Strategic Asset Allocation - Assumptions are key

March 8, 2006

SOCIETE GENERALE
Asset Management

Michala Marcussen

Head of Strategy and Economic Research

New techniques, but assumptions remain key !

- Traditional asset only approach
  - Expected asset returns
  - Asset volatilities
  - Asset correlations
  - Assumes a single time period

- Liability Driven Investment (LDI)
  - Demographic variables (mortality rates, marital rates, retirement rates, …)
  - Wage inflation / Cost of living adjustment
  - Assumptions on the return portfolio

- Dynamic stochastic Asset Liability Management (ALM)
  - Defining probability distributions for the underlying variables
  - Assumes multiple time periods

Setting assumptions : Historical data

Historical data

- Many portfolio optimisation models still rely on historical data as a guide to future outcomes (expected return, volatility, correlation)
- ✓ Simple to implement
- × Assumptions are often unrealistic (and sometimes even impossible !)

US Treasury market (Lehman index)

	Annualised return		Breakeven yield	Breakeven yield
	Nominal	Real	5yr horizon	15yr horizon
Spot			**4.6%**	**4.6%**
-5 years	5.6%	3.0%	2.7%	9.5%
-10 years	5.9%	3.3%	2.1%	11.3%
-15 years	7.1%	4.4%	-	18.0%

The breakeven yield is the yield level at end point (linear interpolation) required to obtain the same nominal return over the horizon.

Setting assumptions : Spot data

Spot market data

- Take current spot market data as a point of departure
  - Spot bond yields
  - E/P ratios for equities
  - Implicit inflation expectations

- Taking our example from the previous slide, this implies a nominal return assumption of 4.6% per annum for US government bonds over the maturity of the index of around 7 years

✓ Simple to implement

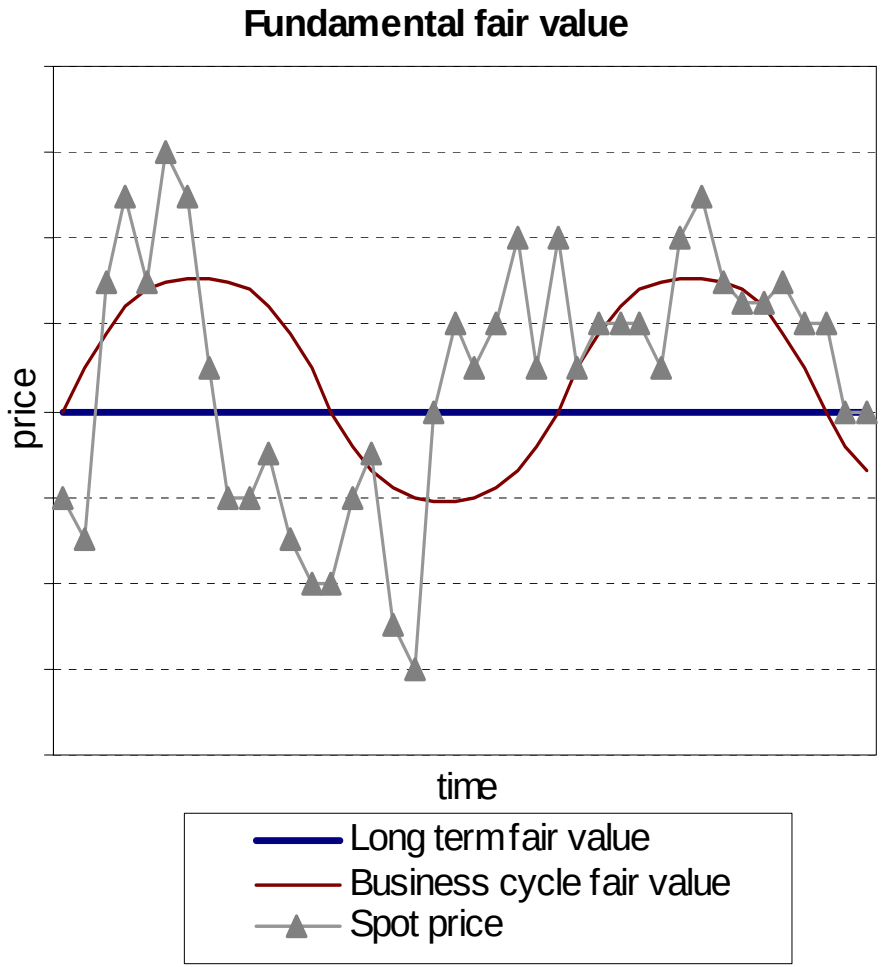
✓ An often more probable assumption than historic market data

× Assumes that asset classes constantly trade at fair value

Setting assumptions : Fundamental fair value

Fundamental fair value (Mean reversion)

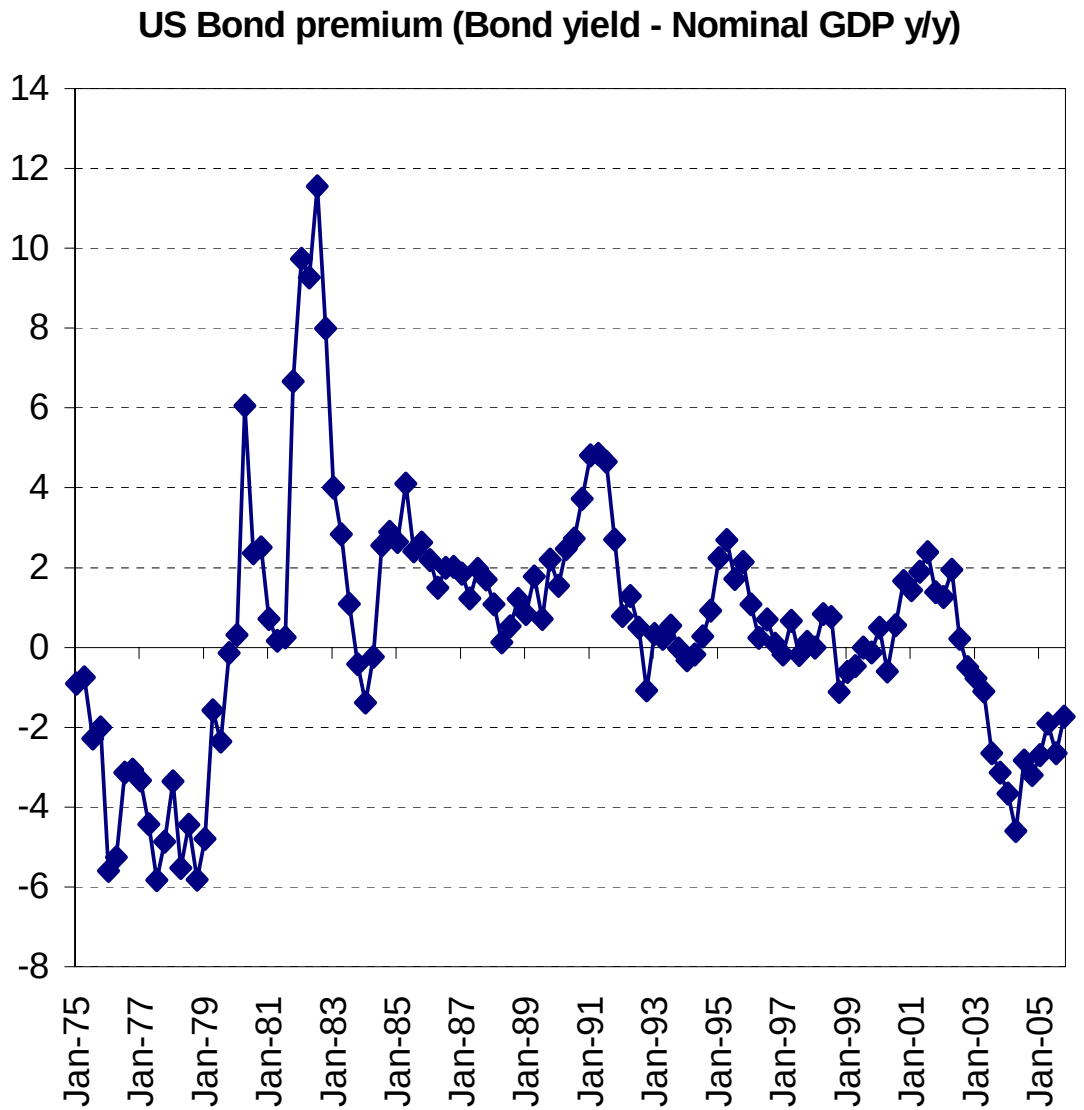
- Fundamental fair values are determined by the trend potential growth rate of the economy and the structural factors hereof
- Any divergence from the fundamental fair value will occur as a result of short-term divergence from the long-term trends (I.e. the business cycle) and/or as a result of short-term market factors (i.e. liquidity, new regulation, etc.)



- ✓ Corrects for short-term divergence from fundamental fair value
- ✓ Allows for the development of long-term assumptions
- ✓ Provides realistic assumptions
- ✓ A framework for scenario analysis
- × Model risk is substantial

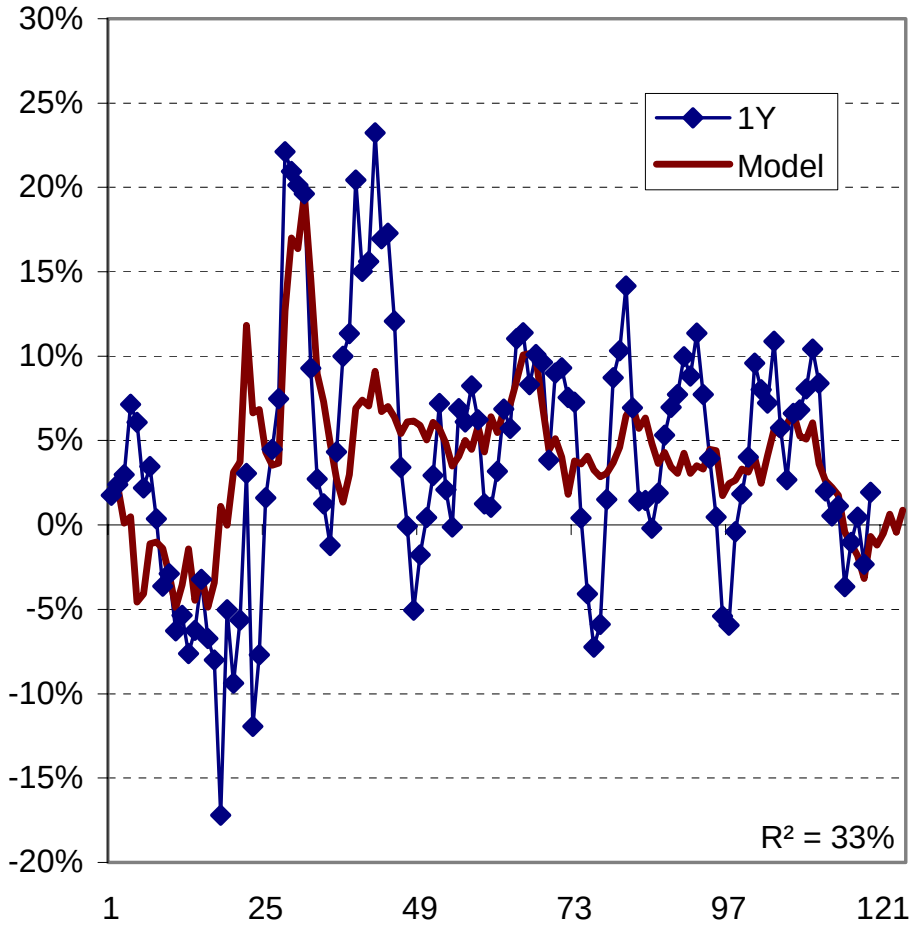
A simple fundamental fair value model…

- A simple bond risk premium
  - Nominal bond yield minus nominal GDP
  - Mean reverting
- A simple model for bond returns
  - Accumulated real return over a given period is a function of the bond risk premium at time 0

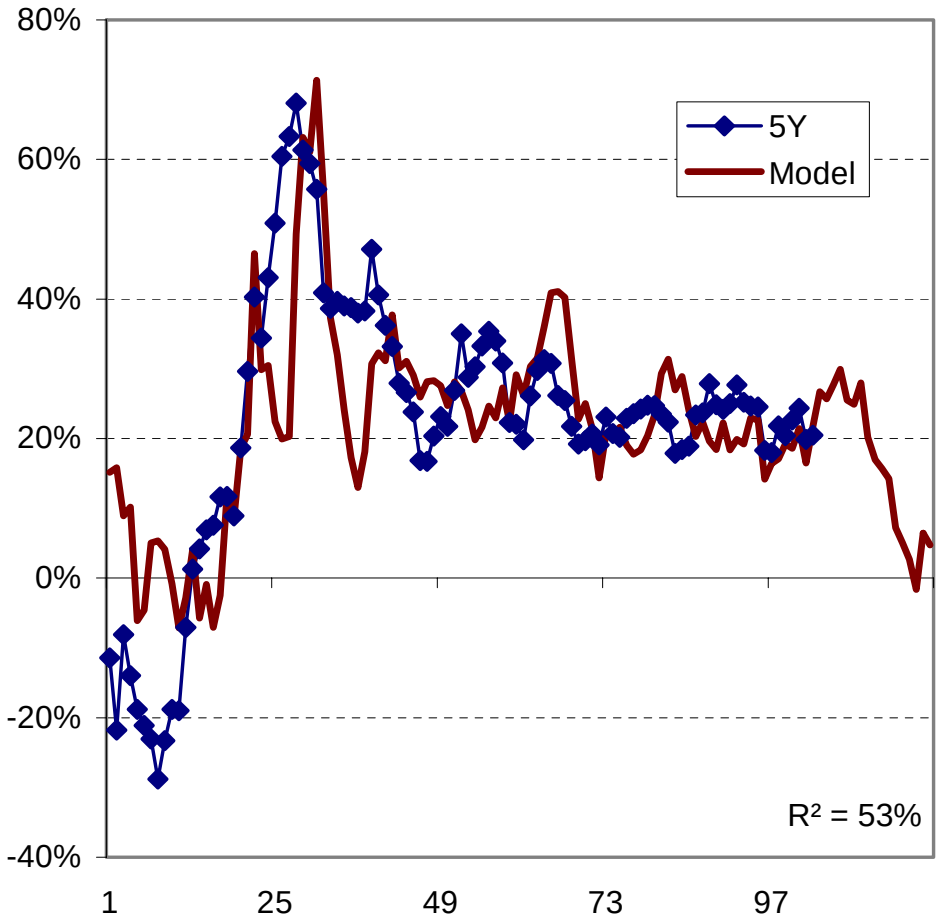


… predictability increases over time

Model : Real US Treasury market return (acc.)



Model : Real US Treasury market return (acc.)



Heading towards a dynamic allocation approach

- Strategic Asset Allocation (SAA)
  - Analysis of investor objectives and risk tolerance
  - Long time horizon
  - Static asset allocation
- Tactical asset allocation (TAA)
  - Analysis of financial market conditions : takes advantage of short term inefficiencies
  - Short time horizon
  - Active asset allocation

- Dynamic Asset Allocation
  - Integrated approach to the investor's situation and financial market conditions
  - Multiple time horizons
  - Active approach

Developing a framework for fundamental fair value analysis : Asset class valuation inputs

- Bond model inputs
  - Real GDP growth
  - Inflation
  - A risk premium linked to the stability of the overall economy and the condition of public finances
  - A risk premium linked to investor preferences

- Equity model inputs
  - Real earning growth coherent with the long-term view on GDP growth
  - Mean reversion of the P/E ratio over the long term
  - We do allow for changes to the fair value of P/E reflecting underlying structural changes

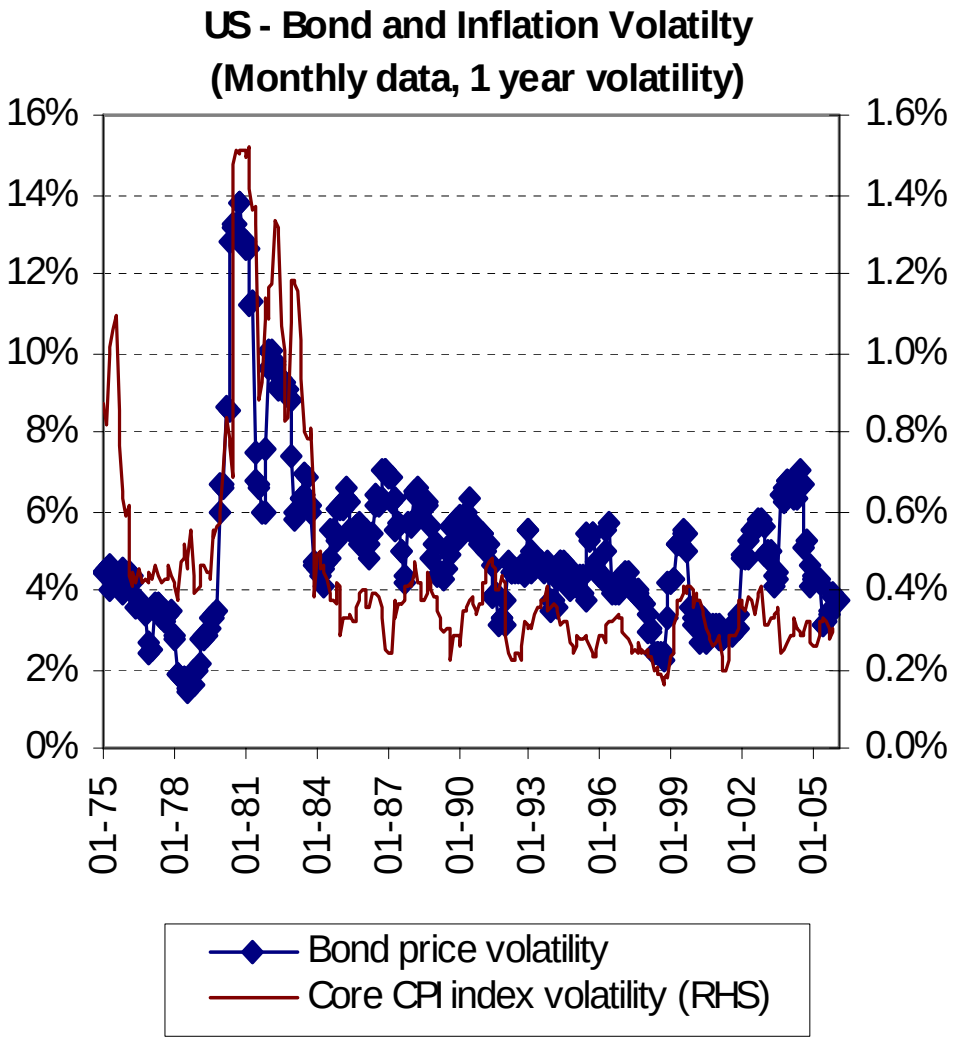
- Foreign exchange inputs
  - Purchasing power parity
  - Productivity gains (Balassa-Samuelson)
  - Balance of payments

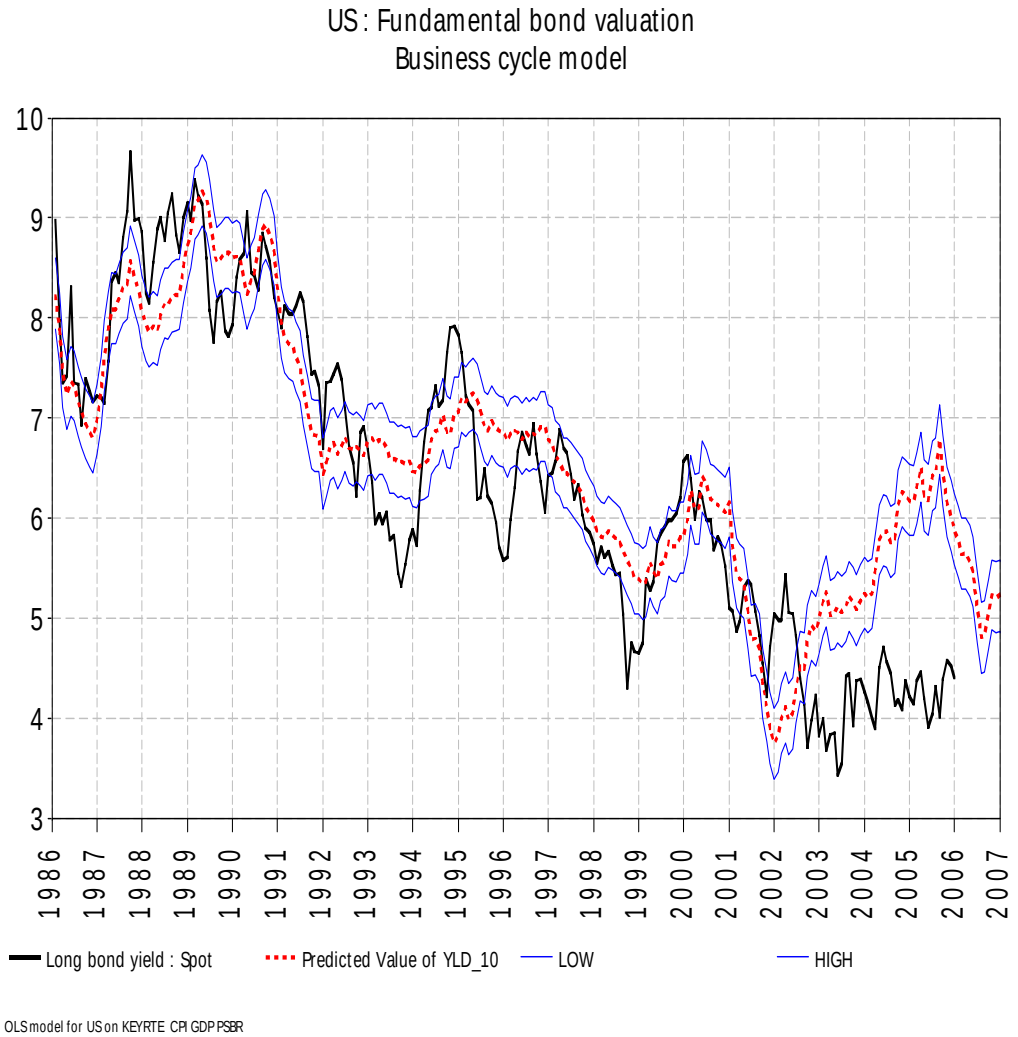
Developing a framework for fundamental fair value analysis : Volatility and correlation

- Asset class volatility
  - Structural component
    - A function of the long-term volatility of the underlying economy , notably monetary policy
  - Cyclical component
    - Tied to the liquidity cycle, again monetary policy is key
    - Note, that with enhanced global financial market integration, cyclical volatility is increasingly tied to global liquidity conditions

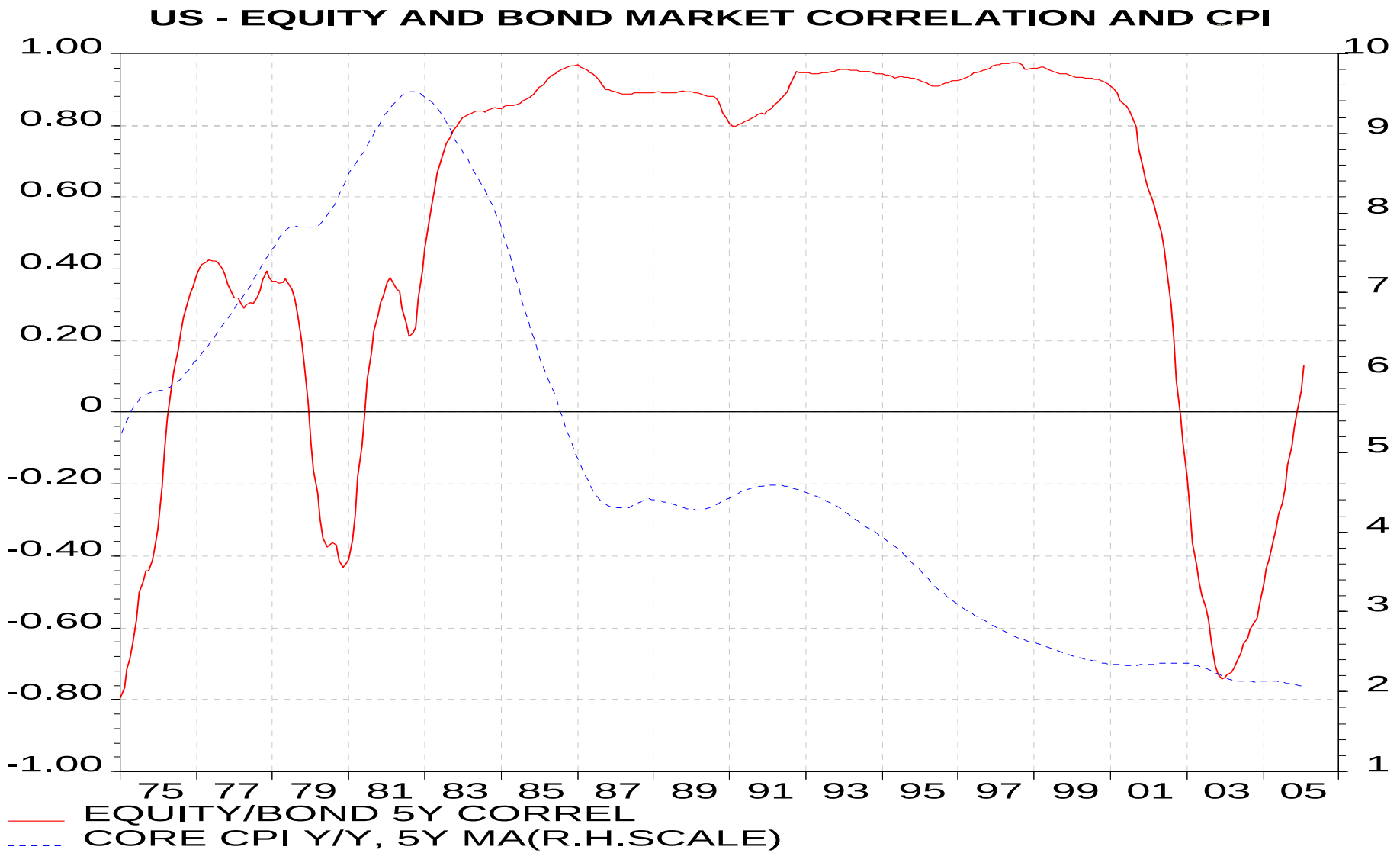
- Asset class correlation
  - Changes over time can be related to changes in the correlation of underlying economic variables, notably real GDP growth and inflation
  - The more integrated economic cycles are across geographical regions, the greater the correlation of the respective asset classes

An example : the US bond market





An example : the US bond and equity market correlation



Source: DATASTREAM

Developing a framework for fundamental fair value analysis : Real GDP growth and inflation

Key economic variables

- Real GDP growth
- Inflation

Growth accounting

- Real GDP growth = Productivity gains + Employment growth

  Where

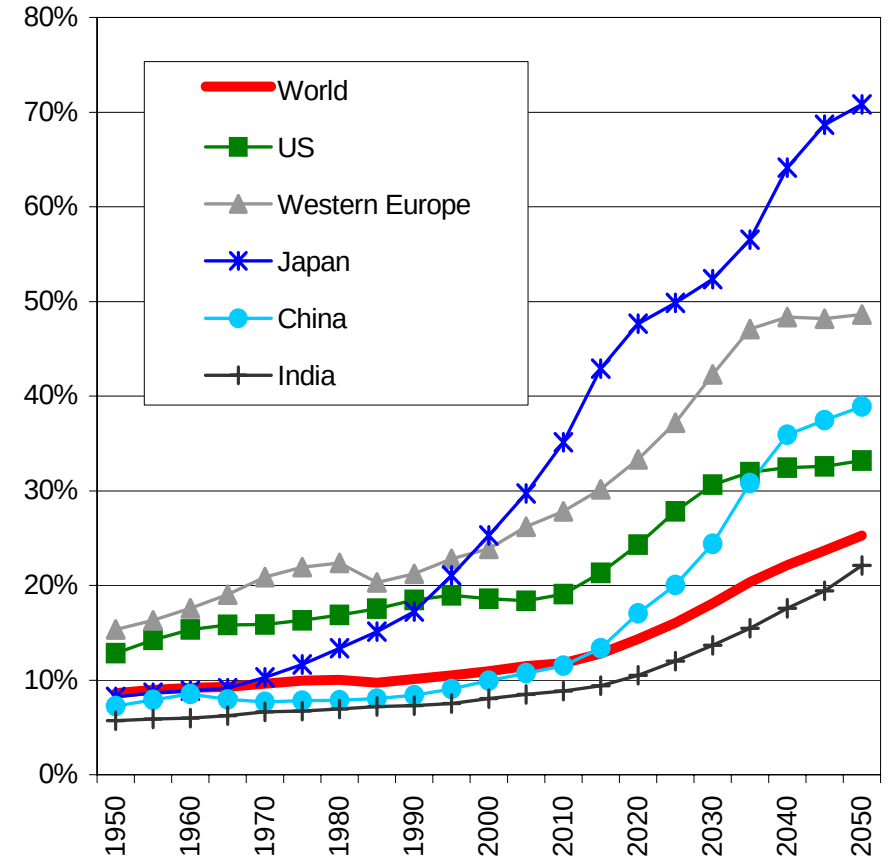
  - Employment = Labour force * (1 – Unemployment rate)
  - Labour force = Working age population * (Participation rate)

Inflation

- A function of shocks to aggregate supply and demand on product and labour markets

Global themes for the long run : Ageing populations

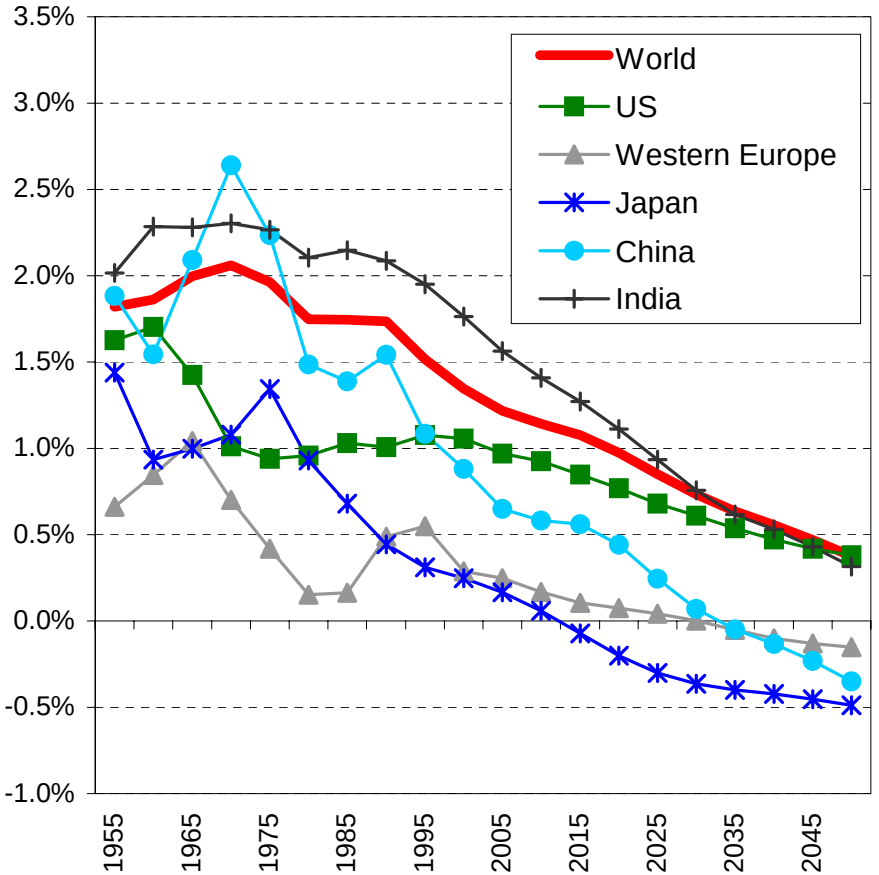
Old age dependency ratios
(Persons 65+ / Persons 15-64)



Source: UN

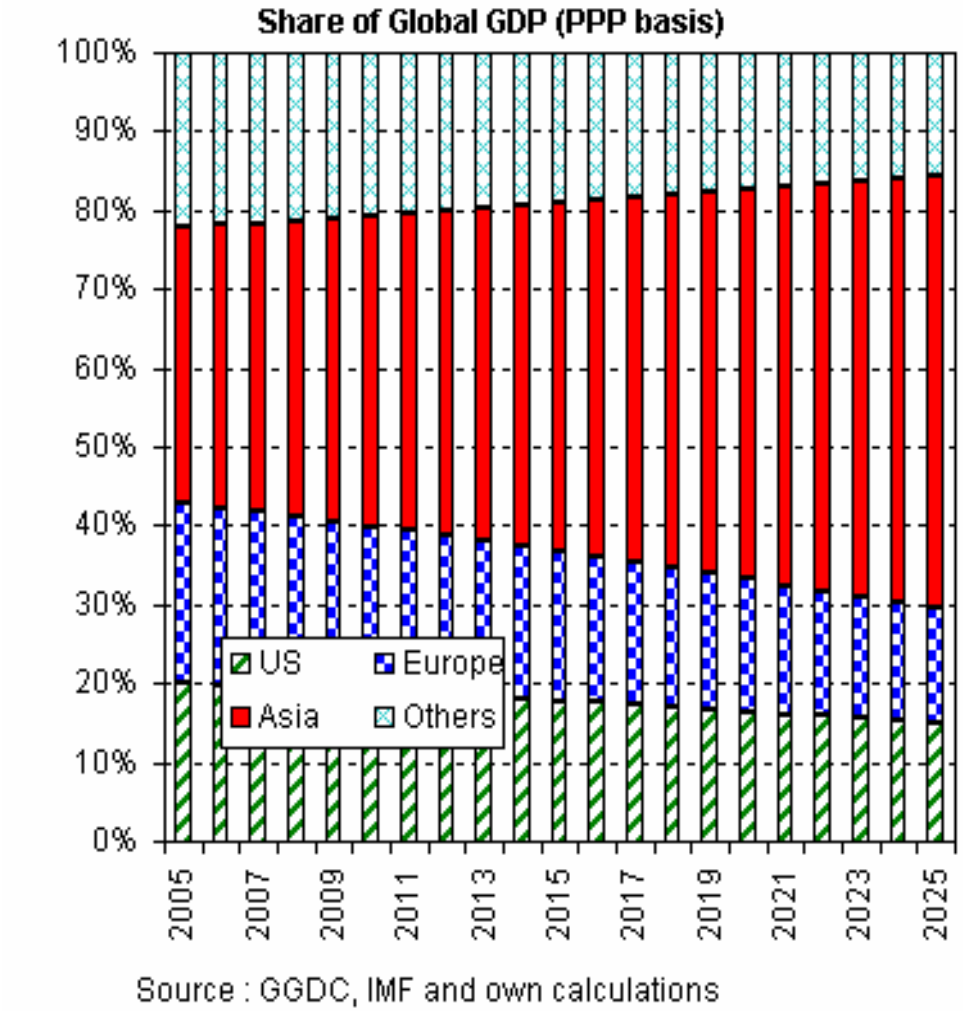
- A growing burden on public sector expenditure
- Lower trend potential growth

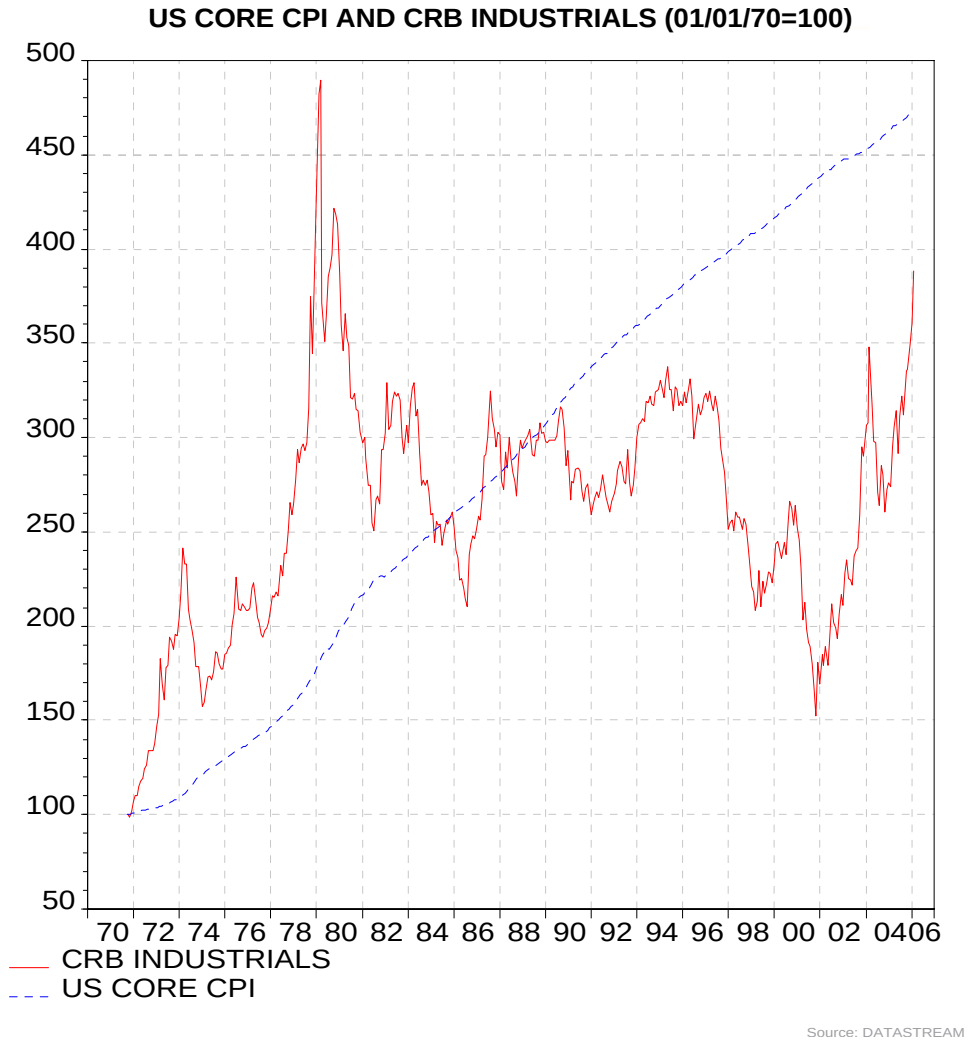
Population growth
(year-on-year change)



- Higher wage inflation
- Increased demand for duration

Global themes for the long run : Globalisation

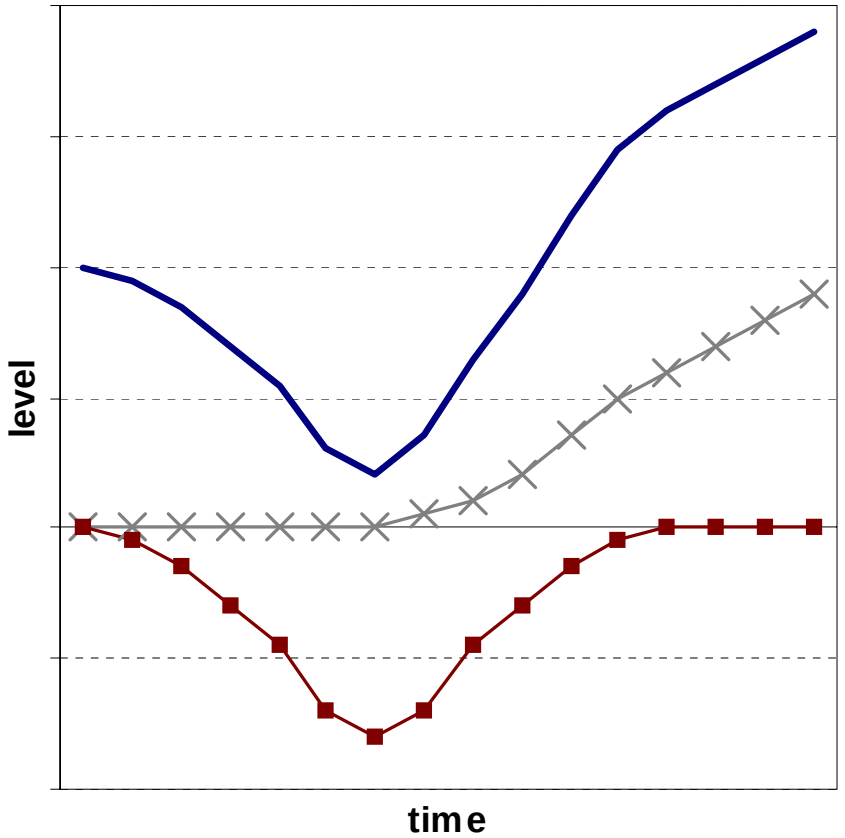




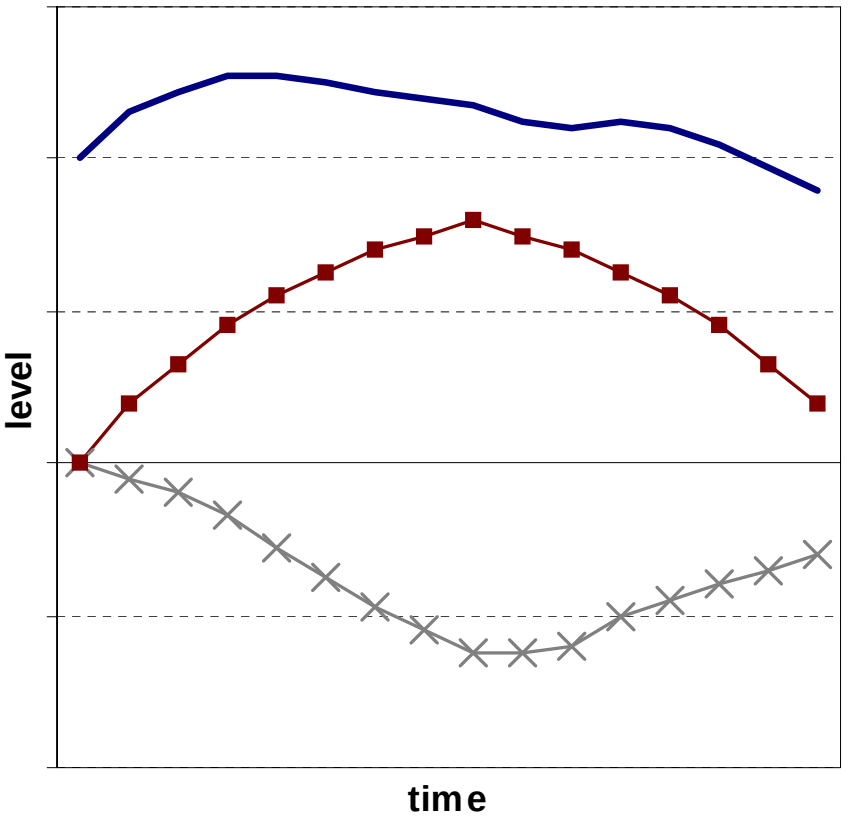
- A shift in the breakdown of global GDP
- A shift in relative prices

Globalisation and ageing : A stylised impact on real GDP growth inflation

Stylized illustration of the impact of ageing and globalization on inflation

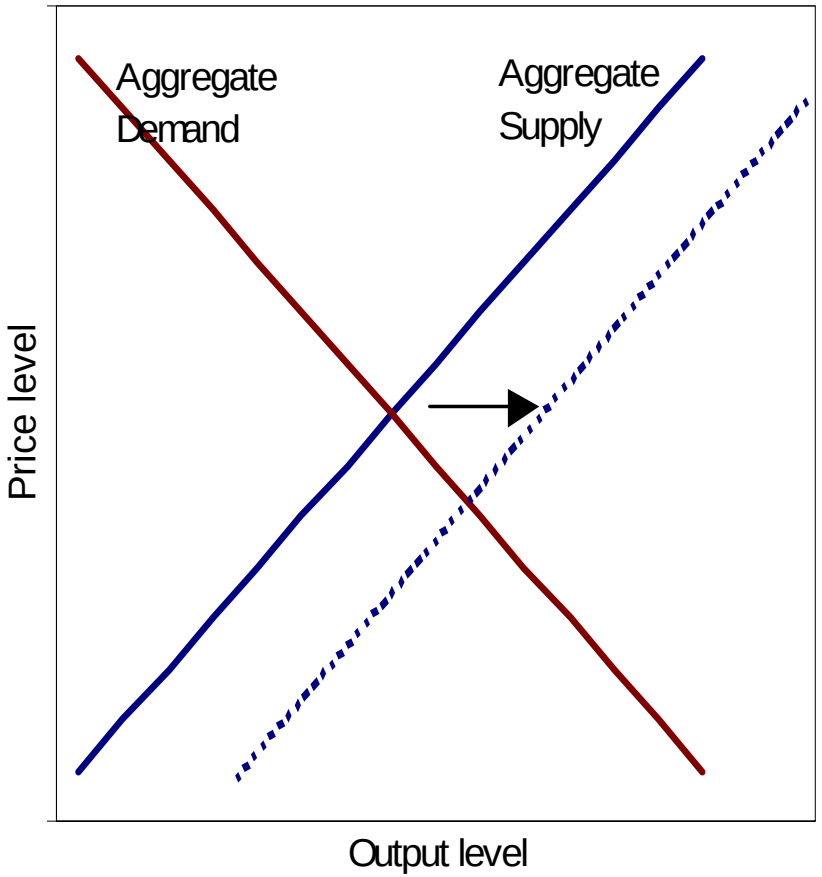


Stylized illustration of the impact of ageing and globalization on real GDP

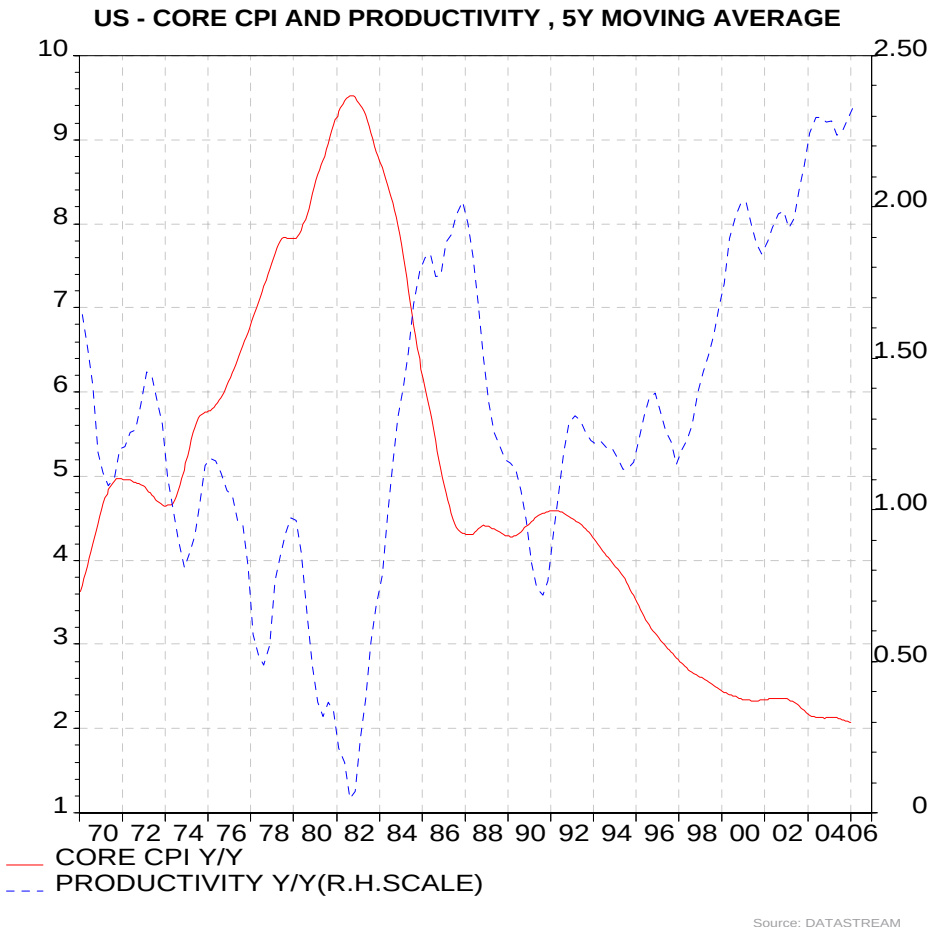


Global themes for the long run : Technological changes

A stylized supply shock



■ Higher aggregate supply



■ Lower inflation

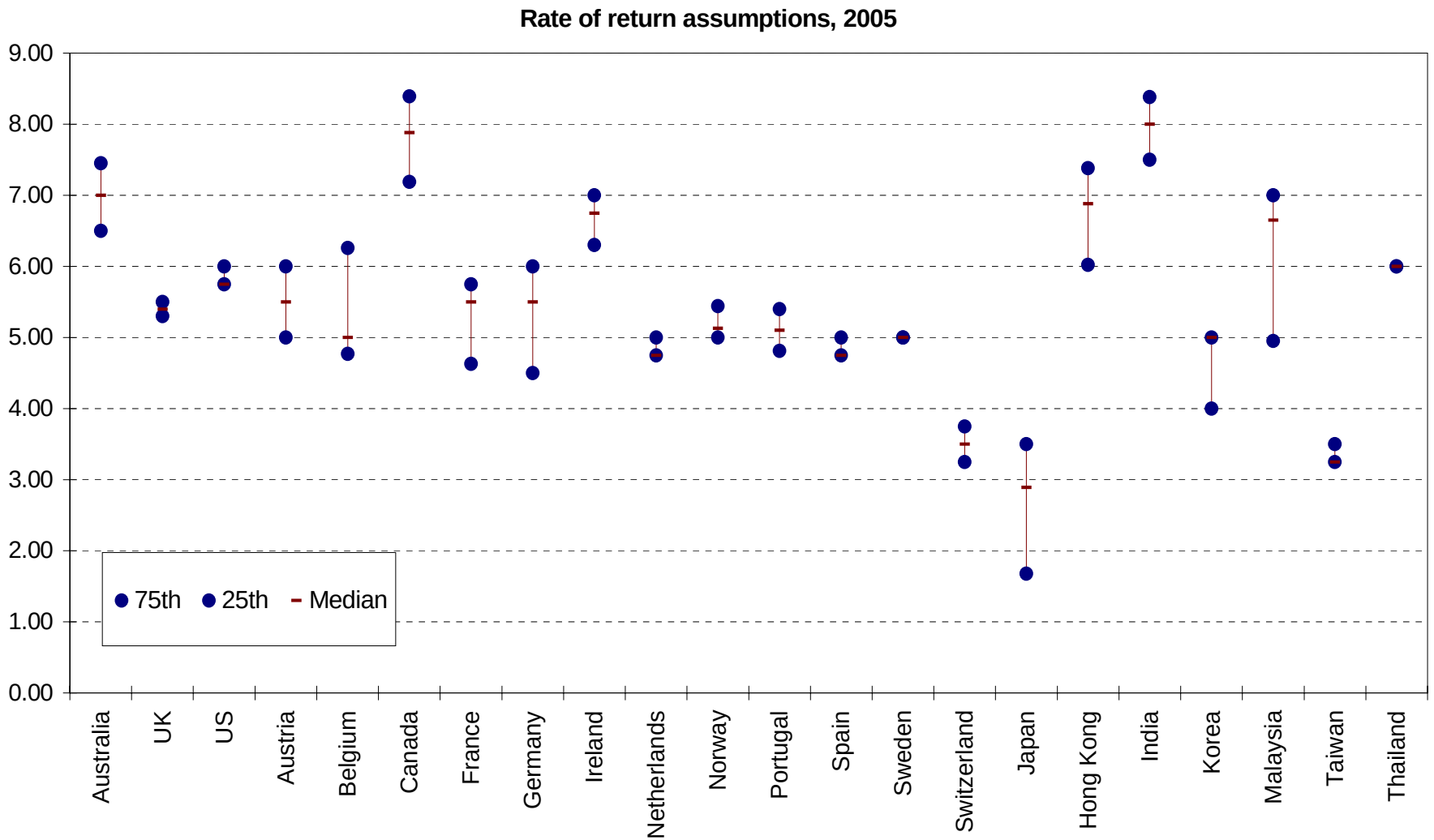
An example : the US economy and financial markets

	Real GDP y/y	*hereof employment*	*hereof productivity*	CPI y/y	Nominal GDP y/y	Long bond yield	**Bond return** *Nom. y/y*	**Real y/y**	Volatility	**Equity return** *Nom. y/y*	**Real y/y**	Volatility	**Correlation** Equity/Bond
1975-05	3.1%	*1.6%*	*1.5%*	4.5%	7.7%	7.8%	*8.9%*	**4.2%**	5%	*12.5%*	**7.6%**	14%	27%
1975-79	3.7%	*2.6%*	*1.0%*	8.1%	11.8%	8.2%	*6.4%*	**-1.6%**	3%	*2.8%*	**-4.9%**	16%	42%
1980-89	3.1%	*1.7%*	*1.3%*	5.6%	8.6%	10.6%	*11.5%*	**5.6%**	7%	*15.2%*	**9.1%**	15%	37%
1990-99	3.1%	*1.3%*	*1.8%*	3.0%	6.1%	6.7%	*9.3%*	**6.1%**	5%	*18.3%*	**14.8%**	10%	36%
1995-99	3.9%	*1.6%*	*2.2%*	2.4%	6.2%	6.1%	*7.5%*	**5.0%**	4%	*20.5%*	**17.7%**	12%	30%
2000-05	2.8%	*1.0%*	*1.8%*	2.5%	5.2%	4.7%	*5.9%*	**3.4%**	4%	*5.7%*	**3.1%**	14%	-12%
Central scenario													
2006-10	2.9%	*0.9%*	*2.0%*	2.5%	5.4%	5.0%	*4.0%*	**1.5%**	5%	*9.8%*	**7.1%**	15%	-10%
2011-20	2.7%	*1.2%*	*1.5%*	2.5%	5.2%	5.0%	*5.0%*	**2.4%**	5%	*8.8%*	**6.1%**	15%	-10%
2021-30	2.5%	*1.0%*	*1.5%*	2.5%	5.0%	5.0%	*5.0%*	**2.4%**	5%	*8.2%*	**5.6%**	15%	-10%
Risk scenario													
2006-10	2.3%	*0.8%*	*1.5%*	3.0%	5.3%	6.0%	*2.9%*	**-0.1%**	10%	*8.2%*	**5.0%**	25%	10%
2011-20	1.5%	*0.5%*	*1.0%*	3.5%	5.0%	6.0%	*6.0%*	**2.5%**	10%	*5.2%*	**1.6%**	25%	25%
2021-30	1.3%	*0.3%*	*1.0%*	4.5%	5.8%	6.5%	*5.9%*	**1.3%**	10%	*7.8%*	**3.1%**	25%	25%

* Note, all returns are given in local currency on an annual basis.

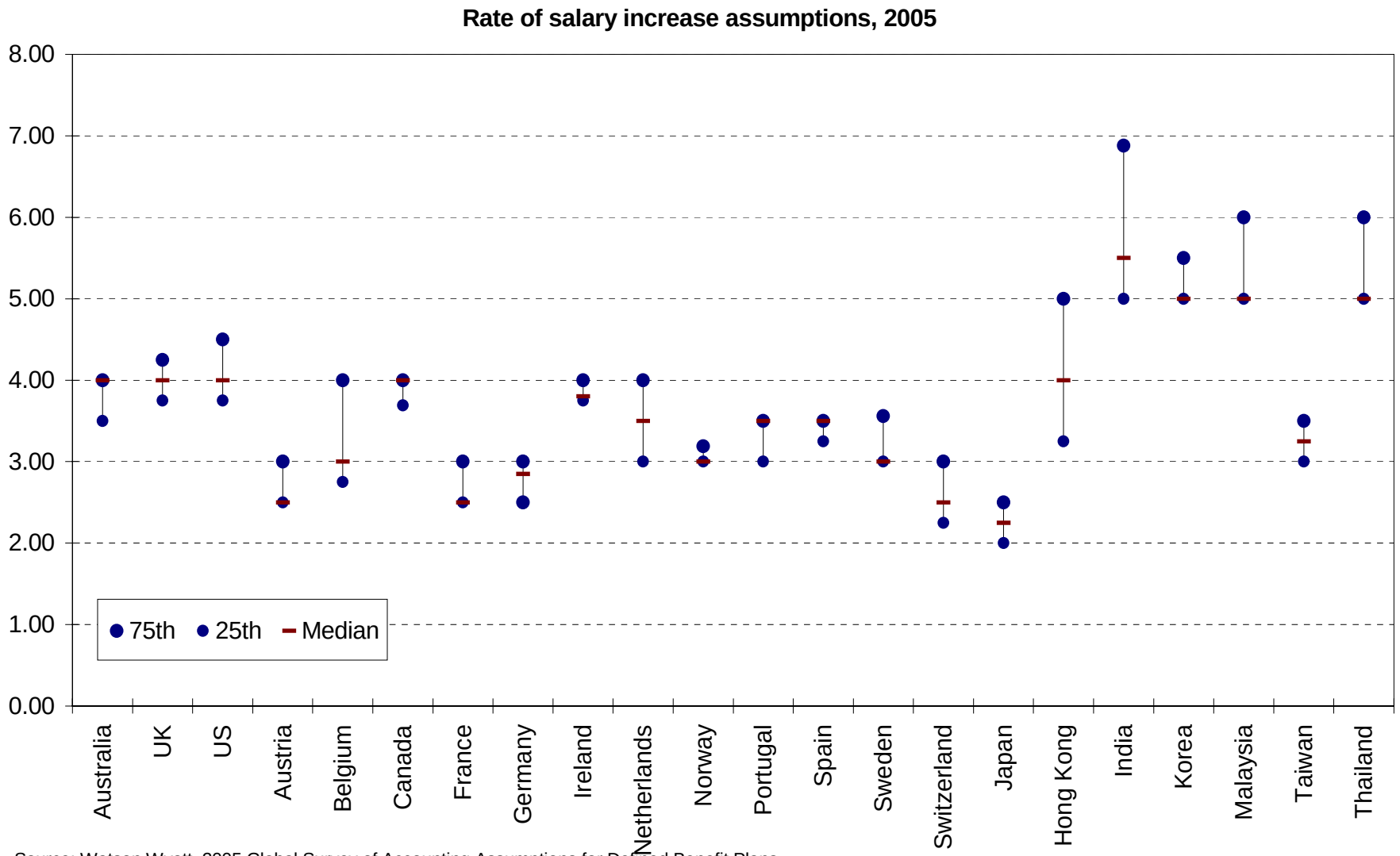
- **Central scenario assumptions**
  - Extension of retirement age to 70 by 2015 and 75 by 2020.
  - Firm productivity gains, but lower that those of the late 1990s
- **Risk scenario**
  - No extension of retirement age
  - A sharp decline in productivity

Global defined benefit pension funds : Return assumptions



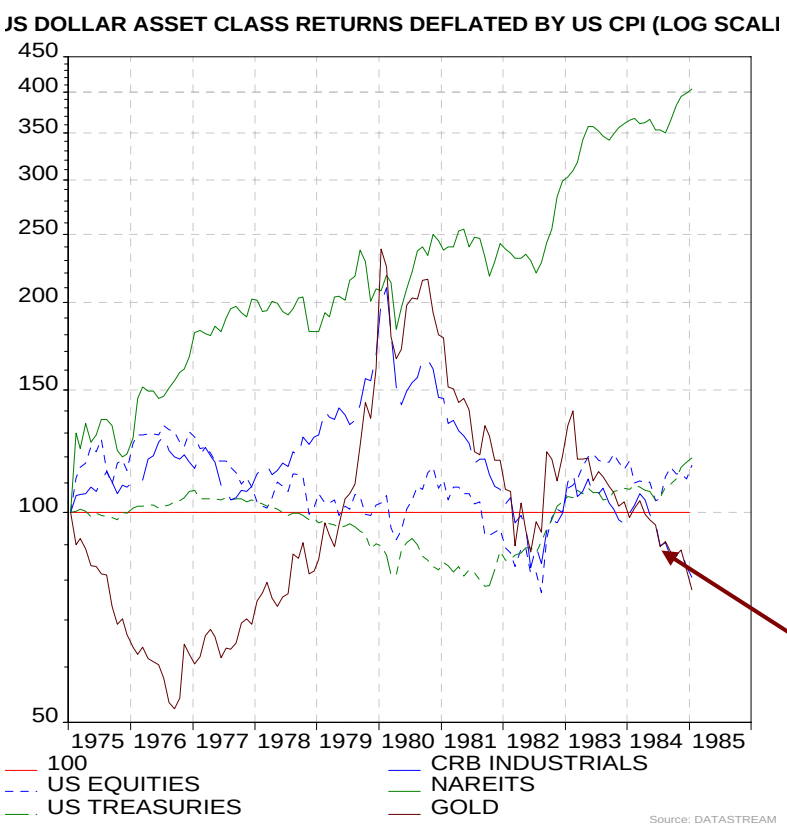
Source: Watson Wyatt, 2005 Global Survey of Accounting Assumptions for Defined Benefit Plans

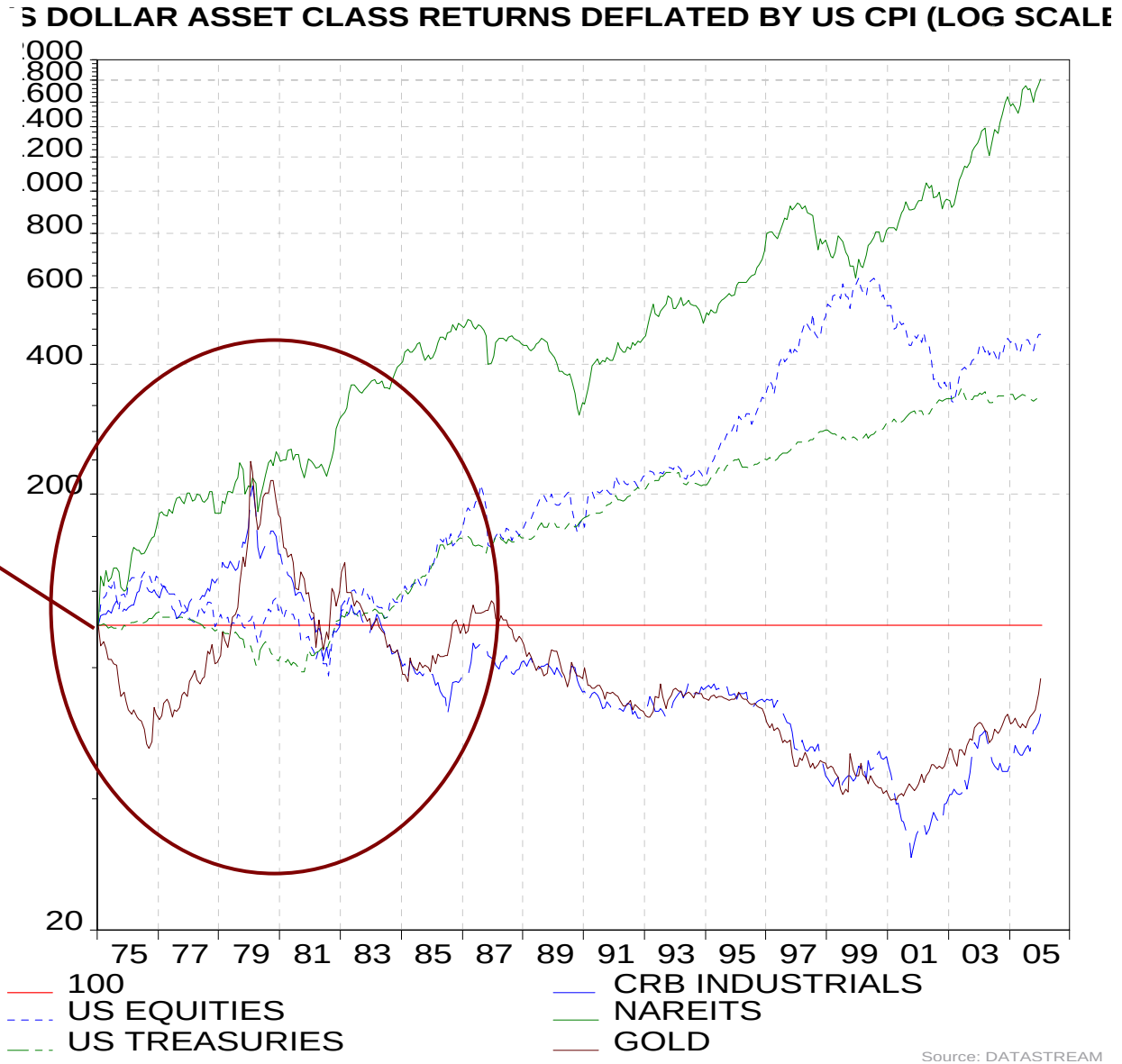
Global defined benefit pension funds : Salary assumptions



Source: Watson Wyatt, 2005 Global Survey of Accounting Assumptions for Defined Benefit Plans

Inflation and asset classes





Conclusion: Invest in your assumptions !

- New ALM techniques are still vulnerable to model assumptions
  - Liability driven techniques
    - Liability assumptions, notably real wage growth
    - Nominal versus real matching
    - Assumptions for the “return portfolio”
  - Dynamic stochastic ALM models
    - Probability distributions for the key underlying variables

- Fundamental fair value
  - Corrects for short-term divergences from fundamental fair value
  - Allows for the development of long-term assumptions
  - Provides “fair” assumptions
  - A framework for scenario analysis
  - A framework for dynamic asset allocation