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Will long-run health trends in Europe turn negative?

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05-2020

MEA DISCUSSION PAPERS

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Abstract:

Alarmed by the worsening health for middle-aged baby-boomers in the US, we conduct a cohort analysis of health deficits similar to Abeliansky and Strulik (2019) but focus on middle-aged individuals. As opposed to previous findings, we find that health among the middle-aged has stalled, and in some cases worsened, for the more recent birth cohorts. Our results are robust to different definitions of the health index. Our results are relevant for the ongoing discussion on how to achieve longer healthy working lives. They also have important implications in terms of expected future public and private costs of health care for middle-aged and older individuals.

Zusammenfassung:

Alarmiert durch den sich verschlechternden Gesundheitsstatus von Personen mittleren Alters aus geburtenstarken Jahrgängen in den Vereinigten Staaten, folgen wir Abeliansky and Strulik (2019) und analysieren Gesundheitsdefizite über Kohorten hinweg. Wir fokussieren uns dabei auf Individuen im Arbeitsalter und finden, dass sich die Gesundheit der jüngsten Kohorten nicht weiter verbessert und in manchen Fällen sogar verschlechtert. Dies steht im Kontrast zu früheren Forschungsergebnissen. Unsere Ergebnisse sind robust gegenüber verschiedenen Zusammensetzungen des Gesundheitsindex. Sie sind weiterhin relevant für die laufende Diskussion darüber, wie man ein längeres, gesundes Arbeitsleben erreichen kann und haben wichtige Implikationen für künftige öffentliche und private Kosten der Gesundheitsvorsorge von Individuen mittleren und älteren Alters.

Keywords:

General health, employment, Life expectancy

JEL Classification:

I10; I14

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Abstract

Alarmed by the worsening health for middle-aged baby-boomers in the US, we conduct a cohort analysis of health deficits similar to Abeliansky and Strulik (2019) but focus on middle-aged individuals. As opposed to previous findings, we find that health among the middle-aged has stalled, and in some cases worsened, for the more recent birth cohorts. Our results are robust to different definitions of the health index. Our results are relevant for the ongoing discussion on how to achieve longer healthy working lives. They also have important implications in terms of expected future public and private costs of health care for middle-aged and older individuals.

Keywords: Health; Aging; Health deficit index; Health inequality

JEL codes: I10; I14

Acknowledgments: This paper uses data from all SHARE Waves (DOIs: 10.6103/SHARE.w1.700 through 10.6103/SHARE.w7.700). The SHARE data collection has been primarily funded by the European Commission through the FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812) and FP7 (SHARE-PREP: N°211909, SHARE-LEAP: °227822, SHARE M4: N°261982) and Horizon 2020 (SHARE-DEV3: GA N°676536, SERISS: GA N°654221) and by DG Employment, Social Affairs & Inclusion. Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the U.S. National Institute on Aging (U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815, R21_AG025169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064, HHSN271201300071C) and from various national funding sources is gratefully acknowledged (see www.share-project.org).

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1 Introduction

We analyze the development of health in Europe by cohorts of birth. Studying the health development of individuals close to retirement age is especially important in light of the ongoing pension reforms in most industrialized countries which aim to increase labor force participation at older ages. Many researchers have indeed concluded that improvements in health and life expectancy make working longer a feasible solution to the problem of unsustainability of pension systems caused by rising life expectancy and falling birth rates (e.g., Maestas & Zissimopoulos 2010; Wise et al. 2017). But will this health capacity remain?

Vaupel (2010) finds in his review that mortality at advanced ages is being postponed in most countries. Recently, however, the increase in US life expectancy has stalled.[1] Moreover, US baby boomers, despite their longer life expectancy over previous generations, have higher rates of chronic disease, more disability, and lower self-rated health than members of the previous generation at the same age (King et al. 2013).

Europe appears to do better. European countries have a higher life expectancy (OECD 2019), higher healthy life expectancy (WHO 2019) and better health (Avendano et al. 2009, Avendano and Kawachi 2014) than the US. While this is well documented, evidence on long-term health trends in Europe is scarce. An exception is Abeliansky and Strulik (2019) who compute the health deficit of individuals aged 50 to 85 in 14 European countries by birth cohort. They find that the deficit declines for more recently born cohorts for both men and women. They argue that this continuous trend approximates the rate of medical progress.

We conduct a cohort analysis of the health deficit similar to Abeliansky and Strulik (2019; A&S). We replicate their findings for older cohorts but reach strikingly different conclusions for middle-aged individuals, defined as between age 50 and 64. As opposed to previous findings, we find that health among the middle-aged has stalled, and in some cases worsened, for the more recent birth cohorts. Our results are robust to different definitions of the health index.

Our results are relevant for the ongoing discussion on how to achieve longer healthy working lives. They may also have important implications in terms of expected future public and private costs of health care for middle-aged and older individuals.

2 Methodology

In order to investigate the relationship between year of birth and health, we follow A&S and run the following regression:

$$\ln(Health\ Index_i) = r + \alpha * age_i + \sum_{t=1}^{T-1} \gamma_t * yrbirth_{it} + \epsilon_i \qquad (1)$$

[1] US life expectancy decreased after 2014, mostly due to higher mortality among young and middle-aged adults (Woolf and Schoomaker, 2019).

where *i* represents the individual; *age* represents the age at the interview, *yrbirth* is a set of year-of-birth fixed effects; *t* refers to the year of birth and ϵ is the error term. We also include country fixed effects and the mean of age.[2]

The dependent variable is an index of health deficiencies. Similar to A&S, we follow Mitnitski and Rockwood (2001) in constructing a health index based on the number of health deficits which an individual has relative to the possible number of health deficits that are measured in the data:

$$Health\ Index = \frac{\Sigma(x_i)}{n} \tag{2}$$

where $x_i \in [0, 1]$ denotes health measure i and n the number of health measures.[3] This index has been recently introduced in the economics of aging literature by Dalgaard and Strulik (2014). It increases about exponentially with age.

3 Data

Both A&S and we use data from the Survey of Health, Ageing and Retirement in Europe (SHARE), a biennial survey on individuals aged 50 or older, which includes a wide range of micro-data on socio-economic status, social and family networks as well as health across European countries.[4] Health data in SHARE are rich and include both subjective and objective measure of health, including biomarkers and physical performance measurements.

There are, however, several differences in the way we use the SHARE data. First, we can include seven waves of data, spanning the years 2004 to 2017, differently from A&S who used six waves of data. This enables us to examine cohorts born between 1941 and 1964. Second, we are very consistent in only using data that are available in all waves. In particular, we only include countries that are available in all waves (namely Austria, Belgium, Denmark, France, Germany, Italy, Spain, Sweden, and Switzerland), differently from A&S who used 14 countries. This is important because results might be influenced by countries entering or leaving the sample.[5] Third and very importantly, we only select health variables that are available in *all* waves. This differs from A&S and will be crucial for our results. Fourth and finally, we base our health index on all health variables that are consistently available in SHARE. These are 52 health variables, as compared to 38 variables used by A&S. We want to avoid to take any stance on which variables are more important, because this might lead to discretionary choices. The list of health variables is provided in the Appendix.

4 Results

Figure 1 shows the year-of-birth coefficients obtained from Equation (1), by gender and for a sample of individuals in the age range 50 to 64. In all graphs, the reference year is 1953.

The left panel of Figure 1 shows the results for women. There seems to be no relationship between the year of birth and the health deficit, and the difference between the 1941 and the 1964 cohort is not statistically significant after performing a Wald test. Even more surprising is the pattern for men (right panel): interestingly, in contrast to women there is a somewhat clearer trend observable.

[2] Including individuals' age mean allows us to account for the correlation at the individual level of unobserved heterogeneity with time changing covariates (Mundlak approach). The literature shows indications of the presence of such correlation (see for example Abeliansky and Strulik, 2018).

[3] If there were missing values for some of the variables used, we reduced the denominator by the corresponding number of missing variables. The health index is thus always relative to the number of available health measures.

[4] Börsch-Supan et al. (2014) provides a description.

[5] The oldest generations might not be present in countries who entered the sample late; similarly, the youngest generations are not present in countries that leave the sample early.

Men who were born in 1941 have a 11.5% lower health deficit index than those born in 1964, and this difference is statistically significant at the 5% level.

Figure 1: Health deficits by year-of-birth (fixed effects), age 50-64

This Figure shows the year-of-birth estimates from a regression following Equation (1). We included country fixed effects and the mean of age. The year of reference is 1953. Confidence intervals are represented by red vertical lines. Standard errors are clustered on the year-of-birth level.

To test the robustness of our results with respect to the choice of variables included in the health deficit index, we construct a set of health deficit indexes using a random selection of 40 out of the 52 total health variables available.[6] The randomly generated indexes show generally a very similar picture as the full-set index we presented in Figure 1.

In order to get a better picture of long-run health developments, we provide further evidence on the same extended age range considered by A&S. Figure 2 shows the year-of-birth coefficients for individuals of age 50 to 85, constructed using the health index with the full set of 52 health measures. We replicate the findings by A&S that there are strong health improvements for older cohorts. However, comparing this trend with the trend among later cohorts shows a striking result: there appears to be a clear break of the trend (possibly a reversal?) for younger cohorts, differently from A&S who observed a steady improvement in health for all ages.[7]

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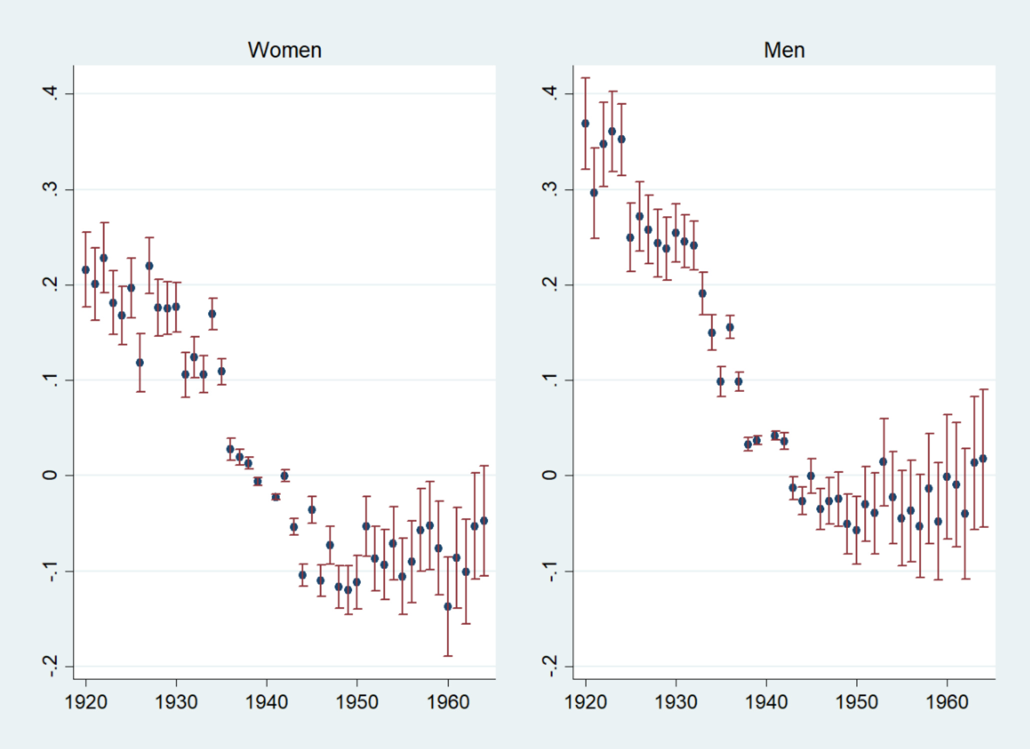
[6] Results are relegated to the Appendix. As a further robustness check, we constructed 30 additional indexes with only 35 variables being randomly included. The findings are very similar to those from the health indexes with 40 variables.

[7] The span of the SHARE data between 2004 and 2017 does not allow observing individuals of the same age if the birth years of these individuals are too far apart. This means that we cannot say whether the health cohort-trend depicted in Figure 2 is explained by working-age individuals experiencing slower or no health improvements with respect to older individuals, or by younger cohorts being generally unhealthier than older cohorts.

Figure 2: Health deficits by year-of-birth (fixed effects), extended age range 50-85

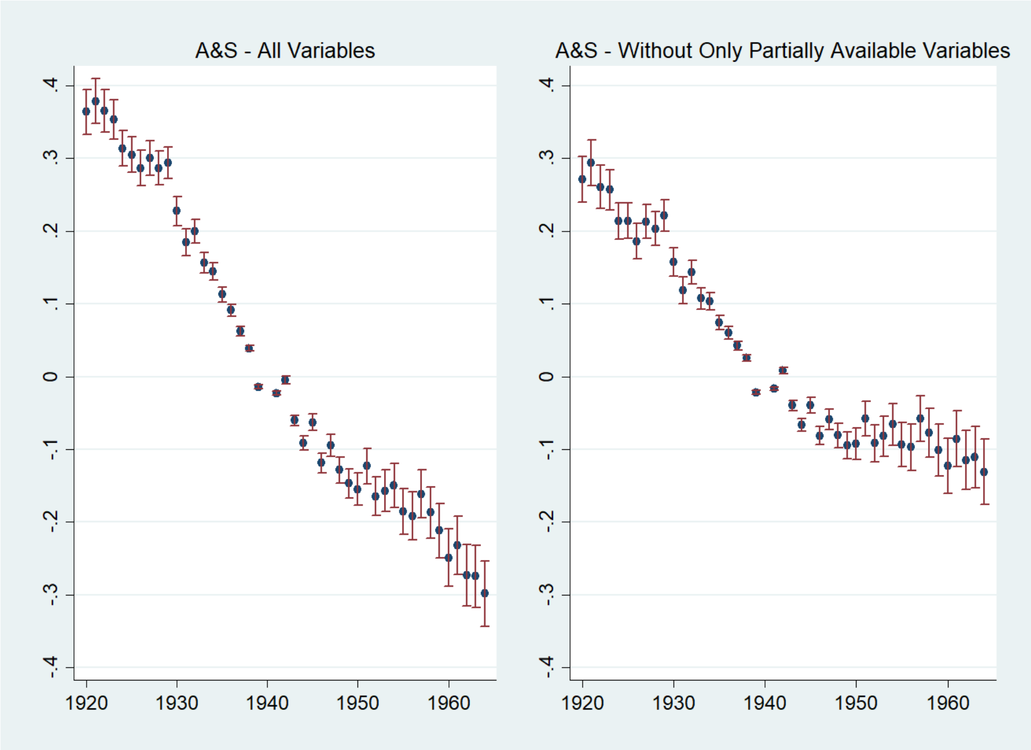


This Figure shows the year-of-birth estimates from a regression following Equation (1). We included country fixed effects and the mean of age. The year of reference is 1940, the usual sample is extended by individuals of age 66 to age 85. Confidence intervals are represented by red vertical lines. Standard errors are clustered on the year-of-birth level.

What drives this striking difference? We have shown that our results are robust with respect to random selections of health variables. Hence, the difference must be due to a systematic selection of health variables. Figure 3 shows that four variables drive most of the differences. These four health variables are asthma, arthritis, pain in back, knees, hip or other joints, and walking speed which are included by A&S but excluded by us because they are only available in the early SHARE waves but not in later waves.[8] Because being observed in an earlier wave means belonging with a higher probability to an older cohorts, older cohorts might be associated with a higher index than younger cohorts only because of the construction of the health deficit index. To show this, we constructed the index of A&S (2019) ourselves – once with their full set of 38 variables (left panel of Figure 3), and once only with the 34 variables which are available in all waves (right panel of Figure 3). Comparing the two panels shows clearly that the apparent improvement of health among middle-aged individuals reported by A&S is due to the inclusion of variables which are only available in the early waves of SHARE.

[8] Asthma, arthritis, pain in back, knees, hip or other joint in Waves 1,2 and 4, and walking speed only in Waves 1 and 2.

Figure 3: Health Index, replication of A&S



Note: Replication of the Health Deficit Index used by Abeliansky and Strulik (2019). As in A&S and in contrast to our own analysis, we include older cohorts, use all 14 A&S countries and include SHARE data only up to Wave 6.

In order to get some insights on which health deficits improved and which deteriorated from older to younger cohorts, we ran probit regressions of each binary health deficit item on age and cohort. The results show that most of the measures of functional health (ADLs and IADLs, mobility) either improved or did not change. Among the diagnosed illnesses ("has a doctor ever told you") heart attacks, cancers (excluding lung cancer) and hypertension feature a lower prevalence for younger cohorts; only lung diseases (including lung cancer) increased. Mental health issues (such as depression, sleeping problems, irritability, fatigue) however became more prevalent for the younger cohorts, as did symptoms which may be related to mental health problems (falls, fear of falls, dizziness, faints).

5 Heterogeneity by socio-economic status

Since health is strongly correlated with socio-economic status, we want to get some insights into the heterogeneity of our results. To this purpose, we look at different levels of wealth and education. Figures 3 and 4 plot the coefficients, for women and men respectively, divided by household net worth. Individuals in the left panel have less net worth than the median[9], individuals in the right panel do have more. We observe a relatively constant trend for women irrespective of wealth and for men with high wealth. For men with low household net worth we observe instead a strong worsening health trend: men born in 1941 have 18.8% less deficits than men born in 1964, and this difference is statistically significant at the 1% level. Since the average health index was

[9] Medians are calculated separately by country, sex, interview year and cohort.

already higher for the less wealthy born in 1941, this implies that the health gap between the poorer and the richer is widening.

Figure 4: Health Index, Wealth - Women

This Figure shows the year-of-birth estimates from a regression following Equation (1) for less and more wealthy women respectively. We included country fixed effects and the mean of age. The year of reference is 1953. Confidence intervals are represented by red vertical lines. Standard errors are clustered on the year-of-birth level.

Figure 5: Health Index, Wealth - Men

This Figure shows the year-of-birth estimates from a regression following Equation (1) for less and more wealthy men respectively. We included country fixed effects and the mean of age. The year of reference is 1953. Confidence intervals are represented by red vertical lines. Standard errors are clustered on the year-of-birth level.

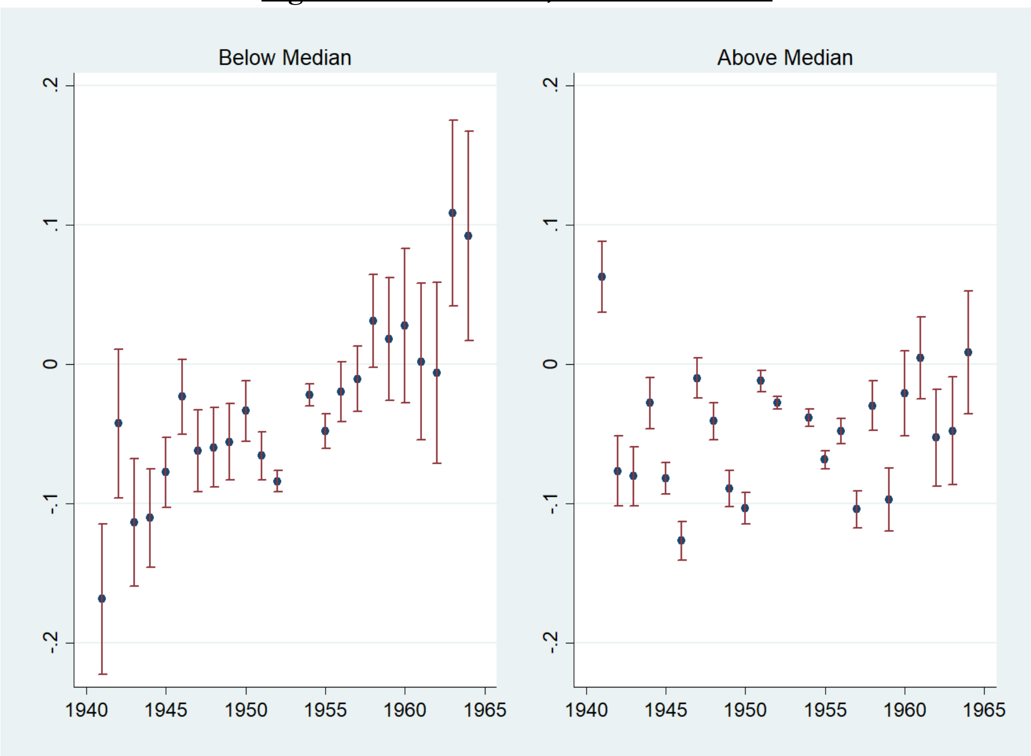
Figure 5 and 6 present the coefficients for low (left panel) and high (right panel) levels of education.[10] We observe a strong increasing trend of the health deficit across cohorts for highly educated women and less educated men. For highly educated women born in 1942, the health deficit index is 13.5% lower than for those born in 1963, and the difference is statistically significant at the 5% level. For less educated men, the 1943 cohort has a 22.7% lower deficit index than men born in 1964. The difference is statistically significant at the 1% level. For less educated women and more educated men we observe instead a relatively constant pattern.

[10] The level of education is measured by years spent in education. Individuals who spent less years than the median in education are considered as less educated, those who spent more time as more educated. The median is calculated separately by country, sex, interview year and cohort.

Figure 6: Health Index, Education - Women

This Figure shows the year-of-birth estimates from a regression following Equation (1) for less and more educated women respectively. We included country fixed effects and the mean of age. The year of reference is 1953. Confidence intervals are represented by red vertical lines. Standard errors are clustered on the year-of-birth level.

Figure 7: Health Index, Education - Men



This Figure shows the year-of-birth estimates from a regression following Equation (1) for less and more educated men respectively. We included country fixed effects and the mean of age. The year of reference is 1953. Confidence intervals are represented by red vertical lines. Standard errors are clustered on the year-of-birth level.

6 Conclusion

We investigated the relationship between health deficits and year of birth in seven European countries. In line with earlier findings, we observe health improvements for older cohorts. However, in stark contrast to previous studies and more in line with recent US results, we find a stagnating trend for middle-aged women and a slightly worsening trend for middle-aged men. Our results are robust to random selections of 35 or 40 items among our large set of 52 health measures. We show evidence of quite a sudden break in the health trend between older and younger cohorts: improving for the older, stagnating and slightly worsening for the younger cohorts. The declining health trend seems to be mainly driven by men with wealth and education below the median, and by highly educated women.

There are several interpretations of our results. They might be driven by institutional changes and policy interventions in the health care sector affecting the most recent cohorts of middle-aged individuals. Worse lifestyle habits could be another potential explanation, in line with what has been happening in the United States. Further research is needed to understand the causal forces driving our results, and whether our observations are the beginning of a long-term trend reversal.

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8 Appendix

Table A.1: Variables from the SHARE Data

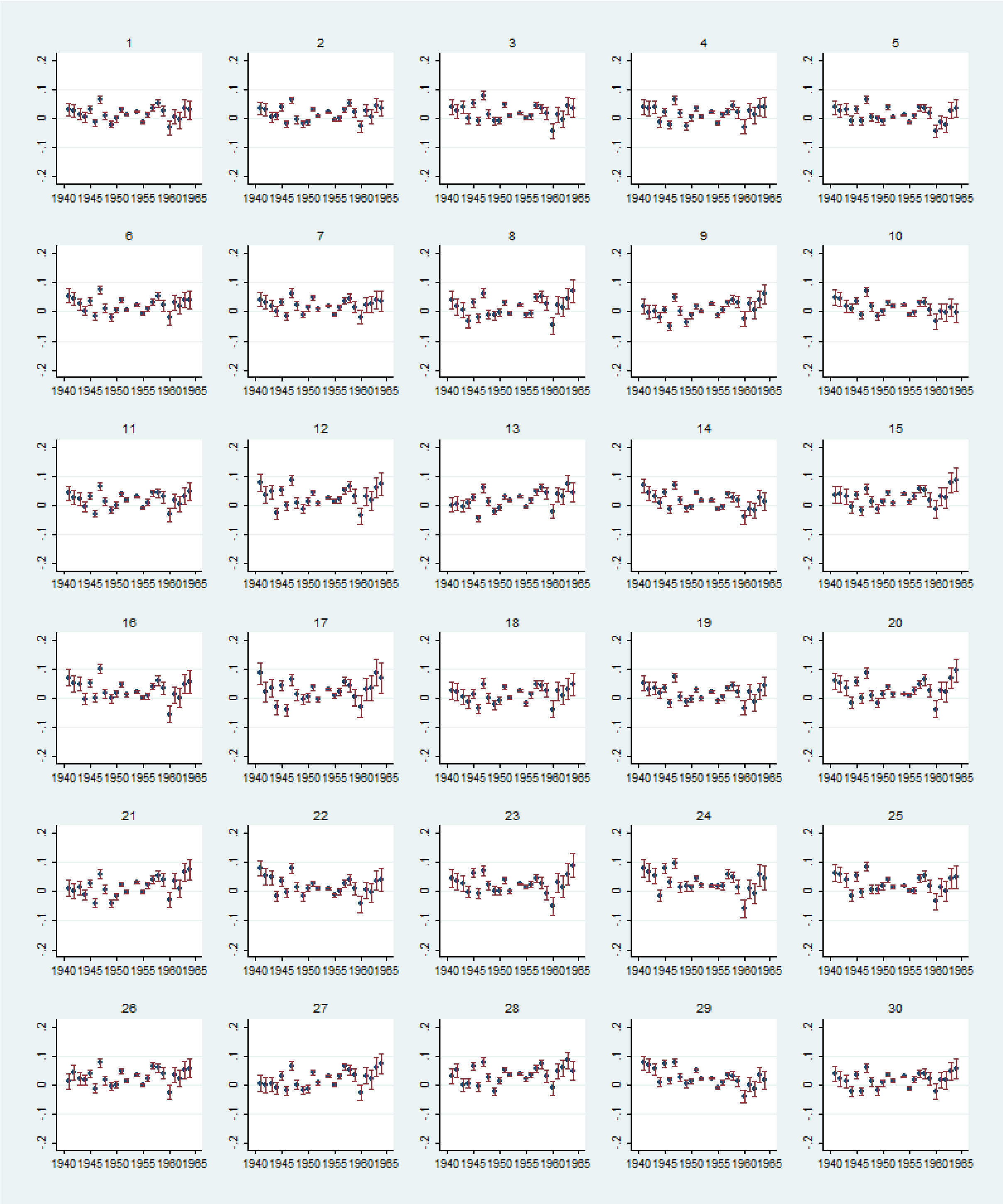
Dimension	Variable	Coding in Share
Any long-term illness	Ph004_	Yes = 1, No = 0
Heart attack	Ph006d1	Yes = 1, No = 0
Chronic lung disease	Ph006d6	Yes = 1, No = 0
Cancer	Ph006d10	Yes = 1, No = 0
Stomach or duodenal ulcer, peptic ulcer	Ph006d11	Yes = 1, No = 0
Hip fracture or femoral fracture	Ph006d14	Yes = 1, No = 0
Doctor told you had: other	Ph006dot	Yes = 1, No = 0
Wears glasses/contact lenses	Ph041_	Yes = 1, No = 0
Hearing aid	Ph045_	Yes = 1, No = 0
Difficulties climbing several flights of stairs	Ph048d4	Yes = 1, No = 0
Difficulties preparing a hot meal	Ph049d8	Yes = 1, No = 0
Difficulties with telephone calls	Ph049d10	Yes = 1, No = 0
Difficulties taking medications	Ph049d11	Yes = 1, No = 0
Falling down	Ph089d1	Yes = 1, No = 0
Fear of falling down	Ph089d2	Yes = 1, No = 0
Dizziness, faints or blackouts	Ph089d3	Yes = 1, No = 0
Suicidal feelings or wish to be dead in the last month	Mh004_	Yes = 1, No = 0
Trouble sleeping recently	Mh007_	Yes = 1, No = 0
Irritable recently	Mh010_	Yes = 1, No = 0
Not enough energy in last month	Mh013_	Yes = 1, No = 0
Unable to concentrate while reading	Mh015_	Yes = 1, No = 0
Difficulties joining activities (because of health)	Ph005_	Not limited = 0, limited, not severely = 0.5, severely limited = 1
High blood pressure	Ph006d2	Yes = 1, No = 0
Cholesterol	Ph006d3	Yes = 1, No = 0
Stroke	Ph006d4	Yes = 1, No = 0
Diabetes	Ph006d5	Yes = 1, No = 0
Parkinson	Ph006d12	Yes = 1, No = 0
Catarcts	Ph006d13	Yes = 1, No = 0
Difficulties seeing across street	Ph043_	None = 0, mild = 0.25, moderate = 0.5, bad = 0.75, very bad = 1
Difficulties seeing arm length	Ph044_	None = 0, mild = 0.25, moderate = 0.5, bad = 0.75, very bad = 1
Difficulties walking 100mt	Ph048d1	Yes = 1, No = 0
Difficulties sitting long	Ph048d2	Yes = 1, No = 0
Difficulties getting out chair	Ph048d3	Yes = 1, No = 0
Difficulties climbing one flight of stairs	Ph048d5	Yes = 1, No = 0

Difficulties kneeing	Ph048d6	Yes = 1, No = 0
Difficulties extending arms	Ph048d7	Yes = 1, No = 0
Difficulties pulling/pushing object	Ph048d8	Yes = 1, No = 0
Difficulties lifting 5kg	Ph048d9	Yes = 1, No = 0
Difficulties picking an object	Ph048d10	Yes = 1, No = 0
Difficulties dressing	Ph049d1	Yes = 1, No = 0
Walking across a room	Ph049d2	Yes = 1, No = 0
Difficulties bathing	Ph049d3	Yes = 1, No = 0
Difficulties eating	Ph049d4	Yes = 1, No = 0
Difficulties getting out of bed	Ph049d5	Yes = 1, No = 0
Difficulties using the toilet	Ph049d6	Yes = 1, No = 0
Difficulties using map	Ph049d7	Yes = 1, No = 0
Difficulties shopping	Ph049d9	Yes = 1, No = 0
Difficulties doing housework	Ph049d12	Yes = 1, No = 0
Difficulties managing money	Ph049d13	Yes = 1, No = 0
Depression	Mh002_	Yes = 1, No = 0
Unable to concentrate on entertainment	Mh014_	Yes = 1, No = 0
Less enjoyment	Mh016_	Yes = 1, No = 0
BMI	Bmi	(bmi <= 18.5 or bmi >= 30) = 1; (bmi >= 25 and bmi <30) = 0.5; (bmi > 18.5 and bmi < 25) = 0

Grip strength	Maxgrip and bmi	It is recorded as frail for women if (maxgrip <= 29 & bmi <= 24);
		maxgrip <= 30 & (bmi >= 24.1 & bmi <28));
		(maxgrip <= 32 & bmi > 28);
		
		for men if: (maxgrip <= 29 & bmi <= 24);
		(maxgrip <= 30 & (bmi >= 24.1 & bmi <= 28));
		(maxgrip <= 32 & bmi > 28)

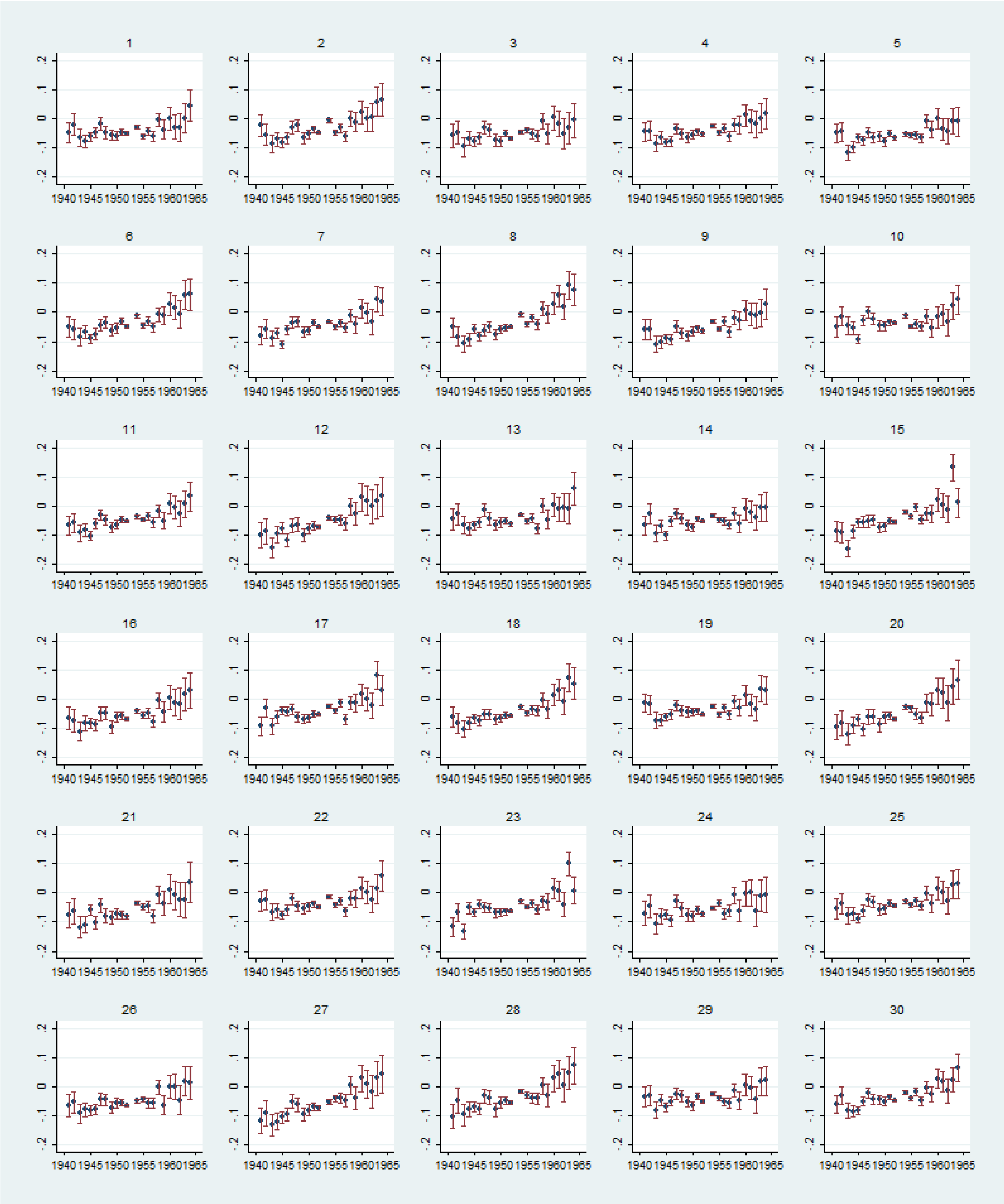
Mobility	Mobility	(mobility >= 3) = 1; (1 >= mobility < 3) = 0.5 and (mobility < 1) = 0

Figure A.1: Random Index - Women



This Figure shows the year-of-birth estimates from a regression following Equation (1) for 30 indexes that were generated by randomly including 40 out of 52 available health measures. We included country fixed effects and the mean of age. The year of reference is 1953. Confidence intervals are represented by red vertical lines. Standard errors are clustered on the year-of-birth level.

<u>**Figure A.2: Random Index – Men**</u>



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