

# **Longevity Risk Regulation Around the World: An Even Playing Field?**

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*The views expressed in this presentation are those of the authors and do not necessarily represent those of the IMF or IMF policy.*

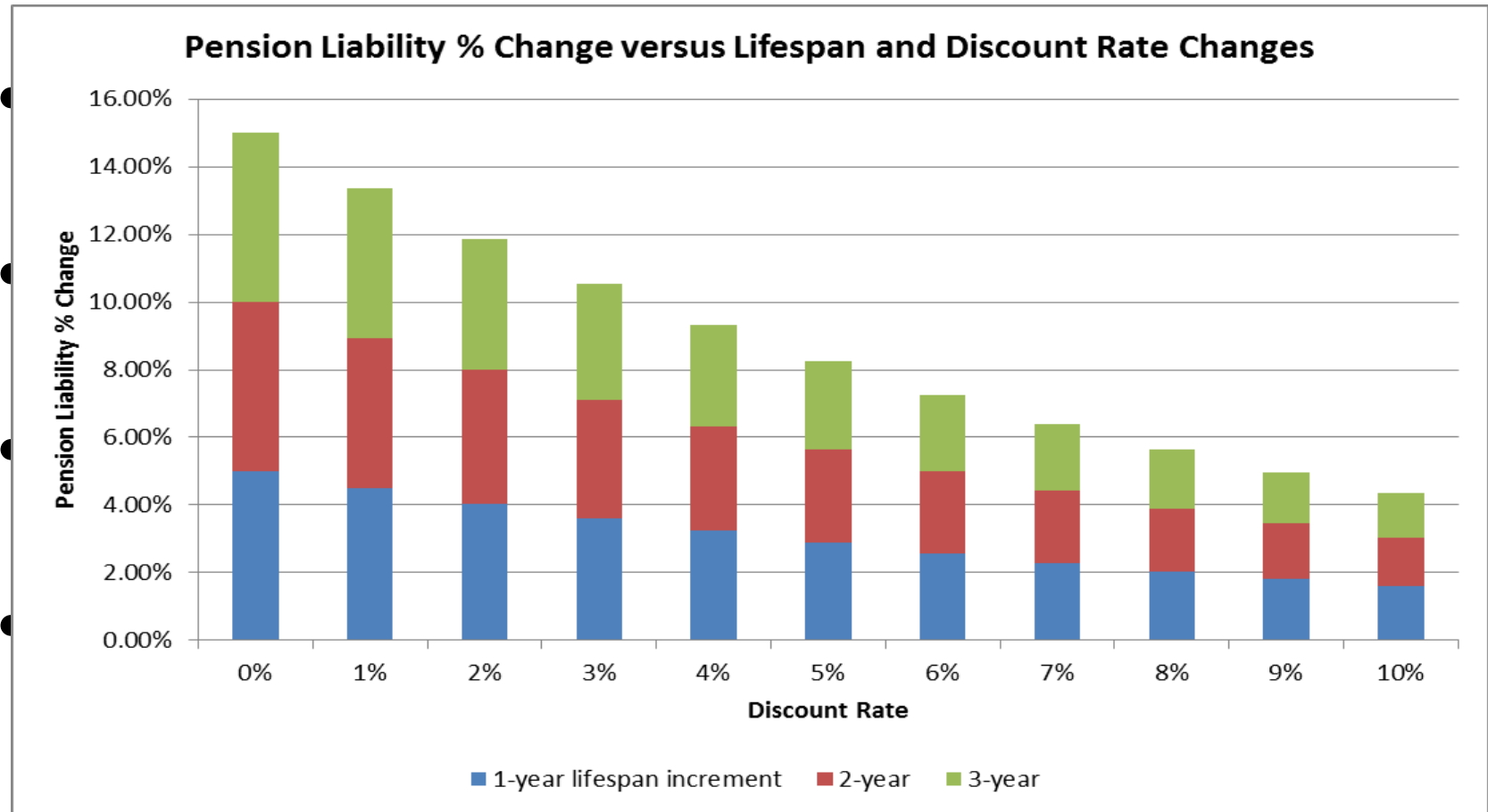
# Introduction

- April 2012 IMF Global Financial Stability Review chapter on longevity risk transfer (LRT) markets (defined benefit (DB) pension => insurance sector)
- December 2013 Joint Forum report on regulatory aspects of LRT markets
- Left with puzzles as to why there were vibrant LRT markets in some countries and not others
- Even regulatory playing fields in countries with active LRT markets, versus uneven in those without?

# Overview

- Longevity risk math, markets and market drivers
- Longevity risk regulations in select countries (pension fund and insurer mortality assumptions and solvency liability discount rates)
- Links between levelness of regulatory playing fields and LRT market activity
- Rationale for leveling playing field (or not)

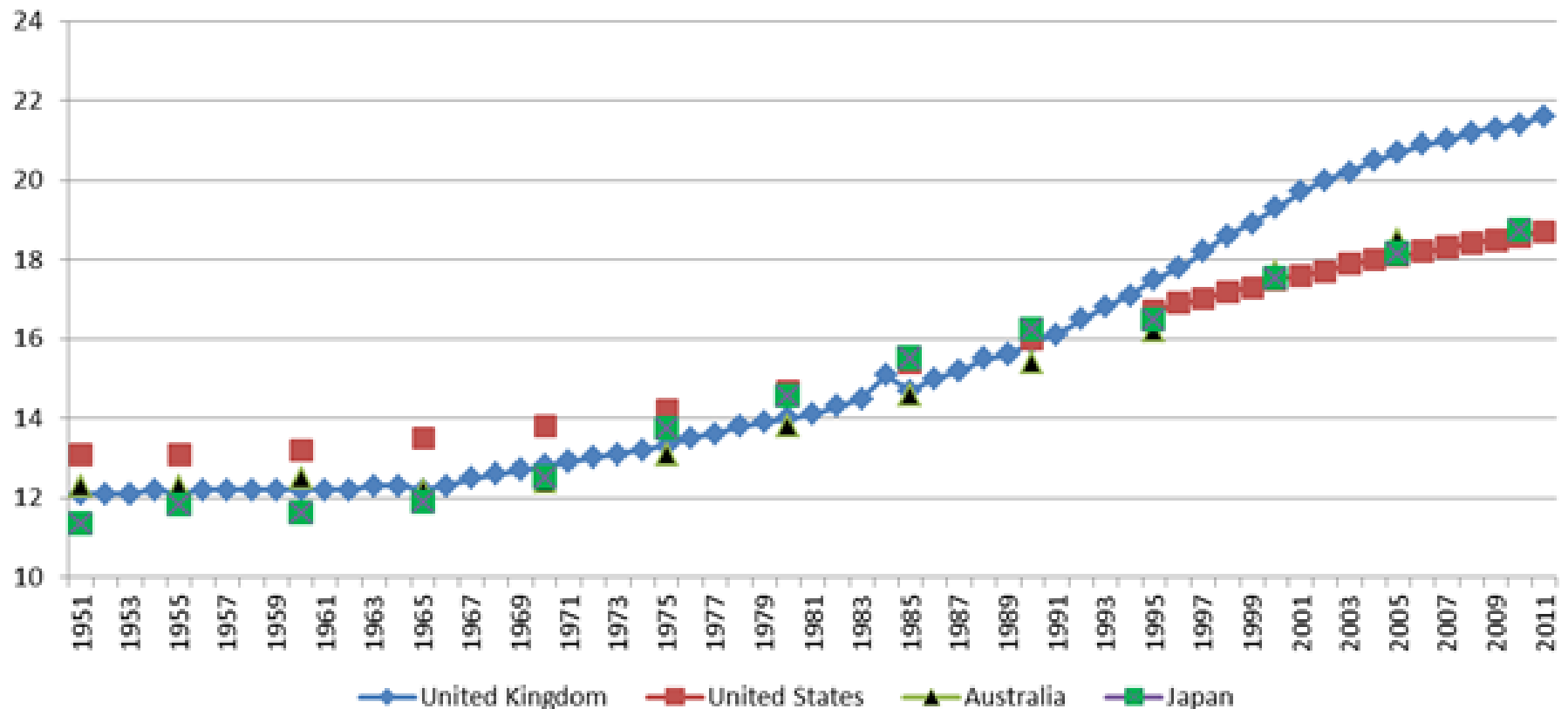
# Longevity risk is a major defined benefit plan risk that is particularly acute at lower interest rate levels



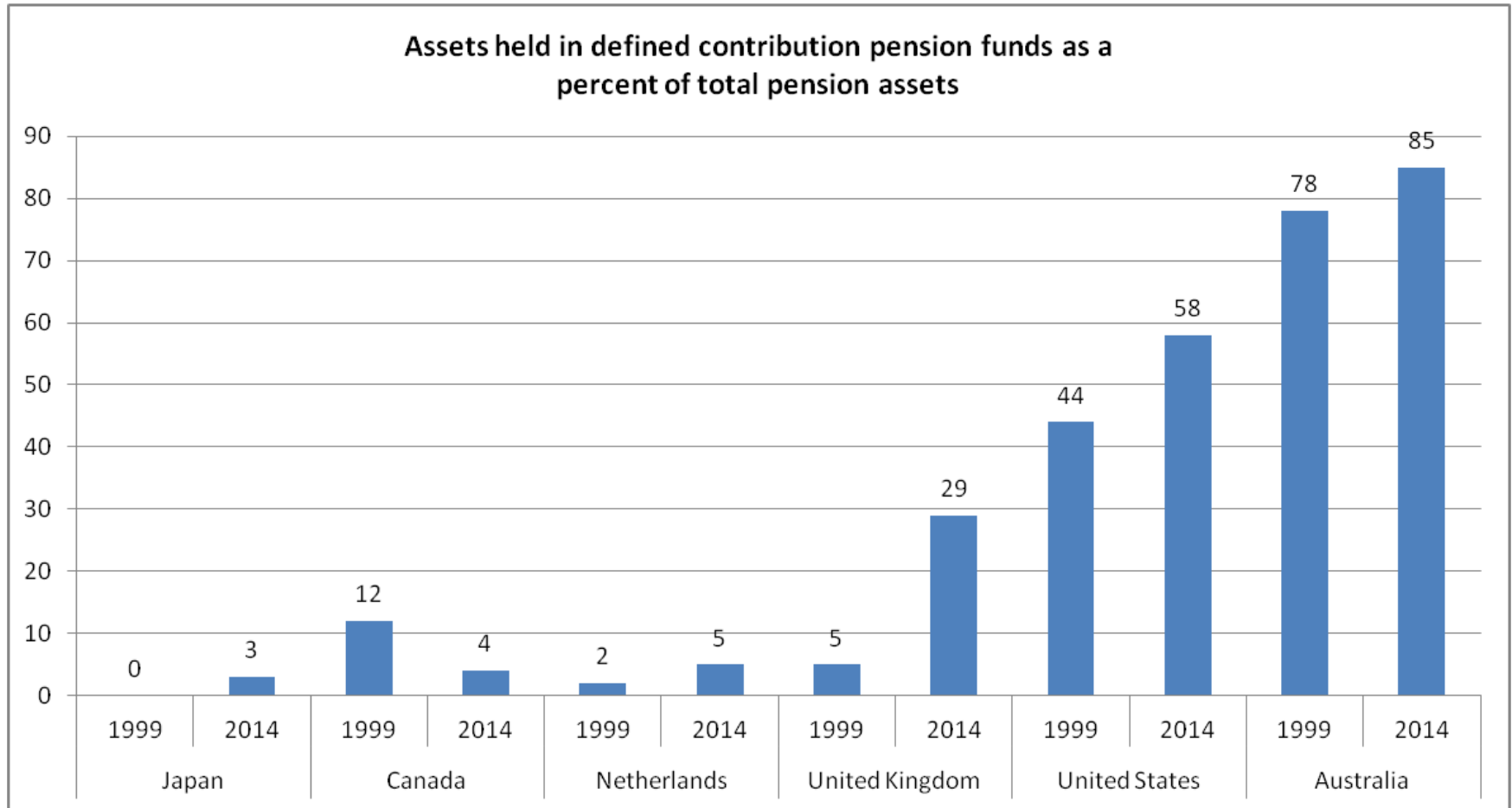
# Longevity is consistently underestimated

## Cohort Estimates of Male Life Expectancy at Age 65

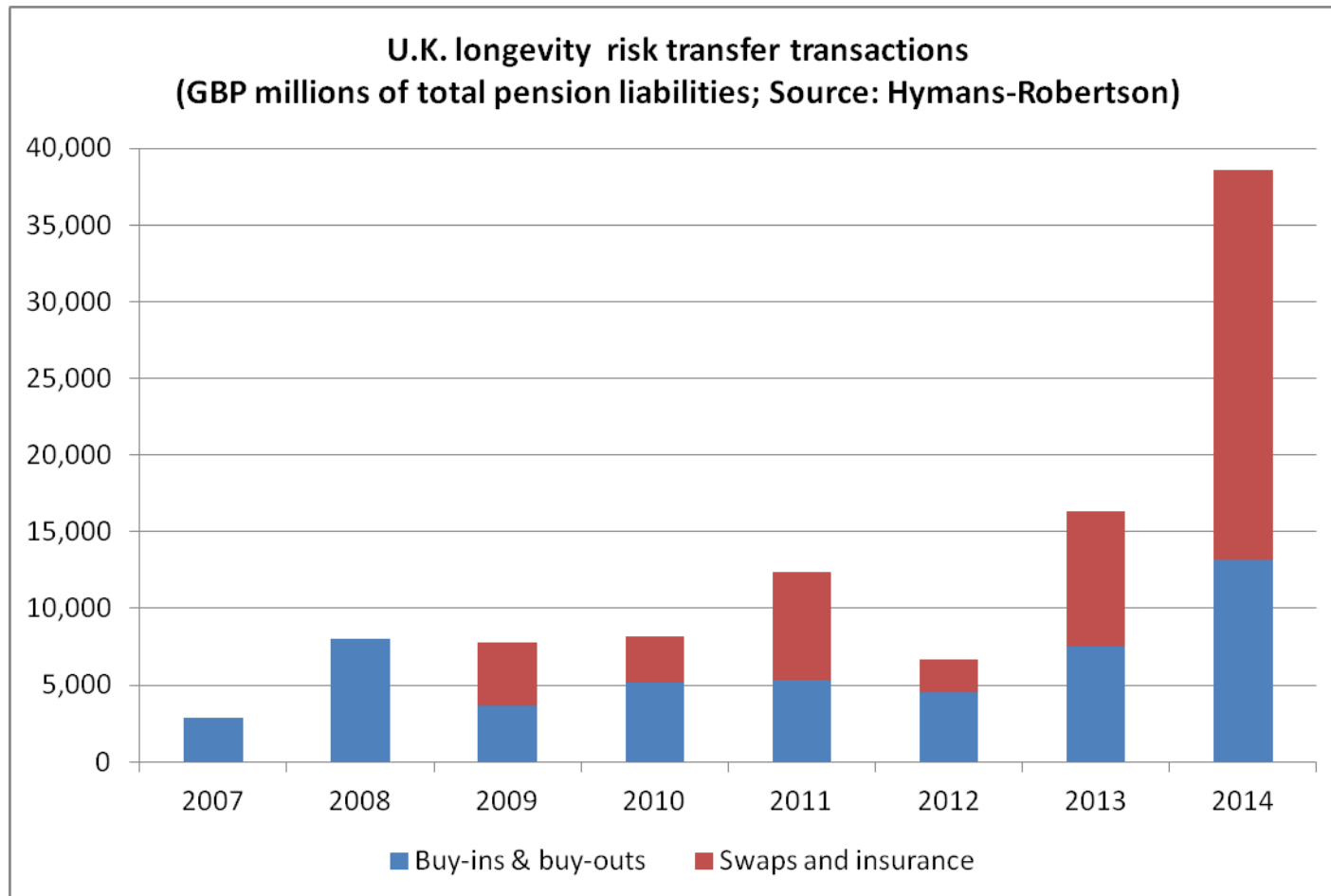
Sources: Office for National Statistics (UK); OASDI Board of Trustees (US)



# Many DB plans being closed to new employees and DB accruals being closed to existing employees



# Life (re) insurers have natural appetite for longevity risk to offset mortality risk in life insurance books





### Non-UK Longevity Risk Transfer Transactions

Sponsor	Provider (s)	Solution	Size (mm)	Date
Aegon	Deutsche Bank	Swap	€ 12,000	Feb-12
General Motors	Prudential (U.S.)	Buy-Out	\$26,000	Jun-12
Verizon	Prudential (U.S.)	Buy-Out	\$7,000	Oct-12
Aegon	Société Générale CIB / SCOR	Swap	€ 1,400	Dec-13
AXA France	Hannover Re	Swap	€ 750	Aug-14
Motorola	Prudential (U.S.)	Buy-Out	€ 3,100	Sep-14
Timken	Prudential (U.S.)	Buy-Out	€ 600	Jan-15
Kimberly-Clark	Prudential & MassMutual(U.S.)	Buy-Out	€ 2,500	Feb-15
Bell Canada	Sun Life	Insurance	C\$5,000	Mar-15

# Most Active Longevity Risk Transfer Markets (Big Private Plans That Are Mostly Defined Benefit)

	<b>DB%</b>	<b>%GDP</b>	<b>Intensity</b>
<b>Netherlands</b>	95%	166%	158%
<b>Switzerland</b>	100%	119%	119%
<b>U.K.</b>	71%	101%	72%
<b>Canada</b>	97%	71%	69%
<b>U.S.</b>	57%	83%	47%
<b>Japan</b>	97%	29%	28%
<b>Australia</b>	10%	103%	10%
<b>Germany</b>	100%	6%	6%
<b>Korea</b>	72%	7%	5%
<b>Peru</b>	15%	19%	3%
<b>Spain</b>	28%	9%	3%
<b>Mexico</b>	13%	15%	2%
<b>Brazil</b>	6%	13%	1%
<b>Chile</b>	0%	62%	0%
<b>France</b>	0%	1%	0%
<b>Singapore</b>	0%	0%	0%
<b>Taiwan</b>	n/a	n/a	-

## Joint Forum (2013): What might be impeding longevity risk market growth?

- Reinsurance longevity risk capacity constraints?
- Pension funds not required to fully recognize and deal with (e.g., reserve for) longevity risk?
- Hedges not be fully rewarded by regulators and credit rating agencies?
- **Pension funds given more flexibility than insurers on mortality projections & discount rates?**

Plus...

- Market risk attract more attention (“in your face”)
- Government backstopping assumed (moral hazard)

# Mortality Projections and Discount Rates for Solvency Standards

- Appropriate funding levels are determined by the discounted PVs of the expected future payments
- There is consensus on the use of the most accurate mortality projections, but not for discount rates
- Liabilities should ideally be valued at market value of a defeasance portfolio of risk-free traded securities
- In practice broadly three discount rate assumptions:
  - risk-free interest rates (government bond yields plus a spread and interest rate swap curves)
  - Risky (e.g., corporate) bond yields
  - Expected asset rates of return

# No Uniform International Standards

- Unlike Basel Accords for banks no global agreed-to standards for insurance and pension fund regulation
- But IAIS is working on basic capital requirements for insurers. G-SII discount rate rules finalized in 2014. Consultation paper on IAIG rules recently published.
- In many countries insurers and pension funds are regulated by different entities
- Joint Forum (2013) asserted that in many countries pension funds allowed to use less stringent mortality assumptions, and higher discount rates than insurers

**Table 1 Are Specific Mortality Tables and Discount Rates Required by Regulation?**

Country	Minimum Table?		Mortality Improvements?		Discount Rates?	
	Insurance	Pensions	Insurance	Pensions	Insurance	Pensions
Brazil	No	Yes	No	No		Yes
Canada	No	Yes	Yes	Yes	No	No
Chile	Yes	Yes	Yes	Yes		
France	Yes	Yes	Yes	Yes	Yes/Yes <sup>c</sup>	Yes
Germany	Yes	Yes <sup>a</sup> /No <sup>b</sup>	Yes	Yes	Yes/Yes <sup>c</sup>	Yes
Japan	No	Yes	No	No	Yes	
Korea	No	No	No	No	Yes	
Mexico	Yes	No	Yes	No		No
Netherlands	No	No	Yes	Yes	Yes/Yes <sup>c</sup>	Yes
Peru	Yes	Yes	No	No		
Singapore	No				Yes	
Spain	No	No	Yes	Yes	/Yes <sup>c</sup>	
Switzerland	No	No	No	No	Yes	Yes
Taiwan						
U.K.	No	No	Yes	Yes	No/Yes <sup>c</sup>	No
U.S.A.	Yes	Yes	No	Yes	Yes	Yes

<sup>a</sup> For non-regulated Pensionkassen and insurance-oriented Pensionfonds.

<sup>b</sup> For regulated Pensionkassen and non-insurance-oriented Pensionfonds

<sup>c</sup> Europe's Solvency II will impose interest rate swap-based discount rates

*Source:* OECD (2014) except for Singapore and Taiwan

<b>Mortality Curve Assumptions (and Shortfalls)</b>		
	<b>Defined Benefit Pension Plans</b>	<b>(Re)Insurers</b>
Brazil	US 1983/AM (10-20%)	US Annuity 2000 (10-20%)
Canada	UP-94 + AA Adjustment (5-10%) Or CPM (0-2%) <sup>b</sup>	GAM94-CIA (=UP94+) (2-5%)
Chile	RV2009 (2-5%)	RV2009 (2-5%)
Japan	EPI2005 (5-10%)	SMT 2007 (0-2%)
Korea	6 <sup>th</sup> EMT	6 <sup>th</sup> EMT
Mexico	EMSSA 1997 (0-2%)	EMSSA 2009 (0-2%)
Peru	Chilean RV2004	Chilean RV2004
Singapore		
Taiwan		
United States	RP2000-Scale AA (5-10%) RP2000-Scale BB (0-2%)	GAM94-Scale AA (2-5%) <sup>c</sup>
Switzerland	BVG2010 (0-2%) VZ2010 (0-2%)	ERM/F 2000 (zero)
France	TGH/F 2005 (0-2%)	TGH/F 2005 (0-2%)
Germany	DAV2004R (zero) <sup>d</sup>	DAV2004R (zero)
Netherlands	AG Prognosetael 2012 (zero on 2010 version)	AG Prognosetael 2012 (zero on 2010 version)
Spain	PERM/F P2000 (2-5%)	PERM/F C2000 (2-5%)
United Kingdom	SAPS-CMI 2008 (0%)	PCMA/PCFA 2006-CMI (0%)

<sup>b</sup> The Canadian Actuarial Standards Board has proposed that more up to date CPM mortality tables be promulgated effective August 1, 2015.

<sup>c</sup> GAM2000 mortality tables were promulgated by the NAIC in January 2013 but only six U.S. states have adopted as of July 2014.

<sup>d</sup> For non-regulated German Pensionkassen and insurance-oriented Pensionfonds

## Discount Rate Assumptions (Current)

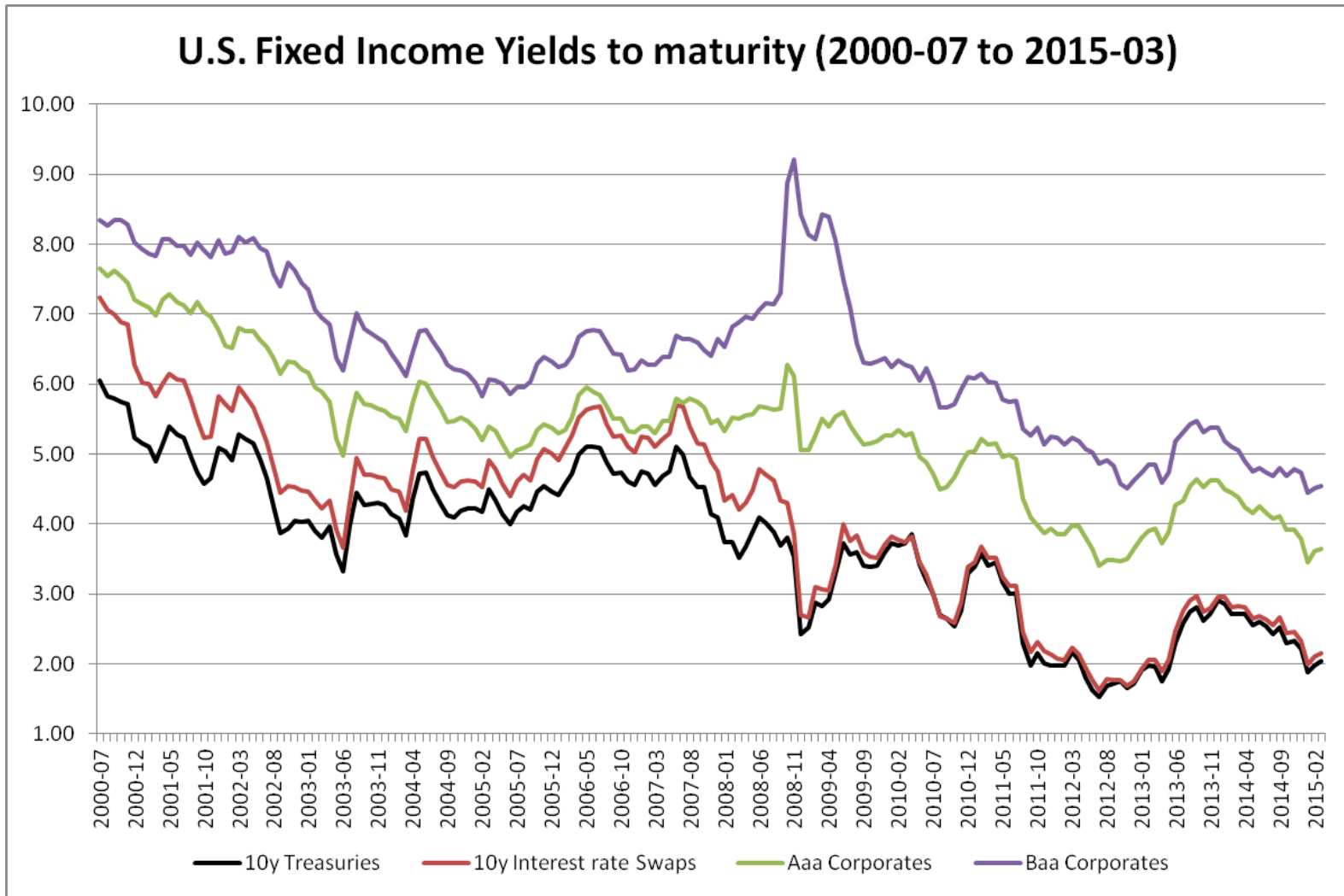
	Defined Benefit Pension Plans	(Re)Insurers
Brazil	Maximum real rate of 6%	
Canada	Government bond yields + illiquidity premium	Government bond yields + illiquidity premium (30y AA Corps / Govts + 100bps)
Chile		
Japan	Time averaged high quality bond yields	Government bond (JGB) yield based
Korea		
Mexico	Liquid high-quality corporate bond yields	
Peru		
Singapore		Government bond yields
Taiwan		
United States	Time averaged [AA] corporate bond yields	[Current AA] corporate bond yields minus a conservatism adjustment
Switzerland	ROR on assets	Government bond yields
France	Maximum of 60% of government bond yields	Maximum of 60% of government bond yields
Germany	Maximum of 60% of government bond yields	Maximum of 60% of government bond yields
Netherlands	EU Swap Curve to 20y / Ultimate Forward Rate (UFR) over 20y	EUR Swap + UFR
Spain		
United Kingdom	Gilts + 0.80% to 1.30%	ROR on assets



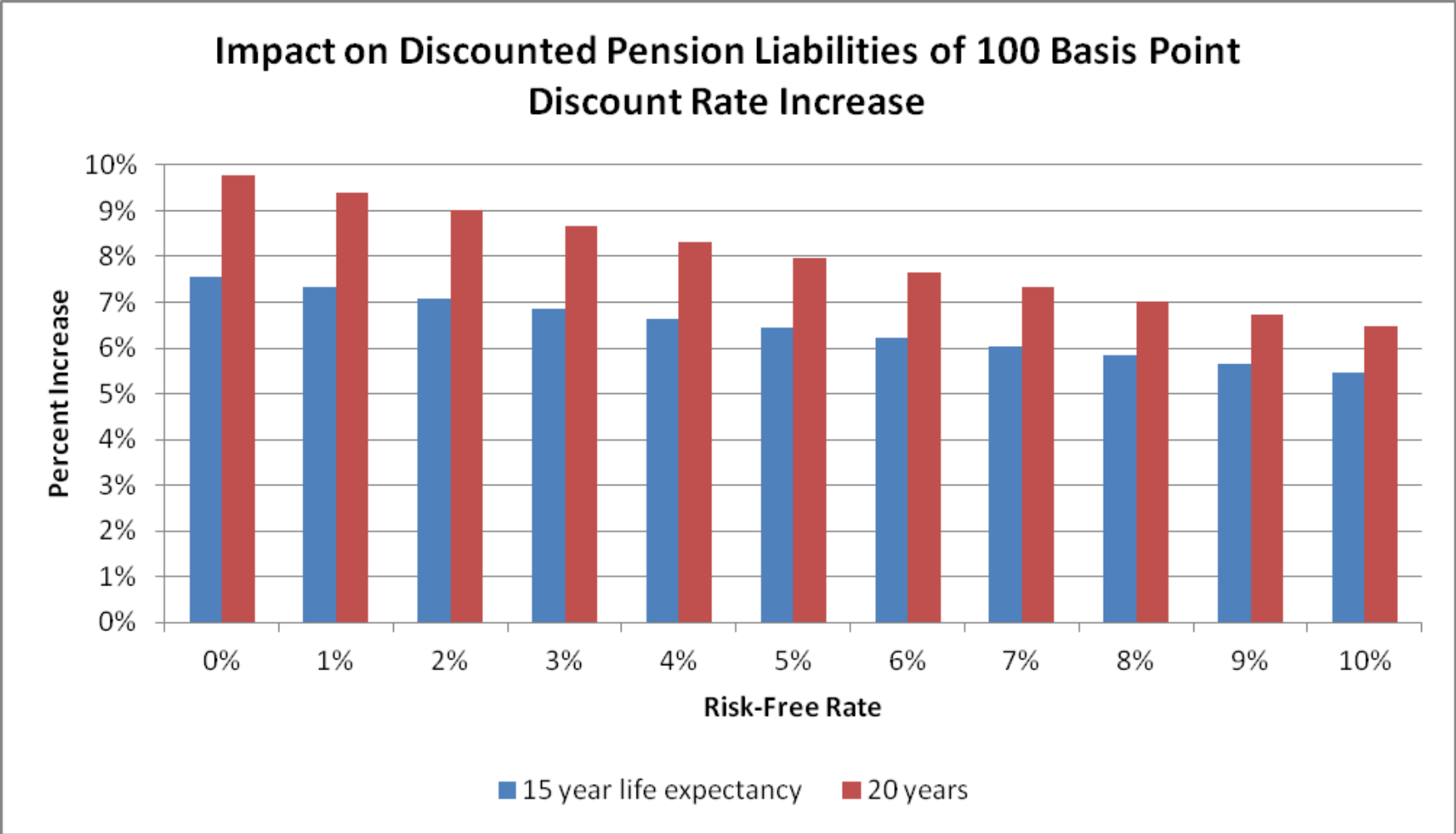
## Discount Rate Assumptions (Post Solvency II)

	Defined Benefit Pension Plans	(Re)Insurers
Brazil	Maximum real rate of 6%	
Canada	Government bond yields + illiquidity premium	Government bond yields + illiquidity premium (30y AA Corps / Govts + 100bps)
Chile		
Japan	Time averaged high quality bond yields	Government bond (JGB) yield based
Korea		
Mexico	Liquid high-quality corporate bond yields	
Peru		
Singapore		Government bond yields
Taiwan		
United States	Time averaged [AA] corporate bond yields	[Current AA] corporate bond yields minus a conservatism adjustment
Switzerland	ROR on assets	Government bond yields
France	Maximum of 60% of government bond yields	EUR Swap + UFR
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Netherlands	EU Swap Curve to 20y / Ultimate Forward Rate (UFR) over 20y	EUR Swap + UFR
Spain		EUR Swap + UFR
United Kingdom	Gilts + 0.80% to 1.30%	EUR Swap + UFR

# Differences Between Risky and Risk-Free Rates Can Be Substantial – 100 to 200 Basis Points



# A 100 Basis Point Discount Rate Differential Can Undersize Discounted Liabilities Substantially



# Rationales for Different Discount rate Assumptions

- Risk-free rate use driven by idea that liability value shouldn't reflect benefit non-payment risk
- Yields of highly liquid securities (eg Treasuries) not appropriate since pension and annuity liabilities don't impose high liquidity needs
- Expected asset returns seem prone to gaming (higher return assumption => lower solvency liabilities). **See also Babbel et al, 2002 and Gold, 2002)**
- Hence use of swap curves and or government yields plus a liquidity spread?

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**Switzerland inactivity** – DB plan use of slightly slacker mortality assumptions and use of expected asset returns as discount rate?

**U.S. activity** - DB plan switch to updated mortality assumptions?

## Rationale for favoring pension fund sector

- Policymakers may not want to discourage corporate DB pension provision? (If so perhaps this rationale should be made more explicit?)
- DB plan sponsors provide an extra layer of shortfall protection, versus single layer offered by insurers? (But Kisser, Kiff and Soto (2015) suggests sponsors of underfunded plans are more likely to make use of any regulatory leniency.)
- In any case, rationale should be more explicit

**Thank You!**