

Innovative Financial Products for an Aging World



Presentation for the Japan Life Insurance Forum, Tokyo 2019

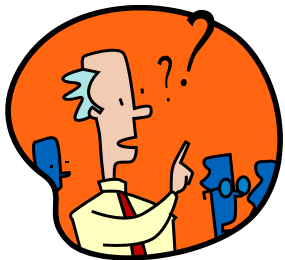
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Risk Management for an Aging World

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)

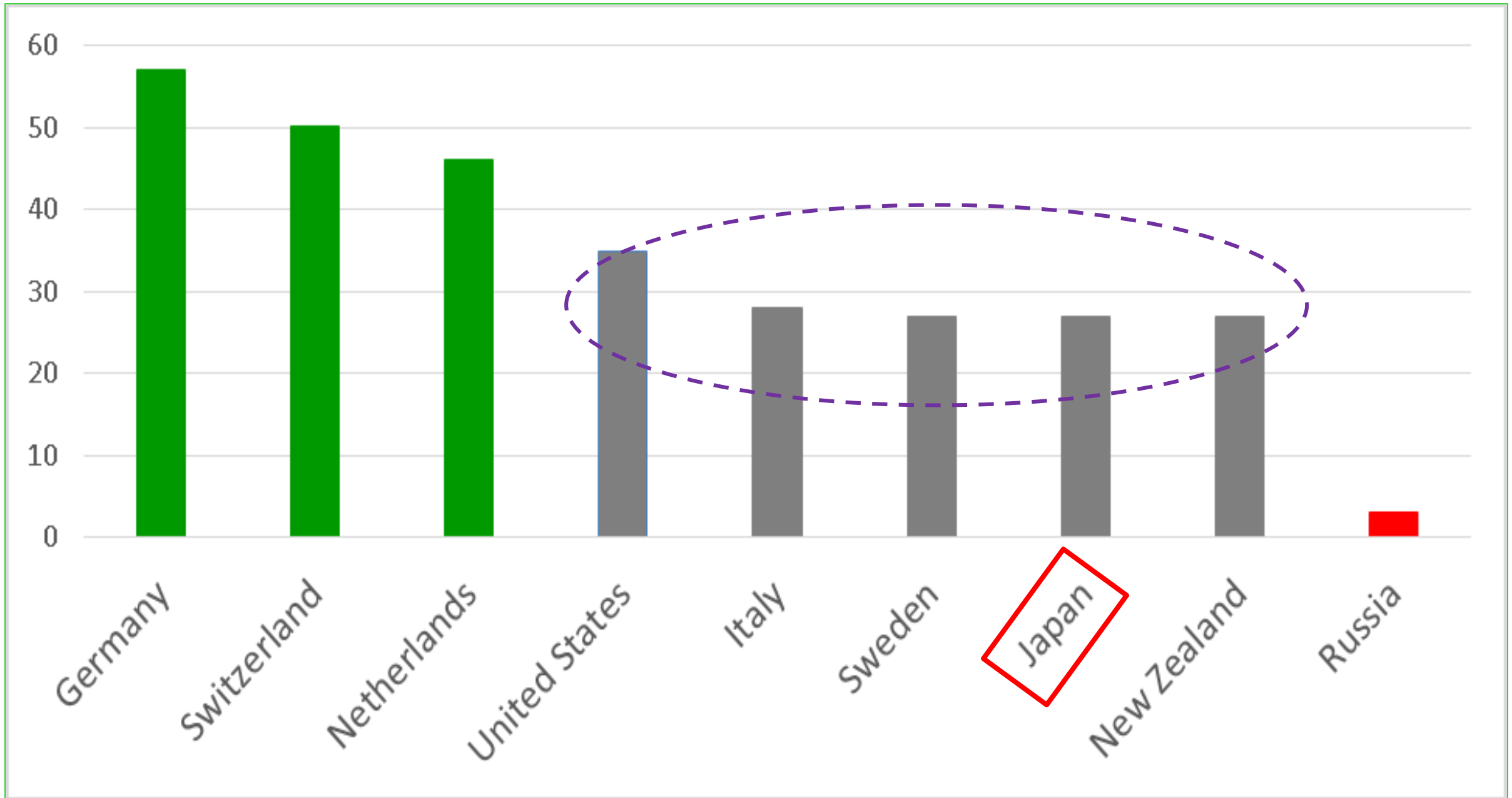
At the Core: Financial illiteracy is widespread! The “Big Three” (Lusardi/Mitchell)

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.

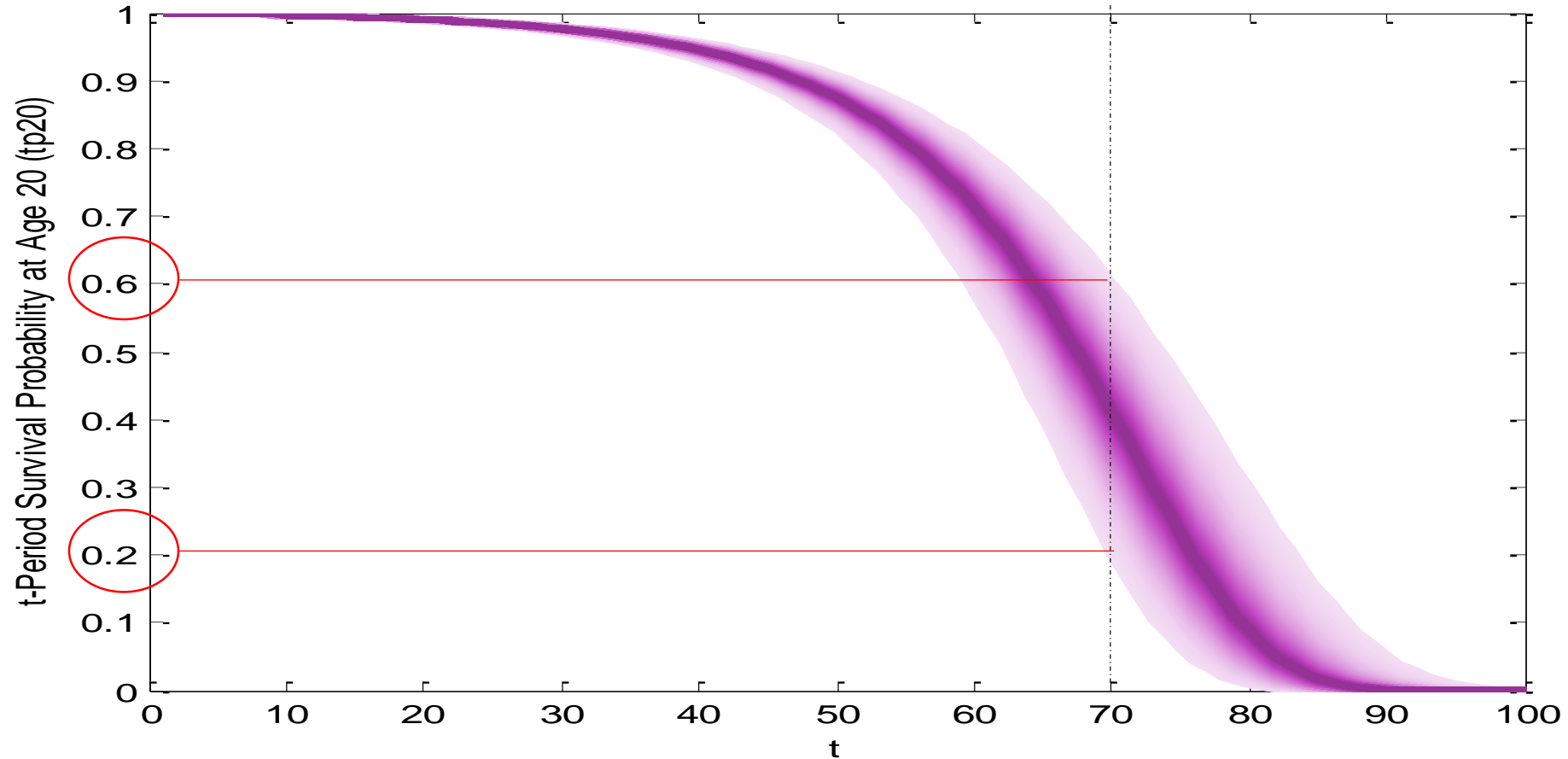
International Comparisons (% correct)



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.



Asset price risk

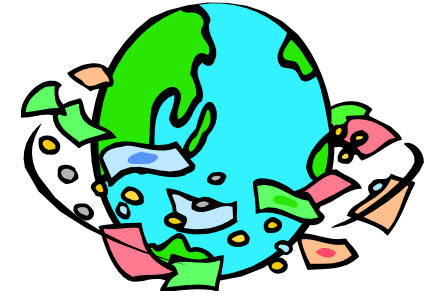
- Reverse mortgages: let people access net equity in their homes
- Home price insurance tied to home price index: Shiller
- Longer-duration indexed bonds: Needed for price-indexed annuities



The image shows a digital stock market ticker board with a blue background and yellow and white text. It displays various stock symbols and their corresponding prices and changes. The board is organized into columns, with some columns representing different sectors or companies. The text is in Japanese characters and numbers. The board is slightly tilted and appears to be a photograph of a physical display.

Symbol	Price	Change	Symbol	Price	Change	Symbol	Price	Change	Symbol	Price	Change
2675.0	2398.0	1775	1629.5	3387.0	1409.5	3382.0					
-39.0	-51.0	-3	-21.0	-47.0	-8.0	-13.0					
2645.0	2380.5	1782	1625.0	3377.0	1381.0	3350.5					
2692.5	2418.5	1785	1636.0	3386.0	1417.0	3408.5					
2635.0	2376.0	1782	1623.0	3354.0	1381.0	3340.0					
1077	8106	4874.5	14785	463	2051.5	293					
-9	-163	-108.0	-95	-9	+13.0	-4					
1076	8100	4080.0	14520	462	2026.0	292					
1083	8115	4084.0	14800	465	2054.0	295					

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>

