



Bureau du surintendant  
des institutions financières  
Bureau de l'actuaire en chef

Office of the Superintendent  
of Financial Institutions  
Office of the Chief Actuary



# Global Aging and its impact on the Financial Markets

*Presentation to the Retirement Committee of  
Mouvement Desjardins*



**Desjardins**  
**Comité de retraite**

8 october 2003

# Presentation

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- Mandate of the Office of the Chief Actuary
- Canadian aging
- Global aging
- Possible Impact on Financial Markets
- Future challenges





## Primary regulator in Canada of federal financial institutions and pension plans.

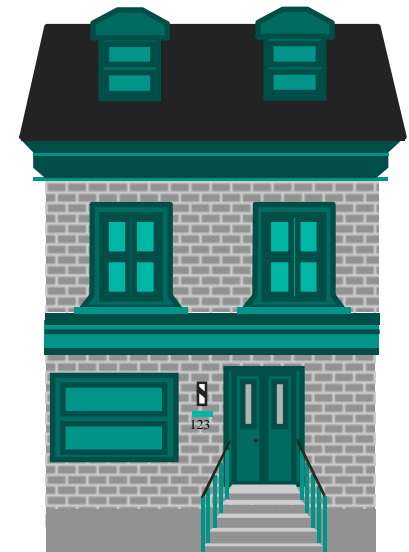
- protects policyholders, depositors, and pension plan members against any undue loss.
- provides services and actuarial advice to the Government of Canada through the **Office of the Chief Actuary**.
  - Prepares actuarial reports for the Canada Pension Plan, the Old Age Security and the Canada Student Loans Program.
  - Prepares actuarial reports of the public sector pension plans: Public Service, Canadian Forces, RCMP, and others ...
  - Provides actuarial advice to our clients.

# Retirement Income Security



**Canadian retirement system with mixed funding approaches is well recognized in the world for its capacity to adapt rapidly to changing conditions.**

- Full funding (RPP/RRSP)
- Partial funding (CPP/QPP)
- Pay-as-you-go funding (OAS/GIS)



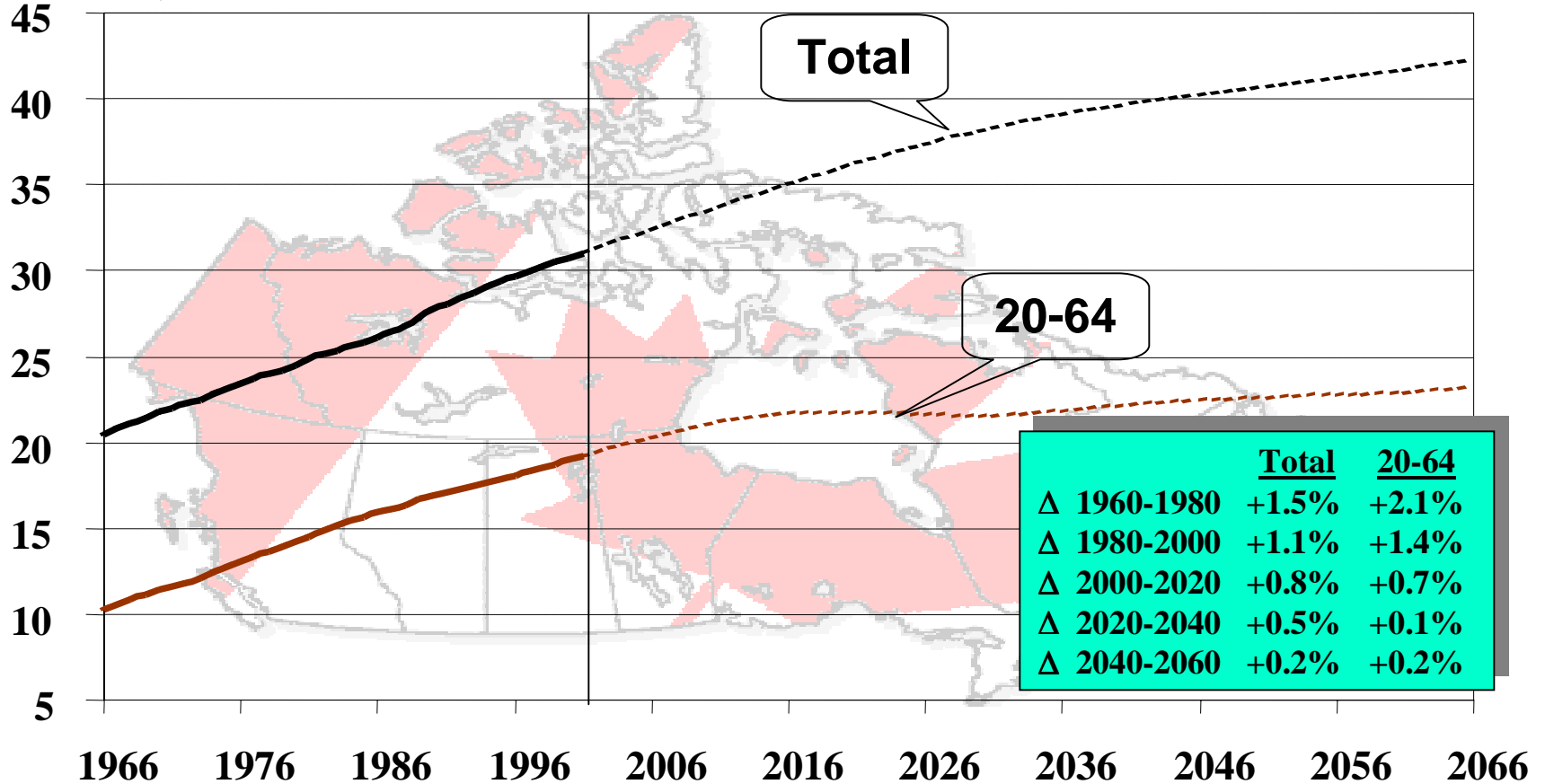
***The Canadian retirement system could be viewed as about 40% to 45% funded.***



# Population of Canada



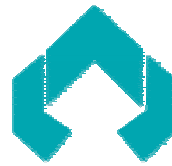
(in millions)



After 2025, all projected population increase will come from migration.



# Migration (1986-2000)



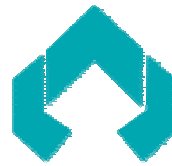
	Canada less Quebec	Quebec	Canada
Immigration	+165,000	+32,000	197,000
Emigration	-37,000	-7,000	-44,000
From Québec	+11,000	-11,000	0
Net Migration	139,000	14,000	153,000
% of Population	0.64 %	0.20 %	0.53 %

## Assumptions of the reports : CPP and QPP

2001	0.61 %	0.14%	0.48 %
2015	0.58 %	0.25%	0.51 %

# Population Evolution

(in millions)



	<u>QPP</u>	<u>CPP</u>	<u>QPP Proportion</u>
<b>1966</b>	<b>5,8</b>	<b>14,2</b>	<b>29 %</b>
<b>1980</b>	<b>6,5</b>	<b>18,0</b>	<b>27 %</b>
<b>1990</b>	<b>7,0</b>	<b>20,7</b>	<b>25 %</b>
<b>2000</b>	<b>7,4</b>	<b>23,4</b>	<b>24 %</b>
<b>2020</b>	<b>7,9</b>	<b>28,1</b>	<b>22 %</b>
<b>2050</b>	<b>7,8</b>	<b>32,8</b>	<b>19 %</b>

*(Need 3.1 million more in 2050 in order to maintain the 25% proportion of year 1990)*

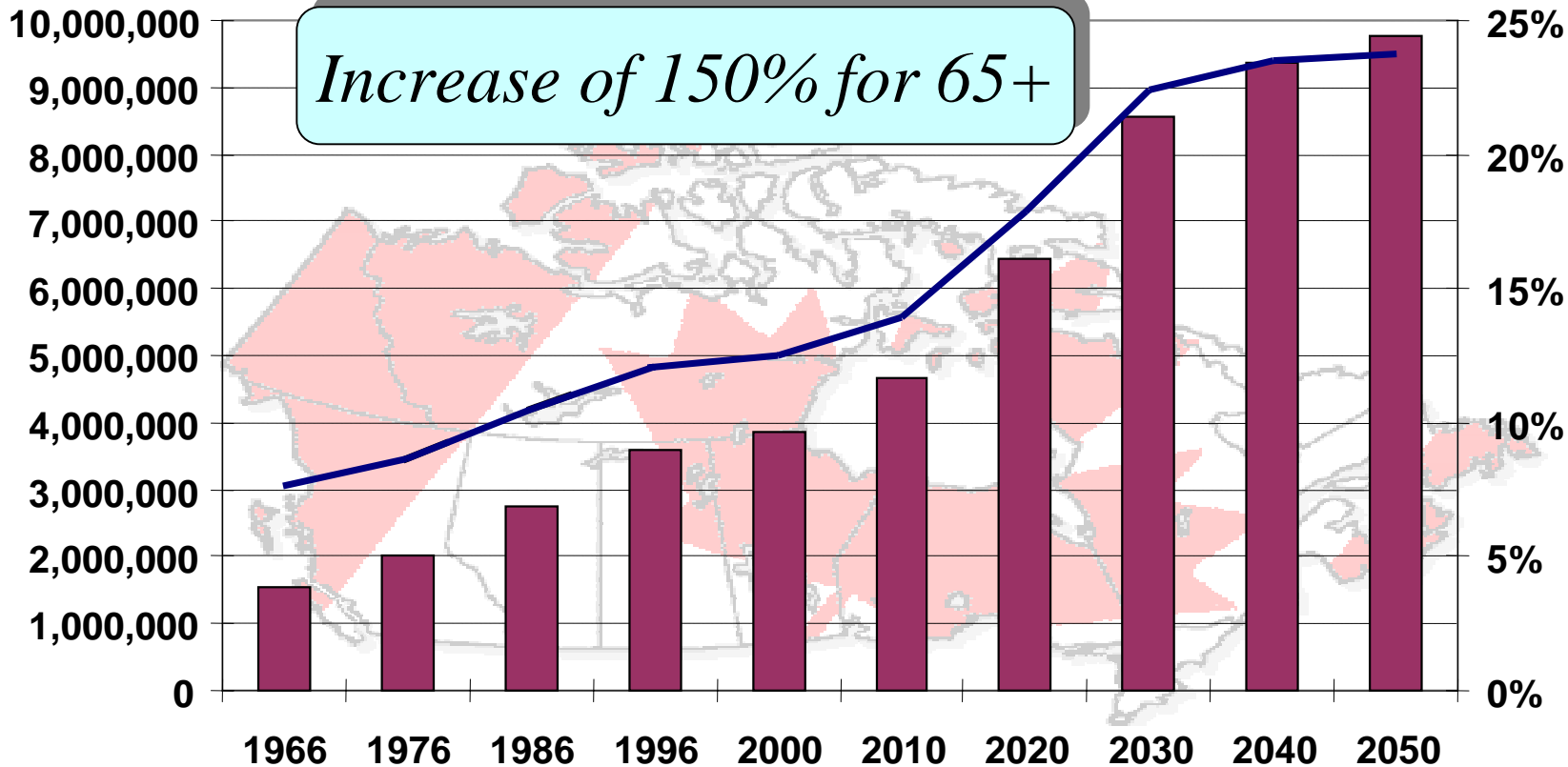
# Canadian Aging



(Population 65+)

*Increase of 275% for 80+*

*Increase of 150% for 65+*



■ Number    — % population





# Public Pension Plans Expenses in % of GDP



<b>Year</b>	<b>CPP/QPP</b>	<b>OAS/GIS</b>	<b>Total</b>
1980	0.9%	2.2%	3.1%
1990	2.0%	2.5%	4.5%
2000	2.4%	2.3%	4.7%
2010	2.8%	2.4%	5.2%
2020	3.3%	2.8%	6.1%
2030	3.8%	3.2%	7.0%
2040	3.9%	3.0%	6.9%
2050	4.0%	2.7%	6.7%



# Mortality rate

Yes, but...

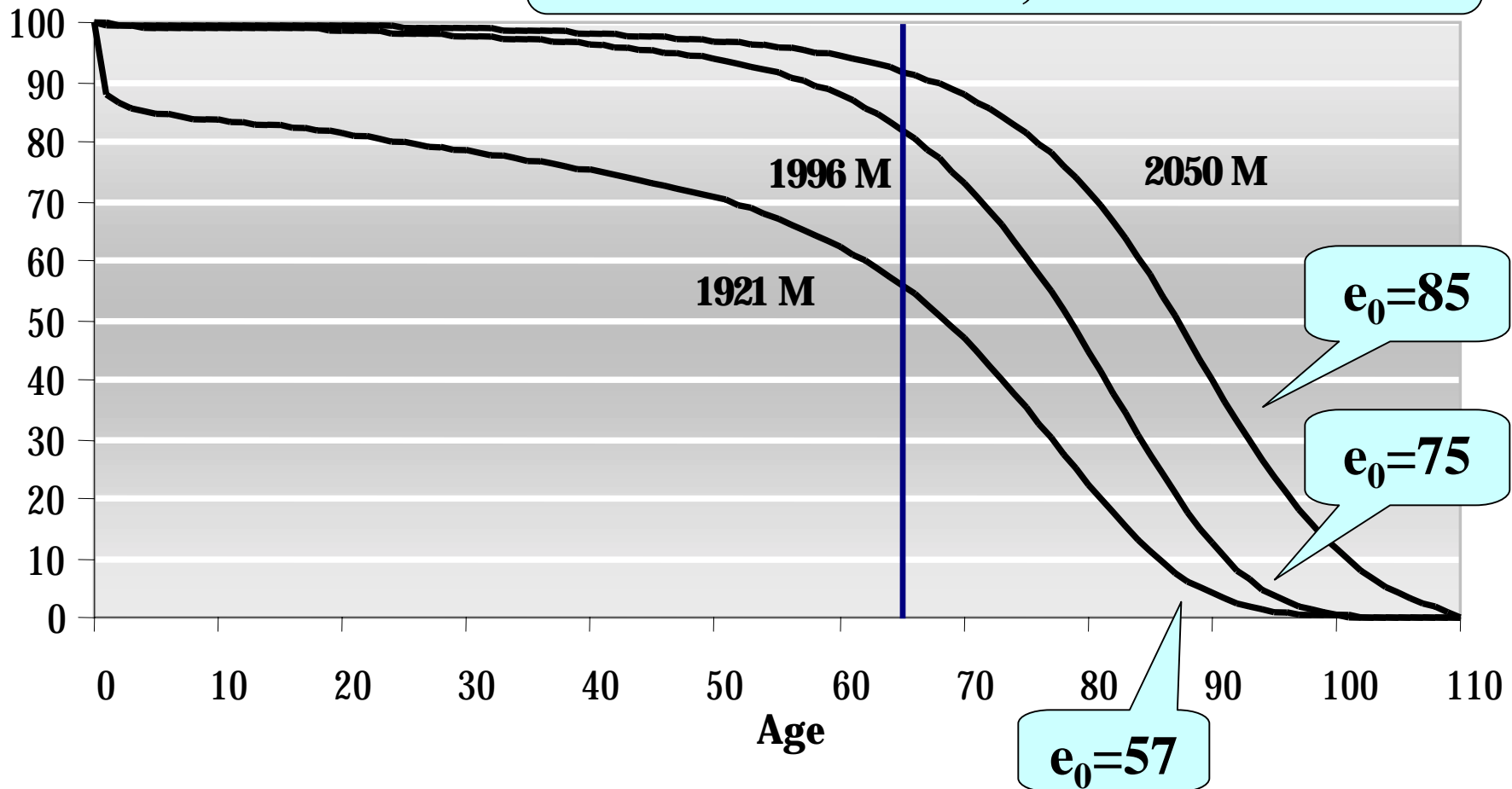
It requires eliminating all mortality risks before 80.

- In Canada and U.S., the leading causes of death are circulatory diseases (40% of deaths), cancer (20% of deaths) and accidents (9% of deaths).
- How long can we live?
- Can we reach 100 years old?
- From 1900 back 130,000 years, life expectancy remained approximately at the same level.
- It has increased by three decades since 1900 from 49 to 79.
- Analysts argue that **further progress will come more slowly** because we are approaching lower limits to death rates and we have already won the easier medical battles.



# Probability of surviving

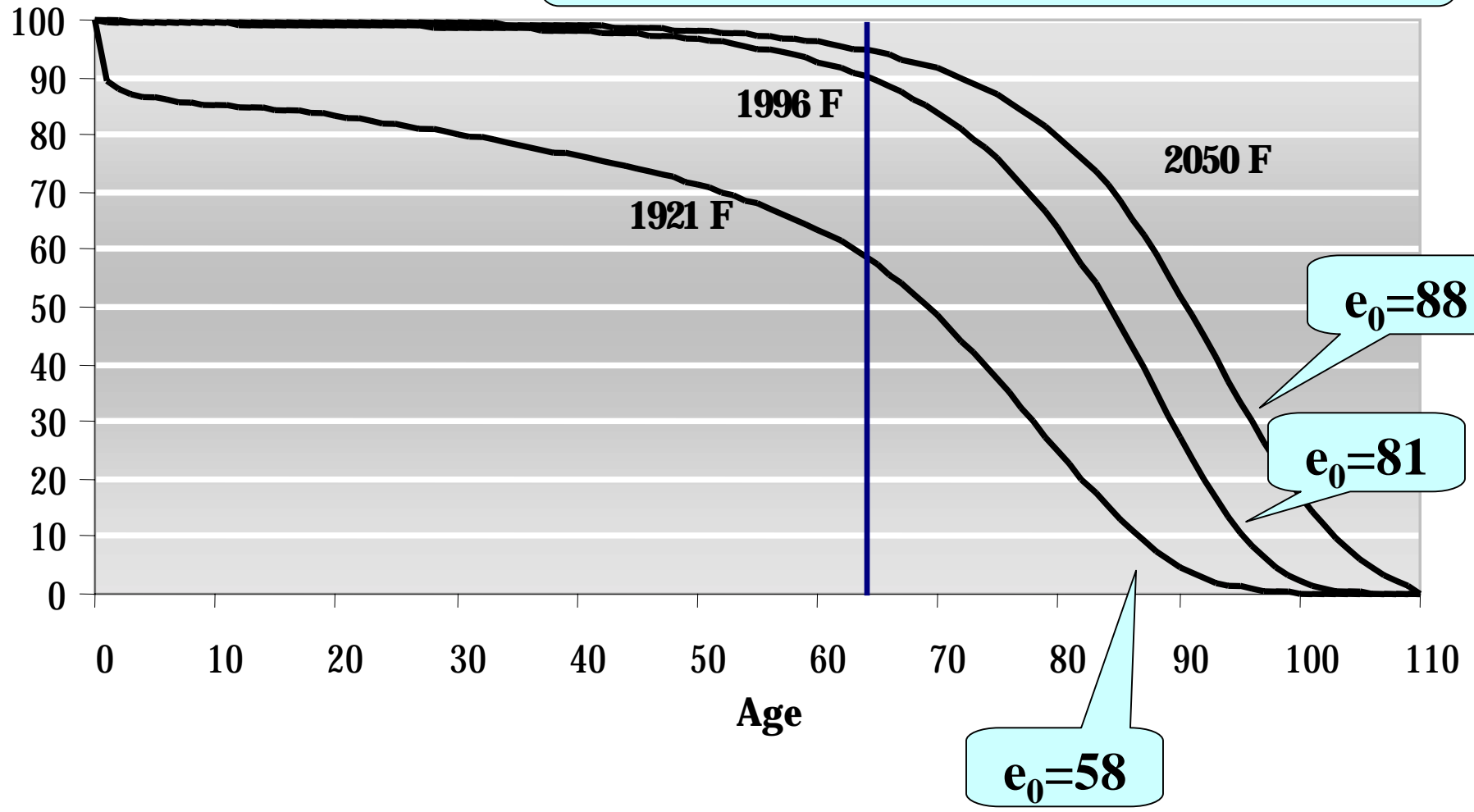
« 70% of males would die between 74 and 94 »  
*Globe and Mail, March 2002*



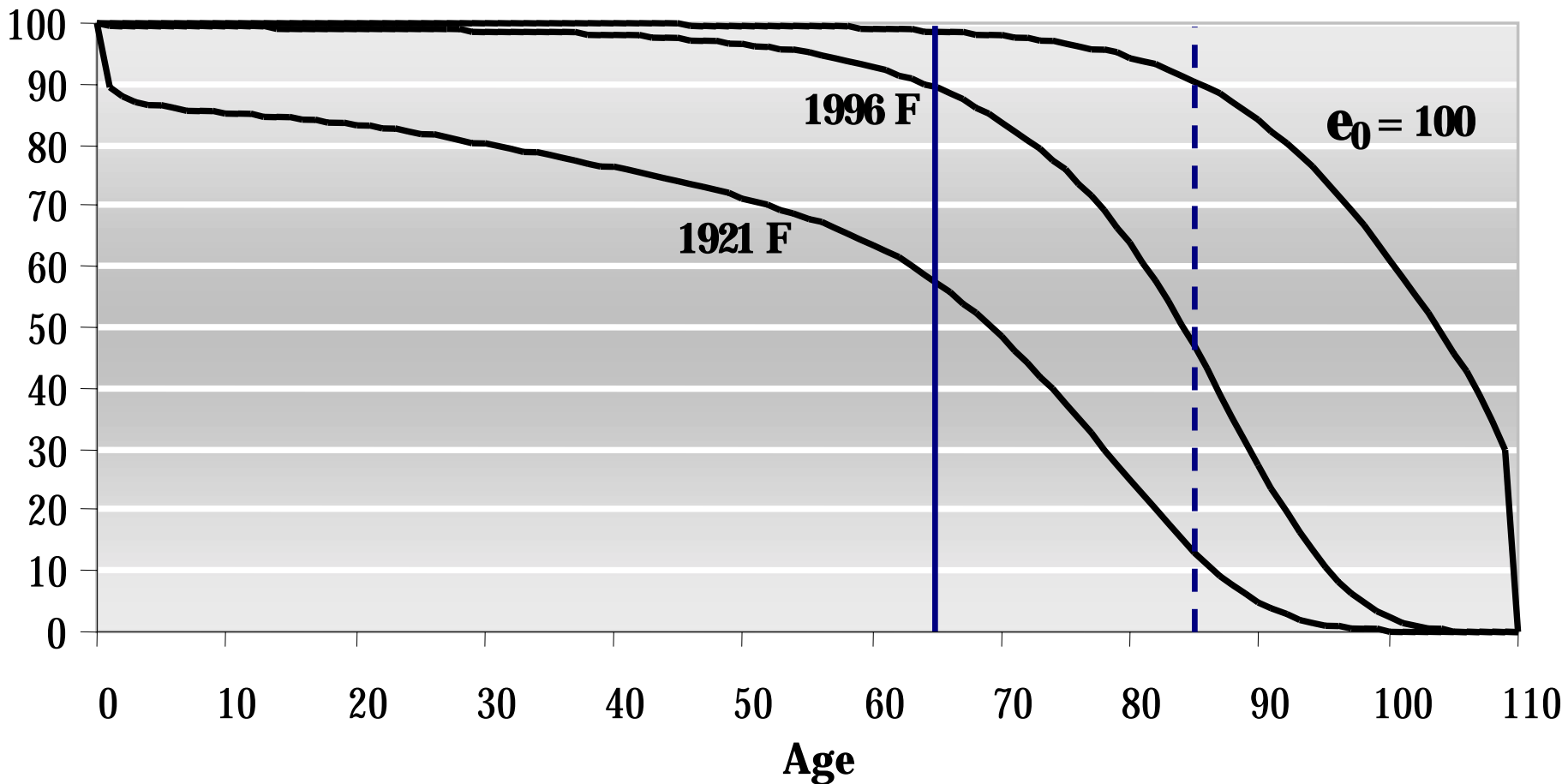


# Probability of surviving

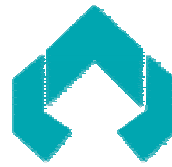
« 70% of females would die between 77 and 96 »  
*Globe and Mail, March 2002*



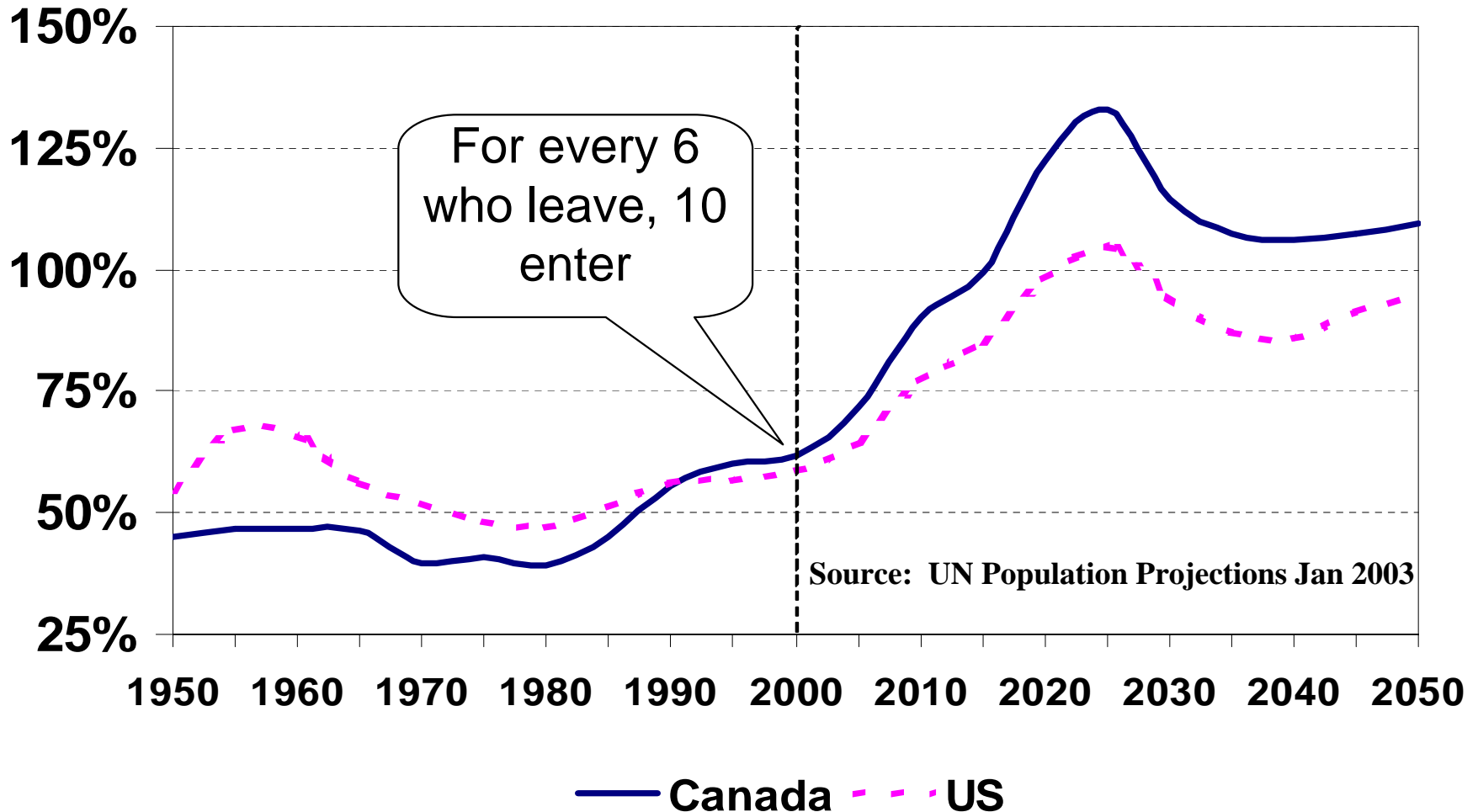
# Probability of surviving



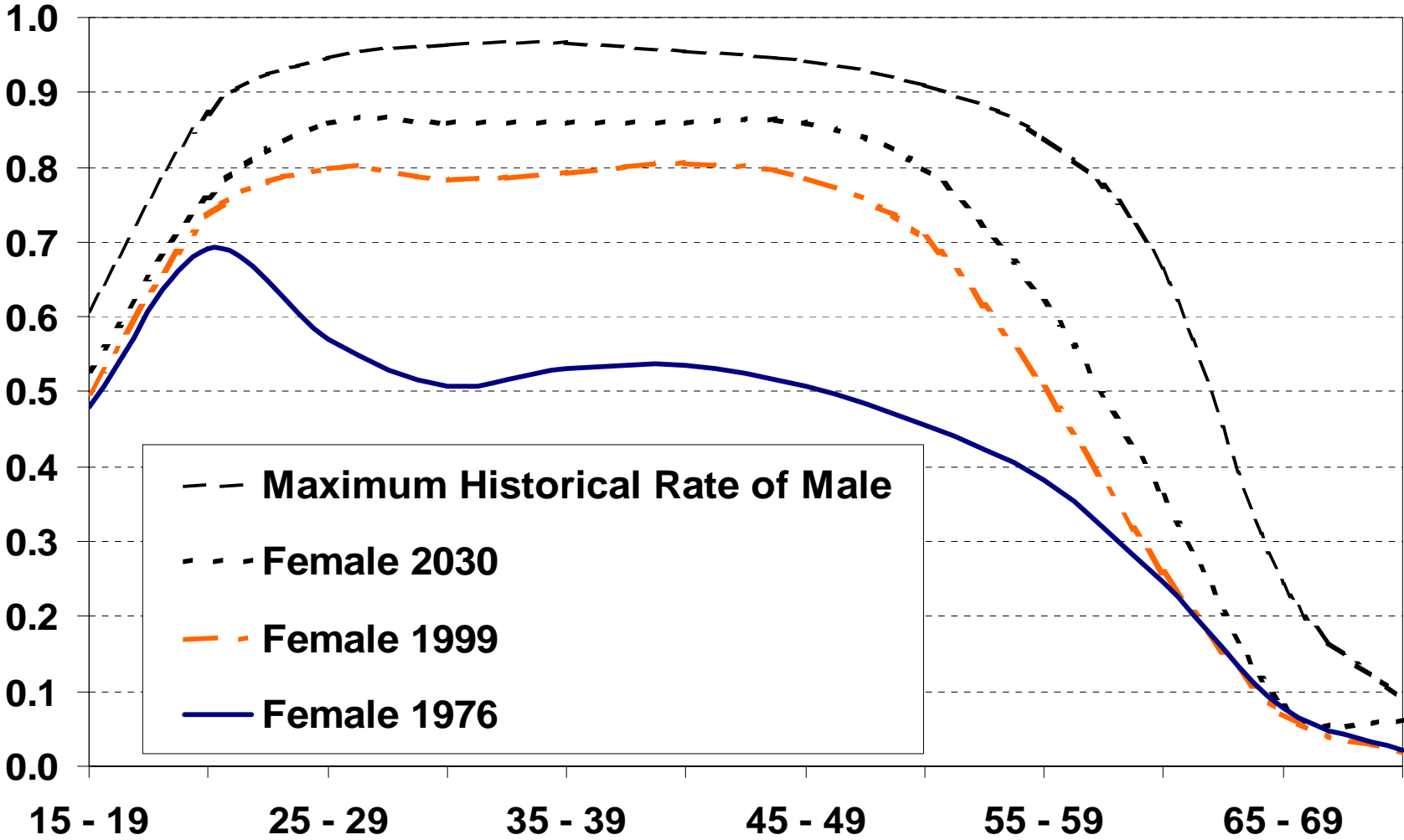
# Future Labour Shortage (More people leaving than entering)



Ratio of 60-64 over 20-24



# Female Participation Rates (Canada)

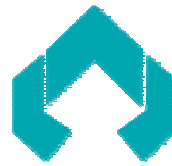


# Global Aging

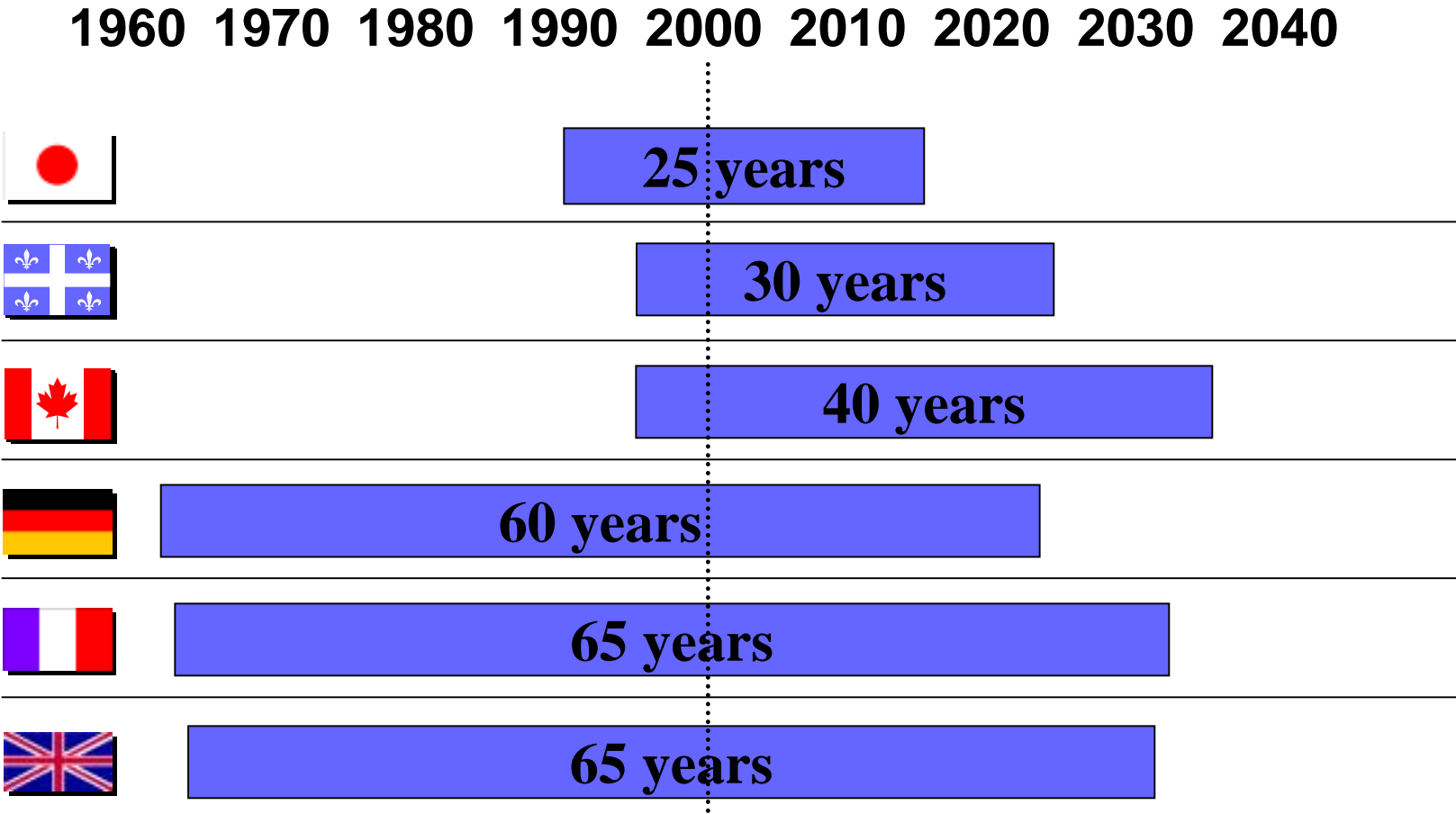


- Aging indicators
  - Magnitude of the aging
  - Speed of the aging
  - Impact on the working labour force
- Effective age of retirement (*OECD said the adverse impact of early retirement on future living standards could be as large as that of population aging itself.*)

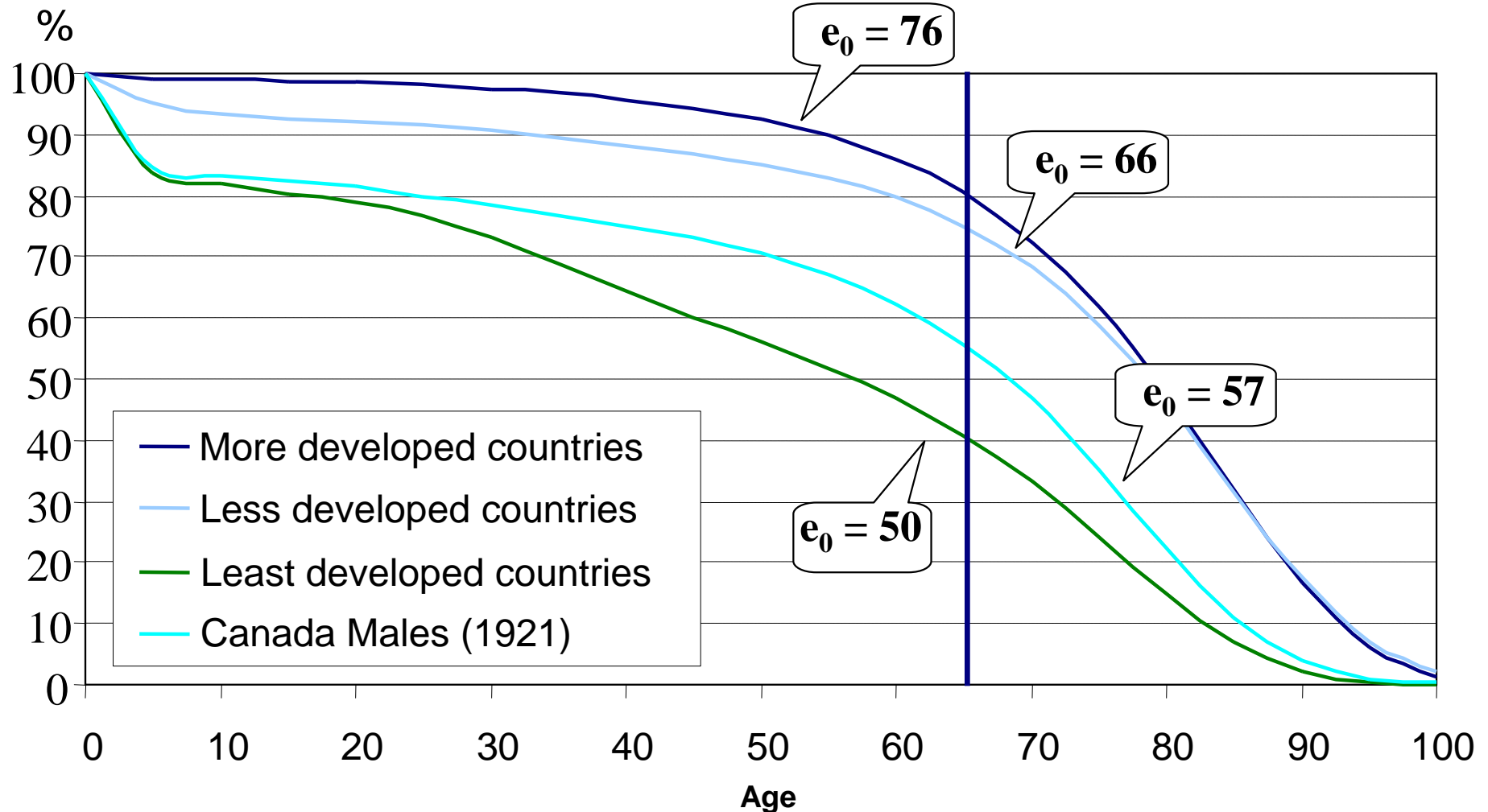




# Projected number of years needed to go from 12% to 24% of 65 and over as a % the total population



# Probability of surviving (World comparison)



United Nations, Population Division, Years 2000-2005



# Life expectancy at birth

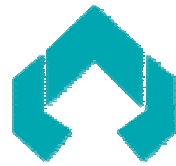


Country	(in 1980)	(in 2000)	(in 2050)
Japan	- 5	<b>82</b> (9 <sup>th</sup> )	+ 6
United States	- 4	<b>77</b> (3 <sup>rd</sup> )	+ 5 (3 <sup>rd</sup> )
Mexico	- 5	<b>73</b> (11 <sup>th</sup> )	+ 7
China	- 4	<b>71</b> (1 <sup>st</sup> )	+ 6 (2 <sup>nd</sup> )
Brazil	- 5	<b>68</b> (5 <sup>th</sup> )	+ 10
Indonesia	-11	<b>67</b> (4 <sup>th</sup> )	+ 10 (5 <sup>th</sup> )
Russia	+ 1	<b>67</b> (6 <sup>th</sup> )	+ 7
India	- 9	<b>64</b> (2 <sup>nd</sup> )	+ 10 (1 <sup>st</sup> )
Zambia	+ 20	<b>32</b> (74 <sup>th</sup> )	+ 20

*Since 1980, the difference in  $e_0$  between the best and the worst country has actually increased from around 40 to 50 years !*



# Impact on financial markets



- Yale University



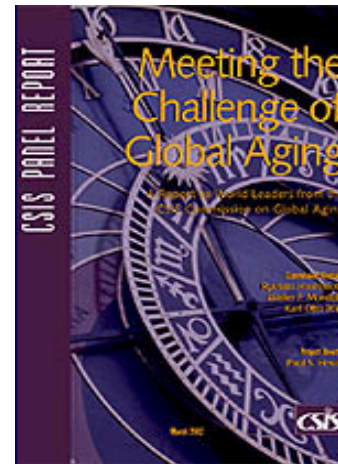
- Merrill Lynch



30 October 2009



- CSIS Reports  
*(Center for Strategic and International Studies)*





# Demography and Predictability of Stock Market

(Geanakoplos, Magill & Quinzii, Yale University)

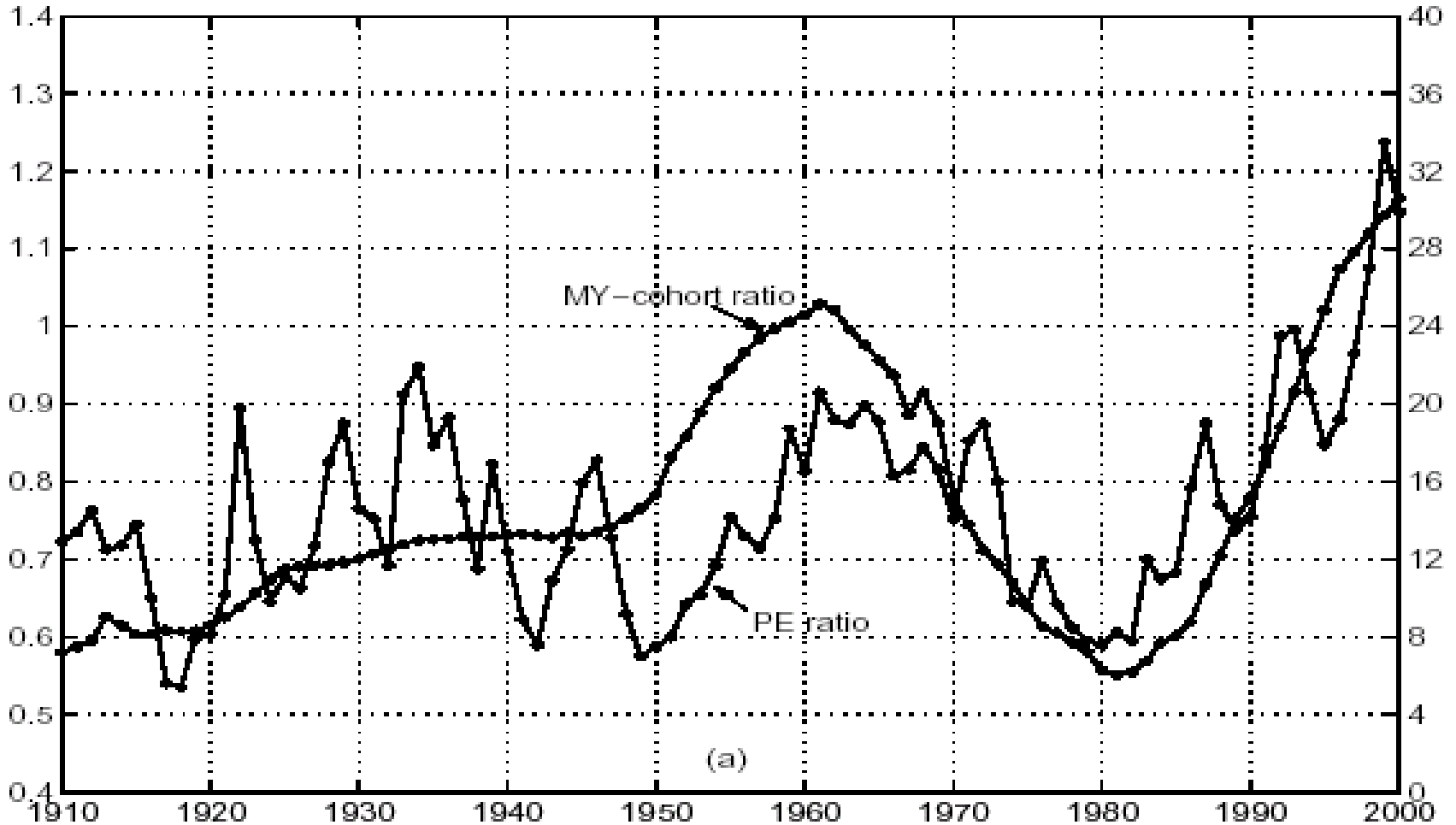


- **Borrowing when young (20-39)**
- **Investing for retirement in middle age (40-59)**
- **Disinvesting in retirement (60+)**
- **Objective:** provide a framework for studying the relation between changing demographic structure and capital market equilibrium
- **Methodology:** Divide the 20<sup>th</sup> century into five 20-year periods of alternatively high and low birth rates.
  - *1910s, 1950s, 1990s, babyboom*
  - *1930s, 1970s, babybust*

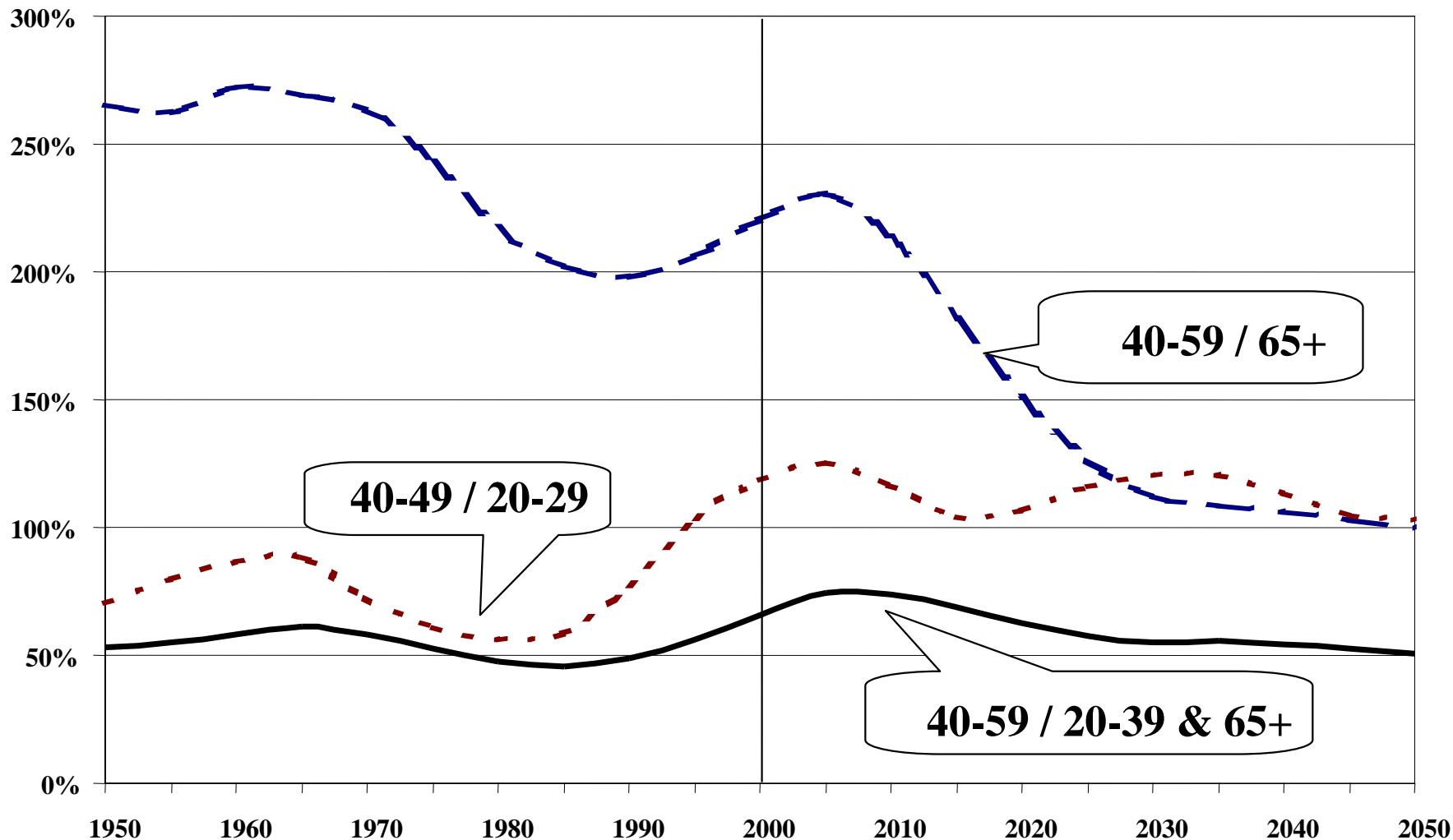


# Demography and Predictability of Stock Market

(Geanakoplos, Magill & Quinzii, Yale University)



# What about other demographic ratios ? (Canada)





# Demographics and Funded Pension System

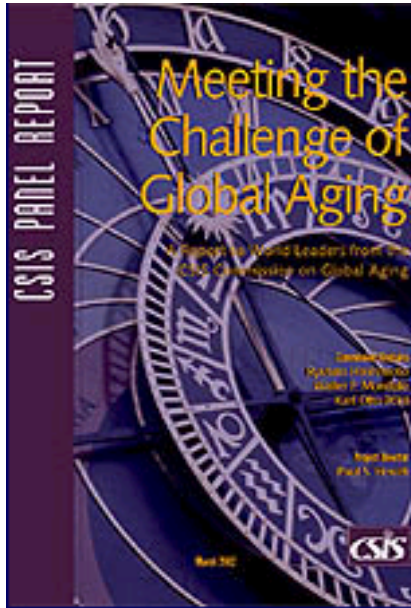


- Countries studied (Netherlands, United Kingdom, United States, Japan)
- What will happen to the **net cash flow** of funded pension systems when populations are increasingly aged?
- After 2010, number of people who retire and draw a pension will increase dramatically and net cash flow into the systems will start to decrease.
- However, the next five to ten years will continue to see good demand from the pension funds for investments.
- What will happen to the **asset allocation** of pension funds?
- It is likely that pension funds in the future will hold fewer equities and more fixed income products in their portfolios.





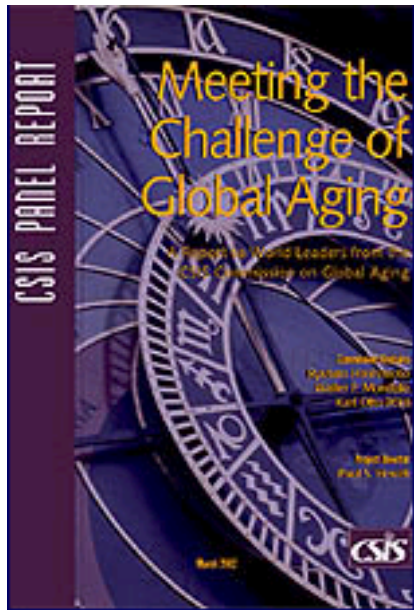
# Findings



If the rates of labour force participation among older populations do not rise over time, **every developed country could face tight or shrinking labour markets that would significantly constrain their potential for economic growth.**



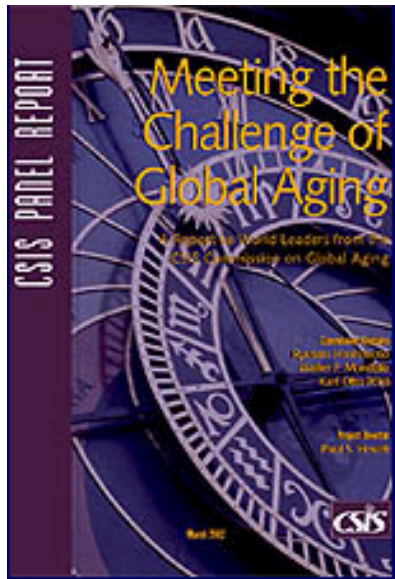
# Findings



The populations of Japan and the EU-15 are projected to decline over the next 50 years, while the populations of the **United States and Canada will continue to grow**, albeit at a slower rate.



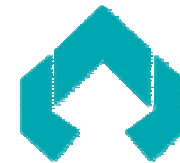
# Findings



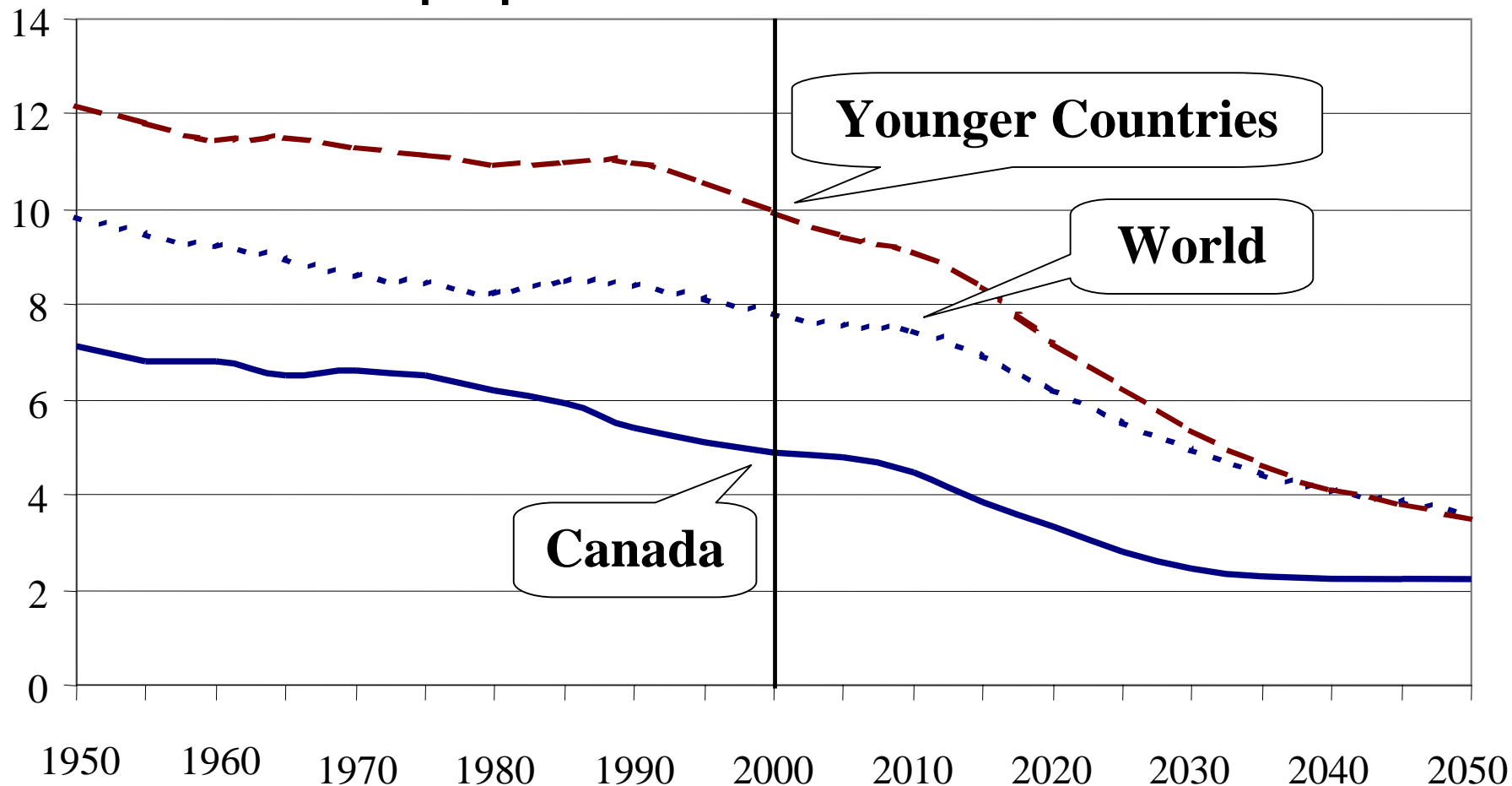
Although funded pension systems are less susceptible to demographic shocks, **the transition from pay-as-you-go (state-funded) to fully funded pensions** can create a double-payment problem, in which one working-age generation must pay for the pension benefits promised to preceding generations while simultaneously saving for its own old age.

 ***The Canadian retirement system could be viewed as about 40% to 45% funded.***

# How do we position for the aging of the World population?



## Ratio of population 20 to 64 Over 65 +

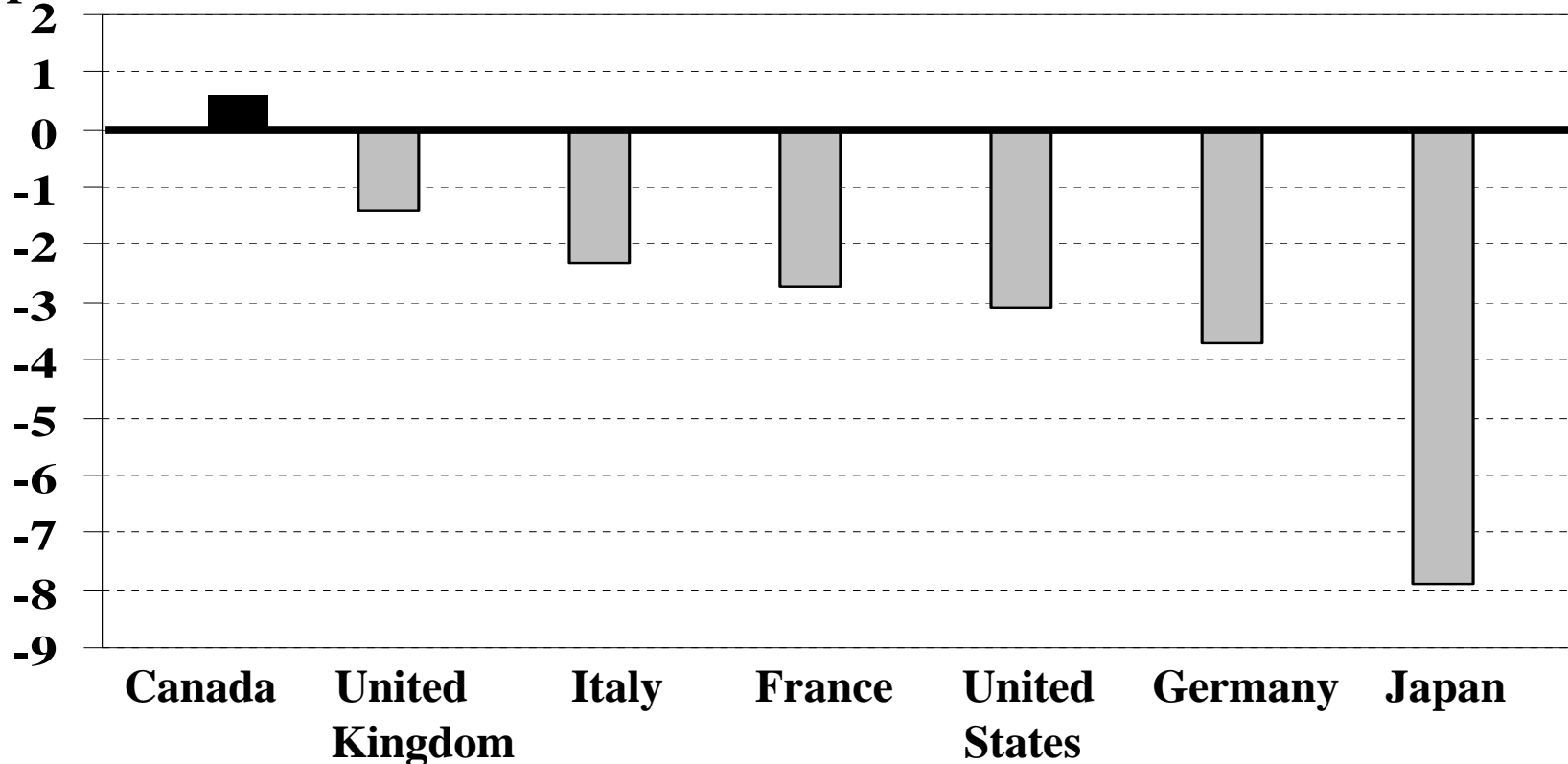


# How do we position for the aging of the Canadian population?



## Total Government Financial Balances, 2002

per cent of GDP



Balancing the budget and putting the debt-to-GDP ratio on a downward track are good ways to ensure that OAS can be financed on a sustainable basis.



# Future challenges

- Retirement is a reality for a vast majority of Canadians.
- The aging is expected to be more severe in Canada than in United States, our main commercial partner.
- Contrary to the other industrialized countries, Canada should not undergo a fall of its working population thanks in particular to future immigration.
- The expected aging of the working labour force and the resulting labour shortage that could occur will represent one of the biggest challenge in the coming years.