

Demographic determinants of population ageing in European countries

Michael Murphy, London School of Economics

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What determines population ageing?



“in more developed countries, the massive improvements in survivorship from one birth cohort to the next have been the most important source of aging. Less developed countries have also enjoyed huge increases in survival from one cohort to the next, therefore the contribution of mortality and fertility declines were similar”

(Preston & Stokes, 2012)

“Fertility decline is, by far, the most important cause of population ageing”

(Wilmoth 2015)

The demographic determinants of population ageing



Components

Fertility

Mortality

Net Migration

Methods

Stable & related models

Projections scenarios

Preston, Himes & Eggars
(PHE, 1989) model

Stable population model:

% population in age group with alternative demographic regimes



Gross reproduction rate (GRR)	Age group			Expectation of life at birth (e_0)	Age group		
	0-14	15-59	60 & over		0-14	15-59	60 & over
2.5	42.7	51.4	5.9	40	17.0	62.6	20.4
2.0	36.8	54.7	8.5	50	17.8	60.7	21.5
1.5	29.3	57.7	13.0	60.4	18.7	59.4	21.9
1.0	19.5	58.6	21.9	70.2	19.5	58.6	21.9

GRR panel based on $e_0=70.2$ & e_0 panel on GRR=1
Source: United Nations (1956), Tables 15 & 16.

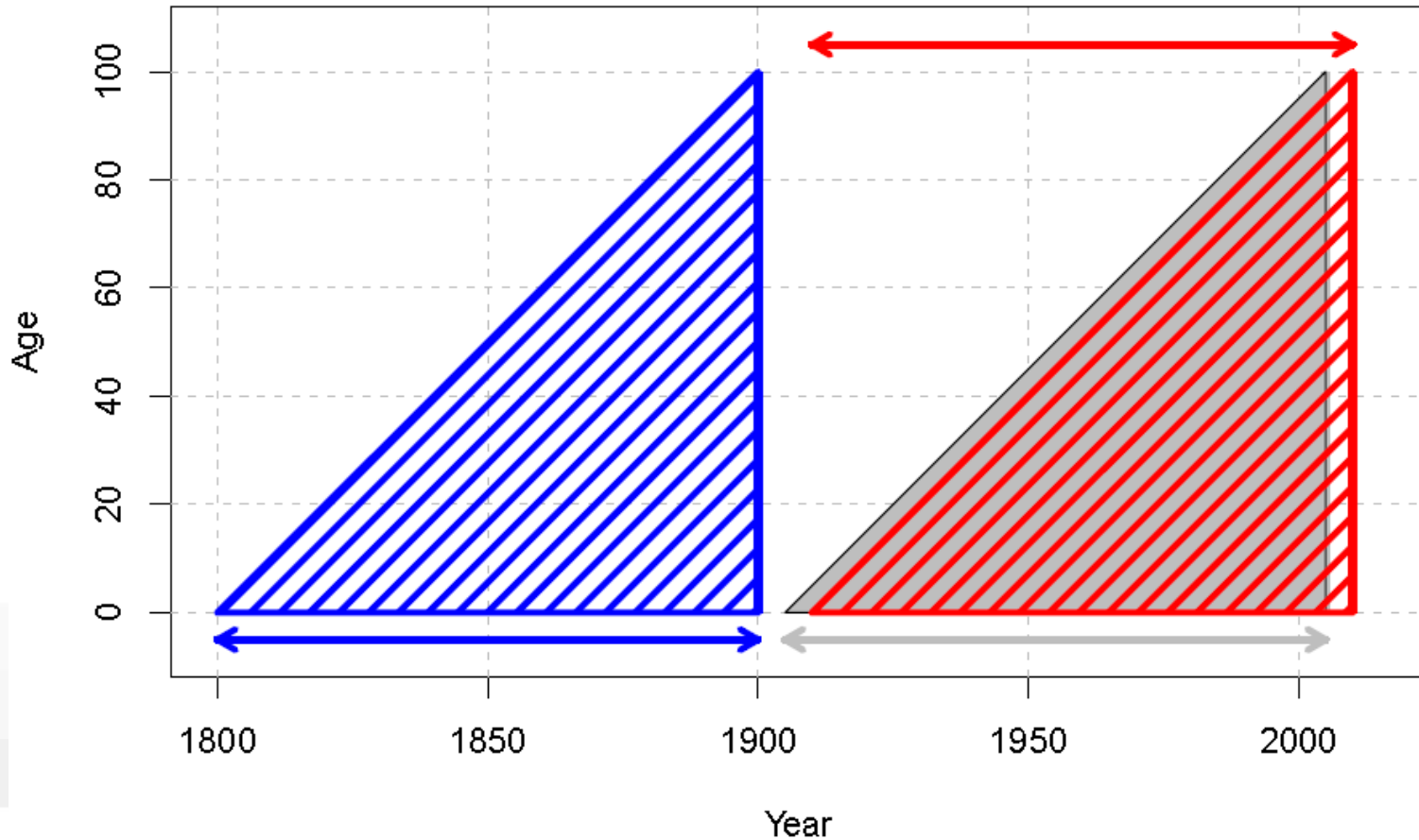
Mean ages and differences under alternative scenarios, Sweden and United Kingdom



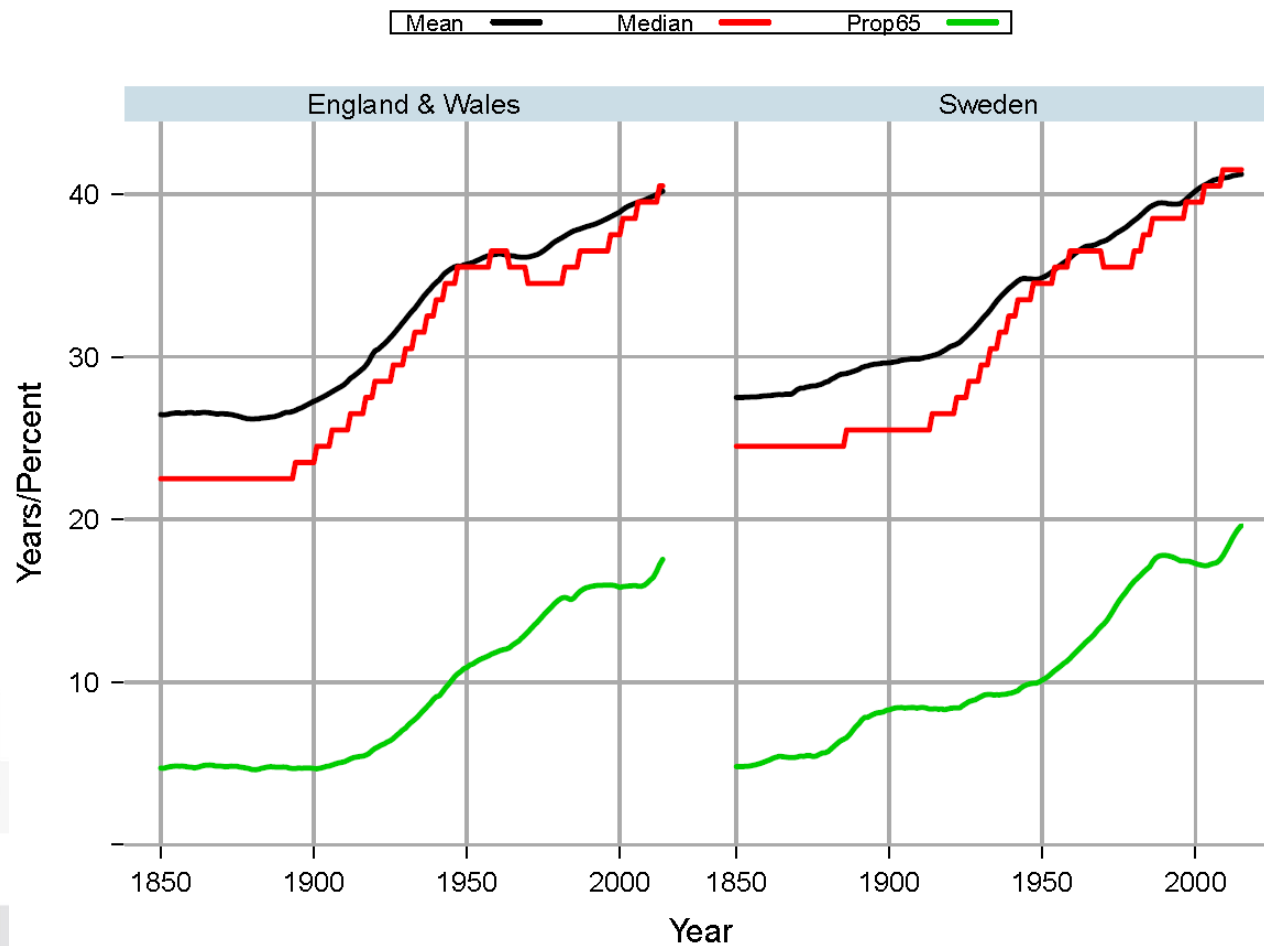
	Projection Year		Difference	
	1970	2015	2015 - 1970	2015 Scenario - Actual
Sweden				
Actual	37.1	41.7	4.6	-
Fertility fixed	37.1	40.1	2.9	1.6
Mortality fixed	37.1	40.0	2.8	1.7
Migration zero	37.1	43.3	6.2	-1.6
UK				
Actual	35.9	40.5	4.6	-
Fertility fixed	35.9	37.5	1.5	3.0
Mortality fixed	35.9	39.5	3.6	1.0
Migration zero	35.9	41.9	6.0	-1.4

Source: Based on United Nations (2014) & DemProj.

Data used for PHE estimation in years 1900, 2005 & 2010

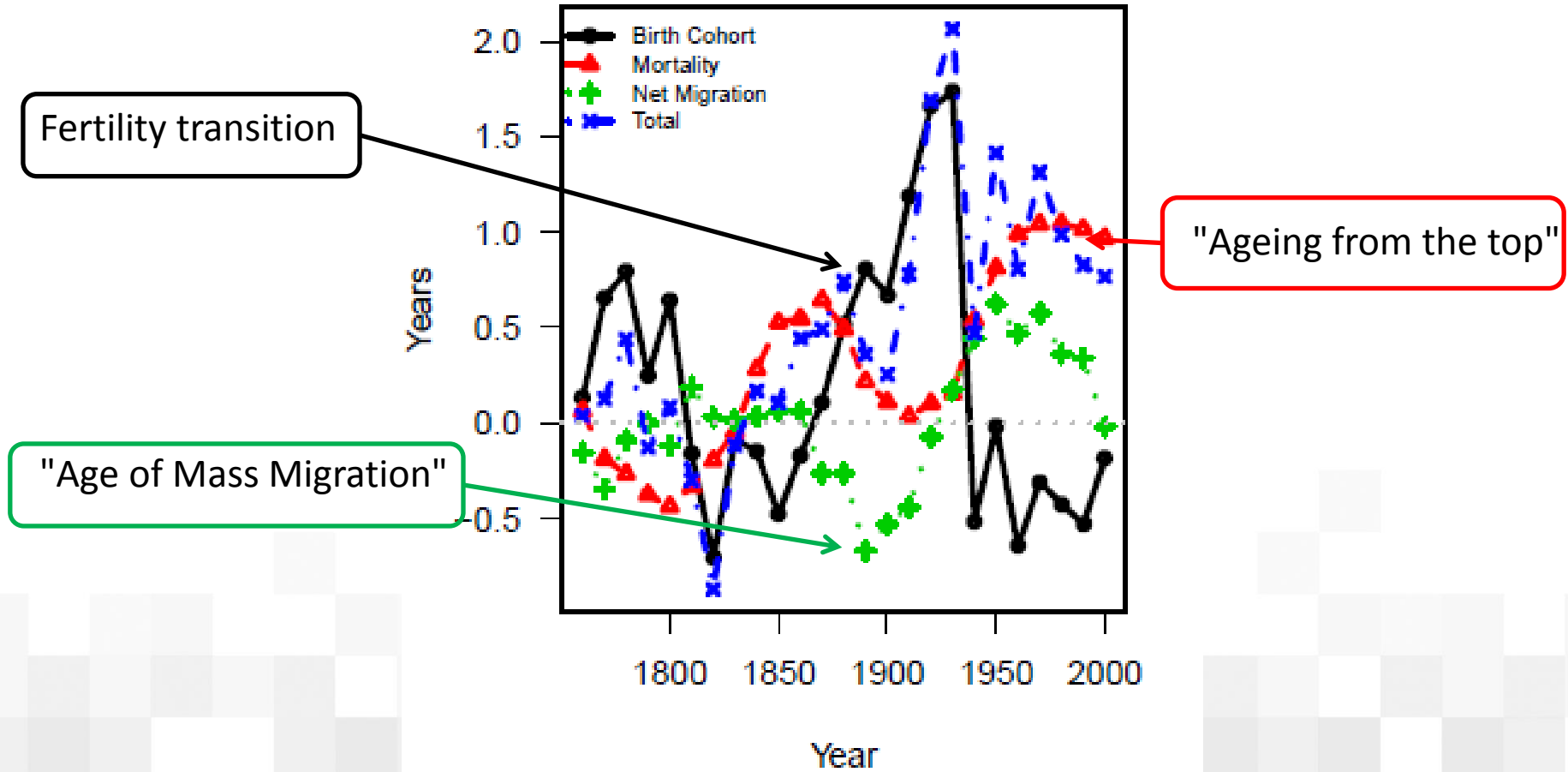


Indicators of Population Ageing



Source: Human Mortality Database.

Decadal changes in population mean age, Sweden. 1751-2013



"Many people appear to believe, for example, that high immigration at young ages makes a population younger. However, ... it is changes in migration rates that contribute to the growth rate, not the level itself."
Preston & Stokes, 2012, pp223-4

Conclusion



While the question of the relative contribution of fertility and mortality to population ageing is one that has been discussed for many decades, there does not appear to be a clear unique answer to the question. All methods discussed are correct, but they emphasise different aspects.

Horiuchi (1991, p. 42): “It is important to distinguish direct and indirect effects of mortality changes on population growth. The present method [such as PHE] is concerned with direct mortality effects only. Mortality reduction, however, has some indirect effects. ... Such indirect mortality effects working through fertility are difficult to assess when the present method is adopted”. The population projections method includes both direct and indirect effects.

References



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