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Why Demographics Matter for Macro Finance

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All the information contained in this presentation is as of date indicated unless otherwise noted.





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Yorkshire Actuary Society

Leeds, 12 December 2018

Demographics: A Different Perspective

WHAT IT CONNECTS TO & INFLUENCES

D: Discount rates, [Debt](#)

E: [Economic Growth](#), Efficiency, Structure

M: [Mortality](#)

O: Organisation Behaviour, Structure

G: Geography, [Geopolitics](#), Governance

R: Robotics, [Real Estate](#)

A: Asset Prices, [Asset Allocation](#)

P: People, [Pensions](#), Politics

H: Heterogeneity, [Households](#)

I: [Inflation](#), [Inequality](#), Institutions

C: [Consumers](#), Culture, Cities

S: [Sustainability](#)

WHO DOES IT PERTAIN TO?

All the “People” in the world and their characteristics. From an economic perspective, we restrict attention to them as “consumers and workers” in the world.

It affects all Income Statements & Balance sheets in the world for

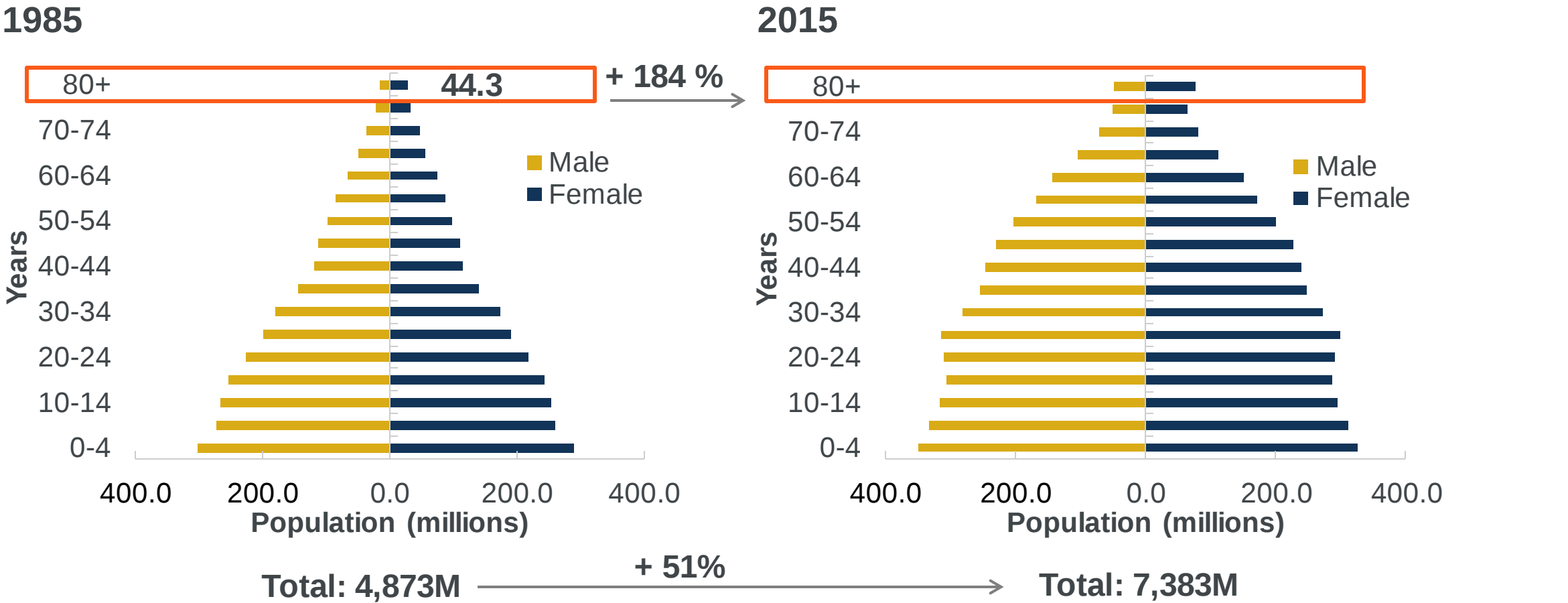
- Individuals
- Households
- Corporates
- Nations

Unless otherwise stated, all data sourced to “UN” is the most current data attributable to the United Nations Population Division. Data shown beyond 2015 is a UN projection.



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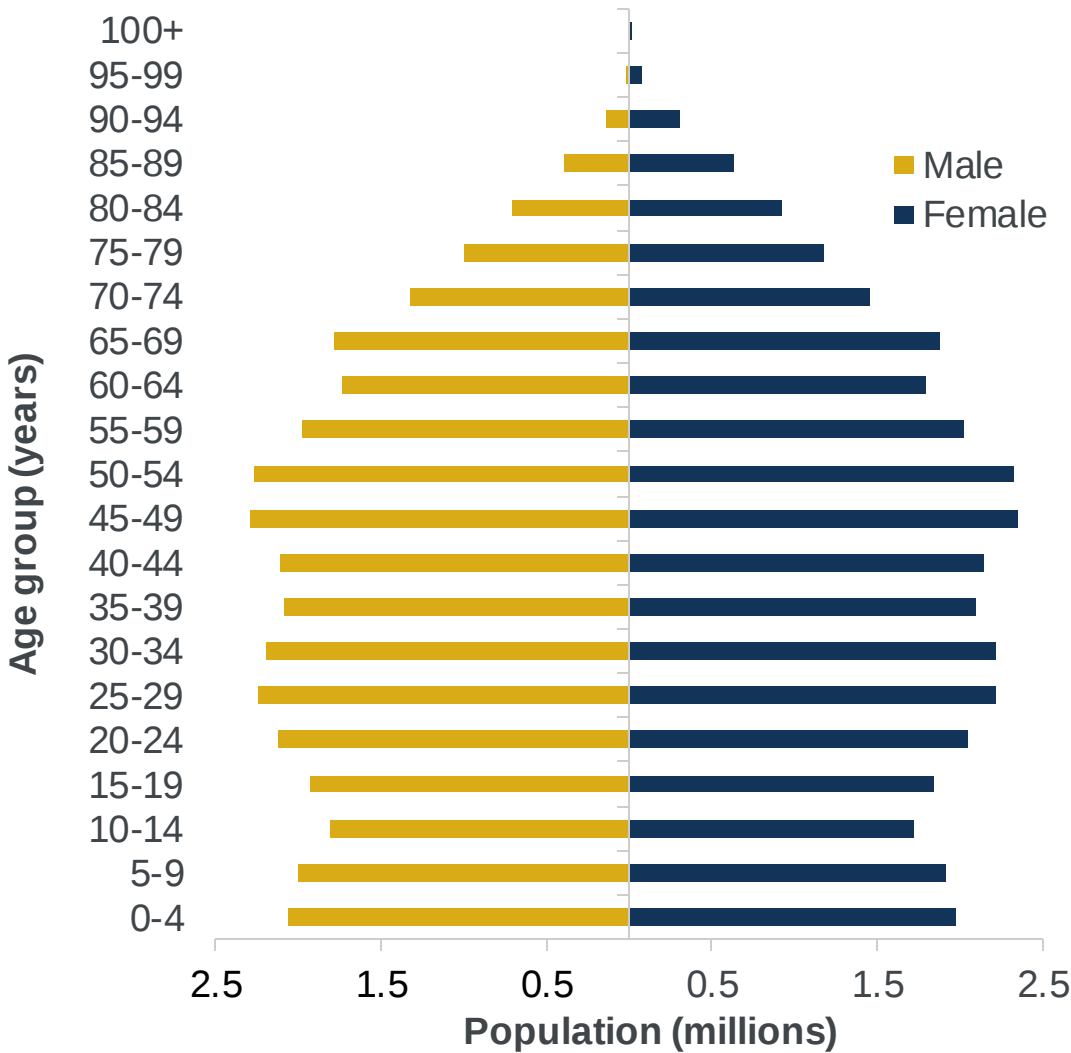
The World's Super-old (80+) Age Group Fastest Growing



Source: UN, SSGA Demographics

Share of 20+, 60+, 80+ & 100+ Age Groups

UK Population, 2015



% of Total Population

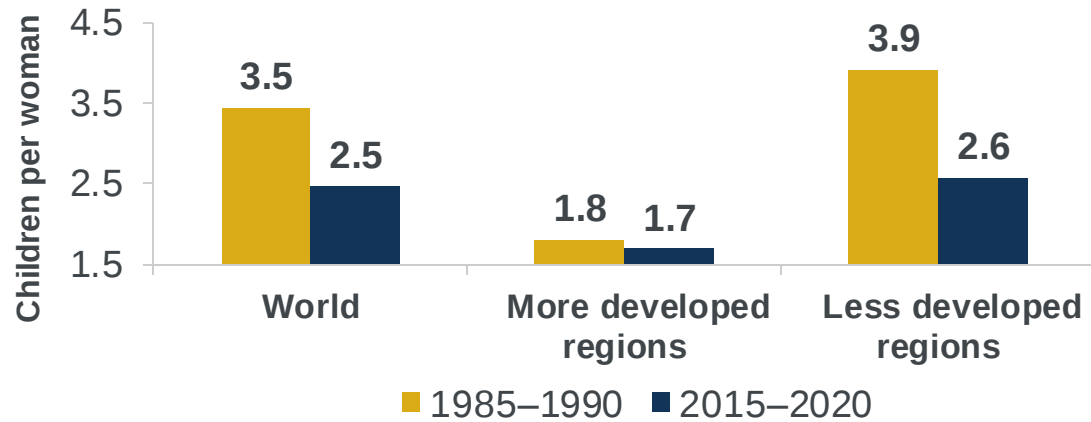
	Age group 20+	Age group 60+	Age group 80+	Age group 100+
UK	76.6	23.5	4.9	0.023
World	65.8	12.3	1.7	0.006

Source: UN, SSGA Demographics

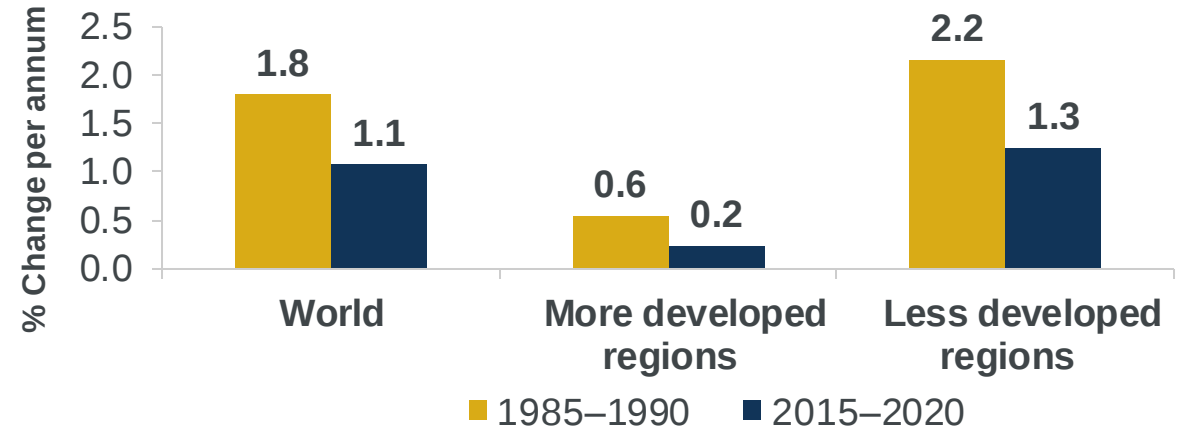


Core Demographics: World, Less & More Developed

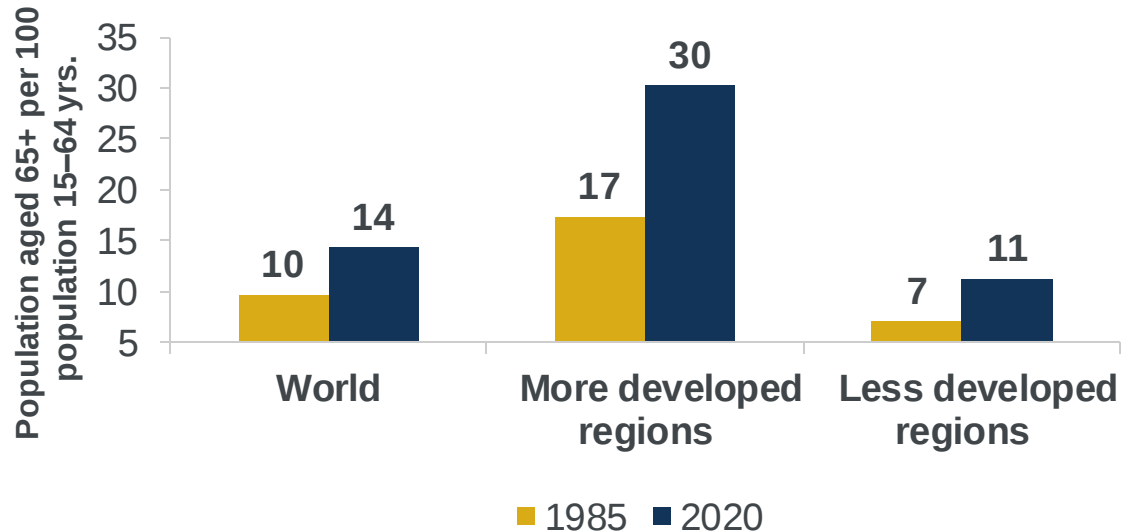
Total Fertility Rate



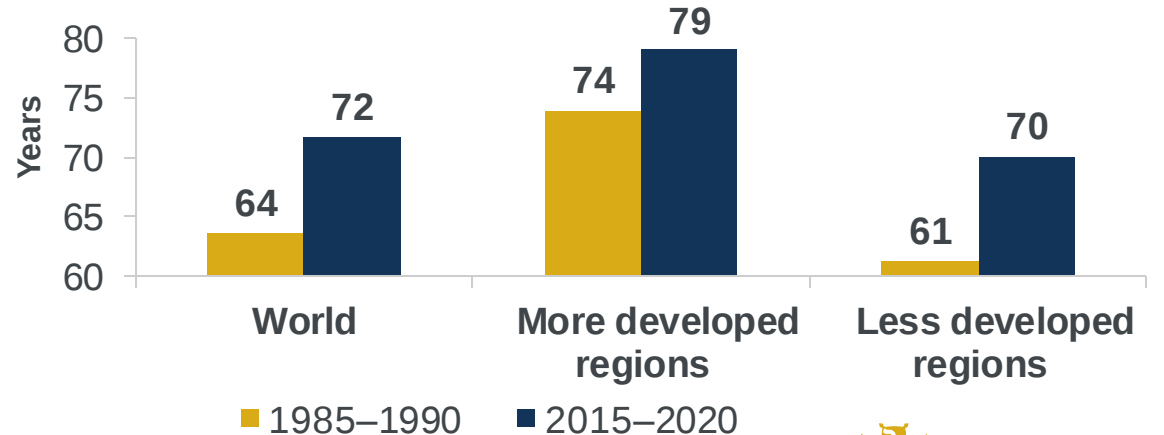
Population growth annual average



Old Age Dependency Ratio



Life Expectancy at Birth



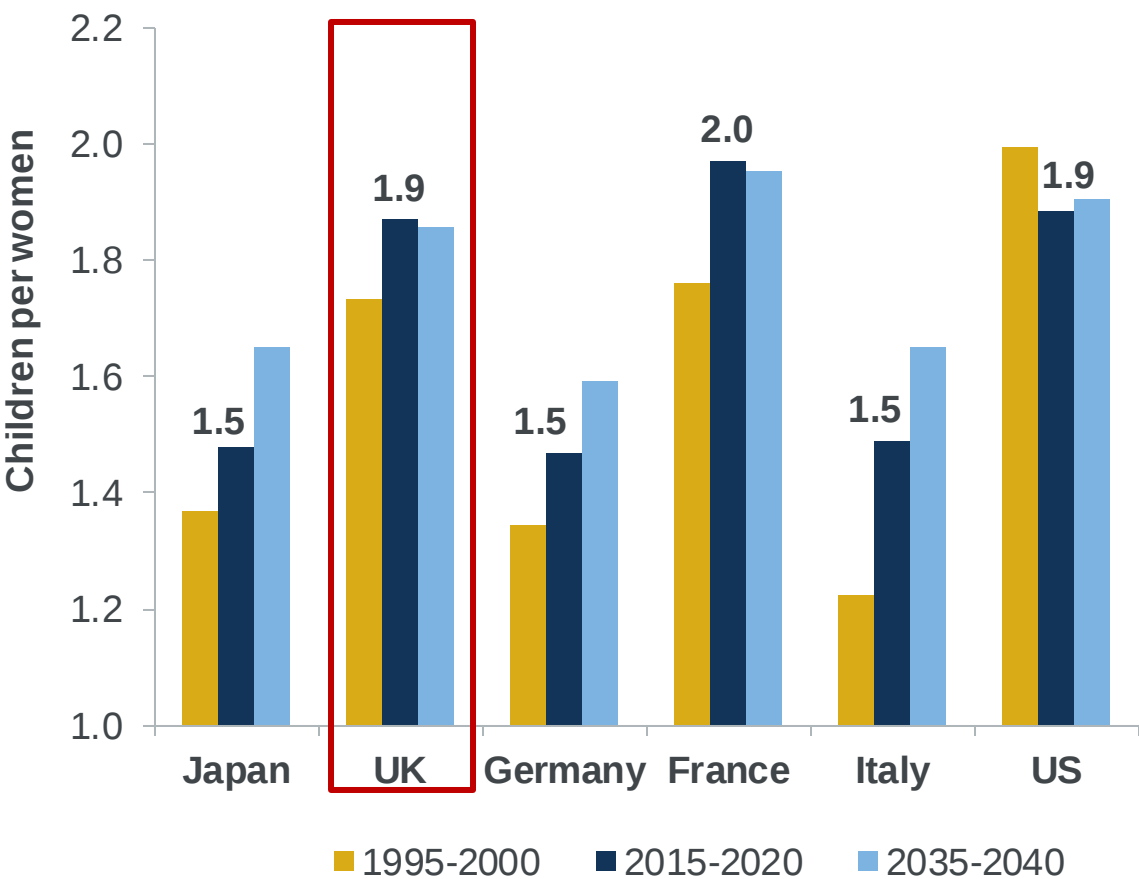
Source: UN, SSGA Demographics



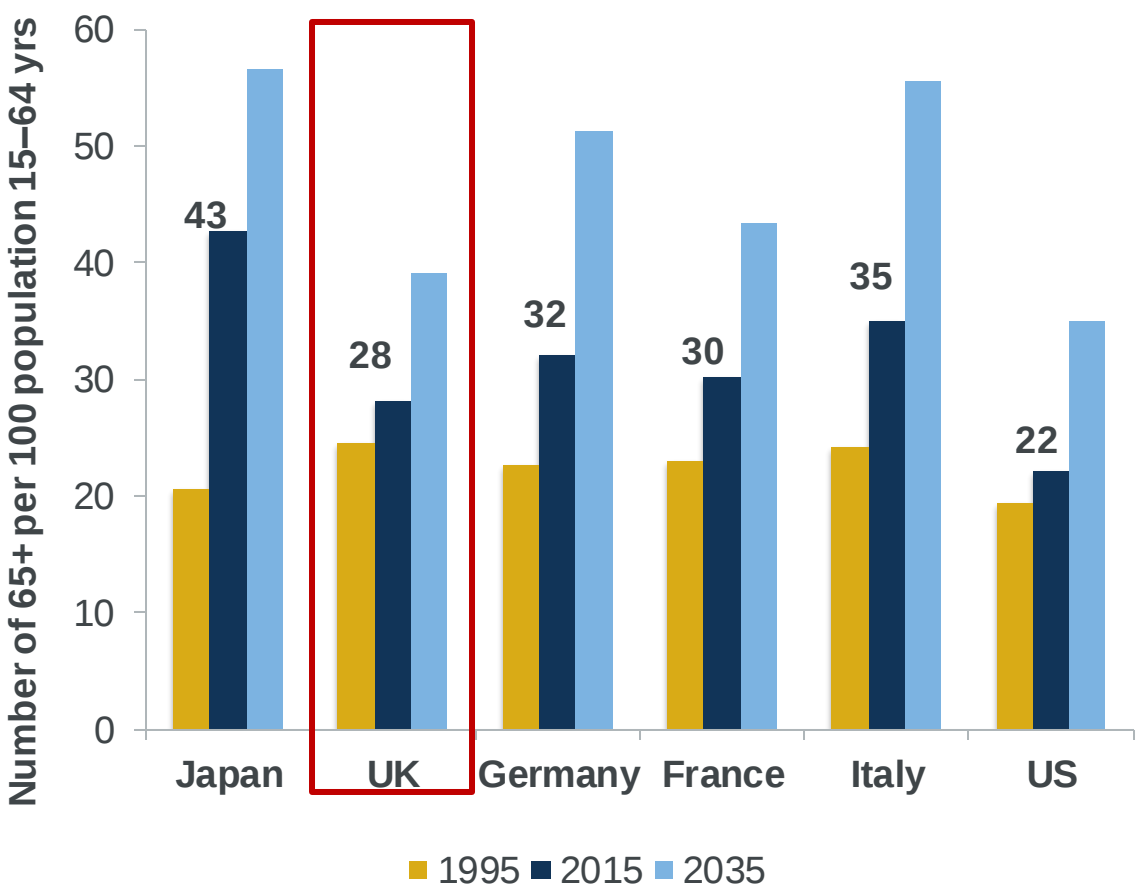
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Core Demographics: G6

Fertility Rate



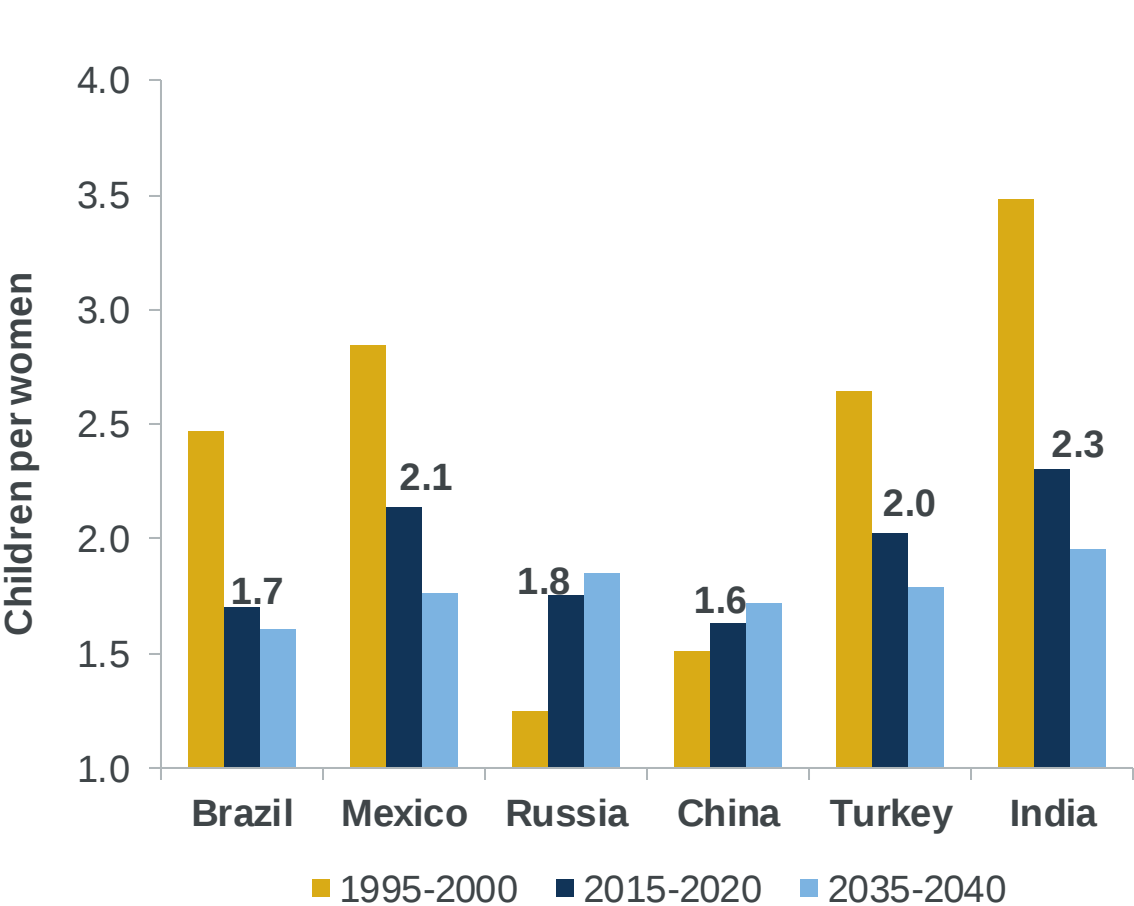
Old Age Dependency Ratio



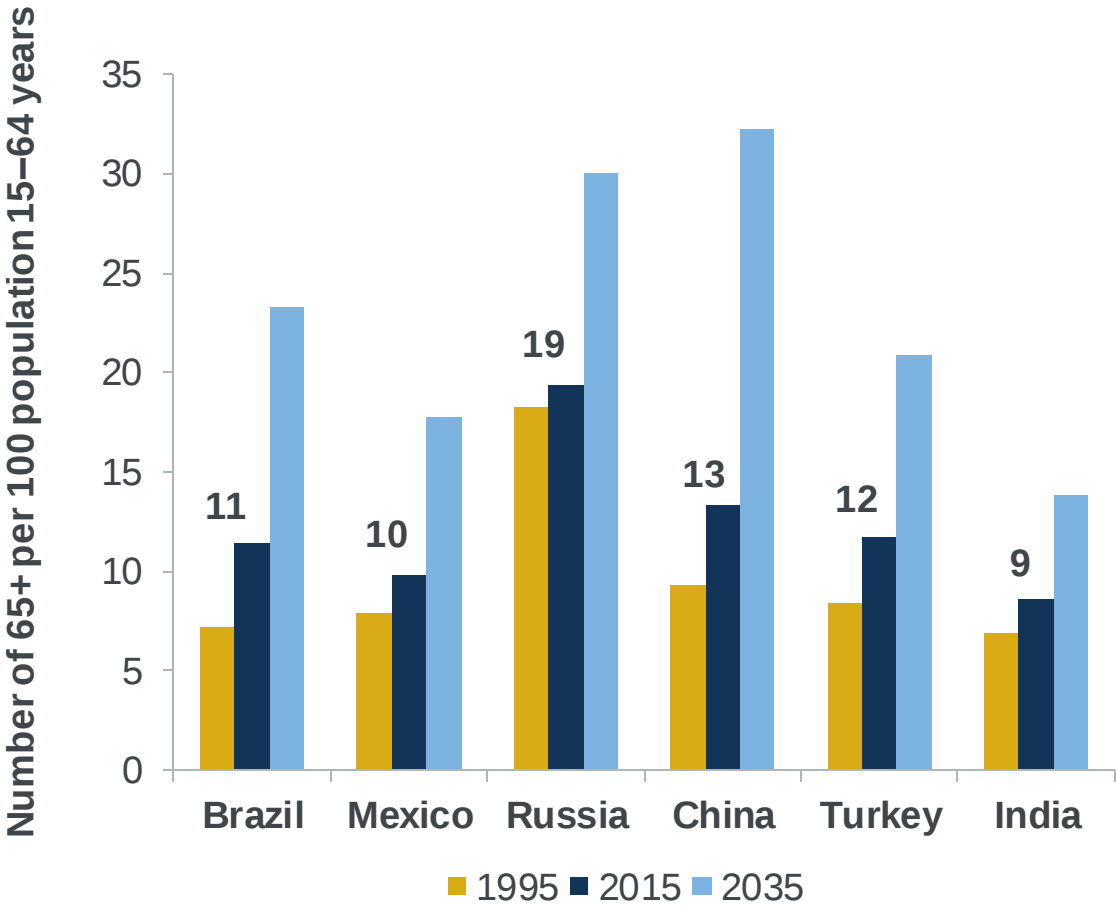
Source: UN, SSGA Demographics

Core Demographics: EMG6

Fertility Rate



Old Age Dependency Ratio



Source: UN, SSGA Demographics



The Demographic Manifesto (2000)

Radical Policy Actions to mitigate the Ageing Time Bomb

- **Abolish Mandatory retirement ages.** Adopt Flexible retirement.
- **Close** gender gaps to better utilize female work potential
- **Rethink & implement** immigration policies
- **Outsource and off-shore** non-core jobs based on costs and benefits

Source: CS, SSGA Demographics



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Retirement Ages: Effective & Official (2016)

Retirement Age (Years)	Men		Women	
	Effective	Official	Effective	Official
Korea	72.0	61.0	72.2	61.0
Mexico	71.6	65.0	67.5	65.0
Turkey	66.1	60.0	66.3	58.0
Japan	70.2	65.0	68.8	65.0
Switzerland	66.0	65.0	64.3	64.0
United States	66.8	66.0	65.4	66.0
United Kingdom	64.6	65.0	63.2	63.0
Italy	62.1	66.6	61.3	65.6
France	60.0	61.6	60.3	61.6
Germany	63.3	65.0	63.2	65.0

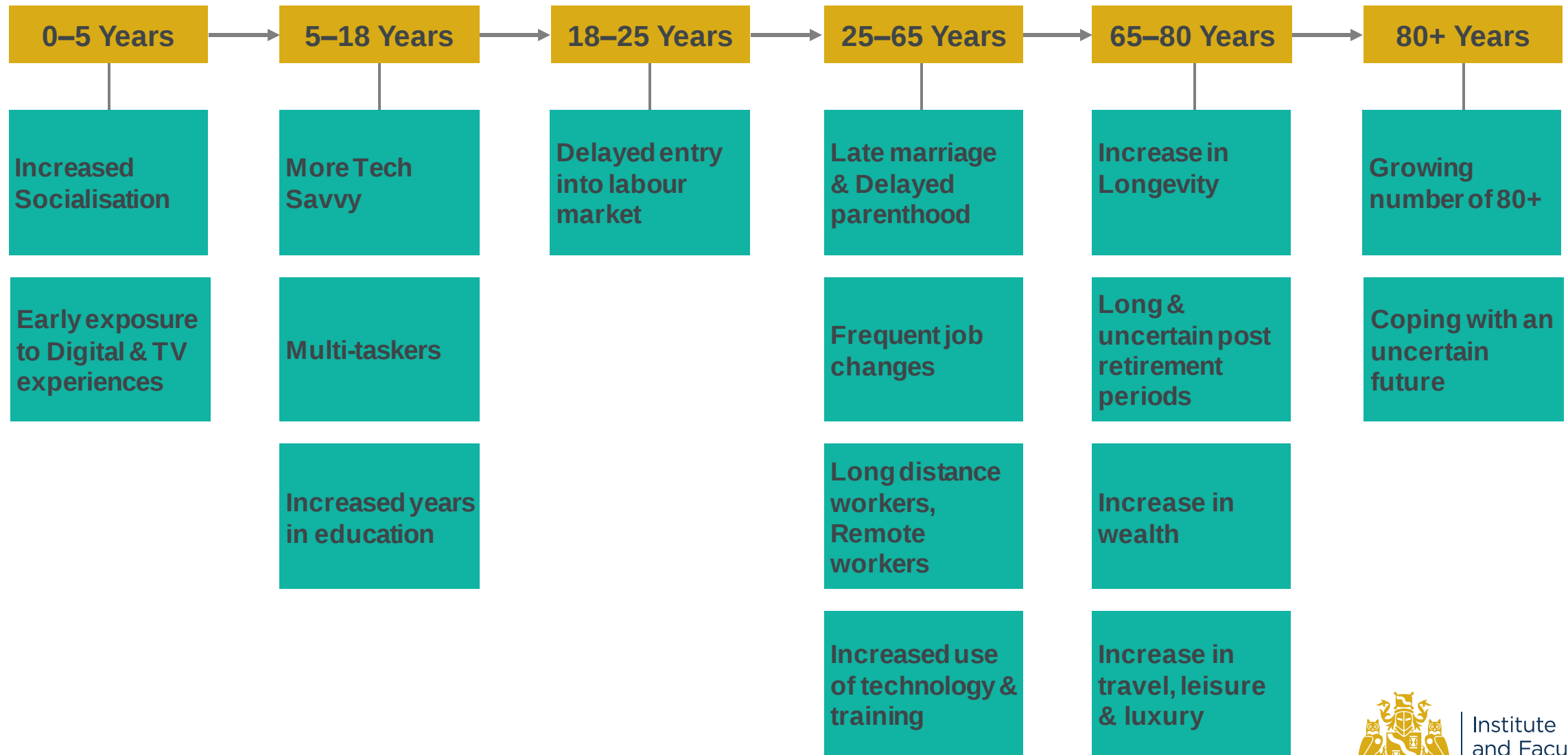
Red Cells: Effective retirement age > Official retirement age

Source: OECD, SSGA Demographics



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Changing Life Cycles in a Changing World



Source: Longer Lives, Changing Life Cycles: Exploring Consumer & Worker Implications, Credit Suisse (2011)



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How Increasing Longevity Affects us All?

Individuals & Families

- Challenge existing asset & time allocation frameworks & intergenerational dynamics

Governments & Societies

- Policy changes in labour, education, health, pensions & social benefits necessary

Asset managers, pension funds, insurance cos., banks, SWFs etc.

- Re-assess frameworks & assumptions. Develop new solutions for clients & new approaches to understanding longevity.

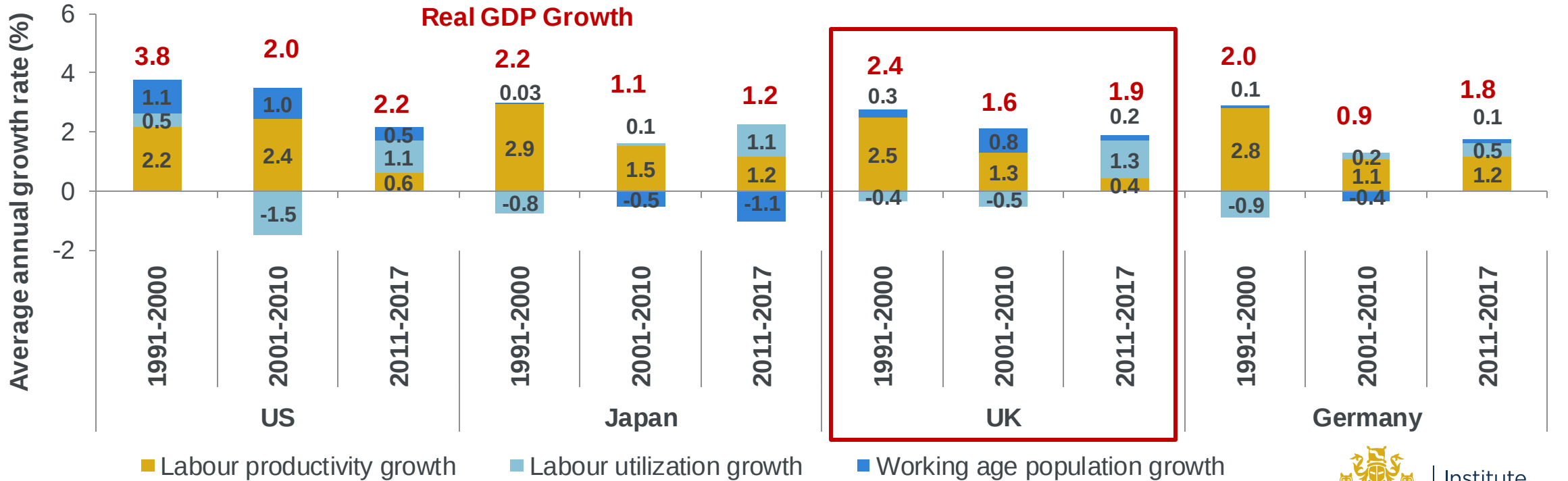
Significant change in thinking and mind-set needed

Demographic Components of GDP Growth

Working-age Population Growth working-age population = population aged 15–64	Labour Productivity Growth labour productivity = real GDP/hours worked	Labour Utilisation Growth labour utilisation = hours worked/working-age population
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G6 GDP growth rate has fallen dramatically. Main cause is **declining labour productivity growth**.

GDP Growth Decomposition



Source: SSGA Demographics, GGDC, UN



GDP Structure: Advanced Countries

National Income Identity (expenditures method): $C + G + I + (X - M) \equiv \text{GDP}$

C = Consumption, I = Investment, G = Government, X = Exports, M = Imports

GDP Breakdown (% of GDP)

	Netherlands		Belgium		UK	
	1980	2015	1980	2015	1980	2015
Household Consumption	52.2	44.6	55.3	51.2	64.3	65.0
Government Consumption	23.0	25.3	22.7	23.9	20.8	19.4
Gross Capital Formation	23.7	19.3	26.6	23.2	20.2	17.6
Exports	50.8	82.5	49.6	82.9	26.0	27.2
Imports	49.6	71.7	52.7	81.3	23.9	29.3

	Germany		US		Japan	
	1980	2015	1980	2015	1980	2015
Household Consumption	59.2	53.9	61.3	68.1	53	56.6
Government Consumption	20.7	19.2	15.9	14.4	14.4	19.9
Gross Capital Formation	27.0	19.2	23.3	20.3	33.8	23.9
Exports	18.7	46.8	9.8	12.6	13.4	17.6
Imports	23.3	39.2	10.3	15.4	14.6	18

Openness of an economy is measured by the sum of exports + imports as a ratio of GDP:

154% (Netherlands), 164% (Belgium), 56% (UK), 86% (Germany), 36% (Japan), 28% (US)

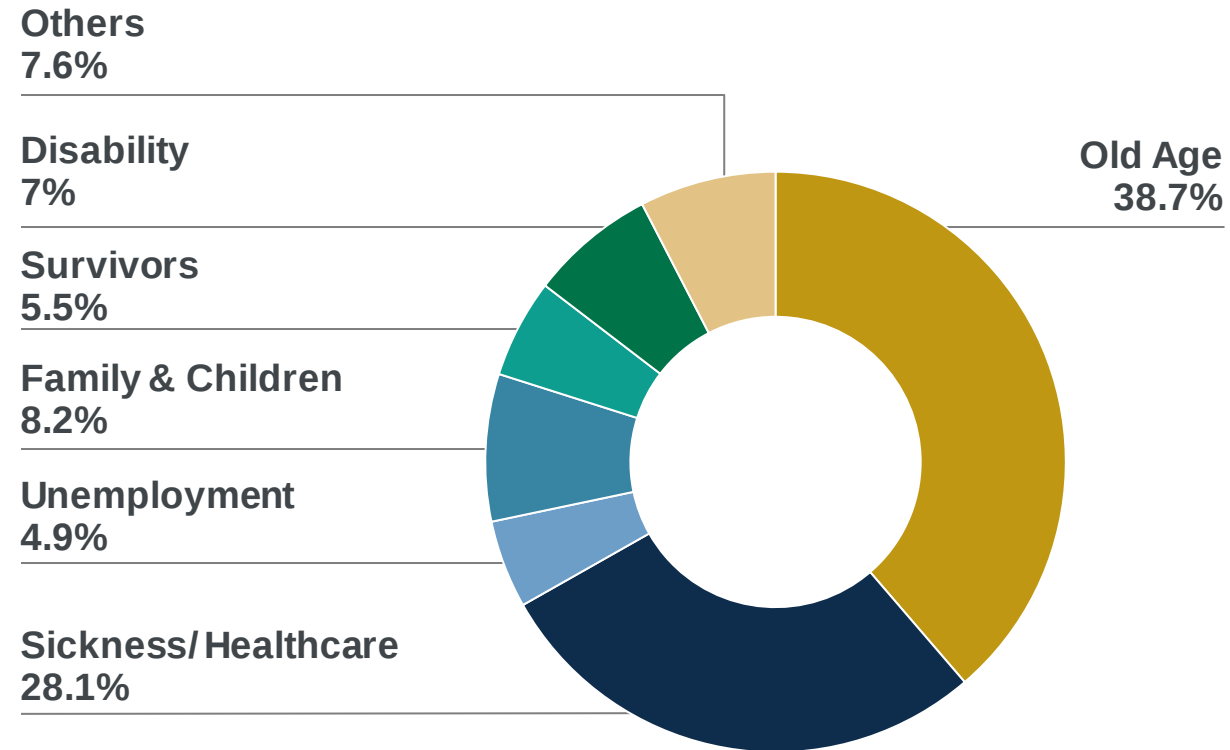
Source: World Bank, SSGA Demographics



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Unsustainable Fiscal Strains (Ageing Related)

EU28, 2014, % of Total Benefits



- In most EU countries, age related expenditures currently account for 20% + of GDP
- This is **unsustainable currently and in future** without radical reform

Source: EC, SSGA Demographics



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EC Projections for Pensions, Health & LT Care: 2016–70

Country	Change 2016–70	2016	2020	2030	2040	2050	2060	2070
Public pensions, gross as % of GDP								
Germany	2.4	10.1	10.3	11.5	12.0	12.2	12.5	12.5
France	-3.3	15.0	15.0	15.4	15.1	13.8	12.5	11.8
Italy	-1.7	15.6	15.6	17.2	18.7	17.3	15.1	13.9
UK	1.7	7.7	7.7	8.0	8.6	8.3	8.9	9.5
EU28	-0.2	11.2	11.1	11.6	12.0	11.7	11.3	11.0
Health care spending as % of GDP — Baseline scenario								
Germany	0.7	7.4	7.5	7.7	8.0	8.2	8.1	8.1
France	0.5	7.9	8.0	8.2	8.4	8.4	8.4	8.3
Italy	0.7	6.3	6.2	6.5	6.9	7.2	7.1	7.0
UK	1.4	7.9	8.1	8.4	8.8	9.1	9.2	9.4
EU28	0.9	6.8	6.9	7.2	7.4	7.6	7.7	7.7
Long-term care spending as % of GDP — Baseline scenario								
Germany	0.6	1.3	1.5	1.7	1.8	2.0	2.0	1.9
France	0.6	1.7	1.8	1.9	2.3	2.4	2.4	2.4
Italy	1.2	1.7	1.8	2.0	2.3	2.8	3.1	3.0
UK	1.3	1.5	1.6	1.8	2.1	2.4	2.6	2.8
EU28	1.2	1.6	1.7	1.9	2.2	2.5	2.7	2.7

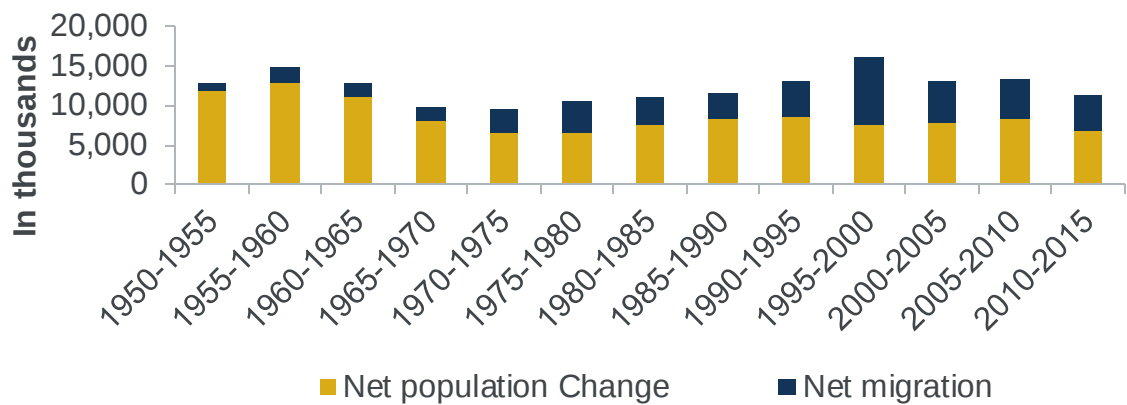
Source: EC Ageing Report, SSGA Demographics



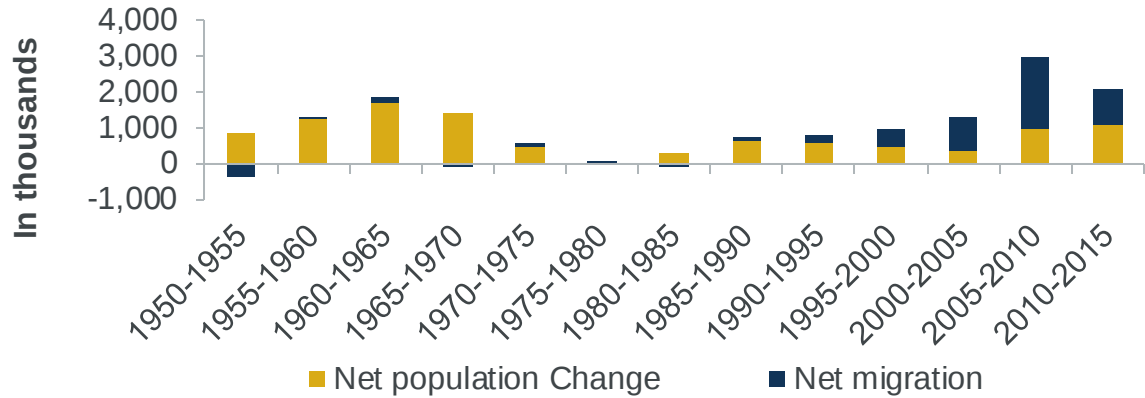
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Decomposition of Population Change

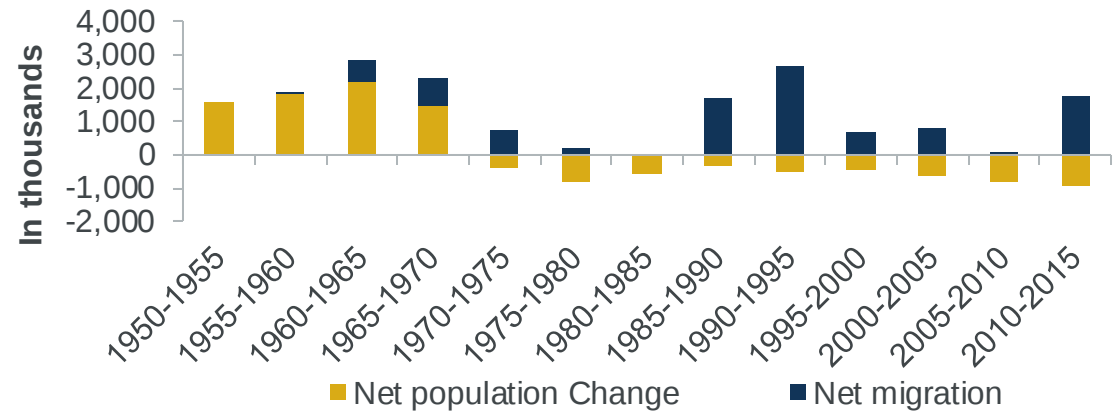
US



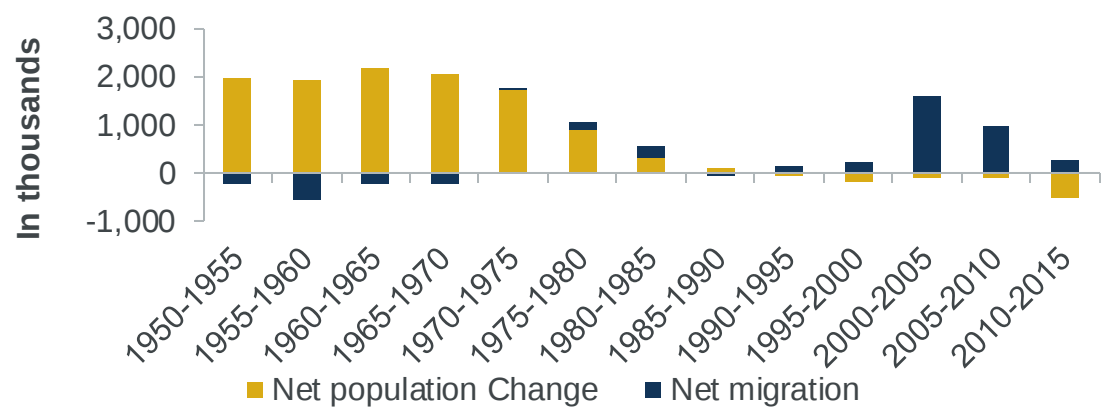
UK



Germany



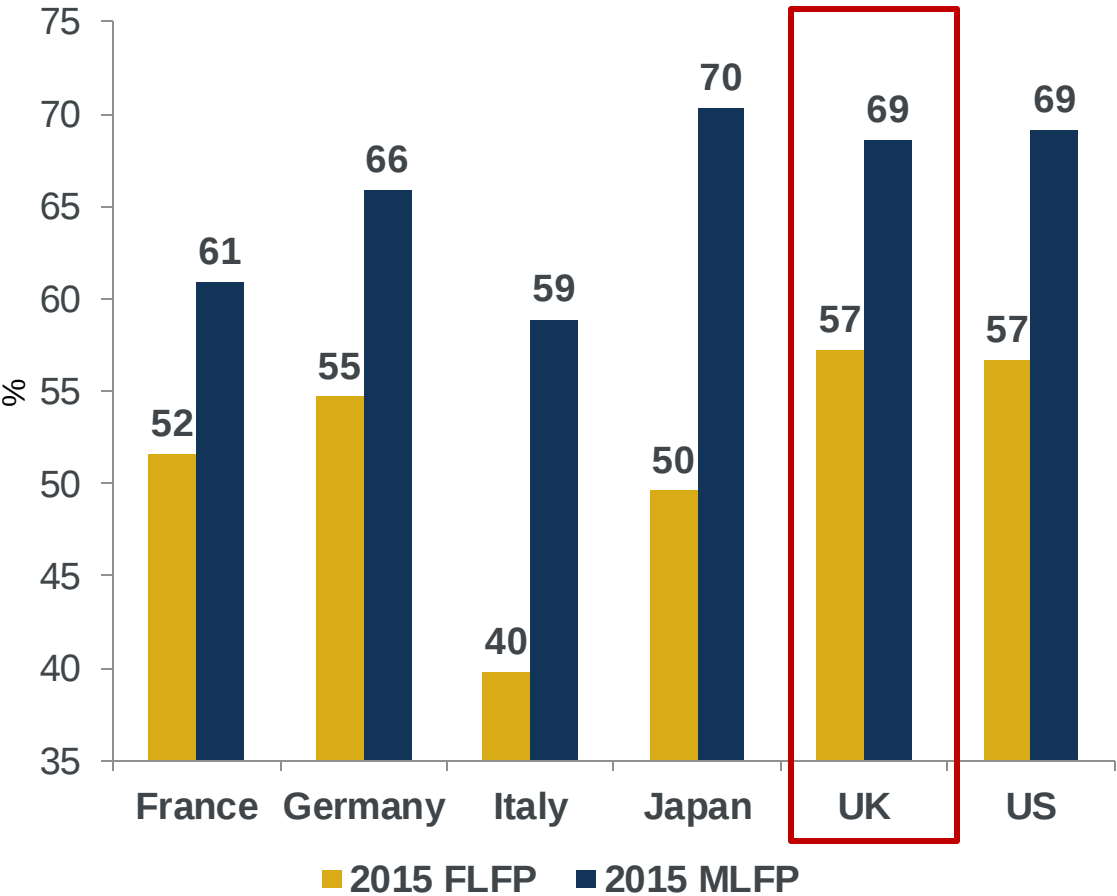
Italy



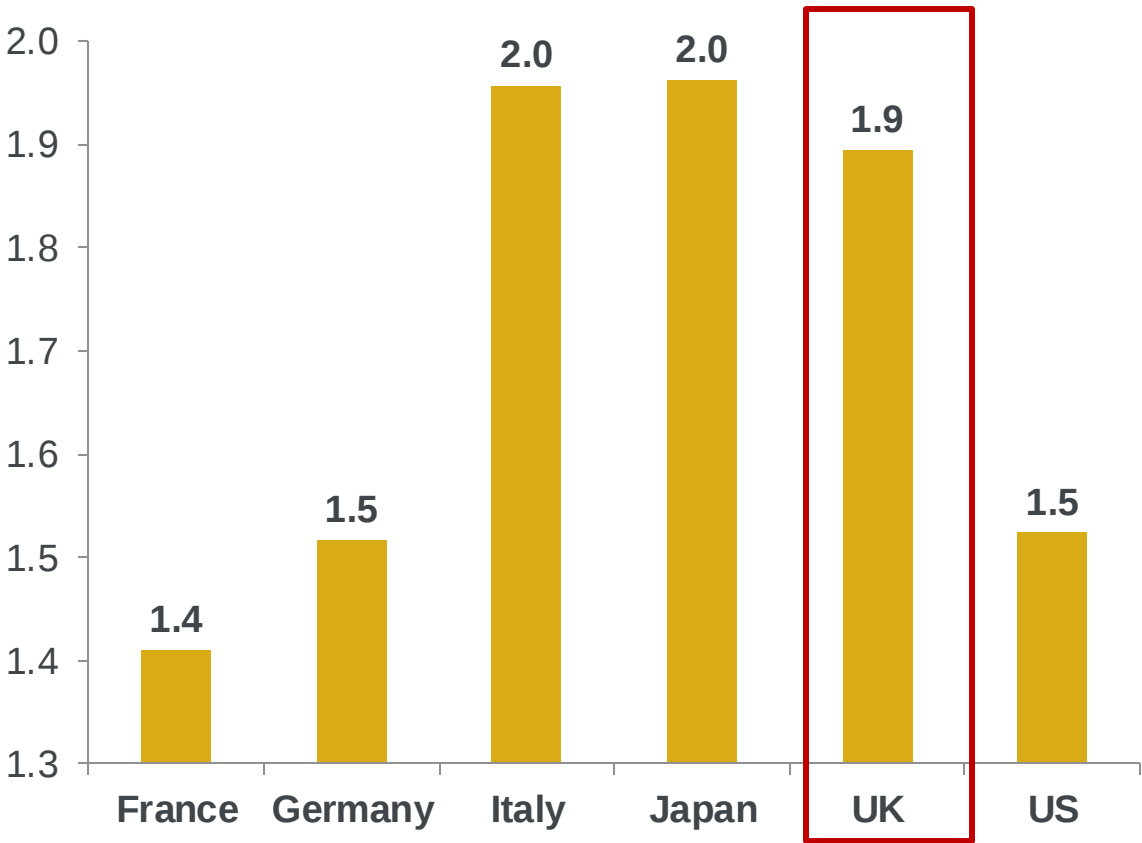
Source: UN, SSGA Demographics

Gender Differences: Participation & Income

Gender Labour Participation Differences

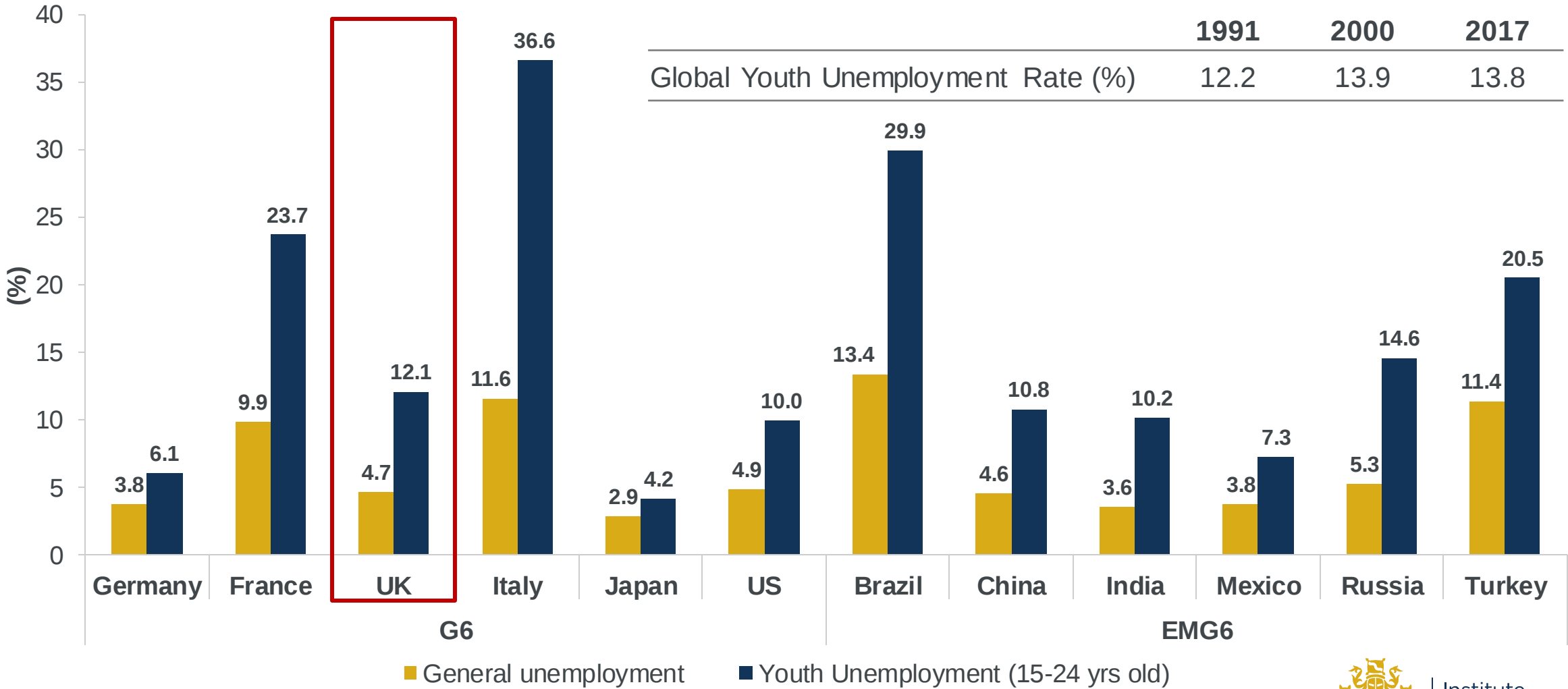


Ratio of Male GNI Per Capita to Female GNI Per Capita 2015 in 2011 PPP



Source: ILO, UN, SSGA Demographics

Rising Youth Unemployment



Source: ILO, World Bank, SSGA Demographics



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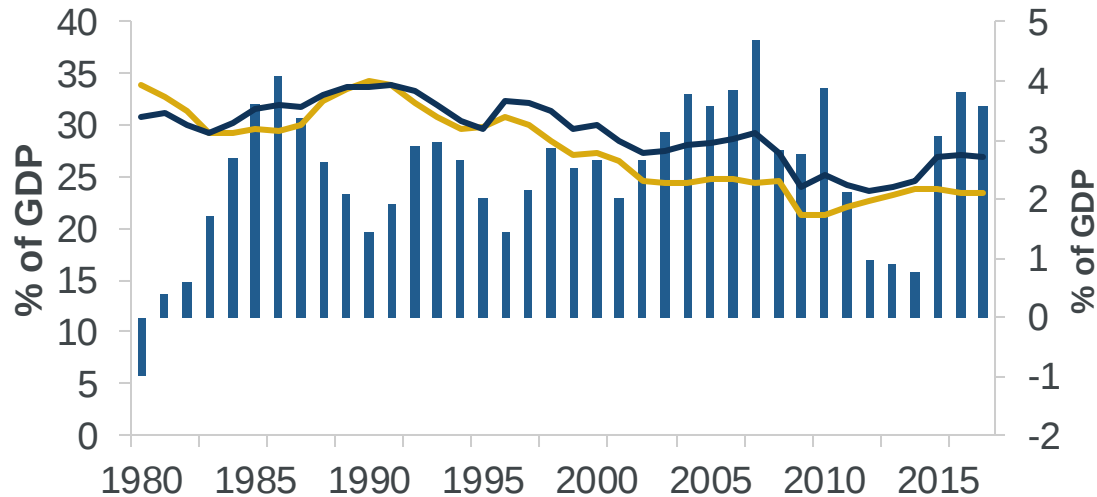
Demographics, Savings & Current Account

From National Income Identity: $S = I + CA + (G - T)$

S = Private Saving, I = Investment, G = Government Expenditure, CA = X – M = Net Exports, T= Taxes

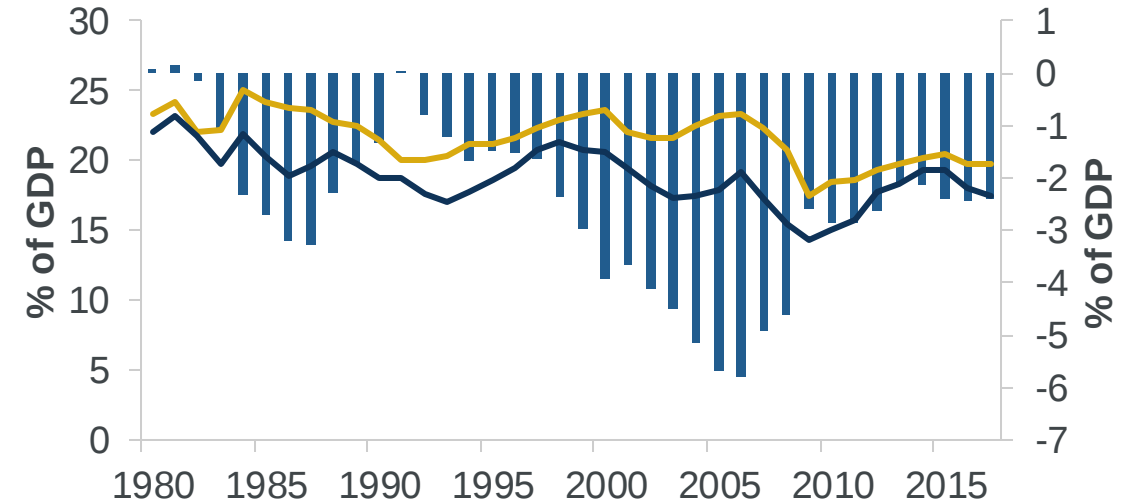
We find statistically strong links between **demographic variables** & aggregate saving, investment and **current account balance**

Japan



■ Current account balance (RHS) — Total investment (LHS) — Gross national savings (LHS)

US



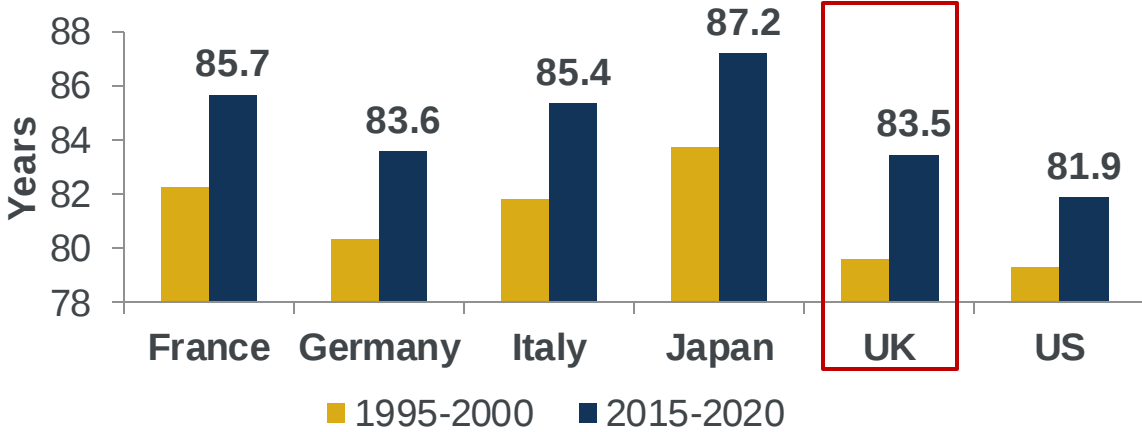
Source: IMF, SSGA Demographics



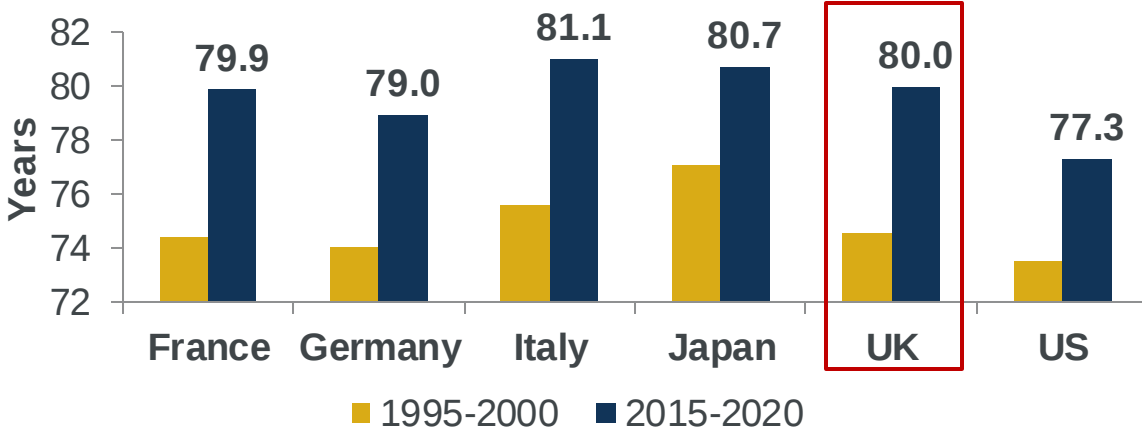
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Life Expectancy at Birth and at Age 60

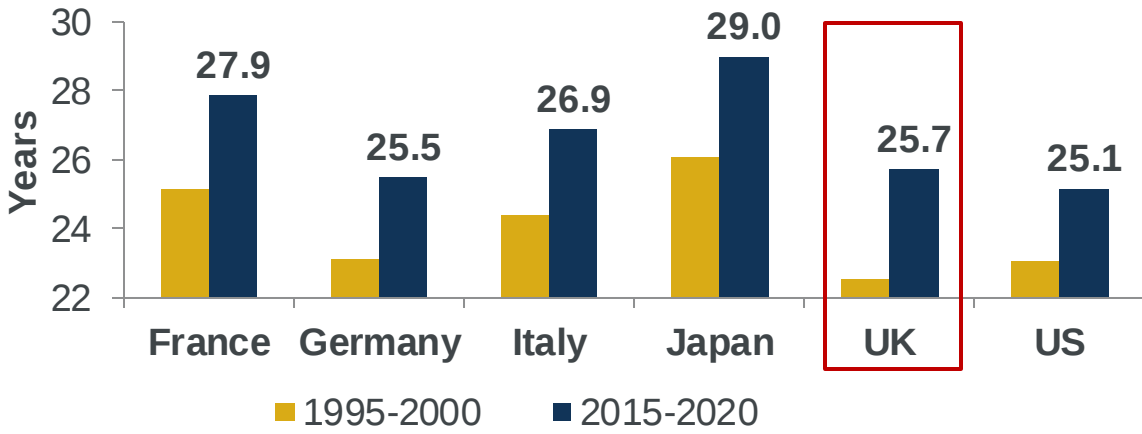
Female Life Expectancy at Birth



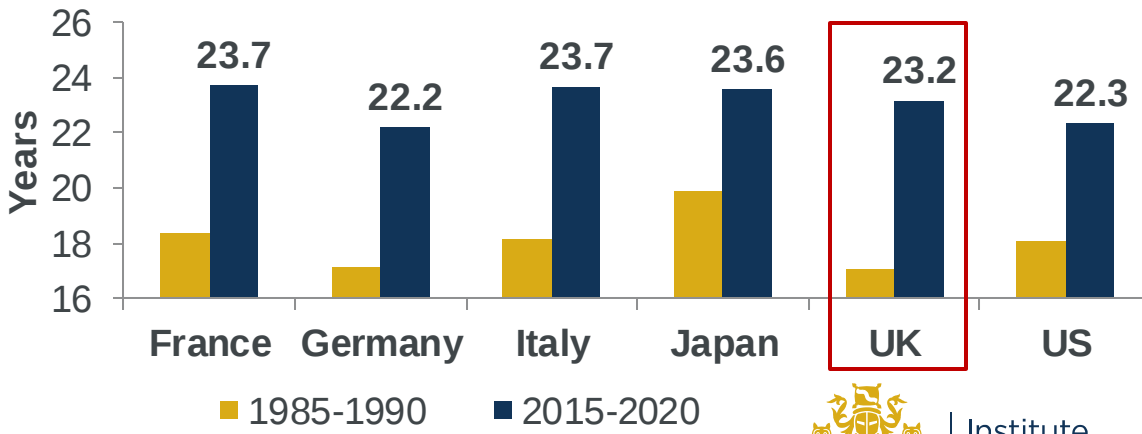
Male Life Expectancy at Birth



Female Life Expectancy at Age 60



Male Life Expectancy at Age 60

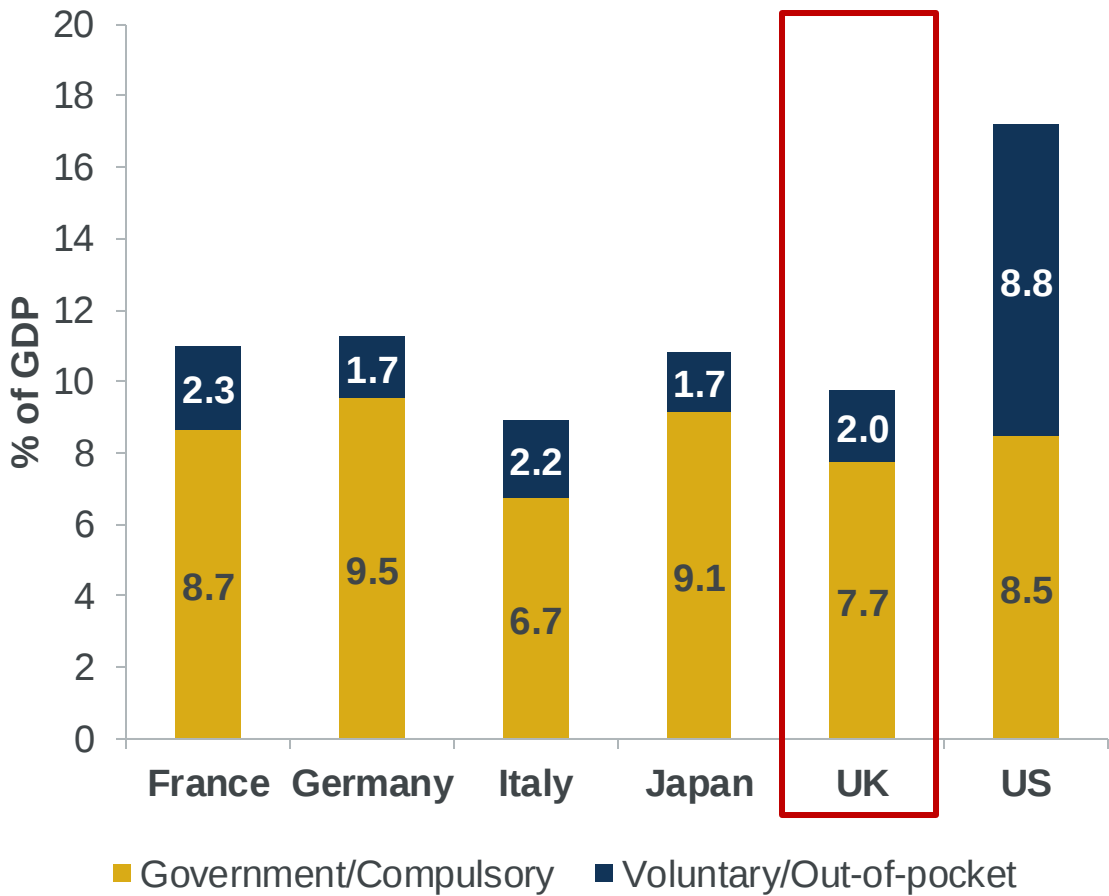


Source: UN, SSGA Demographics



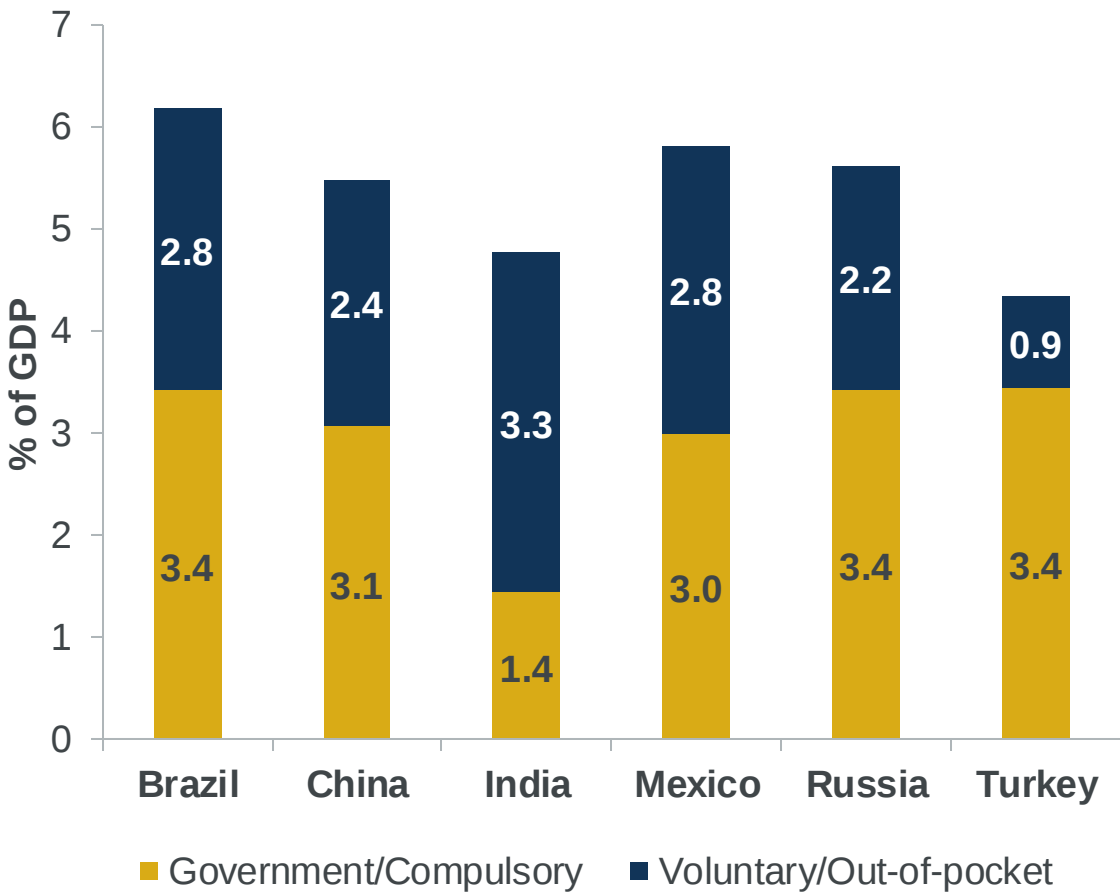
Health Expenditures

G6 Health Expenditures as % of GDP, 2016



Source: OECD, SSGA Demographics

EMG6 Health Expenditure as % of GDP, 2016 or Nearest Year



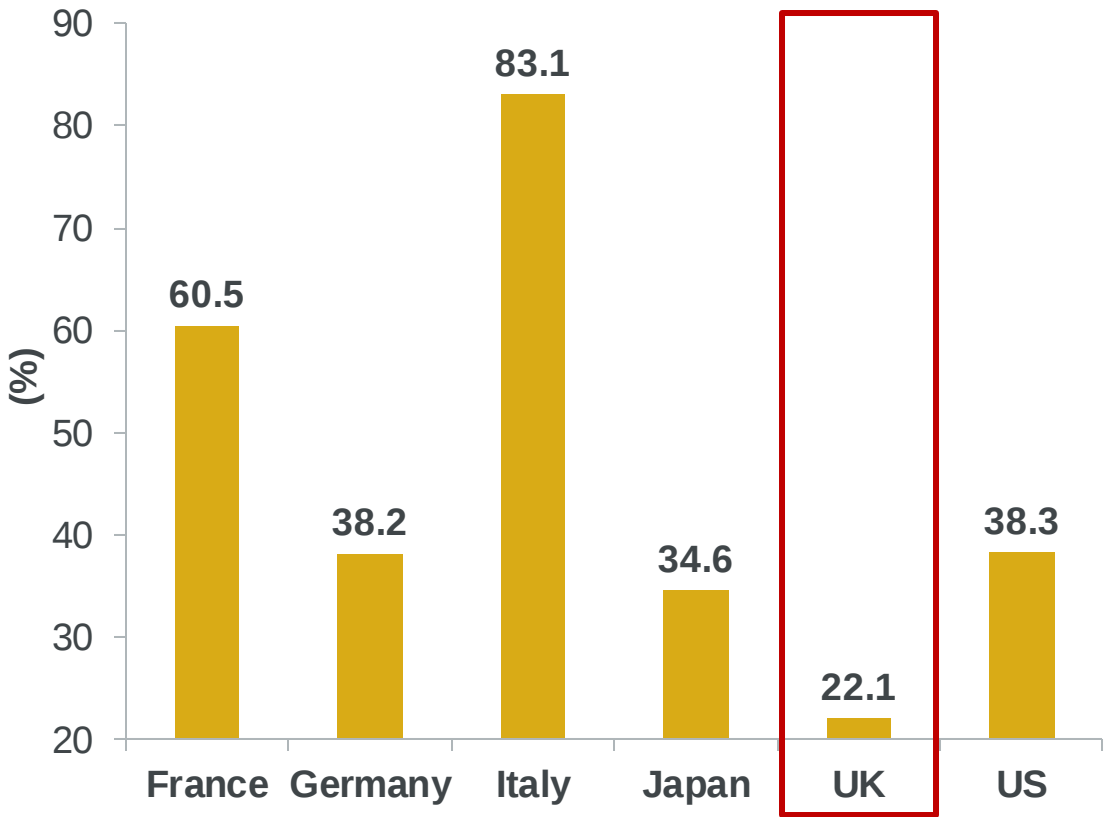
Brazil data relates to 2013.
Russia data relates to 2015.
China and India's data relates to 2014.



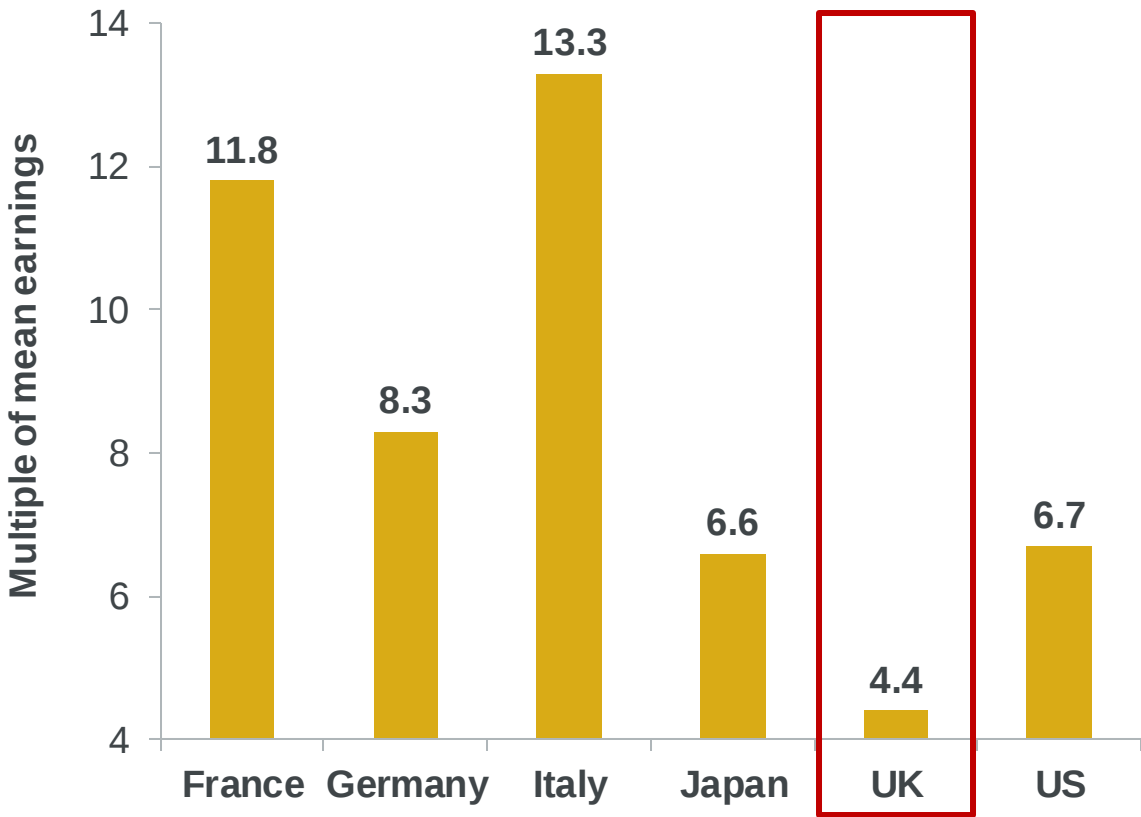
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Pension Indicators, Average Male Earners (2016)

G6: Gross Pension Replacement Rates



G6: Gross Pension Wealth



Source: OECD, SSGA Demographics



Demographics & Monetary Policy

My view since 2005

Effects of Interest Rates:

The **young**: Long on human capital & short on assets

The **old**: Long on assets & short on human capital

Monetary policy impact is different based on **relative fractions of young & old**

Credit Restrictions

The more people in the latter parts of their working lives and in retirement and the fewer the young workers — the less important are credit constraints



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Demographics & Asset Pricing Fundamentals

Research has shown demographics to affect the following which are fundamentals of asset prices.

- GDP growth
- Inflation
- Sovereign Spreads
- Sovereign Ratings
- Long-term interest rates
- Equity premia
- Credit spreads
- Real Estate

Therefore it is essential to understand the dynamics of both behaviour and fundamentals in asset allocation.



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Sectors Demographically Advantaged

Changing consumers and workers in a global and technologically advancing world.
Not just people numbers, but groups and behaviours impact these sectors.

INFRASTRUCTURE

NATURAL RESOURCES

LEISURE & LUXURY

EMERGING MARKETS

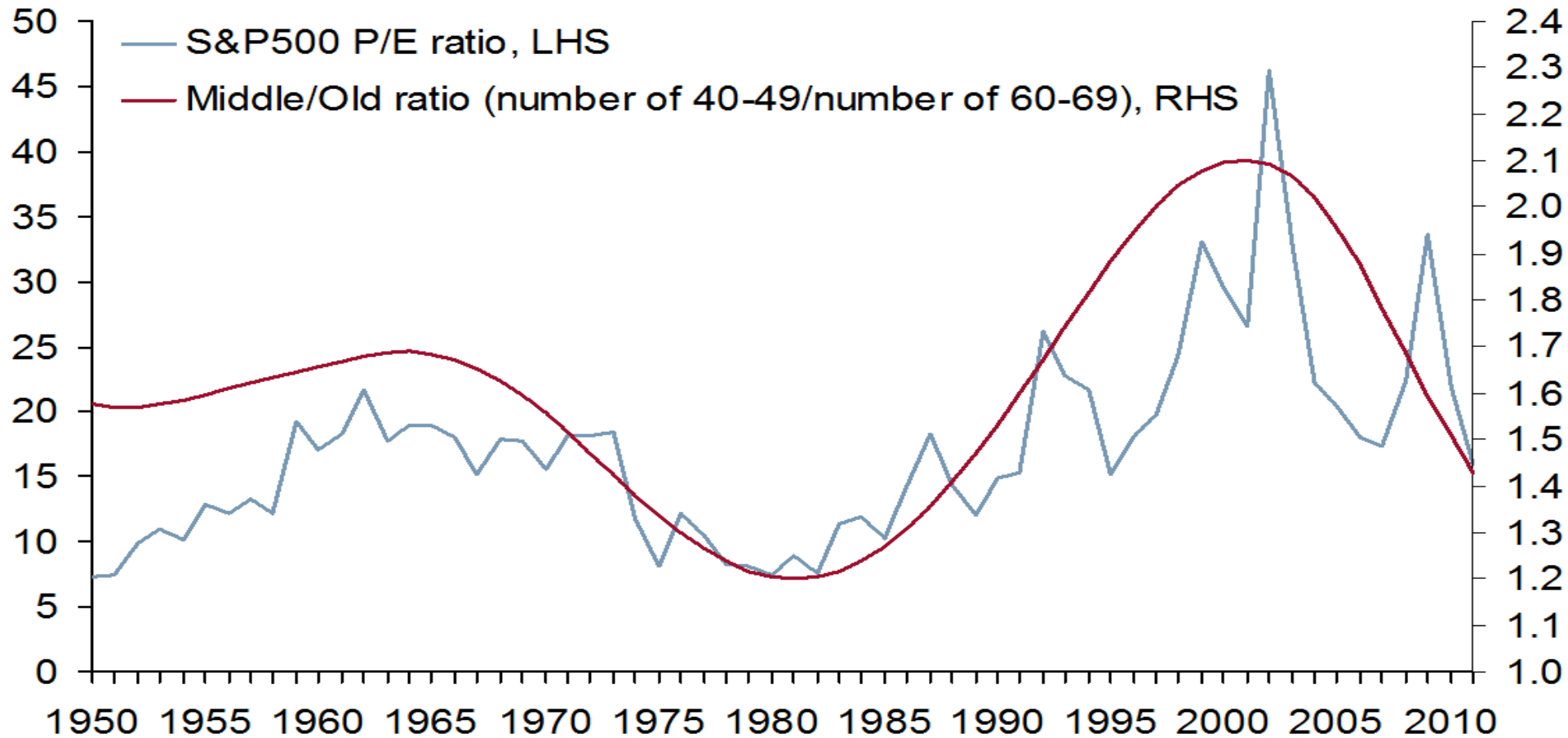
PHARMA & *BIOTECH*

FINANCIAL SERVICES



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Misapplication of Demographics? US: S&P 500 P/E Ratio and Middle/Old Ratio



Weak correlation for France, Germany and Japan when this framework is applied.

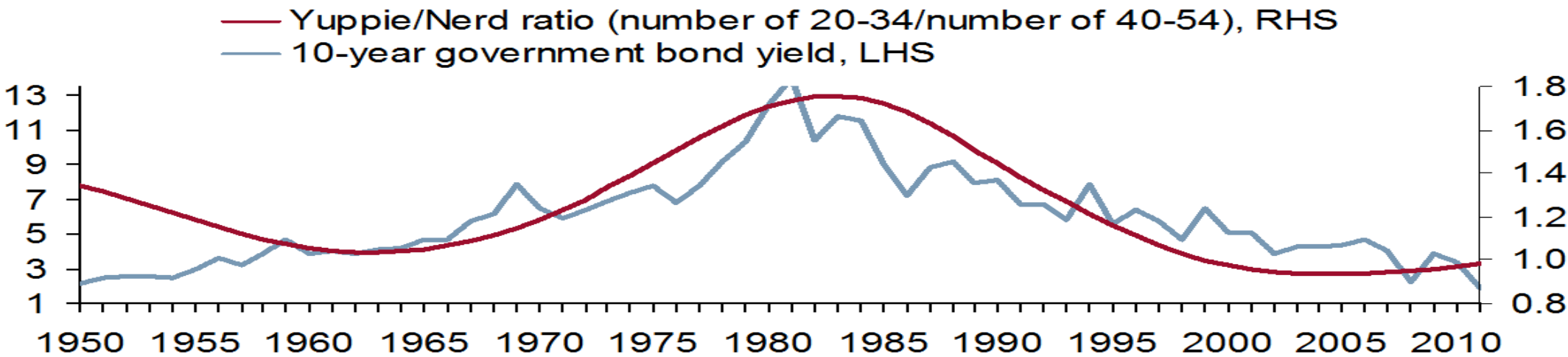
Source: UN, Online Data Robert Shiller, CS



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Demographics & Interest Rates

US: Yuppie/Nerd ratio & nominal 10-year government bond yield



Correlation between Yuppie/Nerd ratio & nominal 10-year government bond yield

	US	UK	Japan	France	Germany
Time period	1950–2011	1958–2011	1972–2011	1950–2011	1950–2011
Correlation	0.8	0.81	0.57	0.83	0.69

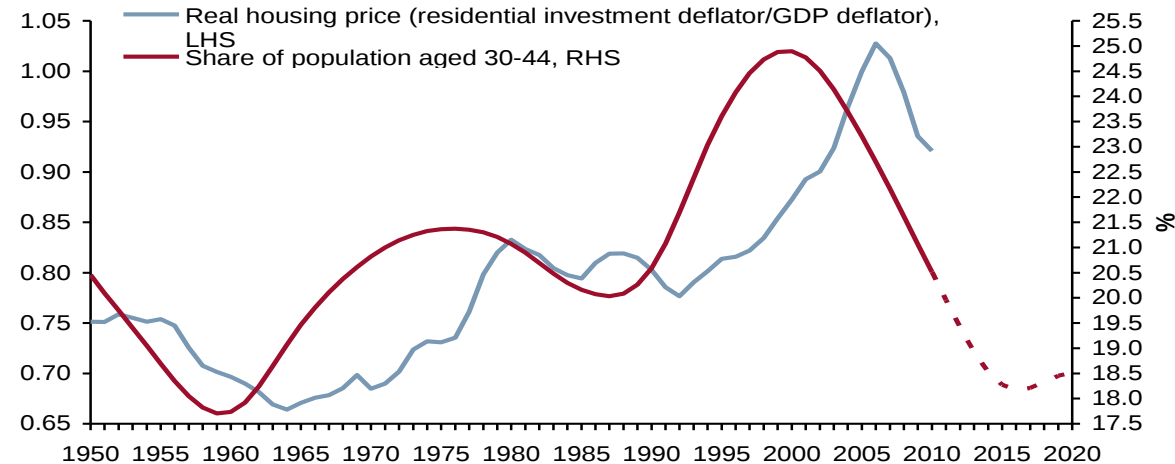
Source: Global Financial Data, UN, CS
Past performance is not a guarantee of future results.



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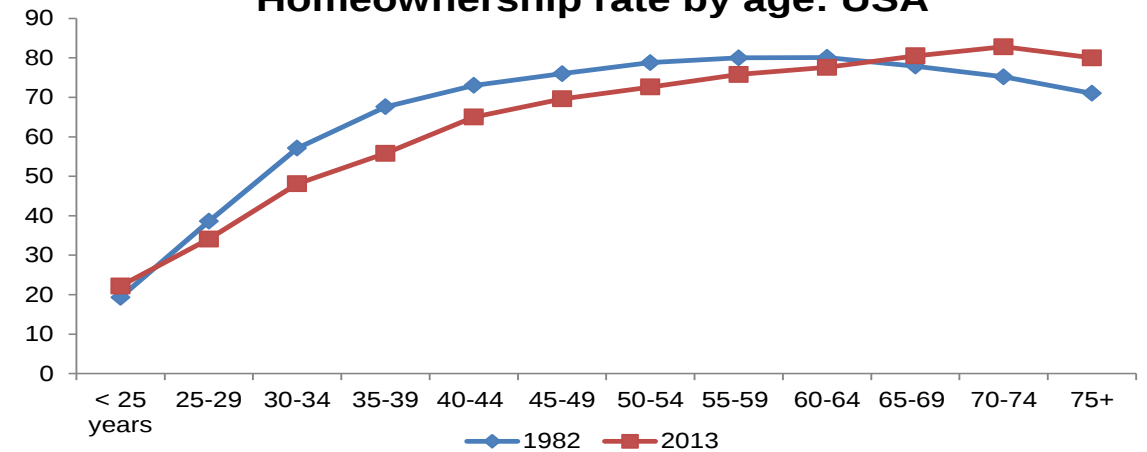
Housing & Population Share (30–44 years)

Real Housing Price & Share of Population Aged 30–44, US



Real housing price is the residential investment deflator divided by the GDP deflator

Homeownership rate by age: USA



Source: Bureau of Economic Analysis, US Census Bureau UN, CS



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Population Density & Water/Sanitation Access

(%) of Population with Access to Improved Sanitation Facilities

	Rural		Urban	
	1990	2015	1990	2015
Brazil	31.0	51.5	79.1	88.0
China	40.2	63.7	67.8	86.6
India	5.6	28.5	49.3	62.6
Mexico	34.5	74.5	78.9	88.0
Russia	58.3	58.7	77.9	77.0
Turkey	63.8	85.5	96.1	98.3

(%) of Population with Access to Improved Water Source

	Rural		Urban	
	1990	2015	1990	2015
Brazil	67.7	87.0	95.8	100.0
China	56.1	93.0	97.0	97.5
India	64.2	92.6	88.9	97.1
Mexico	59.4	92.1	91.5	97.2
Russia	81.6	91.2	97.8	98.9
Turkey	74.7	100.0	94.2	100.0

Population Density (People Per Sq. Km)

	1985	2016
Japan	331.2	348.4
UK	233.7	271.3
France	103.7	122.2
Italy	192.4	206.0
Germany	222.5	236.9
US	26.0	35.3
Canada	2.9	4.0
Brazil	16.2	24.8
China	112.0	146.9
India	262.9	445.4
Mexico	39.8	65.6
Russia	8.8	8.8
Turkey	63.8	103.3

Source: World Bank, SSGA Demographics



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Pension Fund Asset Allocation Trends: 2017 versus 2001

	2001				2017			
	Equities (%)	Bonds (%)	Cash (%)	Other (%)	Equities (%)	Bonds (%)	Cash (%)	Other (%)
Australia	62	19	5	14	49	14	15	22
Canada	62	26	2	10	45	31	2	22
Japan	52	46	0	2	30	56	4	10
Netherlands	44	44	11	1	33	50	0	17
Switzerland	36	35	20	9	33	34	4	28
UK	67	18	5	10	47	35	2	16
US	65	28	2	5	50	21	2	28

DB — DC Asset Split (2017 versus 2001)*

	2001		2017	
	DC (%)	DB (%)	DC (%)	DB (%)
Australia	83	17	87	13
Canada	3	97	5	95
Japan	0	100	4	96
Netherlands	2	98	6	94
UK	8	92	19	81
US	52	48	60	40

Source: Willis Towers Watson (2018)

* DC assets in Switzerland are cash balance plans and are excluded from the analysis



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Factors Influencing Longevity

Robert Fogel (2005): Physiology of aging over life cycles of 3 cohorts:

Civil War cohort (1838–1845): Short lives with common disabilities at young ages, prone to malnutrition and exposed to severe diseases

World War II cohort (1920 and 1930): Fewer died as infants, most lived past age 60 without severe chronic diseases

Cohort born between 1980 and 1990: 50–50 chance of living to age 100

Heterogeneity of longevity depends on:

Social economic status (education, occupation, income level)

Gender, marital status, nutrition

Living environment (climate, pollution, sanitation, population density)

Physiological factors

Life style, diet

Source: R. Fogel (2005), 'Changes in the Physiology of Aging During the Twentieth Century', NBER Working paper 11233



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An “Asset Allocation Puzzle”

Advisor and Investor Type	% of Portfolio			Ratio of Bonds to Stocks
	Cash	Bonds	Stocks	
Fidelity				
Conservative	50	30	20	1.5
Moderate	20	40	40	1
Aggressive	5	30	65	0.46
Merrill Lynch				
Conservative	20	35	45	0.78
Moderate	5	40	55	0.73
Aggressive	5	20	75	0.27
Jane Bryant Quinn				
Conservative	50	30	20	1.5
Moderate	10	40	50	0.8
Aggressive	0	0	100	0
New York Times				
Conservative	20	40	40	1
Moderate	10	30	60	0.5
Aggressive	0	20	80	0.25

In a 1997 study, 4 financial advisors provided asset allocation recommendations for different types of investors — conservative, moderate and aggressive

Their advice on the ratio of bonds to stocks varied with investor-type. This is contrary to Markowitz and was considered a puzzle by the authors

Source: Mankiw et al (1997)



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Development, Governance, Corruption & Gender Balance Indicators

Countries	Human Development Index Score (%)	Human Development Index Rank	Gender Gap Index Score (%)	Gender Gap Index Rank	Corruption Perception Index Score	Corruption Perception Index Rank	Sustainability	Percentile Rank
Norway	94.9	1	83.0	2	85	6	1.17	91.4
Switzerland	93.9	2	75.5	21	86	5	1.32	95.7
Germany	92.6	4	77.8	12	81	10	0.76	71.0
Netherlands	92.4	7	73.7	32	83	8	0.89	77.6
US	92.0	10	71.8	49	74	18	0.35	58.6
Canada	92.0	10	76.9	16	82	9	1.24	93.3
Sweden	91.3	14	81.6	5	88	4	0.98	82.4
UK	91.0	16	77.0	15	81	10	0.38	59.0
Japan	90.3	17	65.7	114	72	20	1.01	86.2
France	89.7	21	77.8	11	69	23	-0.06	44.3
Finland	89.5	23	82.3	3	89	3	0.96	81.0
Italy	88.7	26	69.2	82	47	60	0.35	58.1
Saudi Arabia	84.7	38	58.4	138	46	62	-0.50	28.6
Russia	80.4	49	69.6	71	29	131	-0.89	16.7
Turkey	76.7	71	62.5	131	41	75	-2.00	5.7
Mexico	76.2	77	69.2	81	30	123	-0.77	20.0
Brazil	75.4	79	68.4	90	40	79	-0.45	30.0
China	73.8	90	67.4	100	40	79	-0.52	27.1
India	62.4	131	66.9	108	40	79	-0.95	14.3

Source: WB, WEF, UN, TI, SSGA Demographics



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Conclusions

Changing behaviour of consumers and workers is rendering many old models invalid.

Understanding of behaviour alongside market and economic factors will be key to good policy.

Macro fundamentals (growth, inflation, public debt) are affected by underlying demographics

Demographics affects equity premia, sovereign spreads, sovereign ratings, term premia and therefore has implications for asset allocation

Pensions strategic asset allocation must holistically take into account the macro drivers of inflation risk, interest rate risk, longevity risk and market risk

The social implications of demographics are now being captured by the Sustainable Development Goals at a macro-policy level and ESG at the micro investments level.



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Global Demographics & Retirement Research

- Asia at A Crossroads: Demographics, Economics & Investment (November 2018)
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- Why Global Demographics Matter? (September 2017)

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<https://www.ssga.com/global/en/our-insights/viewpoints/demographics-and-retirement.html>



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Biography



Amlan Roy, PhD

Dr. Amlan Roy is the Global Chief Retirement Strategist and Senior Managing Director at SSGA since April 2017. He is an experienced Global Macro Researcher specializing in Demographics & Pensions related to Economics, Investments and Public Policy. He highlights structural issues related to gender disparity, youth unemployment, system risks due to policy interactions with ALM & SAA. He is a Senior Research Associate at LSE and Guest Finance Professor at LBS.

Prior to joining SSGA, he was Head of Global Demographics & Pensions Research and Managing Director at Credit Suisse having joined there in 1998. At Credit Suisse, Amlan was a client facing Researcher presenting to clients in 25+ countries and speaking at 60+ global conferences/events. In a prior role he developed global risk and asset allocation models serving as an international expert on Financial System Architecture.

His big-picture macro strategic research in Global Demographics & Pensions is used by policy makers and investors and draws on the fields of Macroeconomics, Portfolio Theory, Behavioral Economics, Statistics, Derivatives and Econometrics.

Prior to joining Credit Suisse, he spent over a decade in academia with a distinguished teaching career in the US and the UK. He was UK ESRC Research Fellow, Ponders Fellow a Boston University Doctoral Scholar and a Government of India National Scholar. Amlan has a PhD and an MA in Financial Economics from the University of Iowa, an MBA from Indian Institute of Management Ahmedabad and a BA Honours in Economics from St. Stephen's College, University of Delhi.



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Questions

Comments

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