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FOR DEMOGRAPHY AND
GLOBAL HUMAN CAPITAL



Gender Disparities in Healthy Life Expectancy at Older Ages: A Cross-National Comparison

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Motivation

- **Gender disparities in health** have been extensively studied worldwide (Case and Paxson 2005; Crimmins and Kim 2010; Andrade et al. 2011; di Lego et al. 2020; Nepomuceno et al 2021; Grundy 2006; Jacobsen et al. 2008; Mathers et al. 2001; Oksuzyan et al. 2014; Verbrugge 1989; Yong et al. 2010)
- **Men have higher mortality than women at all ages** across different nations and for many leading causes of death (Crimmins and Saito 2001; Nusselder et al. 2010; Rieker and Bird 2005; Van Oyen et al. 2013).
- **Despite living longer than men, women perform worse** in terms of disability, chronic morbidity and self-rated health outcomes - **puzzling/paradoxical that the proportion of life spent in good health is higher for men than for women** (Crimmins et al. 2002; Luy and Minagawa 2014; Robine et al. 2001; Spiers et al. 2003; Robine et al. 2009; Van Oyen et al. 2010; Yokota et al. 2019).
- **Pattern holds for different countries** and with different levels of development, gender roles and Welfare State Systems (Andrade et al. 2014; Camargos et al. 2007; Palloni and McEniry 2007; Zunzunegui et al. 2009).



Motivation

- **Cross-national comparative studies restricted** developed countries or specific regions – mostly due to data/lack of comparability of health indicators (Nusselder et al. 2010; Robine et al. 2009; Van Oyen et al. 2010; Yokota et al. 2019).
- However, **gender gaps in health are country-specific**, as different countries not only have specific health and mortality trajectories but their own **cultural and gender roles**, which may in turn affect the differentials (Okojie 1994; WCF 2018).
- Crucial to quantify health inequalities by gender and across countries with different levels of development



Objective

- **Estimate** gender disparities in health expectancy across different countries
- **Decompose** the gender gap into contributions of mortality and disability



Data

GATEWAY TO
GLOBAL
AGING
DATA

SURVEYS
AT A GLANCE

CONCORDANCE
ACROSS SURVEYS

DOCUMENTATION
AND PRESENTATIONS

GRAPHS
AND TABLES

POLICY
EXPLORER

PUBLICATIONS
BASED ON SURVEYS

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FAQ



GATEWAY TO GLOBAL AGING DATA

A platform for population survey data on aging around
the world



Study Overview	Core Interview		End of Life Interview		Life History		Health Assessment		Self-Completion		HCAP
HRS	MHAS	ELSA	SHARE	CRELES	KLoSA	JSTAR	TILDA	CHARLS	LASI	MARS	
United States	Mexico	England	20+ European countries & Israel	Costa Rica	Korea	Japan	Ireland	China	India	Malaysia	
STUDY OVERVIEW											
Respondent Eligibility											
Age Eligibility	51	50	50	50	Cohort 1: 60 / Cohort 2: 55-65	45	50-75	50	45	45	40
One or all age-eligible	one	one	all	one†	one	all	one	all	one	all	three oldest
Spouse inclusion	regardless of age	regardless of age	regardless of age	regardless of age	Cohort 1: none / Cohort 2: regardless of age	only if age eligible	none	regardless of age	regardless of age	regardless of age	none
Survey											
Method	in-person/ phone/ self-	in-person	in-person/self-	in-person/self-	in-person	in-person	in-person/self-	in-person/self-	in-person	in-person	in-person

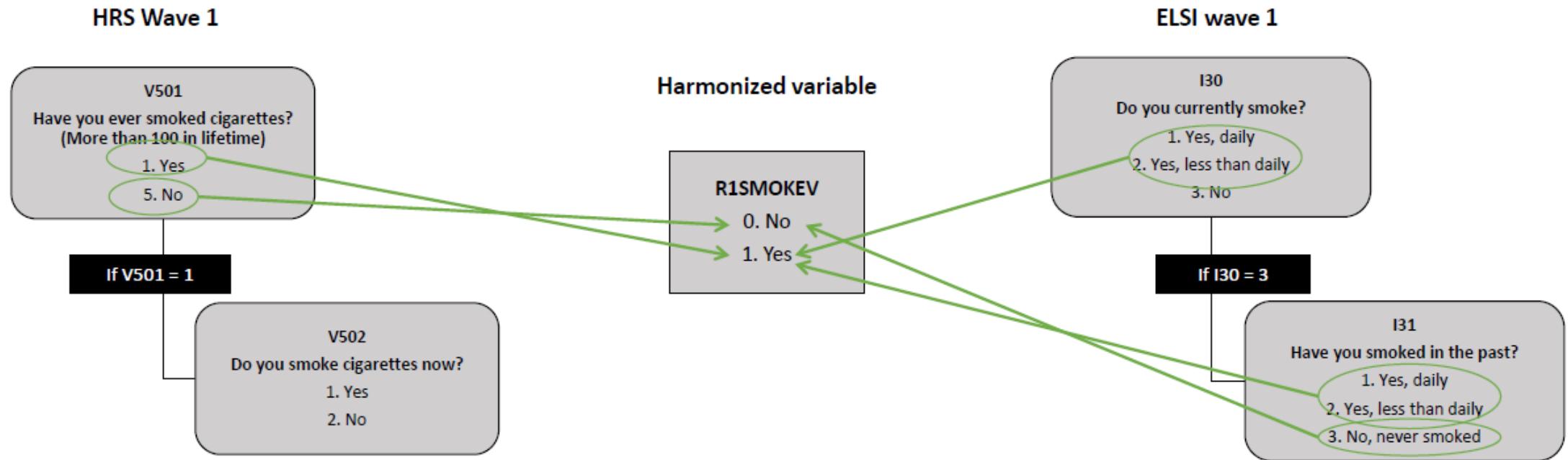
Simple Harmonization between Studies

Harmonized variable name: R1SMOKEV

Harmonized variable label: Wave 1: Has the respondent ever smoked

Harmonized variable codes:

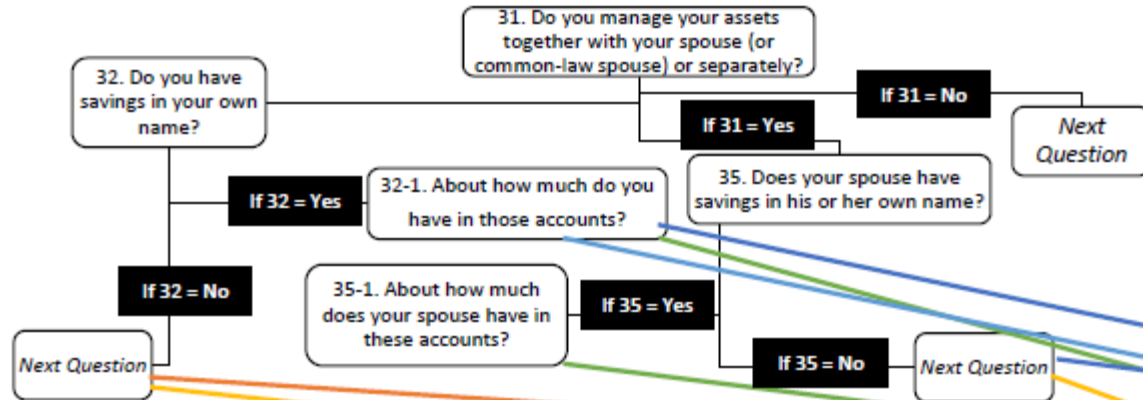
- 0. No, the respondent has never smoked
- 1. Yes, the respondent has smoked



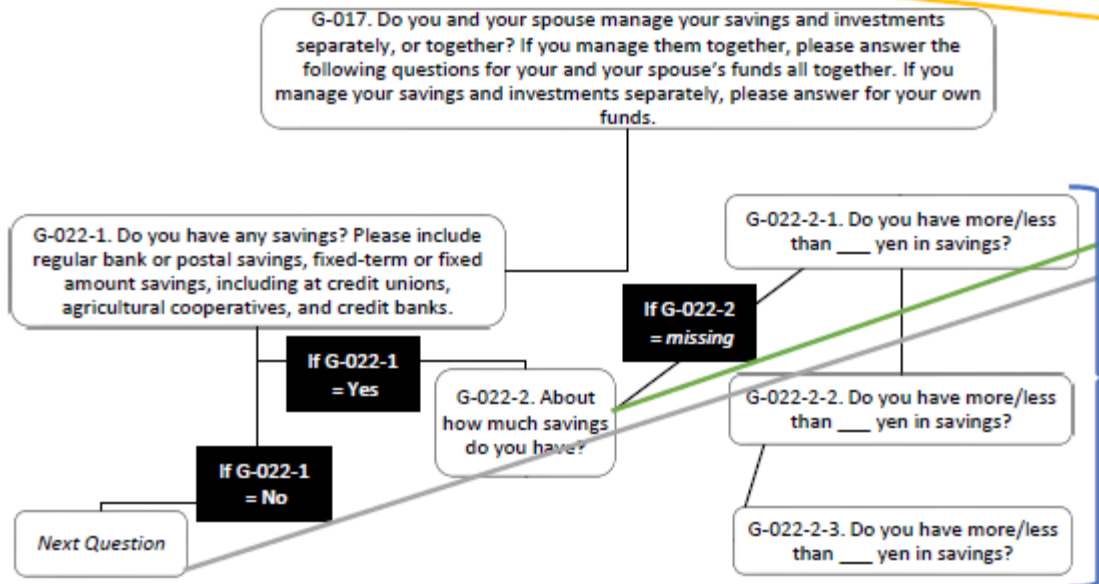
Source: Gateway to Global Aging Data, Produced by the Program on Global Aging, Health & Policy, University of Southern California with funding from the National Institute on Aging (R01 AG030153)

Complex Harmonization

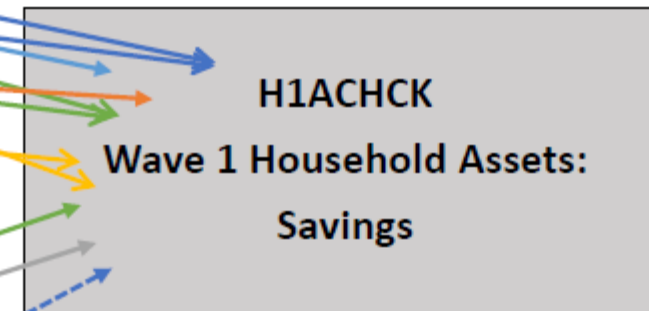
JSTAR Self-completion 2007



JSTAR CAPI 2007



Harmonized JSTAR



Source: Gateway to Global Aging Data, Produced by the Program on Global Aging, Health & Policy, University of Southern California with funding from the National Institute on Aging (R01 AG030153)

Harmonized Codebooks

Each harmonized dataset is accompanied by its own codebook.



- Introduces the harmonization project and study
- Overviews survey timing, survey design, and sampling framework
- Discusses weighting and imputation
- Divides variables into sections based on research domain
- Details specifics of harmonization process
 - Descriptive statistics
 - Categorical variable codes
 - How it was constructed
 - Differences across waves
 - Differences compared to HRS

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Source: Gateway to Global Aging Data, Produced by the Program on Global Aging, Health & Policy, University of Southern California with funding from the National Institute on Aging (R01 AG030153)

Harmonized Codebooks

Summarizes each set of variables

Categorical Variable Codes

Value-----	R1SMOKEV	R2SMOKEV	R3SMOKEV	R4SMOKEV	R5SMOKEV	R6SMOKEV	R7SMOKEV
.d:DK	11		1	2			
.m:Missing		1	6	20		193	181
.p:proxy	174			143	133		
.r:Refuse	5	1		4	2	1	
0.No	4288	3478	3773	4340	3839	3955	3585
1.Yes	7621	5952	5991	6541	6300	6452	5900
Value-----	S1SMOKEV	S2SMOKEV	S3SMOKEV	S4SMOKEV	S5SMOKEV	S6SMOKEV	S7SMOKEV
.d:DK	7		1	2			
.m:Missing		1	5	19		192	178
.p:proxy	122			136	131		
.r:Refuse	4	1		4	2	1	
.u:Unmar	3561	2671	2708	2932	2742	2802	2548
.v:SP NR	468	583	677	716	568	557	558
0.No	2837	2302	2527	2964	2625	2739	2478
1.Yes	5100	3874	3853	4277	4206	4310	3904



Source: Gateway to Global Aging Data, Produced by the Program on Global Aging, Health & Policy, University of Southern California with funding from the National Institute on Aging (R01 AG030153)

Harmonized Codebooks

Details variable creation and any assumptions made in the creation

How Constructed

RwSMOKEV indicates whether the respondent reports ever having smoked. The answer to the respondent's first ever-smoked question is fed-forward for subsequent waves. A code of 0 indicates that the respondent reports never having smoked. A code of 1 indicates that the respondent reports having ever smoked. Don't know, refused, or other missing values to RwSMOKEV are assigned special missing codes .d, .r, .m, respectively. RwSMOKEV is set to special missing .p if the smoking question was skipped because the interview was by proxy. RwSMOKEV is set to plain missing (.) for respondents who did not respond to the current wave.

SwSMOKEV indicates whether respondent's spouse reports ever having smoked and is taken directly from the spouse's responses to RwSMOKEV. In addition to the special missing codes used in RwSMOKEV, SwSMOKEV employs two other missing codes, .u and .v. Special missing value .u is used when the respondent does not report being coupled in the current wave. Special missing value .v is used when the respondent reports being coupled in the current wave but their spouse is not interviewed.



Concordance across surveys

Measure	Question	HRS	MHAS	ELSA	SHARE	KLoSA	CHARLS	LASI
ADL	Diff-bathing	w1-13	w1-4	w1-8	w1-2, w4-7	w1-7	w1-3	w1
	Diff-eating	w1-13	w1-4	w1-8	w1-2, w4-7	w1-7	w1-3	w1
	Diff-get in/out of bed	w1-13	w1-4	w1-8	w1-2, w4-7	w1-7	w1-3	w1
	Diff-using toilet	w2-13	w1-4	w1-8	w1-2, w4-7	w1-7	w1-3	w1
	Diff-walk across room	w1-13	w1-4	w1-8	w1-2, w4-7	-	-	w1
	Diff-dressing	w1-13	w1-4	w1-8	w1-2, w4-7	w1-7	w1-3	w1
	Diff-controlling urination/defecation	-	-	-	-	w1-7	w1-3	-
	Diff-brushing teeth, washing face/hair	-	-	-	-	w1-7	-	-



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Sample Characteristics

Country/Region	Survey	Wave	Number of Observations
USA	HRS	12	18,747
England	ELSA	7	9,666
Korea	KLoSA	5	7,029
China	CHARLS	3	16,344
India*	LASI	1	52,393
Europe**	SHARE	6	66,877
Mexico	MHAS	4	17,616

- Number of Interviews/eligible respondents
- Age >50
- Non-institutionalized

* Data for India refers to year 2016/2017 and not 2014/2015

** only added in Wave 7 and thus not included in this study: Finland, Lithuania, Latvia, Slovakia, Romania, Bulgaria, Malta and Cyprus.



Source: Gateway to Global Aging Data, Produced by the Program on Global Aging, Health & Policy, University of Southern California with funding from the National Institute on Aging (R01 AG030153)

Methods Part I: disability-free life expectancy (DFLE) with Sullivan (1971)

total number of person-years
lived in the age group x and $x + n$

$$\underbrace{L_{x+n}^i}_{\text{the number of person-years lived without disability between ages } x \text{ and } x + n} = \overbrace{L_{x+n}}^{\text{total number of person-years lived in the age group } x \text{ and } x + n} \underbrace{\left(1 - \pi_{x+n}\right)}_{\text{proportion of disabled individuals in the age group } x \text{ and } x + n.}$$

the number of person-years lived
without disability between ages x and
 $x + n$

proportion of disabled
individuals in the age
group x and $x + n$.



Methods Part I: disability-free life expectancy (DFLE) with Sullivan (1971)

$$DFLE_x = \frac{\sum_{k=x}^w L_{k+n}^i}{l_x}$$

Mortality data comes from:

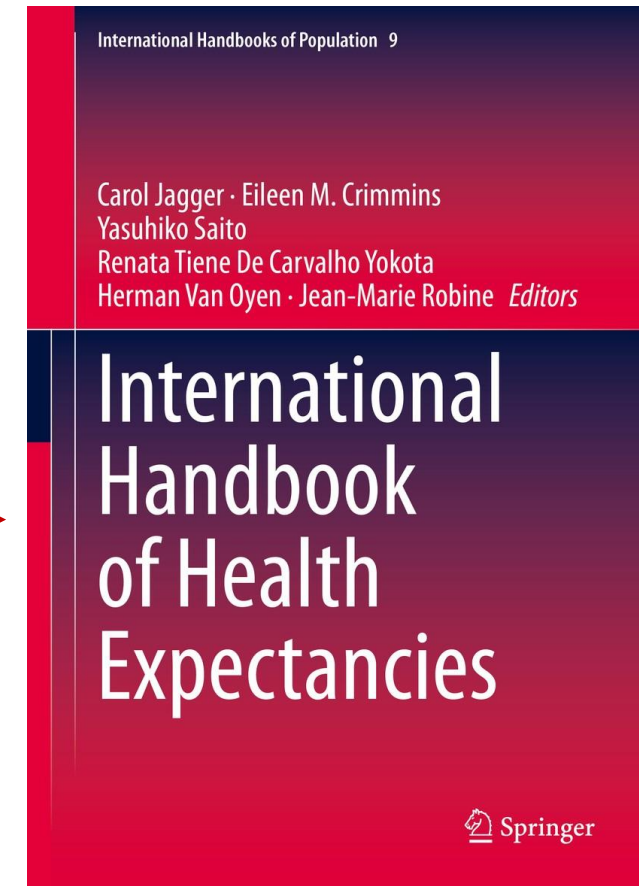
1. HMD for European Countries, USA and Korea;
2. Eurostat for Pooled EU countries;
3. United Nations for China, Mexico and India
4. ONS for England

$$\Delta DFLE_x = DFLE_x^{Women} - DFLE_x^{Men}$$



Methods Part II: Decomposing the gender gaps

- Continuous change decomposition method (Horiuchi 2008)
- Implemented in R by Riffe (2018).
- Description van Raalte and Nepomuceno (2020).
- Former application for the case of LAC countries (Nepomuceno, di Lego, Turra 2021)
- **Split the gender gap** in DFLE into mortality and disability effects.



Results



Table 2 - Decomposition of Gender Difference in Total Life Expectancy (LE), Life Expectancy Free of Disability (DFLE), and Life Expectancy With Disability (LEWD) into mortality and disability effect at age 60

Country/Survey	LE	DFLE
USA (HRS)	2.98	1.59
China (CHARLS)	3.81	0.79
Mexico (MHAS)	2.64	0.71
India (LASI)	1.63	-0.16
Korea (KLoSA)	4.76	3.27
England (ELSA)	2.68	1.60
Europe (SHARE)		
<i>Europe (Pooled)</i>	4.01	1.94
Denmark	3.00	2.92
Portugal	4.14	-0.69



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Country/Survey	LE	DFLE	Components	
			Mortality	Disability
USA (HRS)	2.98	1.59	2.18	-0.59
China (CHARLS)	3.81	0.79	2.31	-1.52
Mexico (MHAS)	2.64	0.71	1.88	-1.16
India (LASI)	1.63	-0.16	1.08	-1.23
Korea (KLoSA)	4.76	3.27	3.84	-0.57
England (ELSA)	2.68	1.60	1.77	-0.17
Europe (SHARE)				
<i>Europe (Pooled)</i>	4.01	1.94	2.72	-0.78
Denmark	3.00	2.92	2.29	0.62
Portugal	4.14	-0.69	2.23	-2.92

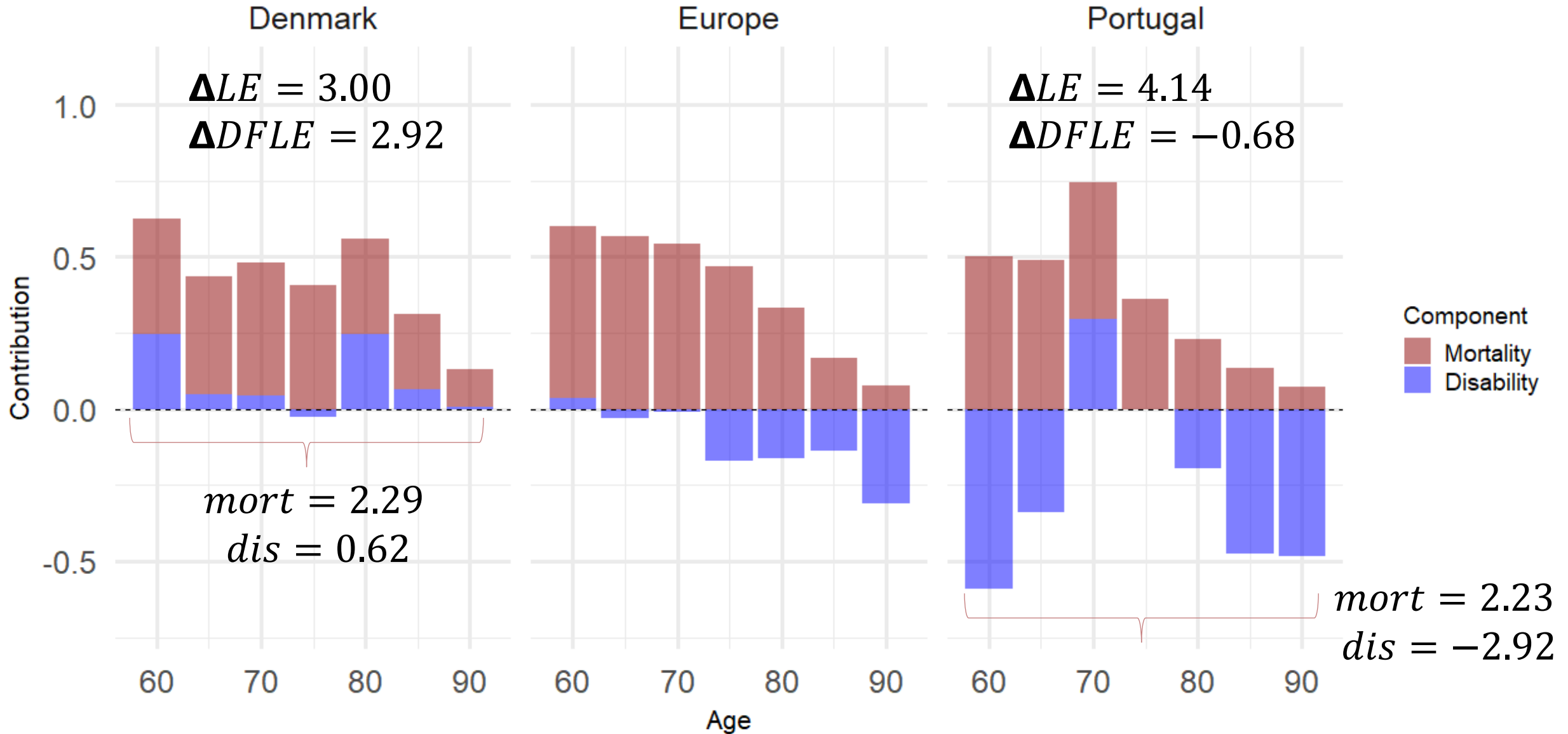


Table 2 - Decomposition of Gender Difference in Total Life Expectancy (LE), Life Expectancy Free of Disability (DFLE), and Life Expectancy With Disability (LEWD) into mortality and disability effect at age 60

Country/Survey	LE	DFLE	Components		LEWD	Components	
			Mortality	Disability		Mortality	Disability
USA (HRS)	2.98	1.59	2.18	-0.59	1.39	0.80	0.59
China (CHARLS)	3.81	0.79	2.31	-1.52	3.02	1.50	1.52
Mexico (MHAS)	2.64	0.71	1.88	-1.16	1.93	0.76	1.16
India (LASI)	1.63	-0.16	1.08	-1.23	1.79	0.55	1.23
Korea (KLoSA)	4.76	3.27	3.84	-0.57	1.49	0.92	0.57
England (ELSA)	2.68	1.60	1.77	-0.17	1.08	0.91	0.17
Europe (SHARE)							
<i>Europe (Pooled)</i>	4.01	1.94	2.72	-0.78	2.07	1.29	0.78
Denmark	3.00	2.92	2.29	0.62	0.08	0.71	-0.62
Portugal	4.14	-0.69	2.23	-2.92	4.83	1.91	2.92

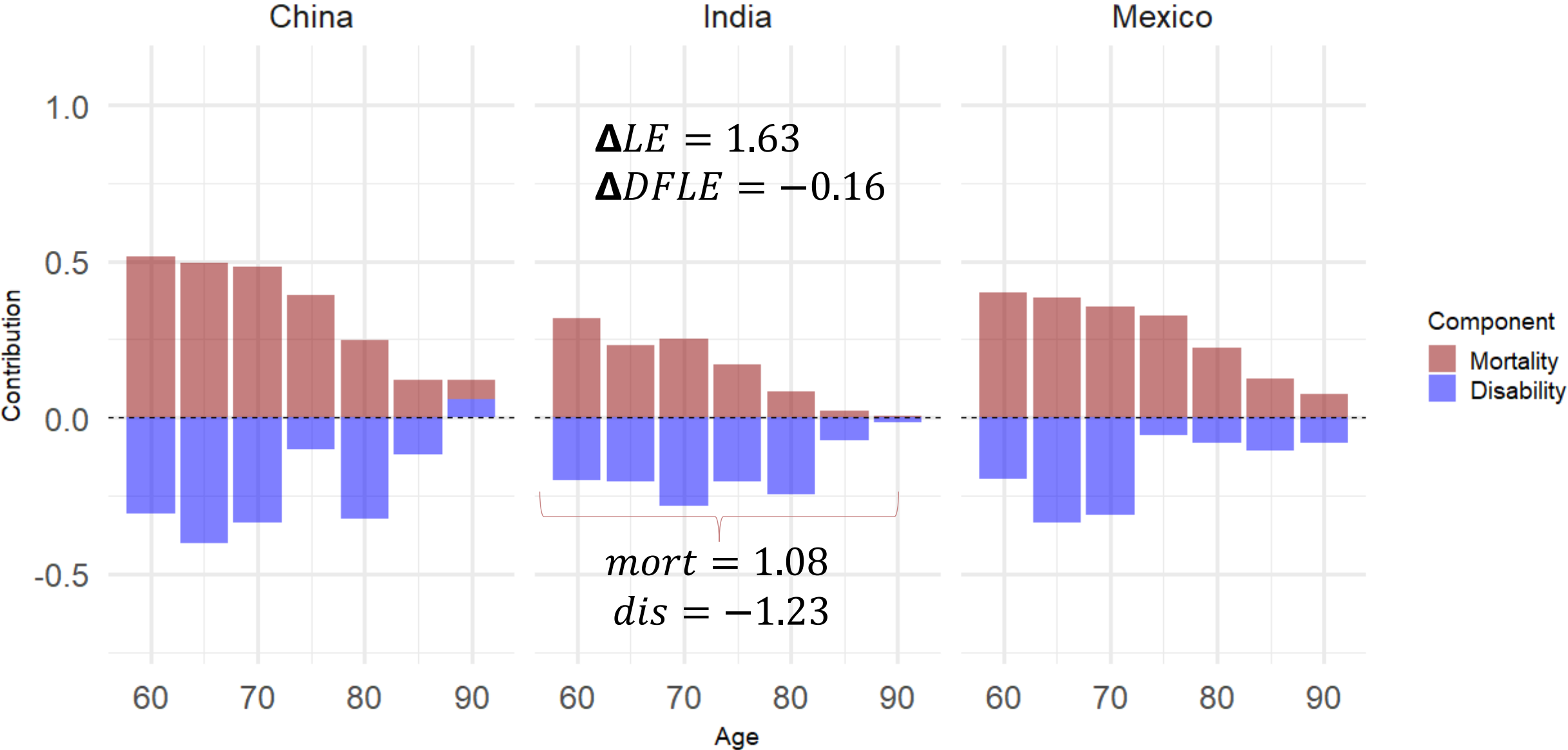


Figure 1. Contribution of Mortality and Disability to the Gender Gap in DFLE, by age



Source: Gateway to Global Aging Data, Produced by the Program on Global Aging, Health & Policy, University of Southern California with funding from the National Institute on Aging (R01 AG030153)

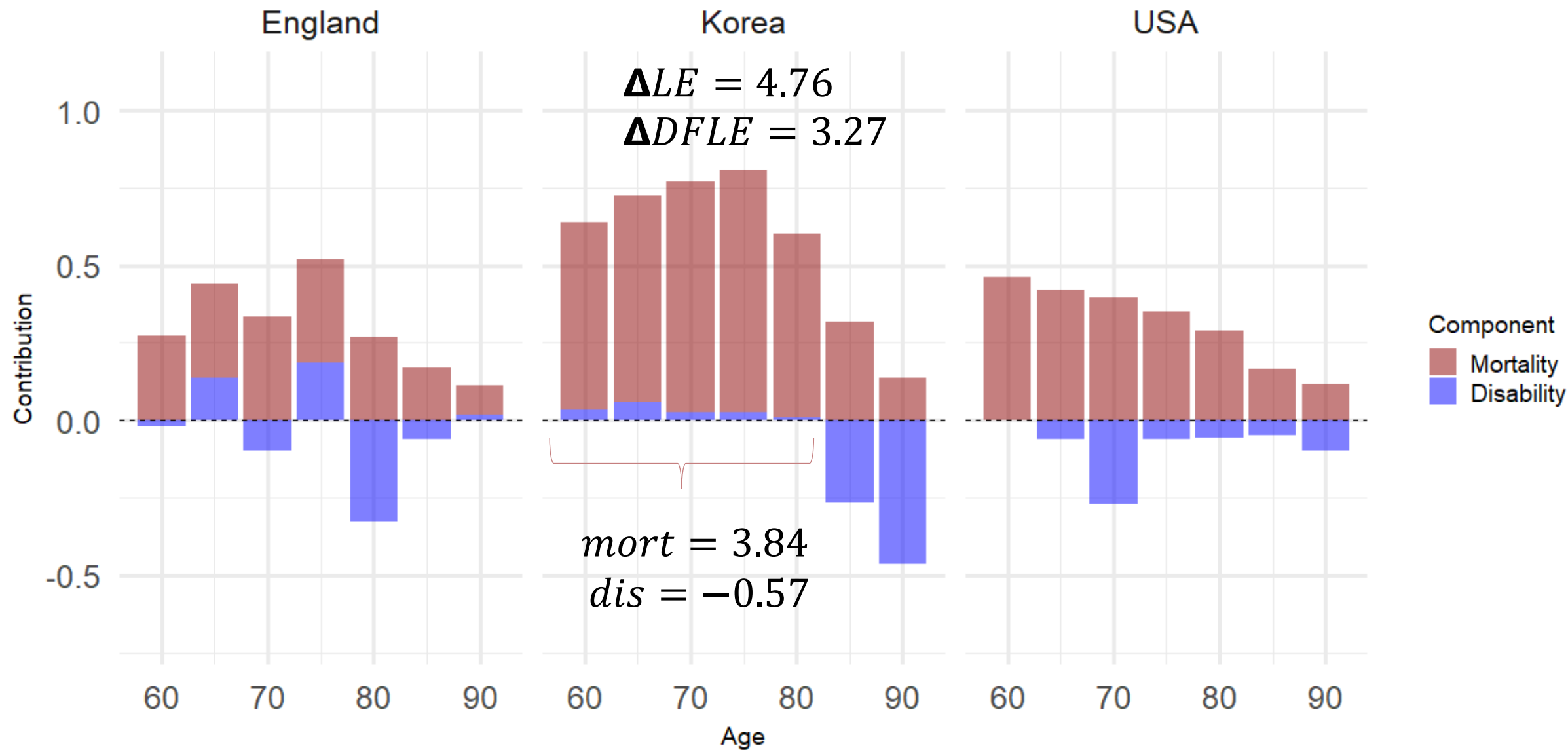
Figure 2. Contribution of Mortality and Disability to the Gender Gap in DFLE, by age



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Figure 3. Contribution of Mortality and Disability to the Gender Gap in DFLE, by age



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Discussion, Limitations and Caveats

- **Gender differences in mortality and disability can be examined simultaneously** by estimating and decomposing the gender gap in life expectancy.
- **The gap is important but does not tell the whole story** – decomposing the gap is key.
- Approach can be used to further investigate the male-female health survival gender paradox.
- **Cross-country comparisons are challenging but important** to identify patterns and unpack gender differences in health and associations with Welfare State Systems, gender roles, etc.
- **!!ADLs are one dimension of health – important to include/analyse others**
- **!!Sensitivity tests with other health dimensions** and compare different sources for validity (SHARE-SILC for Europe, e.g.)



Thank you!

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Levels and Trends of Health Expectancy: Understanding its Measurement and Estimation Sensitivity



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