

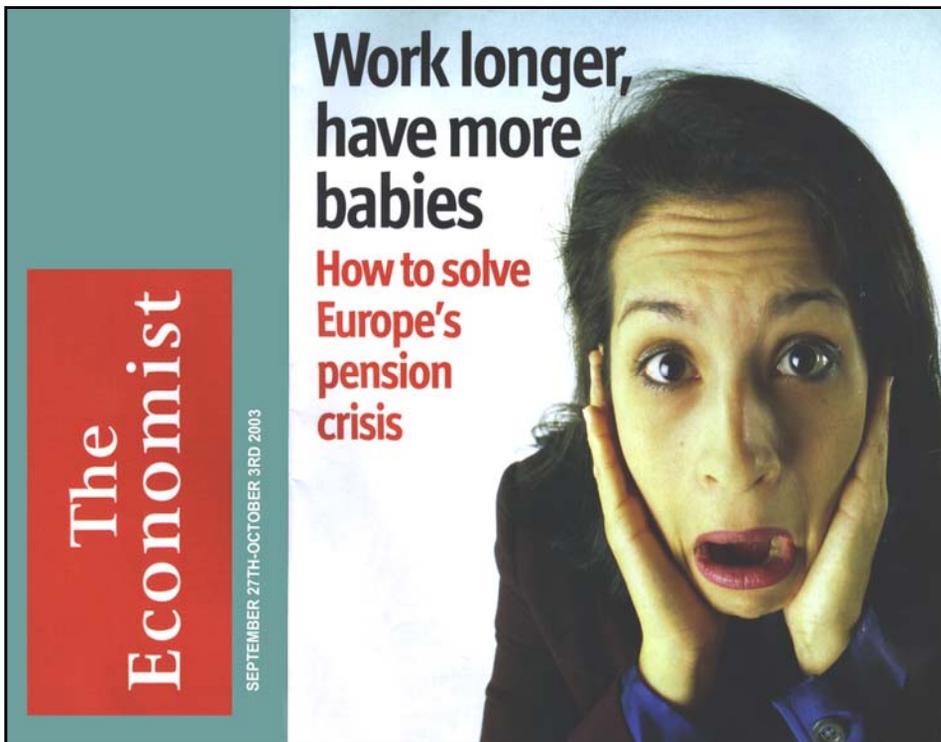
Demographics, Economics and Social Choice: Stepping back from Pension System Details

ADAIR TURNER

1st March 2005

CSIS

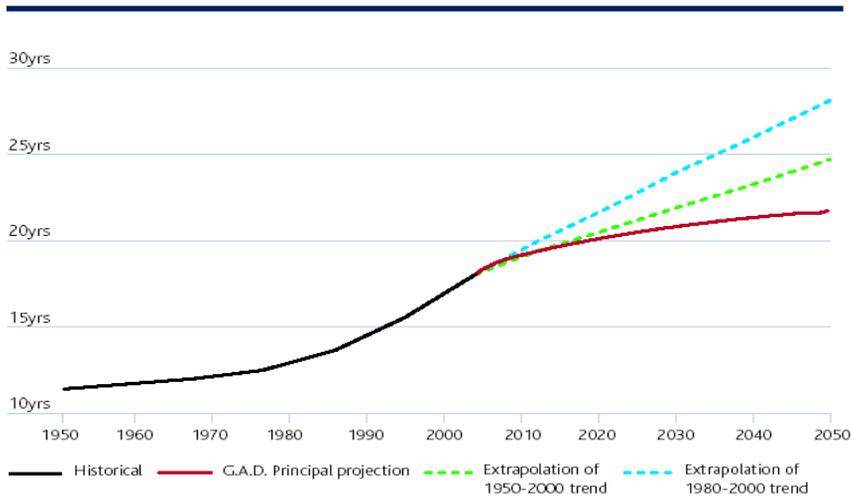
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- **Demography and the Challenge**
 - Different starting points and what are we trying to achieve?
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Three Dimensions of Demographic Change

- Increasing Longevity
- Declining Fertility
- Baby Boom Cohort

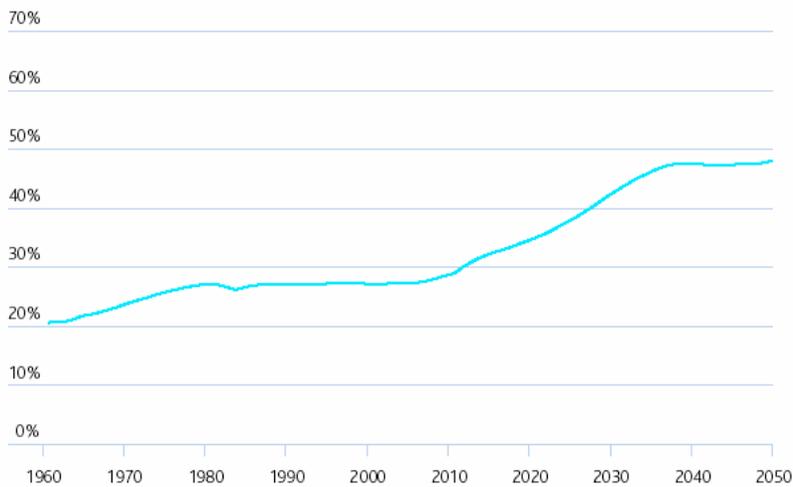
Cohort life expectancy for men at 65: UK



Source: Pensions Commission analysis 1950-1970 based on GAD historical data, England and Wales
GAD historical data 1980-2002, UK
GAD 2002-based principal population projection, UK, from 2003 onwards

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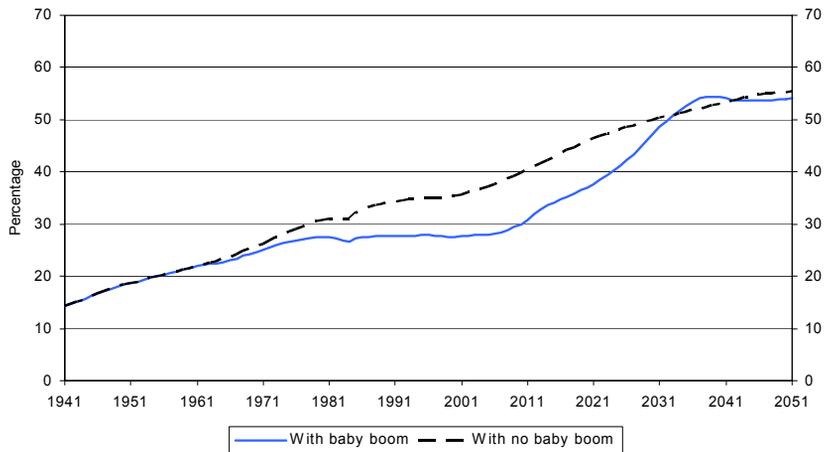
Old-age dependency ratio - All 65+:20-64



Source: GAD 2002-based principal population projection, UK
ONS Population estimates unit, UK

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Old age dependency ratio: Base case projection and the impact of the baby boom



Source: Pensions Commission analysis based on a synthetic model of the England and Wales population.

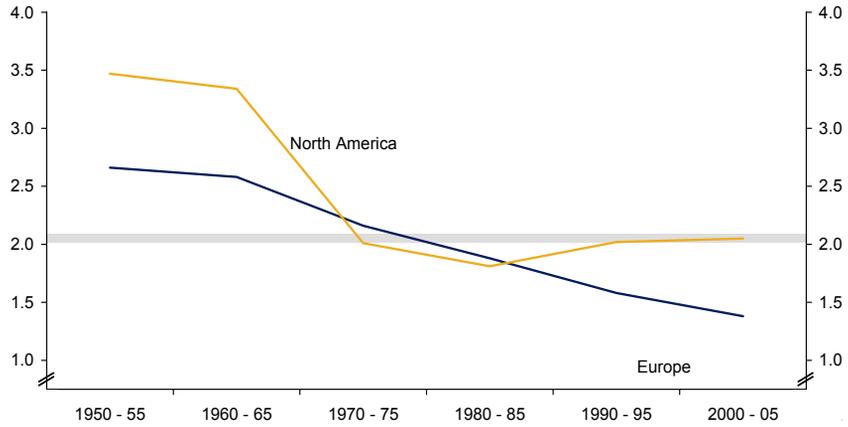
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Four possible options

- Pensioners are poorer relative to the rest of society
- Taxes rise to pay for state pensions
- Pensions savings increase - in present and future generations
- Average retirement ages rise

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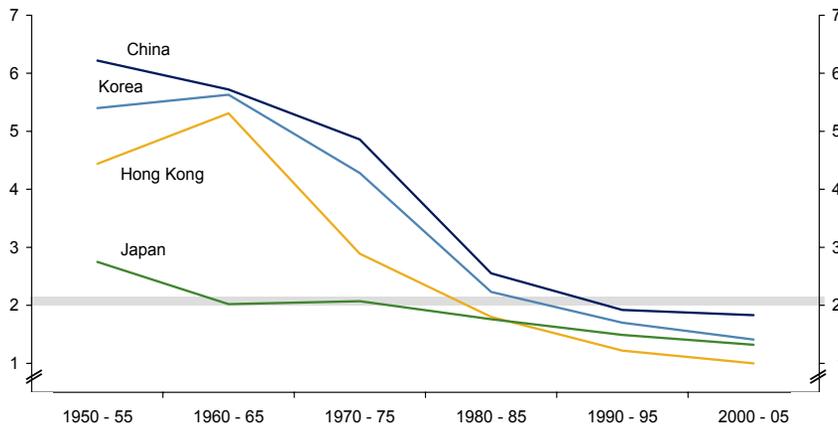
Total Fertility Rates - Europe and North America 1950-2000



Source: United Nations

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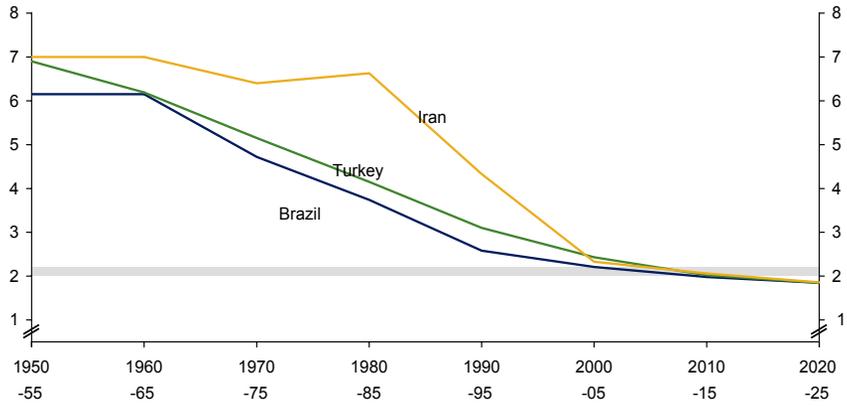
Total Fertility Rates - Asian Countries 1950-2000



Source: United Nations

9

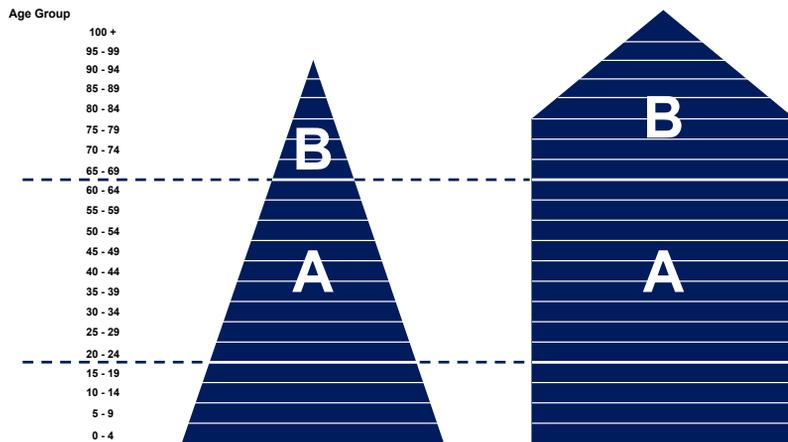
Total Fertility Rates - Iran, Turkey, Brazil, 1950-2020



Source: United Nations

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From Pyramids to Columns



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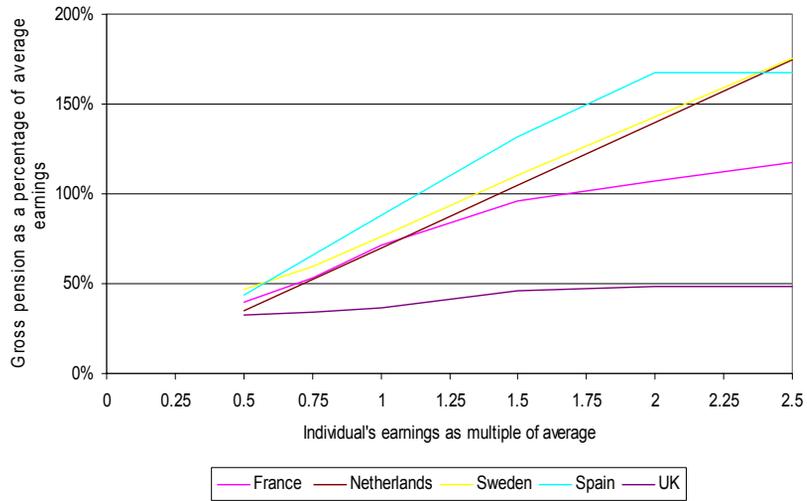
What are we trying to achieve and how

Two fundamental questions:

- Should government policy aim to achieve mandatory earning-related pensions, or only an anti-poverty basic pension?
- What are the pros and cons of funded and unfunded systems?

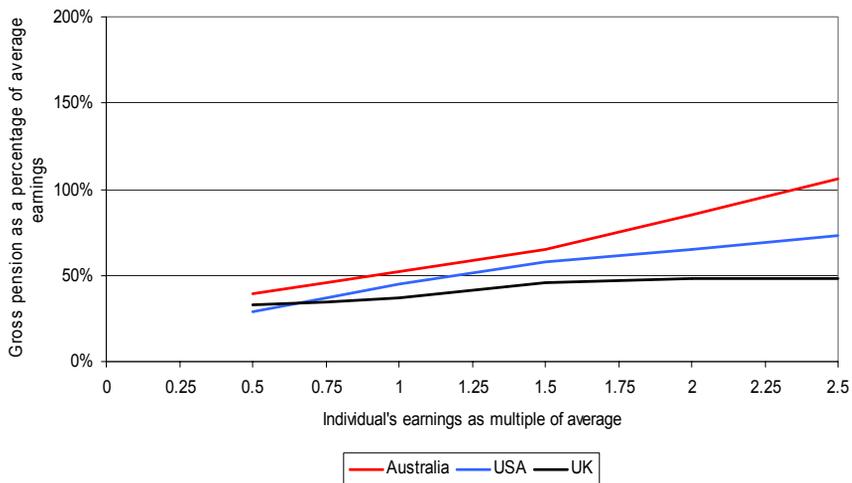
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Gross Mandatory System Pension Values: UK vs the 'Earnings-related' Systems



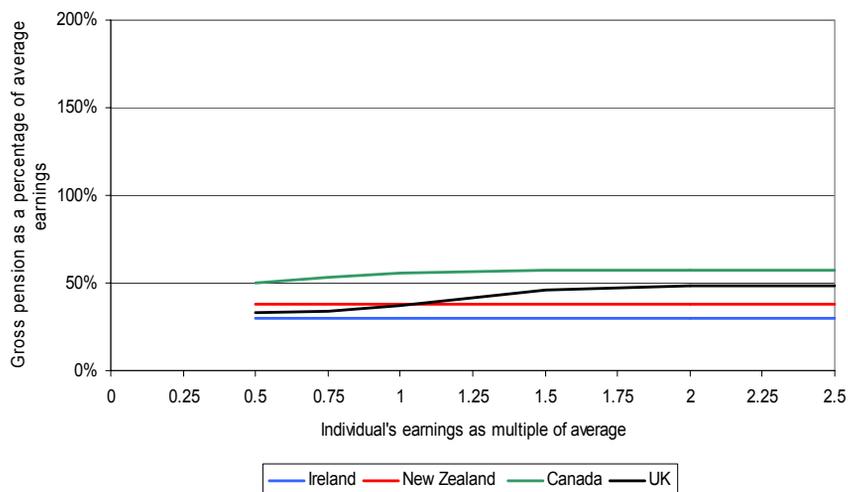
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Gross Mandatory System Pension Values: UK vs the 'Intermediate' Systems



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Gross Mandatory System Pension Values: UK and Other 'Poverty Prevention' Systems



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Present and Forecast Public Pension Expenditures

Percentage of GDP	Percentage of GDP		Percentage Point Change
	2000	2050	
Austria	14.5	17.0	2.5
Belgium	10.0	13.3	3.3
Denmark	10.5	13.3	2.8
European Union 15	10.4	13.3	2.9
Finland	11.3	15.9	4.6
France	12.1	15.8	3.7
Germany	11.8	16.9	5.1
Greece	12.6	24.8	12.2
Ireland	4.6	9.0	4.4
Italy	13.8	14.1	0.3
Luxembourg	7.4	9.3	1.9
Netherlands	7.9	13.6	5.7
Portugal	9.8	13.2	3.4
Spain	9.4	17.3	7.9
Sweden	9.0	10.7	1.7
UK	6.1	6.9	0.8

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P.A.Y.G. Pension Systems: Key Ratios

No population growth
No productivity growth

$$\frac{\text{Average retirement income}}{\text{Average worker contribution}} = \frac{\text{Working years}}{\text{Retired years}}$$

Implicit rate of return on contributions = 0

Population growth positive
No productivity growth

$$\frac{R. I.}{W. C.} = \frac{W. Y.}{R. Y.} * \text{Population growth}$$

Rate of return = Population growth rate

Population growth positive
Productivity growth positive

$$\frac{R. I.}{W. C.} = \frac{W. Y.}{R. Y.} * \text{Population growth} * \text{Productivity growth}$$

Rate of return = population growth rate + productivity growth rate

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Demographic Drivers of Support Ratio

$$\frac{\text{No. of Workers}}{\text{No. of Retired}} = \text{"Support Ratio"} = \frac{\text{Working Years}}{\text{Retired Years}} * \text{Population Growth}$$

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Support Ratio Dynamics

Ratio of Workers to Retirees, Assuming Working From Age 20

Population Growth % p.a.	+0.5 Zero -0.5	3.5	→	2.8	↓
		3.0		2.25	
		2.6		1.9	
Life Expectancy at 65		15		20	
Retirement Age		65		65	

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Support Ratio Forecasts 2000-2050

Ratio of 20-64 Year Olds to 65+

	2000	2050
UK	3.7	2.1
Italy	3.4	1.4
USA	4.8	2.8
China	8.8	2.4
Korea	9.0	1.7
World	7.8	3.6

Source: UN Medium Variant

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P.A.Y.G. Schemes: Three Alternatives

- If support ratios for any given retirement ages fall, then three possible solutions
 - Increased retirements ages
 - Poorer pensioners
 - Bigger worker contributions

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Support Ratio Dynamics under Different Demographic Challenges

Increase in longevity
- no change in fertility

Support ratio effect can be fully offset by proportional rise in retirement age

Decline in fertility
in addition to increase in longevity

Proportional rise in retirement age insufficient to offset support ratio effect

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Support Ratio Dynamics

Ratio of Workers to Retirees, Assuming Working From Age 20

Population	+0.5	3.5	2.8	3.53
Growth Rate	Zero	3.0	2.25	3.00
% p.a.	-0.5	2.6	1.9	2.55
Life Expectancy at 65		15	20	20
Retirement Age		65	65	68.75

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Are Funded Systems Different?

- In any pension system today's pensioners are dependent on resource transfer from today's workers
- Funded systems only help overcome demographic challenges if they increase savings - in current and future generations
- Funded systems face demographic risks
- The implications are closely similar for funded and non-funded systems

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Pension Claims Against Future Output - Three Current Models

	<u>Nature of Claim</u>	<u>Risks</u>
PAYG STATE SYSTEM	<ul style="list-style-type: none"> • Against totality of GDP • Enforced via contributions/taxes 	<ul style="list-style-type: none"> • Political • Indirectly - Demographic and Macro-economic
FUNDED DC	<ul style="list-style-type: none"> • Against profits • Via ownership of equities and bonds 	<ul style="list-style-type: none"> • Volatility of: <ul style="list-style-type: none"> ○ Profit slice of GDP ○ Market price of equities and bonds
FUNDED DB	<ul style="list-style-type: none"> • Against profits • Via ownership of equities and bonds in the fund • But also via bond-like promise of the individual company 	<ul style="list-style-type: none"> • Volatility of: <ul style="list-style-type: none"> ○ Profit slice of GDP ○ Bond and equity prices • Bankruptcy of the individual firm

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Fishing Boats, Fish And A Falling Population

Steady State

- 1,000 population
- 500 per generation
- 500 working, 500 retired
- Workers work
 - Half time fishing
 - Half time building a boat
- Boats wear out over one working life

Relative price: 1 boat = $\frac{1}{2}$ of catch for one working life

Demographic Change

- 500 generation of retirees followed by 250 generation of workers
- Retirees would like to sell 500 boats they have built
- Workers only need to buy 250 boats

Price of boats, relative to fish, will fall

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Two Near Equivalences

Compulsory DC scheme
invested in Government
index linked bonds
and
Tax financed PAYG

If the rate of return on index-linked government bonds is equal to rate of growth.

DC scheme invested in
corporate bonds
and
DB average salary scheme

Still different in respect to

- Life expectancy risks
- Diversification of bond portfolio

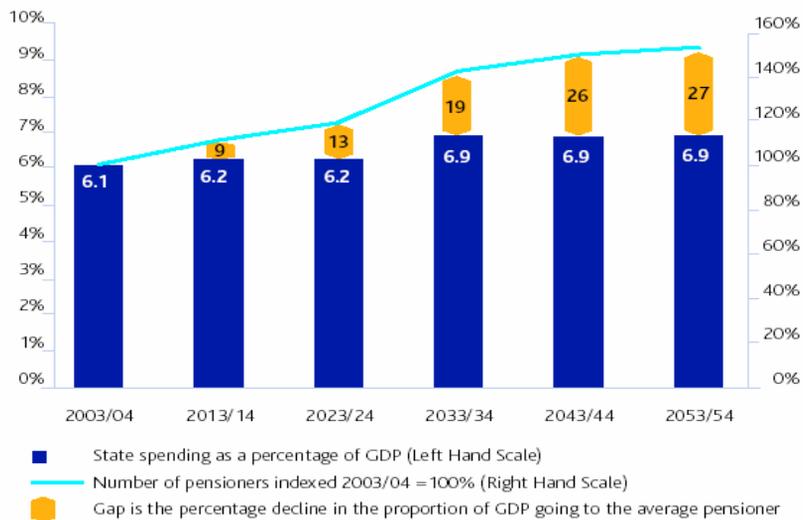
But similar since DB schemes are bond-like liabilities

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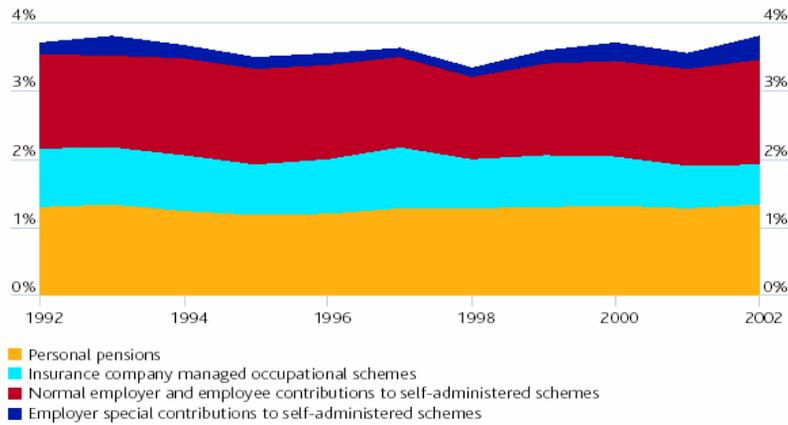
Increases in number of pensioners greater than increases in state spending



Source: Pensions Commission analysis of data from DWP and GAD

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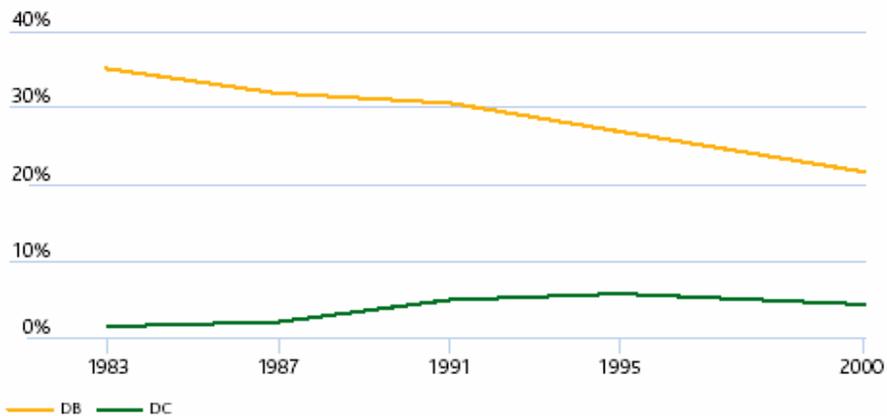
Components of funded pensions contributions as a percentage of GDP



Source: Pensions Commission estimates as defined in Table 3.4.

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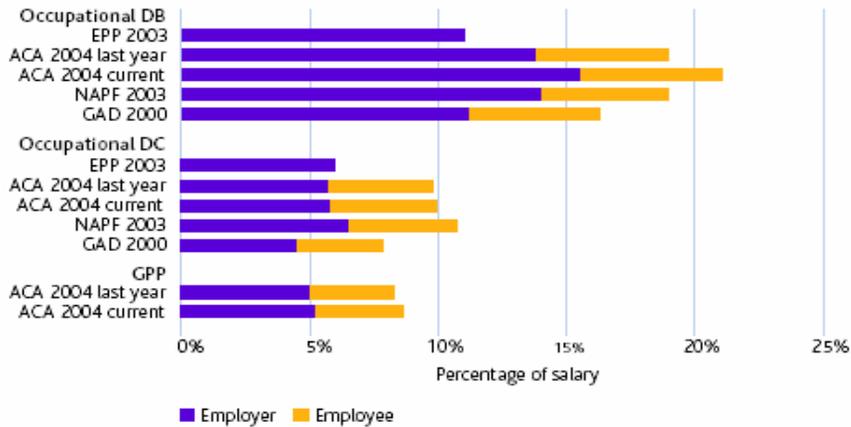
Estimated Percentage of Private Sector Employees Participating in Occupational Pension Schemes



Source: Pensions Commission analysis based on occupational pension schemes 2000, GAD and CNS employment data.

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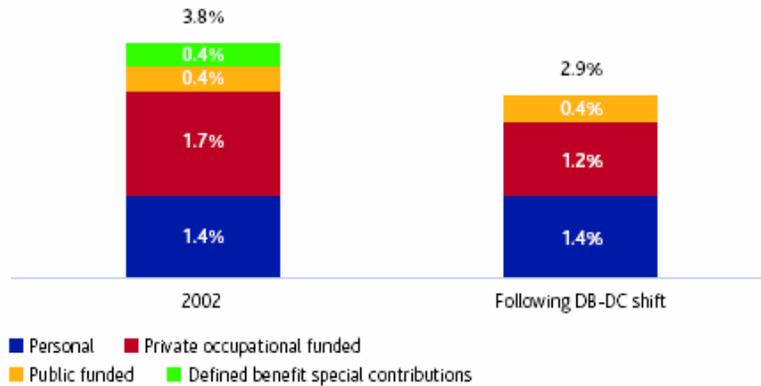
Contributions to Employer-Sponsored Pension Schemes



Source: Occupational pension schemes 2000 GAD, Annual Survey 2003 NAPF, Smaller Firms Pensions Survey 2004 ACA, Employers' Pension Provision Survey 2003, DWP

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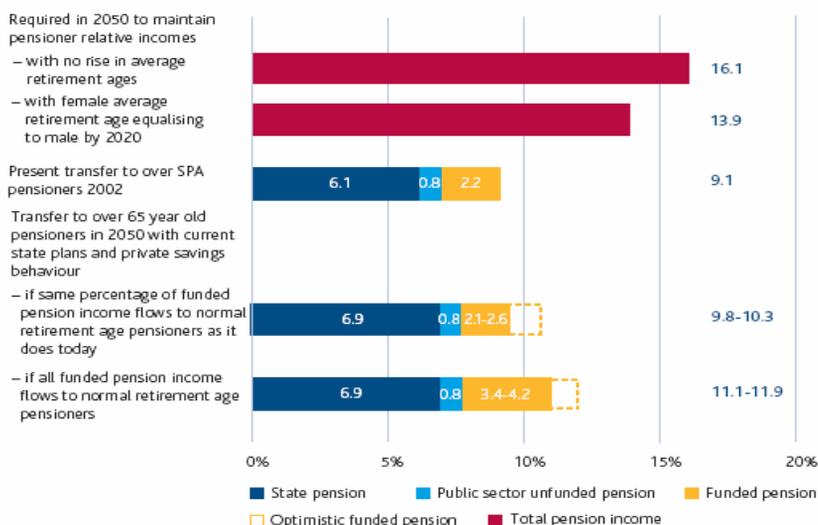
Change in Pension Savings as a Percentage of GDP with the Maturing of the DB-DC Shift



Source: Pensions Commission Estimates

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The Implications of Current Plans and Savings Behaviour for the Percentage of GDP Transferred to Pensioners



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The Implications of Current Plans and Savings Behaviour for the Percentage of GDP Transferred to Pensioners

Assuming that 10.85% is transferred via pensions in 2050 (the mid-point of 9.8-11.9%). This implies a total transfer, including investment income, of 12.05%.

	Possible combinations			
Pensioners poorer by	-21%	-15%	-9%	-3%
Average retirement age rises from 63.8 to: (in addition to female retirement equalisation)	64	65	66	67

Source: Pensions Commission analysis

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Pension Provision: Increasingly Unequal

Adequately / More than Adequate Replacement rates

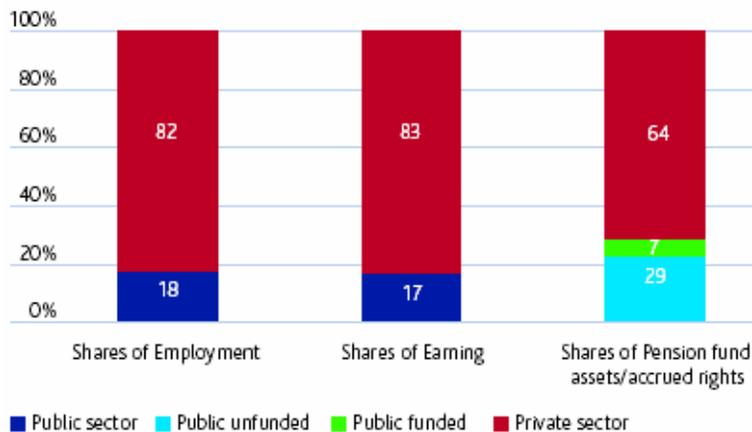
- Members of private sector DB schemes still open to accruals
- Most public sector employees
- Senior executive members of top-hat DC schemes with high contribution rates
- Lower income people who at least in income replacement returns are well-covered by the state

Inadequately Provided

- Non-pension scheme members and most DC scheme members concentrated in
 - Lower-middle and middle income groups
 - Smaller and mid-size firms
 - Service sectors

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Pensions Assets and Accrued Rights: Public and Private Sector Estimated Percentage Shares at end 2002



Source: Pensions Commission analysis based on employment data from CNS and earnings data from ungrossed NES

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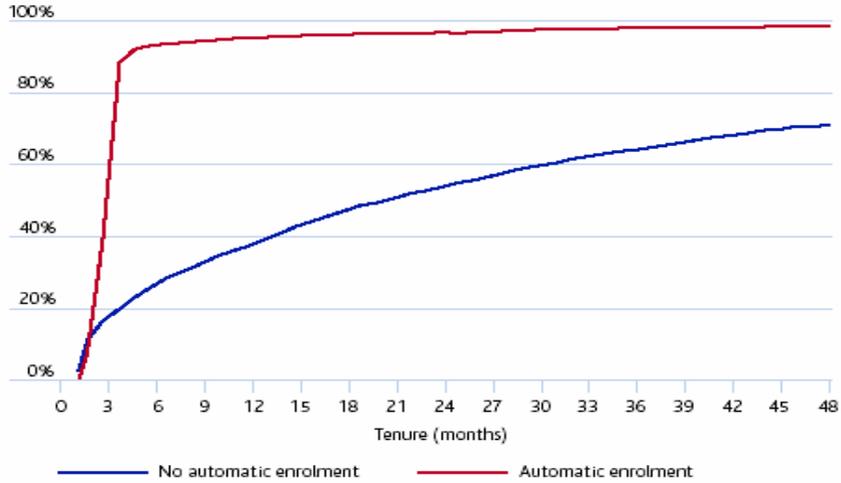
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Reasons for problems with UK voluntarist approach

	<u>Fixable?</u>
■ Complexity	In theory yes
■ Lack of trust	In theory yes
■ Means-testing – poor incentives to save	Yes
■ Behavioural economics – inherent irrationality	No
■ Cost of distribution	?

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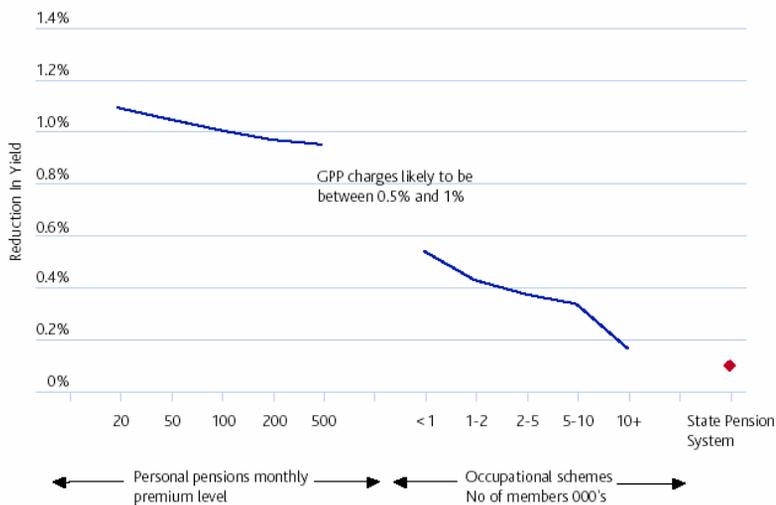
Percentage of Employees Participating in a 401(k) Pension Scheme With and Without Automatic Enrolment



Source: Madrian and Shea, (2001)

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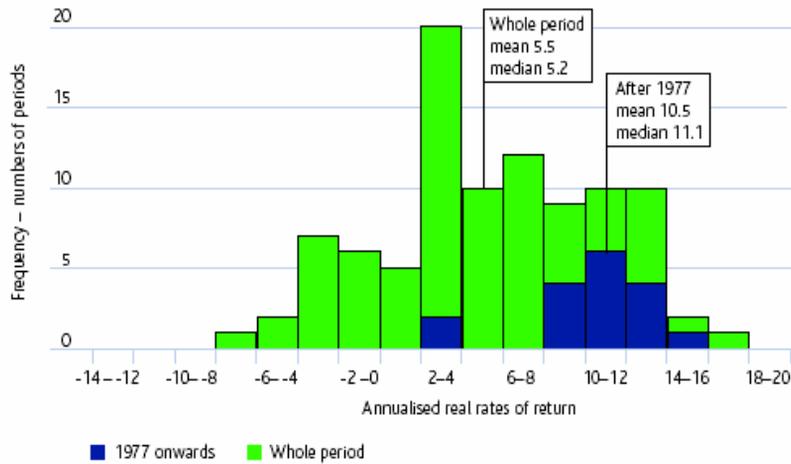
An Estimate of the Overall Cost Curve: Reduction in Yield



Source: Personal pension data from FSA comparative tables: the line shown is the unweighted mean.
Occupational pensions from GAD survey 1998.
GPP estimates based on discussion with the industry.

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Distribution of Real Annualised Rates of Return on UK equities Over 10 Year Periods Since 1899



Source: Barclays Equity Gilt Study 2004

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Three Possible Ways Forward

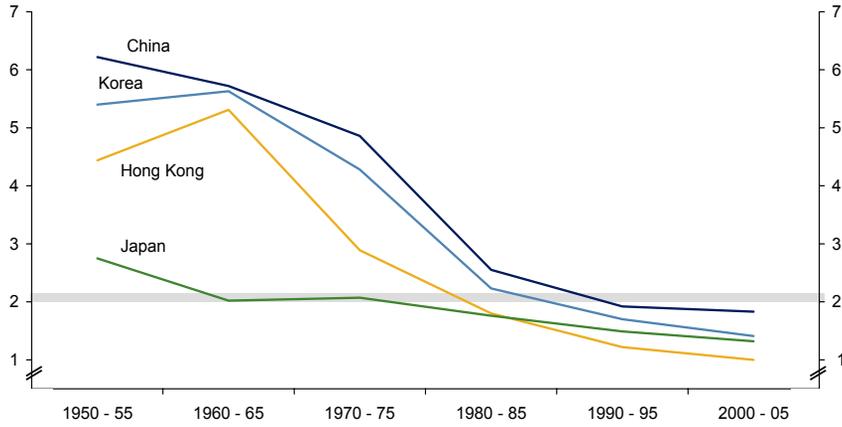
- Revitalisation of the voluntary system
- Changes to the state system
- A greater degree of compulsion than that inherent within existing S2P / contracting-out arrangements

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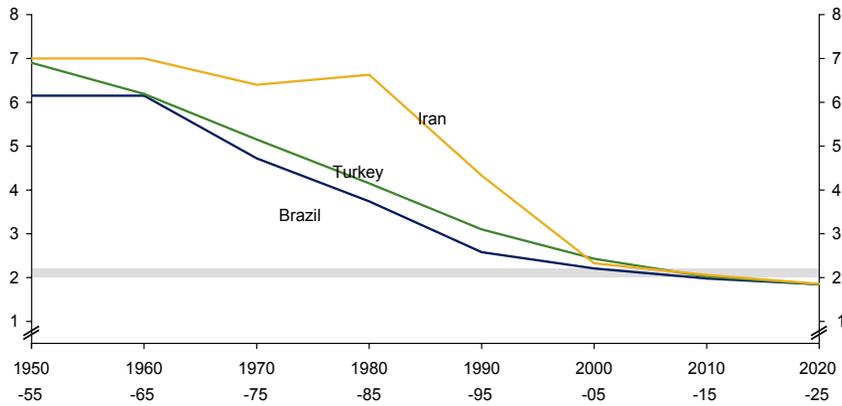
Total Fertility Rates - Asian Countries 1950-2000



Source: United Nations

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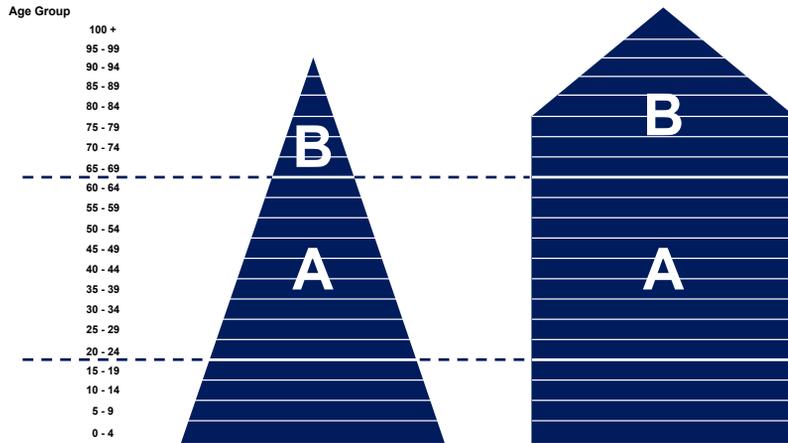
Total Fertility Rates - Iran, Turkey, Brazil, 1950-2020



Source: United Nations

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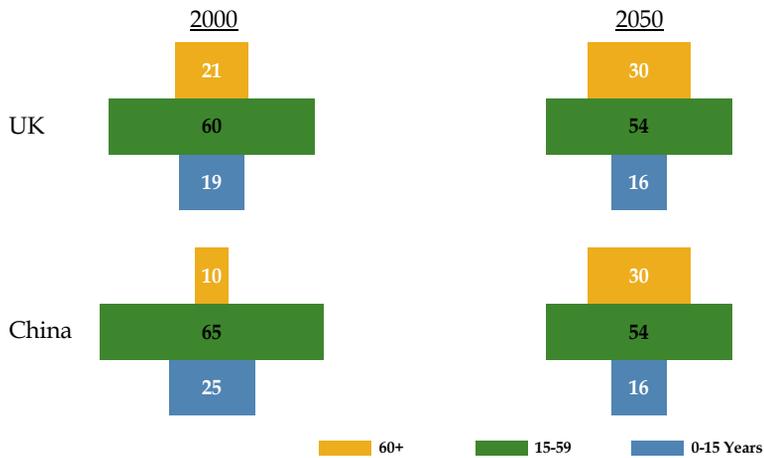
From Pyramids to Columns



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Demographic Change in UK and China - UN Medium Variant

% Population by Age Band



Source: OECD Historical Statistics; OECD Economic Outlook

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Demographic Conditions and Investment Attractiveness

TFR Below 2.05 Today	TFR in 2015 - 2020*		
	Below 2.05	2.05 - 2.3	Above 2.3
China	Brazil	Algeria	Bangladesh
Korea	Indonesia	Argentina	Congo
Russia	Iran	Chile	Egypt
Thailand	Mexico	India	Iraq
Ukraine	Turkey	Morocco	Kenya
	Vietnam	Malaysia	Nigeria
	Uzbekistan	South Africa	Pakistan
			Philippines
			Saudi Arabia

* Projection per UN Medium Variant

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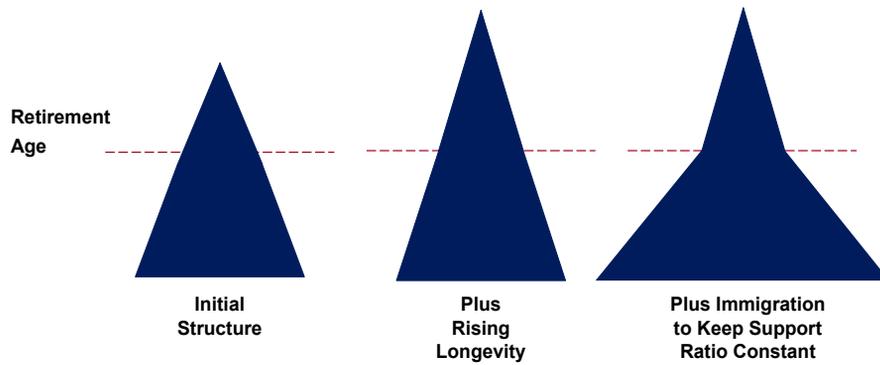
Immigration Only Responses - UN Migration Scenario

- To maintain the ratio of 15-64 year olds to 65+ year olds constant requires:

	Total Population - Millions	
	2000	2050
UK	59	136
European Union	372	1,228

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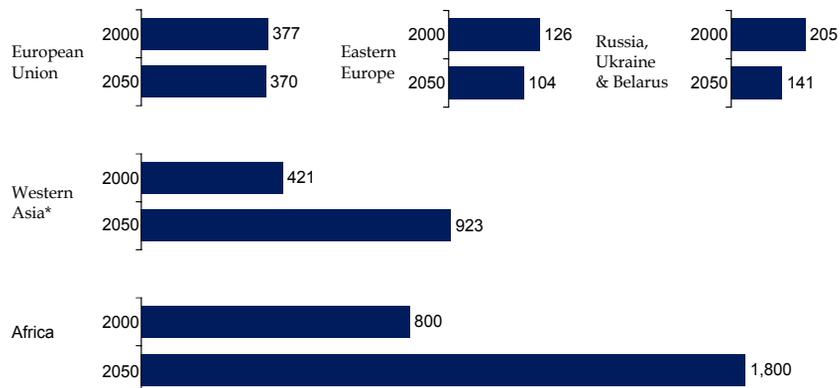
Rising Longevity, Fixed Retirement Age and Stable Support Ratios



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Europe and Its Neighbours - Population

Millions

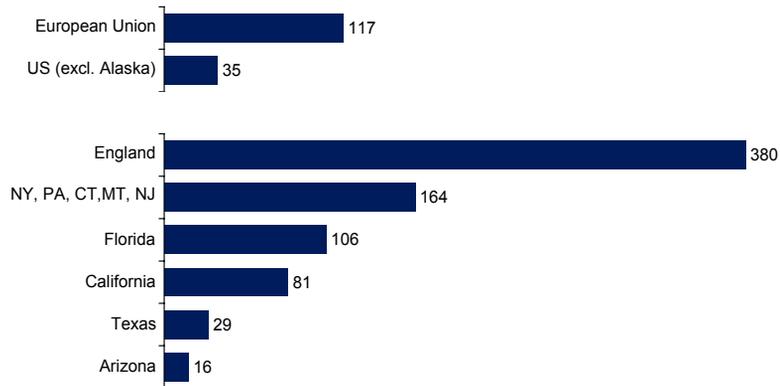


Source: UN Medium Variant
 * Note: UN definition plus Pakistan, Afghanistan and Iran

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Population Density - US and Europe

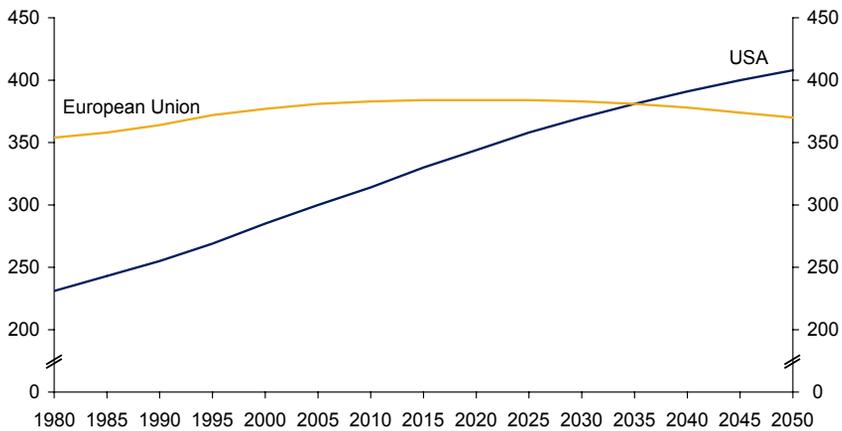
000s per Sq.km: 2000



Source: GAD

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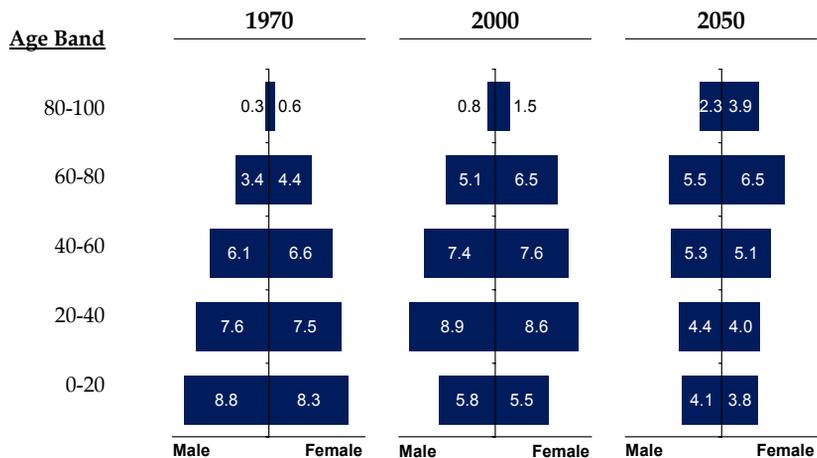
Demographics and Geopolitical Weight



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Italy's Population Structure 1970-2050

Millions



Source: U.N. Medium variant for 2050 projection

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Fertility Intentions of Women

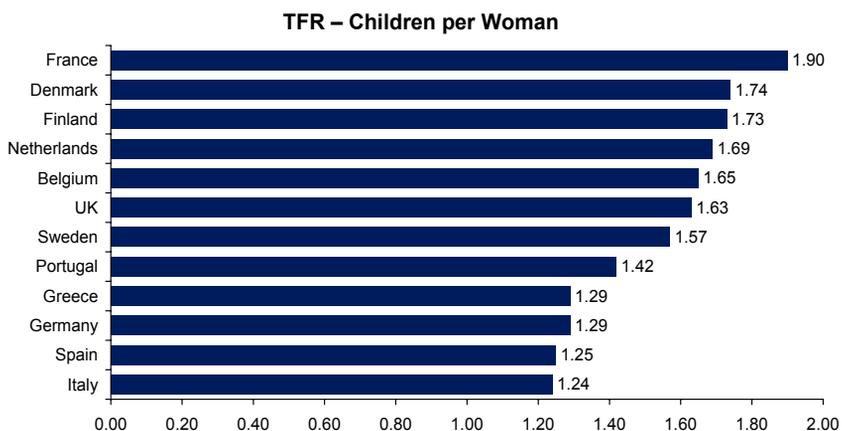
England & Wales

Women Aged	Average Intended Family Size
18-20	2.08
21-23	2.16
24-26	1.98
27-29	2.02
30-32	1.97
33-35	1.97
36-38	1.90

GAD
Forecast of
Long-term
Trend = 1.74

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European Fertility Rates - 2001



Source: GAD

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Who bears different categories of risk?

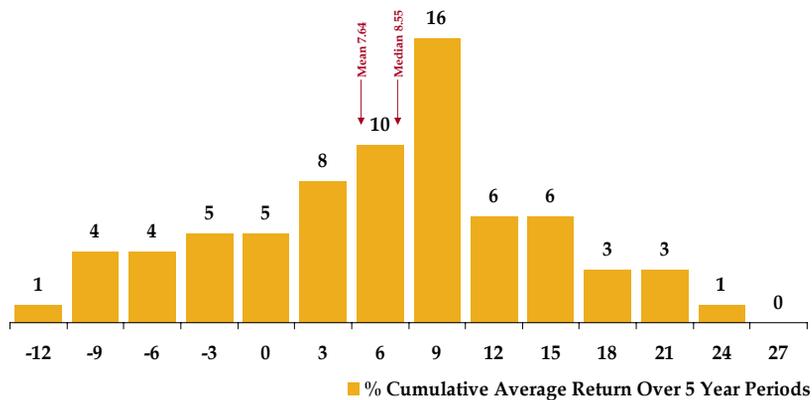
Risk	Classic DB	Classic DC	UK State Pension
Investment pre-retirement	Employer	Individual*	State
Investment post-retirement	Employer	Annuity provider	State
Specific longevity post-retirement	Employer	Annuity provider	State
Average longevity post-retirement	Employer	Annuity provider	State
Long-term average longevity	Employer	Individual	State/ Individual

* Partially absorbed by insurance companies in with-profits schemes

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Real Return On Large Stocks: US 1926 - 2000

No. of 5 Year Periods with Return in Range (72 Periods)

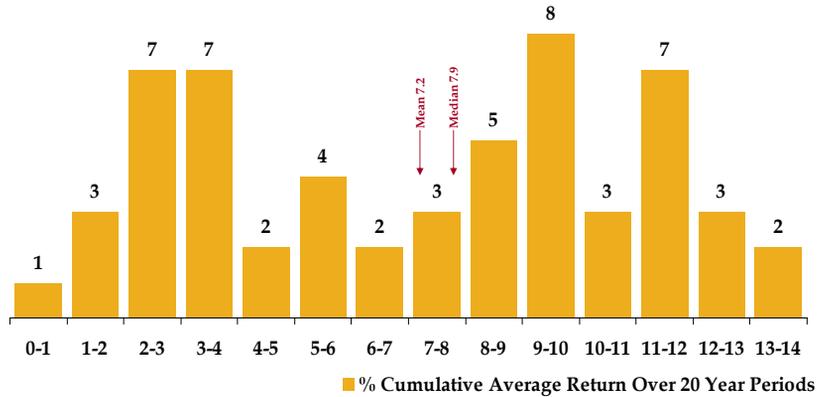


Source: Ibbotson Associates: 2002 Yearbook

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Real Return On Large Stocks: US 1926 - 2000

No. of 20 Year Periods with Return in Range (57 Periods)

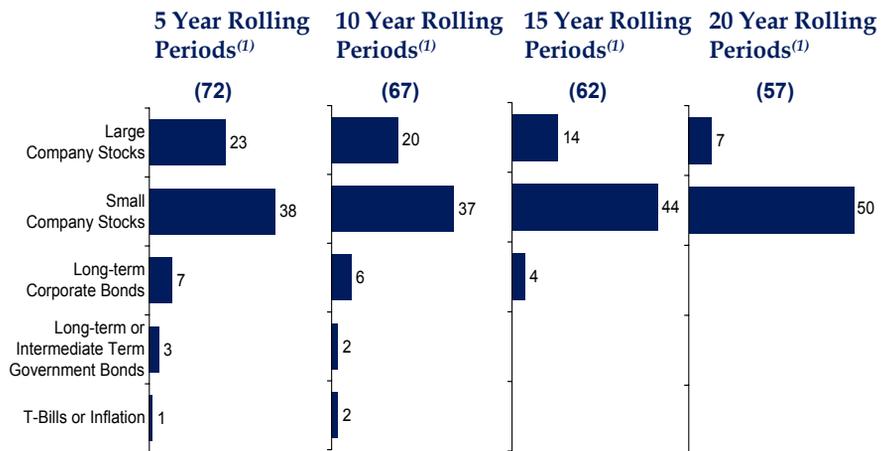


Source: Ibbotson Associates: 2002 Yearbook

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Highest Returning Assets 1926-01: US

No of Times Asset Class was Highest Return



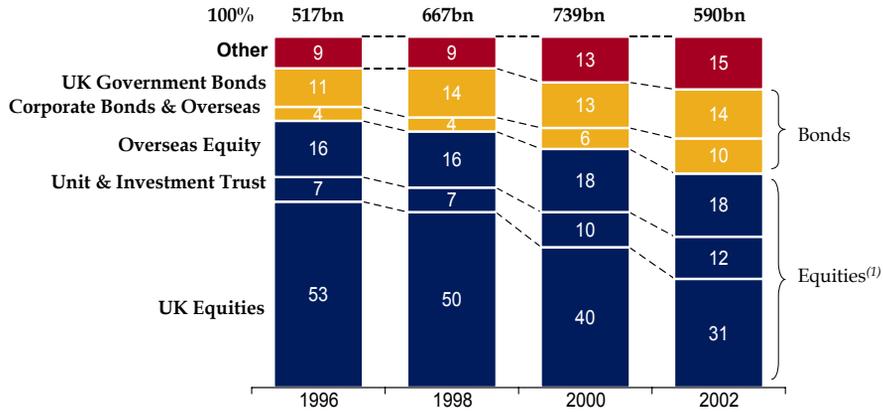
Source: Ibbotson Associates: 2002 Yearbook, Market Results for 1926-2001

(1) Five-year and ten year rolling periods also include 1 period in which inflation was higher than all investment returns

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Pension Fund Asset Allocation: 1996 - 2002

% of Total Pension Fund Investment

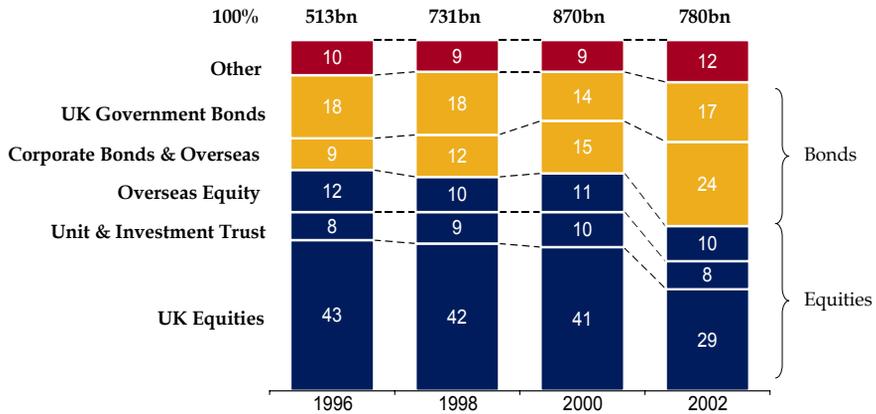


(1) Majority of Unit and Investment Trust Investments are indirect holding of equities; small quantity of bonds also held in this indirect route
Source: ONS MQ5 Table 4.2

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Life Company Asset Allocations: 1996 - 2002

% of Total Life Company Investment

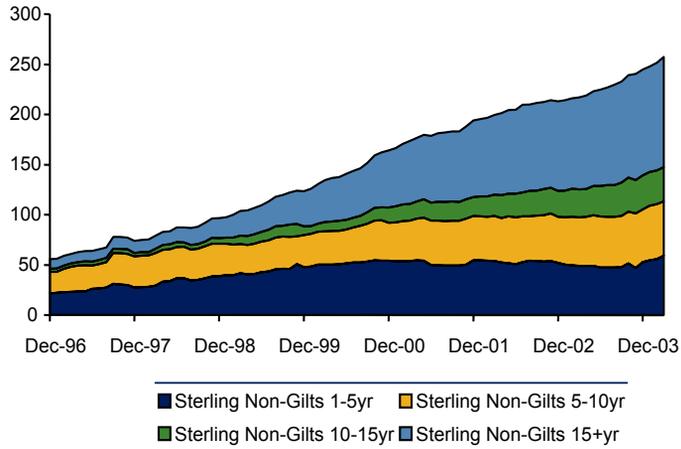


Source: ONS MQ5

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Sterling Non-Gilts

Face By Maturity Sterling Billions

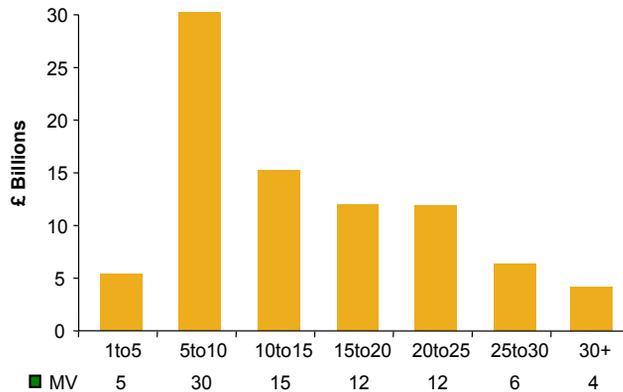


(1) Source: Merrill Lynch Index System

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Index Linked Gilts

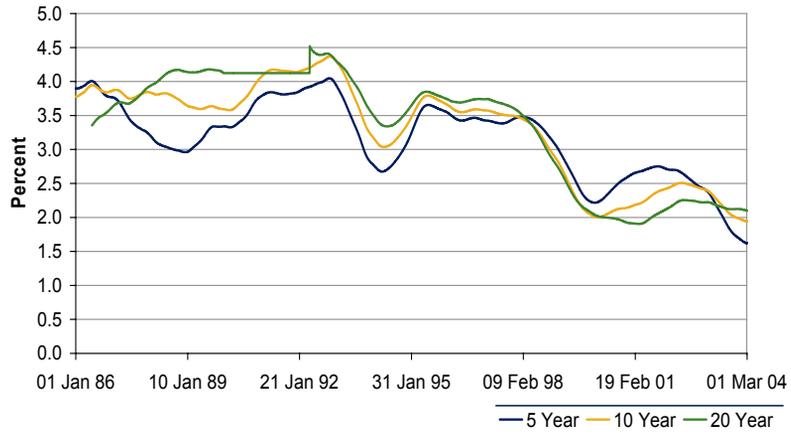
Sterling Billions 6 April 2004, Total £85bn



(1) Source: Merrill Lynch Index System

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Real UK Gilt Yields 1-Year Moving Averages



Source: Bank of England