

Supplementary material

Description	Assigned values (value of 1 indicates a deficit and 0 no deficit)					
Difficulty with walking 100 yards	No=0	Yes=1				
Difficulty sitting for about two hours	No=0	Yes=1				
Difficulty getting up from a chair after sitting for long periods	No=0	Yes=1				
Difficulty climbing several flights of stairs without resting	No=0	Yes=1				
Difficulty climbing one flight of stairs without resting	No=0	Yes=1				
Difficulty stooping, kneeling, or crouching	No=0	Yes=1				
Difficulty reaching or extending arms above shoulder level	No=0	Yes=1				
Difficulty pulling or pushing large objects like a living room chair	No=0	Yes=1				
Difficulty lifting or carrying weights over 10 pounds, like a heavy bag	No=0	Yes=1				
Difficulty picking up a 5p coin from a table	No=0	Yes=1				
Difficulty dressing, including putting on shoes and socks	No=0	Yes=1				
Difficulty walking across a room	No=0	Yes=1				
Difficulty bathing or showering	No=0	Yes=1				
Difficulty eating, such as cutting up your food	No=0	Yes=1				
Difficulty getting in or out of bed	No=0	Yes=1				
Difficulty using the toilet, including getting up or down	No=0	Yes=1				
Difficulty using a map to figure out how to get around in a strange place	No=0	Yes=1				
Difficulty preparing a hot meal	No=0	Yes=1				
Difficulty shopping for groceries	No=0	Yes=1				
Difficulty making telephone calls	No=0	Yes=1				
Difficulty taking medications	No=0	Yes=1				
Difficulty managing money, (e.g paying bills and keeping track of expenses)	No=0	Yes=1				

Description	Assigned values (value of 1 indicates a deficit and 0 no deficit)					
Difficulty doing work around the house or garden	No=0	Yes=1				
Self-reported general health	Excellent=0	V.good=0.25	Good=0.5	Fair=0.75	Poor=1	
Whether respondent has felt depressed much of the time during past week	No=0	Yes=1				
Whether respondent felt everything they did during the past week was an effort	No=0	Yes=1				
Whether respondent felt their sleep was restless during the past week	No=0	Yes=1				
Whether respondent was happy much of the time during the past week	Yes=0	No=1				
Whether respondent felt lonely much of the time during the past week	No=0	Yes=1				
Whether respondent enjoyed life much of the time during the past week	Yes=0	No=1				
Whether respondent felt sad much of the time during the past week	No=0	Yes=1				
Whether respondent could not get going much of the time during the past week	No=0	Yes=1				
High blood pressure or hypertension (self-reported)	No=0	Yes=1				
Angina (self-reported)	No=0	Yes=1				
Heart attack (including myocardial infarction or coronary thrombosis) (self-reported)	No=0	Yes=1				
Congestive heart failure (self-reported)	No=0	Yes=1				
An abnormal heart rhythm (self-reported)	No=0	Yes=1				
Diabetes or high blood sugar (self-reported)	No=0	Yes=1				
A stroke (cerebral vascular disease) (self-reported)	No=0	Yes=1				
Chronic lung disease such as chronic bronchitis or emphysema (self-reported)	No=0	Yes=1				
Asthma(self-reported)	No=0	Yes=1				
Arthritis (including osteoarthritis , or rheumatism) (self-reported)	No=0	Yes=1				

Description	Assigned values (value of 1 indicates a deficit and 0 no deficit)					
Osteoporosis, sometimes called thin or brittle bones (self-reported)	No=0	Yes=1				
Cancer or a malignant tumour (excluding minor skin cancers) (self-reported)	No=0	Yes=1				
Parkinson's disease (self-reported)	No=0	Yes=1				
Any emotional, nervous or psychiatric problems (self-reported)	No=0	Yes=1				
Alzheimer's disease (self-reported)	No=0	Yes=1				
Dementia, organic brain syndrome, senility or any other serious memory impairment (self-reported)	No=0	Yes=1				
Self-reported eyesight (while using lenses, if appropriate)	Excellent=0	V.good=0.2	Good=0.4	Fair=0.6	Poor=0.8	Blind=1
Self-reported hearing (while using hearing aid if appropriate)	Excellent=0	V.good=0.25	Good=0.5	Fair=0.75	Poor=1	
Whether respondent has fallen down at all /last year /last 2years	No=0	Yes=1				
Whether respondent has fractured hip ever /in last 2 years	No=0	Yes=1				
Whether respondent has had joint replacement ever	No=0	Yes=1				
Whether respondent has had pain whilst walking	No=0	Yes=1				
Identify today's date: day of month	Yes=0	No=1				
Identify today's date: month	Yes=0	No=1				
Identify today's date: year	Yes=0	No=1				
Identify the day of the week?	Yes=0	No=1				
Passed prospective memory test	Yes=0	No=1				
Immediate word recall (sample organised into quartiles)	1st quartile=0	2nd quartile=0.3	3rd quartile=0.6	4th quartile=1		
Fluency test (animals) (sample organised into quartiles)	1st quartile=0	2nd quartile=0.25	3rs quartile=0.5	4th quartile=0.75	5th quartile=1	5th quartile=1
Delayed word recall (sample organised into quartiles)	1st quartile=0	2nd quartile=0.25	3rs quartile=0.5	4th quartile=0.75	5th quartile=1	5th quartile=1

Table S1: Deficits included in the English Longitudinal Study of Ageing frailty index and their coding

	Model 1 (cohort trajectories)	Model 2 (gender)	Model 3 (wealth)
<i>Fixed effects</i>			
Intercept	0.18***	0.17***	0.23***
Cohort	0.03***	0.03***	0.03***
Cohort ²	0.003***	0.003***	0.003***
Growth rate	0.01***	0.01***	0.01***
Growth rate ²	0.001***	0.001***	0.001***
Growth rate*cohort	0.005***	0.005***	0.005***
Female (ref category; male)		0.02*	
Female*cohort		0.004**	
Middle wealth tertile			-0.05***
Richest tertile			-0.08***
Middle wealth tertile*cohort			0.004**
Richest tertile*cohort			0.004**
Middle wealth tertile*growth rate			-0.0007
Richest tertile*growth rate			-0.002**
<i>Random effects</i>			
Level 1: within person	0.002***	0.002***	0.002***
Level 2: In intercept	0.01***	0.01***	0.01***
Level 2: In growth rate	0.0005***	0.0003***	0.0005***
<i>Model fit</i>			
Log likelihood	48,163	48,223	47,834
AIC (smaller the better)	-96,306	-96,424	-95,635
BIC (smaller the better)	-96,220	-96,320	-95,498
Observations	40,391	40,391	39,681

Table S2: Growth curve models of frailty and ageing by cohort, gender and wealth (quintiles)

*p<0.05; **p<0.01; ***p<0.001 (two-tailed tests)

AIC=Akaike information criterion. BIC=Bayesian information criterion. Standard error of the fixed-effect coefficients are not reported here. Random effects relate to the variance component. Whilst covariance components are estimated we do not report them here.

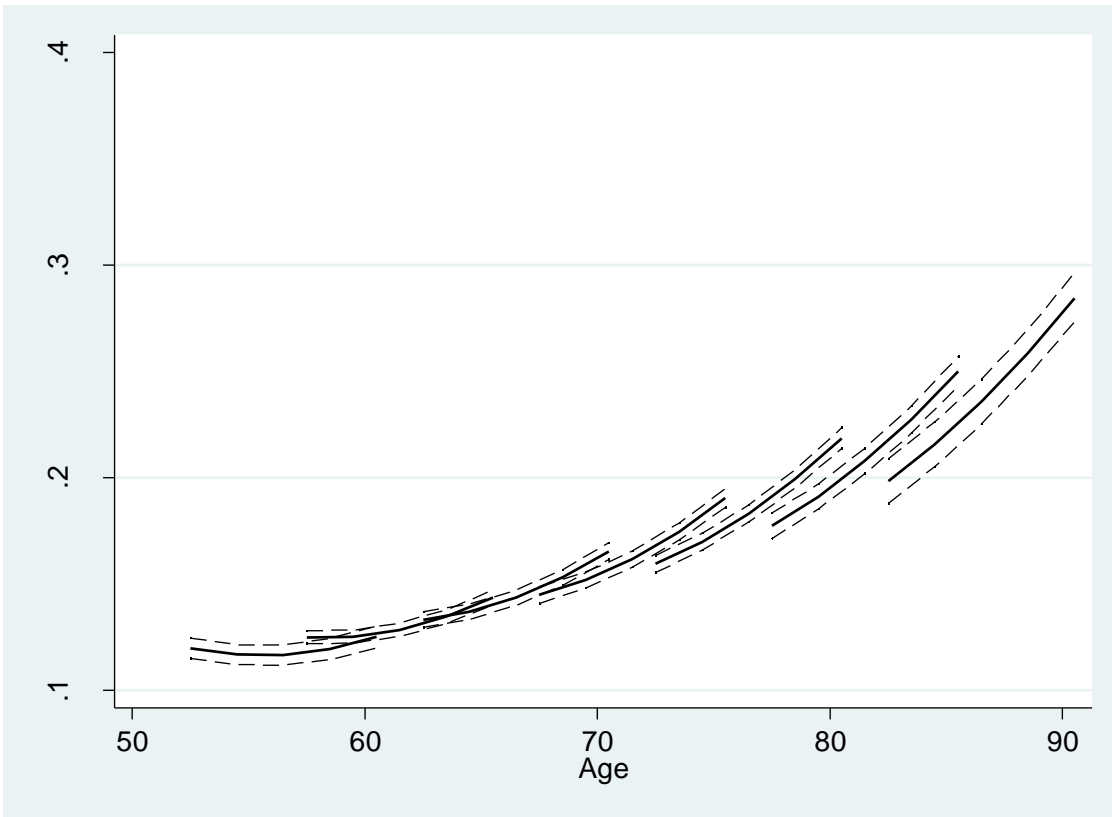
	Model 1 (cohort trajectories)	Model 2 (gender)	Model 3 (wealth)
<i>Fixed effects</i>			
Intercept	0.16***	0.14***	0.21***
Cohort	0.02***	0.02***	0.02***
Cohort ²	0.002***	0.001**	0.002***
Growth rate	0.01***	0.01***	0.01***
Growth rate ²	0.001***	0.001***	0.001***
Growth rate*cohort	0.004***	0.003***	0.003***
Female (ref category; male)		0.03***	
Female*cohort		0.005***	
Middle wealth tertile			-0.04***
Richest tertile			-0.08***
Middle wealth tertile*cohort			0.004*
Richest tertile*cohort			0.003
Middle wealth tertile*growth rate			-0.0002
Richest tertile*growth rate			-0.001
<i>Random effects</i>			
Level 1: within person	0.002***	0.002***	0.002***
Level 2: In intercept	0.009***	0.008***	0.007***
Level 2: In growth rate	0.0002***	0.0002***	0.0002***
<i>Model fit</i>			
Log likelihood	35,676	35,745	35,277
AIC (smaller the better)	-71,332	-71,467	-70,521
BIC (smaller the better)	-71,250	-71,369	-70,390
Observations	26,200	26,200	25,730

Table S3: Growth curve models of frailty and ageing by cohort, gender and wealth (quintiles) for sample members who have frailty index measures at all five waves of ELSA.

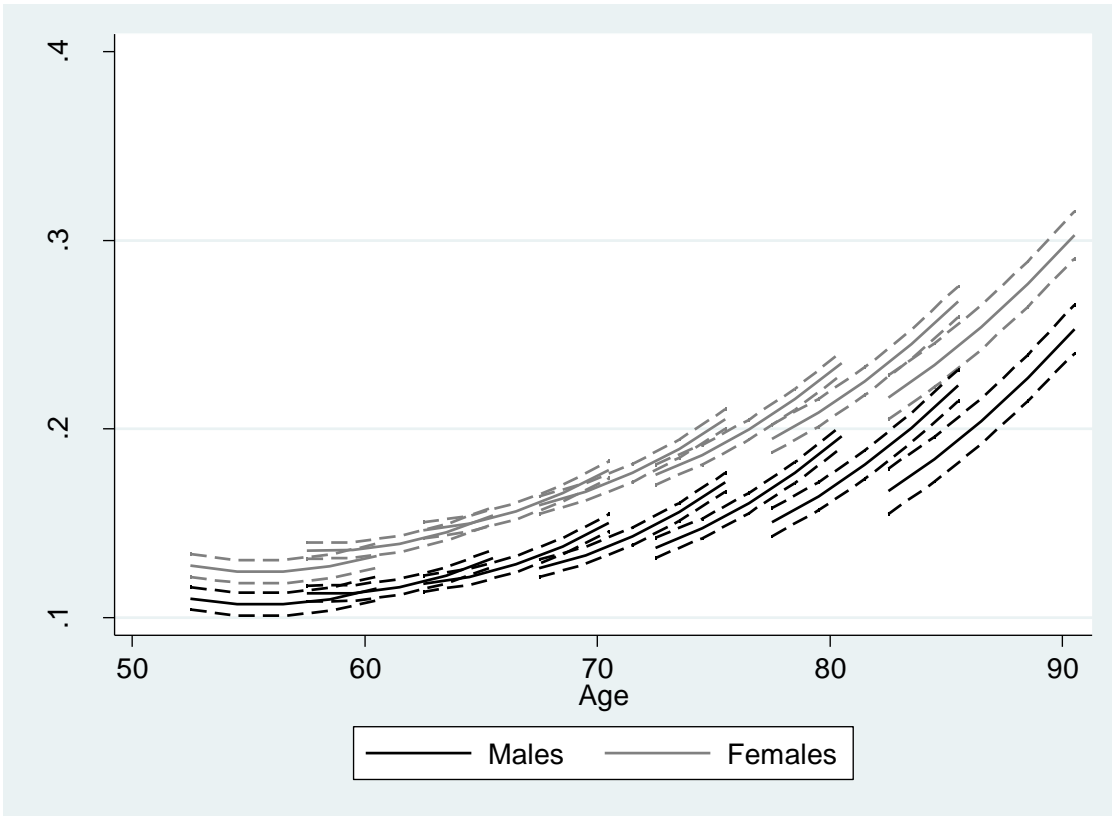
*p<0.05; **p<0.01; ***p<0.001 (two-tailed tests)

AIC=Akaike information criterion. BIC=Bayesian information criterion. Standard error of the fixed-effect coefficients are not reported here. Random effects relate to the variance component. Whilst covariance components are estimated we do not report them here.

Frailty trajectories: all people (aged 50+)



Frailty trajectories: by gender



Continued overleaf

Frailty trajectories: by wealth

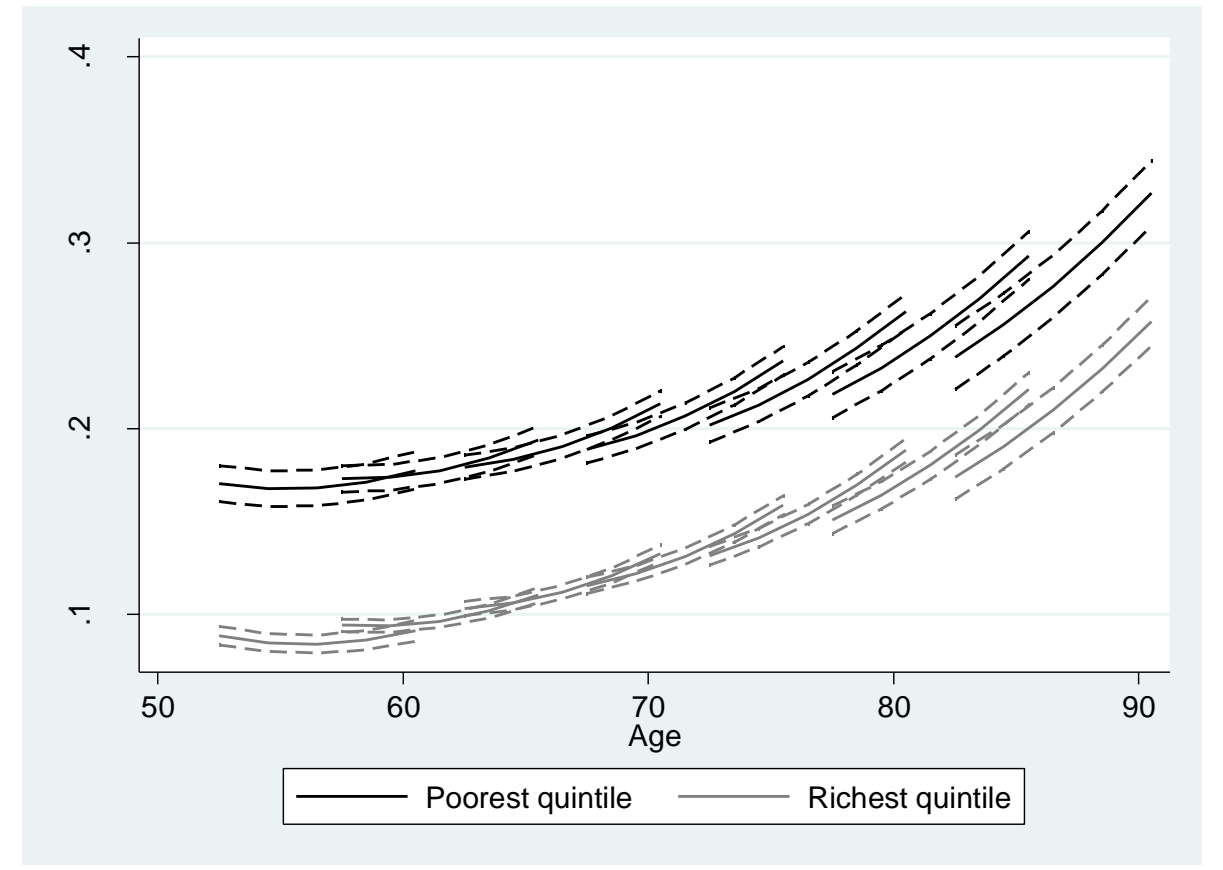


Figure S1: Model cohort specific trajectories of frailty by gender and wealth for the sample members who have frailty index measures at all five waves of ELSA.

Dotted lines indicate 95% confidence intervals around model estimates of frailty.

Missingness of frailty index by wave*	Frequency	%
_____	5,292	46.80
_2345	1,907	16.87
_ _345	1,194	10.56
_ _ _45	944	8.35
_ _ _ _5	698	6.17
_ _ _ _4_	227	2.01
_ _ _ _3_	169	1.49
_ _ _ _2_	141	1.25
_ _ _34_	120	1.06
_ _234_	112	0.99
_ _2_45	105	0.93
_ _23_	104	0.92
_ _3_5	69	0.61
_ _23_5	60	0.53
_ _2_5	46	0.41
_ _2_4_	32	0.28
1_345	25	0.22
1_____	22	0.19
12_45	8	0.07
123_	6	0.05
1_45	6	0.05
1_5	5	0.04
1_3_	4	0.04
12_	3	0.03
12_5	2	0.02
1_34_	2	0.02
1_4_	2	0.02
1234_	1	0.01
123_5	1	0.01
	11,307	100

Table S4: Patterns of missingness in the frailty index (waves 1 to 5)

*_ indicates a frailty index is available for a particular wave whilst a numerical value indicates the wave for which the frailty index is missing.

Number of waves for which frailty index is missing	Number	%	Cumulative percentage
0	5,292	47	46
1	1,257	11	58
2	1,329	12	69
3	1,487	13	82
4	1,942	17	100
Total	11,307	100	100

Table S5: Number of waves of which the frailty index is missing (waves 1 to 5)

Status at wave 5	Frequency	%	Cumulative %
Full or partial interview by proxy	6,242	54.8	54.8
Died	1,047	9.2	64.0
Ill	215	1.9	65.9
In Institution	42	0.4	66.3
Not issued	1,188	10.4	76.7
Out of Britain	142	1.3	77.9
Missing for other reason	2,515	22.1	100.0

Table S6: Status at wave 5 including reasons for non-response

Coefficient	Odds Ratio	Std. Err.	z	P>z	95% confidence interval	
Age (at wave 1 - 5 year intervals)	1.01	0.00	6.37	<0.0000	1.01	1.02
Female	0.84	0.03	-4.22	<0.0000	0.78	0.91
2nd poorest quintile of wealth	0.86	0.05	-2.38	0.017	0.76	0.97
Middle quintile of wealth	0.73	0.05	-4.77	<0.0000	0.65	0.83
2nd richest quintile of wealth	0.64	0.04	-6.76	<0.0000	0.56	0.73
Richest wealth quintile	0.54	0.04	-9.13	<0.0000	0.47	0.61
Frailty index	2.01	0.39	3.55	<0.0000	1.37	2.95
Constant	0.26	0.04	-8.81	<0.0000	0.20	0.36

Table S7: Coefficients from a logistic regression model predicting non-response (at any wave between wave 2 and wave 5)