Demography, Capital Markets and Pension Risk Management

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IMF Seminar

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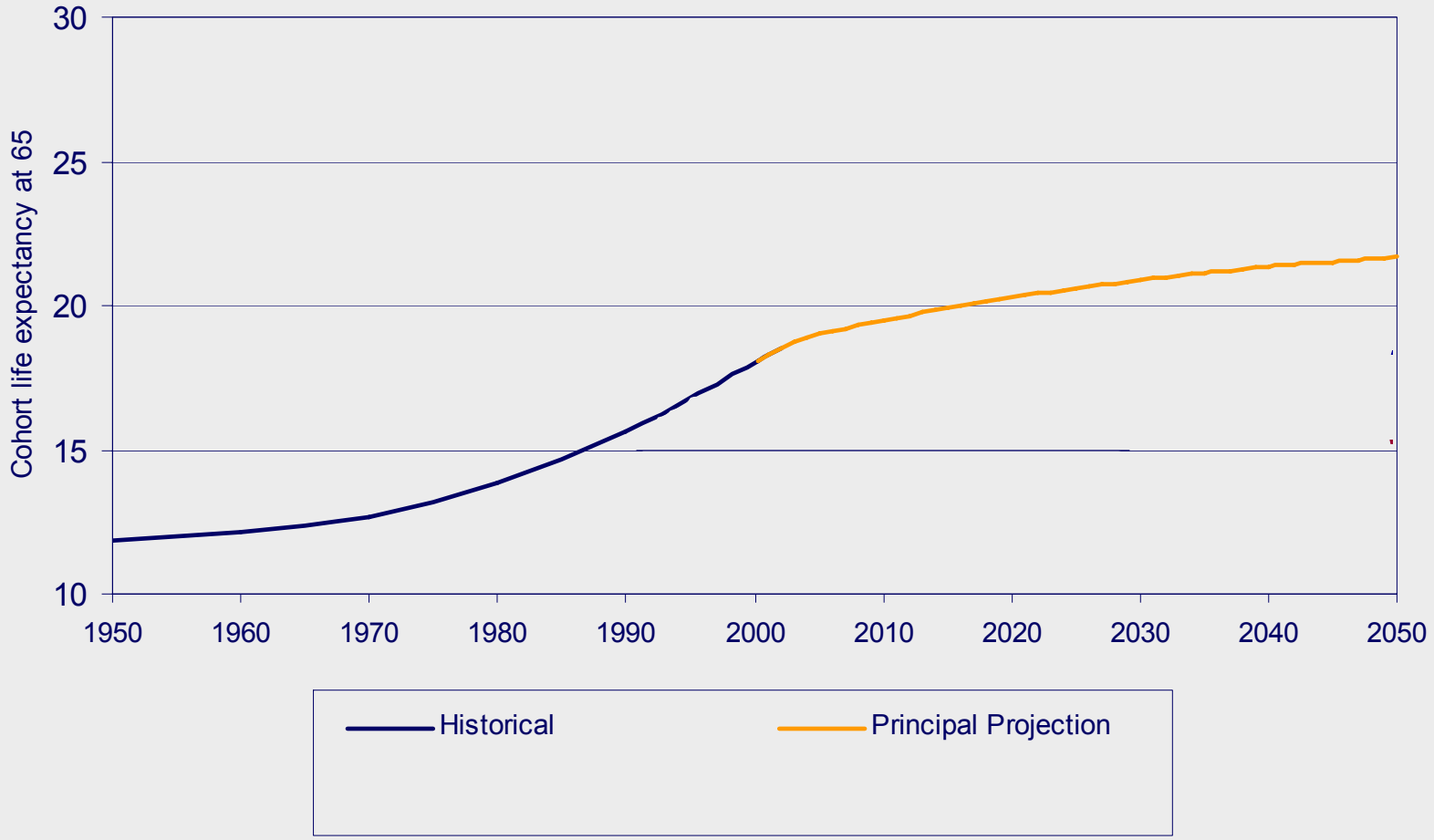
Demographic factors at work

- Increasing longevity
- Lower fertility
- Retirement of Baby Boom

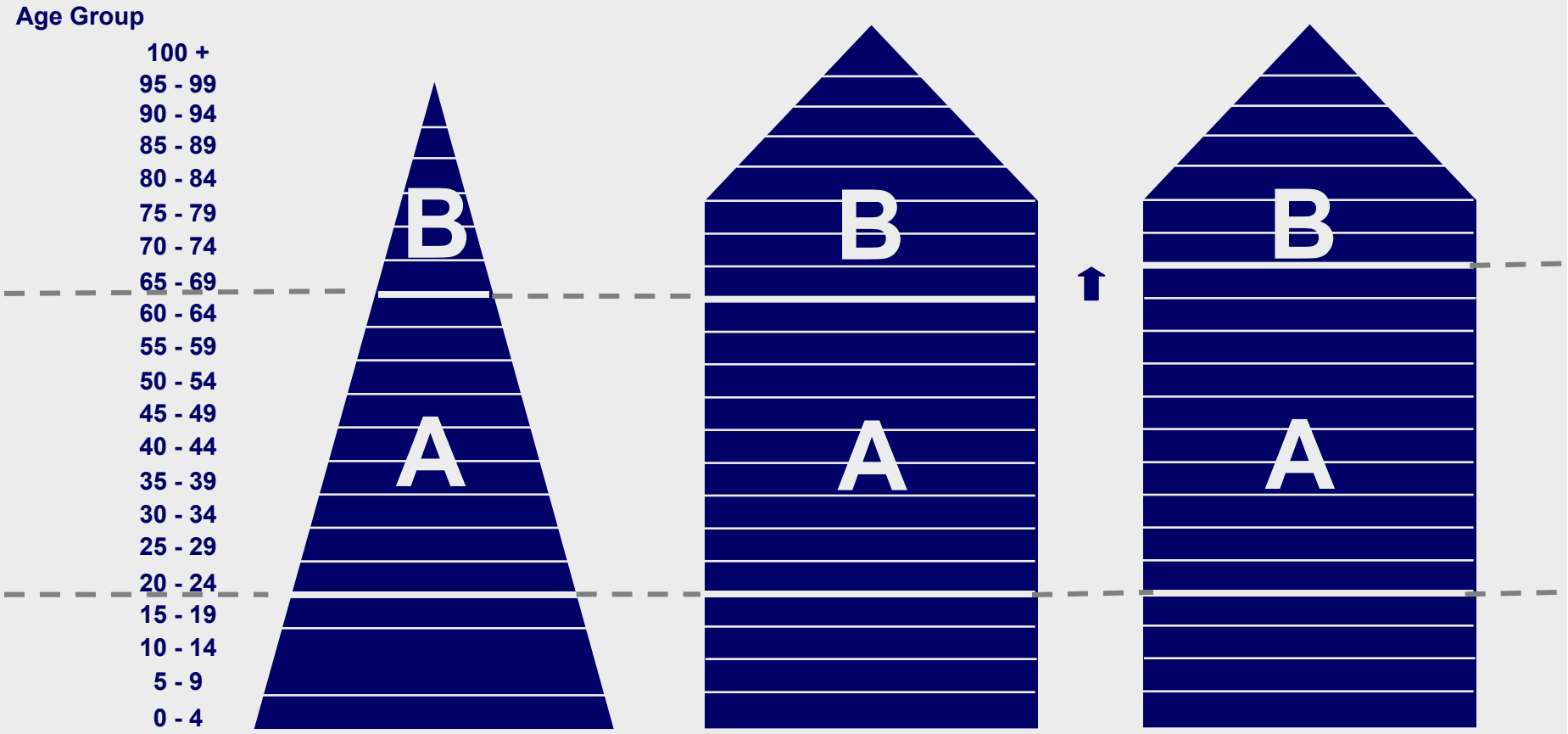
Estimates of cohort life expectancy: Male at 65
UK Government Actuary's principal projections



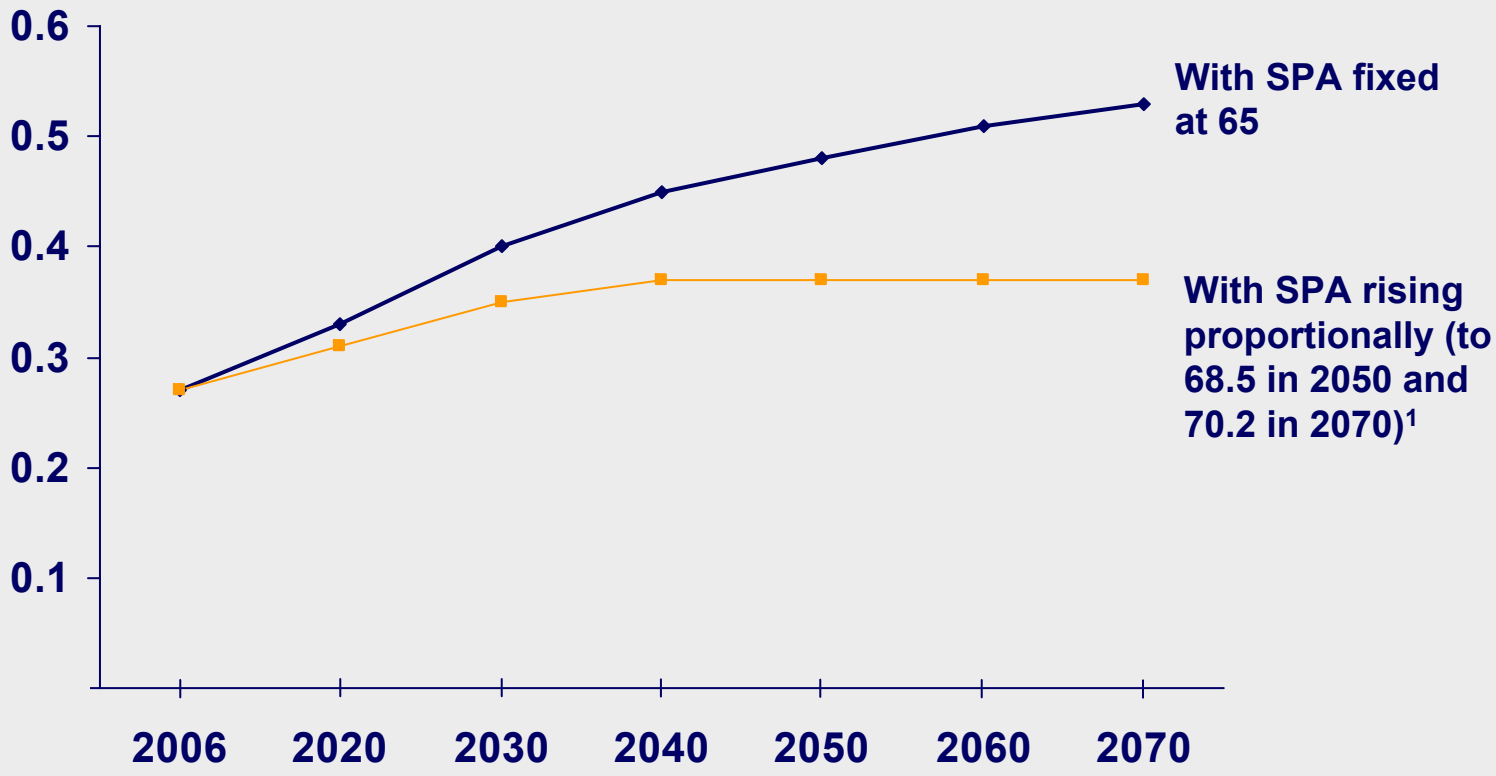
Increasing longevity – The non-problem

	Possible problem	Solution
	Increased % of life beyond post retirement ages	Increase retirement ages proportionally to keep % stable
PAYG	Increased ratio of pensioners to contributors	Unchanged affordability at unchanged contribution rate
Funded	Increased saving to fund longer retirement • Long-term effect ➢ K/L rises ➢ Return on capital falls • Transitional effect: asset prices rise	No/minimal charges in K/L ratio for unchanged real income in retirement

From pyramids to columns



People over SPA to those aged 20 – SPA*



** SPA: State Pension Age*

(1) This proportionate adjustment maintains the proportion of life over 20 years old which is spent in retirement at 27.5%

Lower fertility – The inherent challenge to pension systems

PAYG

Increased ratio of pensioners to contributors

→

Lower pensions relative to average earnings

Higher contribution rates

Increase Pension Age more than proportionally with life expectancy

Funded

Savers of generation 1 have to sell accumulated assets to "smaller"* generation 2

→

Transitional asset price fall effect

K/L rises: return on capital falls

** Smaller can mean either absolutely smaller than G1 (if fertility < 2.0) or "smaller than would be the case if fertility had not fallen"*

Possible de facto demographic effects on funded systems and capital markets

Lower Fertility

Transitional asset price fall effect (at sale)

K/L rises: return on capital falls

Inherent effect of shift to lower fertility

Increased Longevity

Transitional asset price rise effect

Longer-term effect; K/L rises, return on capital falls

Not inherent but could occur if future pensioners do not adjust retirement ages but instead increase savings rate

Demographic impacts on returns to capital

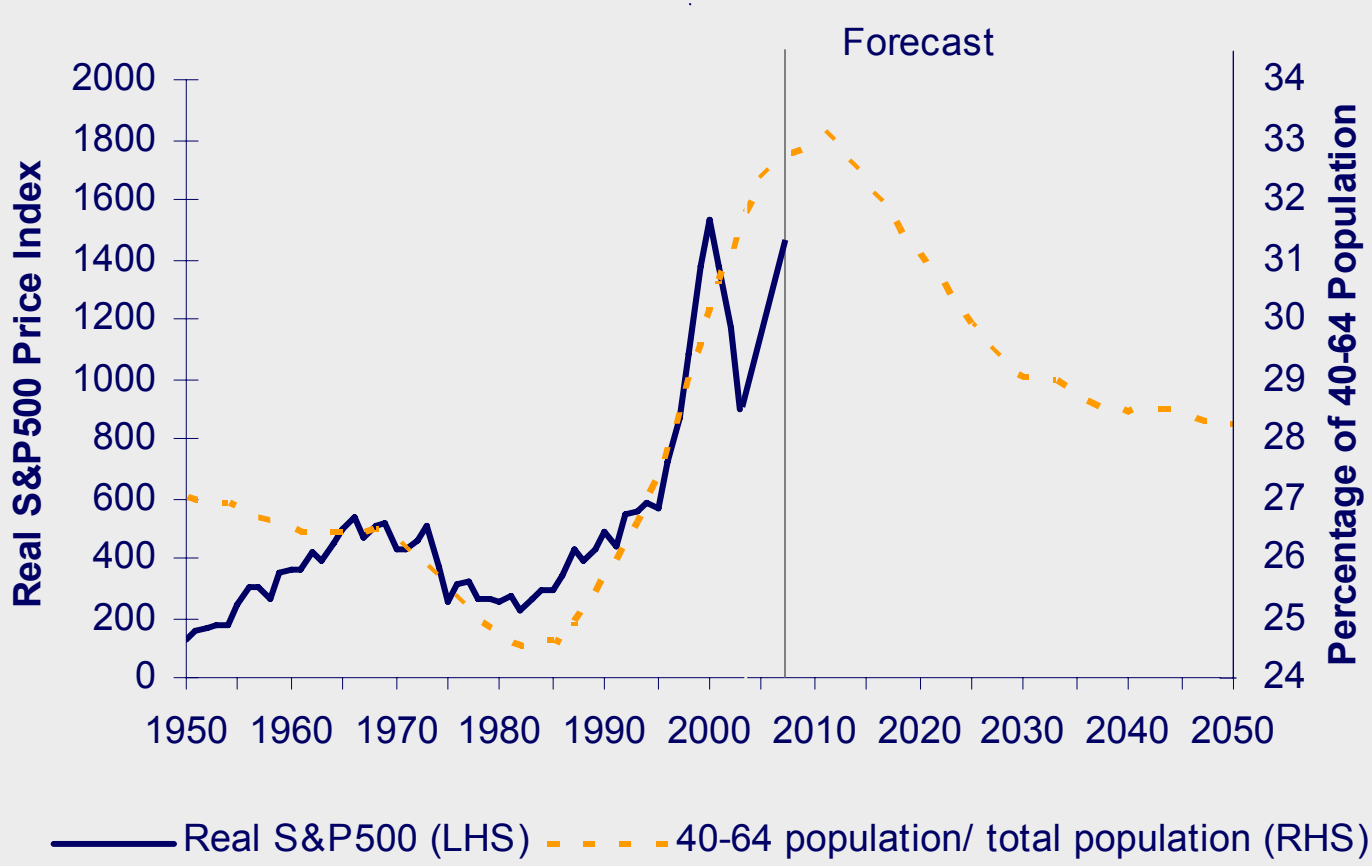
Model Results

- **Garry Young:**

Baby-boom generation	-0.1%
Increased longevity	-0.1%
Falling fertility	-0.3%

- **David Miles:** Given future actual trends in UK demographics, returns fall:
  - 4.56% (1990) to 4.22% (2030)
  - 4.56% (1990) to 3.97% (2060) if PAYG phased out

Real S&P500 price index and % of 40-64 year olds among total U.S population 1950-2003



Source:: Poterba (2004), with additional data to 2006

Theoretical & empirical approaches to measuring demographic effects

"Given the limited amount of time series on returns and demographic variation, and the difficulty of controlling for all of the other factors that may affect asset values and asset returns, the theoretical models should be accorded substantial weight in evaluating the potential impact of demographic shifts"

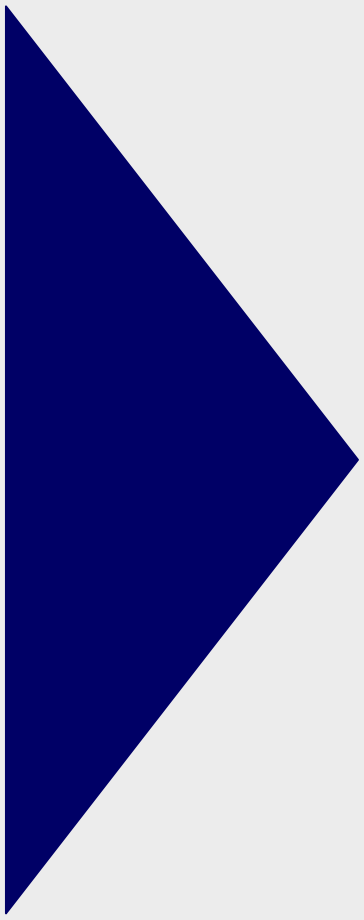
Poterba: *"The Impact of Population Ageing on Financial Markets"*

Global glut of savings hypothesis

In China and other East Asian countries

- Fewer children enable higher savings rate
- Awareness of greater longevity, fewer children and lack of social welfare net, require a high savings rate

Developed countries save more to cope with their demographic/pension challenges



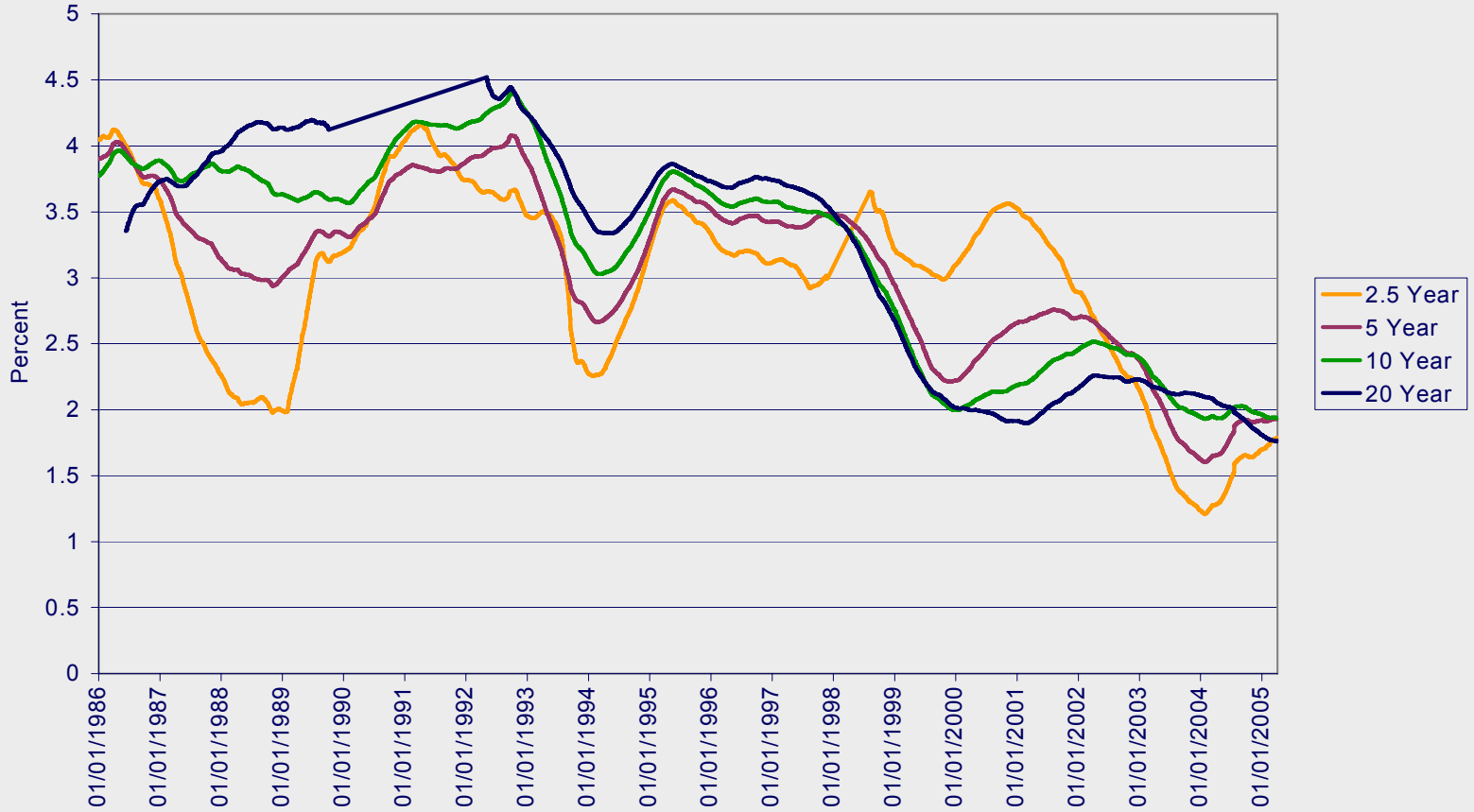
Global glut of savings relative to investment

Long-term, not just cyclical, fall in real interest rates

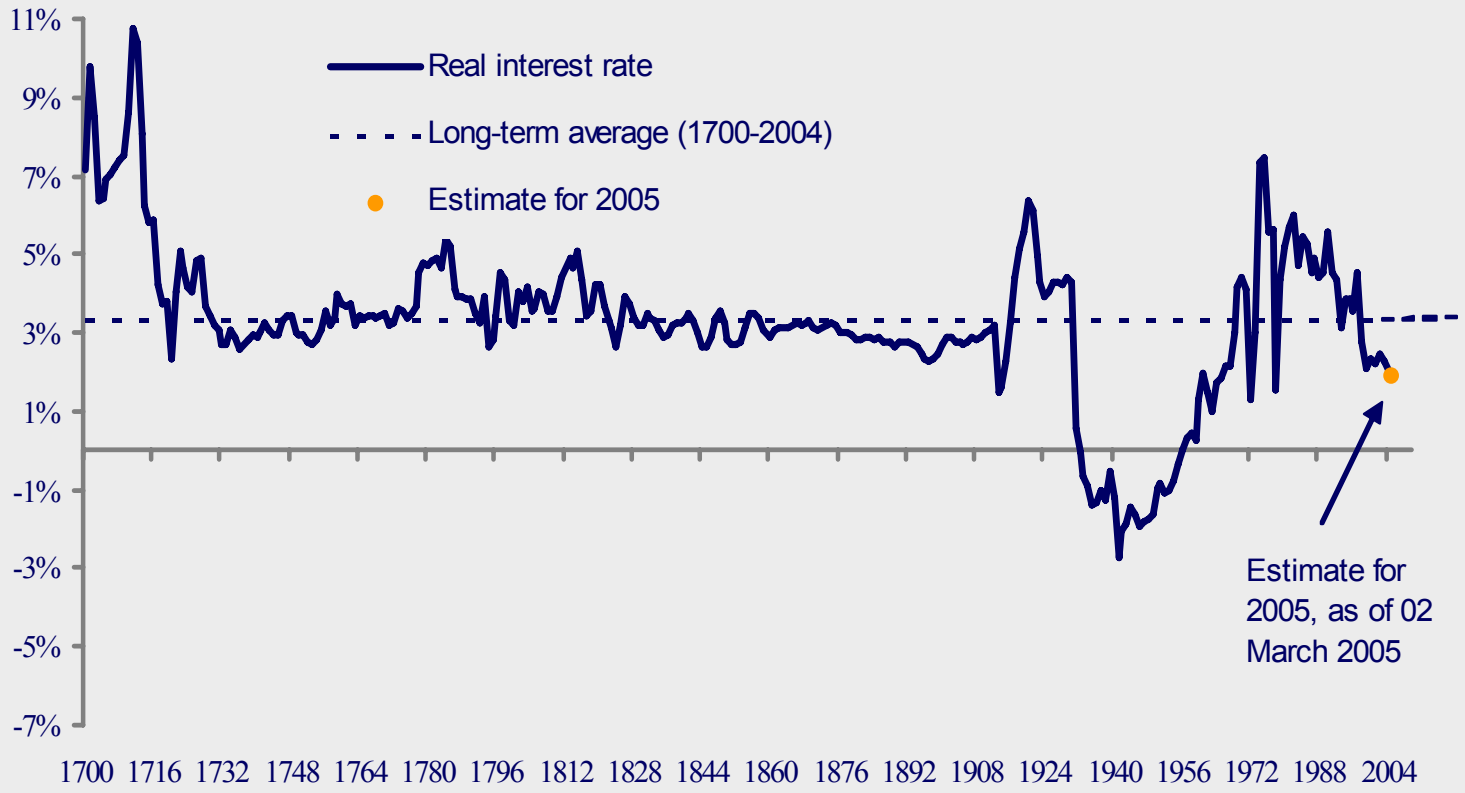
Transitional positive asset price effects

Real yields to maturity on UK index-linked gilts

1986 – 2004

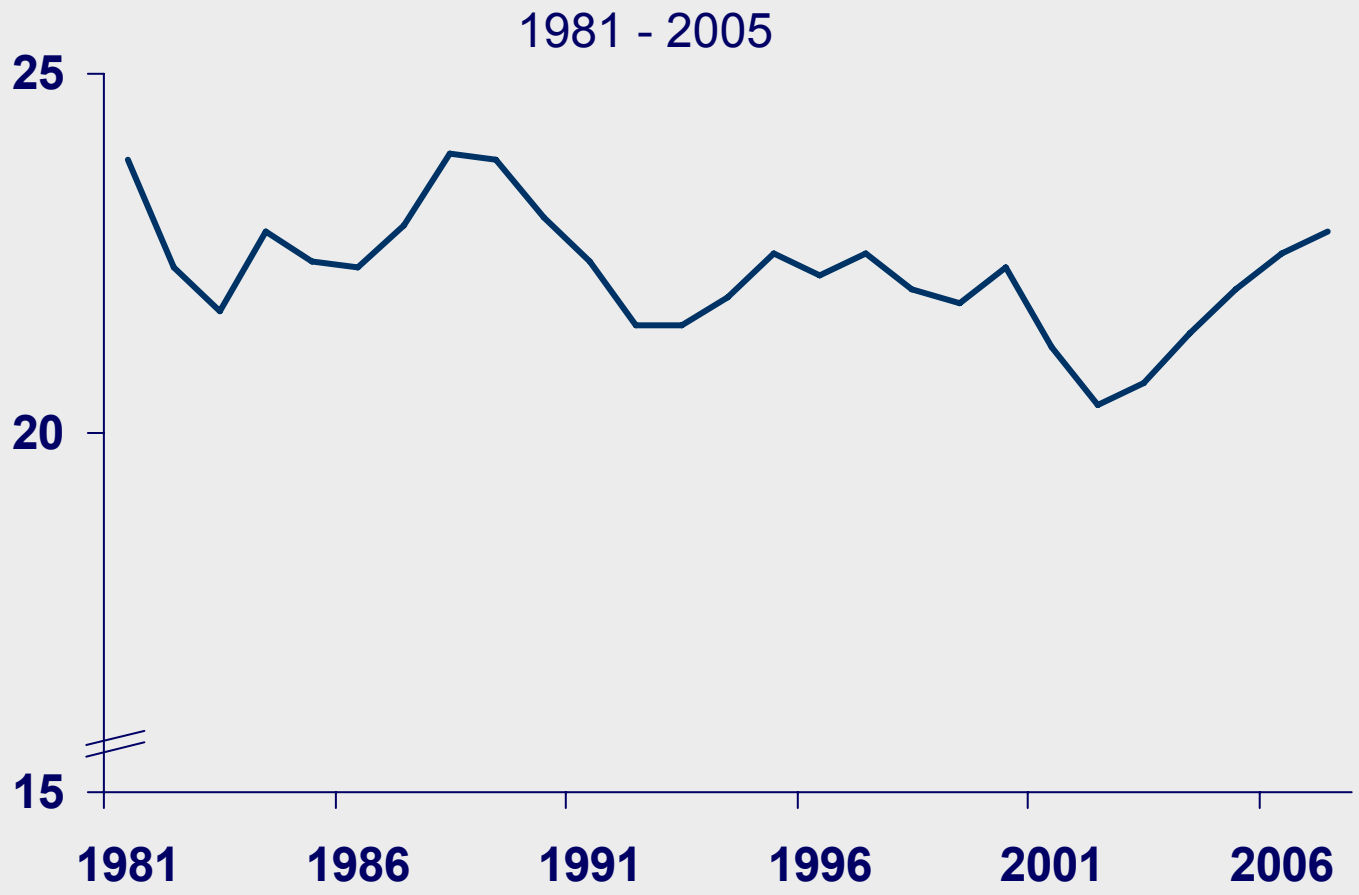


UK Long-term real interest rates



Source: Morgan Stanley Research

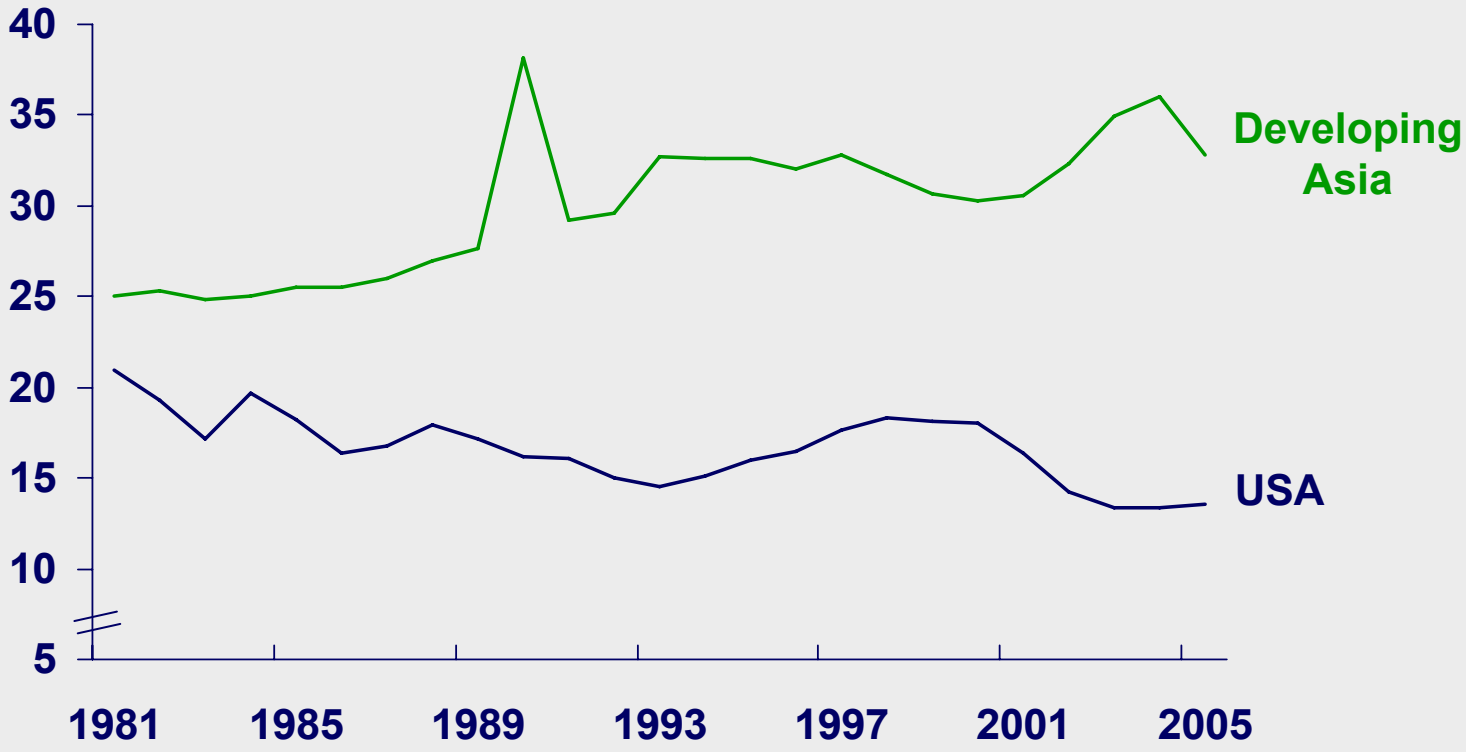
Whole world gross savings rate



Source: IMF World Economic Outlook database

Gross savings rates: developing Asia and the US
% of GDP

1981 - 2005



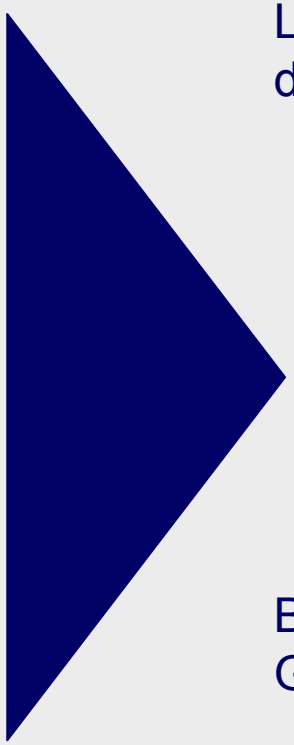
Source: IMF World Economic Outlook database

Alternative hypothesis on global labour / capital balance

Very long-term future increase in K/L driven by demography

… but short/medium term massive increase in the economically relevant labour force

… not matched by increase in global savings/capital stock



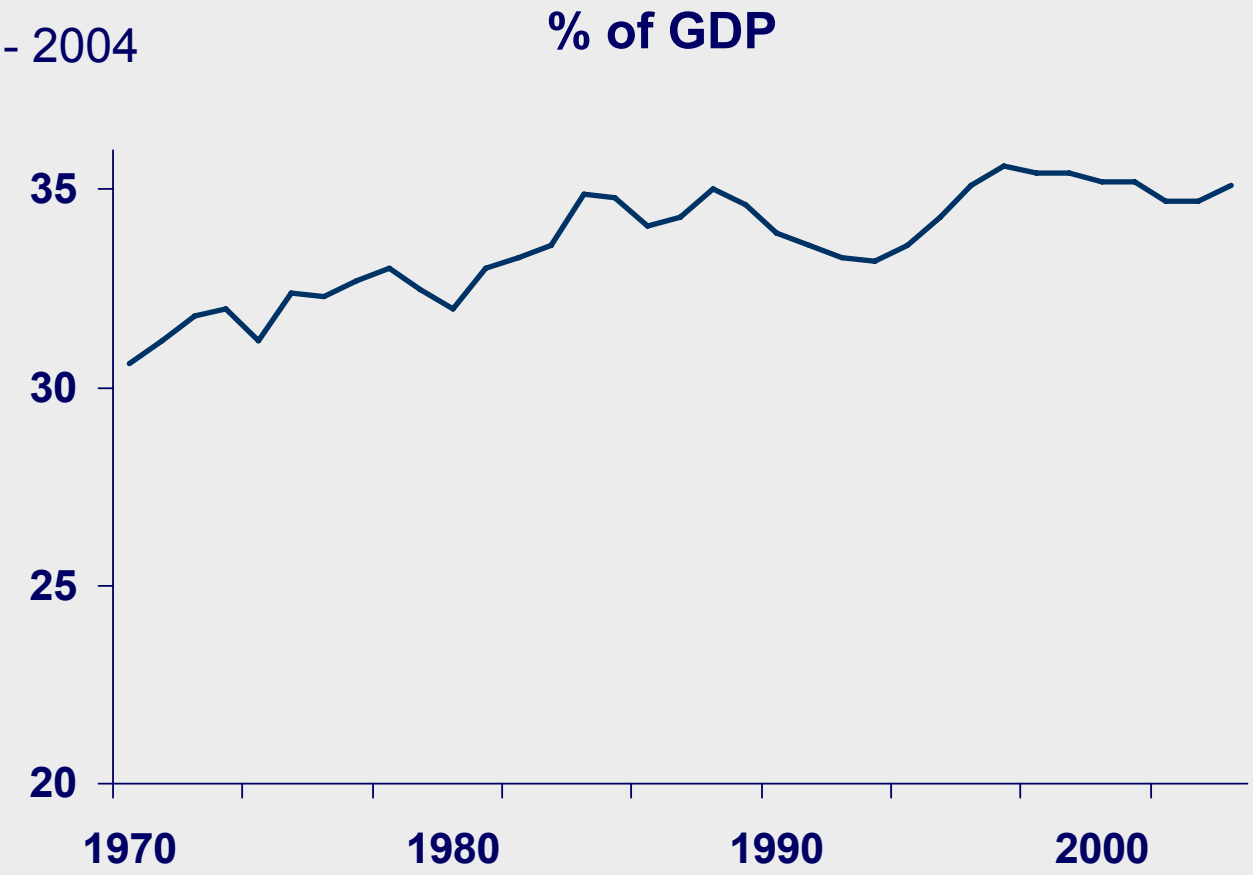
Low real wage growth in developed countries, driven by:

- China and India in traded goods/services
- Immigration in non-traded services

Buoyant profits and profit share of GDP: high equity returns

Profit share of GDP – U.S.

1970 - 2004



Note: Gross Operating Surplus and Gross Mixed Income as % of GDP (Income approach)

Source: OECD: www.oecd.org/statistics/national-accounts

So why are real interest rates historically low?

- **Not** Rise in the global supply of capital relative to labour

- **But** Particular asset allocation preference of major national savers

Demographic challenges to funded pension systems

- Increasing longevity ⟵ Not inherent problem but possible de facto
- Lower fertility ⟵ Overwhelmed in short-term by globalisation effect
- Uncertainty of longevity forecasts

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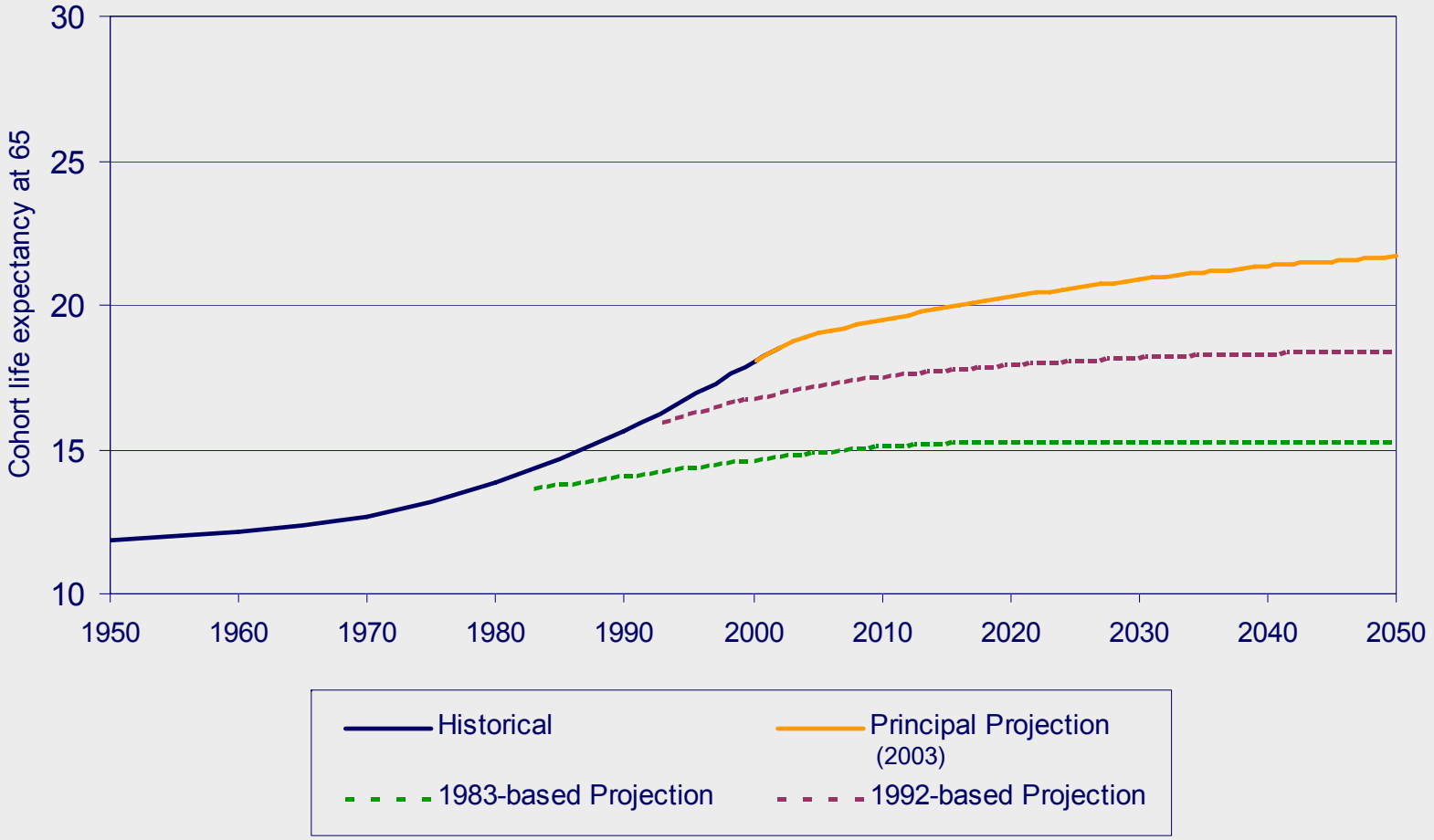
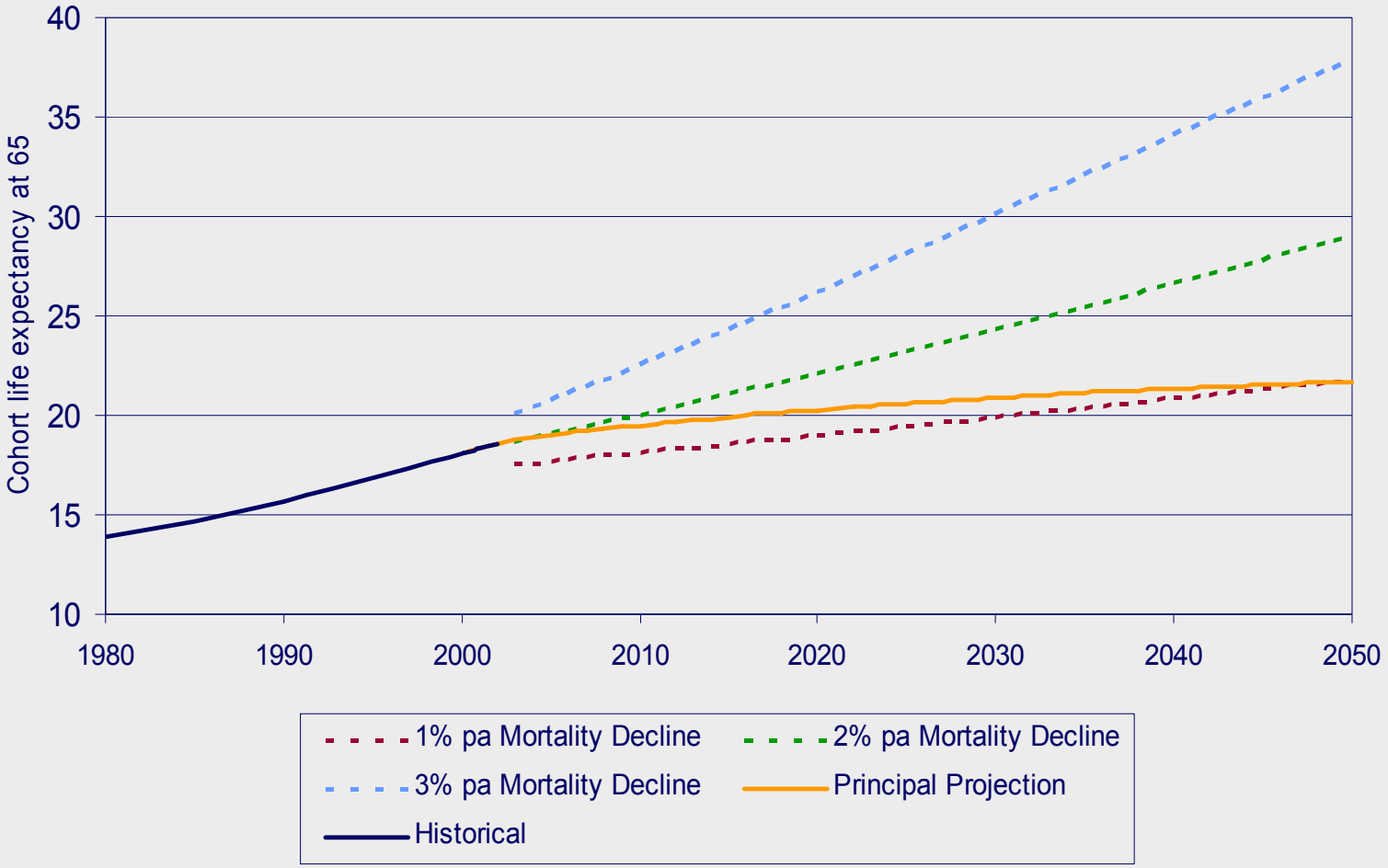
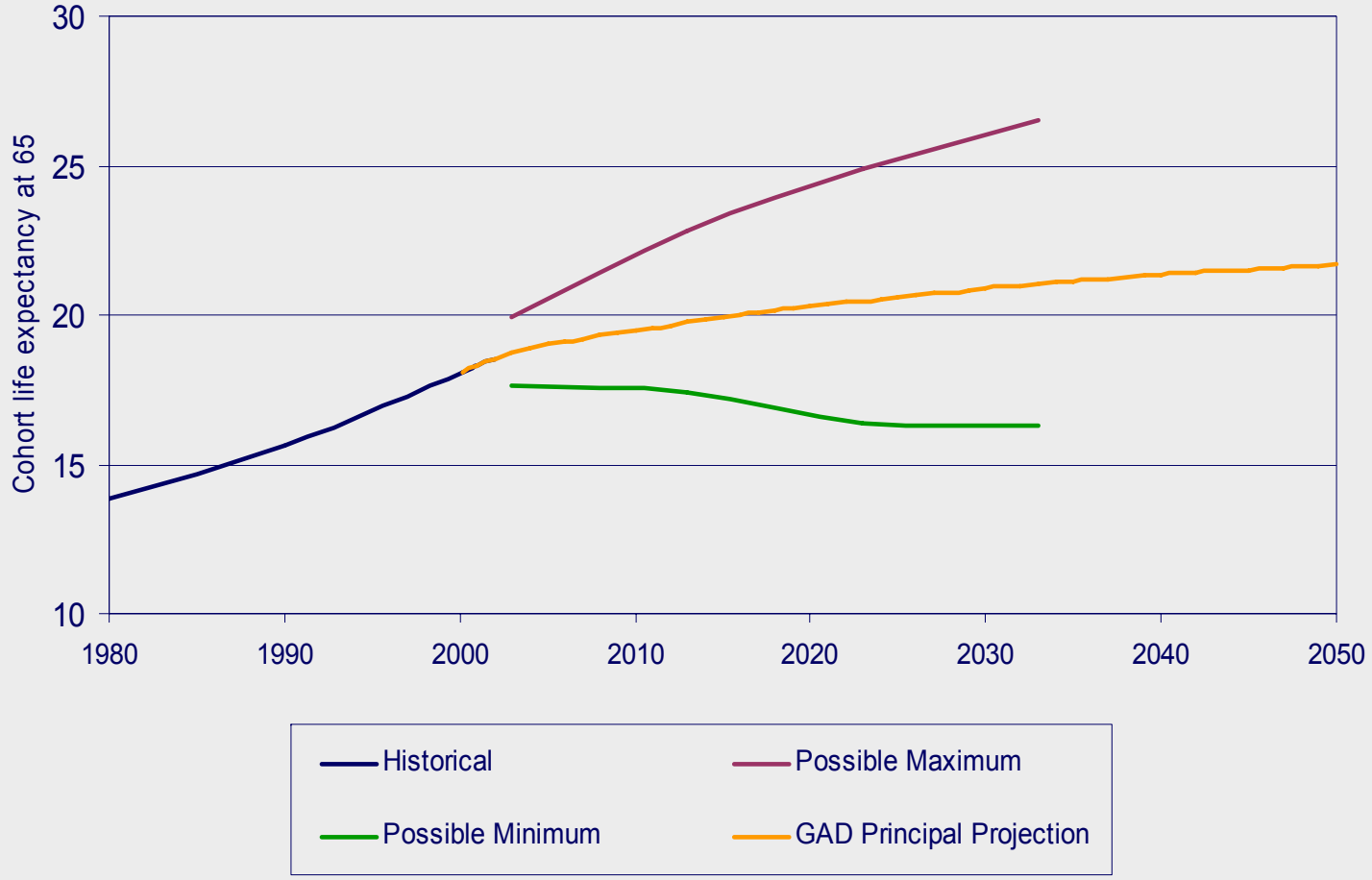


Mortality rate declines & UK G.A. principal 2003 projection



Male cohort life expectancy at 65

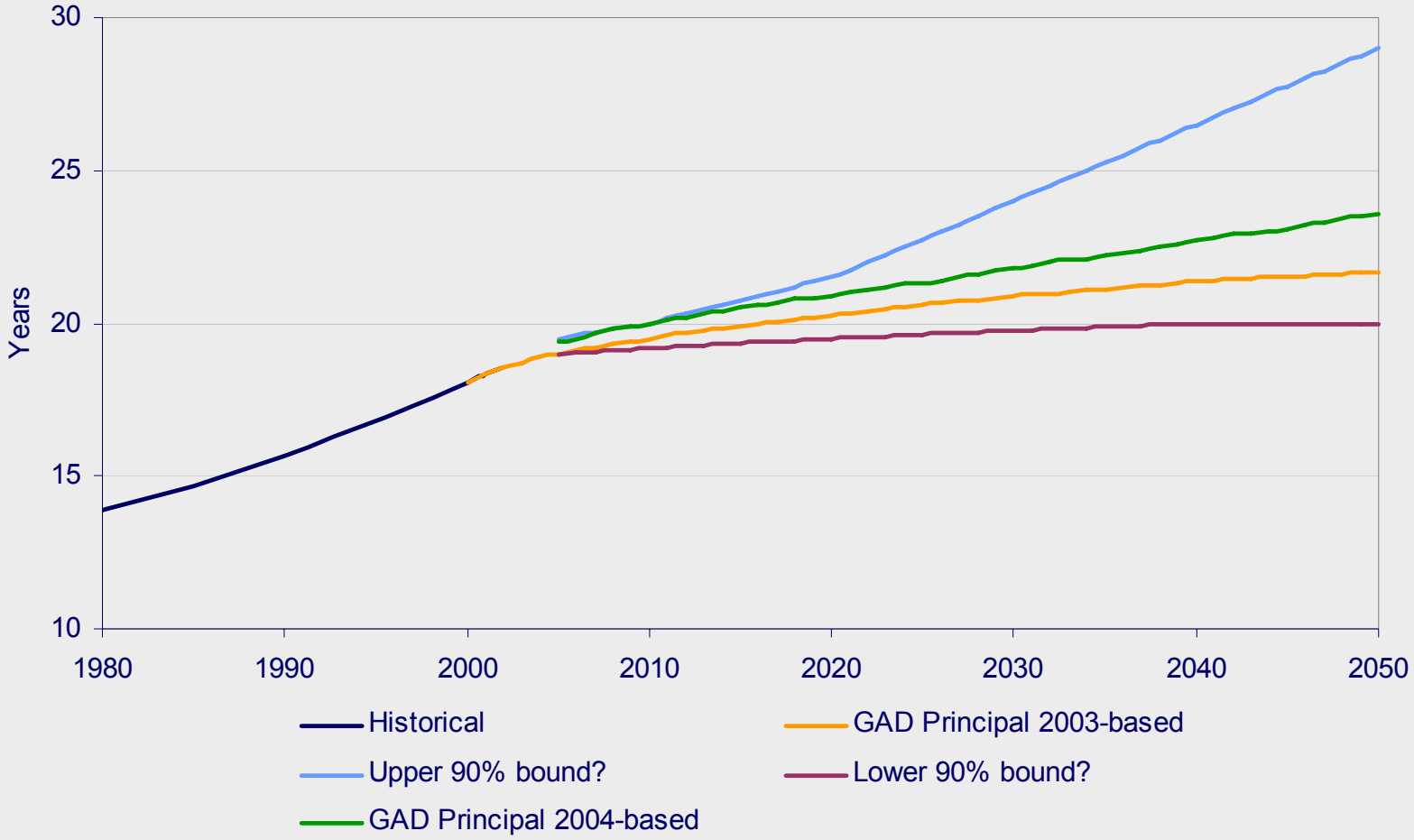
Uncertainty in 2003 forecasts if already apparent 1983 errors/changes are the maximum possible and if error potential is symmetrical



Interpreting the range of uncertainty

- Inherent uncertainty not quantifiable risk
- Total error potential unclear from past errors
- Are the uncertainties symmetric?
- Are future potential error rates likely to be as high as 2003 vs 1983 comparison?

Male cohort life expectancy at 65: range of possible uncertainty around 2004 - based principal projection



Source: *Government Actuaries Department (GAD) and Pensions Commission estimates, UK*

Longevity risk in UK pension provision

£bn of total liabilities – broad estimates at April 2005

Insurance Companies Annuities	80
Pension Funds	800
Unfunded Public Employee Pensions	450*
State Pensions	
• Basic	870
• Earnings-related	260
Total	**2460**

Legal liabilities or close to legal liabilities

Political promises

Can theoretically be changed

* Latest figures (2006) suggest unfunded public employee liabilities now about £550bn

Longevity risk in UK pension provision

£bn of total liabilities – broad estimates at April 2005

	Pre-retirement	Post-retirement
Insurance Companies	10?	70?
Pension Funds	400?	400?
Unfunded Public Employee Pensions	260	190
State Pensions		
• Basic	490	380
• Earnings-related	170	90
Total	**1330**	**1130**

Three factors driving increased overt annuitisation

- Defined Benefit ⟶ Defined Contribution shift
  - ➢ Increased awareness of risks
- Defined Benefit legacy risk management
  - ➢ Bulk buyouts
  - ➢ Latent demand for longevity bonds
- Declining generosity of state PAYG ⟶ demand for post-retirement annuities if private savings rise.

Possible long-term annuity or longevity bonds stock?

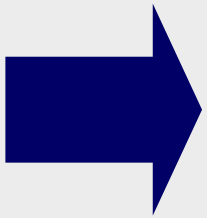
Present Stock £bn

	Overt Annuities (Life Companies)	Annuity Promises (DB Pension Fund)	Total	
Post Retirement	70	400?	470	Required stock to replicate annuity promises given by final salary schemes
Pre Retirement	10	400?	410	Required to manage legacy DB promises

Who should bear cohort longevity risk?

Post-retirement:

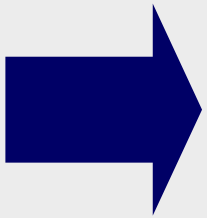
e.g. the risk that the cohort of 65 year olds living in 2005 will live for 20 years not current estimate of 19 years



- Social interest in a fairly priced annuity market
- Longevity uncertainties moderate

Long-Term pre-retirement:

i.e. the risk that the cohort of 35 years old living in 2005 will live for 25 years after reaching 65 in 2035 rather than the current estimate of 21.2 years



- Natural offset exists in human capital / later retirement
- Longevity uncertainties huge.

The search for yield uplift

- Hedge funds: alpha without beta
- Complex yield enhancing strategies: credit derivatives
- Infrastructure finance

Conclusions

Macro-Effects

Long-term potential demographic effects swamped by medium-term globalisation and asset allocation effects driving

- Falling K/L ratio, high capital returns
- Low real interest rates

Pension Fund Management Effects

Decreasing willingness of corporates / governments to absorb longevity risk

- Increased demand for liability matching assets
- Increased demand for yield enhancement at low (?) risk