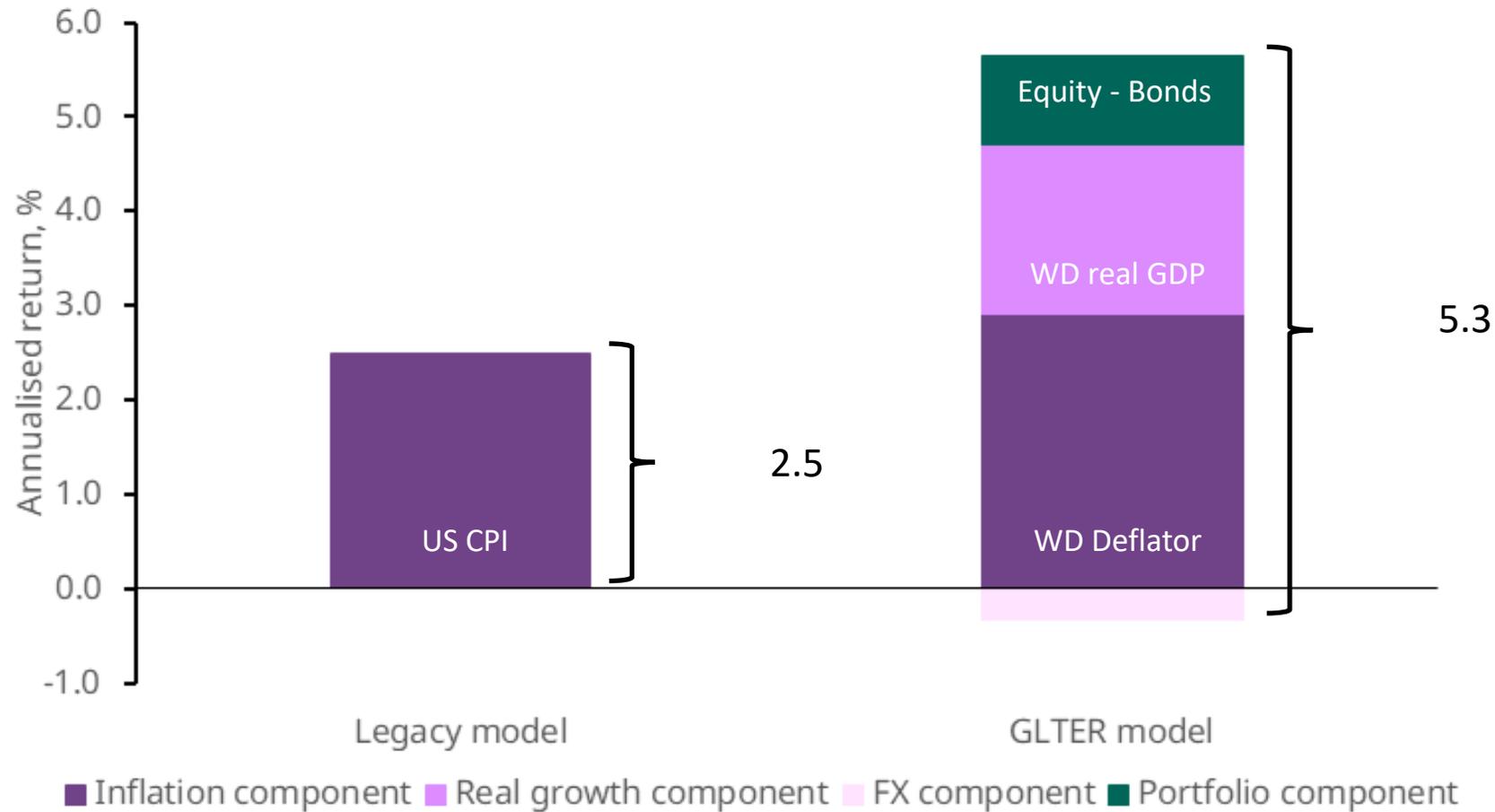


GLTER

- Gold's Long-term Expected Return

- Professor Dirk Baur, UWA Business School, Accounting and Finance
- Dr. Fergal O'Connor, Associate Professor, Cork University Business School
- Dr. Daniel Jerrett, Co-Founder and CIO, Strategy Capital
- Johan Palmberg, Senior Quantitative Analyst, World Gold Council

Gold's expected return: Old and New



• All forecasts from J.P.Morgan LTCMA 2024. Assuming forecast horizon of 10-15 years. CPI forecast (US for Common legacy view, Global for GLTER model). FX component calculated using US dollar paired forecasts with current US dollar index (DXY) weights and subtracting US weakness assuming it lowers US nominal GDP. Equity Risk Premium calculated as MSCI AC World Equity index return less weighted expected return on bond portfolio of Cash with assumed long run changes in issuance for market caps. For internal discussion purposes only.

Gold's expected return: Candidate theories

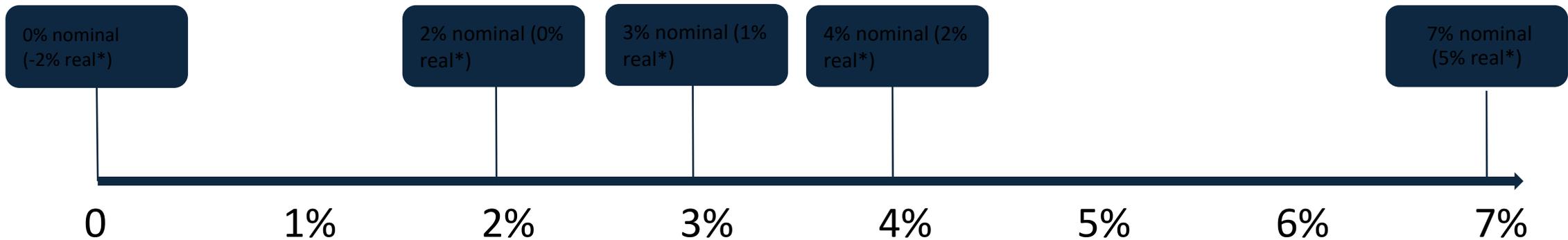
Gold has no IRR.
“you buy a lump
of something
and hope that
somebody pays
you more for
that lump two
years from now”,
Warren Buffett

Gold is a
commodity and
producers set
the price,
Hotelling / Levin
et al

Gold is an
exhaustible
resource or a
zero-beta asset
(Various
sources)

“Gold needs to
rise to maintain
its share of
global assets”,
J.P. Morgan
(2011)

“Asia buys most of
the world's gold.
Should be valued
like Asian real
estate
”, Nomura (2012)

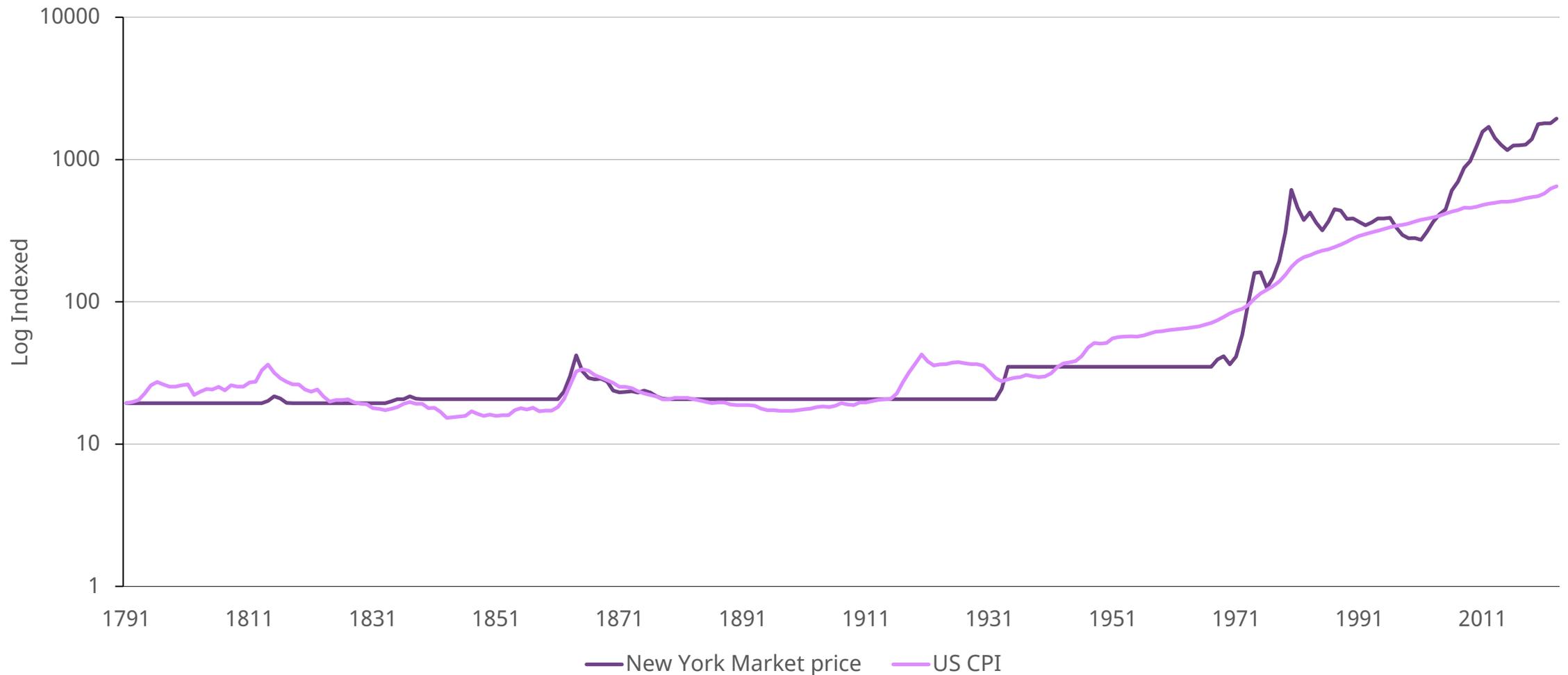


* Average US CPI yoy since 1871, Shiller



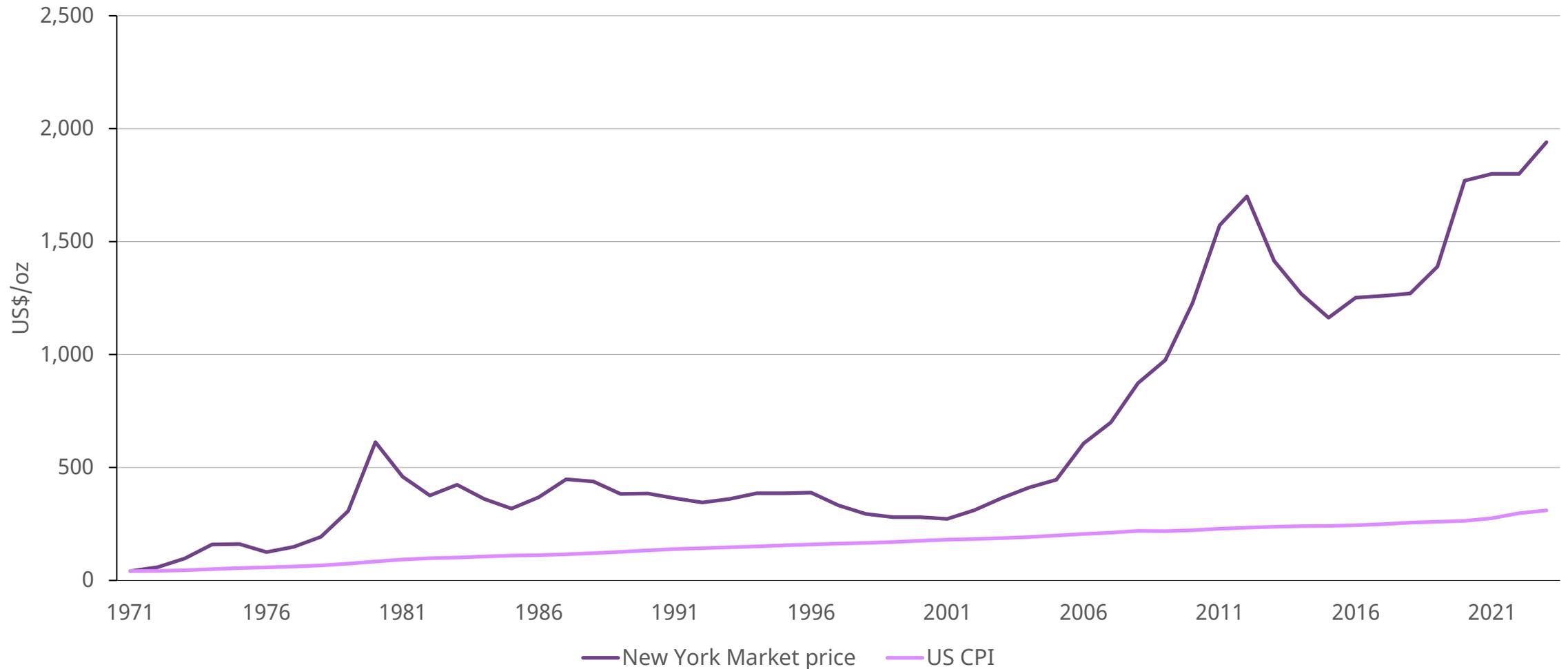
- 1st mischaracterisation...

Expected to rise in line with inflation...since 1791



• Source: Measuringworth.com

Expected to rise in line with inflation...since 1971



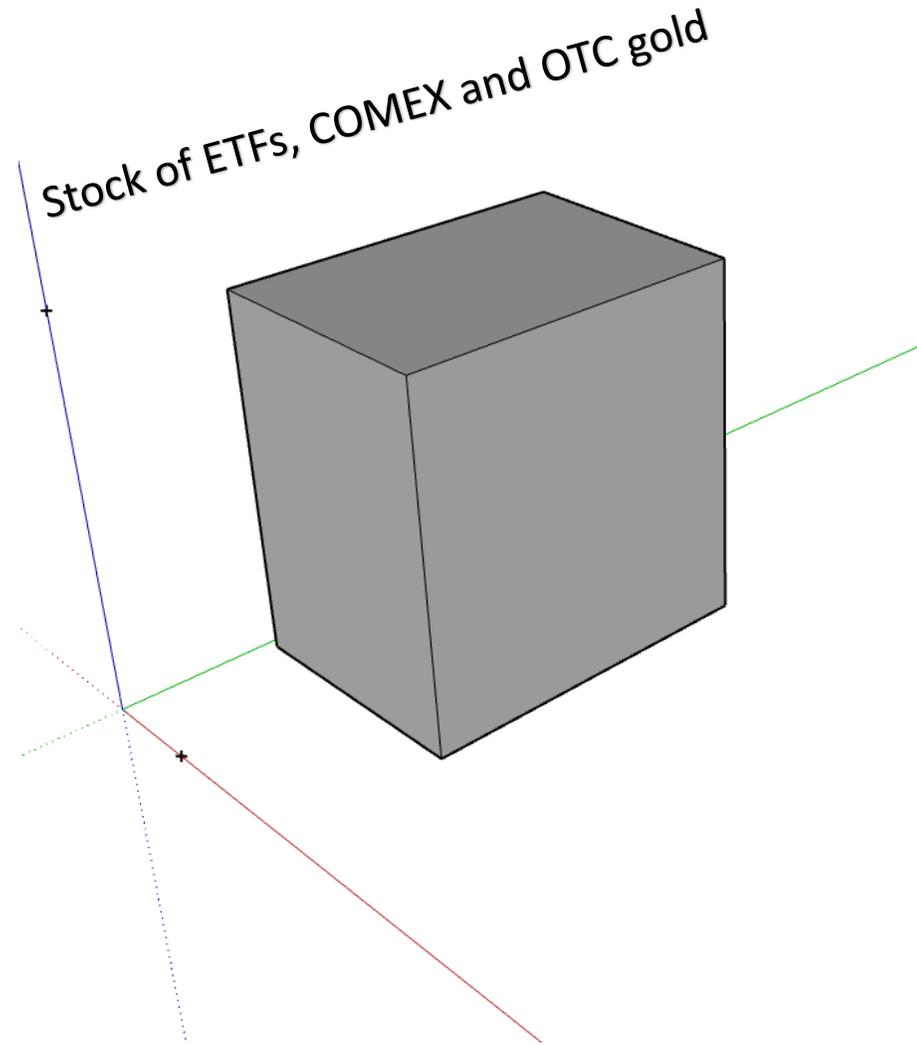
• Source: Measuringworth.com



- 2nd mischaracterisation...

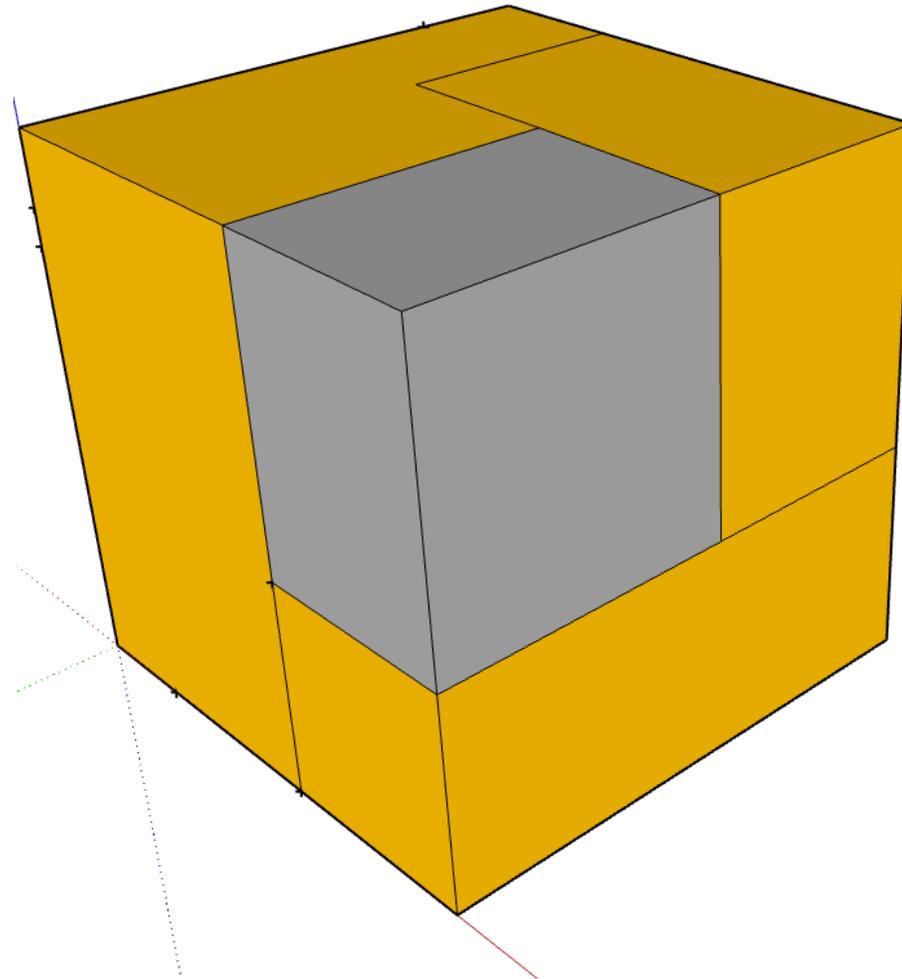
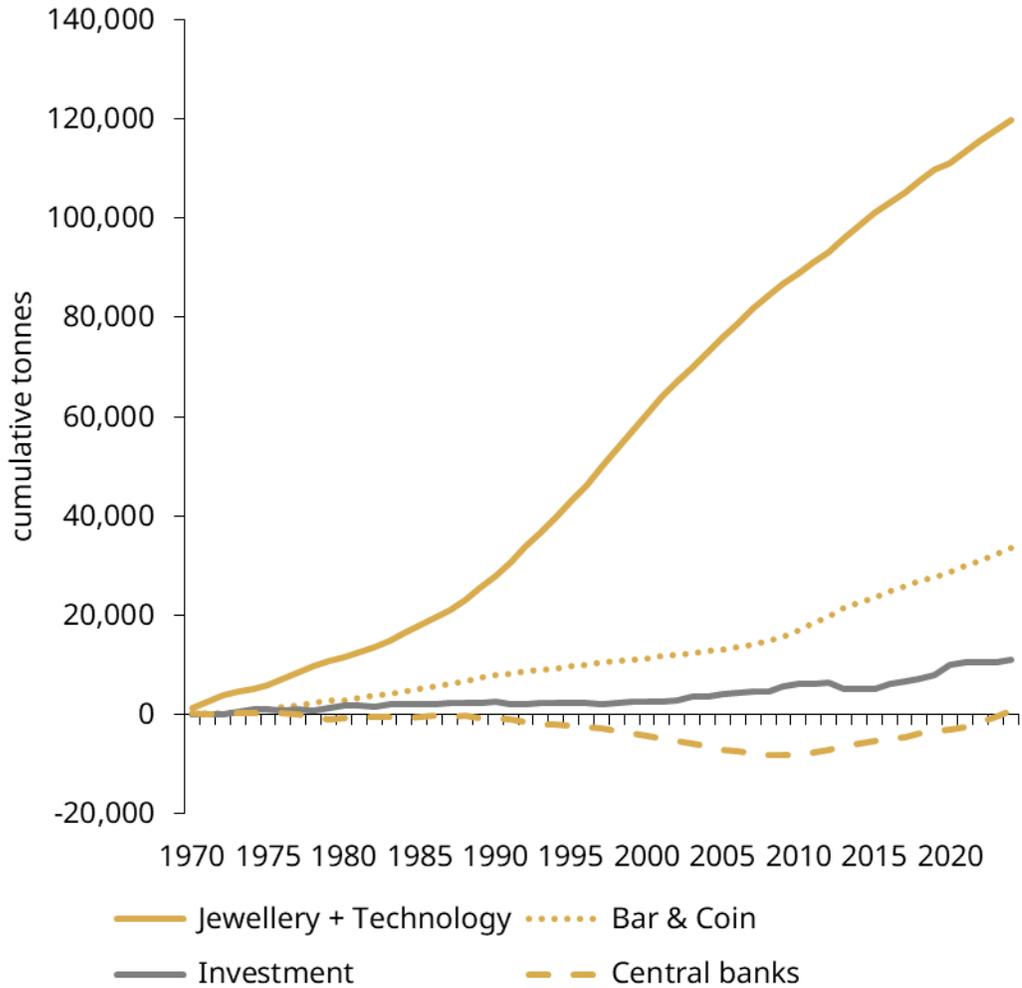
The Cube: perception, investors set the price

Financial component 



• Source: Metals Focus 2022

Where has the mined gold ended up?



Jewellery
Bar & coin
Central banks
Technology
Investment

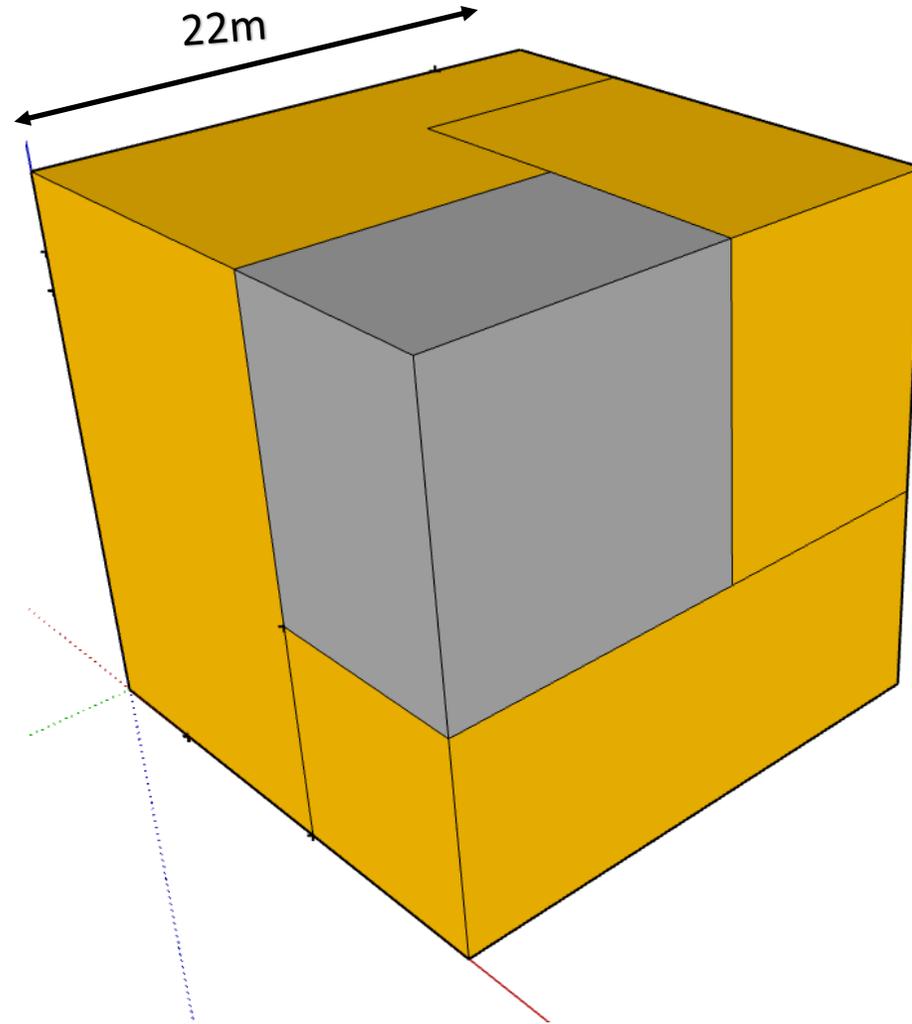
• Source: Refinitiv GFMS, Metals Focus, World Gold Council

The Cube: Investors key in the short run

Financial component



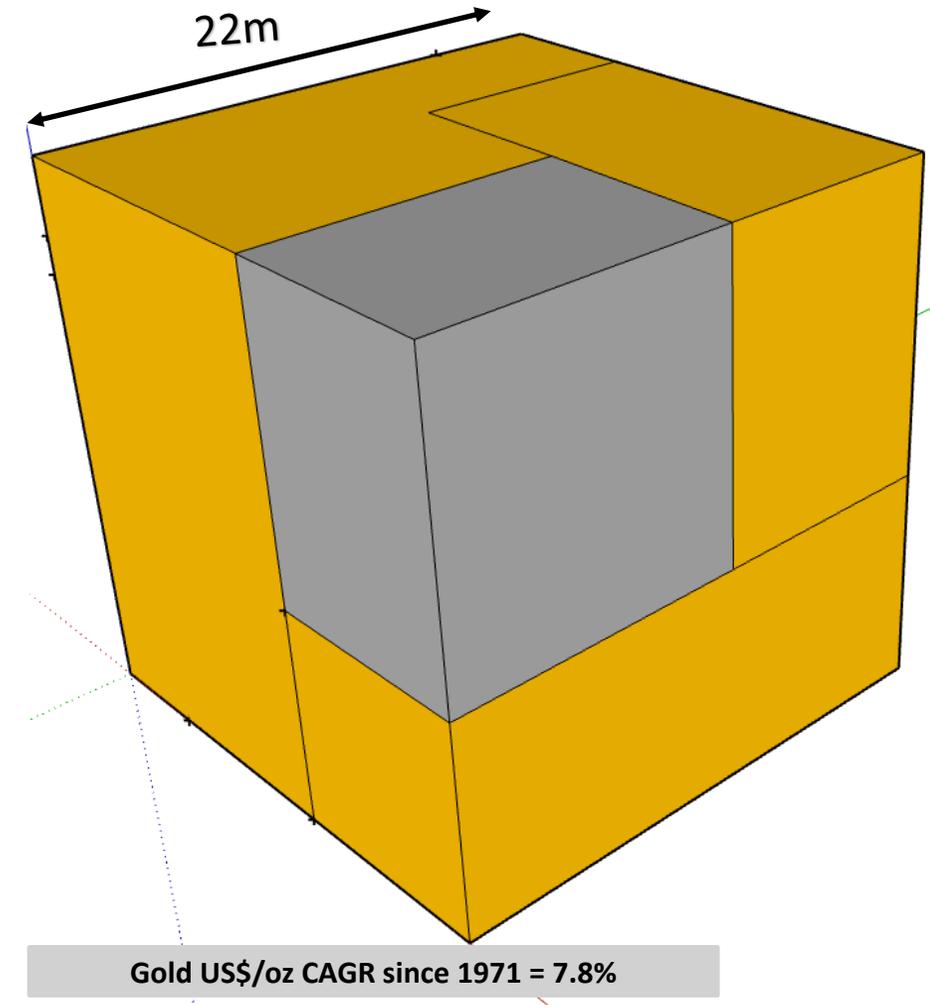
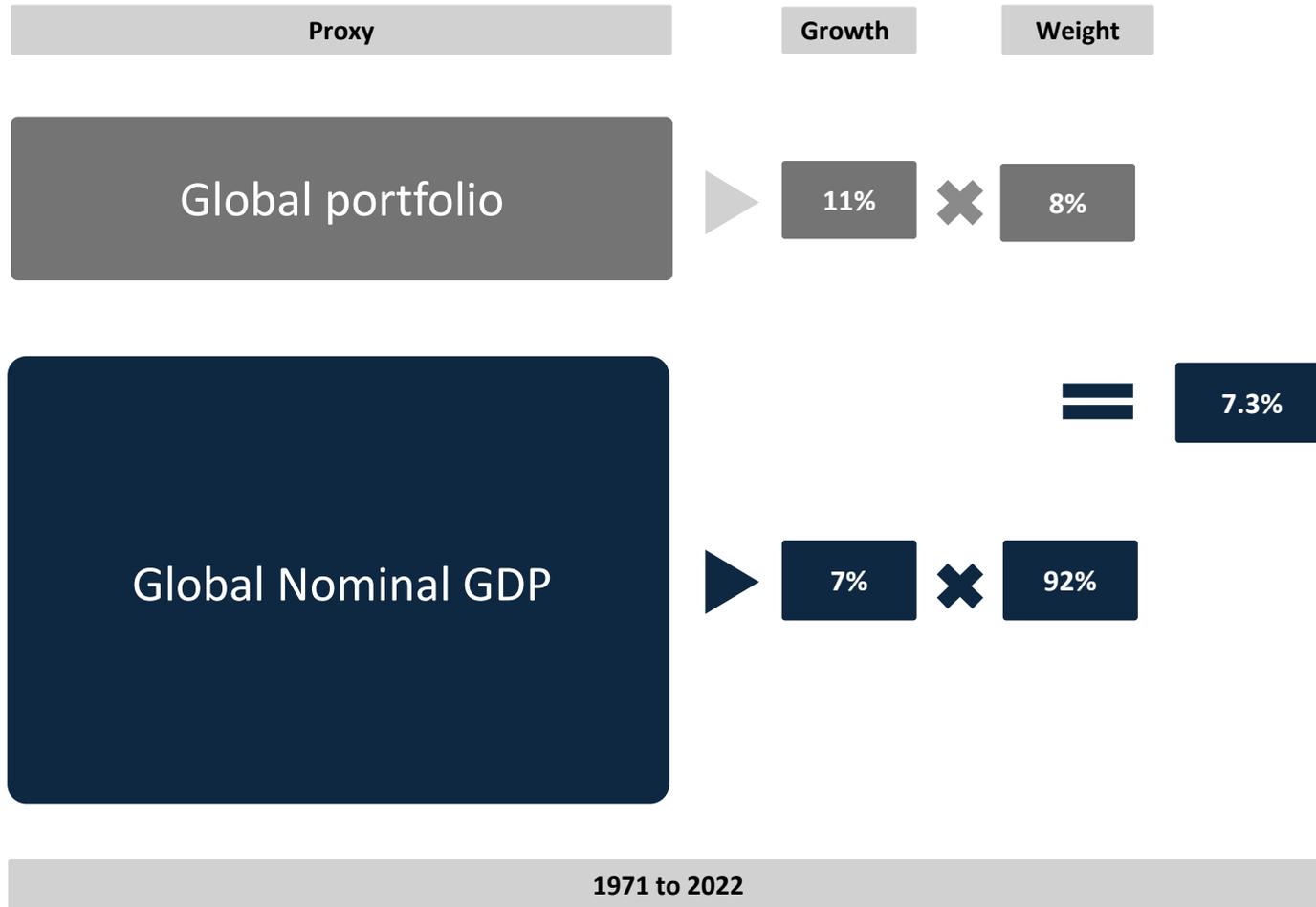
Economic component



- Jewellery
- Bar & coin
- Central banks
- Technology
- Investment

• Source: Refinitiv GFMS, Metals Focus, World Gold Council

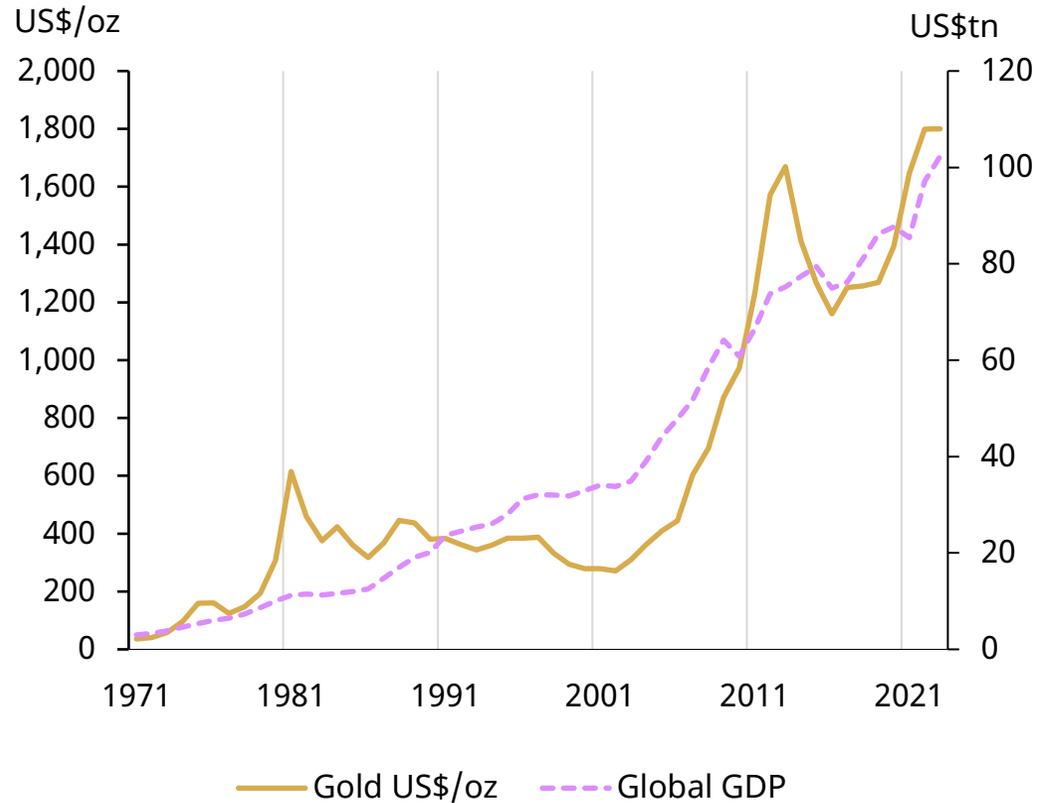
Thought experiment



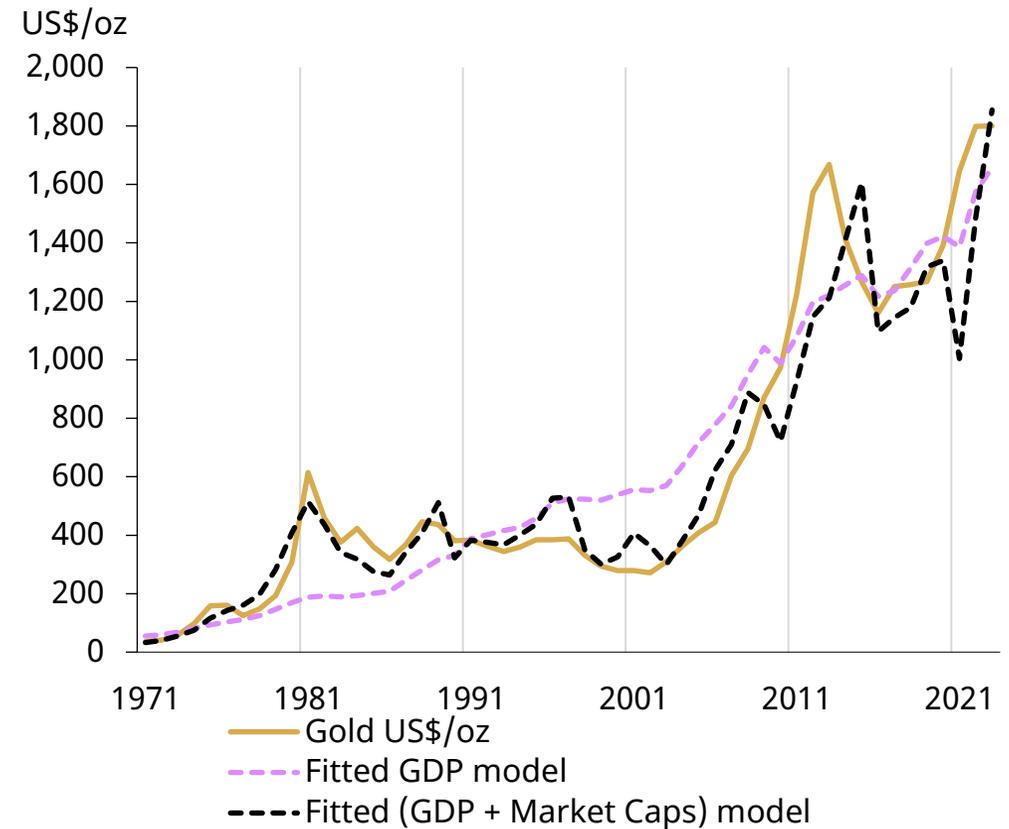
• Source: LBMA, WFE, SIFMA, Refinitiv GFMS, Oxford Economics, World Bank, World Gold Council

The economic and financial components

Global nominal GDP Explains ~ 80% of gold price



GDP and Global portfolio explain ~95%



Source: LBMA, WFE, SIFMA, Refinitiv GFMS, Oxford Economics, World Bank, World Gold Council

The long-run cointegrating system (1971-2022)

Economic component



Financial component



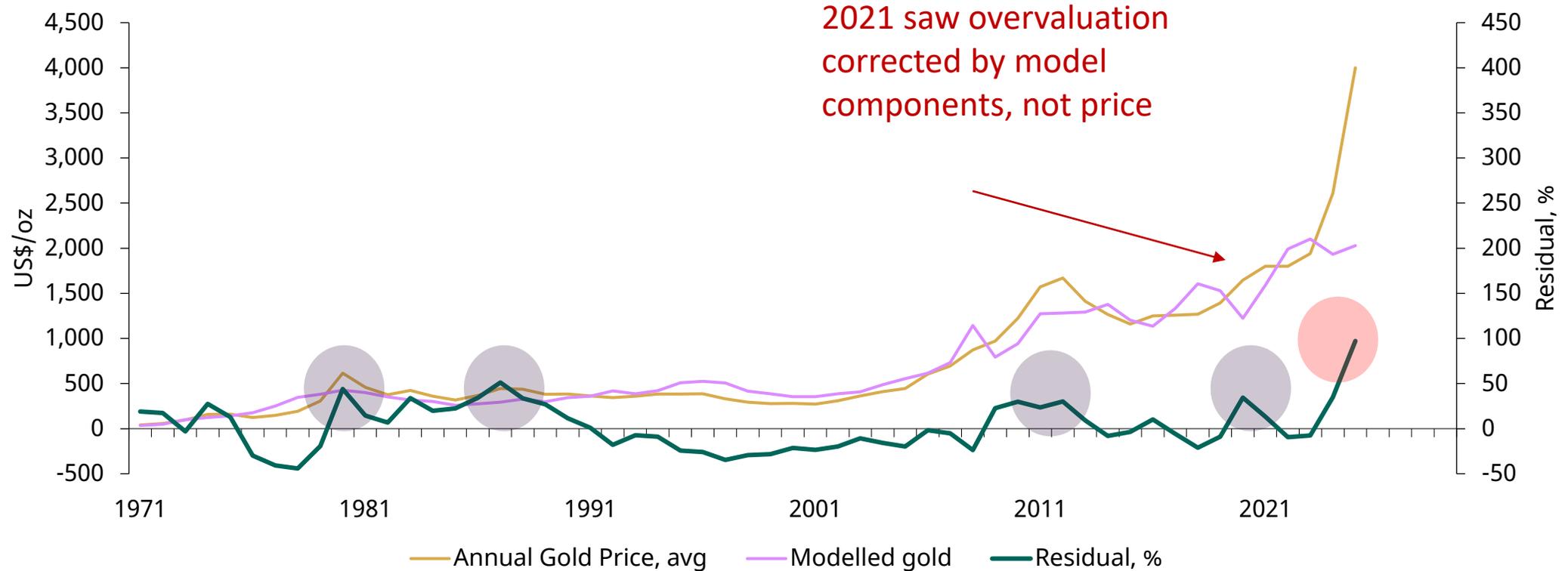
	(1)	(2)
LN Global Nominal GDP	0.811***	3.004***
LN Global Equity Market Cap		0.174*
LN Global Bond Market Cap		-1.366***
Observations	52	52
Adjusted R2	0.786	0.950
Philips Perron Unit Root test, p-value	0.111	0.006
Cointegrated ?	No	Yes

• Source: LBMA, WFE, SIFMA, Refinitiv GFMS, Oxford Economics, World Bank, World Gold Council



- Gold Fair Value and
- Applied Expected Return

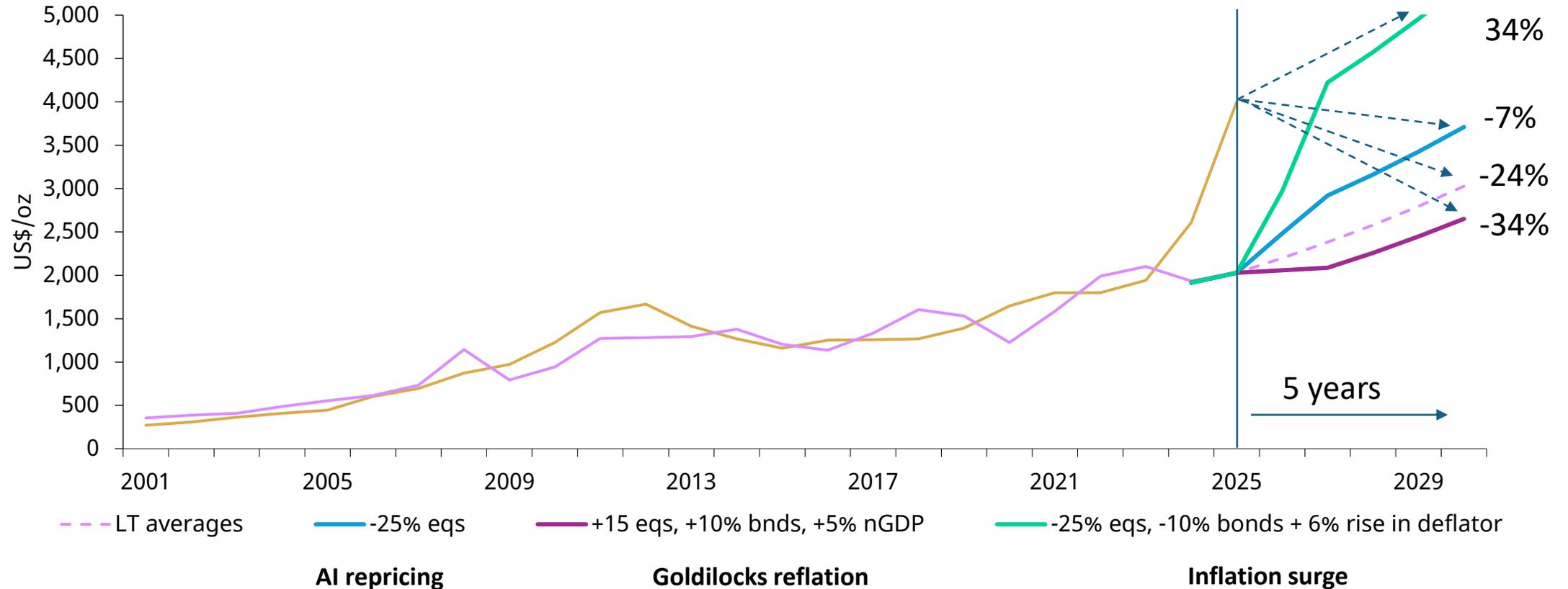
GLTER: gold valuation, current and historical



2025 price set to US\$4,000

• All prices prior to 2025 are annual averages. The 2025 price is set to US\$4,000 to better reflect current pricing. Source: LBMA, WFE, SIFMA, Refinitiv GFMS, Oxford Economics, World Bank, World Gold Council

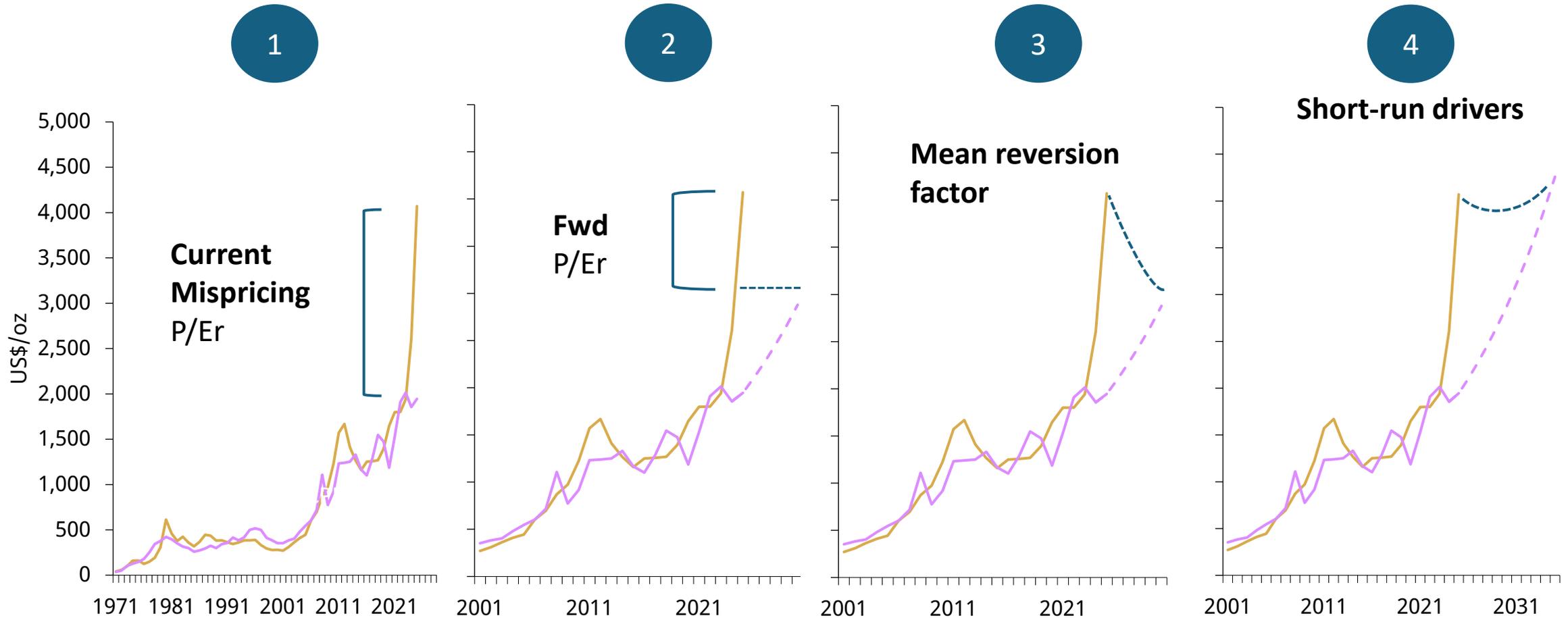
GLTER: gold valuation, hypothetical scenarios



Gold price at US\$4,000 and expected return to fair value in various scenarios in 5 years

All prices prior to 2025 are annual averages. The 2025 price is set to US\$4,000 to better reflect current pricing. LT averages based on CAGR of GLTER components from 1971 to 2024. -25% drop in equities: 15% in 2026, 10% in 2027. MSCI World currently on 24 with LT average of 20 since 1996. S&P 500 on 27 with LT average of 17. A reversion to mean since 1996 for MSCI world = c.20% drop. For S&P 500, the drop would be c.40%. A 6% rise in deflator equates to two years of 3% above average inflation. All scenarios see innovations across 2026 and 2027 before reverting to LT average growth rates. Source: LBMA, WFE, SIFMA, Refinitiv GFMS, Oxford Economics, World Bank, World Gold Council

Econometric foundation – Non-econometric application



The four steps to assessing medium-term expected return

• All prices prior to 2025 are annual averages. The 2025 price is set to US\$4,000 to better reflect current pricing. LT averages based on CAGR of GLTER components from 1971 to 2024. -25% drop in equities: 15% in 2026, 10% in 2027. MSCI World currently on 24 with LT average of 20 since 1996. S&P 500 on 27 with LT average of 17. A reversion to mean since 1996 for MSCI world = c.20% drop. For S&P 500, the drop would be c.40%. A 6% rise in deflator equates to two years of 3% above average inflation. Source: LBMA, WFE, SIFMA, Refinitiv GFMS, Oxford Economics, World Bank, World Gold Council

Expected return calculation using LT averages scenario

$$E[r_T] = \underbrace{\frac{1}{T} \ln \left(\frac{FV_T}{FV_0} \right)}_{\text{FV growth}} - \underbrace{\frac{1 - \phi^T}{T} m_0}_{\text{Mean reversion}} + \underbrace{S_T}_{\text{Short-run factors}}$$

Central banks

New investors

Momentum

$$E[r_5] = \frac{1}{5} \ln \left(\frac{3,027}{2,029} \right) - \frac{1 - 0.25}{5} 0.6 + 0$$

$$E[r_5] = 8.3\% - 10.1\% + 0 = \mathbf{-1.8\% \text{ p.a.}}$$

User inputs

$$T = 5$$

$$nGDPg = 7\%$$

$$mCAPSg = 11\%$$

Given inputs

$$P_0 = 4,000$$

$$FV_0 = 2,029$$

$$FV_5 = 3,027$$

$$halflife = 2.5$$

$$m_0 = \ln \left(\frac{4,000}{2,029} \right)$$

$$\phi = 2^{-1/halflife}$$

$$m_0 = 0.6$$

Thank you

- Johan Palmberg
- Senior Quantitative Analyst

X @goldcouncil

in World Gold Council

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About us

We are a membership organisation that champions the role gold plays as a strategic asset, shaping the future of a responsible and accessible gold supply chain. Our team of experts builds understanding of the use case and possibilities of gold through trusted research, analysis, commentary and insights.

We drive industry progress, shaping policy and setting the standards for a perpetual and sustainable gold market.

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