
Inflation risk management

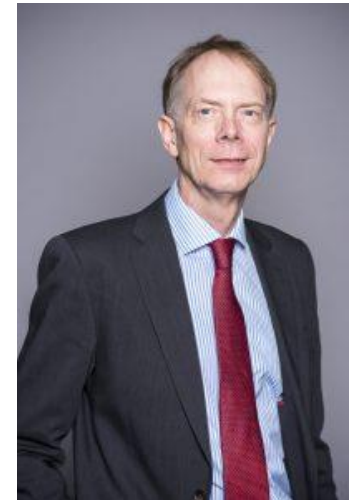
Presentation to the Hungarian Actuarial Society Fall School 2023

By Malcolm Kemp

London, 11 November 2023

About the speaker: Malcolm Kemp

- *Malcolm Kemp is Managing Director of Nematrian, a Board member of the Actuarial Association of Europe (AAE) and a visiting lecturer in enterprise risk management at Imperial College Business School, London. He has written and presented extensively on a wide range of actuarial and risk management topics, see: <http://www.nematrian.com/PresentationLibrary>*
- *Until 2023 he was a member of the Advisory Scientific Committee of the European Systemic Risk Board and chairperson of the AAE's Risk Management Committee. Until 2021 he was the Chief Actuary (Actuarial Function Holder) for Threadneedle Pensions Limited and an Associate in Barnett Waddingham's insurance consulting practice.*



- Background
- AAE (2023) paper “A Primer on Inflation Risk Management”

Background: a sharp inflationary shock in many locations

- Originally mostly viewed as an unexpected cost-push driven inflationary shock (from energy prices and food)
- Increasing focus on risk that inflation could become embedded
- Levels vary by location
 - Although less so than a year ago
- ... And by relevant economic activity
- Influenced by political decisions and trajectory of monetary policy

Year-on-Year (HICP, %)	Sep 2022	Sep 2023
Hungary	20.7	12.2
Romania	13.4	9.2
Slovakia	13.6	9.0
Iceland	5.9	8.5
Czechia	17.8	8.3
Poland	15.7	7.7
Croatia	12.6	7.4
Slovenia	10.6	7.1
Bulgaria	15.6	6.4
Austria	11.0	5.7
France	6.2	5.7
Italy	9.4	5.6
Ireland	8.6	5.0
European Union	10.9	4.9
Malta	7.4	4.9
European Economic Area	10.9	4.9
Portugal	9.8	4.8
Germany	10.9	4.3
Euro area	9.9	4.3
Cyprus	9.0	4.3
Lithuania	22.5	4.1
Estonia	24.1	3.9
Sweden	10.3	3.7
Latvia	22.0	3.6
Luxembourg	8.8	3.4
Spain	9.0	3.3
Finland	8.4	3.0
Norway	7.7	2.8
Greece	12.1	2.4
Switzerland	3.2	2.0
Belgium	12.1	0.7
Denmark	11.1	0.6
Netherlands	17.1	-0.3
Türkiye	83.4	61.7
United States	8.7	2.6

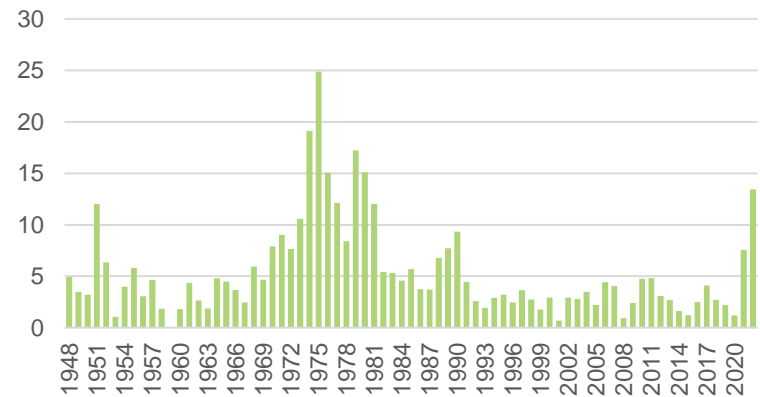
Source: Eurostat

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... Authorities hope to rise to the challenge

- Typical assumptions by (EU) authorities seem to be that:
 - **Monetary policy will keep inflationary expectations “grounded”**
 - Despite some politicians worrying that this will deprioritise growth too much
 - I.e. inflation returns to levels approximating targets given to central banks, e.g. c. 2% pa, over a reasonably short timeframe
 - **We won’t enter a persistently high inflation rate regime**
 - Akin to the c. 15+ years of stagflation seen in e.g. the UK after the oil price shocks of 1973 and 1979

Historic Annual (Dec) UK Inflation rates
(RPI All Items, %pa)



Source: UK Office of National Statistics



Some global trends potentially impacting inflation picture

(De)-Globalisation

- Peak globalisation likely behind us
 - Geopolitical factors favour regionalising supply chains
 - Lower cost efficiency
- = **higher inflation**

Decarbonisation

- Target of CO2-neutral economies
 - Climate policies, especially CO2 pricing, making fossil energy more expensive
- = **higher inflation** (at least during transition phase)

Demographics

- Effects of ageing on labour markets dependent on migration
 - Temporarily higher wage growth
 - Changing consumption patterns in ageing societies
- = **temporarily higher inflation**

Digitalisation

- Ongoing trend (e.g. AI)
 - Macroeconomic productivity effects dependent on specific technologies
- = **No obvious upwards pressure on inflation, instead (continued) dampening effects**

Source: Dr. Michael Menhart, Chief Economist, Munich Re, “Inflation – here to stay?!” , presentation preceding AAE General Assembly, 6 October 2023



- According to Achord & Dotterweich presentations to Convention A (Sept 2022) and AAE (Oct 2022) “*Impacts & Implications of Inflation on Insurance & Pensions*”:
 - **Assets** are **what they are**:

$$MV_{bond} = \sum \frac{c}{(1+r)^j} + \frac{N}{(1+r)^t}$$

$$MV_{equity} = \sum \frac{d(1+g)^j}{(1+r)^j}$$

$r = \text{discount rate}, c = \text{coupon}, N = \text{par value}, d = \text{dividend}, g = \text{growth rate}$

- Insurance and pensions **liabilities** are as **we design them** ...
 - Potentially including more complex risk-sharing mechanisms & impacts



... lead to stylised cash flow discounting models

- Can expand those on the previous slide to:

$$MV_{bond} = \sum \frac{c}{(1 + rfr_{real} + E(i) + CS + IURP)^j} + \frac{N}{(1 + \dots)^t}$$

Inflation expectations are not directly affected by recent historical inflation, but by market participants' and consumers' expectations

Affected by rising rates and inflation, differential effects by credit rating

Only adjusts in current market yields, not in the yield to redemption when you bought it

$$MV_{equity} = \sum \frac{d(1 + g)}{(1 + rfr_{real} + E(i) + CS + ERP)^j}$$

Depending on the asset, the growth rate has a link to past inflation and expected inflation

Note: rfr_{real} = real risk-free rate, $E(i)$ = expected inflation, CS = credit spread, IURP = inflation uncertainty risk premium, ERP = equity risk premium

... and stylised assumed (equilibrium) impacts

Asset class	Stylised impact channels	Nominal impact of rising inflation (in isolation)	Nominal impact of rising nominal rates (in isolation)
Bonds (fixed income) ^[1]	Duration and convexity effects and a credit element linked to rating	Flat to ↓ depending on credit rating	↓
Equities	Dividend discount model (growth and discounting terms)	↑↑ [2]	↓ [2]
Real Estate	Rental discount model	↑↑ [2]	↓ [2]

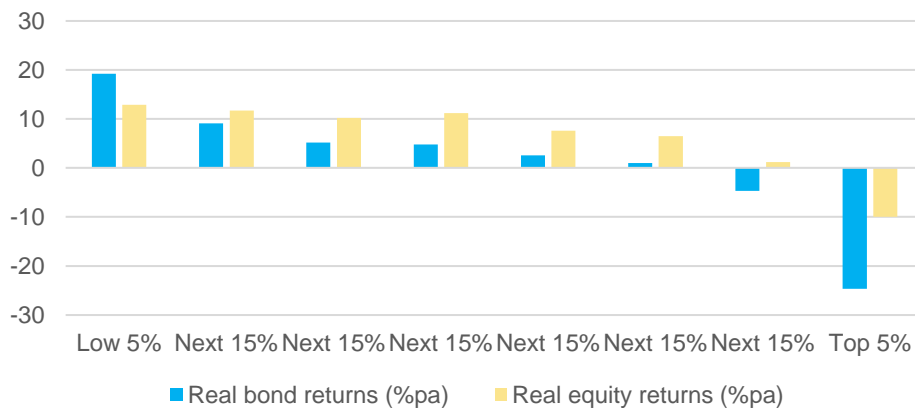
[1] Needs adaptation for inflation-linked bonds, as coupon / principal then also linked to inflation

[2] Hence notion that such assets are “real” assets that provide a natural hedge against inflation

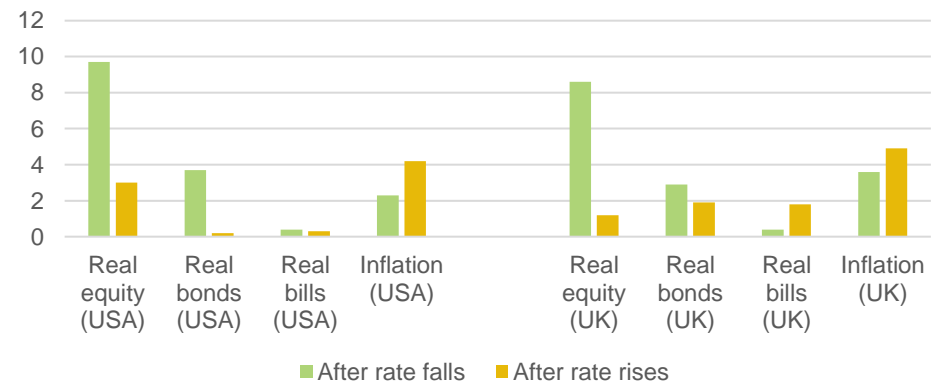
Real-life behaviour much more complicated

- Considerable differences between real bond and real equity returns for different inflation levels and for different directions of interest rate movements
- Reflects importance of investor's **future expectations** on market prices
 - These can be heavily influenced by investor views on franchise values

Real bond and equity returns versus percentiles of inflation rates, 1900-2021



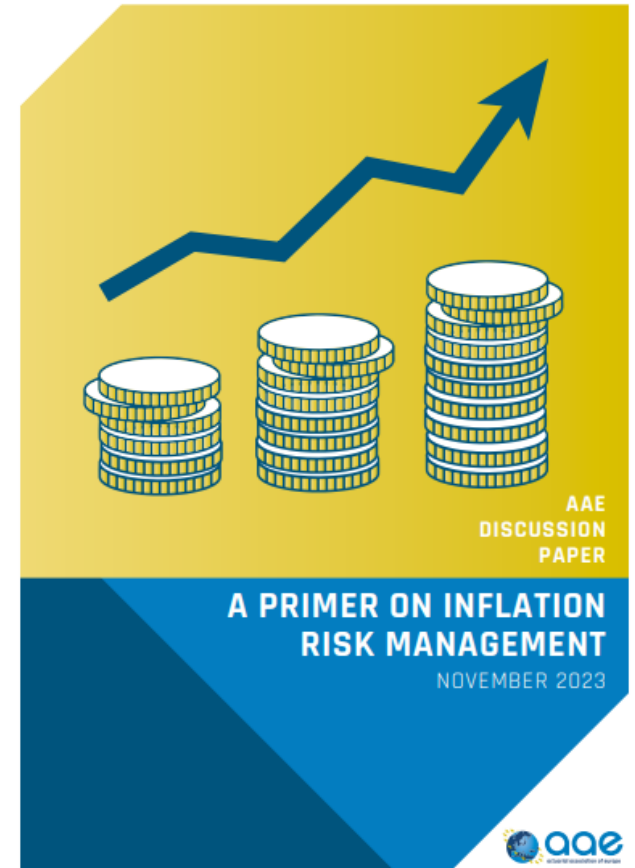
Asset returns after interest rate falls and rises (annualised percentage return, %pa, 1900-2021)



Source: Credit Suisse Global Investment Returns 2022 Yearbook Summary

AAE Paper: background

- Discussion at AAE Risk Management Committee in Rome, 6 Oct 2022
 - Perceived lack of expertise given extended period of low inflation until recently
- Sub-group formed:
 - Jason Wiebe (Chair)
 - Martin Melchior, Richard Deville, Sam Achord, Malcolm Kemp
- Goal: paper to help actuaries understand the fundamentals of inflation and the associated risks and inspire better risk management






Source:

<https://actuary.eu/publications/positions-discussion-papers/>

- Introduction to inflation
 - Caused by increased demand and/or reduced supply. Expectations also important
 - Fears of inflation may also cause consumers to accelerate purchases/reduce savings
 - Expectations of high future inflation can lead to inflationary wage increases
 - As can (expansionary / contractionary) fiscal policies and central bank actions
- Managing inflation risk
 - Hedging, management actions, scenario testing, product design
- Inflation risks include
 - Direct risks: funding future benefits, expense management
 - Indirect risks: financial market impacts, lapses

Special types of inflation include

<p>DEFLATION</p> <ul style="list-style-type: none">- Decrease in price of goods and services- May be due to technological advances increasing productivity (Industrial Revolution)- Often signals downturn in an economy (e.g. China 2023)	<p>HYPERINFLATION</p> <ul style="list-style-type: none">- Rapid, excessive and out of control price increase- Occurs when a government increases its money supply to a point its GDP cannot support- Examples include post war Germany, Zimbabwe (2007-9)	<p>STAGFLATION</p> <ul style="list-style-type: none">- A period of high inflation combined with stagnant economic growth- Often caused by an external shock- Examples include after oil price shocks of '70's
		

Source: Presentation by Jason Wiebe to AAE Webinar "Update on Risk Management Topics, 26 September 2023

Notable historical periods and typical explanations

- Great Deflation (1870-1890)
 - Extended period of deflation due to productivity gains from Second Industrial Revolution
- Great Depression (1929-1939)
 - 25% drop in consumer prices
- WWI & WWII (1914-1918/1939-1945)
 - Inflationary pressures due to significant wartime spending
- Great Inflation (1965 to 1982)
 - Inflation expectations became embedded probably due to a lack of understanding of relation between expansionary fiscal policy and inflation

- Inflation transfers value from accumulated savings to future production: today's savings will purchase less in the future
- And value from asset owners to borrowers: reduces burden of existing debt
- Low amounts of inflation generally seen as good: encourages spending and future investment (and assists with labour flexibility)
- Inflation is not homogeneous across all goods and services
 - Inflationary pressures and inflation measures will vary by country / sector / economic activity
 - C.f. wage versus price inflation, claims versus general inflation

- Product design

- Consider sources and impacts of inflation risk and potential means of mitigation in product design (for example, index caps, price adjustments)
- Examples of potential issues:
 - Indexing of fixed benefits
 - Sector specific inflation on indemnity benefits and impact of deductibles/caps on benefits

- Management actions

- Consider possible management actions to take in event of unexpected inflation (e.g. monitoring key risk indicators, cost cutting measures, premium rate increases, changes in investment strategy)

- Hedging strategies
 - Index linked bonds and inflation derivatives available to hedge risk on indexed benefits
 - Market smaller and less liquid than interest and equity derivative markets
 - Creates increased likelihood of larger basis risk
 - Lack of market may mean using instruments referencing EU indices
 - Country specific inflation may differ from EU inflation
 - Currency basis risk if currency is not pegged to EUR
- N.B. does not directly reference recent regulatory texts such as EIOPA (2023) [Report on the Impact of Inflation on the Insurance Sector \(europa.eu\)](https://www.europa.eu/press-room/media/306224/en/eiopa-report-impact-inflation-insurance-sector)

Additional (internal) risks, e.g.

- Lending and credit: increased interest rates increase cost of borrowing leading to less borrowing and higher defaults
- Securitisations: increased interest rates may make them more volatile
 - Especially highly leveraged or lower tranche
- Policy lapses/coverage reductions
 - Increases in interest rates may result in more surrenders of life insurance
 - Actual behaviour seems quite sensitive to tax rules
 - Non-life insurance can also be impacted
 - Some non-essential covers not renewed and/or benefit reductions to reduce cost

- Bank runs
 - Concerns about strength of financial sector in general or of specific banks could lead to mass withdrawals of money creating potential liquidity crisis
 - E.g., Silicon Valley Bank, Signature Bank
- Losses to asset managers/funds
 - Highly leverage funds may find increased interest rates difficult to carry requiring forced selling of illiquid assets at a loss
- Sovereign debt / emerging Markets
 - Emerging markets facing higher interest rates may be forced to default on their debt

- **Sharp inflationary shock**: size has varied by location and economic activity
 - Macro-economic trends **may increase risk of embedded inflationary expectations and wage/price spirals**
 - **Stylised views** on impacts to insurance and pension fund cash flows **may not align with reality**
- Recent AAE paper “***A Primer on Inflation Risk Management***”: an easy-to-read document providing:
 - An **introduction to inflation** and interaction with e.g. interest rates
 - **Issues** to consider when **managing inflation risk**
 - Covering **direct and indirect risks** and both **assets and liabilities**



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