



OESTERREICHISCHE NATIONALBANK

EUROSYSTEM

# Population Ageing, Productivity, and Structural Policies

Selected Additions to Prof. Axel Börsch-Supan`s JVI  
Lecture

by Governor Prof. Robert Holzmann

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## Topics covered

1. Productivity and the Labor Market
2. The Equilibrium Interest Rate  $r^*$ : Concept, Trend, and Drivers
3. Structural Policies for a Reversal of a  $r^*$  Decline

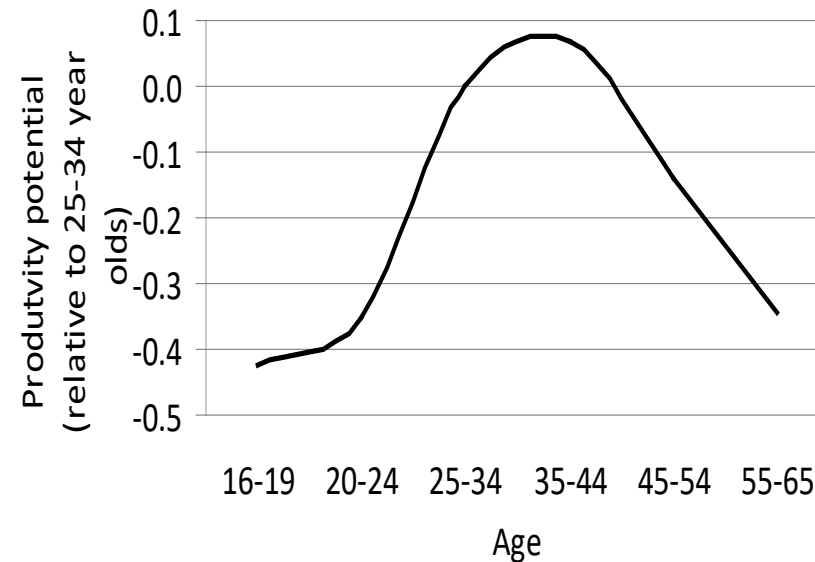
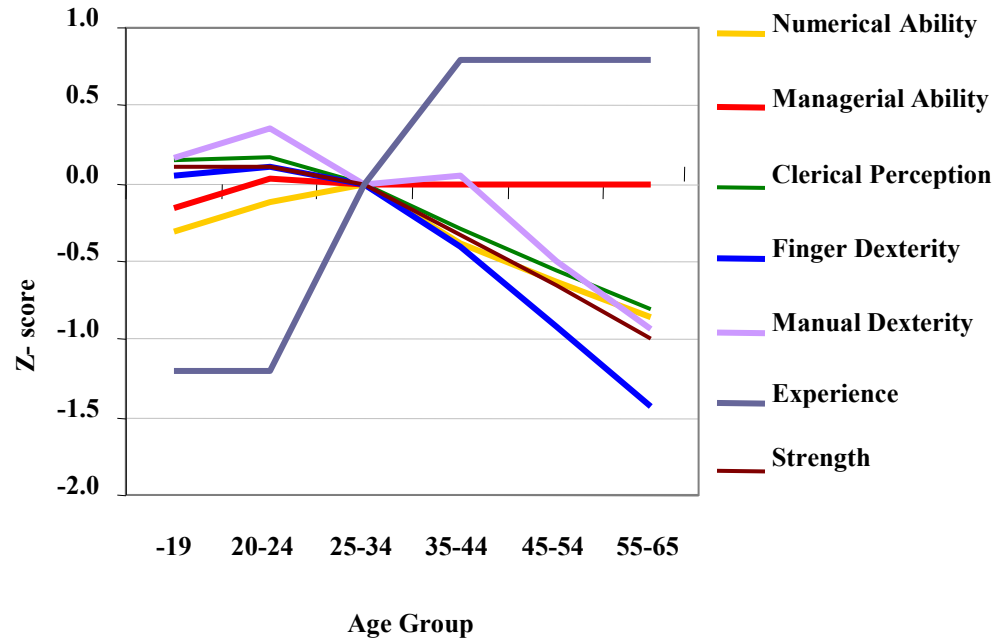
# 1. Productivity and the Labor Market

- Individual productivity in cohort considerations
  - The role of improvement across cohorts
  
- Productivity measurement in services, say health care
  - Progress in diagnostics, operation techniques, and revival
  
- Productivity growth – a two sector consideration
  - A growth sector ( $TFP > 0$ ) and service/leisure sector ( $TFP = 0$ )
  
- Increasing life expectancy and labor market participation
  - How to keep the elderly healthy, educated, and motivated

# Age and Productivity

Analyzing the causes of age-variation in productivity - the productivity raising effects of experience and the detrimental effects of decline in certain cognitive abilities affect the life cycle variation in productivity

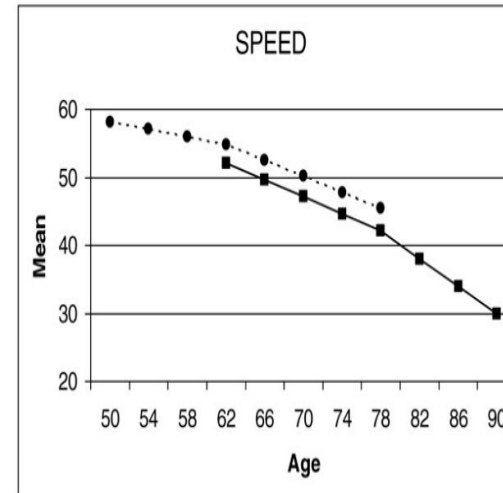
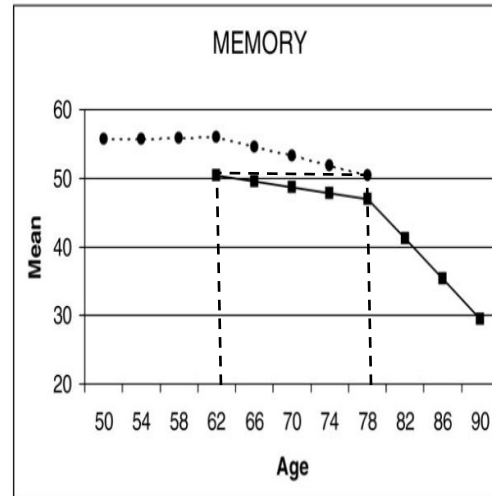
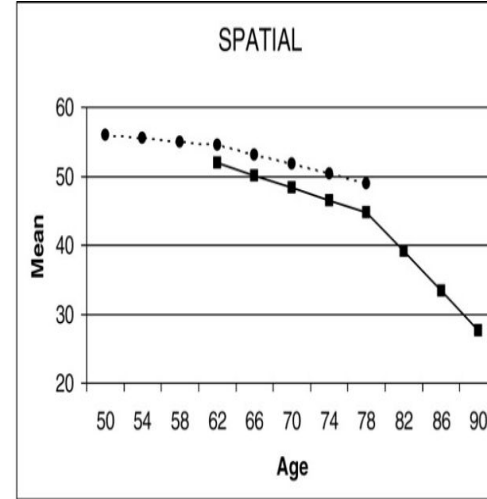
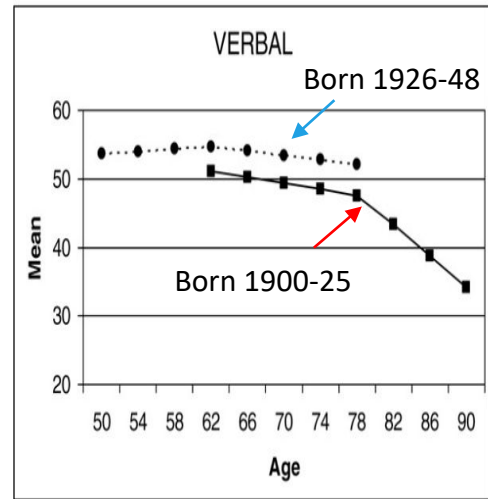
Age-specific skill levels (relative to 25-34 year olds) (GATB)



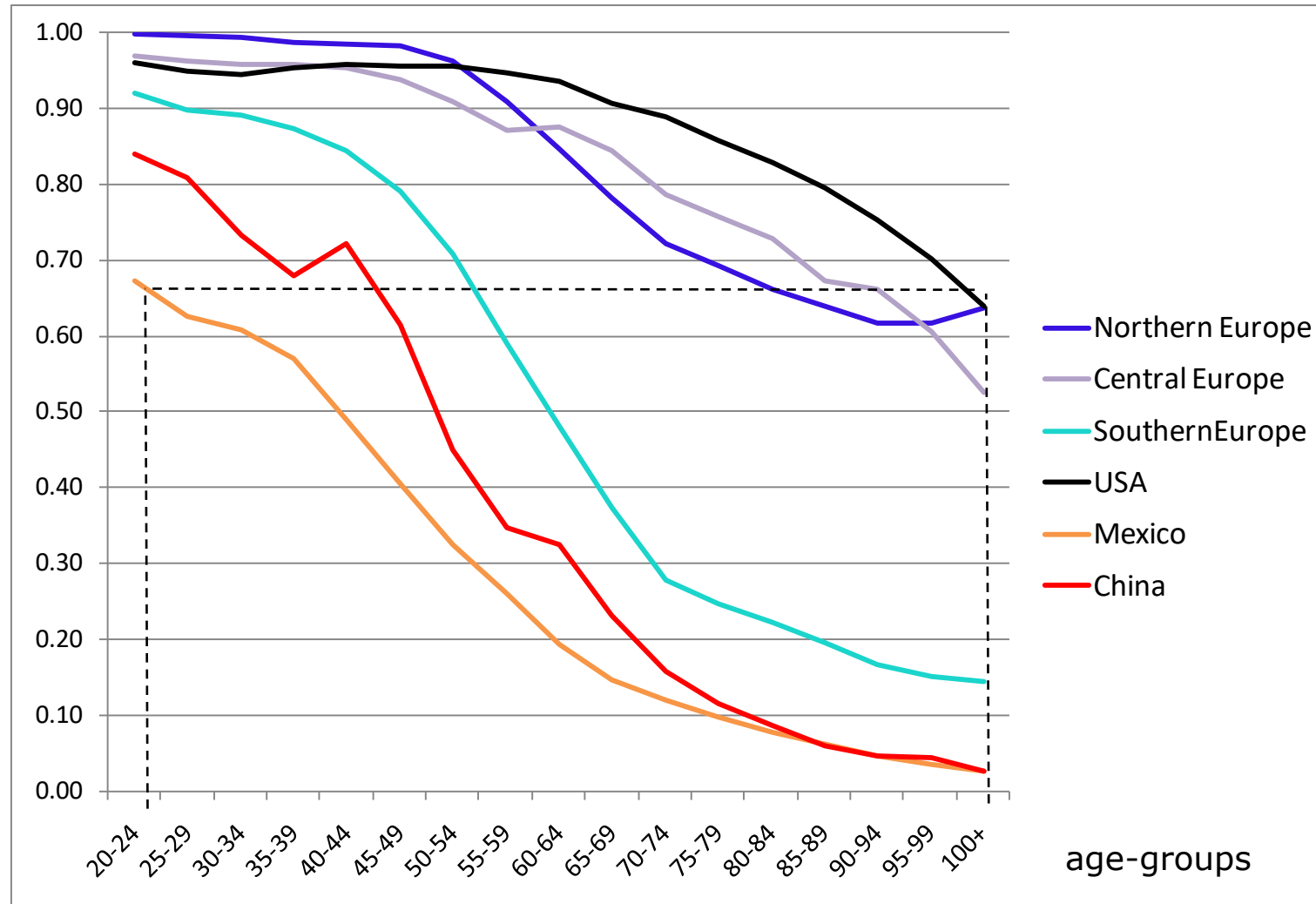
Focusing on determinants of productivity variation by age -> **experience raises productivity** in the first years in the labour market, **cognitive ability decline** implies lower productivity in the latter half

Source: US Dept of Labour (2007), Skirbekk (2008)

# Cognitive abilities by cohort, Sweden



# International variation in productivity potential, secondary education, 2005



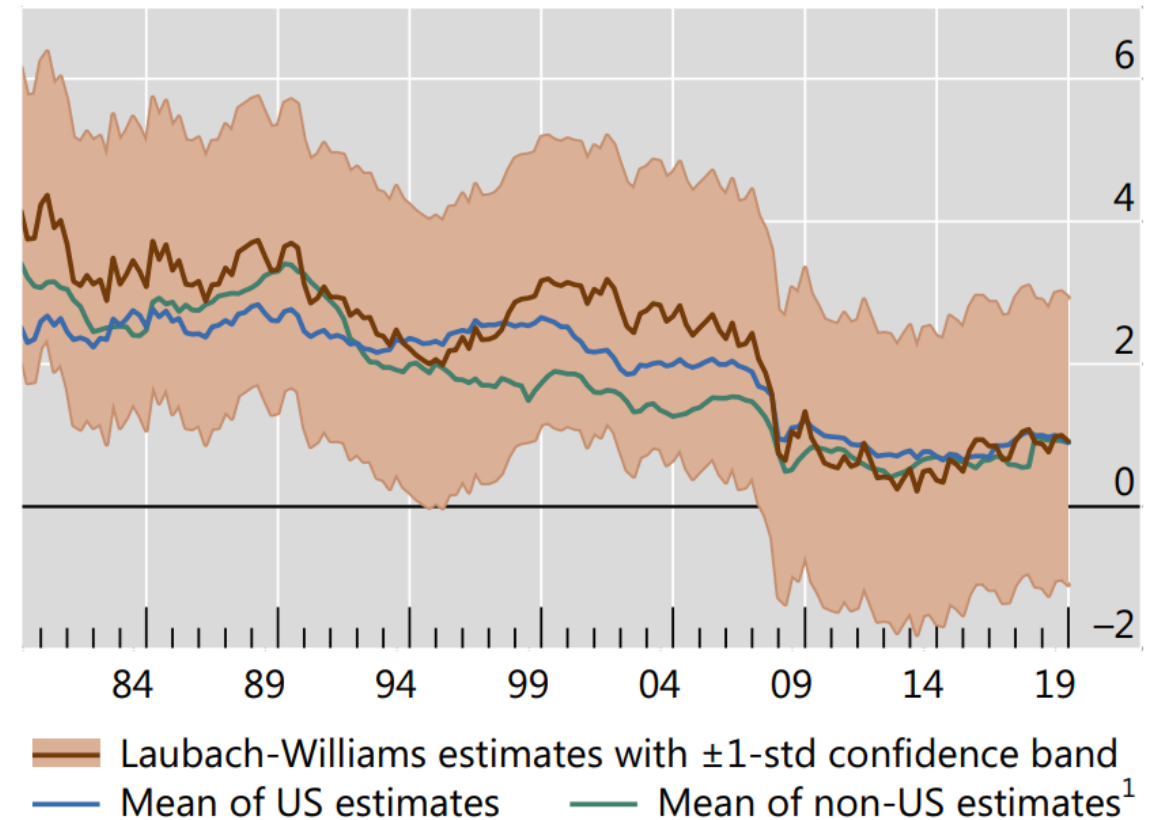
## 2. The Equilibrium Interest Rate $r^*$ : Concept, Trend and Drivers

**The natural rate of interest**—the real interest rate that neither stimulates nor contracts the economy—is important for both monetary and fiscal policy; it is a reference level to gauge the stance of monetary policy and a key determinant of the sustainability of public debt (IMF, WEO 2023, Chapter 2)

**Explanations for decline in real rates** include

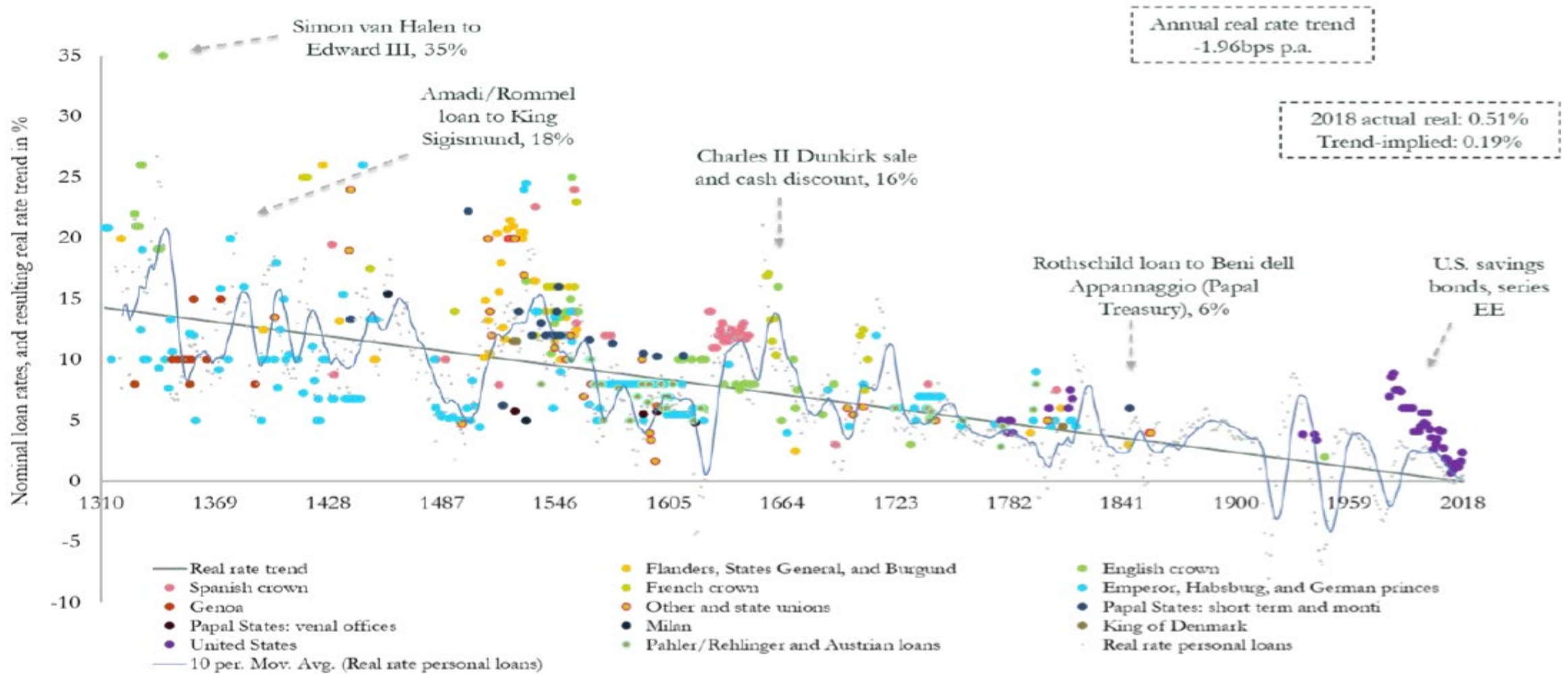
- Slowdown in trend productivity growth
- Shifts in demographics
- Global factors affecting real interest rate
  - Premium on safe and liquid assets
  - Lower economic growth

**Average  $r^*$  estimates over time (in percent)**



Source: Borio (2021, BIS)

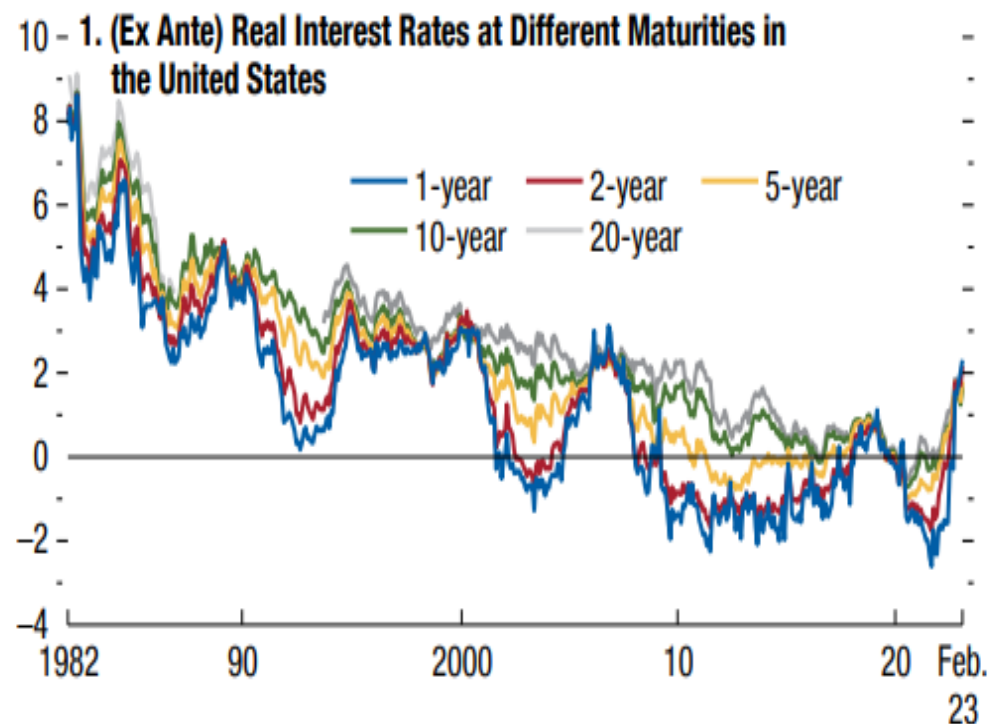
## b. Trends in Nominal and Real Interest Rates: 1310 - 2018



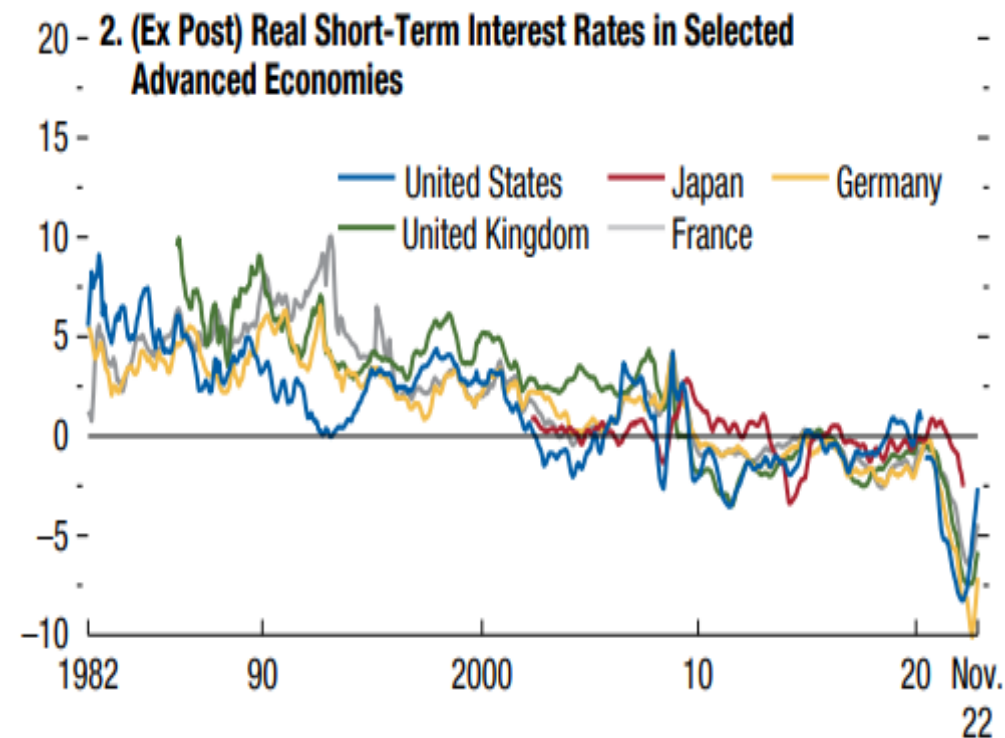
Source: Bank of England.



## c. Ex-Ante and Ex-Post Real Market Interest Rates: Confirming the Trend



Source: WEO, April 2023, Differences between 3-month interbank rates and average of realized CPI inflation over the next 3 months for each country



Source: WEO, April 2023, Difference between US Treasury rate at each horizon and the Cleveland Federal Reserve measure of inflation expectations over the same horizon

### 3. Structural Policies for a Reversal of $r^*$ Decline

- a. via total factor productivity (TFP)
- b. via an increase in the effective labor supply
- c. via capital flows (especially North-South)

## a. Increasing $r^*$ by boosting total factor productivity growth

TFP as a multifaceted concept that can be influenced by policy and institutions (OECD 2022):

- **boost innovation and experimentation** of new knowledge and technologies (investments in R&D, digitalization and intangible assets)
- **contribute to the diffusion** of existing knowledge and technologies (skills, qualifications, public infrastructure)
- **facilitate the allocation of resources** within or between sectors and firms (competition, business dynamics, globalization, financial development)
- and – most importantly - **offers an increase in real income** without additional use of resources

Three critical areas for boosting productivity growth (OeNB occasional paper No. 1, 2022):

- Promote **digitalization** by facilitating investments in complementary infrastructure/skills and strengthening competition and the reallocation of resources (OECD/Gal et al. 2019)
- Address **population ageing** through participation incentives and qualifications (Holzmann et al 2020)
- Address **climate change** through carbon tax and research subsidies (see next slides)

# The productivity channel of climate change

- Higher **R&D** spending and more **innovation** could yield higher productivity growth (a.k.a. “*Porter Hypothesis*”).
- But a **disorderly transition** might lead to sudden stops of carbon intensive production and produce **stranded assets**, reducing capital stock and productivity.
- The **development** and the **diffusion** of green innovations depend on the level of the carbon price. A temporary R&D subsidy can efficiently complement the carbon tax (Acemoglu et al. 2012).
- Higher energy efficiency can induce firms to employ more energy intensive processes (a.k.a. **rebound effect**). Empirically, this effect consumes 25% to 40% of the initial saving (Gillingham et al. 2016)
- To avoid “picking the winners“ problems, the focus of subsidies should be on **basic research** or **infrastructure** projects (Aghion et al. 2014).
- **Knowledge spillovers** are higher for green innovations than for “dirty” innovations as can be seen in patent citations (Dechezleprêtre et al. 2014).
- An envisaged **circular economy** that reuses most of prior inputs to produce output depends effectively much on energy prices that are moving close to zero ... that suggest energy generation beyond wind and sun and has **truly Schumpeterian effects (creative destruction, Schumpeter 1942, Aghion et al 2021).**

## b. How does labor force growth influence $r^*$ ?

Lane (2019), OeNB Occasional Paper No. 1 (2022):

- (1) Aging of population reduces labor force growth which can depress the demand for capital (as the ratio of installed capital relative to size of workforce increases).
- (2) Aging could lower productivity growth (if older cohorts have a lower productivity), this reduces investment opportunities. (Questionable.)
- (3) If higher life expectancy implies longer retirement periods, this is likely to lead to increased savings.  
→ Taken together, a lower level of desired investment and higher desired savings imply a reduction of  $r^*$ .
- (4) An aging population's conjectured increased demand for a safe asset would also reduce  $r^*$ .

Samuelson (1958), Journal of political Economy 66

Price level and interest rate in stationary and non-stationary populations ... the rate of demographic growth may matter (and specifically nowadays as the supply of effective labor force across all ages is challenged in the Global North)

Policy measure: **Increase the effective retirement age** to counteract declining labor force growth.

# Scenario

## Simulations for Austria:

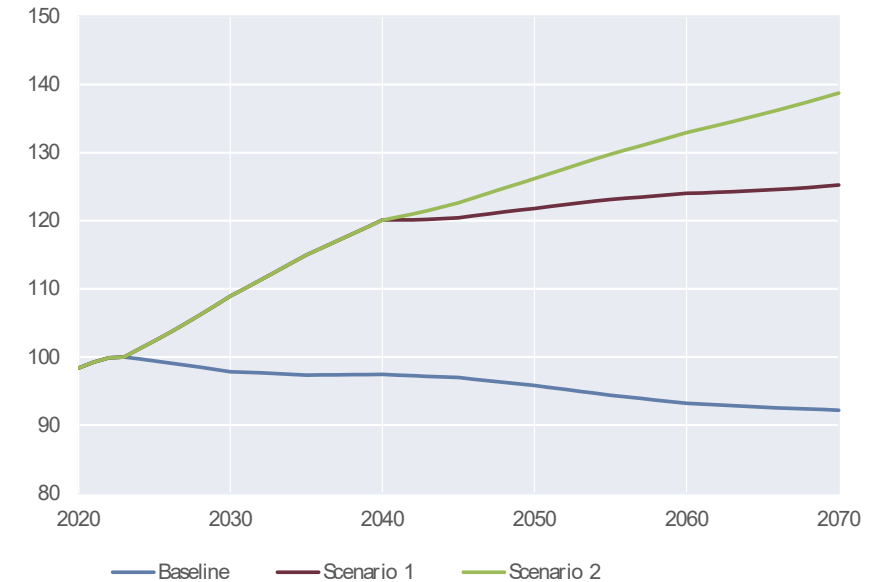
- Scenario 1 : Increase the effective pension entry age from 2024 (61.0 years) to 2040 (68.4 years) so that the pension system becomes sustainable (net pension gap becomes zero).
- Scenario 2: Scenario 1 plus from 2040 onwards increase pension age further in line with development of life expectancy at 65.

## Results:

- The increase in the pension age counteracts the decline of the labor force in the baseline.
- Labor force growth would be particularly strong in the next two decades (slightly more than 1 percent on average). → This is about the same growth as in the first two decades of this century.
- Labor force growth would slow down from 2040 on but would remain positive.

## Development of the labor force

2024=100



Source: Eurostat, OeNB

## Labor force growth under different scenarios

	Baseline	Scenario 2
2023-2030	-0,3	1,2
2031-2040	-0,0	0,9
2041-2050	-0,2	0,5
2051-2060	-0,2	0,5
2061-2070	-0,1	0,4
2023 - 2070	-0,2	0,7

Quelle: OeNB

## c. Increasing $r^*$ via capital flows from the Global North to the Global South

### Historical determinants of capital flows:

- 19<sup>th</sup> and early 20<sup>th</sup> century: **North-South** → British investment in government bodies and railroad, raw materials less important; also German and French
- Before global financial crisis: **East-West**
  - Why does capital flow from poor to rich countries? (Lucas paradox, 1990)
  - Savings glut hypothesis (Bernanke, 2005)
- After financial crisis: Rebalancing
  - Lower levels of flows and change of composition, EA important net lender

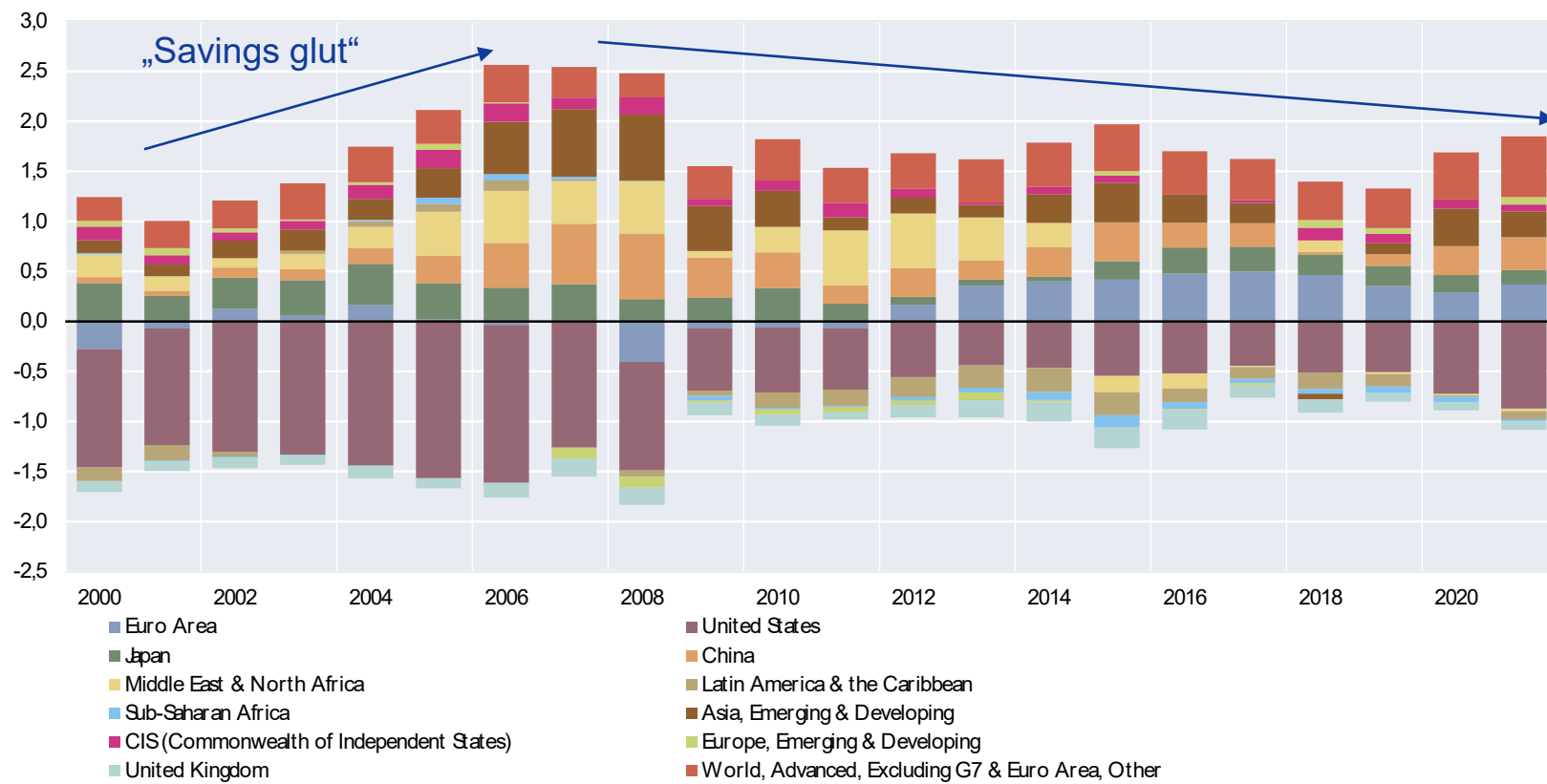
### How to redirect capital flows from North to South to raise productivity?

- Investment in green energy sources, Greentech transfer

# Lucas paradox (1990): why does capital flow from poor to rich countries?

World: Current account balances

in % of world GDP



Quelle: IWF.

## Savings glut hypothesis (Bernanke, 2005):

Rising demand for FX reserves and safe assets (China, oil exporters)

## Before global financial crisis:

UK + US absorbed most of global savings → credit boom, asset price inflation

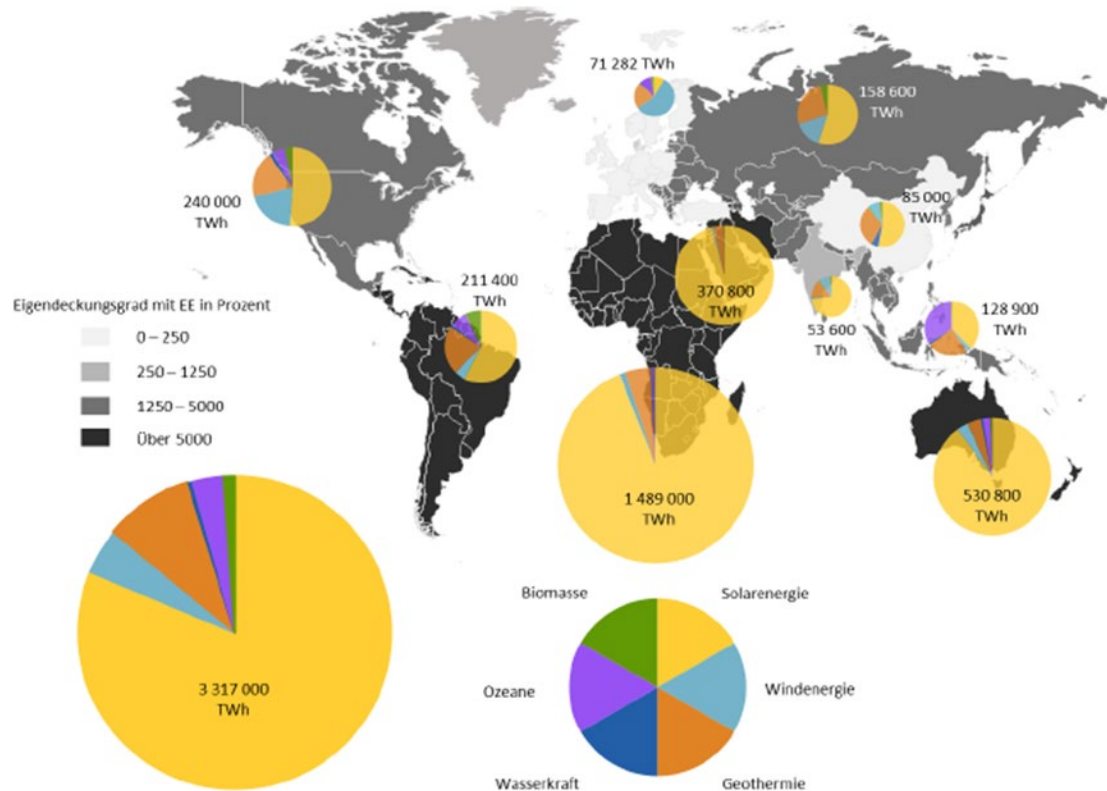
## Since global financial crisis:

Levels declined significantly, EA important net lender (with huge internal heterogeneity)



# Can greentech transfer & clean energy trade raise productivity in North & South?

## Half of global clean energy potential in Africa



Quellen: IPCC 2011, FFE 2017, Shell 2022, Eurostat 2022

- **Cost advantage of Global South in clean energy, but:**
  - Huge financing needs (public and private)
  - Technological constraints
  - Transformation losses of green hydrogen
- **North-South transfer of capital and technology:**
  - Improve absorption capacity (investment security)
  - Greentec transfer via trade, FDI, licensing
  - Cover increasing energy needs (population growth) with own clean energy sources; account for fears of “green imperialism”
  - Move energy-intensive production (e.g. steel) to clean-energy-rich countries (e.g. iron pellets)
- Cheaper clean energy, less uncertainty, higher returns → **productivity rises**

**Danke für Ihre Aufmerksamkeit**

**Thank you for your attention**

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