



## Aging and Retirement plans

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## Study Materials and Reading List

- Slides of the lectures

All materials provided on : <http://home.cerge-ei.cz/pytlikova/LaborSpring19/>

### Readings:

Tito Boeri and Jan Van Ours (2013): *Economics of Imperfect Labor Markets*. 2<sup>nd</sup> ed. Princeton University Press. Chapter 6: Retirement Programs.

Optional:

Bratberg, Holmås and Thøgerson (2004): "Assessing the effects of an early retirement program" *Journal of Population Economics* 17, pp. 387-408

Raj Chetty, John N. Friedman, Søren Leth-Petersen, Torben Heien Nielsen and Tore Olsen (2014): "Active vs. Passive Decisions and Crowd-Out in Retirement Savings Accounts: Evidence from Denmark" *The Quarterly Journal of Economics*, Volume 129, Issue 3, August 2014, Pages 1141–1219,  
<https://doi.org/10.1093/qje/qju013>

## OUTLINE

- Shortly about the exam
- Aging and Retirement plans

## Exam

- Written
- Tuesday 2. April 2019, 11.30, room 320
- Forms of questions

### Two forms of questions: essay question; example:

#### **Question #1 [30 minutes]:**

Migration from the “new” EU members was one of the major fears of the “old” EU member states. Consequently majority of the “old” EU members introduced restrictions on one of the Acquis related to the free movement of people.

- a) Did lifting of the restrictions have had any effect on migration from the new EU member states? Do any other factors influence immigration? Discuss key determinants and barriers to migration.
- b) Discuss impacts of such immigration on native workers, on their employment and wages. Will the effects be different for skilled and unskilled workers?

...

### Two forms of questions: essay question, example:

#### • **Question #2 [20 minutes]:**

There was a large increase in income inequality in the Central and Eastern European (CEE) and the Commonwealth of Independent States (CIS) countries during and after their economic transition. Was it mostly a positive or negative phenomenon? What could be the driving forces behind the observed rise in wage inequality in the CEE and CIS countries? Discuss.

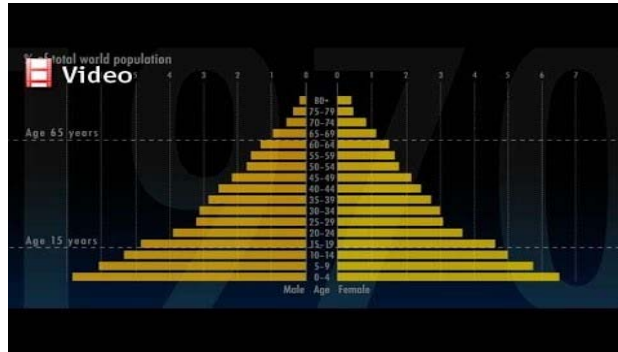
## Two forms of questions: False/True/Uncertain essay questions

**Question #3 [15 minutes]:** Answer the following questions as True, False or Uncertain and briefly explain your reasoning, use diagrams if needed:

- a) According to the Borjas (1987) selectivity theory, for workers who immigrate to the United States from a country with a less equal distribution of earnings the largest potential gain exists for unskilled workers. Thus there is a higher probability of positive selection of migrants from that country to the U.S.
- b) In general, women in low-paying jobs tend to earn a lower percentage of male earnings (for those males in low-paying jobs) than women in high paying jobs.
- c) ...

## Aging and Retirement plans

## Demographic changes

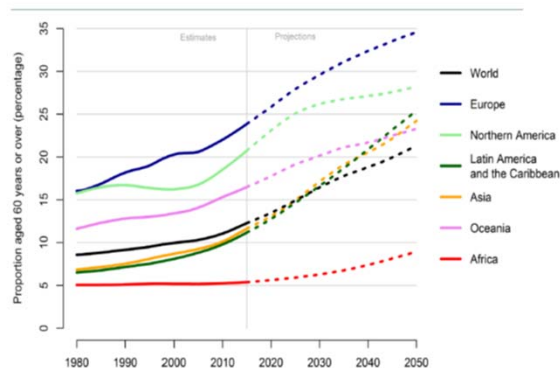


- <https://www.youtube.com/watch?v=QwfH1qYkXTw>
- <http://www.economist.com/blogs/graphicdetail/2014/11/daily-chart-10>
- [https://www.ined.fr/en/everything\\_about\\_population/videos/animation-population-pyramid/](https://www.ined.fr/en/everything_about_population/videos/animation-population-pyramid/)

## Population aging

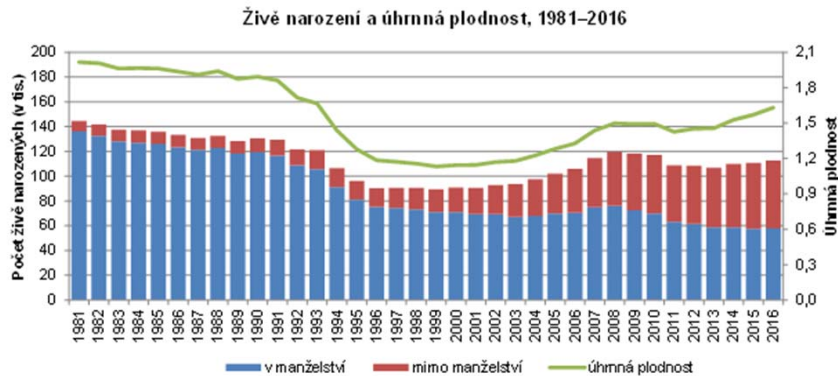
- Reasons
  - Decrease in fertility
  - Increase in life expectancy
- Dependency
  - Dependency ratio =  $(0-14 \text{ plus } 65+)/ (15-64)$
  - Old age dependency ratio =  $(65+)/ (15-64)$

Percentage of population aged 60 years or over by region, from 1980 to 2050



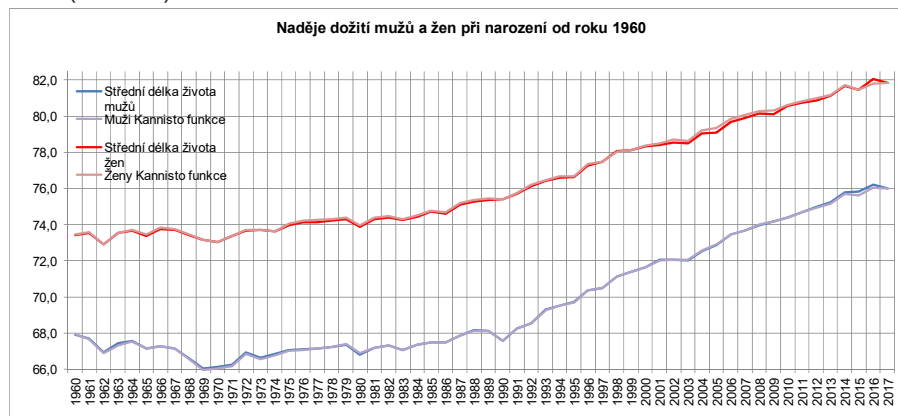
## Population aging – decrease in fertility in CR

- Increase in age of mother + Decrease in number of children per women
- Significant for whole Europe, question of family policies



## Population aging in CR – increase in life expectancy

- From 1966 to 1986 LE increase by 0,2 year (males), by 0,9 year (women)
- From 1996 to 2016 LE increase by 5,8 years (males), by 4,8 years (women)



## Retirement programs

- Large-scale retirement a rather recent phenomenon: until beginning of the 20<sup>th</sup> century, not many workers- retired, they worked as long as they could, and if they stopped working, the retirement involved often a few years of dependence on children.
- Today – extended period of financed independence and leisure
- Forced retirement – mandatory retirement age
- Early retirement programs - offers that cannot be refused
  
- Defined benefit (DB) OR defined contribution (DC) programs
  - DB – a function of the length of employment attachment and final earnings
  - DC – contributions to a pension fund are defined, but the level depends on lifetime contributions

## Pension system in the Czech Republic

- Two pillars system
  - Basic insurance - I. pillar
    - Public
    - Mandatory - myopic behavior
    - Universal – contributors, beneficiaries - old-age, disabled, widowers, orphans
    - DB, PAYG
  - Additional pension insurance - III. pillar
    - Private
    - Voluntary
    - DC

## Retirement programs – interactions with other institutions

- Retirement programs institution often a clear relationship with other institutions, e.g. with:
  - Unemployment benefits: older workers use unemployment benefits as a pre-early retirement system
  - Employment protection legislation: if older workers loose their job and become unemployed, it is more difficult for them to find a job = they may be related to employment protection legislation.

## Retirement decision

Statutory ages x effective ages

- Statutory retirement age, statutory early retirement age
- Effective retirement age, Pension-drawing time

### • Standard retirement age in CR

- Retirement age - Increasing from 1996
  - 1996 – Men – 60 years, Women with 2 children – 55 years
  - 2018 – Men – 63 years + 6 months, Women with 2 children 61 + 2 months
  - Ceiling – 65 years – 2030 of later (women with 2 and more children)
- Pension period increased from 25 to 35 years of insurance

**Retirement Age in Europe**

Area	Country	Retirement age in 2009			Retirement age in 2020			Further increases in retirement age after 2020			
		Men	Women	note	Men	Women	note	Men	Women	note	Year
N	Denmark	65	65		66	66		67+	67+	(a)	
N	Netherlands	65	65		66+8m	66+8m		67+	67+	(b)	
N	Sweden	61-67	61-67	(c)	61-67	61-67	(c)				
W	Austria	65	60		65	60		65	65		2033
W	Belgium	65	65		65	65					
W	Germany	65	65		65+9m	65+9m		67	67		2029
W	France	60-65	60-65	(d)	62-67	62-67	(d)				
S	Italy	65+4m	60+4m		66+11m	66+11m		67+	67+	(e)	
S	Spain	65	65		65-66+4m	65-66+4m	(d)	65-67	65-67	(d)	2027
E	Hungary	62	62		64	64		65	65		2022
E	Poland	65	60		67	62		67	67		2040
E	Slovenia	63	61		65	65					
CZ	Czech Republic	62	56+8m-60+8m	(f)	63+10m	60+6m-63+10m	(f)	67+	67+	(g)	2044

Source: Eurostat, Adequacy and Sustainability of Pensions

(a) Adjusted to life expectancy gains every 5 years, starting 2030

(b) Adjusted to life expectancy gains every year, starting 2022

(c) Flexible retirement age linked to benefit level

(d) If qualifying period completed - and if not completed

(e) Linked to life expectancy

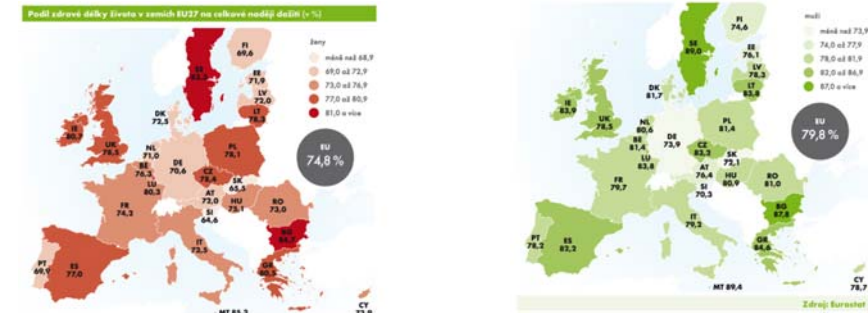
(f) Depending on the number of children raised



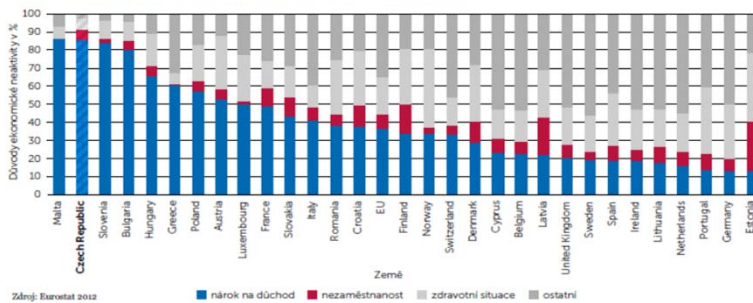
## Retirement programs – cross-country comparison

- Comparison of retirement and early retirement age and incentives to retire across countries and time:
  - Standard and earliest retirement age went historically down (recently an opposite trend, given the population aging);
  - Most common standard retirement age: 65
  - Variation on retirement incentives
  - Net replacement rate for public old-age pensions
    - <40% Ireland, Japan, Mexico
    - >100% Greece, Hungary, Turkey

## Retirement behavior -Reasons for retirement



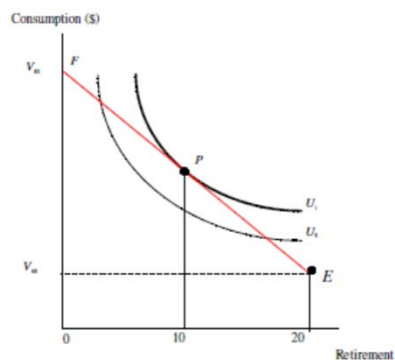
Graf 2. Důvody důchodců k odchodu z pracovního trhu



## Retirement programs – theory

- Lifetime income are higher the longer workers put off the retirement
- An increase in pension benefits reduces the price of retirement, increasing the demand for leisure, encouraging the worker to retire earlier
- If pension benefits are constant, wage increases have a substitution and income effect, so lifetime income will not be altered

## The retirement decision

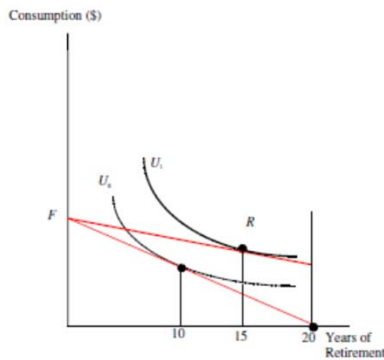


Death at 80:

Point *E* leisure-consumption bundle if retirement at age 60. Point *F* if the worker never retires.

A utility-maximizing worker chooses point *P*, and retires for 10 years.

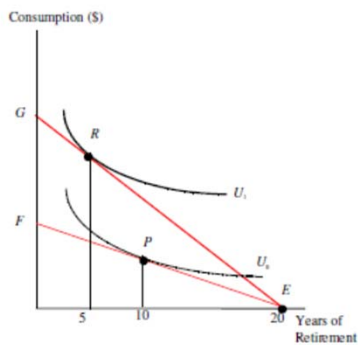
### Effect of an increase in pension benefits on retirement decision



An increase in pension benefits rotates the budget line around point  $F$ . It too generates income and substitution effects, but both effects encourage the worker to retire earlier.

Both effects same direction: work shorter

### Effect of an increase in the wage on the retirement decision



An increase in the wage rotates the budget line around point  $E$ , and generates both income effects and substitution effects as the worker moves from point  $P$  to point  $R$ . The figure assumes that substitution effects dominate and the worker delays his retirement.

$SE > IE$  : work longer

## Retirement theory: Option value

- Option value – continue to work if expected present value of continuing work is greater than expected present value of immediate retirement (Stock and Wise, 1990)
- Option value of work:
  - Positive: continue to work and postpone retirement
  - Negative: retire now
- The option value of working will decrease as the age of the person comes closer to the optimal retirement age.
- Eligibility for early retirement: downward shift in option value – offer you can't refuse,
- Incentives may depend on DB or DC benefit systems

## Optimal retirement age

- If we assume that retirement is irreversible and that there is a constant discount rate  $\delta$ , the value of retirement at a particular year  $r$  evaluated in a calendar year  $t$  consist of 2 components: earnings and pension benefits:
- In years from  $t$  to  $r$  the person will have annual earnings  $Y_t$  of which the net present value is:

$$\begin{aligned}
 NPV_{1,t}(r) &= U_w(Y_t) + \delta U_w(Y_{t+1}) + \delta^2 U_w(Y_{t+2}) + \dots + \delta^{r-t-1} U_w(Y_{r-1}) \\
 &= \sum_{\gamma=t}^{r-1} \delta^{\gamma-t} U_w(Y_\gamma)
 \end{aligned}$$

- Where  $\gamma$  is an indicator of age and the  $U_w$  function indicates the indirect utility that the person derives from the wage earnings.

## Optimal retirement age

- Second, from year  $r$  until death at a given age  $T$ , the person receives a pension benefit  $B_\gamma(r)$ , of which the net present value in year  $t$  can be expressed as:

$$NPV_{2,t}(r) = \delta^{r-t}U_r(B_s(r)) + \delta^{r-t+1}U_{r+1}(B_s(r+1)) + \dots + \delta^{T-t}U_r(B_\gamma(T))$$

$$= \sum_{s=r}^T \delta^{r-t}U_r(B_\gamma(r))$$

Thus, the total net present value of retirement at age  $r$  is:

$$NPV_t(r) = \sum_{\gamma=t}^{r-1} \delta^{\gamma-t}U_w(Y_\gamma) + \sum_{s=r}^T \delta^{\gamma-t}U_r(B_\gamma(r))$$

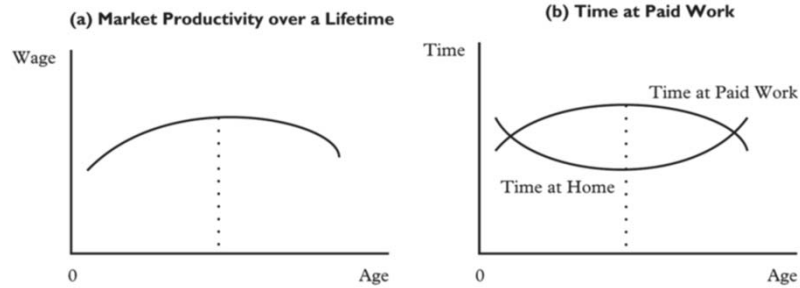
Postponing the retirement increases the length of the first period and reduces the length of the second. Since the earnings go up with age and pension benefits increase with years of service and with the wage in the last year before retirement, postponing retirement increases the total income over the remaining life period. Ceteris paribus, this has a positive effect on the value of retirement.

However, the person will have less time to derive utility from being retired.

## Retirement programs – empirical evidence

- Age and Productivity
  - Older workers: more reliable, better skills
  - Older workers: high health costs, low flexibility, less suitable for training
  - Age-productivity profile not exogenous to institutions
  - Age-productivity relationship difficult to establish but employers have strong opinions about the productivity of older workers
  - Most employer (and also employees) believe in a rule of thumb that average labor productivity declines after an age between 40-50;
  - However, a large heterogeneity across workers, occupations/jobs
  - Research – mixed evidence, B&vanO pgs chapter 6.

### Life-cycle allocation of time



B&vO

### Retirement programs – empirical evidence

#### *Stimulating early retirement in Norway*

#### Bratberg, Holmås and Thøgerson (2004)

– Norway:

- Standard retirement age = 67
- Entitlement to early retirement (AFP) was 66:
  - » 65 in 1990, 64 in 1993, 63 in 1997, 62 since 1998
- AFP:
  - » “dignified” exit from labor force
  - » benefits related to public benefits age 67
  - » Replacement rate exceeds 100% for low incomes; 65% for medium incomes

## Retirement programs – empirical evidence

### Bratberg, Holmås and Thøgersen (2004)

- Analysis as if “natural experiment”
- Non-AFP firms and AFP firms (requires 3 years of employment at present firm)
- Identifying assumption: no selection on unobservables into the AFP firm
- October 1993: reduction eligibility age 65 to 64
- Labor market 3 months after 64<sup>th</sup> birthday:
  - Birthday January – March 1993: control group
  - Birthday January – March 1994: treatment group

## Retirement programs – empirical evidence

### Bratberg, Holmås and Thøgersen (2004)

	Control			Treatment			$\Delta \Delta$
	yes	no	$\Delta$	yes	no	$\Delta$	
Work	82.6	83.8	1.2	64.7	86.0	21.3	-20.1
AFP	–	–	–	26.0	–	-26.0	26.0
Other	17.4	16.2	-1.2	9.3	14.0	4.7	-5.9
Total	100	100	0	100	100	0	0

Conclusion – Use of AFP: largest part leaves work – only small part has more “dignified” exit

### Chetty et al. QJE14: Govt mandated Saving

With Danish administrative data, can observe earnings, income (linked to firms) as well as savings (both retirement savings and other financial savings)

In Denmark, starting in 1998, firms are mandated (by govt) to make automatic retirement contributions to workers' retirement savings accounts of 1% of earnings when earnings crosses some threshold (34.5K DKr)

⇒ Generates a discontinuity by earnings levels: can use a **Regression Discontinuity Design**

Main finding: \$1 contribution to mandatory savings plan → \$1 increase in pensions and total savings

No offset of the forced contribution with reduced savings

**EXAM 2.4.2019, 11.30, ROOM 320 (3<sup>rd</sup> floor)**