

Innovative Financial Products for an Aging World



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Risk Management for an Aging World

We must do more to:

- ✓ Identify the risks;
- ✓ Mitigate the risks;
- ✓ Finance/insure the risks.



Key risks of aging:

- Poor health
(dementia, frailty)
- Longevity
(outliving assets)
- Asset price risk
(housing, investments)
- Political risk
(taxes, transfers)
- Global risk
(epidemics, capital market shocks, longevity shocks)

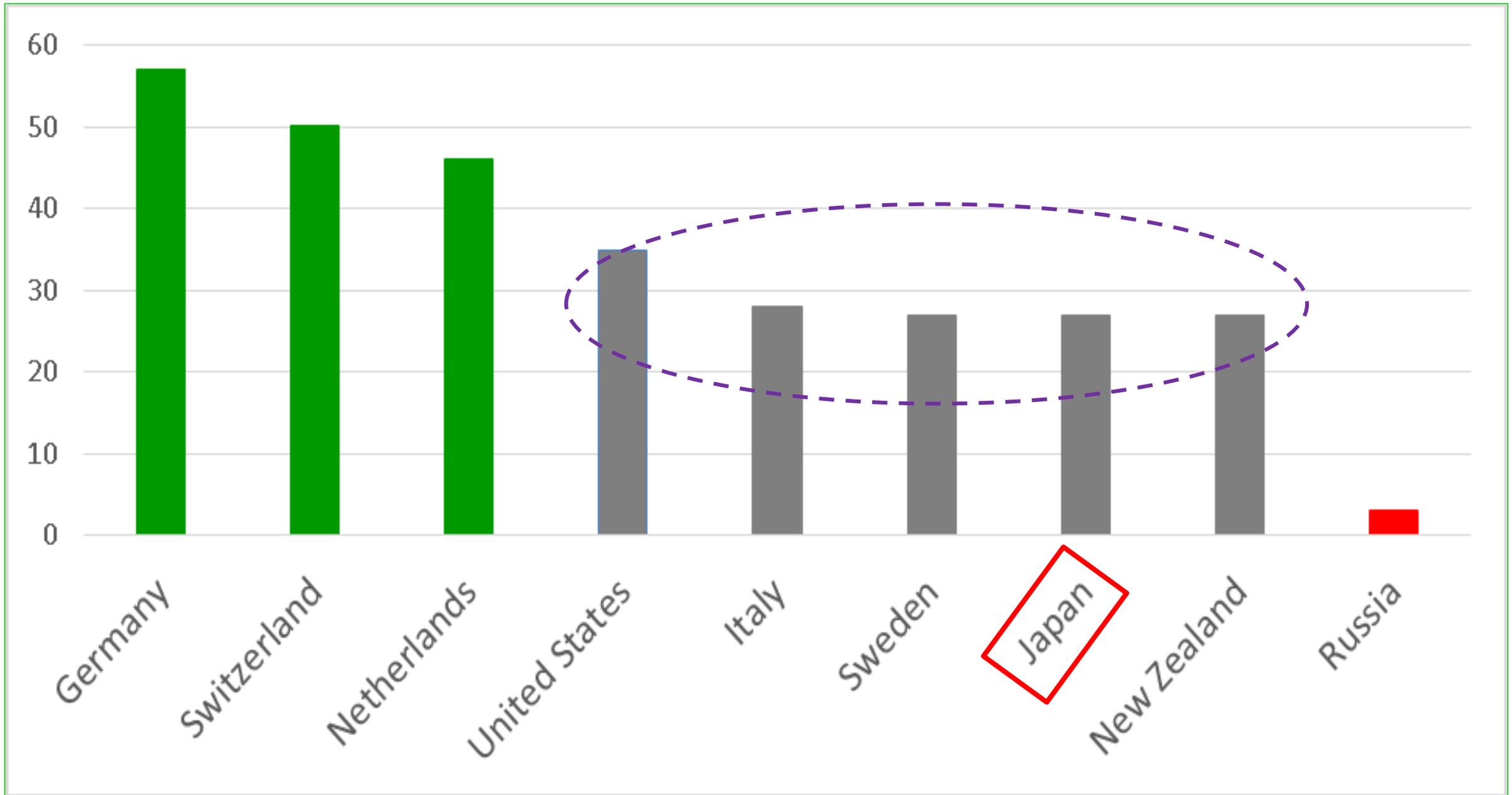
At the Core: Financial illiteracy is widespread! The “Big Three” (Lusardi/Mitchell)

Interest Rate: Let's say you have \$100 in a saving account paying 2% interest/year. How much would you have in the account at the end of 5 years? $< \$102$; $= \$102$, $> \$102$

Inflation: Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, with the money in this account, would you be able to buy: $> \text{today}$, $= \text{today}$; $< \text{today}$

Risk Diversification: True or false ? Buying a single company stock usually provides a safer return than a stock mutual fund.

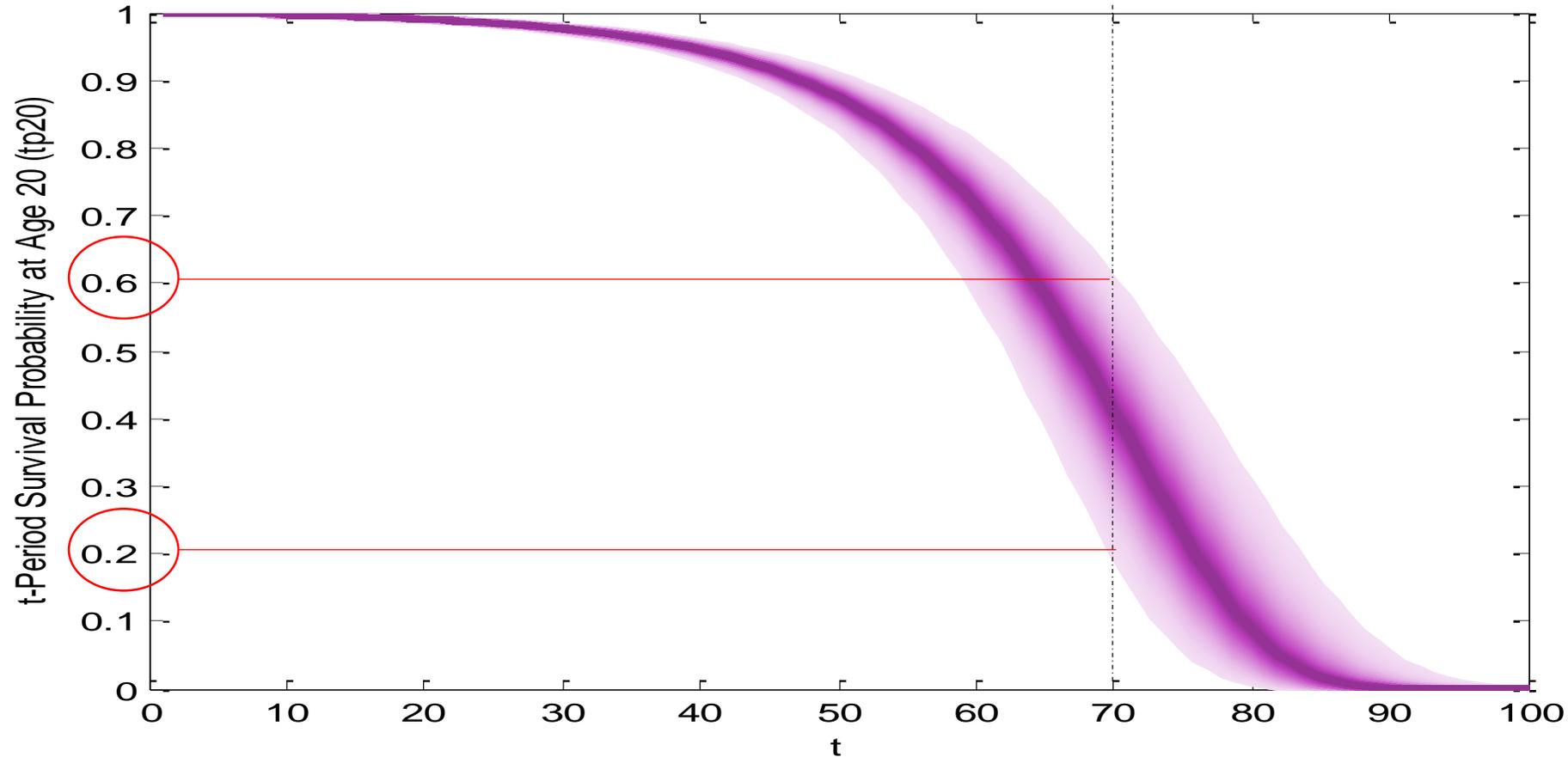
International Comparisons (% correct)



Poor health

- Longitudinal nationally representative surveys of older persons are key. US Health & Retirement Study <http://hrsonline.isr.umich.edu/>
- **Dementia:** Fishman followed healthy people at age 70 to end of their lives.
 - Found **27-31%** of men, **35-37%** of women developed dementia before death.
 - Yet delaying dementia 5 years would cut *prob. of ever getting dementia.*
[exercise, diet, BP, avoid smoking & obesity]
- **Nursing home stays:** Hurd et al. followed people age 57-61 to end of life.
 - Over half (**56%**) ever in a nursing home; **64%** of women, **51%** of men. Much higher than thought previously (~1/3).
 - *Better monitoring, care coordination, rehab, home care, exercise.*

Longevity Risk with Systematic Mortality Shocks



Notes: Simulated distribution of age-20 female t -period survival probabilities (99%:1%) based on CBD (2006b) mortality model (10,000 simulations). Darker areas represent higher probability mass. *Horneff et al. IME 2015*

Annuity Innovations:

- *Variable Annuities*
 - Allows portfolio changes after retirement
- *Two-tier Annuities*
 - Pays out more if need nursing care (3+ ADLs)
- *Deferred Annuity*
 - Recommended for defined contribution plans
- *Tontines*
 - Systematic shocks remain with risk pool.

“Issuer makes known fixed payments (the numerator), ...distributed among the survivors (the denominator). [S]yndicate incurs aggregate longevity risk...(which) reduces the need for capital (if it was an insurance company) and ...increases the expected payout per survivor. *Milevsky (2017)*”

“Putting pensions back” into DC plans very valuable

- Optimally put 5-15% of plan balance @65 into LIA (pays from age 85).
- Pretty good default: 10% >\$65K, results very similar!
- Welfare gains worth 6-14% of retirement accruals (w/ ave. mortality).
- Appealing to wide set of retirees.



In this time of turmoil: what about guarantees on investments?



Various guarantee formats:

- Principal guarantee
- Minimum ROR (or return band)
- Minimum Benefit

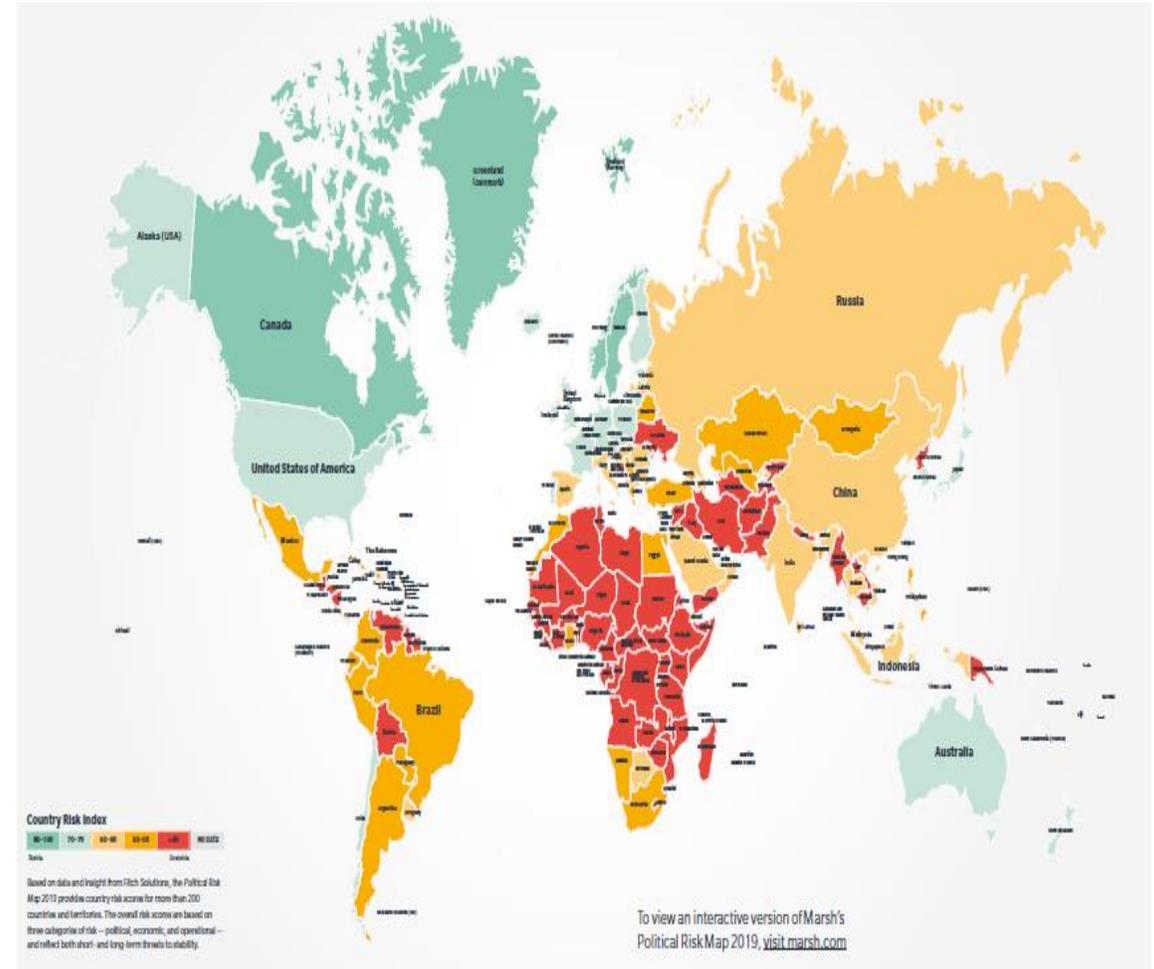
Ex: Japan, Germany, Chile (range), Mexico

Yet BEWARE: Guarantees can be costly! (% of contribution over 40 years)

- Principal Guarantee (*0% ROR*) ~0%
- Bond Return Guarantee 16-25%

And Political Risk is Growing!

- Humanitarian crises;
- Populism/religious violence;
- Nuclear threats;
- Brexit/Ukraine;
- Deficit spending;
- Isolationism/protectionism/
tariffs/anti-migration sentiment.



Global Risk: Epidemics, global asset meltdown, population-wide survival shocks?

- Risks mostly inherently undiversifiable!
- Catastrophe bonds may work across nations and regions.
- PAYGO? This creates other risks in times of low fertility and long lived elderly.



Implications: Mitigating/financing old age risks

- *Poor health*: invest in health, financial literacy.
- *Longevity risk*: annuities, tontines.
- *Asset risk*: longer duration financial instruments, better securitization
- *Political risk*: very difficult!
- *Global risk*: Cat bonds to manage epidemics, financial market crashes
 - Better products to mitigate & finance retirement risk;
 - Better partnership for an aging world.

Thank you!

- *For more information:*

Wharton's Pension Research Council:

- <http://www.pensionresearchcouncil.org/>

Books and working papers:

- <http://www.pensionresearchcouncil.org/publications/books.php>

