

# 2023 INTERNATIONAL CONGRESS OF ACTUARIES



# BRIDGE TO TOMORROW

28 MAY – 1 JUNE 2023 • SYDNEY





# Income related mortality of Lithuanian Seniors in the Light of Covid-19

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*This presentation has been prepared for the 2023 International Congress of Actuaries.  
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# Why mortality of seniors?

- Mortality shape in 65+ age group may be different from the one of whole population
- Important for pensions and annuity funds



# Why mortality of seniors?

- Is correlation between income and mortality present?
- Was correlation between Covid related excess mortality and income observed?

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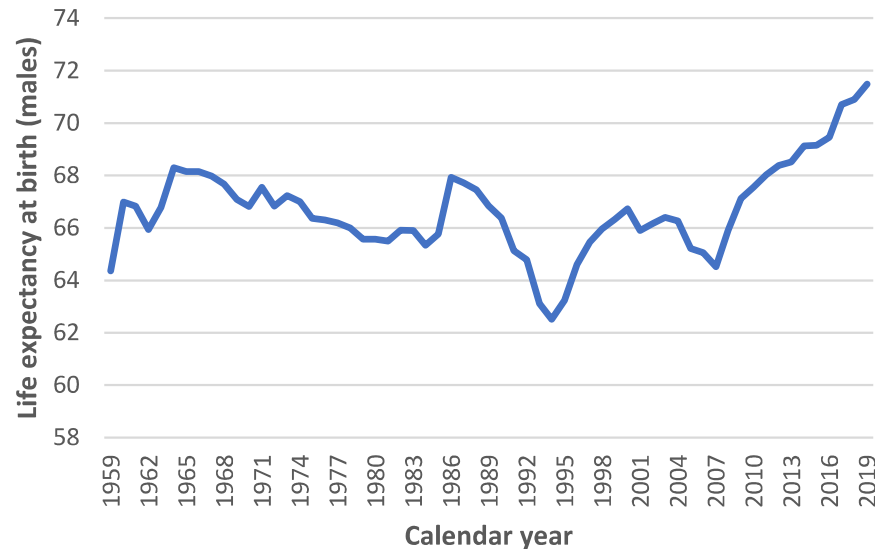


# GENERAL SITUATION

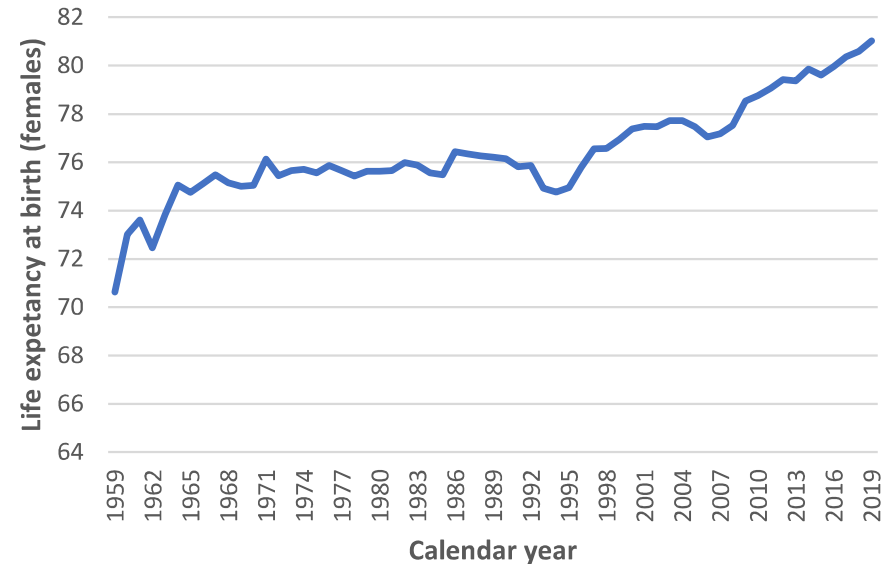


# Positive changes in mortality during 1995 – 2019\*

## Males



## Females

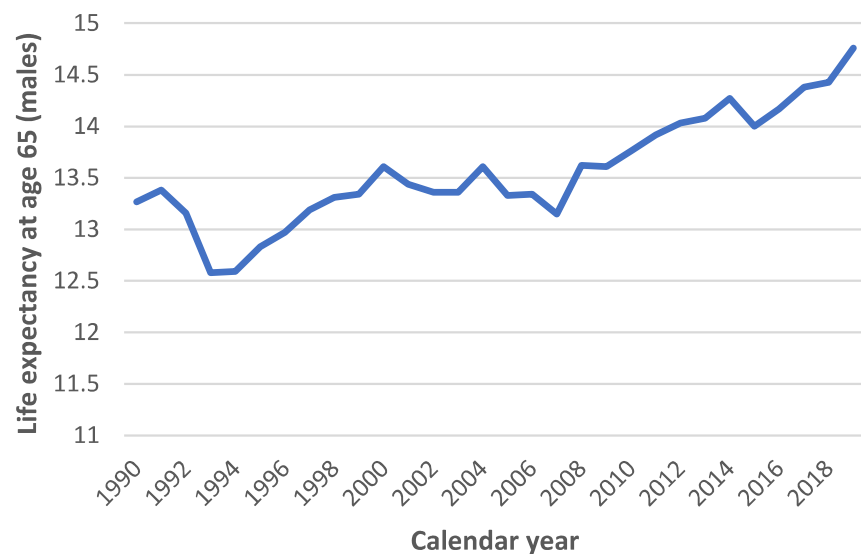


\*Based on data from Human Mortality Database

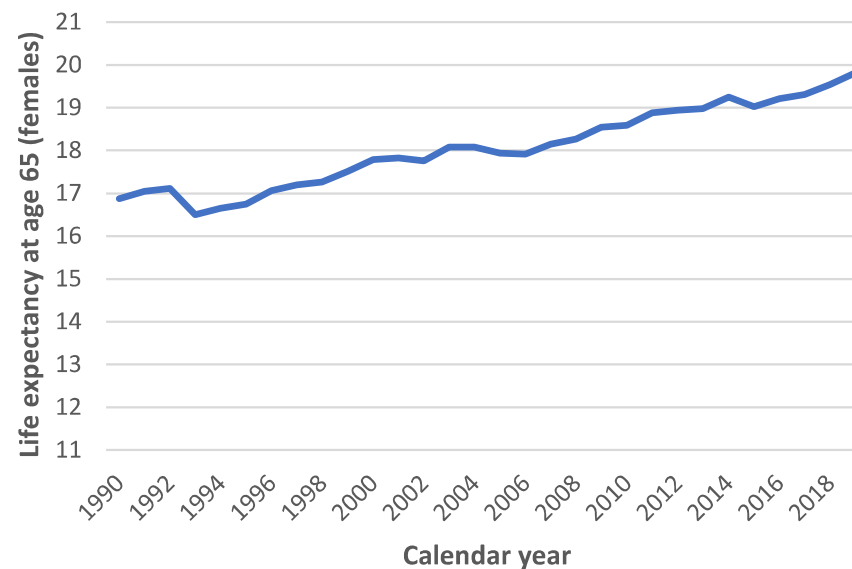


# Positive changes in mortality during 1995 - 2019

## Males



## Females





# Lithuania was still beyond other European countries

	Life expectancy at age 65 during 2019			
	Lithuania	Poland	Italy	Sweden
<b>Females</b>	19,82	20,1	22,54	21,99
<b>Males</b>	14,76	15,97	19,42	19,52

	Increase in LE at age 65 from 1990 to 2019			
	Lithuania	Poland	Italy	Sweden
<b>Females</b>	2,94	3,98	3,65	2,96
<b>Males</b>	1,49	3,56	4,37	4,21

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# INCOME RELATED MORTALITY OF SENIORS



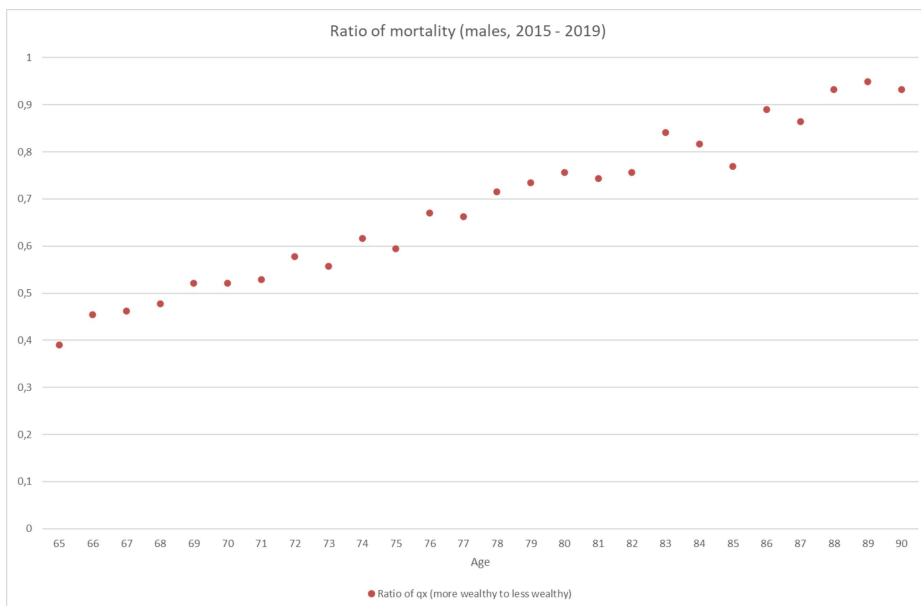
## Is income effect present in mortality of seniors?

- Pension benefit paid by social security
  - Reflects long term salary based income
- Age group 65-90 was analyzed
  - Due to random fluctuations crude mortality data beyond age 90 considered unreliable
  - Mortality after age 90 is modelled using mortality law, not crude data

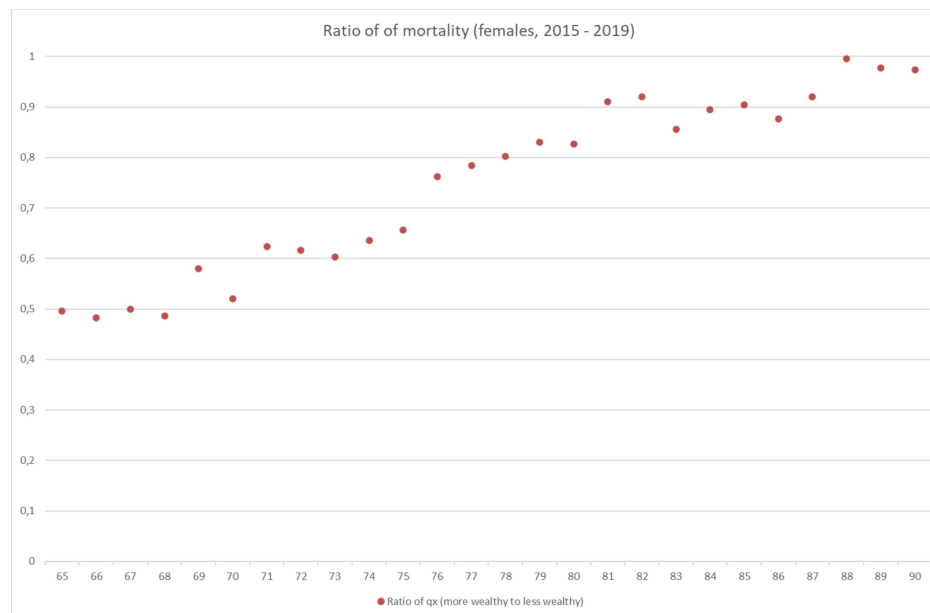


# Mortality ratios (more wealthy to less wealthy) during 2015 - 2019

## Males



## Females



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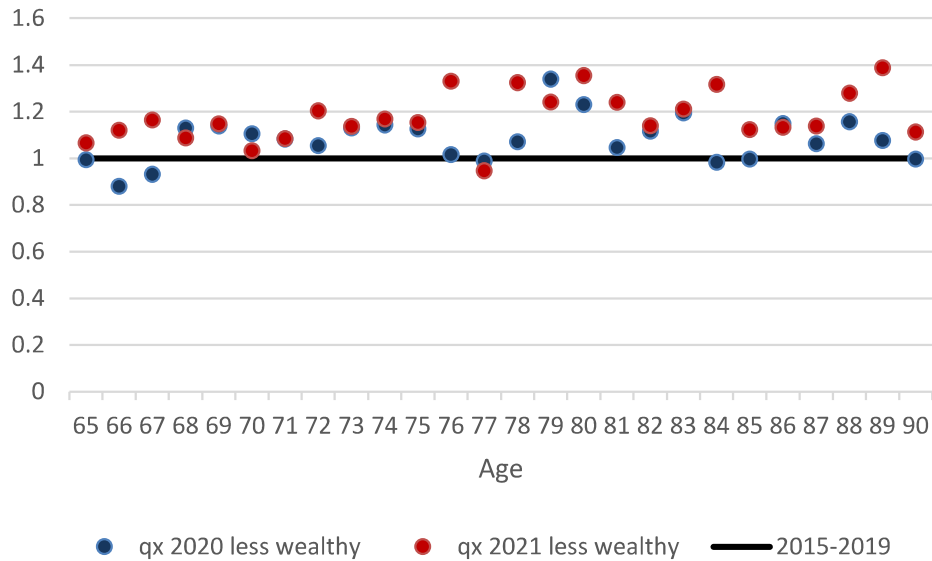


# IMPACT OF COVID-19

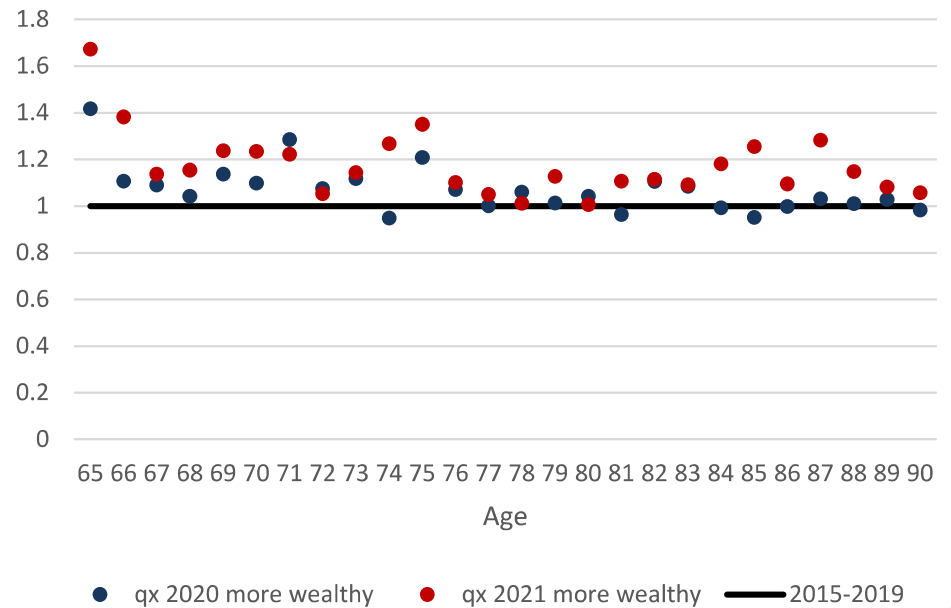


# Crude mortality rates during 2020 and 2021 compared to 2015-2019 average

## Less wealthy males



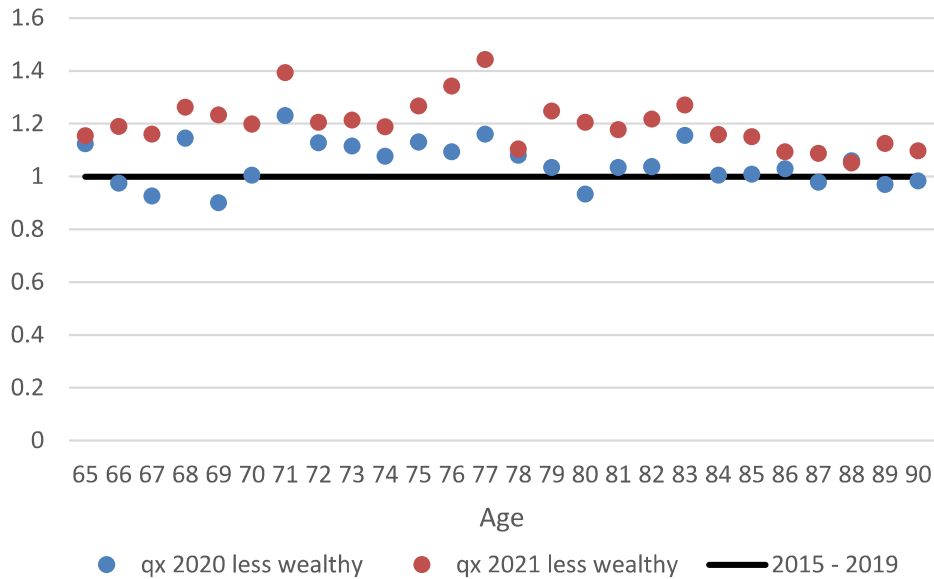
## More wealthy males



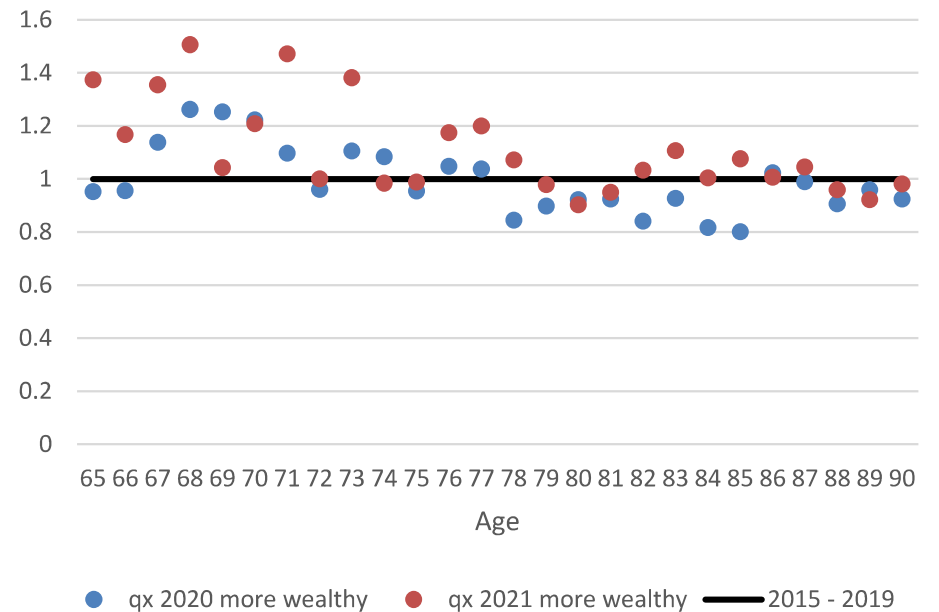


# Crude mortality rates during 2020 and 2021 compared to 2015-2019 average

## Less wealthy females



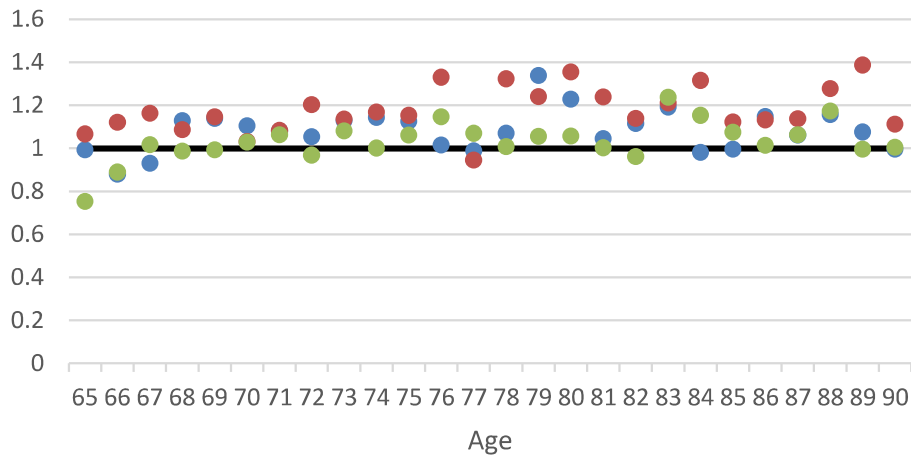
## More wealthy females





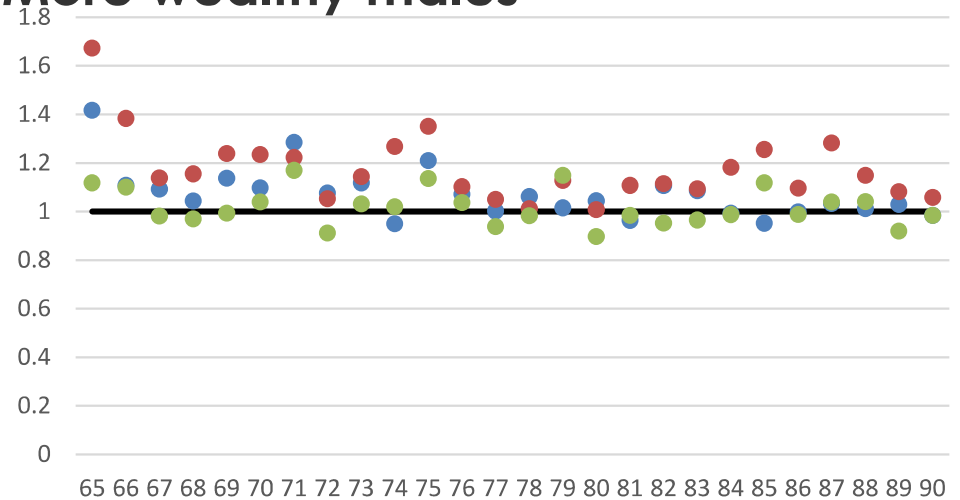
# Crude mortality rates during 2020, 2021 and 2022 compared to 2015-2019 average

## Less wealthy males



● qx 2020 less wealthy ● qx 2021 less wealthy  
 ● qx 2022 less wealthy — 2015 - 2019

## More wealthy males

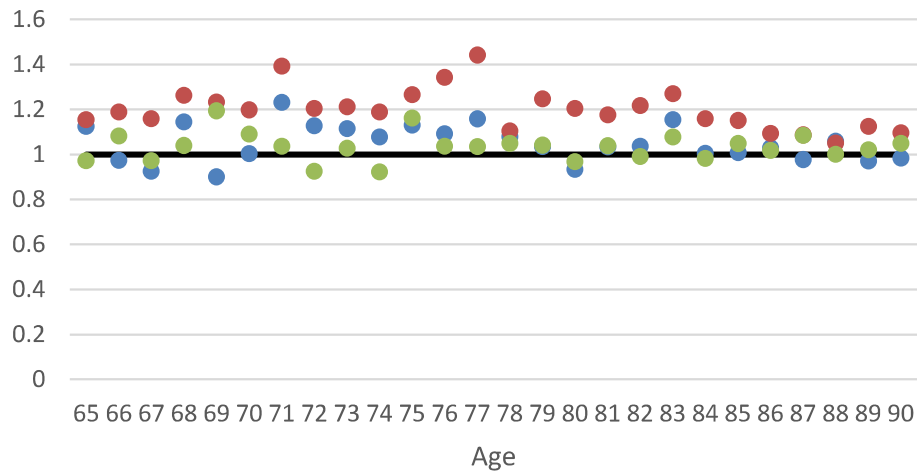


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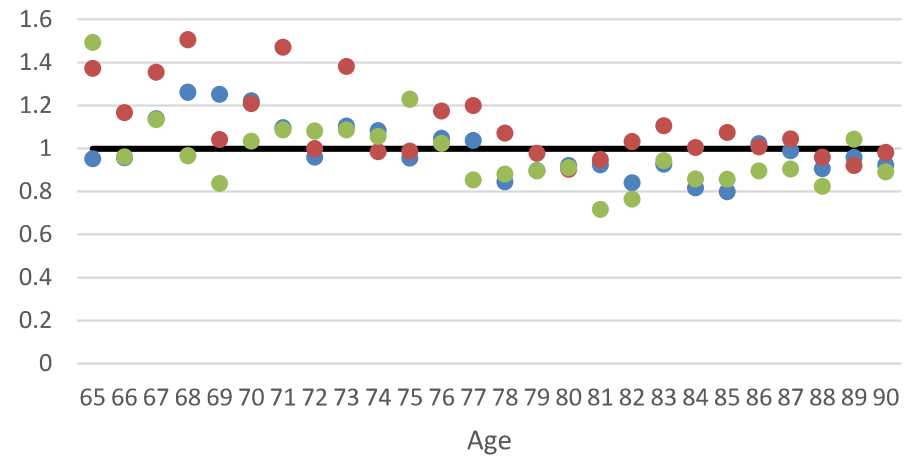
# Crude mortality rates during 2020, 2021 and 2022 compared to 2015-2019 average

## Less wealthy females



● qx 2020 less wealthy ● qx 2021 less wealthy  
 ● qx 2022 less wealthy — 2015 - 2019

## More wealthy females



● qx 2020 more wealthy ● qx 2021 more wealthy  
 ● qx 2022 more wealthy — 2015 - 2019



# LE at 65 (in the interval of 65-90)

Life expectancy at age 65 (in 65-90 age period)						
Period:	Males			Females		
	Less wealthy	More wealthy	Average	Less wealthy	More wealthy	Average
2015-2019 average	13,28	16,61	15,19	18,91	20,4	19,36
2020	12,77	16,12	14,63	18,61	20,50	19,19
2021	12,26	15,57	14,06	17,83	20,01	18,50
2022	13,19	16,49	14,90	18,73	20,66	19,31
Change during 2020 compared to 2015-2019, years	-0,51	-0,49	-0,56	-0,30	0,10	-0,17
Change during 2021 compared to 2015-2019, years	-1,02	-1,04	-1,13	-1,08	-0,39	-0,86
Change during 2022 compared to 2015-2019, years	-0,09	-0,12	-0,29	-0,18	0,26	-0,05



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2015-2019 average	13,28	16,61	15,19	18,91	20,4	19,36
2020	12,77	16,12	14,63	18,61	20,50	19,19
2021	12,26	15,57	14,06	17,83	20,01	18,50
2022	13,19	16,49	14,90	18,73	20,66	19,31
Change during 2020 compared to 2015-2019, percentage	-3,84%	-2,95%	-3,69%	-1,59%	0,49%	-0,88%
Change during 2021 compared to 2015-2019, percentage	<b>-7,68%</b>	-6,26%	-7,44%	-5,71%	<b>-1,91%</b>	-4,44%
Change during 2022 compared to 2015-2019, percentage	-0,68%	-0,72%	-1,91%	-0,95%	1,27%	-0,26%



# Centralized Annuity Provider

- Those who participate in II pension pillar may need to buy pension annuity at retirement
  - Floor (and ceiling) on sum accumulated in Individual Account of II pension pillar is set (currently about 10800 euro)
  - II pillar was introduced in 2004 only, so currently only participants whose salaries exceeded country's average may exceed floor (10800 euro) at retirement
    - Mortality of annuitants differ from mortality of country's total population



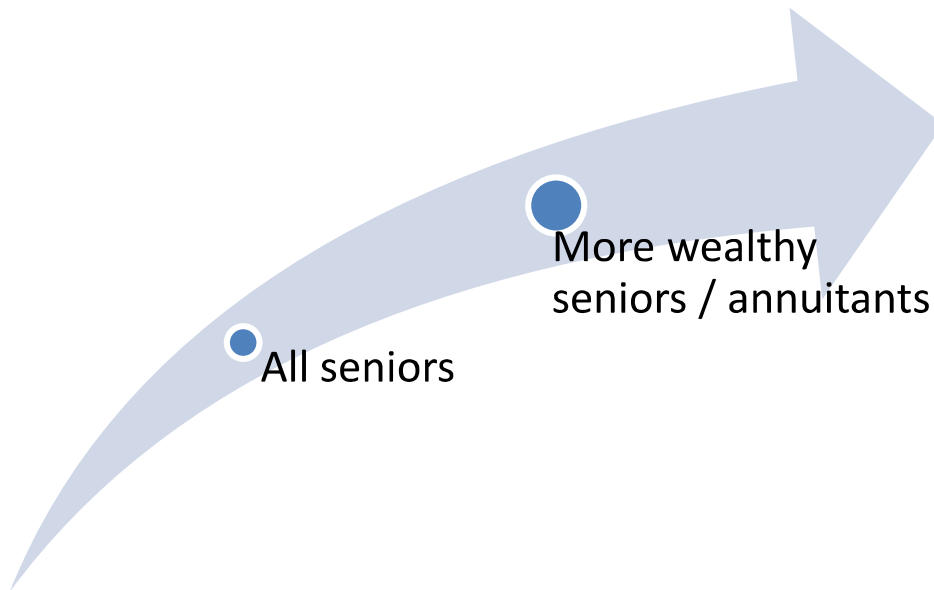
# Centralized Annuity Provider

- Those who participate in II pension pillar may need to buy pension annuity at retirement
  - Acquisition of annuity from CAP is mandatory only since July 1, 2020
  - Participant may postpone acquisition of annuity
    - Some elements of adverse selection may be present

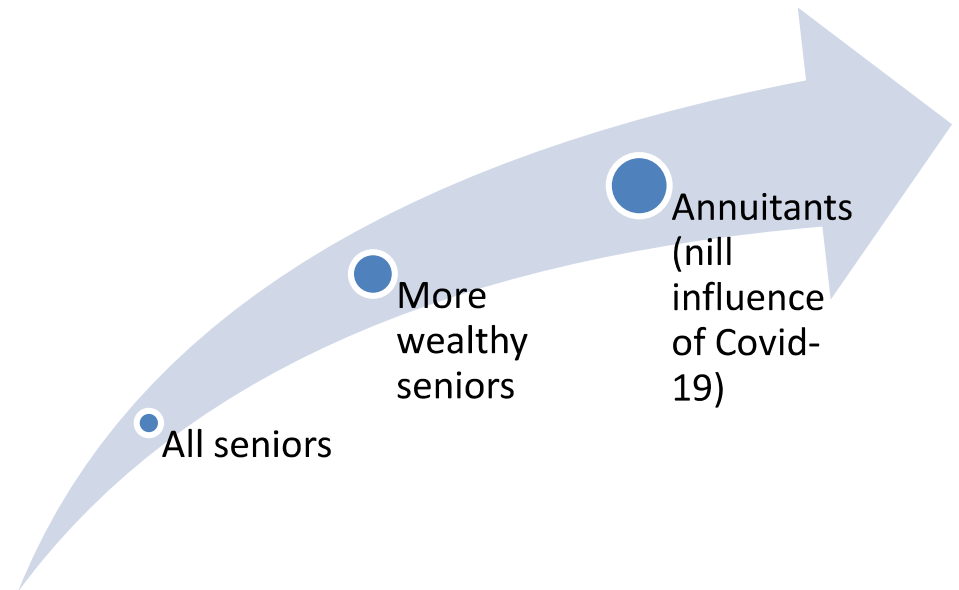


# Increase in life expectancy at age 65

## Expected



## Reality





# Conclusions

- Greatest rise in mortality was observed during 2021
- Excess mortality, income and sex were correlated. Less wealthy males suffered from Covid-19 mostly, while more wealthy females were “most lucky”



# Conclusions

- It seems that during 2022 mortality rates are started to return “normal”
- Despite excess mortality in total population, influence of Covid-19 to “young” annuity fund may be from nil to negative

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