FIRST initiative

Strengthening Financial Sectors

Donors and Stakeholders Workshop on Law 40 of 2004

Implementing an Indonesian National Social Security System

Modelling System Costs

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Plan of Presentation

I. Pension Modelling

II. The Basic Paygo Model

III. The Demographics of Indonesia

IV. Illustrative Cost Estimates

- *Alternative Financing Paths*

I. Pension Modelling

- We focus here on pension modelling
- But the content of the presentation substantially apply to other social security programs as well
- Indeed most pension models may be easily adapted to generate costs for other types of programs because they require the same basic projections tools.

Estimating Pension System Costs

- This is a complicated task:
  - Many factors: demographics, economics, management performance
  - Factors interact with one another
  - Many different pension parameters
  - Parameters may change over time
  - Factors/parameters vary i.e. by age, gender, income level
  - Must project over very long periods
- A model recognized how each of these factors compound together to affect the fiscal position of a pension scheme and its main indicators
- A model increases rigor and discipline and assures consistency

The Need for Modelling does not Stop after Implementation

- Models are also needed to:
  - Monitor cost trends
  - Test resilience of system
  - Cost potential amendments
  - Perform statutory reviews
  - Measure implicit pension debt
  - Perform special studies
- Model needs are *PERMANENT*

Models Are Dynamic

- No model is ever finished
- A model is continually subject to changes
  - To test ideas for modifying the system
  - To reflect newly adopted amendments
  - To reflect new administrative practices and control
  - To deal with newly or no longer available data
  - To add or modify outputs
- Therefore models must be *FLEXIBLE*

Efficient Technical Assistance

- Not sufficient to deliver a foreign-made model and show how to operate it
- Should aim for developing genuine, autonomous and permanent modelling skills
- The ideal approach would be to help Indonesia develops its own model
  - But no time for that now
  - A compromise approach is to bring in an existing model and adapt it to Indonesia's particular circumstances
  - Develop local modelling capacity that allows Indonesia to keep the model in line with its needs

Existing Pension Models

- Several credible and sound software-based pension models exist:
  - WB's PROST
  - ILO's
  - Wiese's PRISM
  - Wilkin's
  - Ernst & Young's DemPen
- Effective customization requires access to programming codes

II. The Basic Paygo Model

Definitions

- **The *Old Age Dependency Ratio* (DR) refers to the general population**

$$DR = \frac{P_{65+}}{P_{15-64}}$$

- **The so-called *System Dependency Ratio* (SDR) refers to a pension system**

$$SDR = \frac{\#Beneficiaries}{\#Contributors}$$

The Basic Paygo Model (1)

- Under a pure PAYGO scheme
  - Contributions = Benefit Payments by definition
  - Ignoring lump sums and expenses
    - [Cont. Rate x Number of Contributors x Avg. Wages] = [Avg. Pension x Number of Beneficiaries]
  - Rearranged: CR = RR x SDR
    - CR = Required Contribution rate
    - RR = Average pension level relative to average wages
    - SDR = Number of beneficiaries per contributor i.e. the so-called System Dependency Ratio

The Basic Paygo Model (2)

- What does the Basic Paygo Model tell us?
  - For a given pension level (RR), paygo cost trends depend directly upon SDRs
  - For a given set of pension eligibility rules, SDR trends depend almost directly upon DRs
  - Then for a given pension level paygo cost trends depend almost directly upon general population trends i.e. DRs

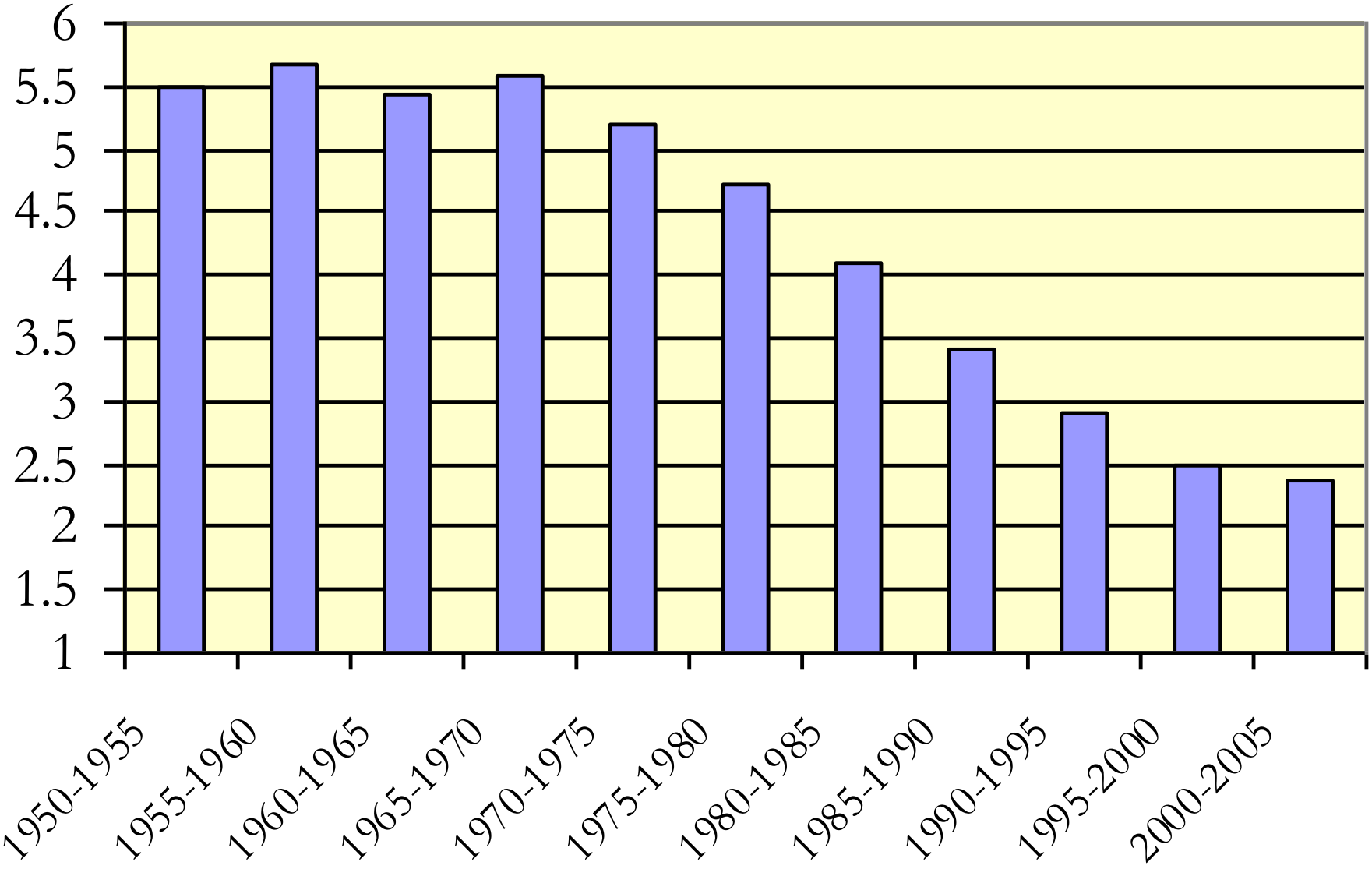
Conclusion: Demographics Drives Paygo Costs

- Decreases in *fertility* reduce the weight of young individuals relative to the older people and increase DRs and hence SDRs
- Improvements in *mortality* at old age also increase DRs and hence SDRs
- *Migration* also has effects similar to fertility
- The effects of demographic changes are slow to emerge but they last for very long periods
- This is why demographic effects can and must be anticipated long in advance
- Demographic changes cannot be altered; they can only be anticipated and managed

III. The Demographics of Indonesia

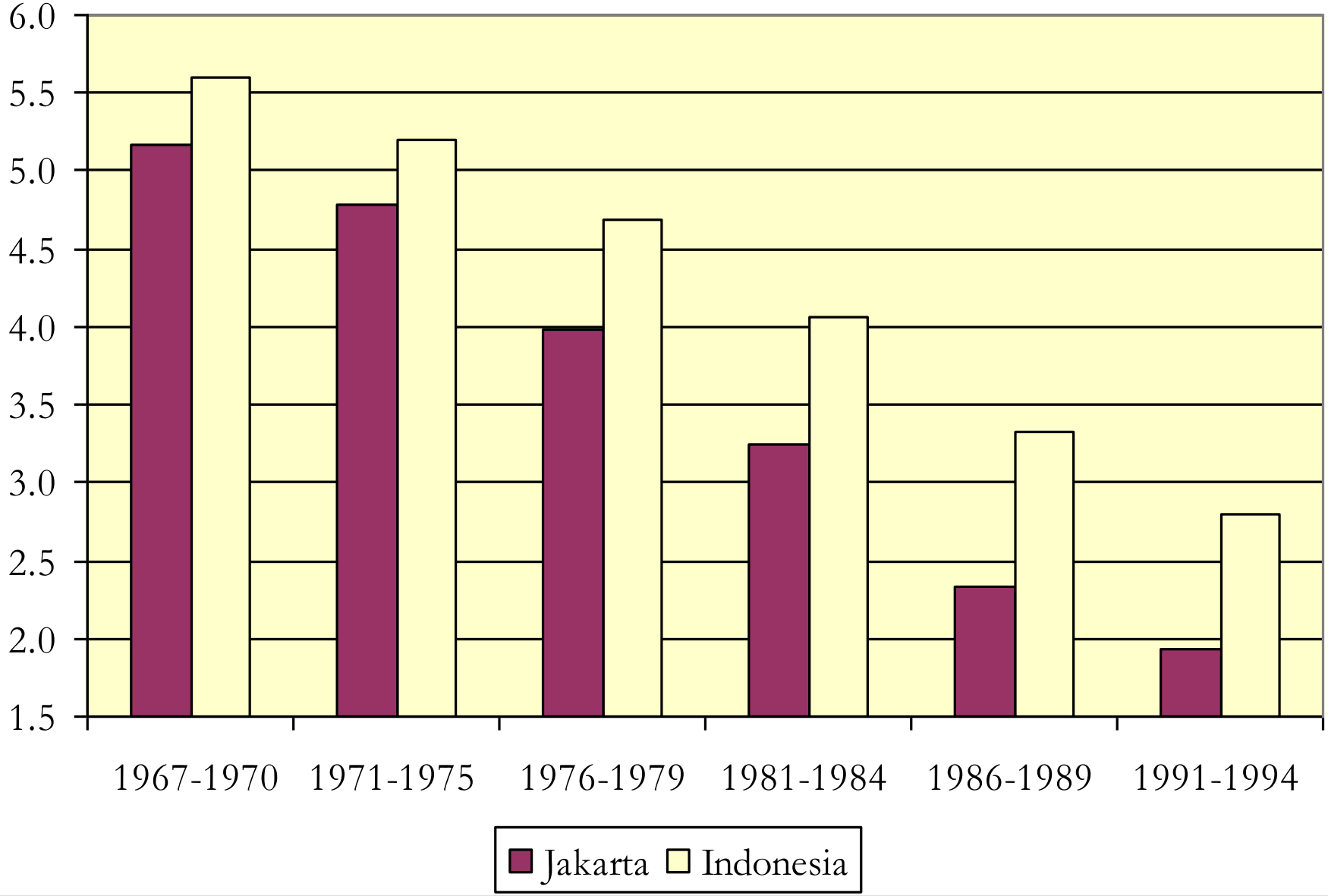
Indonesia Total Fertility Rate

1950 - 2000



Total Fertility Rate

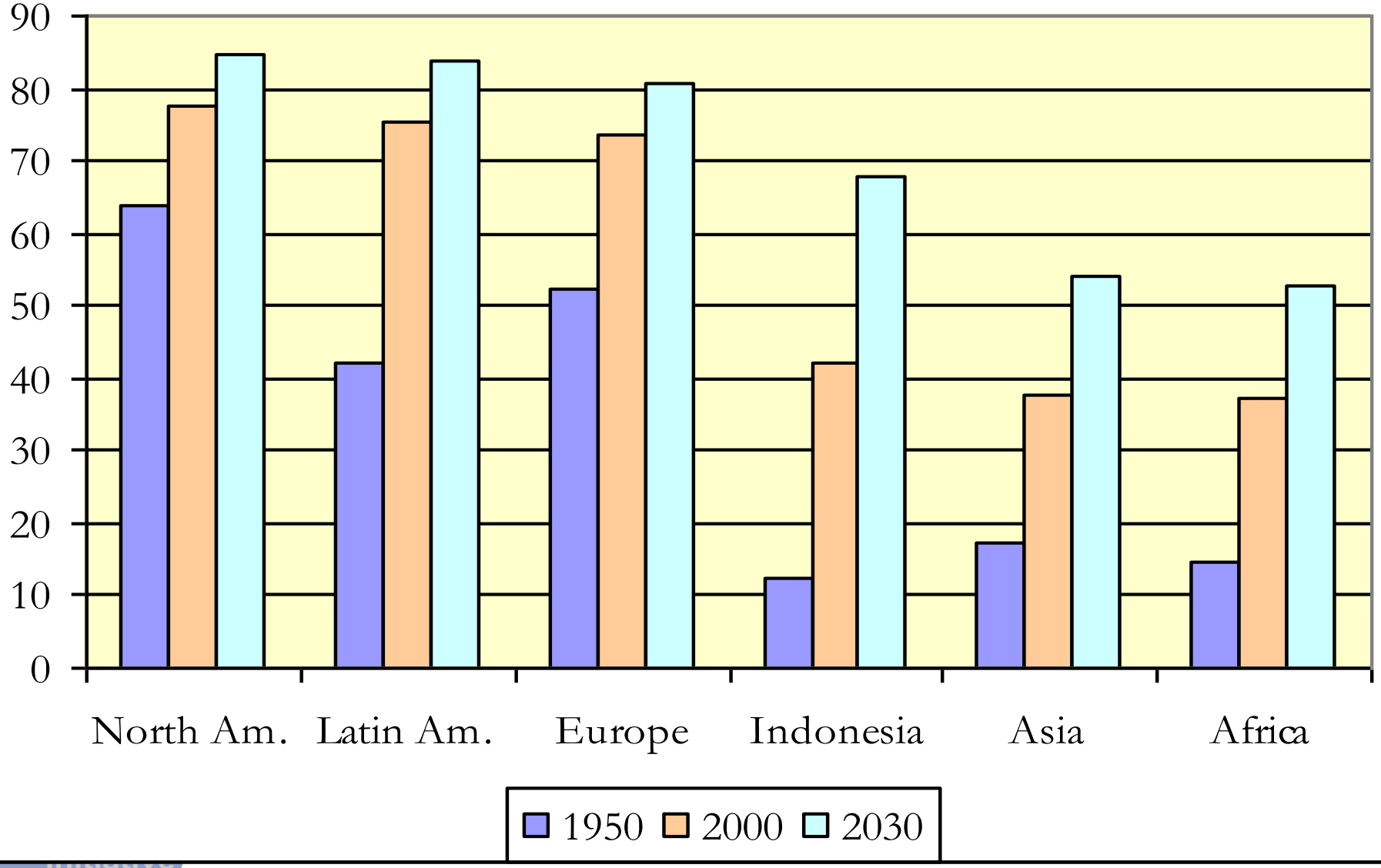
Jakarta vs Indonesia



Urbanization Rates

Indonesia vs Rest of the World

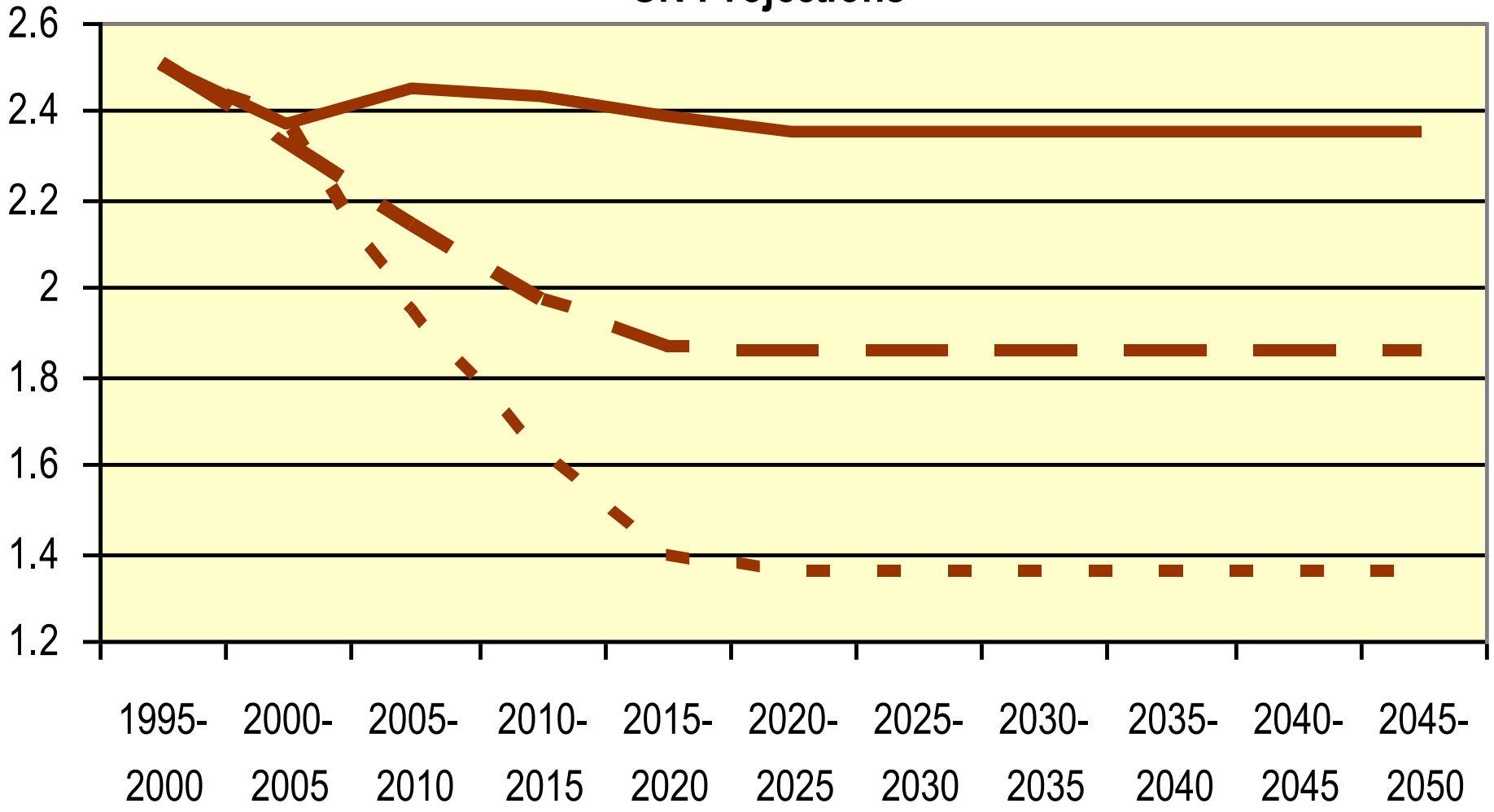
1950 - 2030



Indonesia Total Fertility Rates

1995 - 2050

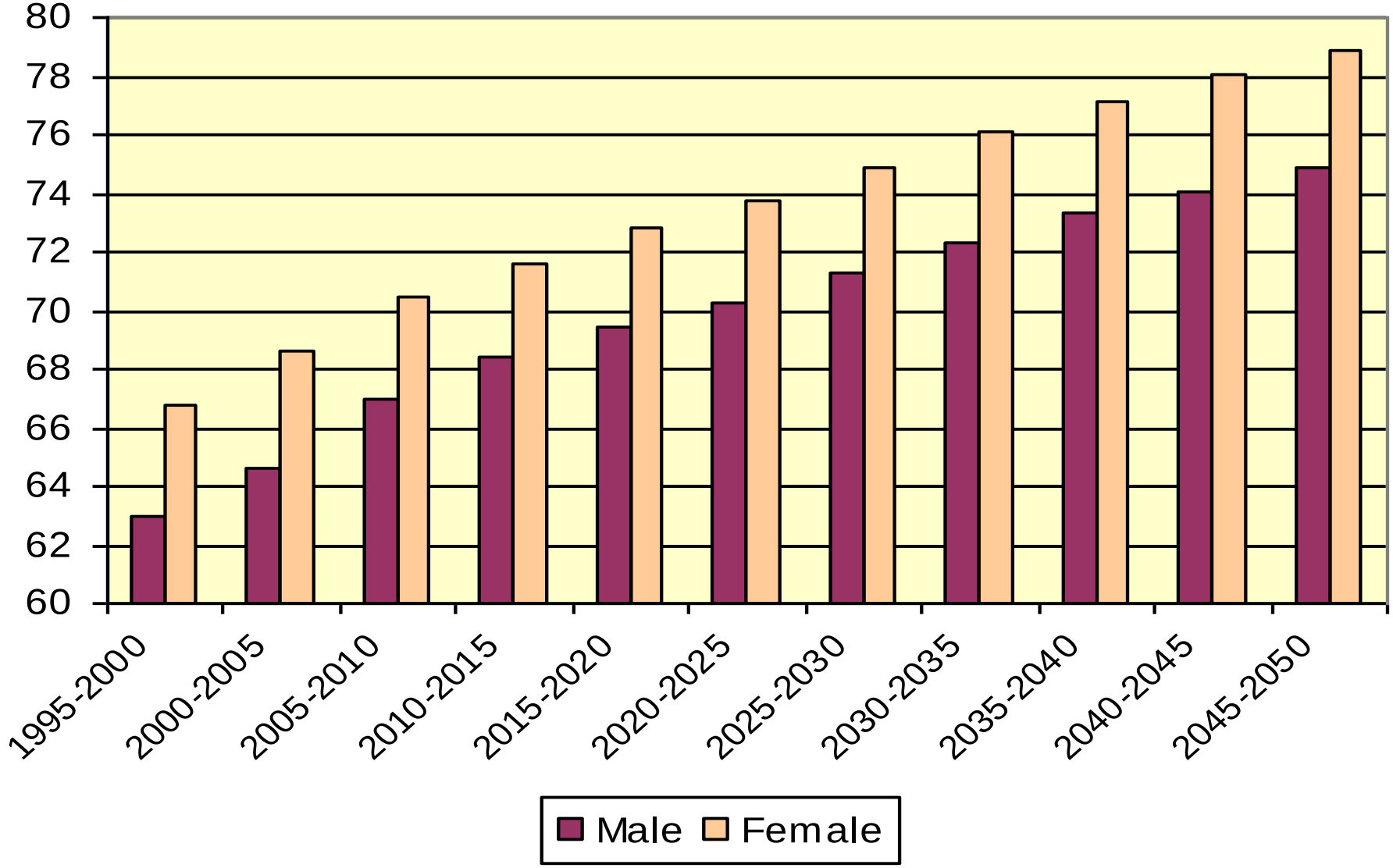
UN Projections



Mortality

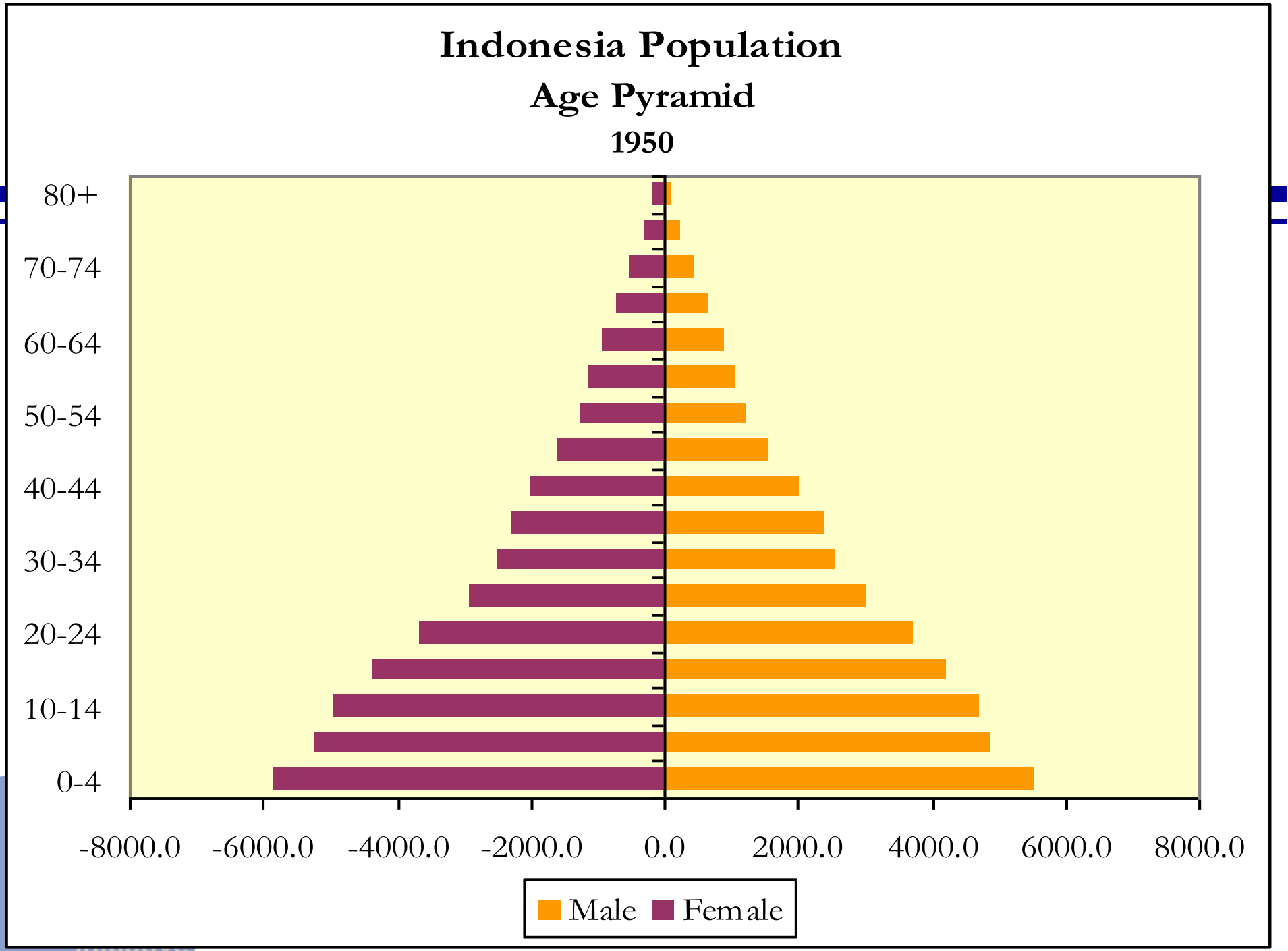
- Life expectancy (LE) captures mortality improvements
- Pension costs are almost only sensitive to post-retirement mortality
- Then it is LE at retirement age that matters
- Here we use LEs at birth for this analysis because LEs at retirement are not available
- Also in the future most gains in LE will come from reduction in old age mortality
  - Most infant mortality improvements already done
  - Children and adult mortality rates are already low

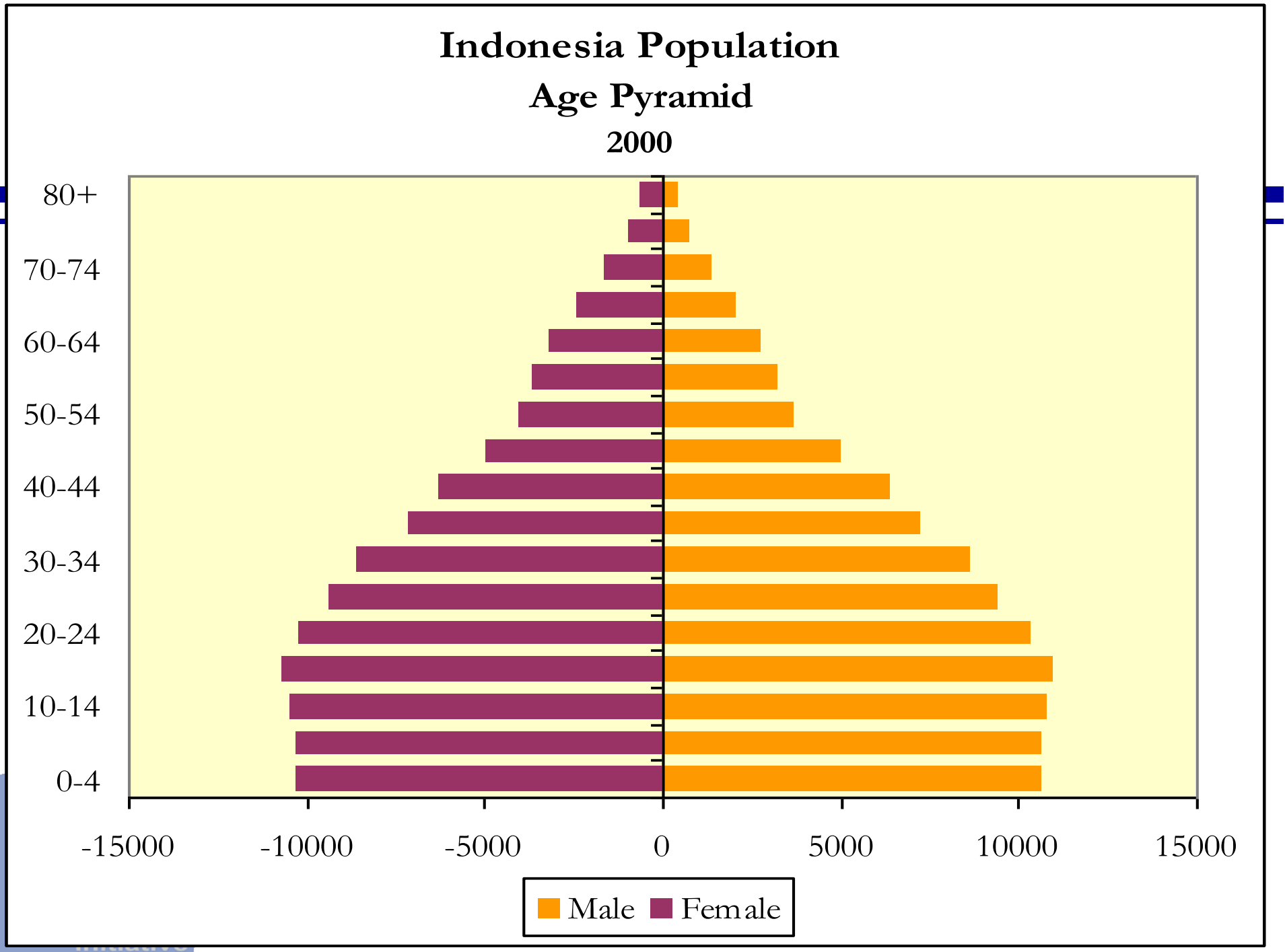
Life Expectancy @ Birth
Indonesia
UN Projections 2000 - 2050

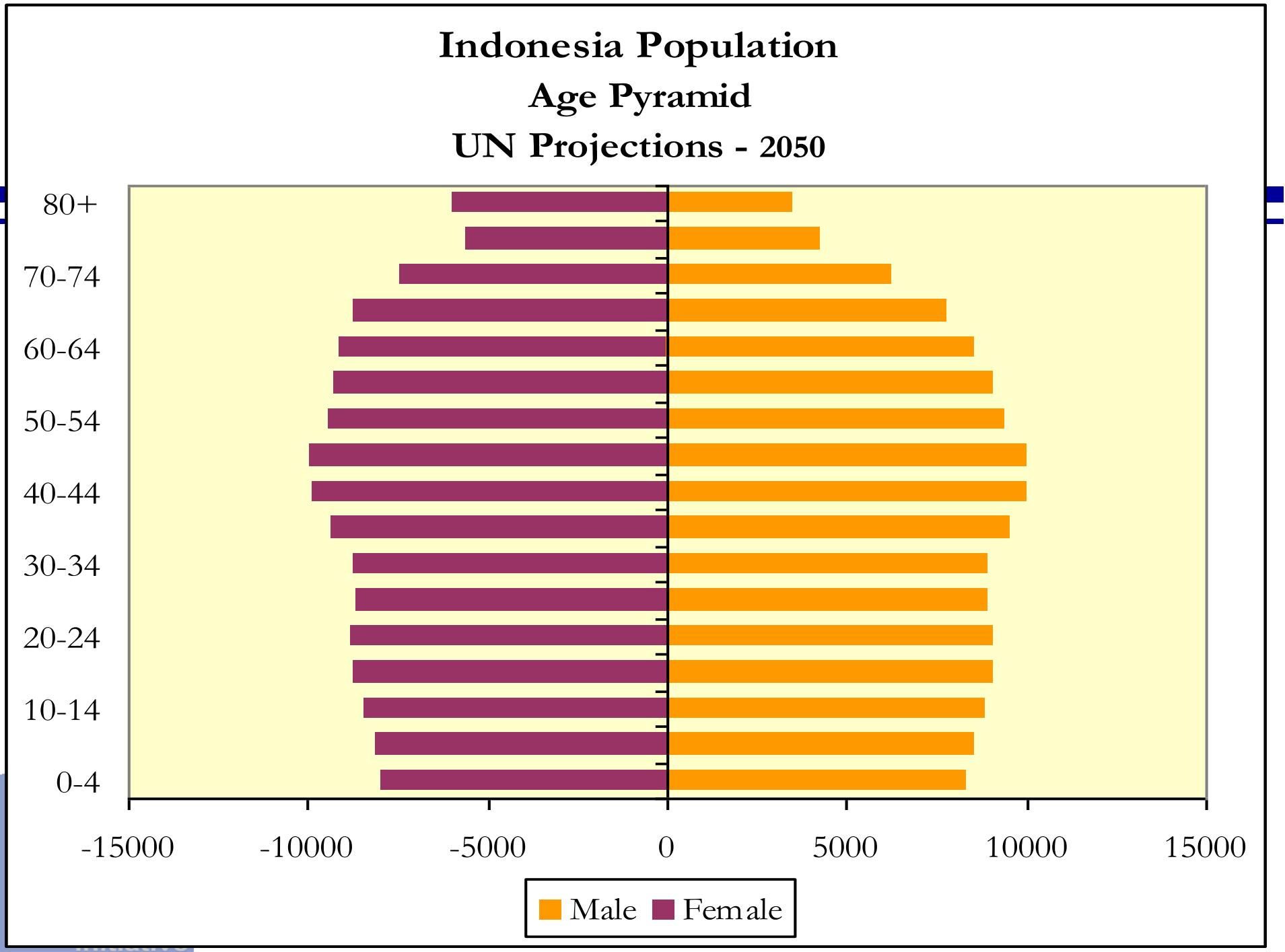


LE at Birth Selected Countries 1950 - 1998

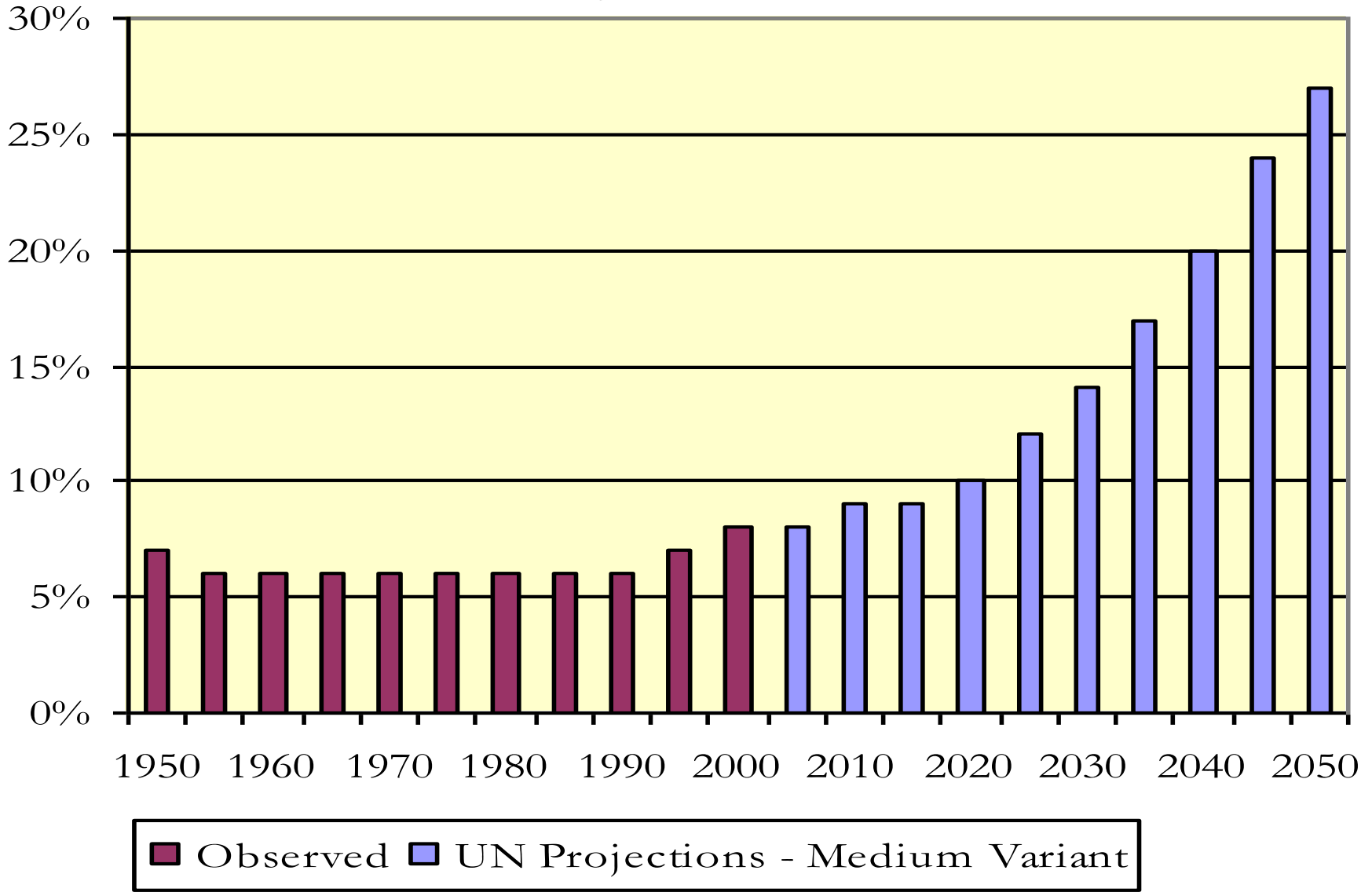
Country	Male			Female		
	1950	1998	Gain	1950	1998	Gain
Austria	62.0	74.1	12.1	67.0	80.7	13.7
Belgium	62.1	74.1	12.0	67.4	80.7	13.3
Czech Republic	60.9	70.8	9.9	65.5	77.7	12.2
France	63.7	74.6	10.9	69.4	82.6	13.2
Germany	64.6	73.8	9.2	68.5	80.3	11.8
Greece	63.4	75.8	12.4	66.7	81.0	14.3
Italy	63.7	75.3	11.6	67.2	81.7	14.5
United Kingdom	66.2	74.8	8.6	71.1	80.1	9.0
Australia	66.7	77.0	10.3	71.8	83.0	11.2
United States	66.0	72.9	6.9	71.7	83.3	11.6
Average	**63.9**	**74.3**	**10.4**	**68.6**	**81.1**	**12.5**
LE Gain per Year	**2.6 months**			**3.1 months**		


Indonesia Population
Age Pyramid
1950
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
-8000.0
-6000.0
-4000.0
-2000.0
0.0
2000.0
4000.0
6000.0
8000.0
Male
Female


Indonesia Population
Age Pyramid
2000
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
-15000
-10000
-5000
0
5000
10000
15000
Male
Female

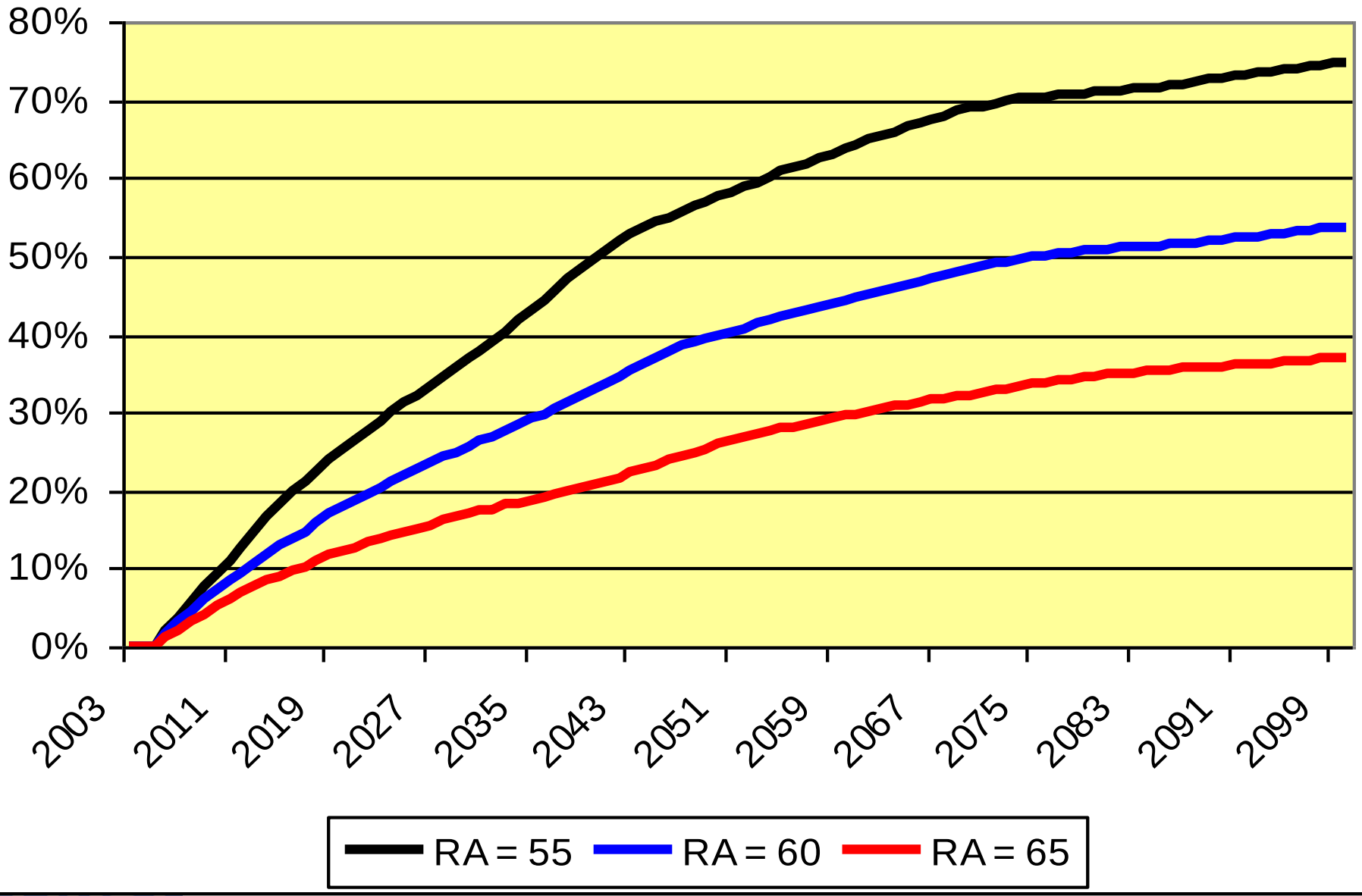

Indonesia Population
Age Pyramid
UN Projections - 2050
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
-15000
-10000
-5000
0
5000
10000
15000
Male
Female

Indonesia Old Age Dependency Ratio @ 65
Observed & Projected
1950 - 2050



System Dependency Ratio

According to Various Retirement Ages



Why SDRs > DRs?

- Although DR and SDR trends are similar, SDRs are generally substantially higher than DRs
  - Most participants start at age > 15
  - Most participants retires at age < 65
  - Disabled, survivor and children pensions
  - Inactive and unemployed who have accrued pensions – not recognized in our projections
  - Covered population is often significantly older than non-covered population - not recognized in our projections

IV. Illustrative Cost Estimates

Starting Parameters

- Contributions start in 2005
- Benefits start in 2006
- Projections to 2100
- Basic flat old age benefit
  - Initial level = 300,000 Rp of 2003 per month
    - About 72% of Minimum Monthly Wages
- Eligibility subject to minimum number years of service
- First cohorts are grandfathered in

Main Pension Provisions

- Retirement age: 55, 60 and 60 adjusted
- Indexation of old age benefit payable at retirement: 100% and 50% of real wages
- Indexation of pensions in payment: 100% of prices
- Disability pension = 80% of old age benefit
- Spousal Pension = 2/3 of old age pension
  - Payable to those within 15 years of retirement age
  - Otherwise a lump sum = 10 millions Rp of 2003
    - Or about 24 x monthly min. wages
- Children pension => 20% of old age benefit

Demographic Assumptions

- Total Fertility Rate
  - 2.4 in 2002 => 1.95 over 20 years
- Mortality Improvement
  - 1% for all ages and all years
  - LE @ Birth increases from 66 in 2003 to 78 in 2100
- Net migration => Nil
- By no means the worst case scenario
  - UN projections
    - LE @ Birth = 77 in 2050
    - TFR medium variant = 1.85 and low variant = 1.35 by 2025
    - Migration => negative but very small

Economic Assumptions

- **Real wage / productivity growth – 3% decreasing to 2% over 40 years**
- **Real GDP growth – linked to productivity and employment**
- **Real interest rate – 5% decreasing to 3.5% over 30 years**
- **Inflation – implicit (*All values in constant Rp*)**

Work Force & Coverage Assumptions

- Labour participation rates
  - Constant over time
- Unemployment rates
  - Constant over time
- Effective coverage rate
  - Constant over time

Management Performance Assumptions

- Collection rate
  - 90% => 97% over 20 years
- Administrative expenses as % of benefits paid
  - 30% => 8% over 20 years
- Real rate of return as % of benchmark
  - 75% => 95% over 15 years
- Asset management expenses
  - 0.4% => 0.2% over 20 years

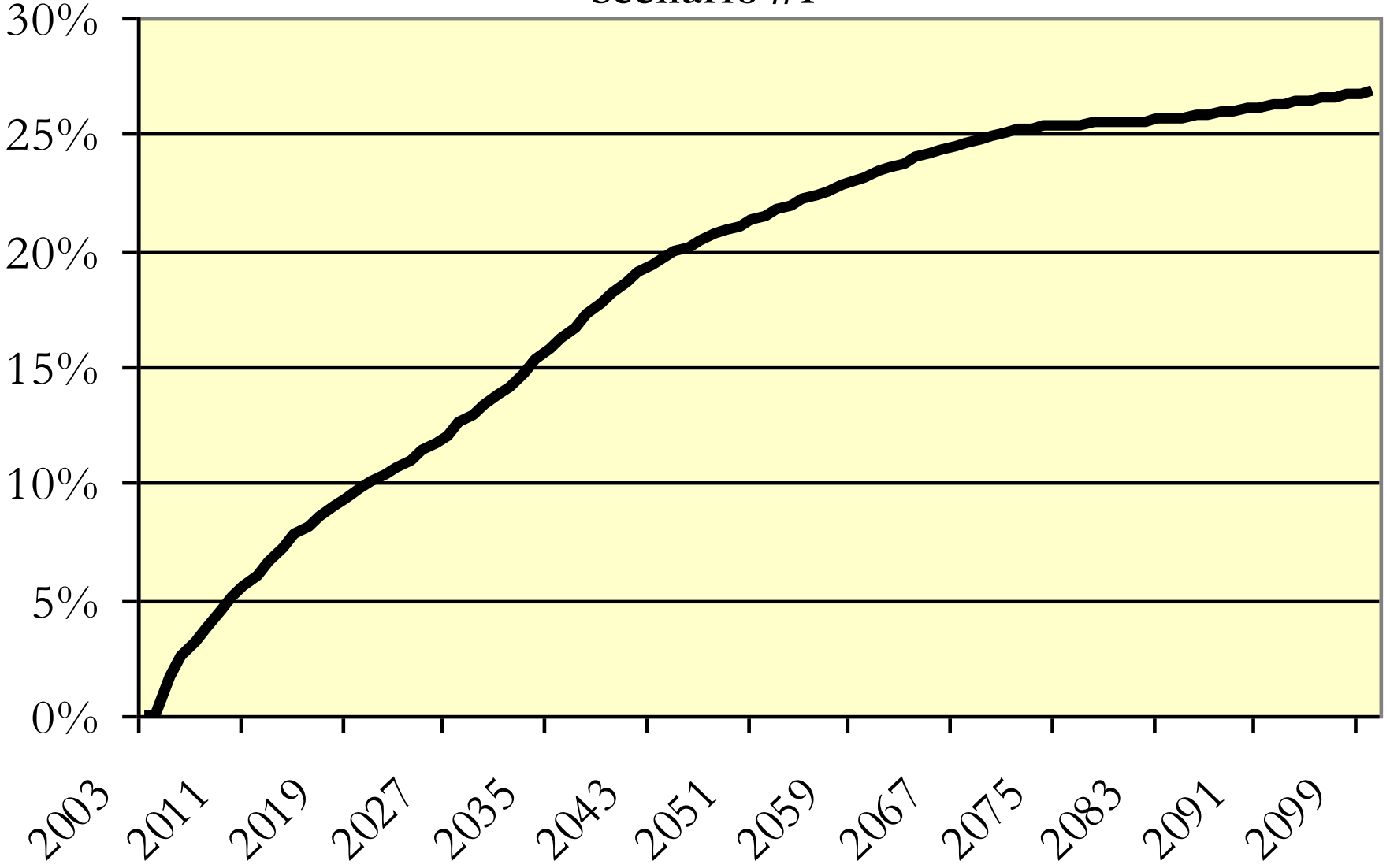
Scenario #1

- Retirement age (RA) is set and kept unchanged at 55
- Benefit level is indexed to full wage growth

Paygo Cost as % of Payroll

RA = 55 and Full Wage Indexation

Scenario #1



Alternatives to Paygo

- Funding reduce future costs by returns on large accumulated assets
- Under full funding assets measure in multiples of GDP – this raises concerns
  - Problem of concentration
  - Investment opportunities are limited
  - Large asset accumulation makes cost very sensitive to asset management performance
- Hence asset accumulation need to be modest
- Cost stability is also a chief objective
- Between paygo and full funding there exists a host of other funding approaches

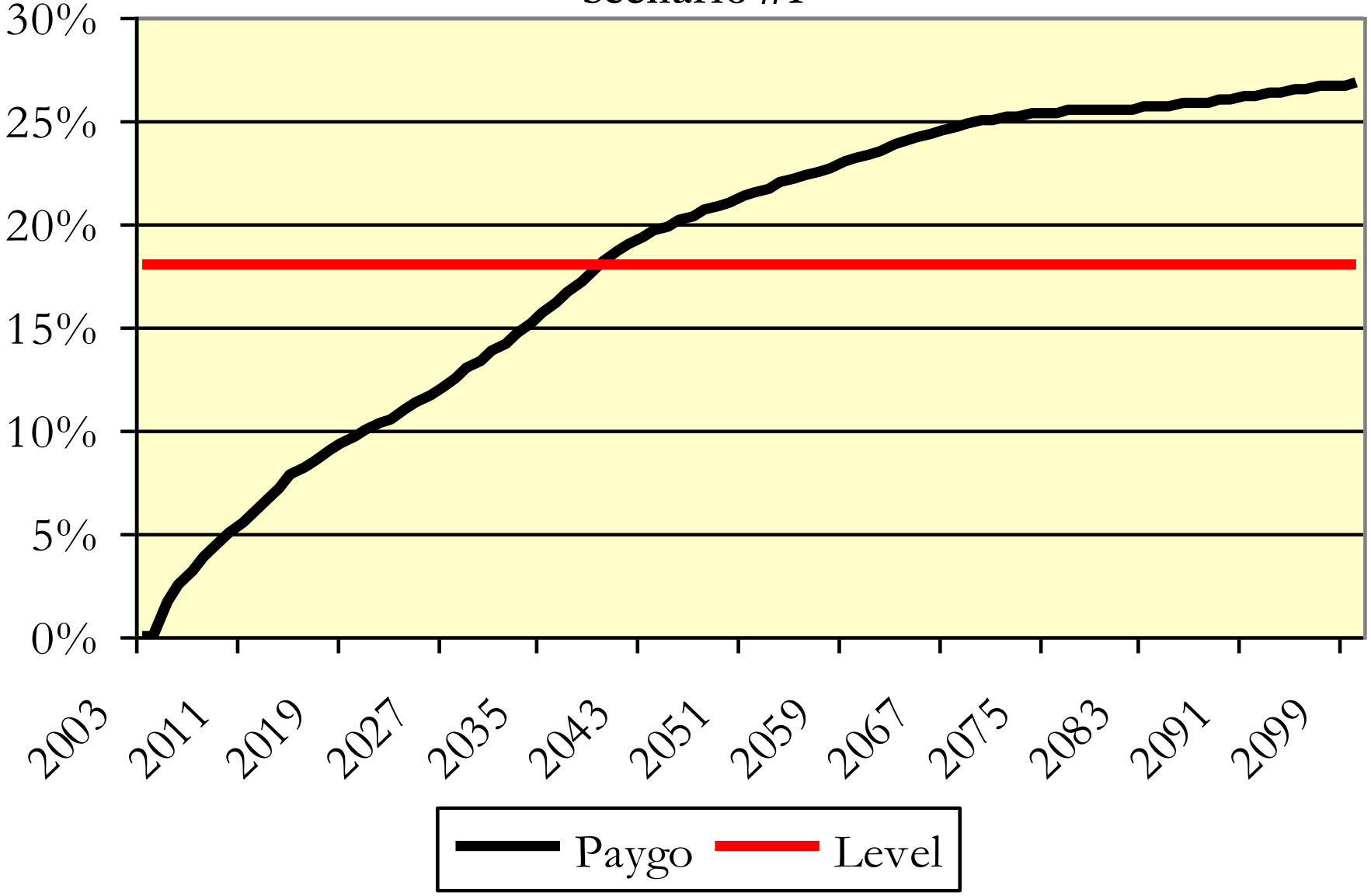
The Level Cost Method (LCM)

- Contribution rate is set as a level % of wages
- PV future contributions = PV future expenditures + PV desired asset reserve at the end of the projection period
  - Applied to a very long projection period
  - Recalculate every 3-5 years for a projection period of same length and adjust rate if necessary
  - Adjustments are small since deviations in experience and changes in assumptions are amortized over a very long period
- Advantages: simplicity, cost stability and modest asset accumulation

Cost as % of Payroll

RA = 55 and Full Wage Indexation

Scenario #1

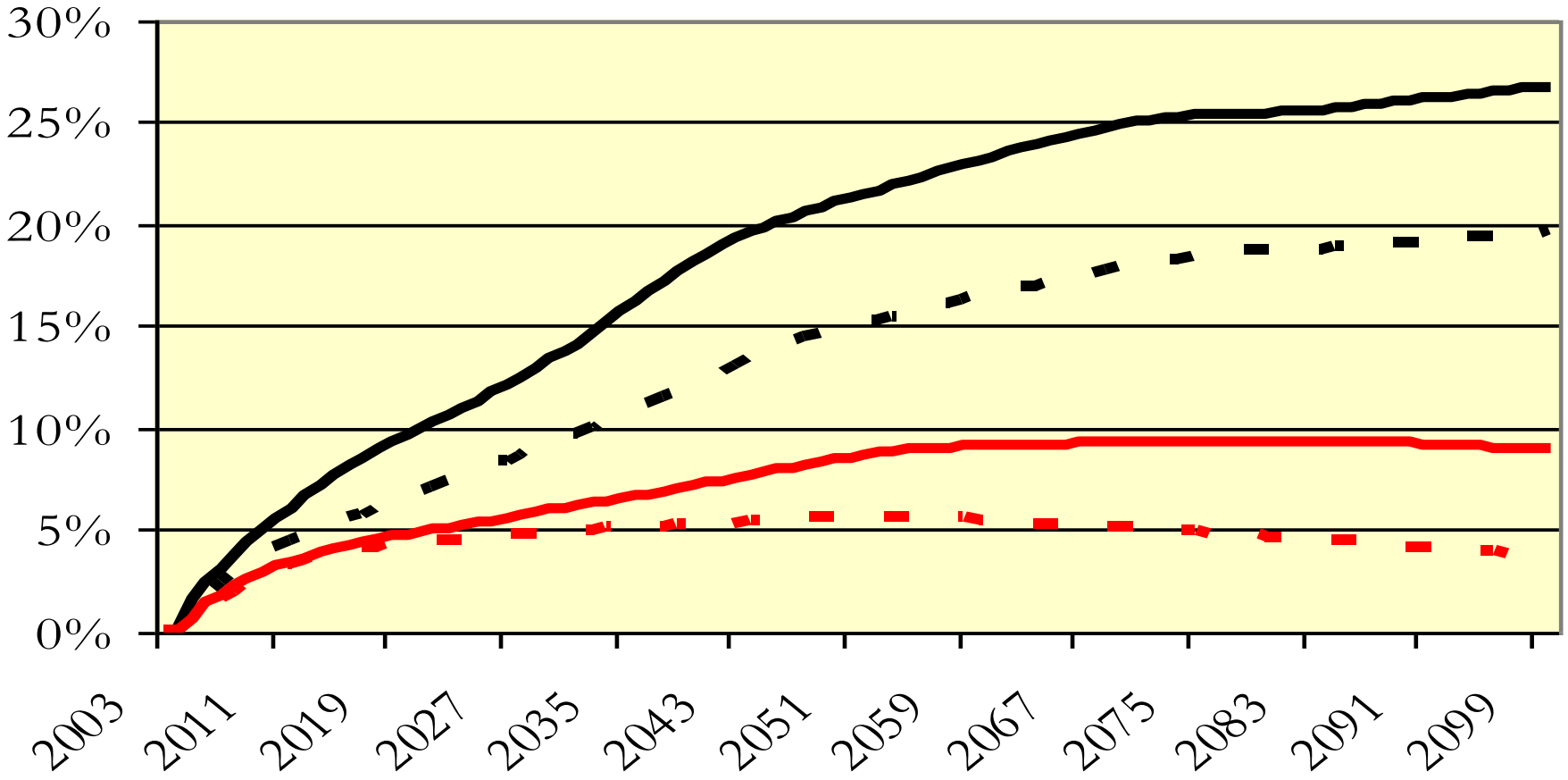


Cost Saving Measures

- Scenario #2 - Increase retirement age to 60
- Scenario #3 – Adjust RA gradually from 60 to offset the effects of aging and stabilize costs over time
  - 1/5 per year for the first 20 years
  - 1/8 per year thereafter
  - RA reaches 65 in 2034 and 70 in 2074
- Scenario #4 - Index the old age benefit payable at retirement to 50% of real wages

Paygo Cost as % of Payroll

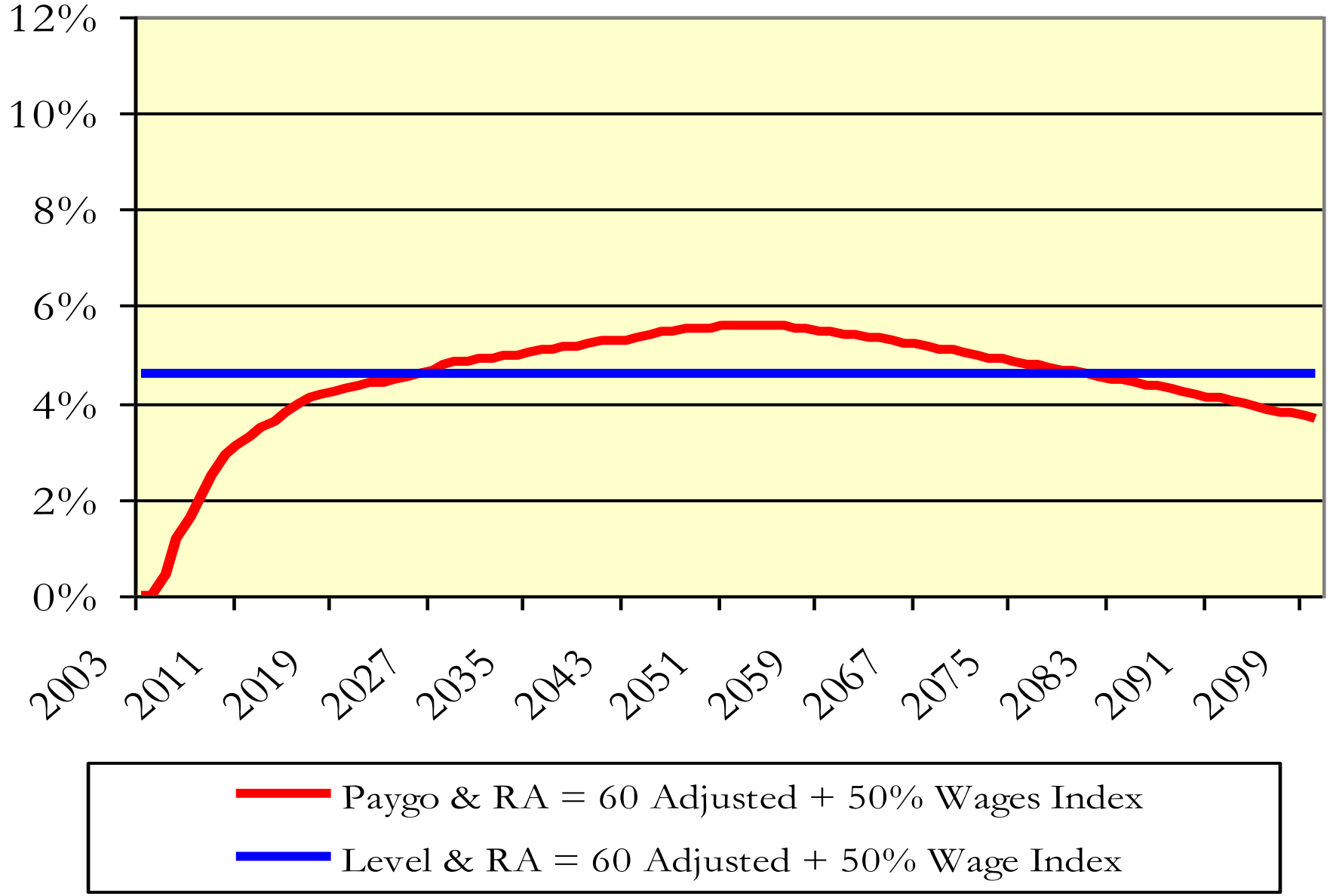
All Scenarios



- Paygo & RA = 55 + 100% Wages Index
- Paygo & RA = 60 + 100% Wages Index
- Paygo & RA = 60 Adjusted+ 100% Wages Index
- Paygo & RA = 60 Adjusted +50% Wages Index

Cost as % of Payroll

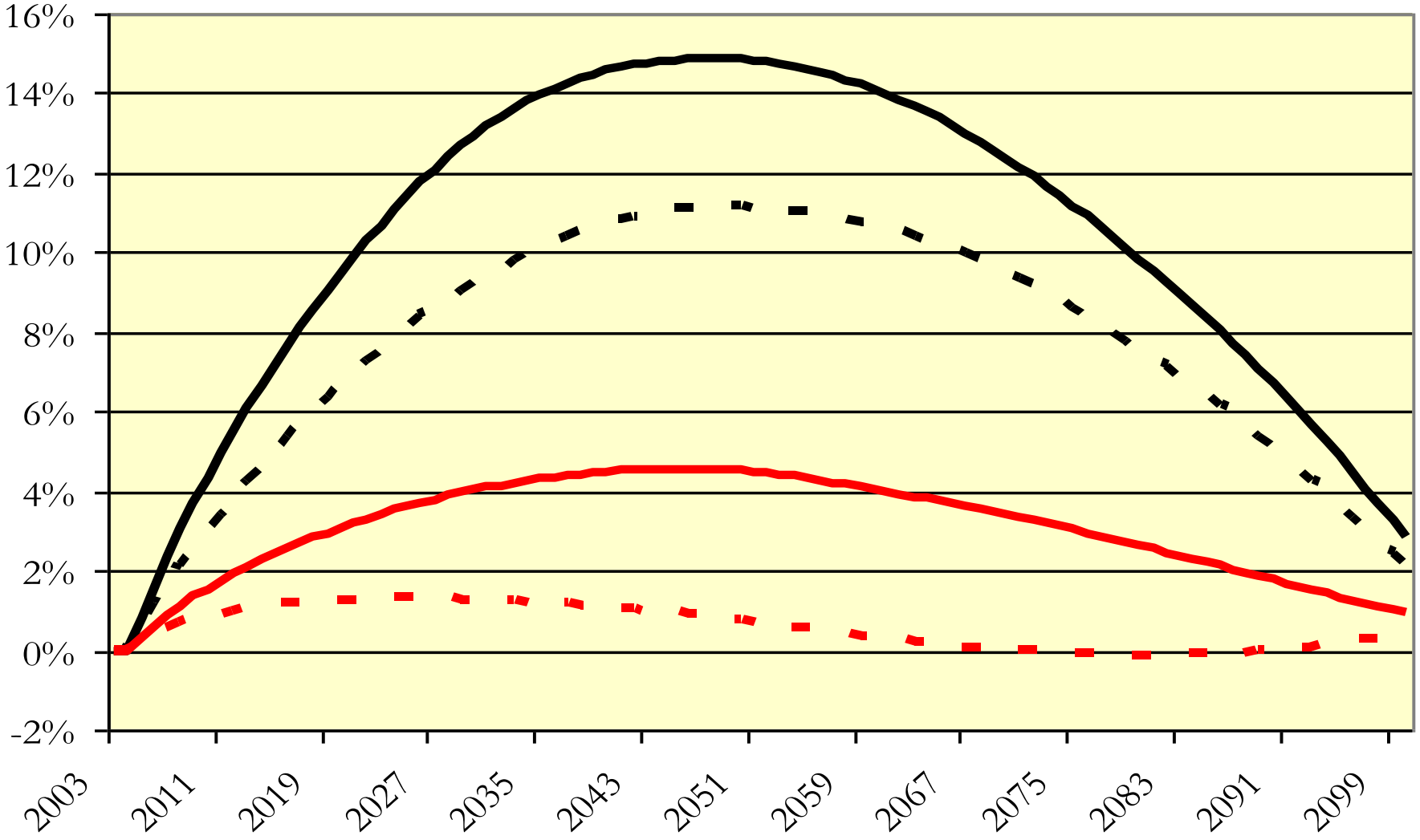
Scenario #4



Fund as % of GDP

Level Cost

All Scenarios

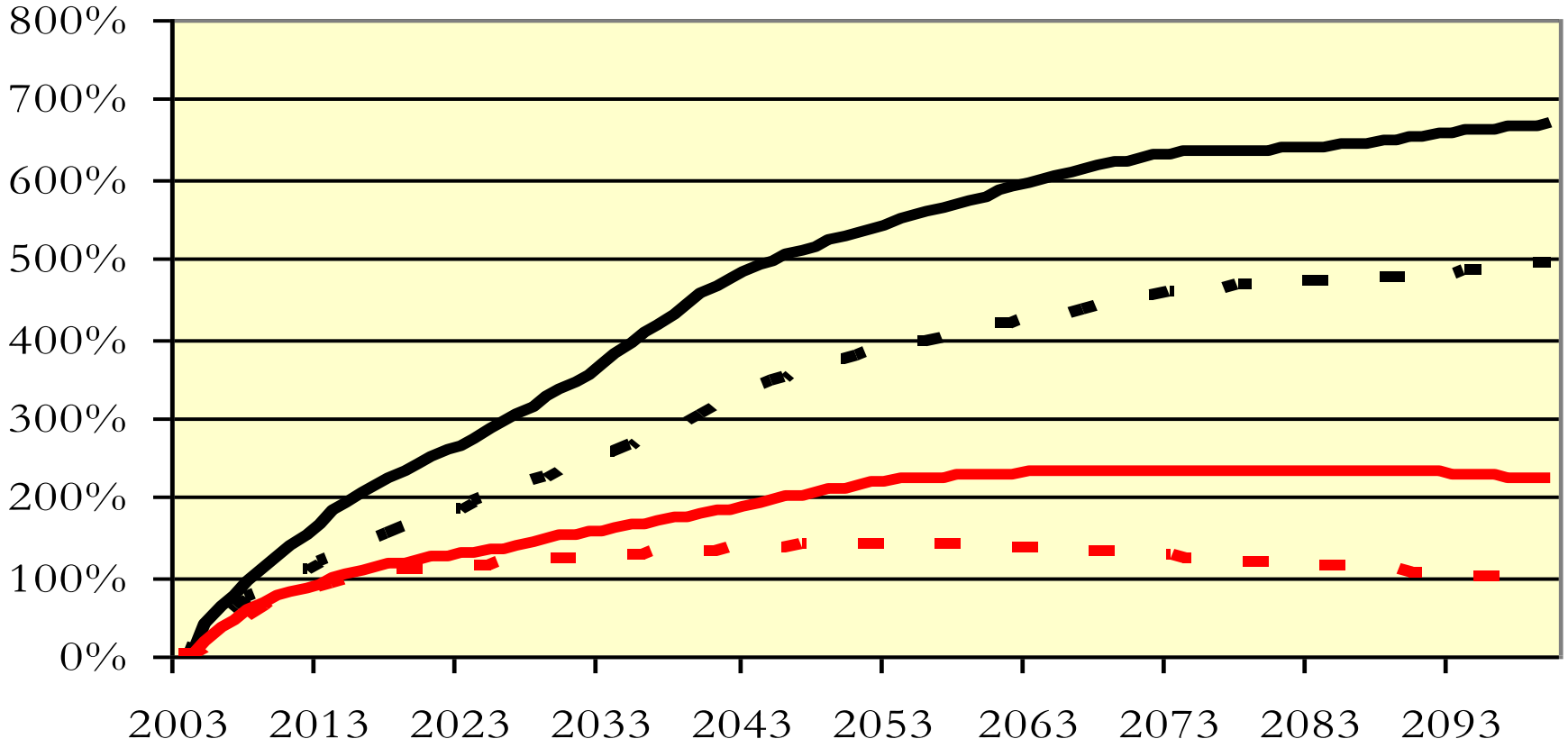


Full Funding Asset Reserves

Rule of Thumb Estimates

% of GDP

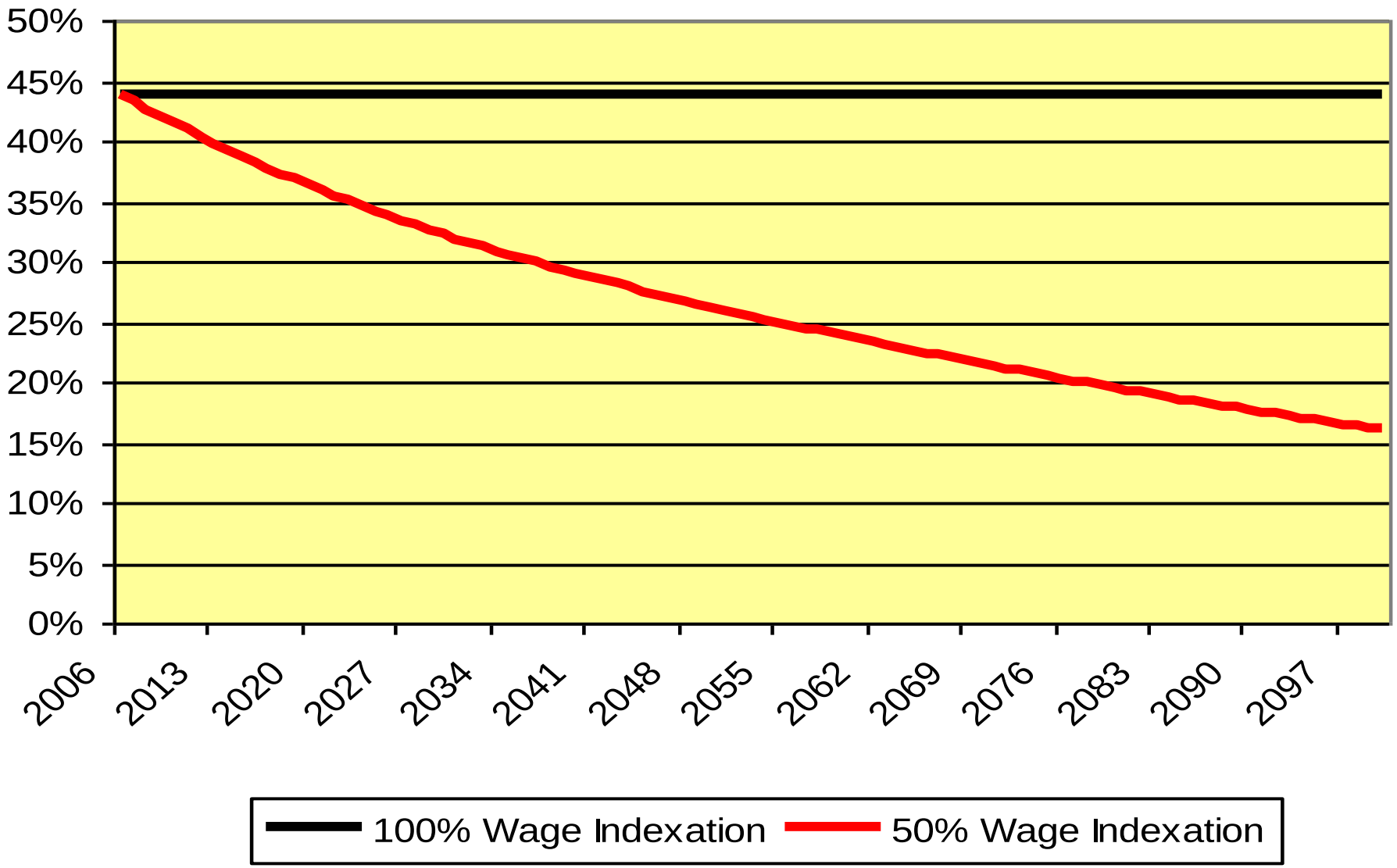
All Scenarios



Old Age Benefit

As % of Average Wages

New Retirees Only



Summary - Level Cost Estimates

Scenario	Management Performance	
	Improved	Not Improved
Retirement age = 55 & indexation = 100% wages	18.0%	25.6%
Retirement age = 60 & indexation = 100% wages	12.8%	18.2%
Retirement age = 60 adjusted & indexation = 100% wages	7.2%	9.9%
Retirement age = 60 adjusted & indexation = 50% wages	4.6%	6.1%

Summary of Impact of Cost Saving Measures

Measure	Impact
Increase retirement age from 55 to 60	-29%
Increase retirement age gradually from 60	-44%
Reduce indexation from 100% to 50% of wages	-36%
Other - Improvement in management performance	-24%

Conclusions

- To be affordable the system must be modest at the start
- Important not to create unrealistic expectations - for example as to the indexation and retirement age
- Because demographic pressures will most likely force reduction of benefits
- Thus necessary to complement the pension scheme with other sources of retirement income

The End

Thank you for your attention!