The raising of life expectancy in southern Europe and the importance of older ages: A cross-sectional comparison between Portugal, Spain and Italy.

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Introduction: *The evolution of Life Expectancy at Birth*
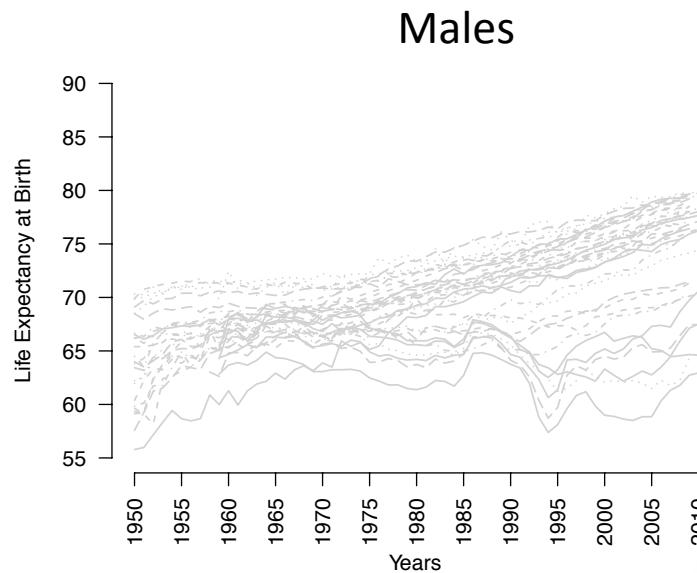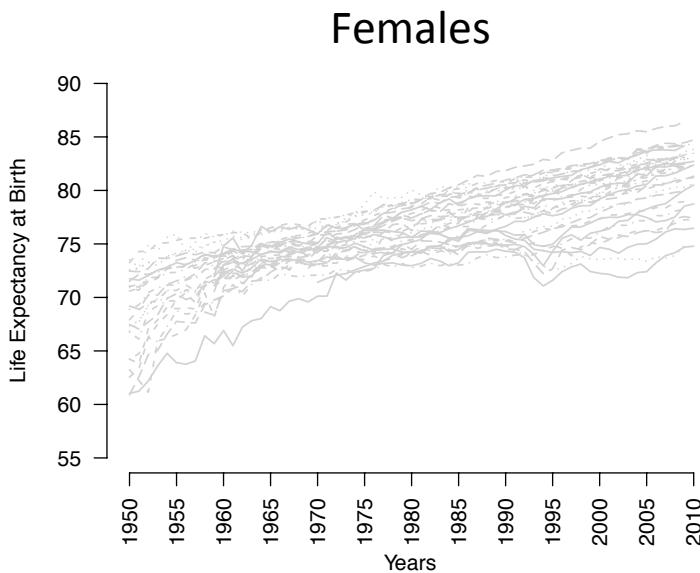
Females

Males

Source: HMD

# Introduction: *The evolution of Life Expectancy at Birth*

Source: HMD

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Introduction: *A different perspective about lifespan*
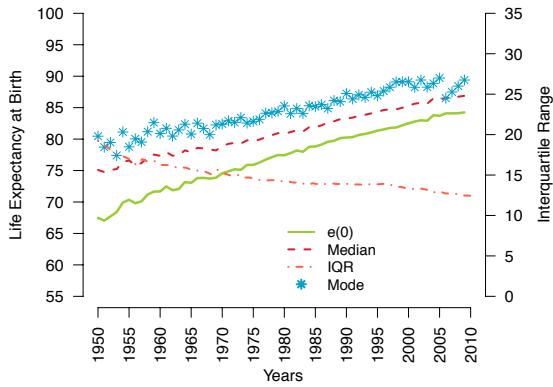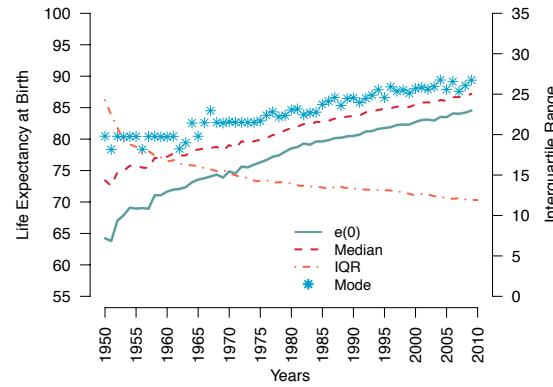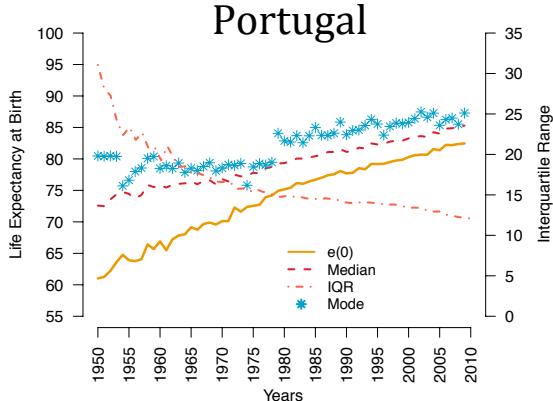
Source: HMD, own calculation.
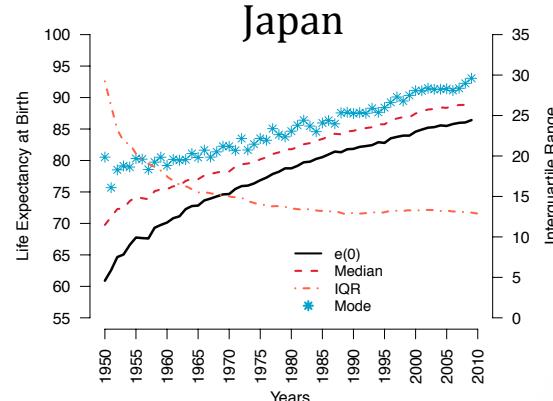
Introduction: *A different perspective about lifespan*
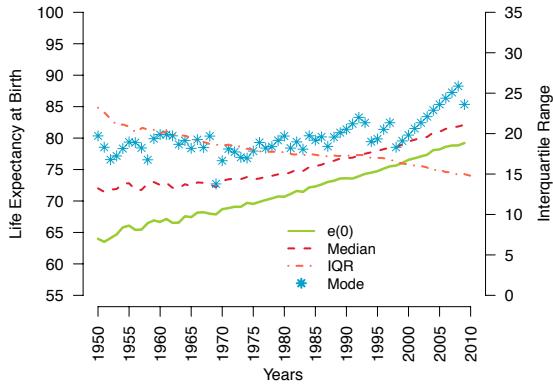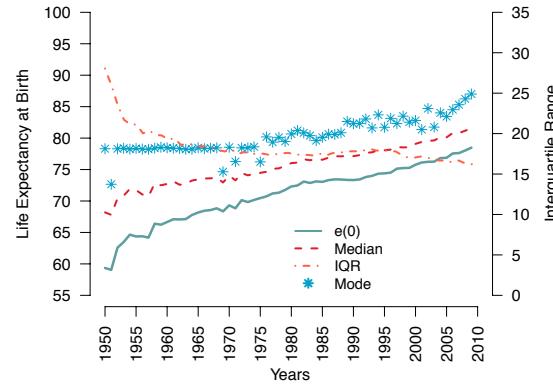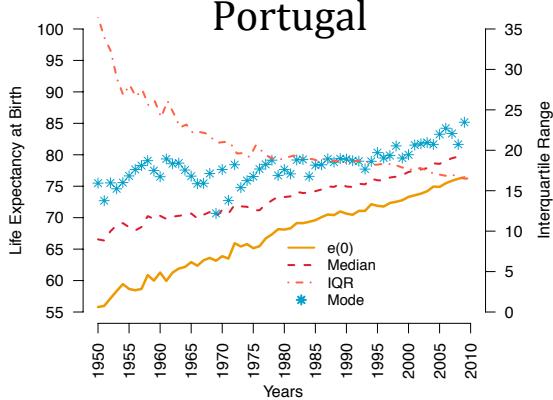
Source: HMD, own calculation.
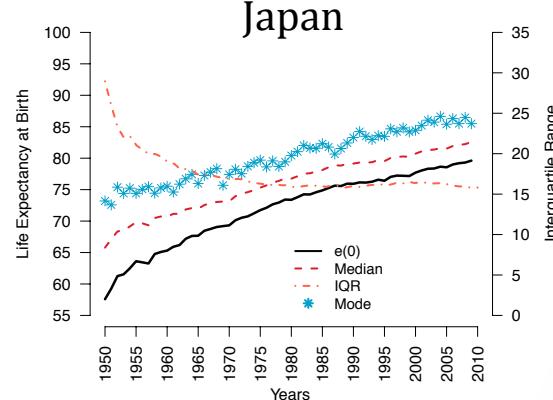
Introduction: *The literature explanation*

- In a general way, literature about the evolution of lifespan, refers that:

    - Life Expectancy is breaking old theorized limits;

    - Record Life Expectancy at Birth presents an almost linear evolution across time;

    - Resulting essentially from:
        i.   Massive reductions in mortality rates associated to young ages (first phase);
        ii. And, in a second phase, in mortality rates registered at older ages.

        - Only possible due to generalized improvements in public health.

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Aim of the study

- We intend to analyze the specific cases of three selected countries (Italy, Spain and Portugal):

  - Identify which old ages, more specifically;

  - Analyze the impact of different causes of death;

  - And if possible, also identify a behavioral pattern similar across the countries.

The impact of older ages in the evolution of LE at birth: A Simple Perspective
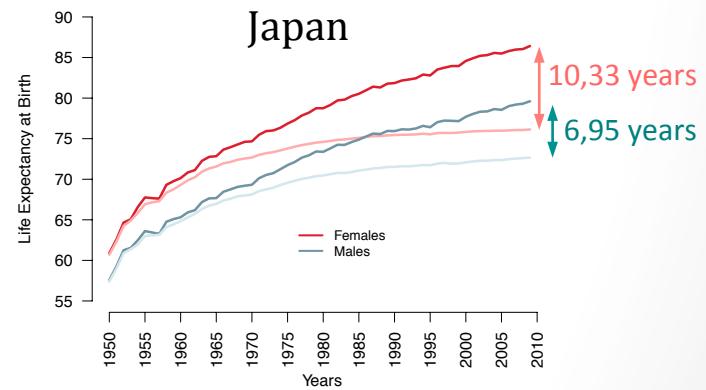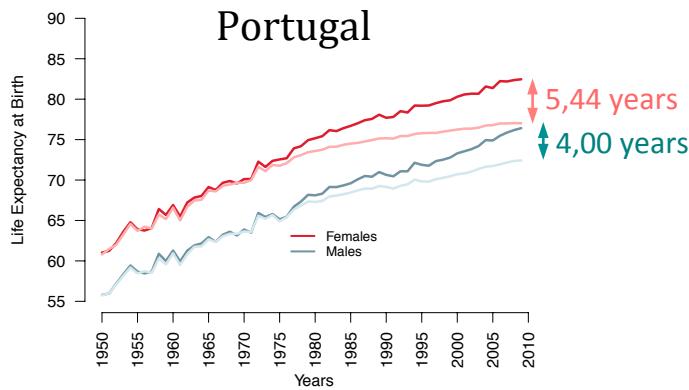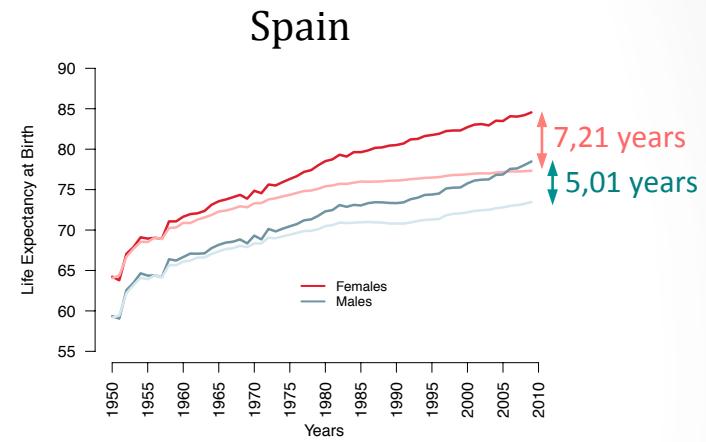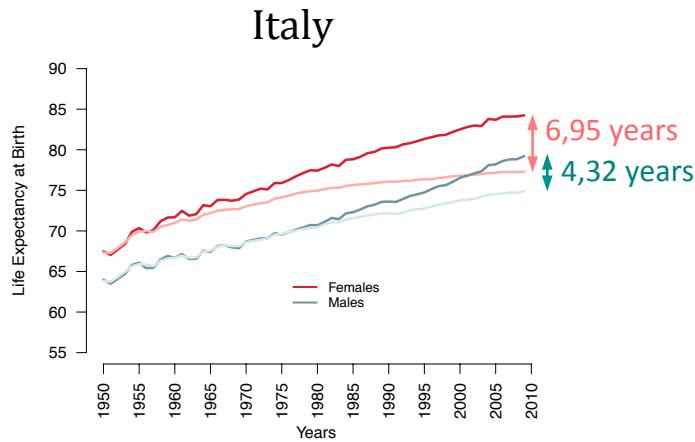
Source: HMD, own calculation.

However, we like to complicate things a bit! ☺

Methodology I

1. Multiple decrement life tables for analyzing the impact that cause of death has in the LE at birth for the population, individually, where:

    i. Conventional LE is given by

$$e_x = \frac{T_x}{l_x}$$

    ii. And LE without the impact of a certain cause of death by

$$^*e_x^{-i} = \frac{^*T_x^{-i}}{^*l_x^{-i}}$$

Methodology II

2. Two different decomposition approaches:

    i. Arriaga (1984)

$$e_0^2 - e_0^1 = \sum_x {}_n\Delta_x$$

where:

$${}_n\Delta_x = \frac{l_x^1}{l_0^1}\left(\frac{{}_nL_x^2}{l_x^2} - \frac{{}_nL_x^1}{l_x^1}\right) + \frac{T_{x+n}^2}{l_0^1}\left(\frac{l_x^1}{l_x^2} - \frac{l_{x+n}^1}{l_{x+n}^2}\right)$$

and for the open-end age group:

$${}_\infty\Delta_x = \frac{l_x^1}{l_0^1}\left(\frac{T_x^2}{l_0^2} - \frac{T_x^1}{l_0^1}\right)$$

Methodology III

2. Two different decomposition approaches:

    ii.   Shkolnikov et al. (2001)

$$_n e_{x,j} = \frac{_n M_{x,j}^1 - {}_n M_{x,j}^2}{_n M_x^1 - {}_n M_x^2} \Delta_x$$

Data

- Data for this study was collected from the Human Mortality Database and from Eurostat;

- Major COD groups (rearranged):
    1. Infectious diseases;
    2. Neoplasms;
    3. Endocrine, nutritional and metabolic diseases;
    4. Diseases of the nervous system;
    5. Diseases of the circulatory system;
    6. Diseases of the respiratory system;
    7. Diseases of the digestive system;
    8. External causes of death;
    9. Remaining causes of dead.

Results

Increasing life Expectancy at Birth I - Italy

Females
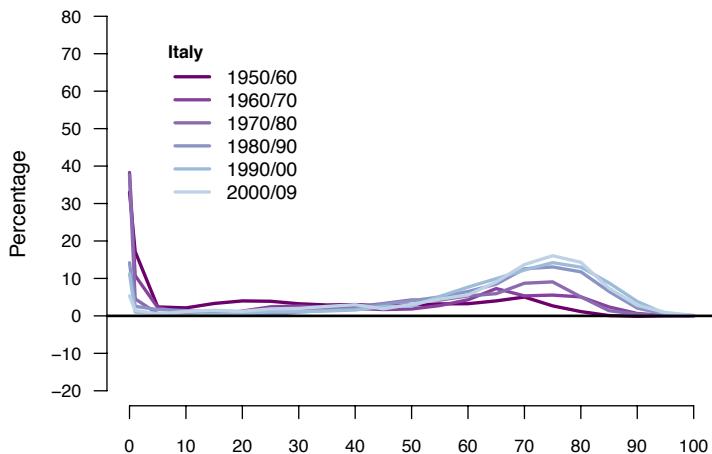
Males
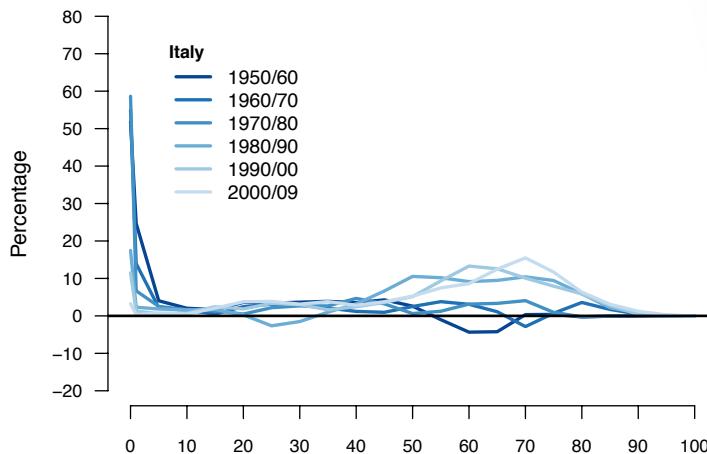
	Females		Males	
	e_0	Increase	e_0	Increase
1950	67,33	—	63,83	—
1960	71,58	4,25	66,56	2,73
1970	74,48	2,89	68,62	2,06
1980	77,36	2,88	70,60	1,98
1990	80,18	2,82	73,54	2,93
2000	82,43	2,25	76,47	2,93
2009	84,14	1,71	79,14	2,68

Increasing life Expectancy at Birth II - Spain

Females
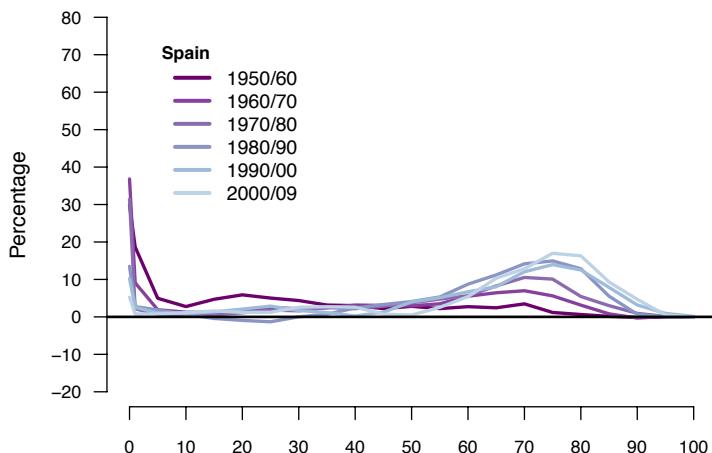
Males
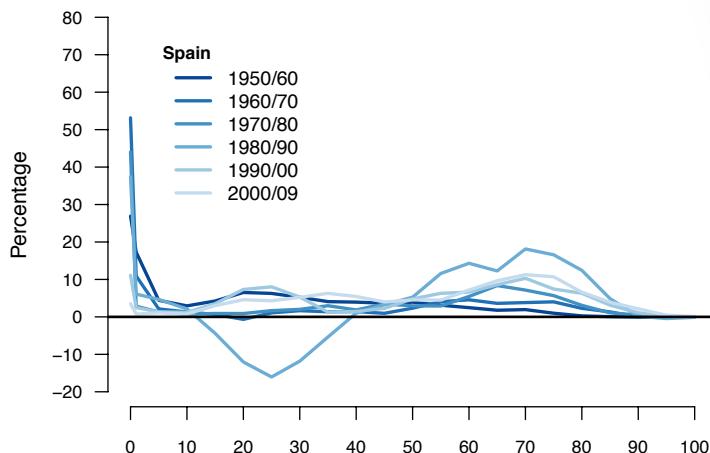
	Females		Males	
	e_0	Increase	e_0	Increase
1950	64,05	—	59,17	—
1960	71,55	7,50	66,56	7,38
1970	74,80	3,25	69,24	2,69
1980	78,47	3,67	72,27	3,03
1990	80,45	1,98	73,27	1,00
2000	82,66	2,21	75,70	2,43
2009	84,49	1,83	78,43	2,72

Increasing life Expectancy at Birth III - Portugal

Females
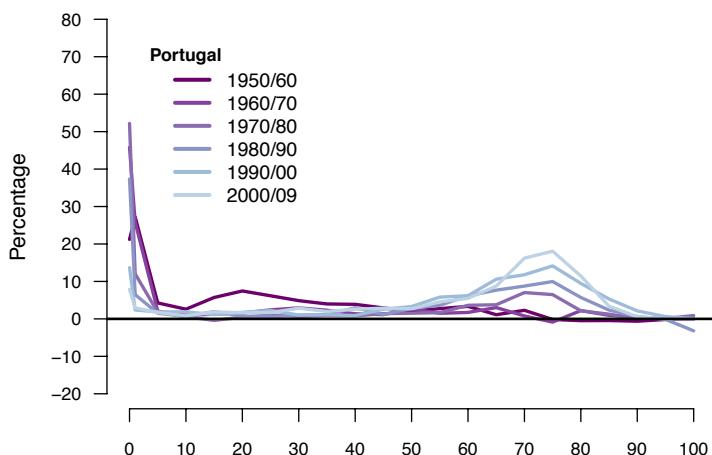
Males
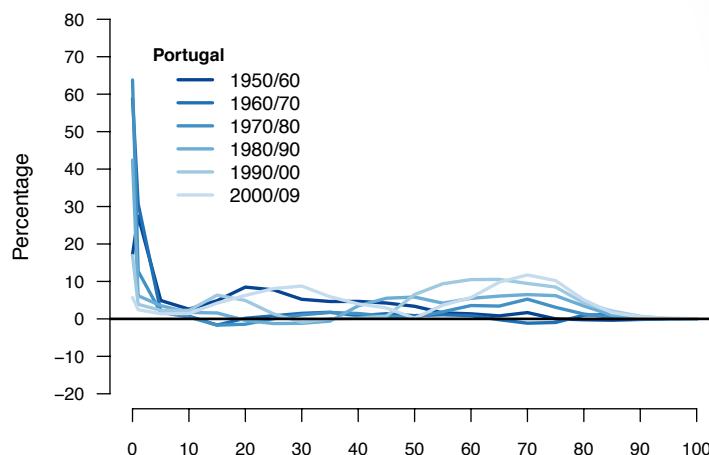
	Females		Males	
	e_0	Increase	e_0	Increase
1950	60,80	—	55,75	—
1960	66,69	5,89	61,05	5,31
1970	70,01	3,31	63,76	2,70
1980	75,17	5,16	68,03	4,27
1990	77,61	2,44	70,57	2,53
2000	80,22	2,61	73,22	2,65
2009	82,38	2,16	76,35	3,13

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Cause of death & Life Expectancy at Birth in the last decade: Males
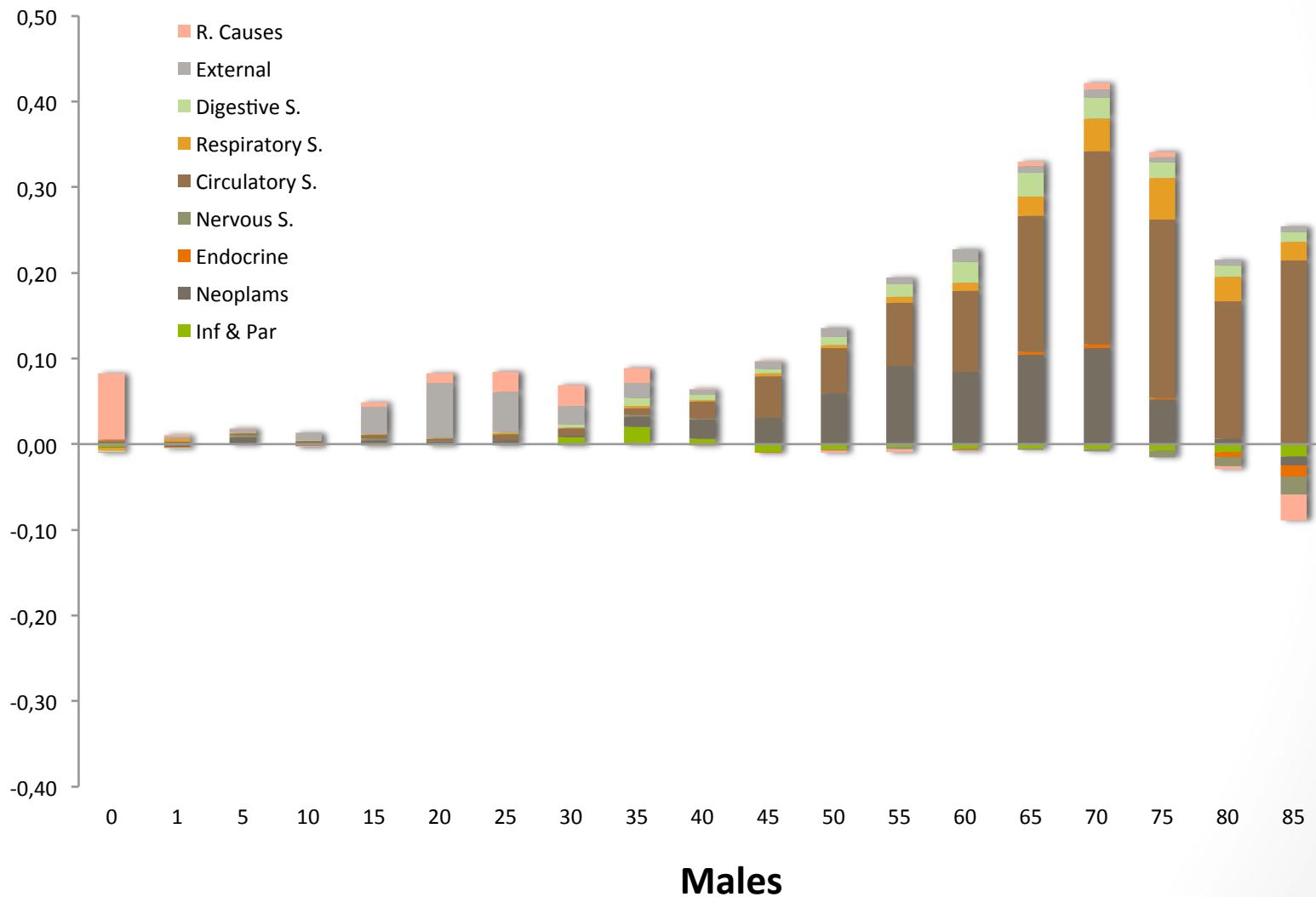
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Cause of death & Life Expectancy at Birth - Italy

Cause of death & Life Expectancy at Birth - Spain

Legend: R. Causes, External, Digestive S., Respiratory S., Circulatory S., Nervous S., Endocrine, Neoplams, Inf & Par

Males

Cause of death & Life Expectancy at Birth - Portugal

Legend:
- R. Causes
- External
- Digestive S.
- Respiratory S.
- Circulatory S.
- Nervous S.
- Endocrine
- Neoplams
- Inf & Par
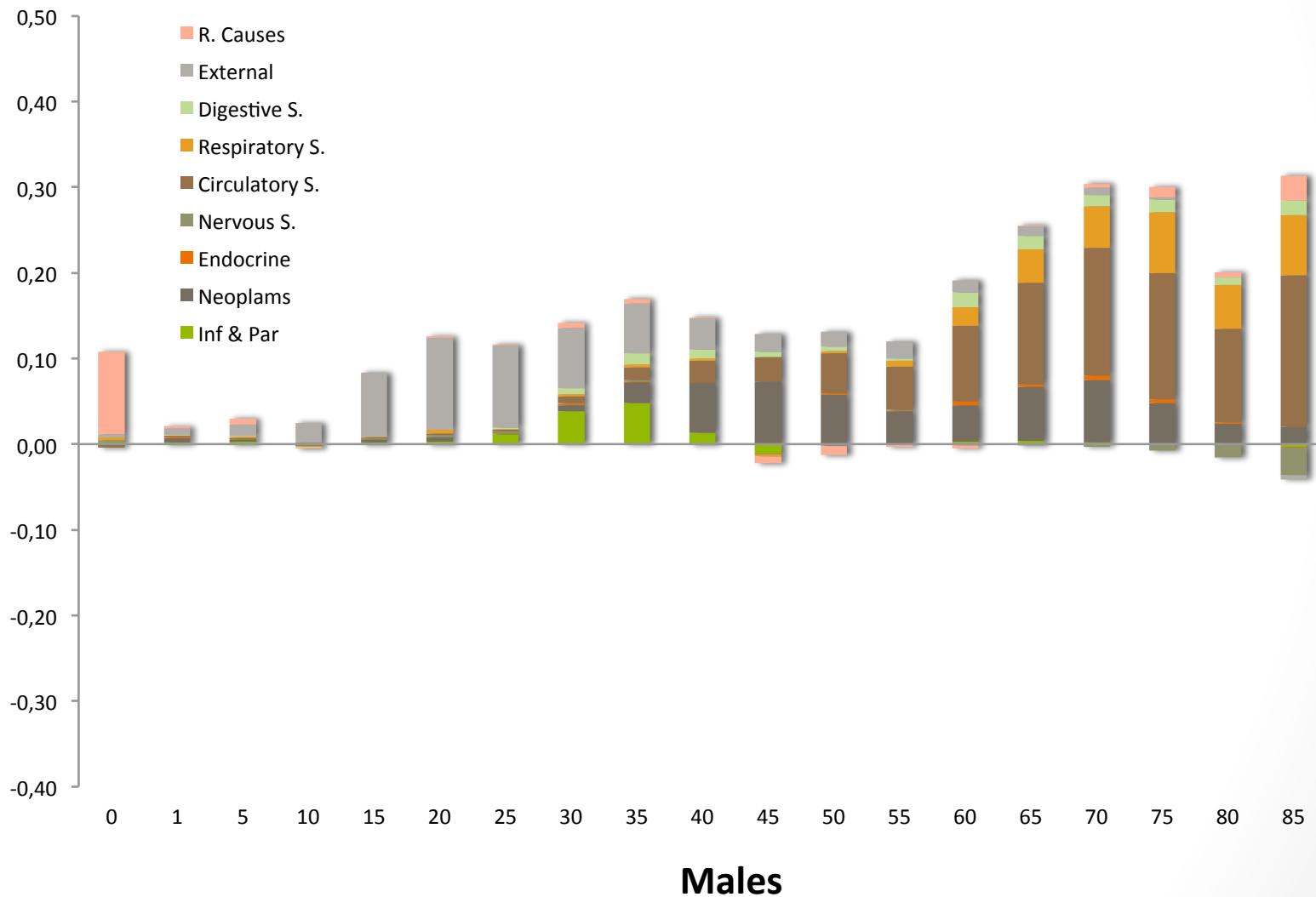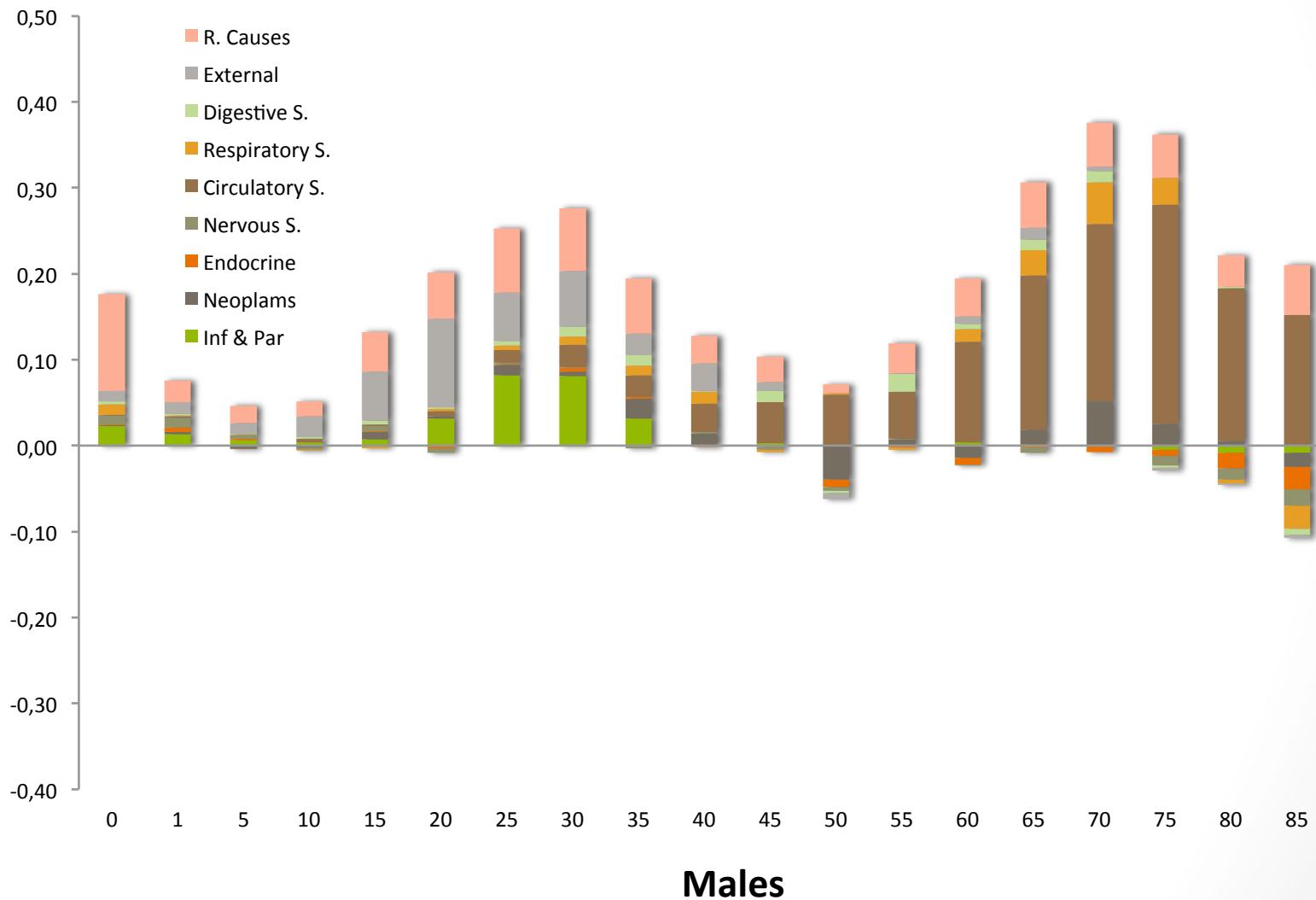
Males

Cause of death & Life Expectancy at Birth in the last decade: Females

Cause of death & Life Expectancy at Birth - Italy
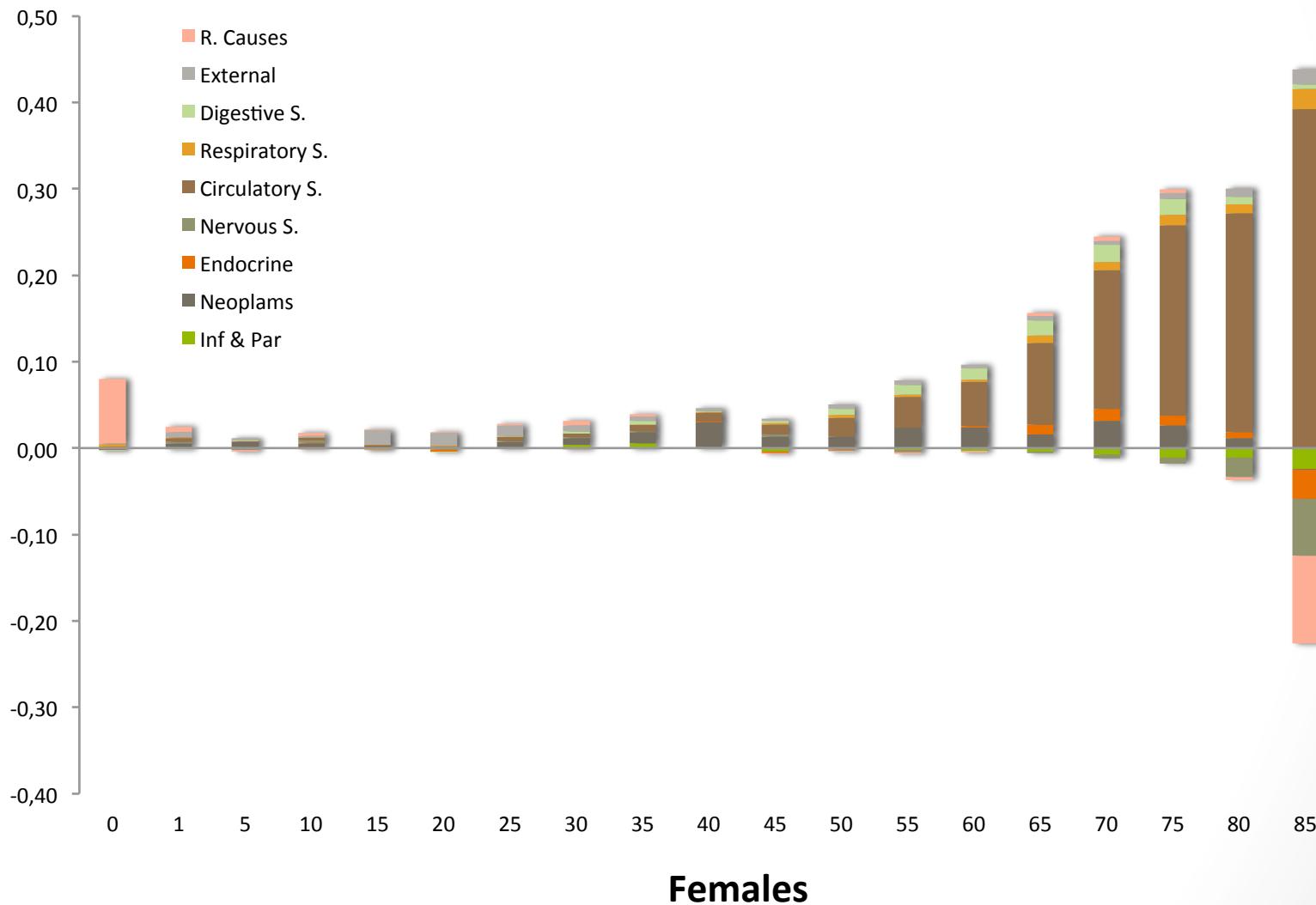
Cause of death & Life Expectancy at Birth - Spain

Legend:
- R. Causes
- External
- Digestive S.
- Respiratory S.
- Circulatory S.
- Nervous S.
- Endocrine
- Neoplams
- Inf & Par

Females

Cause of death & Life Expectancy at Birth - Portugal

Legend:
- R. Causes
- External
- Digestive S.
- Respiratory S.
- Circulatory S.
- Nervous S.
- Endocrine
- Neoplams
- Inf & Par

Females
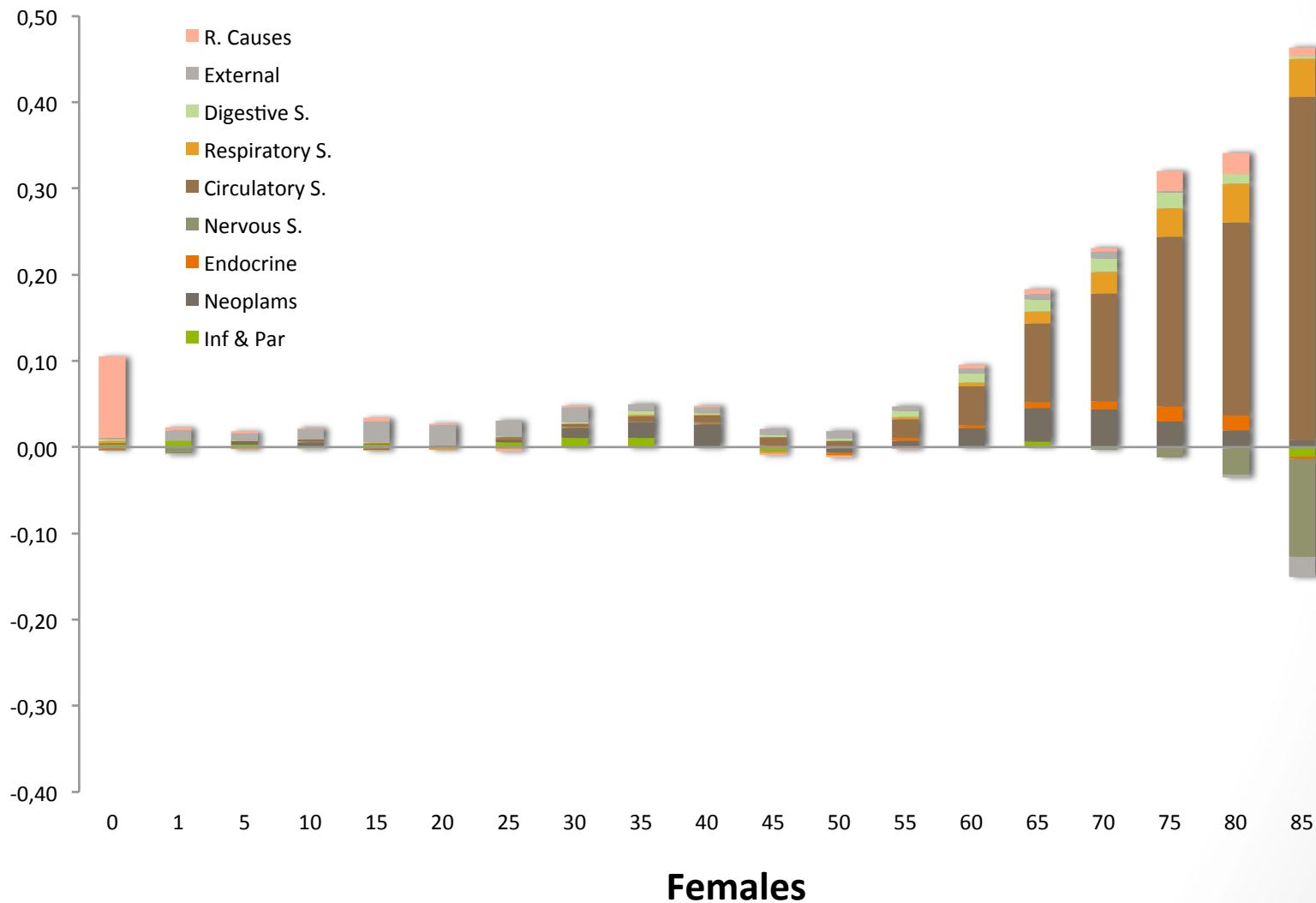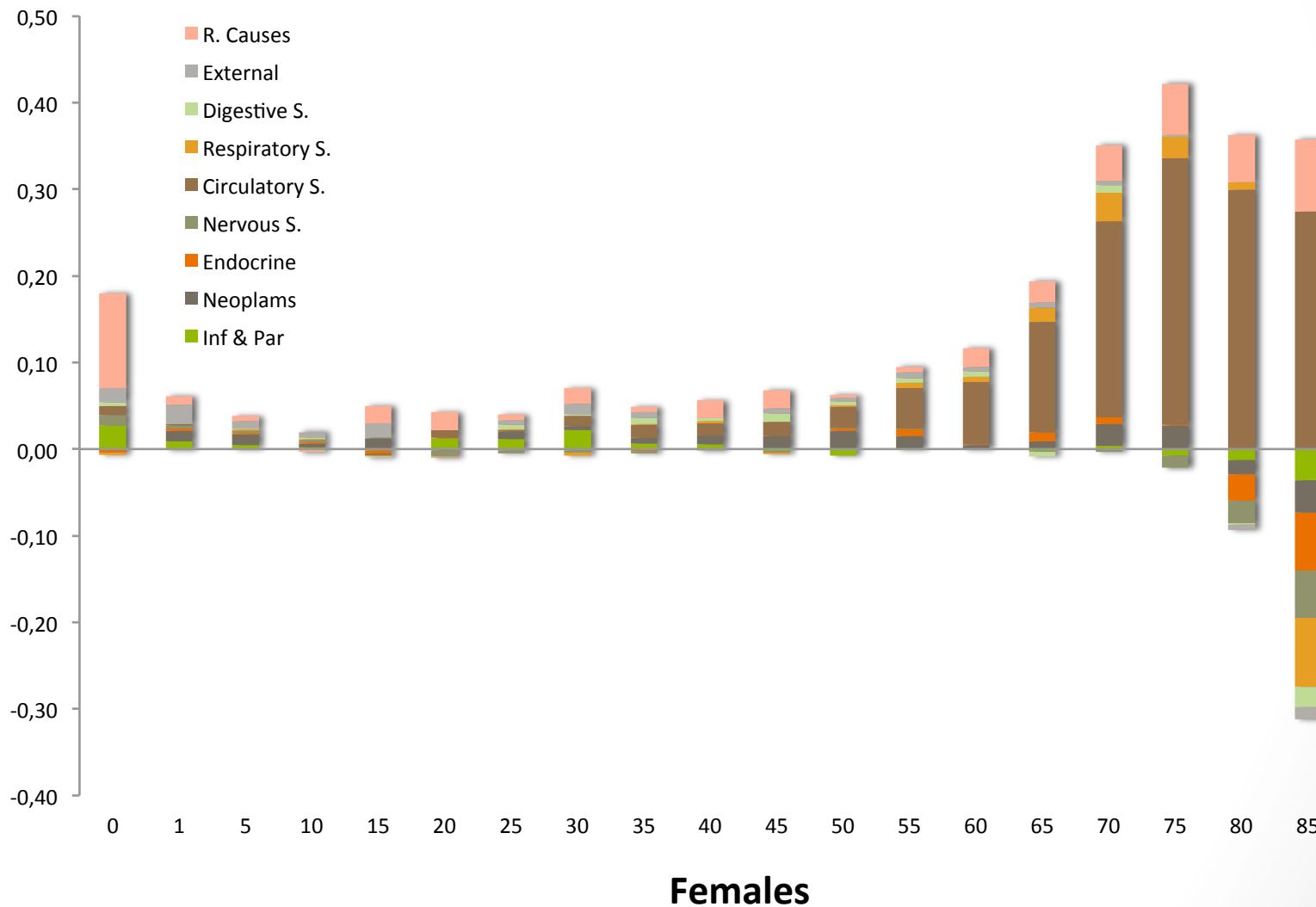
Cause of death & Life Expectancy at Birth

Italy

Year	Inf & Par M	Inf & Par F	Neoplasms M	Neoplasms F	Endocrine M	Endocrine F	Nervous S. M	Nervous S. F	Circulatory S. M	Circulatory S. F	Respiratory S. M	Respiratory S. F	Digestive S. M	Digestive S. F	External M	External F	R. Causes M	R. Causes F
1994	0,50	0,23	4,48	3,48	0,37	0,52	0,34	0,34	6,51	10,19	0,84	0,60	0,79	0,63	1,35	0,65	1,15	1,17
2000	0,25	0,18	4,52	3,57	0,42	0,54	0,36	0,38	6,34	9,82	0,90	0,66	0,66	0,56	1,27	0,64	1,03	1,09
2009	0,30	0,24	4,68	3,70	0,50	0,60	0,45	0,53	5,27	7,74	0,89	0,67	0,57	0,51	1,08	0,55	1,02	1,25

Spain

Year	Inf & Par M	Inf & Par F	Neoplasms M	Neoplasms F	Endocrine M	Endocrine F	Nervous S. M	Nervous S. F	Circulatory S. M	Circulatory S. F	Respiratory S. M	Respiratory S. F	Digestive S. M	Digestive S. F	External M	External F	R. Causes M	R. Causes F
1994	0,80	0,39	4,40	3,01	0,33	0,51	0,32	0,32	5,30	8,59	1,31	0,86	0,86	0,64	1,53	0,58	1,28	1,58
2000	0,43	0,28	4,49	2,97	0,34	0,47	0,38	0,46	4,38	6,51	1,53	1,10	0,76	0,61	1,49	0,57	1,29	1,73
2009	0,34	0,27	4,74	3,07	0,37	0,48	0,51	0,73	4,01	5,38	1,55	1,13	0,74	0,59	1,00	0,45	1,40	1,87

Portugal

Year	Inf & Par M	Inf & Par F	Neoplasms M	Neoplasms F	Endocrine M	Endocrine F	Nervous S. M	Nervous S. F	Circulatory S. M	Circulatory S. F	Respiratory S. M	Respiratory S. F	Digestive S. M	Digestive S. F	External M	External F	R. Causes M	R. Causes F
1994	0,58	0,26	3,12	2,59	0,43	0,54	0,31	0,25	6,03	8,80	1,01	0,76	0,86	0,56	2,00	0,77	2,46	2,38
2000	0,74	0,37	3,30	2,61	0,40	0,53	0,32	0,29	4,92	7,20	1,18	1,01	0,75	0,48	1,54	0,58	2,65	2,24
2009	0,52	0,35	3,85	2,76	0,54	0,67	0,38	0,40	3,70	5,02	1,35	1,19	0,75	0,49	1,23	0,50	2,03	1,88

Conclusions I

- Is a fact that LE is increasing, independently of sex and observed country;

- Older ages are the ones that contribute the most for this evolution, more specifically:
  i. After age 60 (females);
  ii. Between ages 20 and 79, for males.

- Breaking down this contributions by COD, in the last decade, can be seen that major contributions came from reductions in mortality rates associated to diseases of the **circulatory system** and **neoplasms**, mainly at older ages;

Conclusions II

- And in the specific case of males, there is evidence to affirm that deaths connected with **external** causes are still needed to be taken into account;

- Summing up, ones can say that are the diseases of the **circulatory system** and the **neoplasms** that have the highest impact in life expectancy in all three countries;

- However, **circulatory system** diseases have a stronger impact in females LE, and **neoplasms** in males.

Thank you very much! ☺