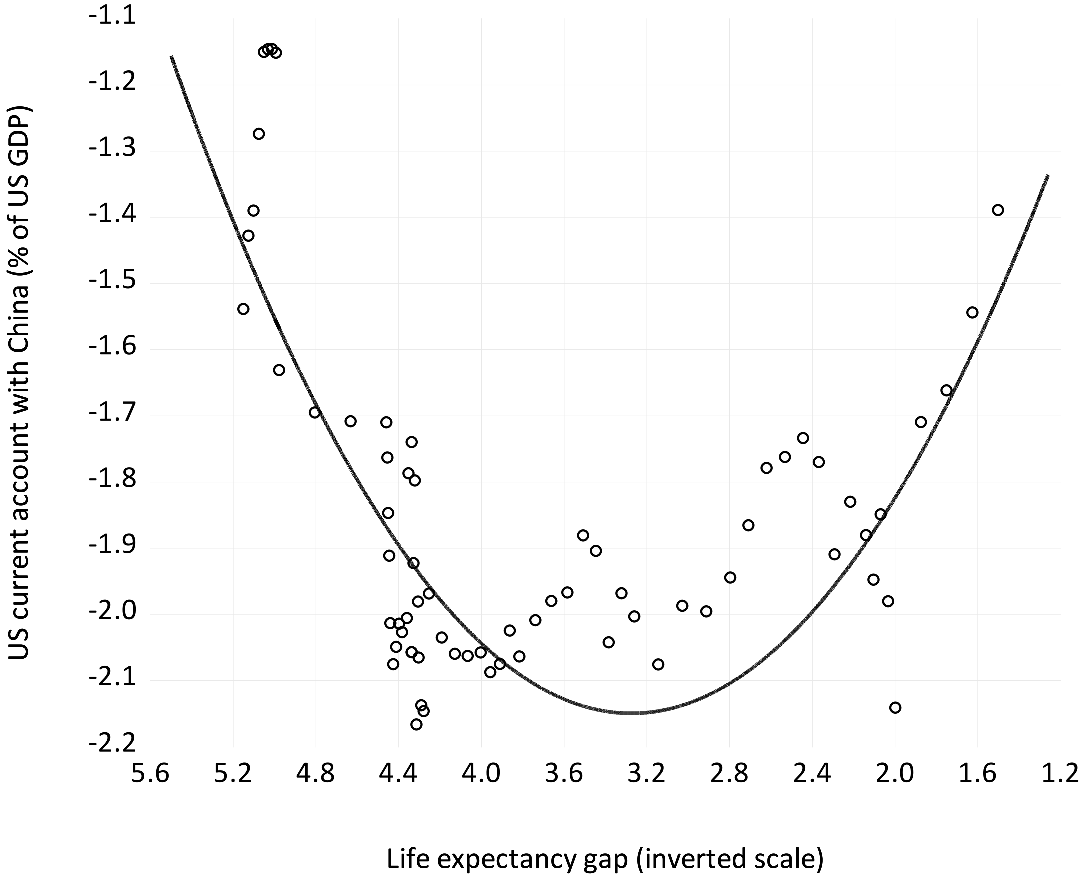
Table B1 (continued)

	Nonlinear impact of life expectancy gap (x_1)		
Control variables	x_1	x_1^2	Threshold of x_1
x_2, x_6, x_7	–1.331** [0.236]	0.210** [0.039]	3.168
x_3, x_4, x_5	–1.593** [0.288]	0.257** [0.049]	3.094
x_3, x_4, x_6	–1.618** [0.253]	0.266** [0.043]	3.041
x_3, x_4, x_7	–1.565** [0.176]	0.255** [0.030]	3.067
x_3, x_5, x_6	–1.545** [0.308]	0.255** [0.052]	3.028
x_3, x_5, x_7	–1.629** [0.233]	0.268** [0.039]	3.040
x_3, x_6, x_7	–1.752** [0.243]	0.294** [0.042]	2.982
x_4, x_5, x_6	–1.246** [0.283]	0.197** [0.047]	3.161
x_4, x_5, x_7	–1.053** [0.166]	0.162** [0.024]	3.257
x_4, x_6, x_7	–1.242** [0.215]	0.195** [0.036]	3.192
x_5, x_6, x_7	–1.277** [0.305]	0.208** [0.050]	3.076
x_2, x_3, x_4, x_5	–1.365** [0.262]	0.218** [0.044]	3.134
x_2, x_3, x_4, x_6	–1.490** [0.271]	0.242** [0.047]	3.084
x_2, x_3, x_4, x_7	–1.659** [0.204]	0.270** [0.035]	3.067
x_2, x_3, x_5, x_6	–1.478** [0.290]	0.242** [0.049]	3.056
x_2, x_3, x_5, x_7	–1.647** [0.289]	0.269** [0.049]	3.062
x_2, x_3, x_6, x_7	–1.927** [0.294]	0.322** [0.052]	2.989
x_2, x_4, x_5, x_6	–1.206** [0.189]	0.189** [0.031]	3.185
x_2, x_4, x_5, x_7	–1.149** [0.153]	0.178** [0.023]	3.219
x_2, x_4, x_6, x_7	–1.198** [0.184]	0.188** [0.030]	3.192
x_2, x_5, x_6, x_7	–1.278** [0.220]	0.204** [0.036]	3.132
x_3, x_4, x_5, x_6	–1.606** [0.280]	0.264** [0.048]	3.039
x_3, x_4, x_5, x_7	–1.555** [0.216]	0.254** [0.037]	3.055
x_3, x_4, x_6, x_7	–1.633** [0.209]	0.272** [0.037]	3.003
x_3, x_5, x_6, x_7	–1.681** [0.251]	0.282** [0.043]	2.982
x_4, x_5, x_6, x_7	–1.120** [0.204]	0.179** [0.034]	3.134
x_2, x_3, x_4, x_5, x_6	–1.398** [0.284]	0.226** [0.049]	3.097
x_2, x_3, x_4, x_5, x_7	–1.588** [0.249]	0.259** [0.043]	3.067
x_2, x_3, x_4, x_6, x_7	–1.771** [0.255]	0.295** [0.045]	3.004
x_2, x_3, x_5, x_6, x_7	–1.845** [0.339]	0.309** [0.059]	2.990
x_2, x_4, x_5, x_6, x_7	–1.152** [0.181]	0.183** [0.030]	3.153
x_3, x_4, x_5, x_6, x_7	–1.591** [0.228]	0.265** [0.040]	3.004
x_2, x_3, x_4, x_5, x_6, x_7	–1.733** [0.291]	0.289** [0.051]	3.003

The number of leads and lags in the DOLS regression is 1. Numbers within parentheses are HAC standard errors. The definitions of the control variables are the same as those in Table 4. ** indicates significance at the 1% level.

Supplementary Material C

Figure C1. U-shaped curve excluding a constant term



The nonlinear fitted line is derived from the estimation results of the polynomial cointegrating regression model reported in Section 4.3 (Table 3, Panel A), while the estimate of the constant term is excluded from the fitted line because it is not significant. However, the result is almost the same as that in Figure 2 because the estimate of the constant term is approximately zero (i.e., 0.03%).

Supplementary Material D

Cointegrating polynomial regression model with fertility gap

The benchmark regression analysis in Section 4 assesses the U-shaped impact of the life expectancy gap without controlling for fertility policies and related behaviors of the household, which are also important demographic factors, especially for China. For further robustness checks, this paper uses the fertility gap between the US and China as an additional explanatory variable. Annual data on the total fertility rate are obtained from the World Development Indicators of the World Bank. These data are converted to a quarterly frequency using the same interpolation method as that explained in Section 3.2, and then, the Chinese data are subtracted from the US data. The sample period is the same as that in Section 4. The regression model includes the fertility gap in linear form because the test for quadratic polynomial cointegration shows that this variable does not have a nonlinear impact on the US current account balance with China. Specifically, the CT test statistic is 4.976, and the null hypothesis of quadratic polynomial cointegration is rejected at the 1% significance level.

All the estimation results for the coefficients on the life expectancy gap and its square reported in Section 4 are re-evaluated with the data on the fertility gap. Table D1 presents only the FMOLS estimation results for the full model for space reasons, and the U-shaped impact of the life expectancy gap holds after controlling for the fertility gap. The FMOLS estimation results for the other models and the DOLS estimation results for all models are summarized in Tables D2 and D3. The U-shaped impact of the life expectancy gap is robust for all cases. Therefore, the inclusion of the fertility gap does not affect our main findings.

Table D1 also shows that the coefficient on the fertility gap is significantly negative, and this result is consistent with the prediction of the life-cycle hypothesis. For example, a lower fertility rate decreases childcare spending and increases the amount of resources that can be saved for the future. Given that this theory holds in China, a widening fertility gap partially reflects an increase in Chinese savings. This effect promotes capital flows from China to the US and leads to a deterioration of the US current account balance with China.

Table D1. Estimation results after the addition of the fertility gap

	Coefficient	S.E.
Life expectancy gap (US – China)	–1.675**	[0.037]
Squared life expectancy gap	0.278**	[0.006]
Growth rate difference in real domestic demand (US – China)	–0.003**	[0.001]
Real exchange rate	0.208*	[0.078]
VIX	0.182**	[0.012]
Relative SMC-to-GDP ratio (US/China)	0.061**	[0.010]
Growth rate difference in working-age population (US – China)	0.210**	[0.012]
Difference in fiscal balance-to-GDP ratio (US – China)	0.025**	[0.002]
Fertility gap (US – China)	–0.990**	[0.051]
Constant term	0.226	[0.217]
Threshold of life expectancy gap	3.011	

The estimation method is the FMOLS. Numbers within parentheses are HAC standard errors. The long-run variance is estimated by the QS kernel, and the bandwidth parameter is selected by the procedure described in Andrews (1991). ** and * indicate significance at the 1% and 5% levels, respectively.

Table D2. FMOLS estimation after the addition of the fertility gap

	Nonlinear impact of life expectancy gap (x_1)		
Control variables	x_1	x_1^2	Threshold of x_1
x_8	–1.601** [0.250]	0.261** [0.041]	3.062
x_2, x_8	–1.551** [0.241]	0.255** [0.039]	3.044
x_3, x_8	–1.625** [0.097]	0.260** [0.016]	3.122
x_4, x_8	–1.657** [0.222]	0.271** [0.036]	3.063
x_5, x_8	–1.486** [0.248]	0.244** [0.040]	3.043
x_6, x_8	–1.890** [0.265]	0.313** [0.045]	3.014
x_7, x_8	–1.621** [0.137]	0.268** [0.022]	3.028
x_2, x_3, x_8	–1.466** [0.183]	0.238** [0.029]	3.084
x_2, x_4, x_8	–1.594** [0.189]	0.260** [0.030]	3.071
x_2, x_5, x_8	–1.541** [0.245]	0.253** [0.039]	3.041
x_2, x_6, x_8	–1.737** [0.270]	0.290** [0.045]	2.990
x_2, x_7, x_8	–1.656** [0.185]	0.274** [0.030]	3.025
x_3, x_4, x_8	–1.561** [0.100]	0.249** [0.016]	3.138
x_3, x_5, x_8	–1.587** [0.094]	0.255** [0.015]	3.116
x_3, x_6, x_8	–1.778** [0.106]	0.289** [0.018]	3.072
x_3, x_7, x_8	–1.686** [0.076]	0.274** [0.012]	3.072
x_4, x_5, x_8	–1.608** [0.075]	0.257** [0.012]	3.130
x_4, x_6, x_8	–1.959** [0.224]	0.323** [0.038]	3.028
x_4, x_7, x_8	–1.629** [0.113]	0.269** [0.018]	3.023
x_5, x_6, x_8	–1.772** [0.243]	0.297** [0.041]	2.988
x_5, x_7, x_8	–1.614** [0.140]	0.266** [0.023]	3.034
x_6, x_7, x_8	–1.825** [0.150]	0.306** [0.025]	2.983
x_2, x_3, x_4, x_8	–1.334** [0.170]	0.215** [0.027]	3.099
x_2, x_3, x_5, x_8	–1.450** [0.154]	0.234** [0.025]	3.100
x_2, x_3, x_6, x_8	–1.600** [0.183]	0.263** [0.030]	3.038
x_2, x_3, x_7, x_8	–1.653** [0.158]	0.271** [0.026]	3.046
x_2, x_4, x_5, x_8	–1.543** [0.129]	0.247** [0.021]	3.126
x_2, x_4, x_6, x_8	–1.742** [0.214]	0.288** [0.036]	3.022
x_2, x_4, x_7, x_8	–1.666** [0.145]	0.276** [0.024]	3.021
x_2, x_5, x_6, x_8	–1.717** [0.270]	0.287** [0.045]	2.987
x_2, x_5, x_7, x_8	–1.691** [0.192]	0.280** [0.031]	3.022

(Continued on the next page)

Table D2 (continued)

	Nonlinear impact of life expectancy gap (x_1)		
Control variables	x_1	x_1^2	Threshold of x_1
x_2, x_6, x_7, x_8	–1.802** [0.160]	0.301** [0.027]	2.991
x_3, x_4, x_5, x_8	–1.300** [0.085]	0.205** [0.014]	3.172
x_3, x_4, x_6, x_8	–1.693** [0.080]	0.274** [0.013]	3.093
x_3, x_4, x_7, x_8	–1.582** [0.072]	0.258** [0.012]	3.062
x_3, x_5, x_6, x_8	–1.732** [0.054]	0.282** [0.009]	3.068
x_3, x_5, x_7, x_8	–1.688** [0.077]	0.275** [0.012]	3.072
x_3, x_6, x_7, x_8	–1.833** [0.067]	0.302** [0.011]	3.031
x_4, x_5, x_6, x_8	–1.762** [0.033]	0.287** [0.005]	3.067
x_4, x_5, x_7, x_8	–1.616** [0.054]	0.264** [0.009]	3.066
x_4, x_6, x_7, x_8	–1.842** [0.122]	0.308** [0.021]	2.990
x_5, x_6, x_7, x_8	–1.727** [0.102]	0.289** [0.017]	2.990
x_2, x_3, x_4, x_5, x_8	–1.154** [0.158]	0.183** [0.026]	3.154
x_2, x_3, x_4, x_6, x_8	–1.462** [0.121]	0.239** [0.020]	3.056
x_2, x_3, x_4, x_7, x_8	–1.572** [0.109]	0.259** [0.018]	3.038
x_2, x_3, x_5, x_6, x_8	–1.597** [0.088]	0.262** [0.015]	3.048
x_2, x_3, x_5, x_7, x_8	–1.619** [0.111]	0.265** [0.018]	3.060
x_2, x_3, x_6, x_7, x_8	–1.858** [0.158]	0.309** [0.027]	3.006
x_2, x_4, x_5, x_6, x_8	–1.722** [0.062]	0.282** [0.010]	3.049
x_2, x_4, x_5, x_7, x_8	–1.482** [0.047]	0.240** [0.008]	3.092
x_2, x_4, x_6, x_7, x_8	–1.834** [0.136]	0.308** [0.023]	2.979
x_2, x_5, x_6, x_7, x_8	–1.860** [0.141]	0.311** [0.024]	2.990
x_3, x_4, x_5, x_6, x_8	–1.581** [0.060]	0.257** [0.010]	3.075
x_3, x_4, x_5, x_7, x_8	–1.415** [0.070]	0.229** [0.012]	3.095
x_3, x_4, x_6, x_7, x_8	–1.715** [0.023]	0.285** [0.004]	3.013
x_3, x_5, x_6, x_7, x_8	–1.817** [0.025]	0.300** [0.004]	3.024
x_4, x_5, x_6, x_7, x_8	–1.734** [0.008]	0.288** [0.001]	3.013
x_2, x_3, x_4, x_5, x_6, x_8	–1.417** [0.079]	0.232** [0.013]	3.054
x_2, x_3, x_4, x_5, x_7, x_8	–1.202** [0.066]	0.192** [0.011]	3.136
x_2, x_3, x_4, x_6, x_7, x_8	–1.768** [0.052]	0.294** [0.009]	3.002
x_2, x_3, x_5, x_6, x_7, x_8	–1.852** [0.056]	0.307** [0.010]	3.013
x_2, x_4, x_5, x_6, x_7, x_8	–1.753** [0.035]	0.291** [0.006]	3.010
x_3, x_4, x_5, x_6, x_7, x_8	–1.633** [0.005]	0.271** [0.008]	3.018

x_8 is the fertility gap, and the definitions of the other control variables are the same as those in Table 4. The FMOLS method is used. Numbers within parentheses are HAC standard errors. The long-run variance is estimated by the QS kernel, and the bandwidth parameter is selected by the procedure described in Andrews (1991). ** indicates significance at the 1% level.

Table D3. DOLS estimation after the addition of the fertility gap

	Nonlinear impact of life expectancy gap (x_1)		
Control variables	x_1	x_1^2	Threshold of x_1
x_8	–1.676** [0.337]	0.271** [0.055]	3.094
x_2, x_8	–1.585** [0.172]	0.256** [0.028]	3.093
x_3, x_8	–1.500** [0.259]	0.244** [0.041]	3.071
x_4, x_8	–1.519** [0.204]	0.243** [0.034]	3.124
x_5, x_8	–1.562** [0.315]	0.251** [0.054]	3.111
x_6, x_8	–1.893** [0.313]	0.314** [0.054]	3.007
x_7, x_8	–1.620** [0.236]	0.270** [0.039]	2.998
x_2, x_3, x_8	–1.543** [0.188]	0.250** [0.030]	3.085
x_2, x_4, x_8	–1.477** [0.145]	0.236** [0.025]	3.131
x_2, x_5, x_8	–1.562** [0.217]	0.252** [0.037]	3.098
x_2, x_6, x_8	–1.742** [0.233]	0.288** [0.040]	3.031
x_2, x_7, x_8	–1.583** [0.162]	0.258** [0.028]	3.068
x_3, x_4, x_8	–1.586** [0.254]	0.255** [0.041]	3.109
x_3, x_5, x_8	–1.500** [0.288]	0.243** [0.048]	3.083
x_3, x_6, x_8	–1.602** [0.272]	0.270** [0.045]	2.965
x_3, x_7, x_8	–1.688** [0.183]	0.280** [0.030]	3.016
x_4, x_5, x_8	–1.453** [0.310]	0.231** [0.057]	3.151
x_4, x_6, x_8	–1.703** [0.332]	0.280** [0.057]	3.037
x_4, x_7, x_8	–1.415** [0.141]	0.236** [0.023]	2.997
x_5, x_6, x_8	–1.750** [0.331]	0.291** [0.057]	3.013
x_5, x_7, x_8	–1.597** [0.242]	0.266** [0.042]	3.004
x_6, x_7, x_8	–1.895** [0.228]	0.328** [0.040]	2.892
x_2, x_3, x_4, x_8	–1.391** [0.242]	0.227** [0.039]	3.121
x_2, x_3, x_5, x_8	–1.452** [0.225]	0.236** [0.037]	3.079
x_2, x_3, x_6, x_8	–1.654** [0.230]	0.275** [0.038]	3.008
x_2, x_3, x_7, x_8	–1.735** [0.219]	0.285** [0.036]	3.045
x_2, x_4, x_5, x_8	–1.456** [0.202]	0.232** [0.035]	3.137
x_2, x_4, x_6, x_8	–1.596** [0.237]	0.260** [0.041]	3.068
x_2, x_4, x_7, x_8	–1.453** [0.140]	0.240** [0.023]	3.025
x_2, x_5, x_6, x_8	–1.708** [0.232]	0.282** [0.041]	3.031
x_2, x_5, x_7, x_8	–1.568** [0.205]	0.255** [0.036]	3.070
x_2, x_6, x_7, x_8	–1.791** [0.217]	0.303** [0.039]	2.957
x_3, x_4, x_5, x_8	–1.606** [0.283]	0.259** [0.047]	3.096

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Table D3 (continued)

	Nonlinear impact of life expectancy gap (x_1)		
Control variables	x_1	x_1^2	Threshold of x_1
x_3, x_4, x_6, x_8	–1.651** [0.284]	0.275** [0.047]	3.006
x_3, x_4, x_7, x_8	–1.454** [0.181]	0.241** [0.029]	3.013
x_3, x_5, x_6, x_8	–1.683** [0.224]	0.282** [0.037]	2.982
x_3, x_5, x_7, x_8	–1.682** [0.204]	0.280** [0.034]	3.004
x_3, x_6, x_7, x_8	–1.822** [0.209]	0.314** [0.035]	2.906
x_4, x_5, x_6, x_8	–1.638** [0.334]	0.270** [0.059]	3.039
x_4, x_5, x_7, x_8	–1.410** [0.174]	0.235** [0.030]	3.004
x_4, x_6, x_7, x_8	–1.574** [0.195]	0.271** [0.034]	2.903
x_5, x_6, x_7, x_8	–1.825** [0.255]	0.316** [0.045]	2.888
x_2, x_3, x_4, x_5, x_8	–1.338** [0.261]	0.215** [0.044]	3.118
x_2, x_3, x_4, x_6, x_8	–1.458** [0.304]	0.240** [0.050]	3.038
x_2, x_3, x_4, x_7, x_8	–1.523** [0.239]	0.252** [0.039]	3.023
x_2, x_3, x_5, x_6, x_8	–1.686** [0.272]	0.280** [0.046]	3.009
x_2, x_3, x_5, x_7, x_8	–1.674** [0.256]	0.276** [0.043]	3.032
x_2, x_3, x_6, x_7, x_8	–1.980** [0.264]	0.337** [0.046]	2.933
x_2, x_4, x_5, x_6, x_8	–1.611** [0.255]	0.264** [0.045]	3.055
x_2, x_4, x_5, x_7, x_8	–1.468** [0.166]	0.243** [0.029]	3.019
x_2, x_4, x_6, x_7, x_8	–1.606** [0.196]	0.274** [0.035]	2.927
x_2, x_5, x_6, x_7, x_8	–1.769** [0.234]	0.300** [0.042]	2.944
x_3, x_4, x_5, x_6, x_8	–1.624** [0.293]	0.270** [0.049]	3.004
x_3, x_4, x_5, x_7, x_8	–1.467** [0.212]	0.244** [0.036]	3.009
x_3, x_4, x_6, x_7, x_8	–1.493** [0.215]	0.257** [0.036]	2.901
x_3, x_5, x_6, x_7, x_8	–1.833** [0.213]	0.315** [0.036]	2.910
x_4, x_5, x_6, x_7, x_8	–1.570** [0.192]	0.271** [0.034]	2.895
x_2, x_3, x_4, x_5, x_6, x_8	–1.450** [0.316]	0.239** [0.053]	3.038
x_2, x_3, x_4, x_5, x_7, x_8	–1.522** [0.234]	0.252** [0.039]	3.016
x_2, x_3, x_4, x_6, x_7, x_8	–1.633** [0.262]	0.281** [0.044]	2.911
x_2, x_3, x_5, x_6, x_7, x_8	–2.125** [0.306]	0.363** [0.053]	2.925
x_2, x_4, x_5, x_6, x_7, x_8	–1.716** [0.192]	0.299** [0.035]	2.866
x_3, x_4, x_5, x_6, x_7, x_8	–1.480** [0.213]	0.255** [0.036]	2.897
x_2, x_3, x_4, x_5, x_6, x_7, x_8	–1.870** [0.273]	0.325** [0.047]	2.877

x_8 is the fertility gap, and the definitions of the other control variables are the same as those in Table 4. The number of leads and lags in the DOLS regression is 1. Numbers within parentheses are HAC standard errors. The long-run variance is estimated by the QS kernel, and the bandwidth parameter is selected by the procedure described in Andrews (1991). ** indicates significance at the 1% level.

Supplementary Material E

Comparison between linear and nonlinear models

To further examine the importance of allowing for the U-shaped impact of the life expectancy gap, we compare the performances of the linear and nonlinear models. By imposing the restriction that $\beta_{12} = 0$ on Eq. (1), the following standard linear regression model is obtained:

$$z_t = \beta_0 + \beta_{11}x_{1t} + \beta_2 x_{2t} + \cdots + \beta_m x_{mt} + u_t \,. \tag{E1}$$

A comparison of Eqs. (1) and (E1) enables us to examine how much the nonlinear impact of the life expectancy gap contributes to the improvement in model performance. The data are the same as those in Section 4, and the FMOLS method is used to estimate Eq. (E1) for consistency with the estimation results of Eq. (1).

The results are reported in Table E1. We find that the significance of the regression coefficients decreases remarkably when the basic and full models are linear with respect to the life expectancy gap. Specifically, the significance of the coefficient on the life expectancy gap disappears in contrast to the nonlinear models. Therefore, the linear specification is not suitable for describing the impact of the life expectancy gap on the US current account balance with China. Similar observations are made for the SMC-to-GDP ratio, working-age population, and fiscal balance-to-GDP ratio. Although the coefficients on domestic demand and the real exchange rate are significant, their signs are inconsistent with the theoretical predictions.

These results suggest the possibility of omission variable problems (i.e., the omission of the squared term of the life expectancy gap), and similar results are obtained from other criteria. The test statistics for linear cointegration developed by Phillips and Ouliaris (1990) are –1.978 and –3.786 for the basic and full models, respectively, showing the absence of linear cointegration (i.e., spurious regression results).

Furthermore, we evaluate the out-of-sample forecast accuracy. The estimation period is from the first quarter of 2003 to the fourth quarter of 2018, and the forecast period is from the first quarter of 2019 to the fourth quarter of 2019. The estimated coefficients and the data on the explanatory variables are used to calculate the out-of-sample forecast values of the US current account balance with China, and the estimation results for the subsample period are almost the same as those for the full sample period. The values of the root mean squared error are 0.506 and 0.209 for the linear basic and full models and 0.037 and 0.168 for the nonlinear basic and full models, respectively. Furthermore, the results for the forecast evaluation remain unchanged if we use alternative criteria such as the mean absolute percentage error and the Theil inequality coefficient. Therefore, model performance is improved by adding the squared term of the life expectancy gap.

Table E1. Linear regression model for the US current account balance with China

	Coefficient	S.E.
(A) Linear basic model		
Life expectancy gap (US – China)	0.039	[0.079]
Constant term	–1.966**	[0.304]
(B) Linear full model		
Life expectancy gap (US – China)	–0.060	[0.032]
Growth rate difference in real domestic demand (US – China)	0.019**	[0.007]
Real exchange rate	1.439**	[0.265]
VIX	0.229**	[0.075]
Relative SMC-to-GDP ratio (US/China)	0.075	[0.068]
Growth rate difference in working-age population (US – China)	–0.035	[0.074]
Difference in fiscal balance-to-GDP ratio (US – China)	0.003	[0.010]
Constant term	–4.302**	[0.778]

The FMOLS method is used. Numbers within parentheses are HAC standard errors. The long-run variance is estimated by the QS kernel, and the bandwidth parameter is selected by the procedure described in Andrews (1991). ** indicates significance at the 1% level.

Supplementary Material F

Estimation of error correction models

Several studies have investigated adjustment mechanisms to deviations from cointegrating relationships (Arghyrou and Chortareas, 2008; Gervais et al., 2016; Unger, 2017). Along this line, we estimate the error correction model as

$$\Delta z_t = \mu + \psi EC_{t-1} + \pi_0 \Delta z_{t-1} + \pi_1 \Delta x_{1,t-1} + \cdots + \pi_m \Delta x_{m,t-1} + e_t \, , \qquad \text{(F1)}$$

where Δ is the difference operator, μ is a constant term, EC_t is an error correction term, ψ is an adjustment coefficient, $\pi_0, \dots, \pi_m$ are dynamic coefficients, and e_t is an error term. The error correction term is calculated as the residual in Eq. (1), and the coefficients reported in Table 3 are used. Hence, $EC_t > 0$ means that z_t (US current account balance with China in period t) is above its equilibrium value, and vice versa. Although the lag length of the model is assumed to be 1, the estimation results for the error correction mechanism are robust if the lag length is set to 2 and 3. The data are the same as those in Section 4.

The estimation results for Eq. (F1) are reported in Table F1. The adjustment coefficient is significantly negative, and the error correction mechanism works appropriately. However, each of the dynamic coefficients is not significant. For their joint significance, the Wald test statistic for the null hypothesis that $\pi_0 = \cdots = \pi_7 = 0$ is 1.648 and its p value is 0.132. Furthermore, the diagnostic tests show that Eq. (F1) is successfully estimated. Therefore, these results suggest that the dynamics of the US current account balance with China are affected mainly by deviations from the polynomial cointegrating relationship in Eq. (1).

Table F1. Estimation of the error correction model

	Coefficient	S.E.
(A) Basic model		
Error correction term	–0.222**	[0.078]
Constant term	–0.018	[0.016]
<u>Lagged variables in first differences</u>		
US current account balance with China	0.196	[0.126]
Life expectancy gap (US – China)	–0.353	[0.224]
<u>Residual diagnostics</u>		
Test for the null hypothesis of no residual autocorrelation	14.809	(0.139)
Test for the null hypothesis of no heteroskedasticity	0.359	(0.783)
(B) Full model		
Error correction term	–0.253**	[0.089]
Constant term	–0.017	[0.017]
<u>Lagged variables in first differences</u>		
US current account balance with China	0.242	[0.134]
Life expectancy gap (US – China)	–0.353	[0.228]
Growth rate difference in real domestic demand (US – China)	0.004	[0.005]
Real exchange rate	1.061	[0.641]
VIX	–0.013	[0.041]
Relative SMC-to-GDP ratio (US/China)	–0.045	[0.061]
Growth rate difference in working-age population (US – China)	–0.002	[0.064]
Difference in fiscal balance-to-GDP ratio (US – China)	–0.019	[0.010]
<u>Residual diagnostics</u>		
Test for the null hypothesis of no residual autocorrelation	5.444	(0.860)
Test for the null hypothesis of no heteroskedasticity	1.702	(0.110)

Numbers within square brackets and round parentheses are standard errors and *p* values, respectively. For the residual diagnostics, the Ljung and Box (1979) test for the null hypothesis of no residual autocorrelation up to order 10 and the Harvey (1976) test for the null hypothesis of no heteroskedasticity are used. ** indicates significance at the 1% level.

References

Harvey, A.C. (1976) Estimating regression models with multiplicative heteroscedasticity. Econometrica 44, 461–465.

Ljung, G., Box, G. (1979) On a measure of lack of fit in time series models. Biometrika 66, 265–270.

Supplementary Material G

Table G1. Alternative measures of the savings rate

	Coefficient	S.E.
(A) Net household savings rate		
Life expectancy	2.475**	[0.219]
Squared life expectancy	–0.017**	[0.001]
Constant term	–92.274**	[8.169]
Threshold of life expectancy	74.891	
(B) Domestic savings rate (calculated from gross disposable income)		
Life expectancy	2.115**	[0.330]
Squared life expectancy	–0.014**	[0.002]
Constant term	–78.318**	[12.336]
Threshold of life expectancy	74.543	

The estimation method is the FMOLS. Numbers within parentheses are HAC standard errors. ** indicates significance at the 1% level. The data on the net household savings rate are available until 2016 in the present study, and the source is the OECD. The data on the domestic savings rate calculated from gross disposable income are available until 2018 in the present study, and the source is the China Statistical Yearbook 2020.

Supplementary Material H

Table H1. Separate assessment of the impacts of Chinese and US life expectancy

	Coefficient	S.E.
Chinese life expectancy	–21.244**	[3.201]
Squared Chinese life expectancy	0.141**	[0.021]
US life expectancy	0.035	[0.478]
Squared US life expectancy	–26.038	[21.261]
Constant term	1799.274*	[789.848]
Threshold of Chinese life expectancy	75.292	

The explained variable is the US current account balance with China as a percentage of US GDP. The sample period is from the first quarter of 2003 to the fourth quarter of 2019. The data are the same as those in Section 4, and the FMOLS method is used. Numbers within parentheses are HAC standard errors. ** and * indicate significance at the 1% and 5% levels, respectively.

Supplementary Material I

Table I1. Unit root and cointegration tests for Eq. (B1)

(A) Unit root test (Elliott et al., 1996)		
	Level	First difference
Relative wage rate	–2.083	–2.708**
Life expectancy at age 65 years	–0.076	–2.856**

(B) Linear cointegration test (Phillips and Ouliaris, 1990)	
Test statistic	–4.746**

The unit root test includes a linear trend and a constant term for variables in levels and a constant term for variables in first differences, and the lag length of the regression is selected by the modified Akaike information criterion developed by Ng and Perron (2001). For the cointegration test, the long-run variance is estimated by the QS kernel, and the bandwidth parameter is selected by the procedure described in Andrews (1991). ** indicates significance at the 1% level.

The unit root test does not reject the null hypothesis of a unit root for the variables in levels. However, the null hypothesis of a unit root is rejected for the variables in first differences. These results suggest that both variables are integrated of order one.

The null hypothesis of no linear cointegration between the relative wage rate and life expectancy at age 65 years is rejected at the 1% significance level. Therefore, Eq. (B1) can be estimated as a linear cointegrating relationship.

Supplementary Material J

Effect of educational attainment

To control for the effect of educational attainment in Eq. (B1), we use the share of the labor force with a bachelor's degree and above in the total labor force for the same age group. The share for the old age group (65 years and over) relative to that for the middle age group (35–44 years) in natural logarithms is added to Eq. (B1) for consistency with the relative wage rate. The sample period is the same as that in Appendix B. The source is the US Bureau of Labor Statistics.

The estimation results are reported in Table J1. The estimated coefficient on life expectancy is similar to that reported in Table B (Appendix B). Therefore, a robust estimation result for γ is obtained after controlling for educational attainment.

Table J1. Robustness check for the estimate of $\boldsymbol{\gamma}$

	Coefficient	S.E.
Life expectancy at age 65 years	3.197**	[0.666]
Relative educational attainment	0.124	[0.315]
Constant term	–0.025	[0.028]

The dependent variable is the relative wage rate. The FMOLS method is used. Numbers within parentheses are HAC standard errors. ** indicates significance at the 1% level.

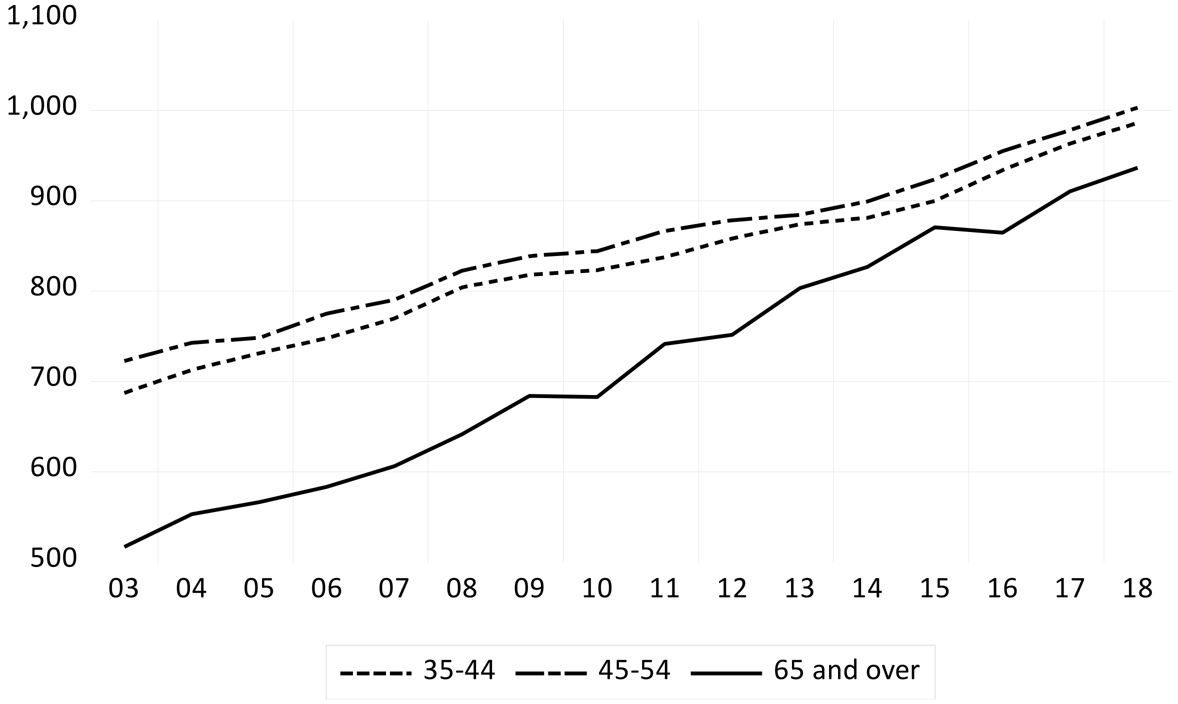
Table J1 also shows that relative educational attainment does not have a significant impact on the relative wage rate ($\delta_t w_t / w_t = \delta_t$). A possible explanation for this result is that educational attainment affects w_t, which means that higher educational levels lead to higher wage rates for both age groups; thus, this effect is excluded from the relative wage rate.

Wage rate and health status for elderly workers

Figure J1 shows that the wage rate is lower for elderly workers than for middle-aged workers, while this gap tends to narrow over the sample period. An improvement in the wage rate for elderly workers is positively associated with an increase in life expectancy at age 65 years, as indicated in Figure J2, which suggests that better health mitigates a decline in elderly productivity. These observations are consistent with the estimation results of Eq. (B1).

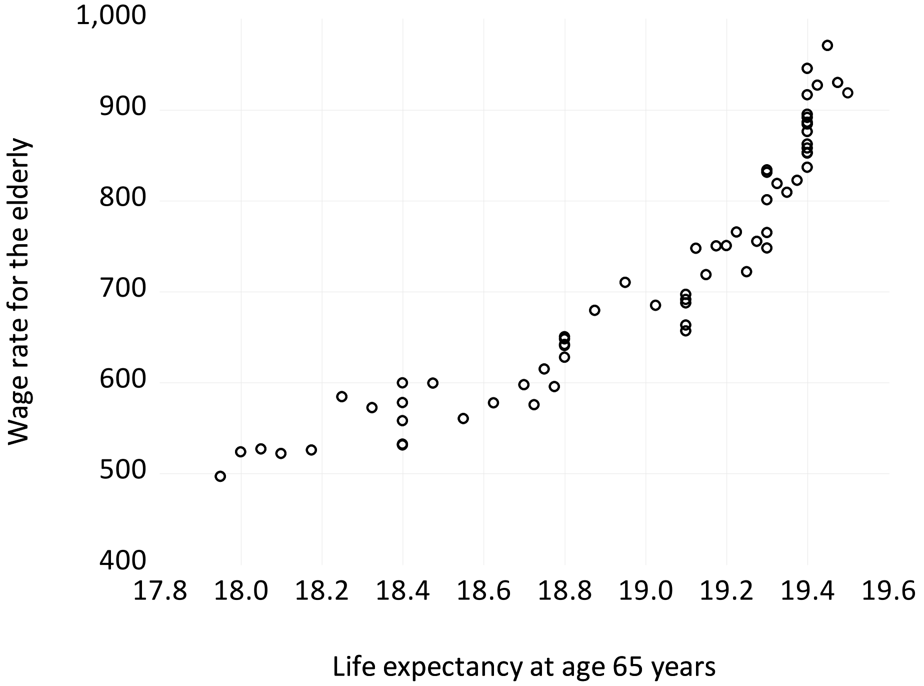
Furthermore, we find that the health status of elderly workers actually improves. The data in Figure J3 are available from 2008 and are standardized by the initial values. The elderly labor force without a disability increased by 1.72 times from 2008 to 2019. Therefore, the number of elderly workers who maintain their health (and thus their productivity) increases as life expectancy increases.

Figure J1. Wage rates for middle-aged and elderly workers



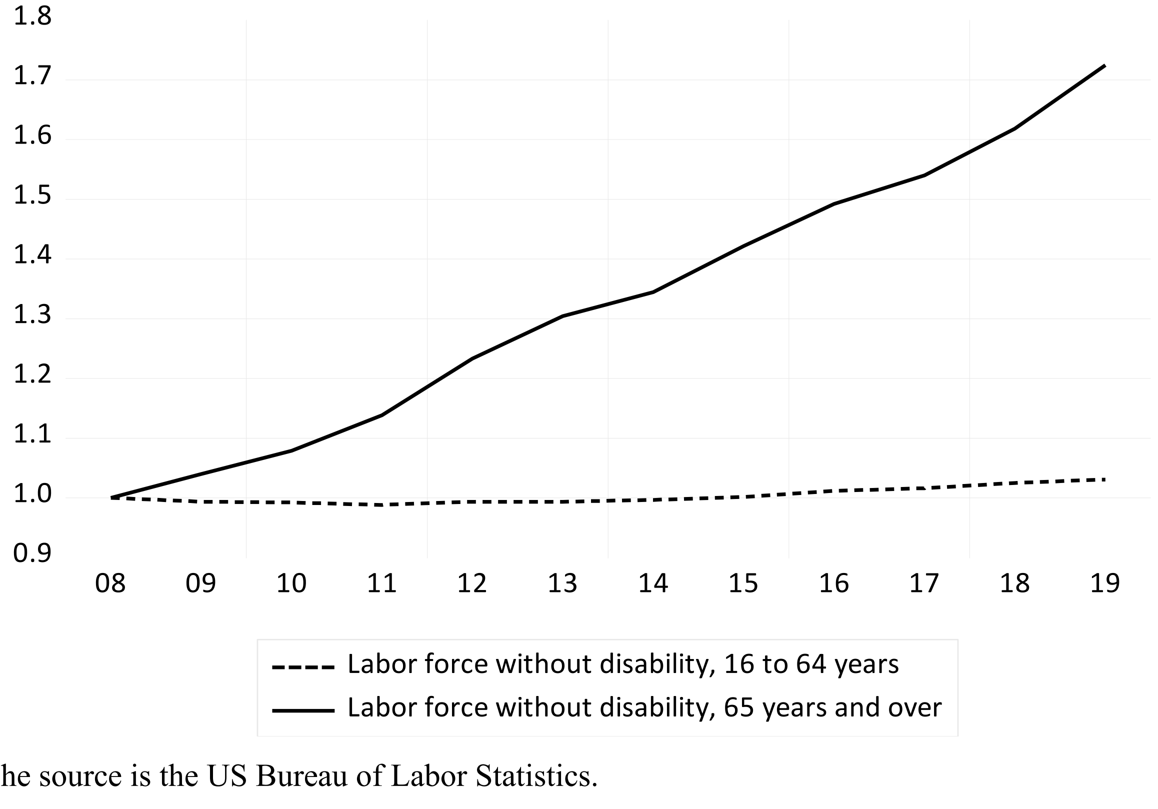
The data consist of weekly nominal earnings for full-time workers (unit: dollars). For all age groups, the characteristics of the workers are the same (all industries and occupations, both sexes, all races, and all educational levels). The source is the US Bureau of Labor Statistics.

Figure J2. Relationship between the elderly wage rate and life expectancy



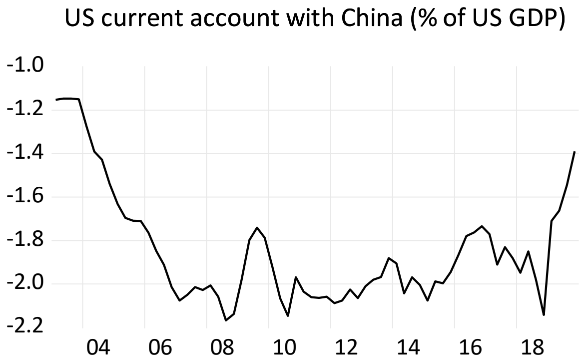
US quarterly data for the period 2003–2018 are used. The definition of the wage rate is the same as that in Figure J1. The sources are the National Center for Health Statistics and the US Bureau of Labor Statistics.

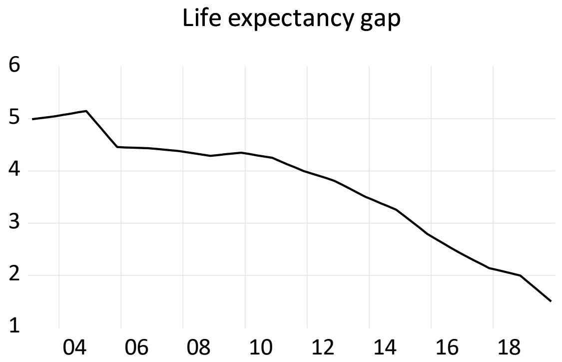
Figure J3. Labor force without a disability



The source is the US Bureau of Labor Statistics.

Supplementary Material


US current account with China (% of US GDP)


Life expectancy gap