



International Actuarial Association (IAA)

Rob Brown, President-Elect
Presentation at East Asian Actuarial Conference
October 16, 2013 – Singapore

Moving the profession forward internationally

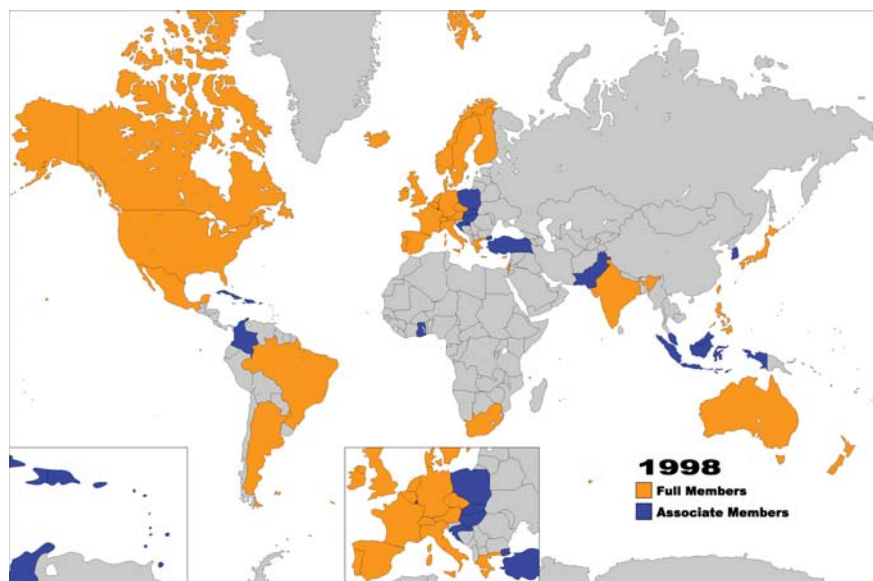
About the IAA

- Worldwide association of professional actuarial associations
 - 64 Full and 27 Associate Member associations representing approximately 60,000 actuaries in more than 108 countries
- 7 special interest Sections for individual actuaries
- Over 750 volunteer actuaries (Council, Committees, Sections) and 9 staff
- Based in Ottawa, Canada – constituted in Switzerland
- Exists to encourage development of a global profession, acknowledged as technically competent and professionally reliable, which will ensure that the public interest is served

Criteria for maintaining Full Membership status

- Must not act in a manner that is prejudicial to the aims or interests of IAA
- Must have a code of conduct which must be consistent with certain principles
- Must have a formal disciplinary procedure, including procedures for initiation of complaints, due process of defence and appeal
- If FMAs adopt standards, they must have a formal process to do so

Map of the IAA – 1998



Map of the IAA - 2013



Vision

The actuarial profession is:

- recognized worldwide as a major player in the decision-making process within the financial services industry
 - in the area of social protection and in the management of risk
- contributing to the well-being of society as a whole.

Mission

- To represent the actuarial profession and promote its role, reputation and recognition in the international domain.
- To promote professionalism, develop education standards and encourage research, with the active involvement of its Member Associations and Sections, in order to address changing needs.

EAST ASIAN ACTUARIAL CONFERENCE

Singapore

October 17, 2013

Robert L. Brown, PhD

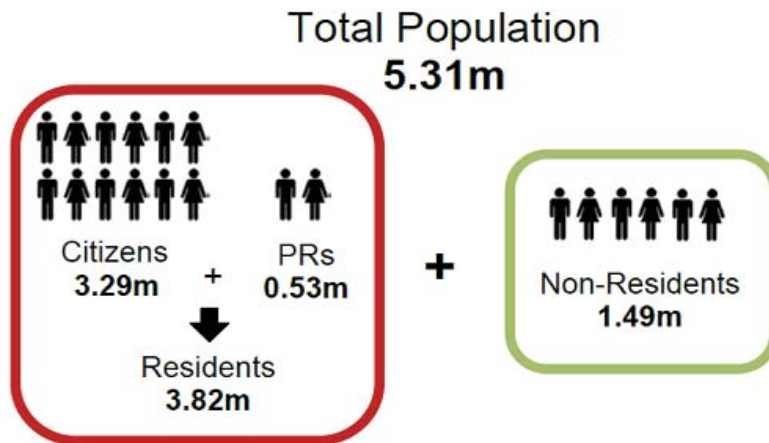
FSA, FCIA, ACAS, FIA (Hon)

HIGHLIGHTS/INTEGRATES THREE PAPERS

- A Sustainable Population for a Dynamic Singapore
- BCG World Pension Summit: Getting Inspired
- CIA Retirement Age TF Report

A Sustainable Population for a
Dynamic Singapore

Chart 4.1: Singapore's Total Population, June 2012



A Sustainable Population for Singapore

- Baby boomers (900,000 in total) started to retire in 2012
- From 2020, number of working-age CITIZENS will decline (older Singaporeans retiring outnumber younger ones starting work)
- CITIZEN population will start to decline in 2025 without action

POPULATION PROJECTION IN 2030

Total Population

6.5-6.9 m

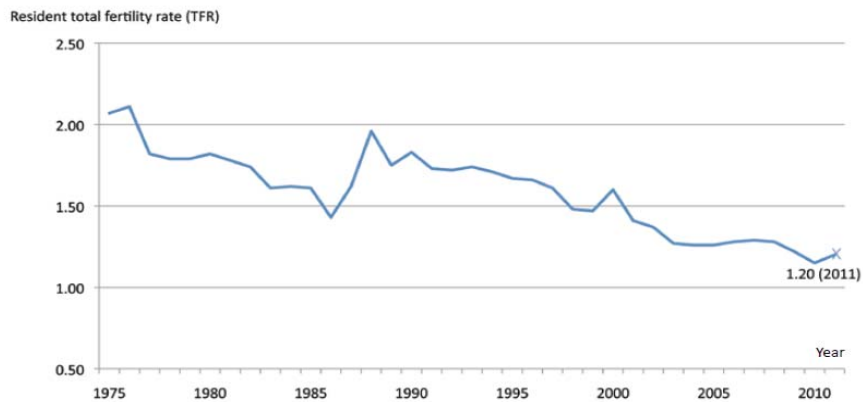
Citizens	PRs	Non-Residents
3.6 – 3.8	0.6	2.3-2.5

Residents

4.2– 4.4

Cause of Aging Population

Chart 1.1: Singapore's Falling Total Fertility Rate



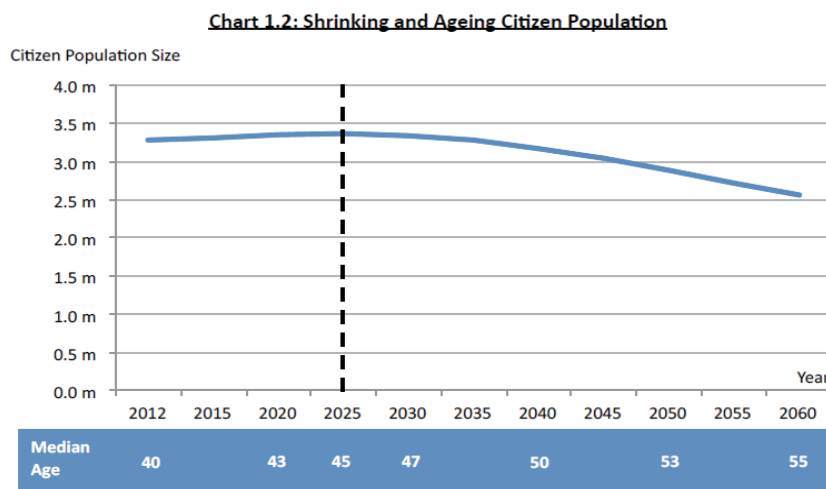
*Data prior to 1980 pertain to the total population.
Source: DOS*

Cause of Aging Population

- Fertility Rate is Down
- Life Expectancy is Up
 - From 66 years in 1970 to 82 in 2010
 - One of the Highest in the World
- These Factors are Common in Many Developed Countries

Shrinking and Aging Citizen Population

- Without Intervention the Singapore Citizen Population will both Age and Shrink



*Assuming current birth rates and no immigration from 2013 onwards
Source: DOS*

Shrinking and Ageing Citizen Population

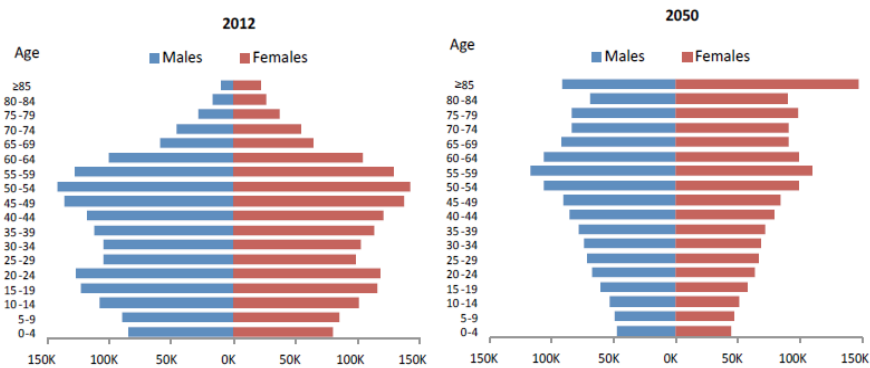
- Without Intervention by 2020 the Number of Citizens of Working Ages will Begin to Decline



Shrinking and Ageing Citizen Population

- Without Intervention, the Citizen Population Pyramid will become Inverted with more Elderly Citizens than Younger Ones

Chart 1.4: Our Changing Citizen Age Profile

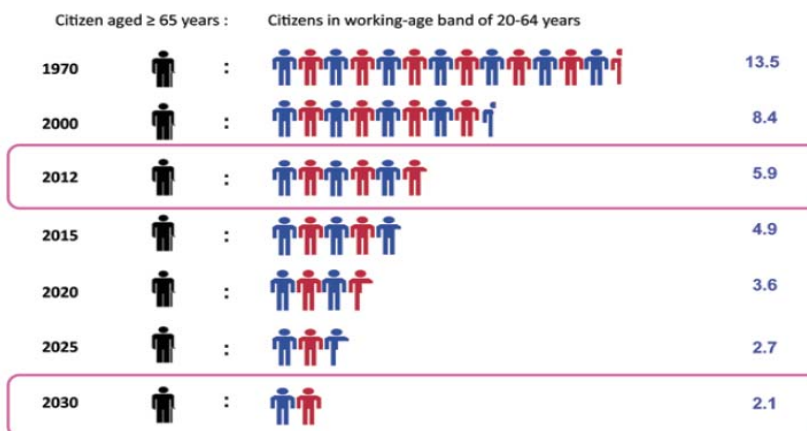


Assuming current birth rates and no immigration from 2013 onwards.
Source: DOS

Shrinking and Ageing Citizen Population

- This creates a Declining Old-Age Support Ratio

Chart 1.5: Declining Old-Age Support Ratio



*Assuming current birth rates and no immigration from 2013 onwards
Source: DOS*

Shrinking and Ageing Citizen Population

- This Could Result in:
 - Rising Taxes
 - Smaller Less Energetic Workforce
 - Labour Shortages
 - Less Vibrant and Innovative Economy
- Young People Might Leave for a More Exciting and Growing Global City
- These Demographic Shifts will happen Quickly

Shrinking and Ageing Citizen Population

- Need to Encourage Singaporeans to work beyond the current expected Retirement Age
- Need to Encourage Employers to Tap this Increasing Pool of Experienced Older Workers
- None of this will Stop the Fall of the Old-Age Support Ratio

Vision For A Sustainable Population

- Founded on Three Pillars:
 - A strong and cohesive Society (Singaporean Core)
 - A Dynamic and Vibrant Economy with Good Jobs and Employment Opportunities
 - High Quality Living Environment for All Ages

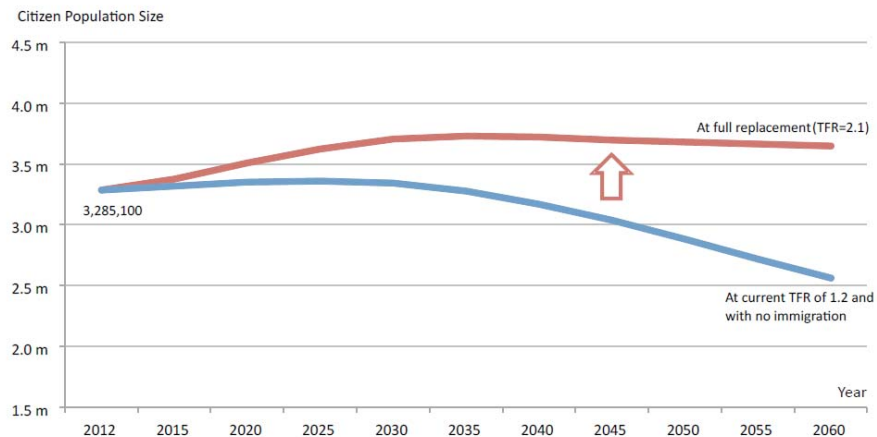
Vision For A Sustainable Population

- More Citizens are remaining Single or Marrying Later
- Married Couples are Having Fewer Children
- TFR in 2011 was 1.20 (Not Rare in East Asia)
- Need to Foster a Pro-Family Culture

Foster a Pro-Family Culture

- Marriage and Parenthood Package
 - Makes it Easier and Faster to get Housing
 - Coverage of most (75%) of Conception and Delivery Costs
 - Defraying Child-Raising Costs including Healthcare
 - Baby Bonus (\$6000 for first two; \$8000 thereafter)
 - Help Couples Balance Work and Family
 - Signal to Fathers to Play Bigger Role in Bringing Up their Children (e.g., Paternity Leave)

Chart 2.5: Effect of Raising Birth Rates on Citizen Population Size

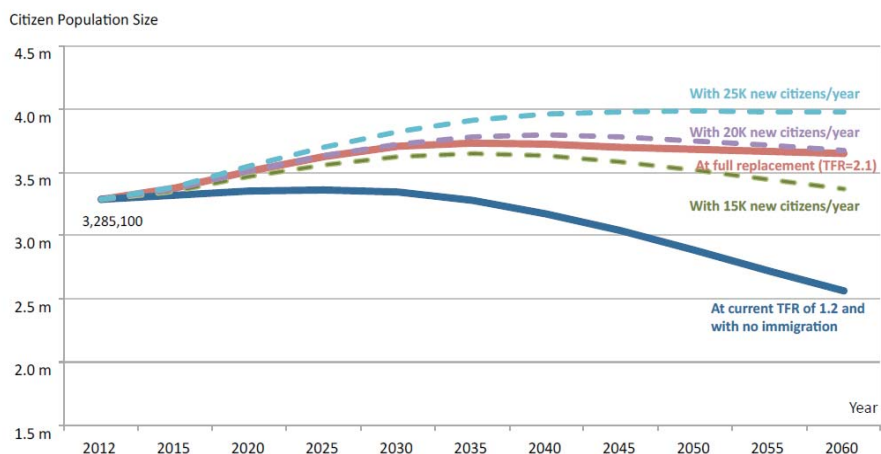


Source: DOS

Vision for A Sustainable Population

- Keep Singaporeans Working or Studying Abroad (200,000) Engaged in Singapore:
 - Hope They will Return
- Continue to Welcome New Citizens and Permanent Residents (to replace non-births)
- Make it Easier for Non-Singaporean Spouses to Qualify for Permanent Residence

Chart 2.7: Citizen Population Size Under Various Immigration Scenarios



Source: DOS

Sustainable Population Strategy

- Will actually tighten PR status to have a Permanent Pool of 0.5 to 0.6 million to Ensure a Pool of Suitable Potential Citizens
- Continue to Welcome Immigrants who can Contribute to Singapore, Share Our Values and Integrate Into Our Society
- Help Immigrants adapt to Singapore Norms, Culture and Values

Creating Good Opportunities for Singaporeans (SCs)

- Need a Dynamic Economy that Creates Jobs and Opportunities for SCs
- Strategy:
 - Remain Open and Globally Competitive (with Asia)
 - Help Business Restructure and Move up the Value Chain (Improve Productivity from 1.8% to 2% to 3%)
 - Build a Strong SCs Core through High Quality Education and Life-Long Upgrading (PMET Jobs)
 - Complement the SCs with a Foreign Workforce (Can be moved In and Out)
 - Keep Older Workers Active Longer

Creating Good Opportunities for SCs

- Foreign Workers add to Economy but Not the Elderly
 - Return Home when Period of Employment Ends
 - Do not get Gov't Subsidies Meant for Residents
 - Thus improve Old-Age Support Ratio and Broaden Tax Base

A High Quality Living Environment

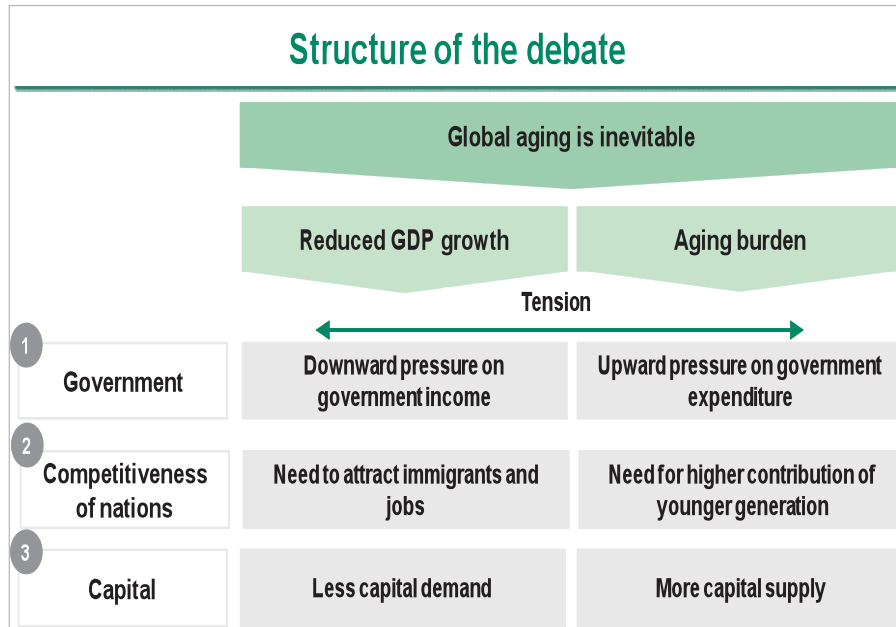
- Invest in Infrastructure and Create High Quality Urban Spaces
- Keep Singapore an Attractive Place to Live
- Must have a Green Environment
- Infrastructure Fell Behind in 2005 to 2010
- Make Every Neighbourhood Senior Friendly
- Create Parks, Sport and Cultural Facilities

World Pension Summit: Getting Inspired (BCG)

- How to Build an Aging Proof Social Security System
- The End of the Biggest Ponzi Scheme Ever

World Pension Summit

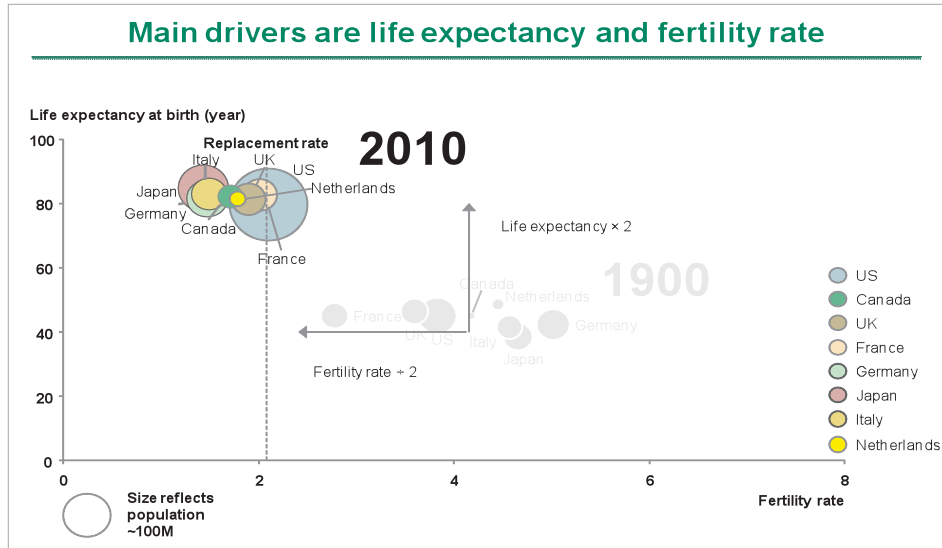
- Impact of Aging on Society and the Economy will be Profound, Global and Lasting
- Will lead to:
 - Reduced GDP Growth
 - Increased Aging Burden



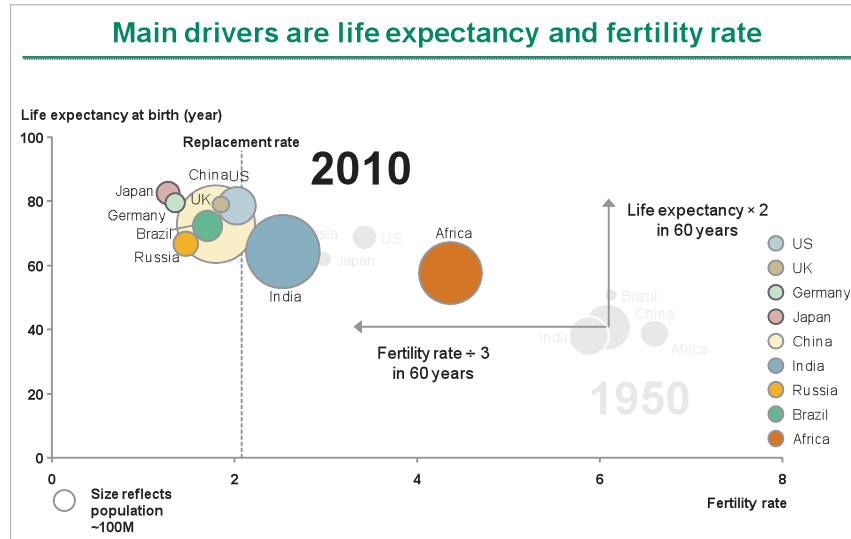
Drivers of Population Aging

- Decreased Fertility
- Increased Longevity
- Shift More Profound for BRIC Countries
- China's Problems are Immense with Worldwide Implications
- Africa will Follow

Main drivers are life expectancy and fertility rate

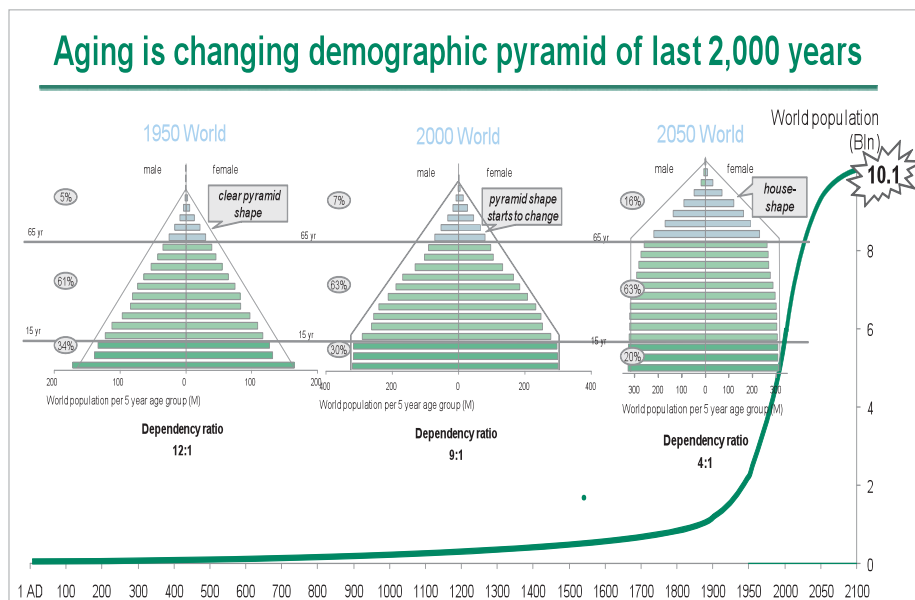


Main drivers are life expectancy and fertility rate



Aging Population

- 1950, World Population totals 2.5B
- Populations are Pyramid Shaped
- Inverse Dependency Ratio of 12:1
- Many Social Security Systems Introduced
- With Ever Growing Labour Force, Often PAYGO



Aging Population

- Inverse Dependency Ratio
 - 12:1 in 1950
 - 9:1 in 2000
 - 4:1 by 2050 (Japan—1.4:1)
- Pyramid has become Ice-Cream Cone
- Must Rethink Social Security Design
- How much of Later Life will be Unhealthy?

Aging Population

- So far, Productive Life Expectancy has Risen with Overall Life Expectancy
- So Obvious SS Redesign: Raise the Age of Eligibility
- Should be Linked to Investing in Human Capital
 - Ensure People have the Right Skills for the Right Jobs

Aging Population

- SS Reform is Slow and Politically Difficult
- BCG Pushed for:
 - Fewer DB Systems
 - More DC or More Target Benefit Systems
- Don't Blindly Pass Costs to Next Generation

Proposed Social Security Initiative

- Make Sure Everyone Understands the Magnitude of the Problem
- Find Fruitful Ways to get Technical Solutions Implemented
- Realize this is a Collective Process; Not a Problem that can be Solved by Individuals

Focus on Singapore

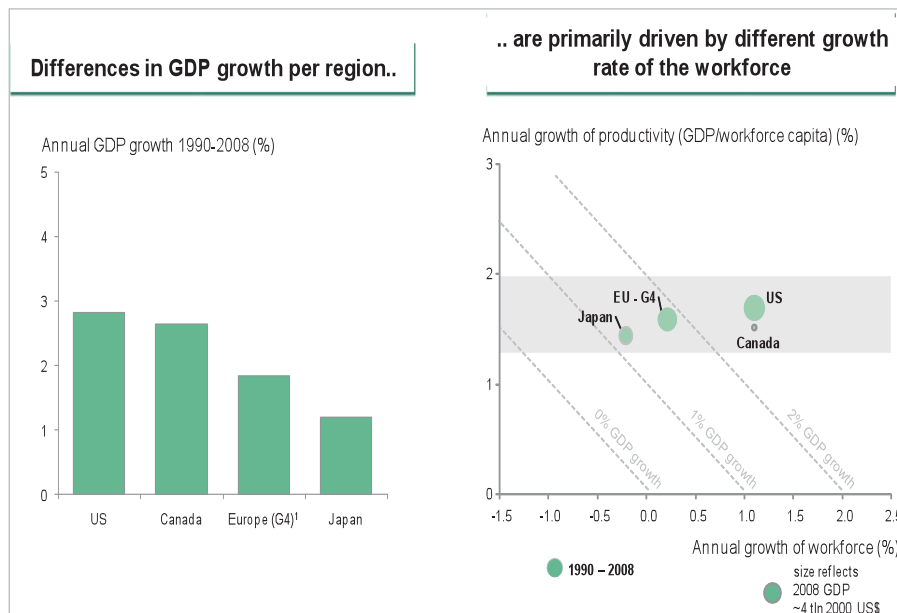
- DC System--so Aging Proof (?)
- Savings Rates are High
- All Big Life Risks (Housing, Health Care, Pensions) in One Holistic System
- System is Sustainable
- But Real Rates of “i” are Negative so Why Save?

Automatic Balancing Mechanisms

- DC Plans are Automatically Balanced at any Time
- Some DB and NDC Plans now Vary Pay-Out by Life Expectancy so are Life Expectancy Immune

Impact of Aging Population on Economy

- Economic Growth Comes From:
 - Workforce Growth
 - Productivity Growth
- Limit to Productivity Growth is 1.5% to 1.8%
- Workforce Growth Rates Expected to Decline



Impact of Aging Population on Economy

- In Many Countries Workforce will Decline
- Aging will have Negative Impact on GDP Growth:
 - - 0.3% in Europe
 - - 0.8% in Canada

Impact of Aging Population on Economy

- Some Positive Impacts:
 - Slower Population Growth Means Less Demand for Infrastructure
- Some Negative Impacts:
 - Slower Growth Means Lower Investment Rates of Return (Hard on Insurance Companies and Pensions)

Impact of Aging Population on Government

- Government incomes will Rise Slowly or Not at All
- At the Same Time, You need more for Health Care and Social Security
- Pay Now or Pay Later?: Expect Combination of:
 - Paying Later: Means Very High Tax Rates for Next Generation (50 to 70%)
 - Spreading the Pain: means Very High Levels of Gov't Debt (As High as 300 to 600% of GDP in 2050)
 - Current Workers Work Longer or Accept Lower Standard of Living

Strategies for Government

- Invest in Areas that will Increase Productivity (Education and Continuing Education)
- Create Opportunities for Young Jobless
- Broaden the Workforce by Increasing Participation of Women and Older Workers
- (Redefine Responsibilities within Families)

Impact on Competitiveness of Nations

- To Attract Industry, Need High Productivity and Sufficient Labour Force Supply
- A Challenge in an Aging Population
- Mitigate Through:
 - Education and Continuing Education
 - Wise Immigration
- Design of SS System will have an Impact (Both as to Who Pays and Who Benefits)

Impact on Capital

- Reduced GDP Growth Means Less Demand for Capital
- As Workforce Retires, will be Decumulation of Savings (Less Capital Supply)
- Next Generation will Save More (Capital)
- With Slow GDP Growth Corporations Save More
- In Total, More Capital Resulting in:
 - Lower Rates of Return
 - Riskier Investment Behaviour

Impact on Capital

- May Need to Reinvent Financial Systems and Institutions
- Expect More Public/Private Partnerships

CIA Retirement Age Task Force Mandate

- To prepare background info to assist the CIA in taking a position on whether the “retirement age” should be increased.
- How should the “issue” be presented?
- What are the consequences of raising the “retirement age”?

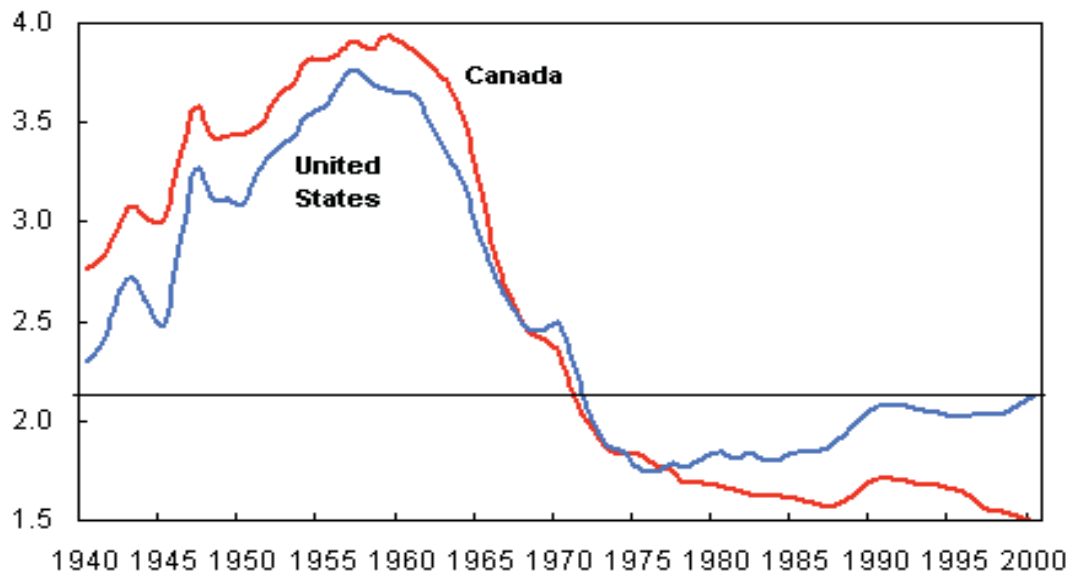
CIA Retirement Age Research Report

- What is “retirement”?:
 - Exit from the Labour Force
 - Employment Income is no longer the Major Source of Income
- Often a long and random process—a transition

Canada’s Shifting Demographics

- Baby boom now headed into retirement (will all be 65+ by 2031)
- Labour force turns to the baby bust for GNP

Number of children per woman

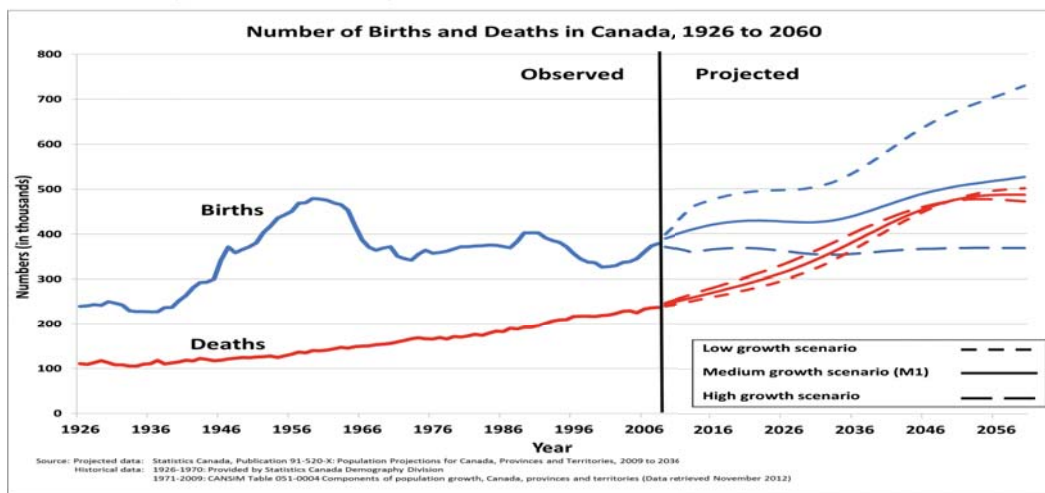


Note: The solid black horizontal line denotes the natural replacement population level of 2.1 children per woman.

Source: Statistics Canada

Number of Births and Deaths in Canada, 1926 to 2056

Figure 2 – Number of Births and Deaths in Canada, 1926 to 2056



Source: Statistics Canada (2010)

Second Cause is Rising Life Expectancy

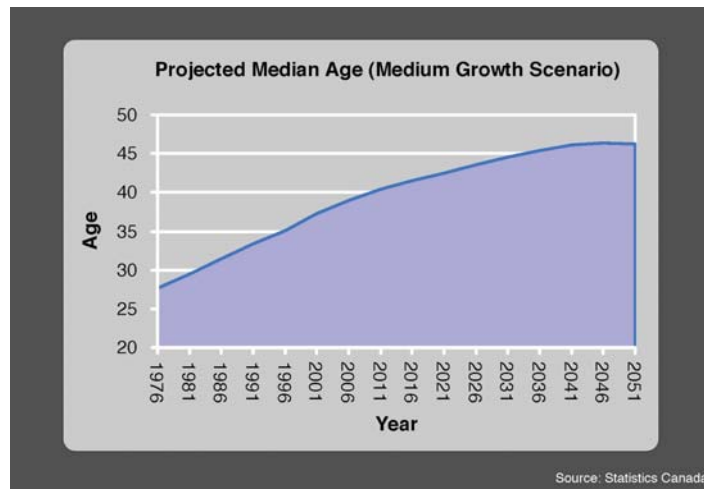
- Recent improvement has been at ages 60+

Canadian Life Expectancy

<i>Year</i>	<i>At Birth</i>		<i>At Age 65</i>		<i>At Age 75</i>	
	Male	Female	Male	Female	Male	Female
1921	58.8	60.6	13.0	13.6	7.6	8.0
1941	63.0	66.3	12.8	14.1	7.5	8.2
1961	68.4	74.2	13.5	16.1	8.2	9.5
1981	71.9	79.0	14.6	18.9	9.0	11.9
2001	76.9	82.0	17.0	20.5	10.3	12.9
2006	78.3	82.9	18.1	21.3	11.2	13.5

Baby Boom just Advanced Problems

- Aged Dependency Ratios will not fall when Baby Boom dies off



Distribution of Canadian Population
By Age Group, 1956-2036

Age	1956	1986	1996	2016	2036
Under 20	39.4	35.6	26.7	21.1	20.2
20-64	52.9	55.8	61.1	62.4	55.0
65+	7.7	8.6	12.2	16.4	24.8
75+	2.5	3.2	5.1	7.0	12.8
85+	0.4	0.7	1.2	2.1	3.8

Aged Dependency Ratios and Inverse

Year	ADR	Inverse ADR
1956	0.146	6.9
1976	0.141	7.1
1996	0.200	5.0
2016	0.263	3.8
2036	0.451	2.2

Aged Dependency Ratios

- We have one of the most Rapidly Aging Populations in the World
- ADR defined as the ratio of those 65+ to those 20-64
- Rising ADR puts sustainability of Social Programs into question

Aged Dependency Ratios and Growth
2050 versus 2010

Country	ADR 2010 (%)	ADR 2050 (%)	Increase
Italy	31.0	61.7	113.3
Canada	20.3	42.3	108.4
France	25.9	43.4	99.0
Japan	35.5	69.6	96.1
U.S.	19.5	35.4	81.5
UK	25.1	39.9	59.0
Sweden	28.0	42.3	51.1

Projected Cost of Social Programs— A Crisis?

- Will look at OAS (includes GIS)
- C/QPP
- Healthcare

OAS/GIS

- Cost \$36.5 B in 2012
- Will cost \$108 B in 2030
- But OAS is taxable income (goes out; comes back)
- Both OAS and GIS have clawbacks
- Benefits increase with CPI; taxes increase with GNP growth; OAS replacement ratio falls
- OAS costs 2.3% of GNP in 2012
- Costs peak at 3.1% in 2030
- Costs will be 2.6% in 2050

OAS/GIS

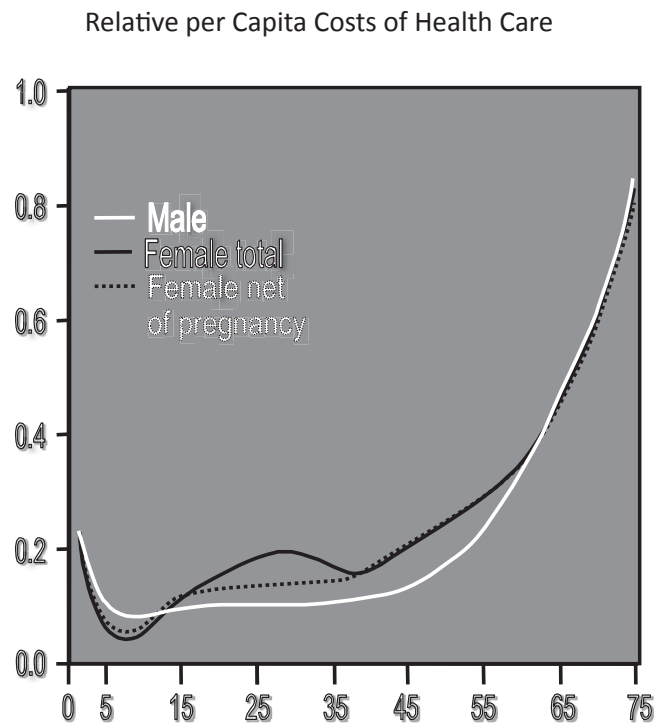
- Age of eligibility to rise from 65 to 67
- Shift starts in 2023; Fully implemented by 2029
- Can also Defer OAS for Five Years (with Actuarial Adjustment of Benefits)
- No impact on anyone born before 1959
- No impact on vast majority of baby boom
- Purpose seems to be purely political optics
- Similar moves in many OECD countries (or ABMs Based on Life Expectancy)
- May be Viewed as Regressive

C/QPP

- CPP sustainable at 9.9%
- QPP sustainable at 10.8%
- CPP Early/Late Adjustment Factors Widened to Reflect Life Expectancy Fully

Health Care Costs

- Health Care Costs are Clearly Age Related



Health Care Costs

- But look further
- Health Care Costs are a Direct Function of Time to Death

Cost Ratio: Died/Survived

Age Range	Cost Ratio: Died/Survived
65	16.7
75-76	8.4
85-87	3.8
90-93	2.5

Health Care Costs

- Impact of Population Aging on Health Care Costs is 1% per annum
- If Health Care costs 10% of GNP today, it would cost 11% in ten years due to Aging
- Improving Life Expectancy is Good News
- In a PAYGO System, a Dollar of Cost Deferred is a Dollar of Cost Saved

Health Care Cost Projections

Year	Denton and Spencer		Brown and Suresh	
	Health Care Costs (\$B)	10-Year Growth Rate	Health Care Costs (\$B)	10-Year Growth Rate
2005	104.16	1.64	103.92	1.58
2015	123.22	1.69	122.29	1.64
2025	149.23	1.93	147.38	1.88
2035	172.30	1.45	169.31	1.40
2045	180.59	0.47	176.53	0.42
2055	186.06	0.30	181.01	0.25
2065	193.85	0.41	187.76	0.36
2075	199.98	0.31	192.77	0.26

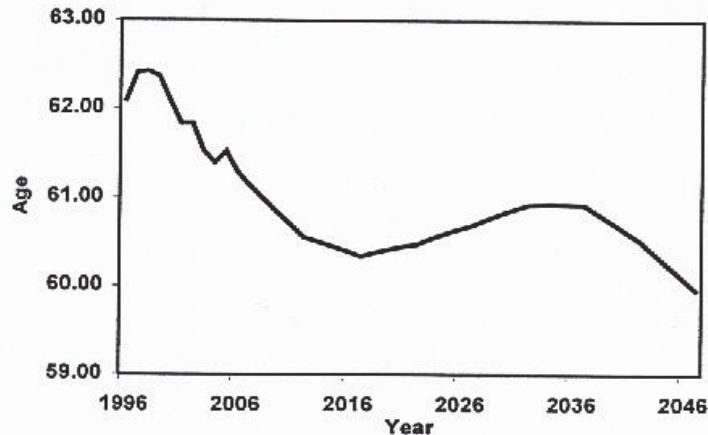
Health Care Costs

- Other Health Care Cost Drivers hide Behind Aging
- Must work hard to control Growth in Health Care Delivery costs
- A Crisis?
- An Avalanche or a Glacier?

Raising the “Retirement Age” Good Public Policy?

- Work by Brown (with Bilodeau, Damm and Sharara) assumed Workers Retire at Earliest Age Possible Once Consumption Requirements of all Society are Met
- Producers of GDP: The Labour Force
- Idle Consumers: The Young, the Aged and the Unemployed
- Must Strike an Equilibrium between Supply and Demand

Median Retirement Age in Canada

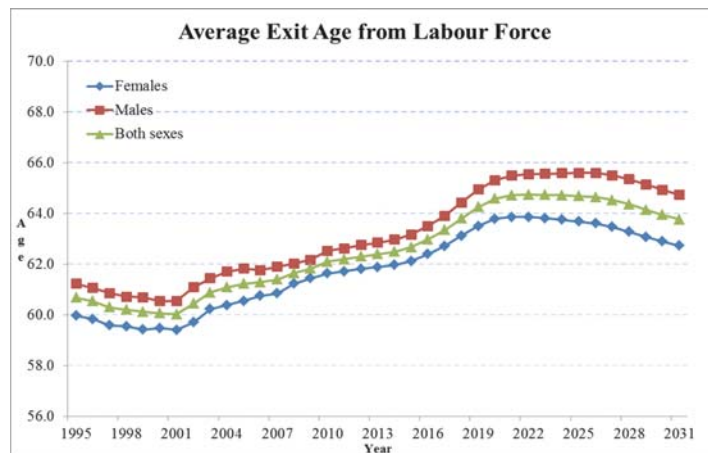


Raising the “Retirement Age” Good Public Policy?

- Previous Graph assumes Productivity Growth of 0.9% per annum (historical average)
- With Productivity Growth of 1.29% per annum, Retirement Age would not have to Rise
- Authors see a Rise in Retirement Age as Inevitable regardless of Public Policy

Raising the “Retirement Age” Good Public Policy?

- Average Age of Labour Force Exit Started to Rise around Year 2001
- Not necessarily connected to a rise in the Age at which one’s Pension Starts
- Started Before Plan to Raise OAS Eligibility Age
- Those with Highest Incomes/Education Retire Last
- Similar Findings in Most OECD Countries
- We expect Workers to stay Active Longer, Regardless of Public Policy



*Based on CPP Assumptions

CPP: Proportion of Beneficiaries Working

Female

Age	2001	2005	2009
60-64	14.4%	19.7%	26.4%
65-69	10.1	12.5	16.8
70-74	5.0	5.8	7.4
75+	2.0	2.1	2.5
Overall	6.6	8.1	10.9

Male

60-64	24.1%	31.9%	37.2%
65-69	17.6	21.1	26.1
70-74	9.5	10.9	13.6
75+	4.4	4.6	5.5
Overall	11.8	14.2	17.6

Raising the “Retirement Age” Good Public Policy?

- Even with rise in Labour Force Exit Age, Still More Years in Retirement

Ratio of Active Life to Retirement

Year	Active Life (Years)	Retirement (Years)	Ratio
Males			
1980	42.8	16.7	2.6
1990	41.7	19.4	2.2
2005	41.9	21.7	1.9
Females			
1980	42.5	21.9	1.9
1990	41.2	24.3	1.7
2005	40.7	26.0	1.6

Shifts in DB Pensions

- DB Plans often encourage retirement at an early age (e.g., no actuarial discount)
 - Workers misinterpret its value (early vs late)
 - This is expensive, but popular
- Prevalent now only with Public Service Plans
- 82% of Public Sector have DB Plans
- Only 1/3 of private sector has any pension
- Less than 20% have a traditional DB Plan

Shifts in DB Pensions

- Reasons for less use (especially in Private Sector)
 - Lowers cost and more predictable costs
 - Workers want to work longer (e.g., happy, or need the savings)
 - Workers may prefer phased retirement
 - Concern about upcoming labour shortages

Shifts in DB Pensions

- Pension Plan Amendments cannot cut accrued benefits
- So cost cuts come slowly
- Some benefits becoming contingent on financial health of Plan (e.g., Indexation of Benefits)
- Or full Target Benefit Plans

Shift in Canadian Pensions

- CPP offers no incentive to Retire Early (Full Actuarial Adjustment on Early/Late Benefits)

Shift to DC Plans

- DC Plans Offer no Retirement Age Incentive
- DC Plans are more flexible
- DB Plans have problems with Benefit Portability
- Shift from DB to DC are expected to increase Retirement Age Further

Shift in Canadian Pensions

- Key Question:
 - What role should the Government Play in Trying to Influence when Workers Retire?

Other Programs That Would Feel Effect

- Provincial Welfare Programs
- Workers' Compensation
- Employment Insurance
- Disability Plans
- Group Insurance Plans

Other Variables Affecting the Impact

- a) Fertility: Increasing Slowly (now 1.6)
Unlikely to hit 2.1 (hard to increase)
- b) Immigration is good if:
 - The Net Level Rises
 - Their Average Age Falls
 - A Higher Percentage are Labour Force Prepared
(today 23% of immigrants are “Family Completion”)

Other Variables Affecting the Impact

- c) Labour Force Participation
 - Female/Male Gap Assumed to Continue to Close
 - Will be Increased Demand for Workers
 - Work not as Physically Demanding Today
 - Must Make Sure Jobs are Available
 - Make Sure Labour Supply Matches the Needs of Jobs
 - Still, not much room for large increases here

Other Variables Affecting the Impact

- d) Productivity
 - Labour Shortages and Higher Wages will make Capital Investment and Innovation Wise
 - Raising Labour Productivity Can Go a Long Way to Solving the Negative Impact of an “Aging Population”
 - Should Target this Variable

Aging Population = Lower Standard of Living

- Higher Old-Age Dependency Ratio
- Higher Taxes Needed to Maintain Public Programs
- Lower Productivity of Older Workers

Aging Population = Higher Standard of Living

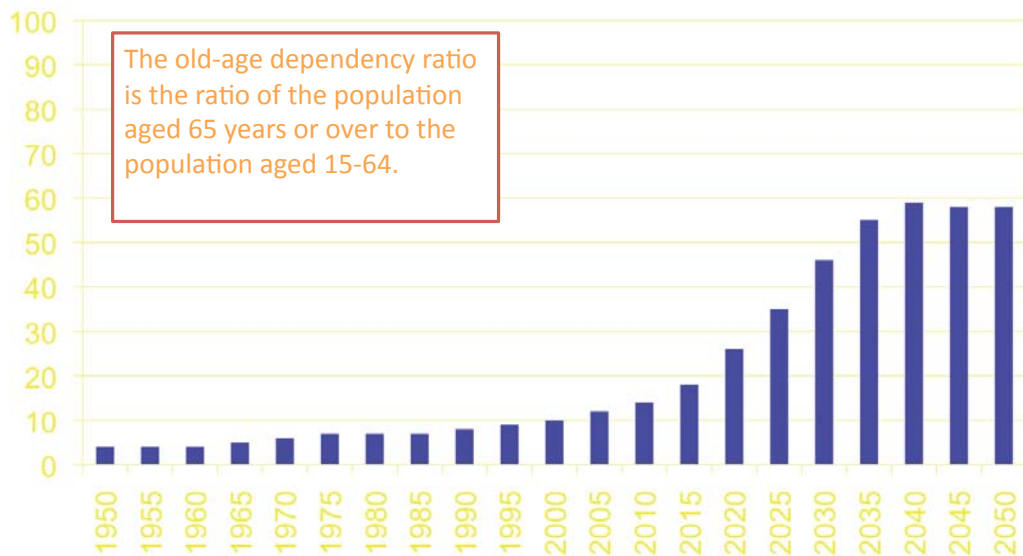
- Lower Overall Population Growth Rate
- Higher Savings Rate
- Lower Taxes as RRSPs Flip to Pay-Out

Lump of Labour Fallacy

- Will Incentives to Keep Older Workers in the Labour Force Create Youth Unemployment?
- Evidence says “NO”
- More Workers mean More GNP and More Jobs
- Early Retirement Incentives in Denmark (1970's) led to Lower Employment Rates

Q & A

Singapore Old Age Dependency Ratios



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2008 Revision

Growth in the Aged Dependency Ratio

- Age 65+/Labour Force 2050/2005

	ADR (2005)	ADR (2050)	Growth
Singapore	12	58%	380%

