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Rethinking Retirement

Solving problems of Saving and Aging, and of Investing and Spending

An Introduction

Household Retirement Saving, Investment, and Spending:
New Lessons from Behavioral Research
Pension Research Council 2024 Symposium
The Wharton School, University of Pennsylvania
May 2, 2024

How can we finance the retirements of aging populations?

The *objective* is easily stated.

- To provide a financially secure retirement for millions of people.

But what are the *critical constraints*?

- How to "store up" sufficient future purchasing power to support a rising share of the population?
- Where will we find that future purchasing power?
    - In future taxes on labor and capital? (PayGo)
    - In capital market claims on future income? (Funded)
- *What* will be "sufficient" to sustain consumption for our uncertain life expectancy?

In "labor constrained" economies, what will be:

- The rate of economic growth?
- Rates of return on financial capital?
- Changes in the distribution of life expectancy?

We need to address three different sets of challenges:

1. Problems of *national savings*
2. Problems of *personal savings*
3. Problems of *investing – and spending*

Solving problems of *Saving, Aging, Investing, and Spending*

1. Problems of national savings

INCOME
Savings comes from income.
Income comes from growth.
Population change affects growth, income, and savings.

DEMAND FOR SAVING
"Dissaving" makes saving possible.
The engine of capital markets.
Necessary for long-term investing.

2. Problems of personal savings

CHOICE
Who gets to choose?
What's mandatory? What's chosen?
What choices are offered?
Who offers them?

TRUST
Essential for savings behavior.

3. Problems of investing –

LONG-TERM INVESTING
What portfolio of assets over time?
Life cycle, target date investing.
Requires deep capital markets.

– and spending

LONGEVITY RISK
Our uncertain life expectancy.
The investing–spending and decumulation challenge.

Reflecting each nation's distinct political economy.

INCOME: *where savings comes from, and investment wants to go*

"Savings comes from income" – in two senses

- We *save* a portion of our income. [verb]
- *Savings* earn a positive return if invested wisely in a portion of someone else's income. [noun]

Economic growth is the source of income

The rate of economic growth is measured by:
    Changes in total hours worked
    + Changes in productivity
    + New investment spending

Population change influences national economic growth and income

- A demographic divergence is underway, some countries aging faster than others.
- Countries with growing populations can have rising hours worked, more investment spending.
- Those with aging, shrinking populations will have fewer hours worked, less investment spending.
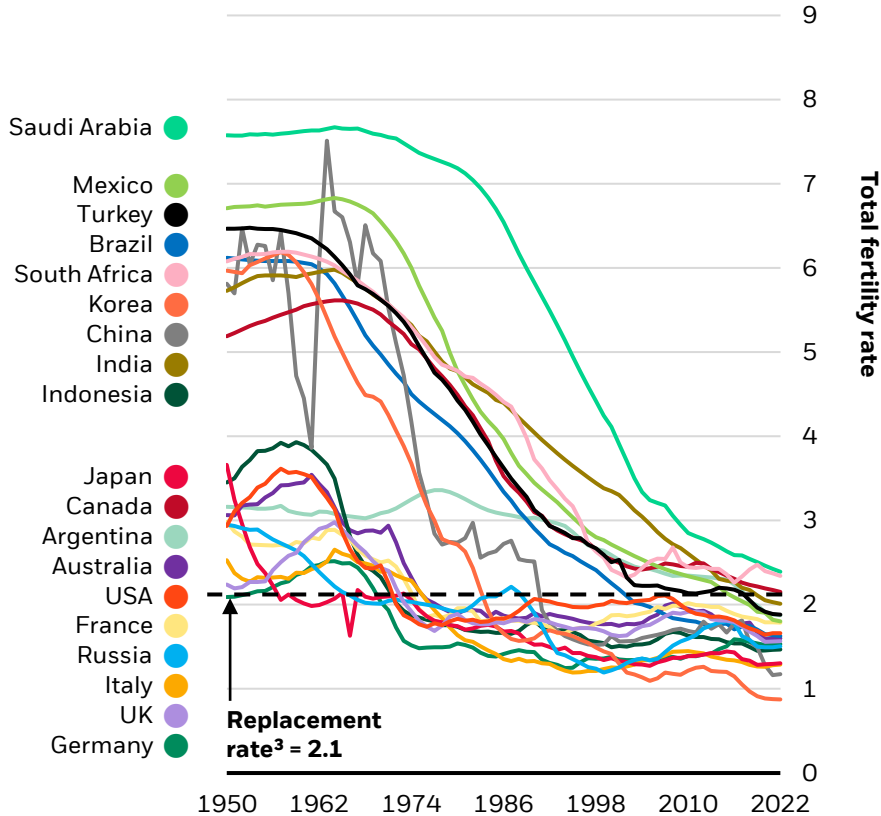
The first challenge: find the countries, industries, and companies with still rising incomes from

- Incremental sources of labor – fertility, offshoring, immigration, older workers, participation rates.
- Substituting capital for labor – if doing so can produce *higher* rates of *realized* productivity.
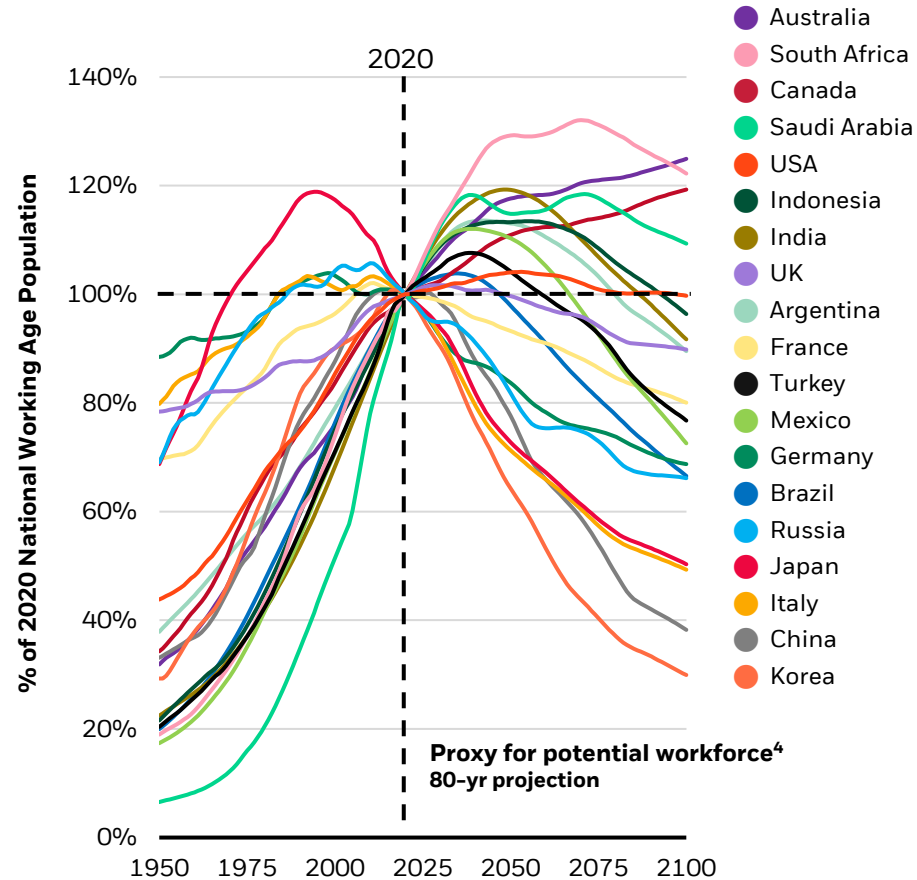- Deploying additional savings – to meet local demand for new investment spending.

Fewer babies, fewer workers

UN "medium variant" projection[1] : Medium Fertility and longevity models / Recent immigration trends

G–20 total fertility rates[2]

Saudi Arabia ●
Mexico ●
Turkey ●
Brazil ●
South Africa ●
Korea ●
China ●
India ●
Indonesia ●

Japan ●
Canada ●
Argentina ●
Australia ●
USA ●
France ●
Russia ●
Italy ●
UK ●
Germany ●

Replacement rate[3] = 2.1

Total fertility rate

1950 1962 1974 1986 1998 2010 2022

G–20 Working–age population (ages 15–64): UN "medium trend"

2020

% of 2020 National Working Age Population

Proxy for potential workforce[4] 80-yr projection

1950 1975 2000 2025 2050 2075 2100

- ● Australia
- ● South Africa
- ● Canada
- ● Saudi Arabia
- ● USA
- ● Indonesia
- ● India
- ● UK
- ● Argentina
- ● France
- ● Turkey
- ● Mexico
- ● Germany
- ● Brazil
- ● Russia
- ● Japan
- ● Italy
- ● China
- ● Korea

How will Japan adapt: 2020 – 2030?

Will hours fall with workforce?
Total hours worked, working age population, unemployment

- Unemployment rate
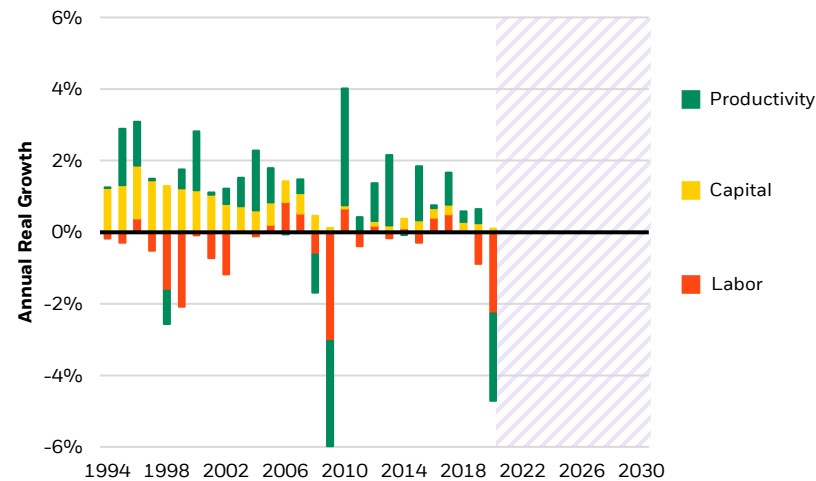- Total hours worked: – 11%
- WAP: – 17% To 2030: – 21%
- WAP w/o net migration: – 21%

Can retirement ages rise further?
Effective retirement ages

- Male: + 1 year
- Female: + 3 years

What will contribute to growth?
Annual pos. and neg. contributions to real GDP (change from 1994 – 2020)

- Productivity
- Capital
- Labor

How much further can participation rise?
Labor force participation rates

- Male: + 2pp
- Total: + 9pp
- Female: + 16pp

Sources: OECD, UN, IMF, and Haver.

How will the US adapt: 2020 – 2030?

Can hours catch up to potential workforce?
Total hours worked, working age population, unemployment

Legend:
- WAP: + 28%
  2030: + 29%
- Total hours worked: + 24%
- WAP w/o net migration: + 9%
- Unemployment rate

Can retirement ages rise further?
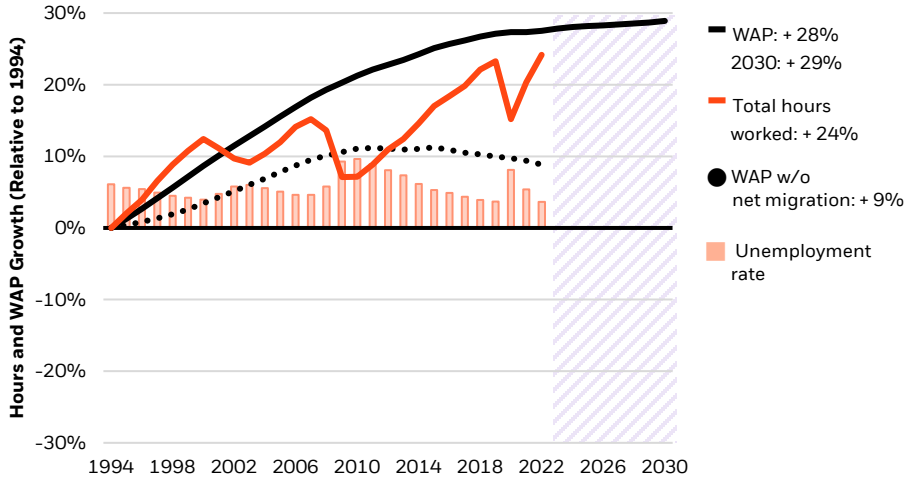Effective retirement ages

Legend:
- Male: + 2 years
- Female: + 1 year

What will contribute to growth?
Annual pos. and neg. contributions to real GDP (change from 1994 – 2020)

Legend:
- Productivity
- Capital
- Labor
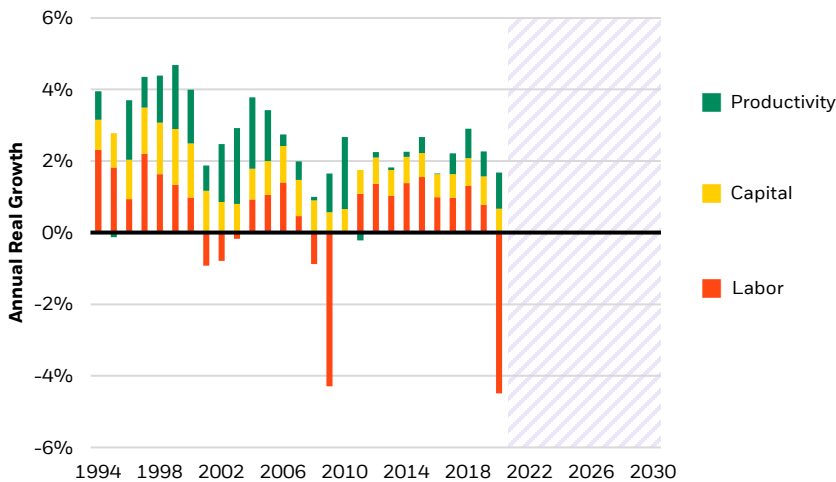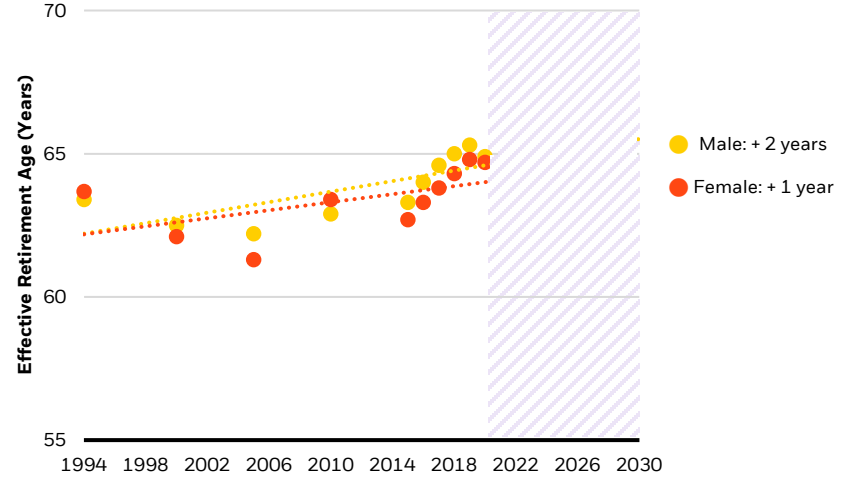
Can participation rates rise (not fall)?
Labor force participation rates

Legend:
- Male: - 5pp
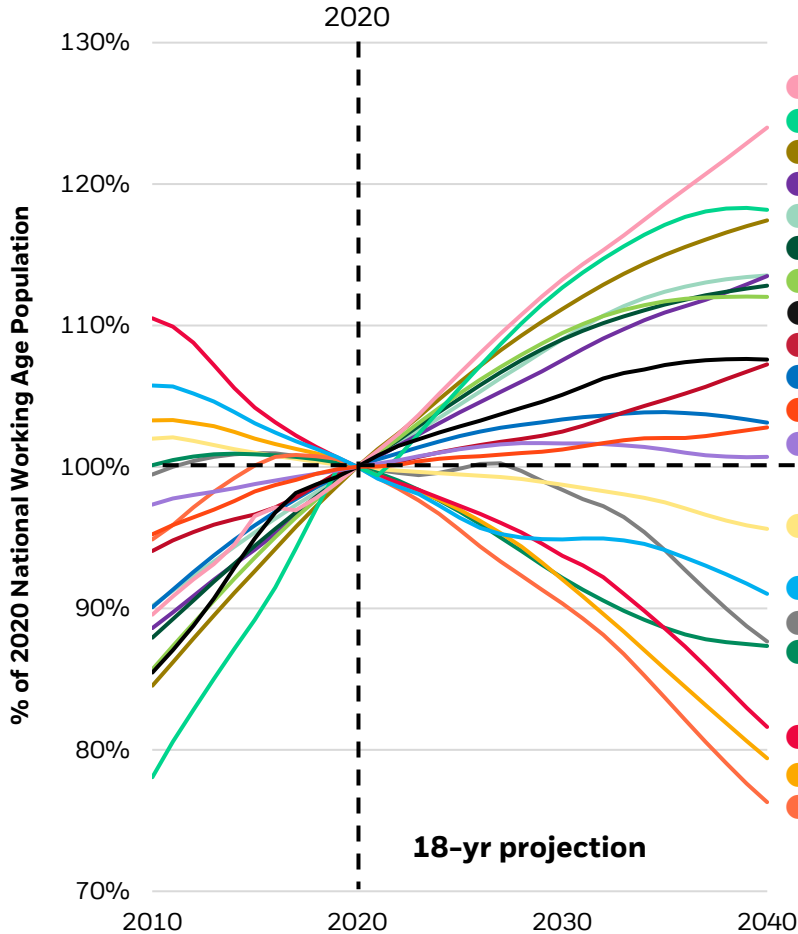- Total: - 3pp
- Female: 0pp
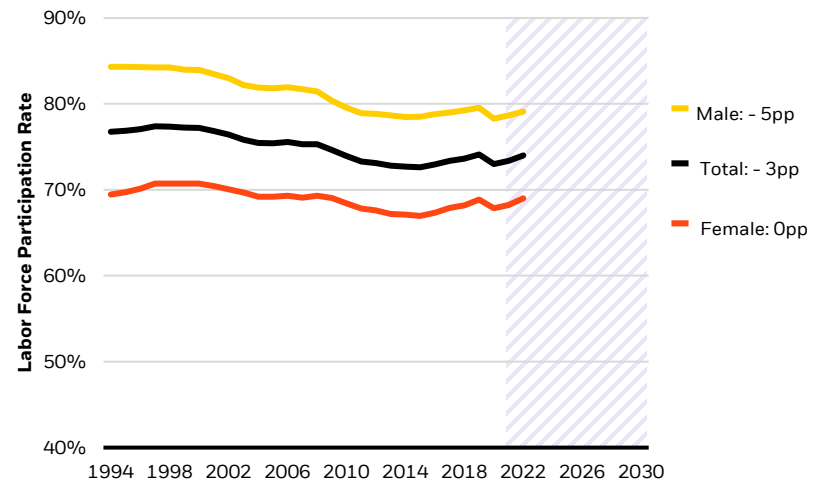
Sources: OECD, UN, IMF, and Haver.

Population and productivity on the road to 2040

What combined changes in G20 working age populations and productivity?

G-20 Working-age population (ages 15-64): UN "medium trend"

	Working–Age Pop. CAGR 2022–2032 *(Future)*	Realized Productivity CAGR 2012–2022 *(Past)*	Shares by country of: Global GDP (2022)[3], MSCI (2023)[4,5]	
			GDP:	**MSCI:**
South Africa	1.2%	0.7%	0.4%	0.4%
Saudi Arabia	1.3%	(0.2%)	1.1%	0.4%
India	0.9%	4.6%	3.4%	1.6%
Australia	0.7%	0.5%	1.7%	2.0%
Argentina	0.9%	(1.1%)	0.6%	–
Indonesia	0.8%	3.0%	1.3%	0.2%
Mexico	0.8%	(0.4%)	1.4%	0.3%
Turkey	0.5%	3.2%	0.9%	0.1%
Canada	0.3%	0.5%	2.1%	3.0%
Brazil	0.3%	(0.3%)	1.9%	0.6%
USA	0.2%	1.0%	25.2%	59.3%
UK	0.1%	0.5%	3.0%	3.9%
France	(0.1%)	0.4%	2.8%	3.0%
Russia[2]	(0.4%)	1.6%	2.2%	–
China	(0.2%)	6.2%	17.8%	3.3%
Germany	(0.9%)	0.3%	4.0%	2.1%
Japan	(0.7%)	(0.2%)	4.2%	6.1%
Italy	(1.0%)	0.0%	2.0%	0.7%
Korea	(1.1%)	1.6%	1.7%	1.4%

"Tailwinds"
WAP growing from 2020 – 2040
GDP: 13%
MSCI: 8%

"Neutral"
GDP: 30%
MSCI: 64%

"Headwinds"
WAP shrinking from 2020 – 2040
GDP: 35%
MSCI: 17%

Note: **1.** Adapted from Adele Hayutin's New Landscapes of Population Change: A Demographic World Tour. Indexed to 2020. UN Medium Fertility Projection.
Sources: OECD Productivity Statistics (as of 06/2023); United Nations Population Statistics (as of 2022). World Bank. **2.** Russia Realized Productivity CAGR 2011-2021
3. World Bank, national accounts data, and OECD National Accounts data files_2022 **4.** MSCI ACWI IMI Index **5.** ACWI IMI's Complete Geographic Breakdown

INCOME SUMMARY: *where will growth and returns be higher?*

Countries with still increasing populations are among the less developed

- Have fewer resources to educate and absorb their rising populations, to create employment.
- Have greatest demand for new investment spending to help absorb their growing populations.

Countries with stagnant or falling populations are among the most developed, highest income

- With a large, but declining share of global GDP.
- With the largest share of current capital market assets.
- With constraints on the supply of labor, pressures for more immigration.

Can substituting capital–for–labor increase productivity enough?

- Adding financial capital will eventually face diminishing returns.
- Productivity gains are unlikely to be evenly distributed across countries, industries, companies.
- Why? If marginal product of capital is less than marginal product of labor then productivity declines.

The productivity imperative – in conditions of a constrained labor supply

We will want to hold investments in countries, industries, and companies where:
- MPK > MPL and this generates realized gains in productivity.
- The frontier of diminishing returns has not yet eroded available (excess) returns.
- Demand for turning savings into investment can be reached via capital markets.

DEMAND FOR SAVINGS: *the engine of capital markets*

Saving & dissaving are "mirror twins"

Putting savings into financial assets requires the creation of financial liabilities.

- *Financial saving and dissaving are simultaneously determined.*

Banks always stand ready to dissave – to borrow your money (accept deposits).

Who else will offer investable claims on future income – with higher returns than deposit rates – that savings can be invested in?

**Reconciled in capital markets**

Internal balances. The supply and demand for savings will be reflected in a country's capital markets.

External balances. Other things equal, if a country has:

- Less domestic savings than investment, it will run a current account deficit (external sector surplus) and import savings.

- More domestic savings than investment, it will run a current account surplus (external sector deficit) and export savings.

Sources of national savings

To accumulate *national savings*, countries need to generate savings from current income and then, simultaneously either:

- Generate sufficient domestic demand for converting (domestic or foreign) saving into investment, or

- Export excess savings and accumulate claims on future income from the rest of the world

United States: saving and saving capacity

Annual sector financial balances
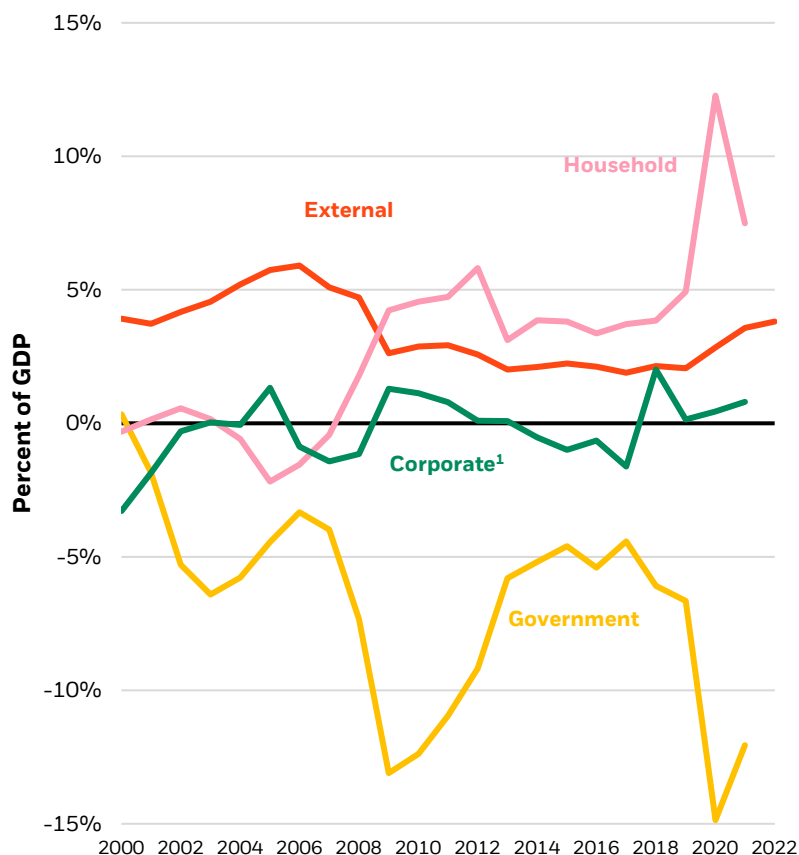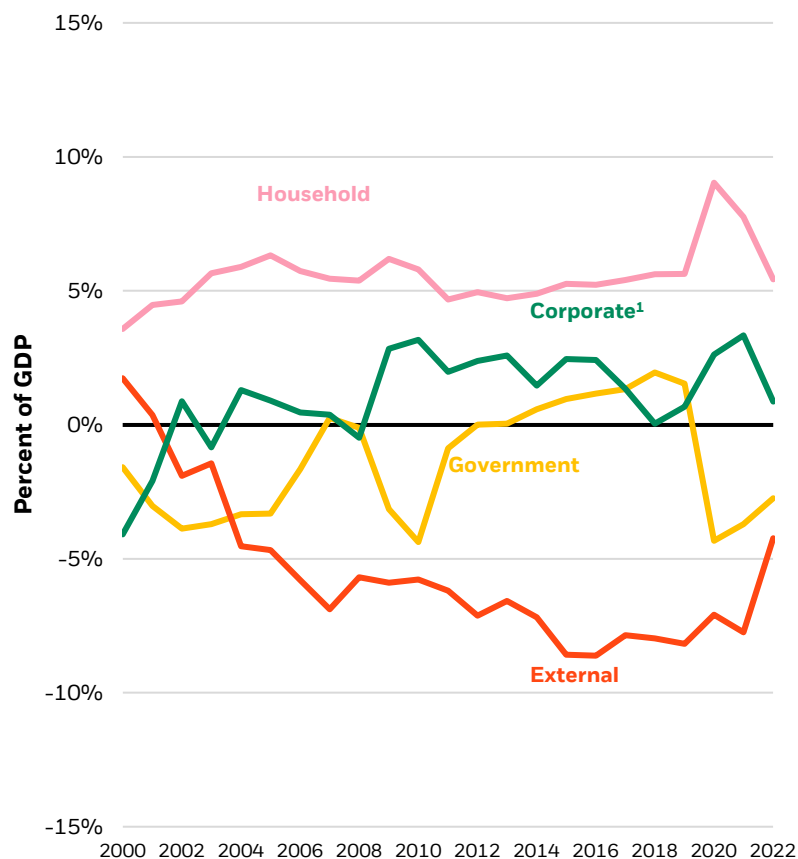

Capital market composition
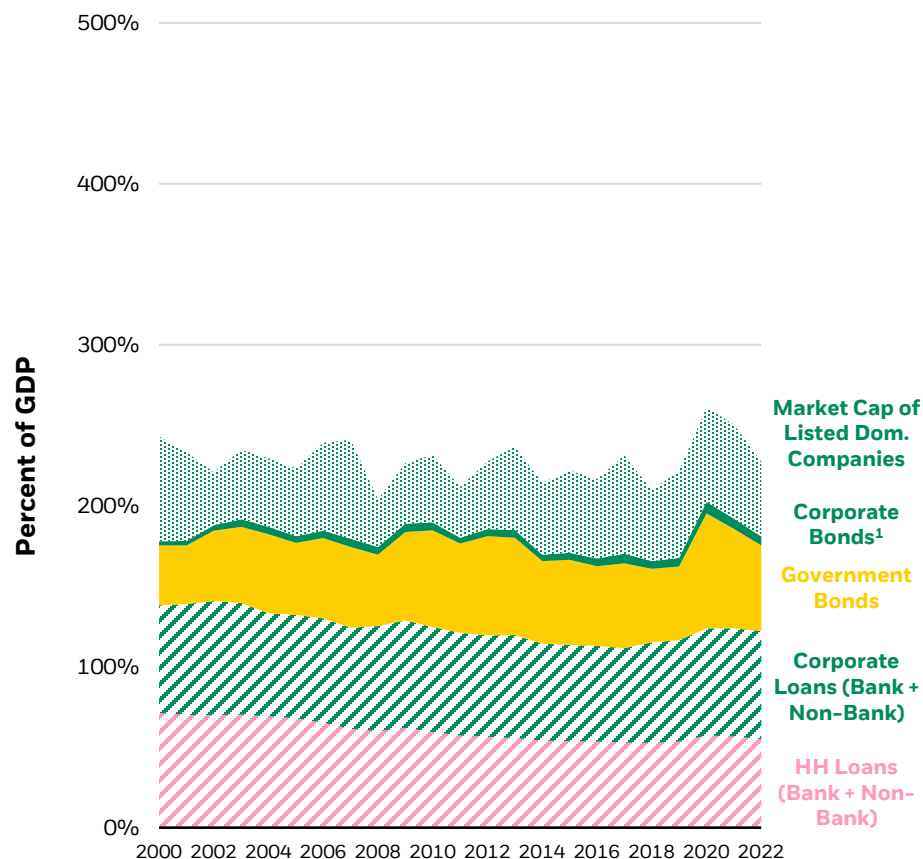
Note: External sector proxied by the opposite of the current account. A current account deficit, meaning the country receives more investment than it expends, corresponds to the external sector being in surplus (i.e., a net lender), and vice versa. **1.** Excludes the financial sector.
Sources: OECD, Bank for International Settlements , and World Bank Development Indicators (via Haver Analytics) (as of 11/13/2023).

Germany: saving and saving capacity

Annual sector financial balances

Percent of GDP

Household
Corporate[1]
Government
External

Capital market composition

Percent of GDP

Market Cap of Listed Dom. Companies

Corporate Bonds[1]

Government Bonds

Corporate Loans (Bank + Non–Bank)

HH Loans (Bank + Non–Bank)

2. Problems of personal savings
CHOICE: *who gets to choose what?*

Personal saving is also defined and constrained by income

- *Accidental savers*: high incomes and a low marginal propensity to consume.
- *Intentional savers*: middle incomes and choosing consumption later vs. now.
- *Constrained savers*: low incomes and a limited capacity to save.

Two choices to save

1. Whether to save at all – and how much to save.
2. Where to invest our savings – with whom and in what instruments.
   a. Fund types – target risk or target date (DC).
   b. Pension, annuity (DB).

Choices can be made "for us" or "by us"

A. Mandatory, required.
B. Voluntary, chosen.
   i.   We are required to make a choice (including to opt out or opt in)
   ii. We choose at our own initiative.

Overcoming problems of human choice

- Affect, emotion, salience
- Reference points
- Risk appetite, risk aversion
- Other sources of human bias, inertia

- Cognitive load
- Financial literacy
- Competing incentives
- Trust and distrust

2. Problems of personal savings

TRUST: *central and essential for savings behavior*

Who can make the inter–temporal trade–off?

A child is left alone with one treat and told that they will receive a second treat if they can resist eating the first treat for 15 minutes. Who can wait? Why do they wait?

The Stanford Marshmallow Experiment (1972):
- Original results suggest a genetic propensity for patience, predict future success in life.[1]
- Later research: both trust and distrust can be learned at a very young age.[2]
- Since Human Genome Project the debate about "nature vs. nurture" is over: it is always both.[3]

"If you cannot recognize all the relationships of trust and distrust lurking below the surface of the political economy, you will never understand something as complicated as savings behavior."

Baseline social trust underlies other forms of trust

- Confidence that individuals have in each other, in social structures.[4]

Trust in finance, banking, money, and credit

- In government institutions, in the financial system.[5]
- In particular counterparties and institutions, compared to others.[6]
- In choices offered, and advice given.
- In expectations for a positive return.

3. Problems of investing – and spending

LONG TERM INVESTING: *portfolio design for individual savers*

Insights from "lifecycle investing"

* Portfolio composition adapts with age.
    * <u>Not</u> because of changes in individual risk *preferences*.
    * But to reflect the shift from human capital to financial capital.
* *Young investors*:
    * Hold higher equity/volatility, for longer period, to grow account balances.
    * Their wages are their "bonds".
* *Older investors*:
    * Nearing retirement, gradually increase bonds, decrease equities.
    * Shielding from volatility, and inflation hedging, to preserve wealth.

Other potential benefits of target date funds

* Adjust volatility precisely over time.
* Mitigate other risks, minimizing emotional investing, inertia.
* An "all-in-one" low-cost solution.
* Clarity, consistency of long-term objective aligns individuals and providers.

Requires capital markets that are deep, broad.

Improving outcomes, but not eliminating longevity risk.

LONGEVITY RISK: solving for our uncertain life expectancy

The high cost of guaranteed, fixed–income pensions is driving the shift to defined contribution

- High capital costs of "double guarantee": for pensions, insurers, governments, and nations.
- But longevity risk is shifted to individuals.

Everyone needs to solve the same problem: "investing and then spending" [decumulation]

- DB sponsors, annuity providers want to minimize calls on their balance sheets.
- DC and hybrid schemes want to offer some life-time benefits, efficiently.
- Individuals need (some) protection against living into the long tail of their life expectancy.

What society needs – and our opportunity   (Martin Wolf, FT, 19 Mar. 2023)

". . . large, collective defined contribution funds . . . [with] higher expected returns on equity . . . to provide (reasonably) predictable – though also when necessary adjustable – pensions."

How can we do this?

What will future investment returns be?

What are the *financial* consequences of a rising old–age dependency ratio?

Beyond the ratio of non–workers to workers, what impact on:
- The composition of growth and investment returns?
- And, ultimately, on aggregate liabilities for elderly consumption?

Japan's GDP per "elderly" capita (65+)
- 1994: ¥28b
- 2022: ¥15b

With a constrained labor supply, growth is limited to productivity gains.

Investment returns will reflect realized increases in output,
- In countries, sectors, companies where MPK > MPL,
- Avoiding problems of diminishing returns to financial capital,
- Available as returns in capital market assets.

The sources of productivity gains are likely to influence the labor and capital shares of income.[1,2,3,.4]

If "labor augmenting" technologies dominate:[5]
- Wage and/or labor share rises, reflecting higher labor productivity (perhaps with a J curve).
- Enhancing household capacity to save?   Impact on capital share, investment returns?
If "labor automating" technologies dominate:[6]
- Wage and/or labor share declines, reflecting technology replacing labor.
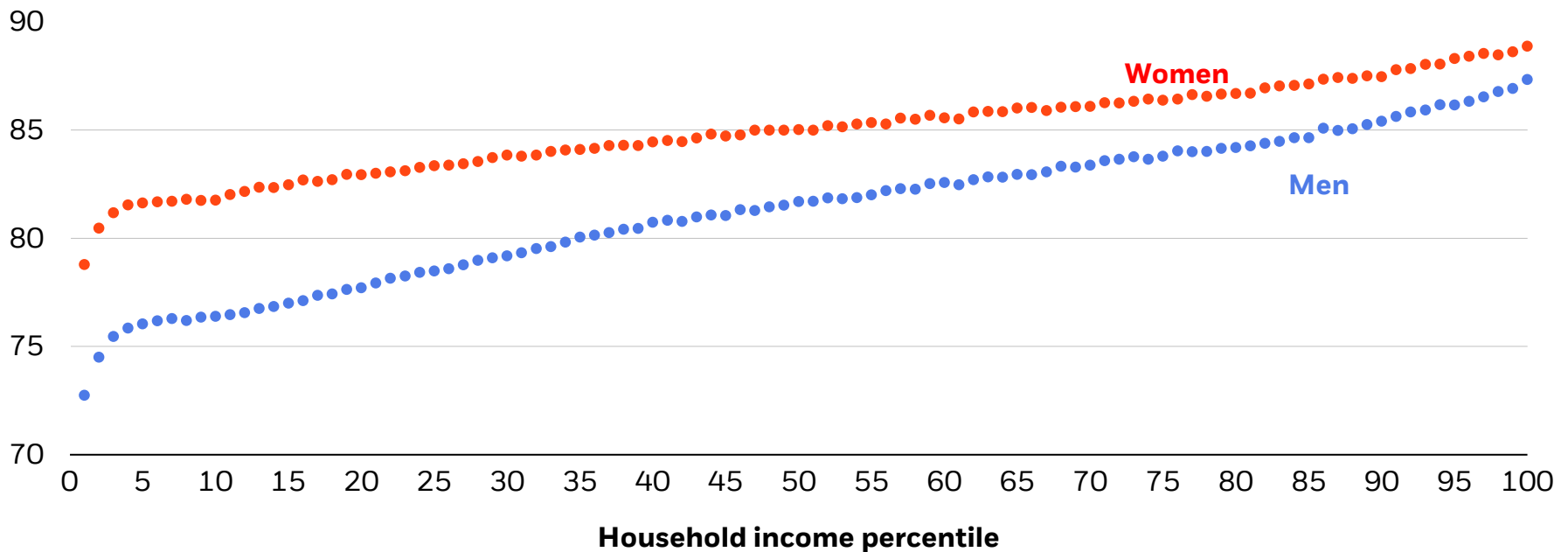- Household capacity to save declines? Impact on capital share, investment returns?

Will the 30–year tend of a rising capital share of income reverse or continue?[7]

Will free-cash flow – and the equity risk premium – rise, fall, or hold steady?

How long will who live?

U.S. life expectancy at age 40 (race-adjusted) by income, 2001–2014

Will the slope of these lines change in the future?

- Will inequality of income increase or decrease?
- Will inequality of health care increase or decrease?

Source: Chetty, R., Stepner, M., Abraham, S., Lin, S., Scuderi, B., Turner, N., ... & Cutler, D. (2016). The association between income and life expectancy in the United States, 2001-2014. Jama, 315(16), 1750-1766.

3. Problems of investing – and spending

How can a finite pool of assets finance a liability with an uncertain horizon?

We face two important uncertainties.

- Future rates of economic growth.
- Precisely how long we will live – individually and collectively.

We need to solve an equation with two unknown variables.

- Future investment returns.
- Future life expectancy.

What tools can we use *adaptively, over time?*

- Change the volatility of the portfolio of assets.
- Refine the actuarial characteristics of the liability, for more accurate life expectancy.
- Pool mortality/longevity risk by age cohort, by actuarial characteristics.
- Shed (some or all) mortality/longevity risk, for a price, a period of time.
- Change the payout – varying, not fixed, benefits – reflecting realized volatility and mortality.

What is the best we can do?

- The lowest all-in cost?
- A reasonably predictable but, when necessary, adjustable pension?

Solving problems of *Saving, Aging, Investing, and Spending*

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DEMAND FOR SAVING
"Dissaving" makes saving possible.
The engine of capital markets.
Necessary for long-term investing.

Where to invest savings?

- *In which country's capital markets?*

- *In which assets?*

2. Problems of personal savings

CHOICE
Who gets to choose?
What's mandatory? What's chosen?
What choices are offered?
Who offers them?

TRUST
Essential for savings behavior.

How to help people save more?

- *Save enough?*

- *Save effectively?*

3. Problems of investing –

LONG-TERM INVESTING
What portfolio of assets over time?
Life cycle, target date investing.
Requires deep capital markets.

– and spending
LONGEVITY RISK
Our uncertain life expectancy.
The investing-spending and decumulation challenge.

What portfolios to build?

- *Which assets? Which liabilities?*

How adapt to changing conditions?

End notes [1/6]

Slides 4-9:

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Hayutin, A. M. (2022). *New Landscapes of Population Change: A Demographic World Tour.* Hoover Press.

Jones, C. I. (2022). The end of economic growth? Unintended consequences of a declining population. *American Economic Review, 112* (11), 3489-3527.

End notes [2/6]

Slide 13:

Barrett, L. F. (2017). *How emotions are made: The secret life of the brain*. Pan Macmillan.

Bargh, J. (2017). *Before you know it: The unconscious reasons we do what we do*. Simon and Schuster.

Dehaene, S. (2014). *Consciousness and the brain: Deciphering how the brain codes our thoughts*. Penguin.

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Lusardi, A., & Mitchell, O. S. (2023). The Importance of Financial Literacy. *The Journal of Economic Perspectives*, *37*(4), 137-154.

Sapolsky, R., M. (2017). *BEHAVE – The Biology of Humans at Our Best and Worst*. Penguin.

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Thaler, R. H. (2015). *Misbehaving – The Making of Behavioral Economics*. W. W. Norton & Company.

End notes [3/6]

Slide 14:

1. Mischel, W., Shoda, Y., & Peake, P. K. (1988). The nature of adolescent competencies predicted by preschool delay of gratification.

2. Pesch, A., & Koenig, M. A. (2018). Varieties of trust in preschoolers' learning and practical decisions; Moffett, L., Flannagan, C., & Shah, P. (2020). The influence of environmental reliability in the marshmallow task: An extension study.; Kidd, C., Palmeri, H., & Aslin, R. N. (2013). Rational snacking: Young children's decision-making on the marshmallow task is moderated by beliefs about environmental reliability.; Watts, T. W., Duncan, G. J., & Quan, H. (2018). Revisiting the marshmallow test: A conceptual replication investigating links between early delay of gratification and later outcomes. Psychological science, 29(7), 1159-1177.

3. Miller, G. W., & Jones, D. P. (2014). The nature of nurture: refining the definition of the exposome. Toxicological sciences, 137(1), 1-2.

4. Morrone, A., Tontoranelli, N., & Ranuzzi, G. (2009). How good is trust?: Measuring trust and its role for the progress of societies. OECD.

5. Koh, B. S., Mitchell, O. S., & Fong, J. H. (2021). Trust and retirement preparedness: Evidence from Singapore. The Journal of the Economics of Ageing, 18, 100283; Beckmann, E., & Mare, D. S. (2017). Formal and informal household savings: how does trust in financial institutions influence the choice of saving instruments?. Available at SSRN 3023711.

6. Arrow, K. J. (1972). Gifts and exchanges. Philosophy & Public Affairs, 343-362.

End notes [4/6]

Slide 15:

Brown, D. P. (1987). Multiperiod financial planning. *Management Science*, *33*(7), 848-875.

Luskin, D.L. and Tint, L.G. (1998). *Investment fund management method and system with dynamic risk adjusted allocation of assets* (U.S. Patent No. 5812987). U.S. Patent and Trademark Office. https://patents.justia.com/patent/5812987

Sharpe, W. F., & Tint, L. G. (1990). Liabilities-a new approach. *Journal of Portfolio management*, *16*(2), 5-10.

Target-date funds were created by Donald Luskin and Larry Tint of Wells Fargo Investment Advisors, later introduced by Barclays Global Investors in March 1994. In 2009, BlackRock Inc. announced a $13.5B acquisition of Barclays Plc's investment arm BGI, forming the world's largest asset manager.

End notes [5/6]

Slide 17:

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   i. Ch. 8: Hoon, H.T. Growth Effects of Additive and Multiplicative Robots alongside Conventional Machines (pp.153-173).
   ii. Ch. 9: Hoon, H.T. Wage Effects of Additive and Multiplicative Robots alongside Factory Buildings and Physical Structures (pp. 174-189).
   iii. Ch. 10: Hoon, H.T. Additive Robots, Relative Prices, and Indigenous Innovation (pp. 190-200).

4. Autor, D., Chin, C., Salomons, A. M., & Seegmiller, B. (2022). New frontiers: The origins and content of new work, 1940–2018 (No. w30389). National Bureau of Economic Research.

5. Keynes, J. M. (1930). Economic possibilities for our grandchildren. In Essays in persuasion (pp. 321-332). London: Palgrave Macmillan UK.

6. Vonnegut, K. (1952). Player piano. Charles Scribner's Sons, USA.

7. Feenstra, R. C., Inklaar, R., & Timmer, M. P. (2015). The next generation of the Penn World Table. American economic review, 105(10), 3150-3182.

End notes [6/6]

Slide 18:

Chetty, R., Stepner, M., Abraham, S., Lin, S., Scuderi, B., Turner, N., Bergeron, A., Cutler, D. (2016). The association between income and life expectancy in the United States, 2001-2014. Jama, 315(16), 1750-1766.

Important Information

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The material does not constitute investment, legal, tax, or other advice and is not to be relied on in making an investment or other decision.

Investing involves risk, including possible loss of principal.

Asset allocation models and diversification do not promise any level of performance or guarantee against loss of principal.

Investment in target date funds is subject to the risks of the underlying funds. The principal value of the funds is not guaranteed at any time, including at and after the target date.