

THE DIFFERENCE IN PRESENT VALUE OF RETIREMENT PENSIONS FOR EDUCATION GROUPS

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Introduction

- relation between education level and some socio-economic indicator
- higher education level brings benefits to the individual as well as to the society
- education structure is maybe more important and could reduce effect of aging than changes in age structure
- questions about differences of profitability of pension system for different subpopulations appear

Aim

To quantify differences of the retirement pensions by four education groups using the income statistics and unique life tables constructed for different educational groups

Model assumptions

Cash flow model

- simple deterministic yearly cash flow model with a valorized amount of yearly pension

$$\ddot{a}_x^{(ea)} = \sum_{t=0}^{\omega-x-0.5} c^{(ea)} {}_{t+0.5}P_x^{(ea)} i_{t+0.5} d_{t+0.5}$$

- $c^{(ea)}$ is the yearly pension
- ${}_{t+0.5}P_x^{(ea)}$ survival probability for a person in the age x surviving another $t+0,5$ years
- $i_{t+0.5}$ valorization index
- $d_{t+0.5}$ discount factor

Model assumptions

The inputs

Level of education	Educational attainment (ISCED 97)	Educational attainment (ISCED 2011)
Basic	ISCED 2	ISCED 2 and lower
Vocational	ISCED 3C	ISCED 35
Secondary	ISCED 3A	ISCED 34
University	ISCED 5A and higher	ISCED 64 and higher

Sex	Retirement age x
Males	62
Females	59

Model assumptions

The inputs

- estimate of the average pension for each educational level (denoted as $c^{(ed)}$)
- based on average wage for each educational level (denoted as $w^{(ed)}$)

$$F_p(c^{(ed)}) = F_w(w^{(ed)})$$

$$c^{(ed)} = F_p^{-1}(F_w(w^{(ed)}))$$

- F_w empirical distribution of wages
- F_p empirical distribution of pensions

Mean estimated pension by education level in 2009, Czech Republic

Educational level	All	Males	Females
Basic	10 650	11 450	9 870
Vocational	11 800	12 550	9 990
Secondary	12 900	13 200	11 400
University	14 300	14 700	12 900

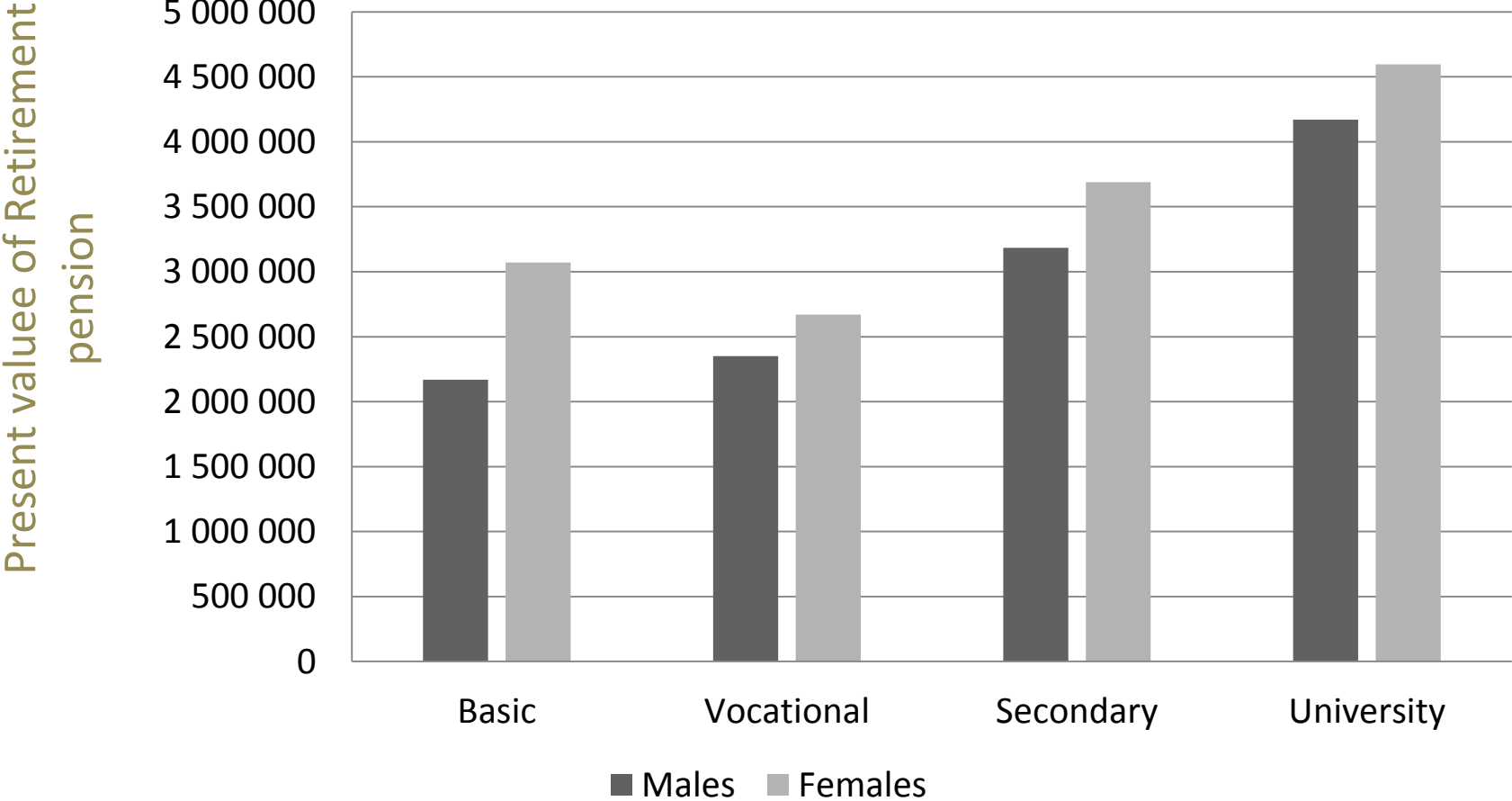
Survival probability p_x

- Numbers of deaths divided by highest attained level of education in 2009 from the database of individual data from Czech statistical office
- Missing values were completed by our methodology
- Population structure by education from RELIK

Results

- **Present values of the retirement pensions for different educational levels and different genders.**

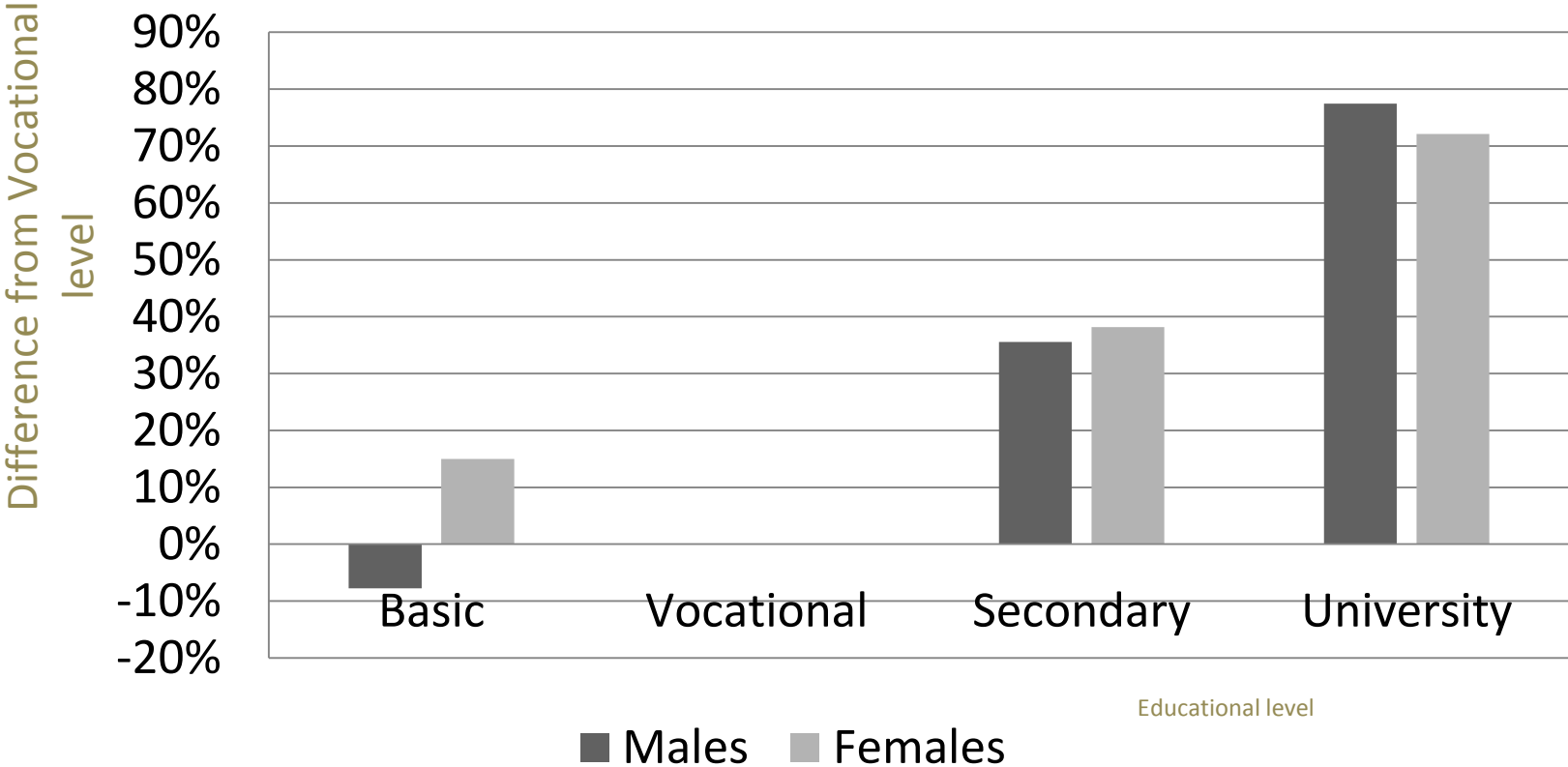
Present values of the retirement pensions for different educational levels and different genders.



Results

- **Present values of the retirement pensions for different educational levels and different genders.**
- **Relative difference comparing the educational categories relative to the Vocational category**

Relative difference comparing the educational categories relative to the Vocational category



Conclusion

- populations differ substantially not only in the amount of yearly pension but also differ in their longevity
- differences of tens of percent for both males and females to the reference educational category

Thank you for your attention...

Questions?