Global Economics:

Growth, Debt & the Challenges Ahead

Presentation by Paul Temperton for Leeds Policy Institute

27 October 2026

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PT1

Three Key themes

1. Resilience
2. Fiscal Risks
3. AI and the boost to growth

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Slide 2

PT1 Three key themes.
Paul Temperton, 2026-11-05T10:29:19.207

1. Resilience

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Resilient world economy

		IMF WEO forecasts made in April 2026			Likely (WEO October)
		Reference forecast	Adverse scenario	Severe scenario	
GDP growth	2026	3.1	2.5	2.0	3.1
	2027	3.2	3.0	2.2	3.4
Inflation	2026	4.4	5.4	5.8	4.7
	2027	3.7	3.9	6.1	4.1
Oil Price	2026	$82	$97	$106	$90
	2027	$76	$75	$125	

Sources: IMF WEO April 2026 and October 2026.

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Effects of a 10% increase in oil prices

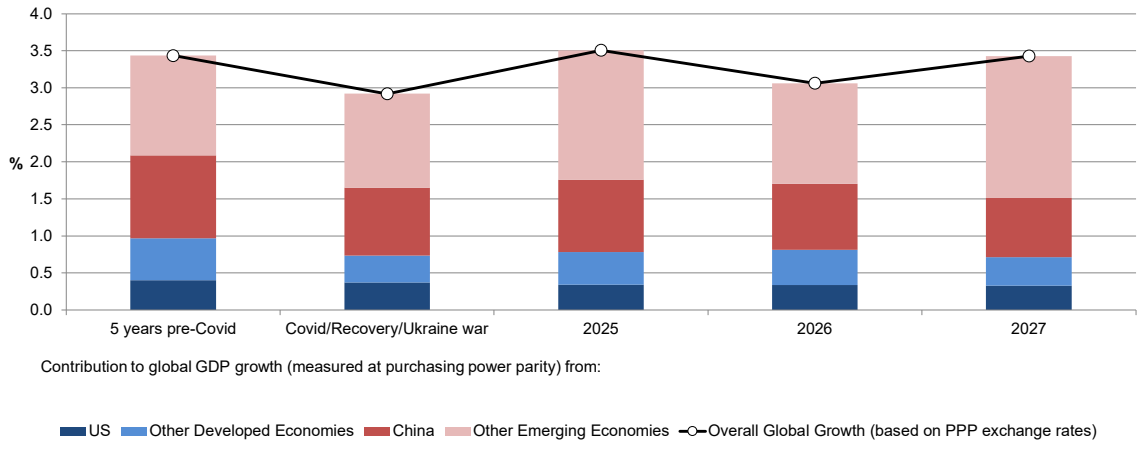
	GDP growth	Inflation
World	-0.25pp	+0.8pp
UK	-0.10 to -0.15pp	+0.2 to +0.3pp
US	-0.10pp after 1 year	+0.25pp
(after 2 years)	-0.25pp after 2 years	
Oil-importing advanced economies (e.g. Eurozone, Japan)	-0.10 to -0.25pp	+0.15 to +0.30pp
Oil-importing emerging economies (e.g. India, Turkey)	-0.20 to -0.60pp	+0.30 to +0.70pp
Oil exporting economies (e.g. Saudi Arabia, Norway)	Higher growth	Slight increase

Sources: various national sources including NIESR, OBR, Bank of England, US Fed, Oxford Economics and IMF. Note: oil prices averaged US$75 per barrel in 2025. They look likely to be on average about 20% higher in 2026.

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World growth and contributions



Source: IMF WEO database via LSEG. 22 October 2026.

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Sources of resilience

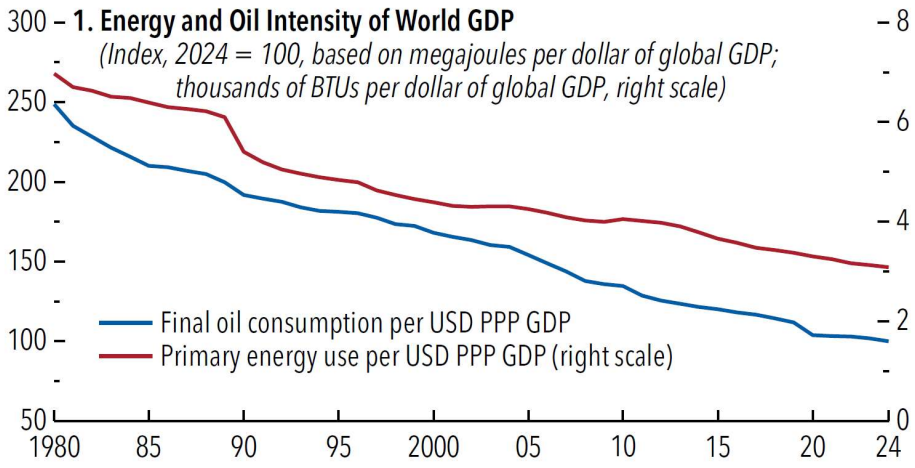
- Household and corporate balance sheets
- Reduced oil dependence
- Trade diversion
- AI investment

Source: IMF WEO and TIER Co.

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Reduced energy intensity of GDP



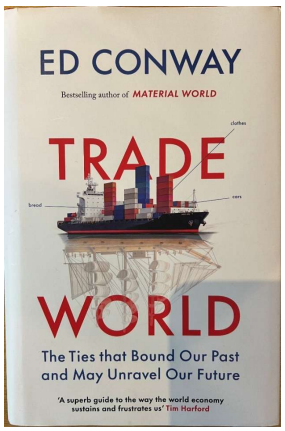
Source: IMF WEO October 2026.

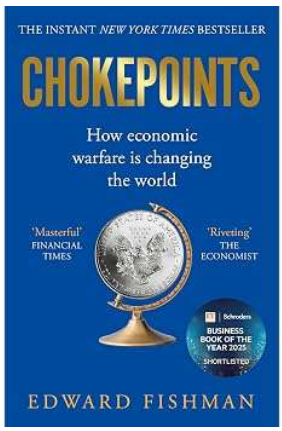
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Trade diversion





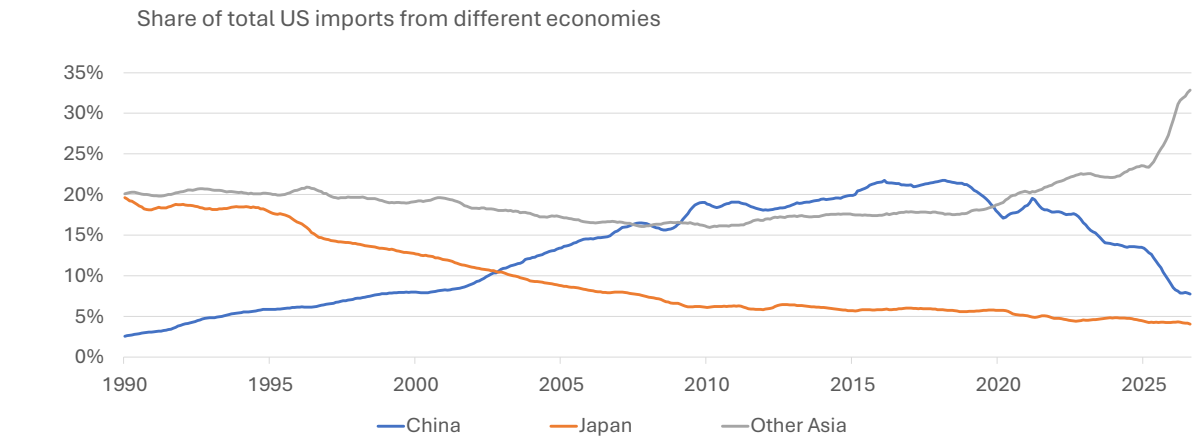


Source: Paul Temperton's photos.

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Sources of resilience: trade diversion



Source: LSEG and TIER Co. calculations. 22 October 2026.

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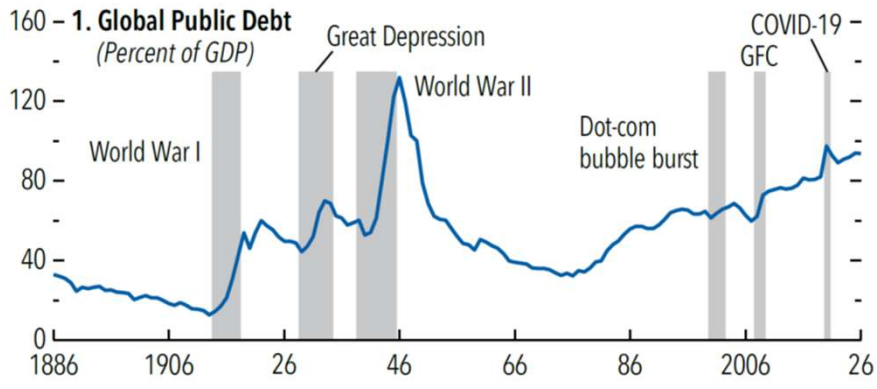
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2. Fiscal Risks

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Global Public Debt

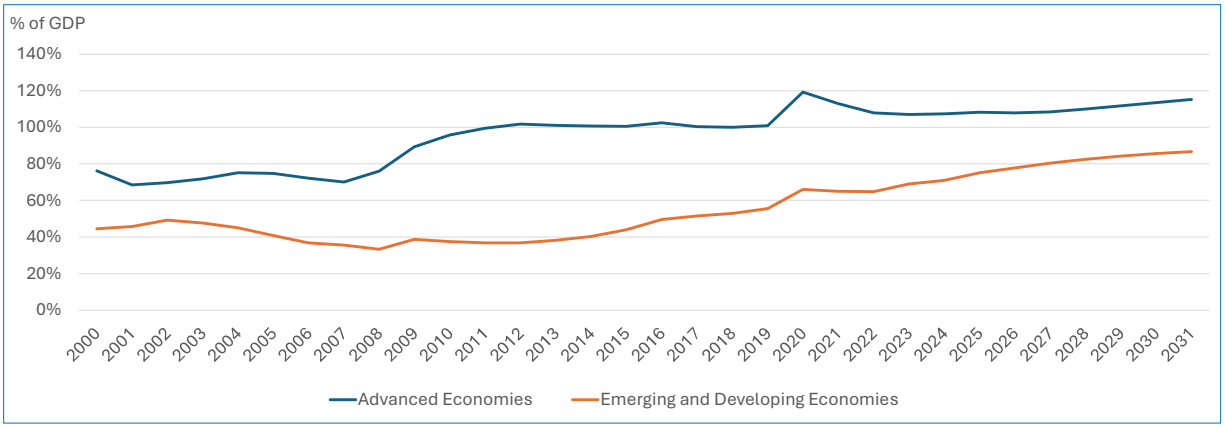


Source: IMF WEO October 2026

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Government Debt trends

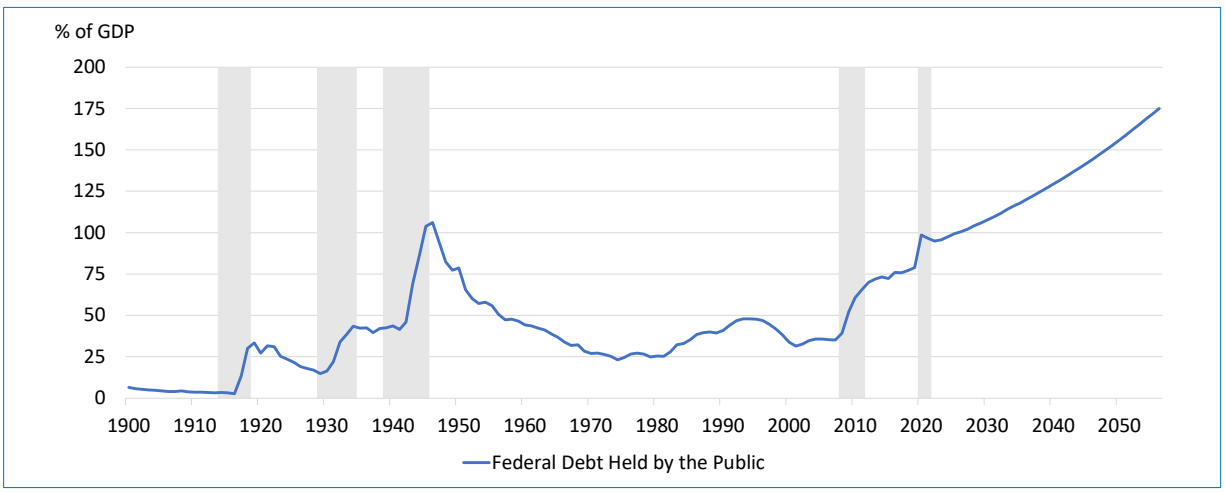


Source: IMF Fisal Monitor October 2026

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US Federal debt projection

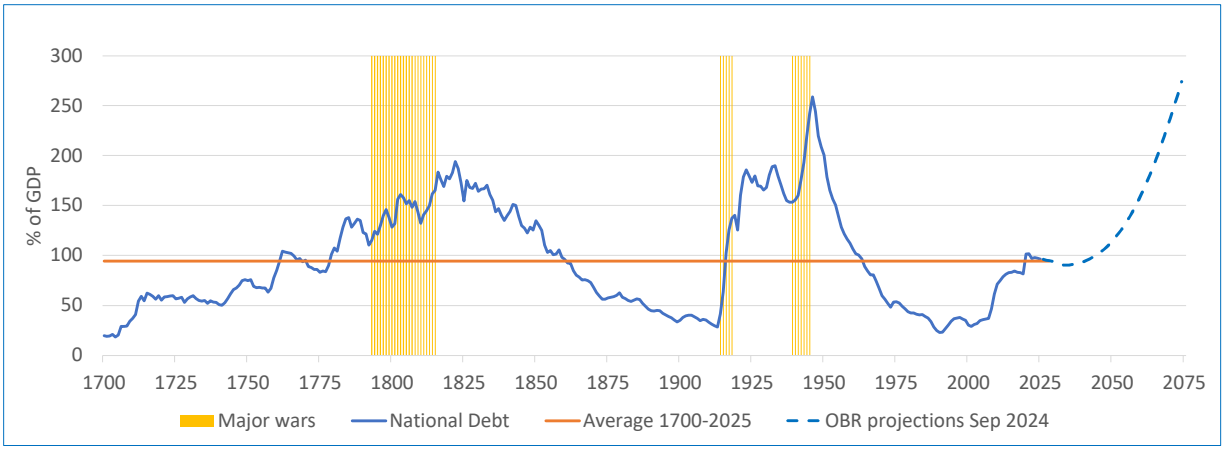


Source: US Congressional Budget Office. Shaded areas are WW1, Great Depression, WW2, GFC and pandemic

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UK national debt

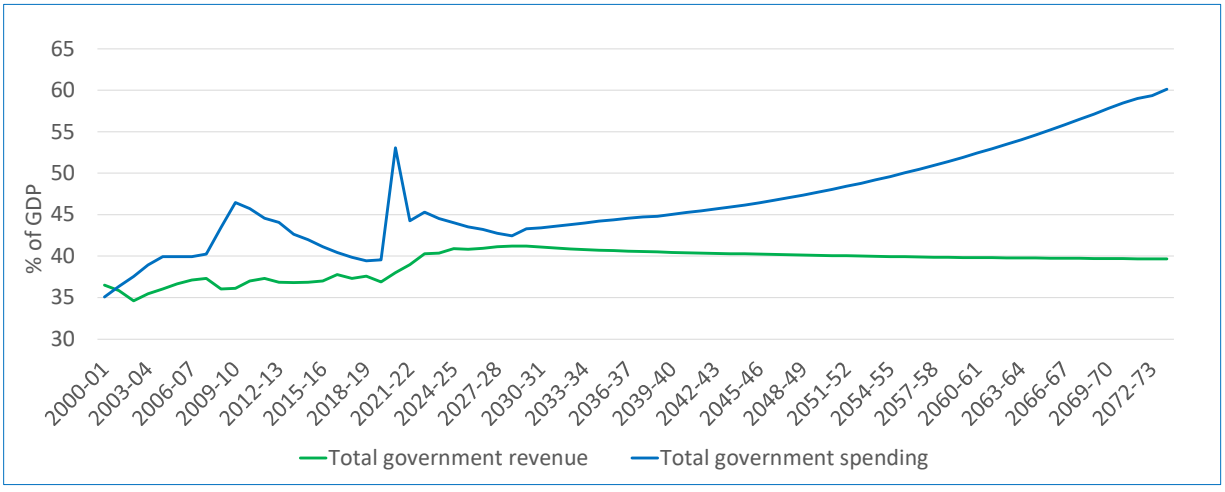


Source: Bank of England Millennium of data database; LSEG and OBR.

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UK government revenue & spending projection



Source: OBR September 2025 Fiscal Risks and Sustainability Report.

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Primary Surplus: the key measure

The Government's Primary Surplus or Deficit is the:

Surplus or Deficit excluding

Interest payments on the government's debt

Normally referred to as s* although the IMF use DSPB

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Debt sustainability: the standard approach

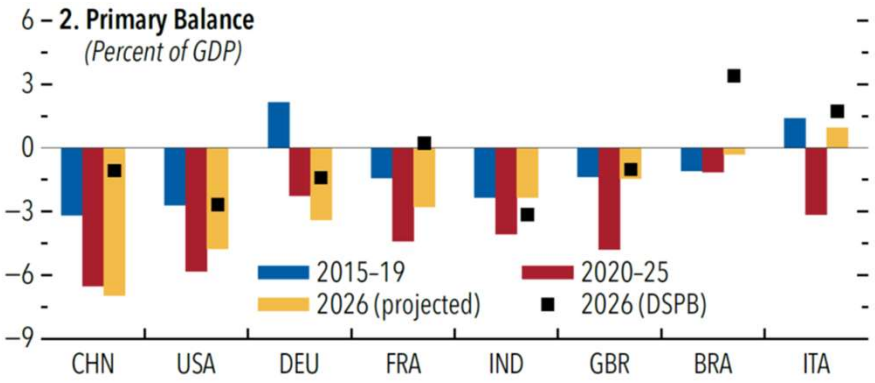
What is needed to stabilise the ratio of debt to GDP?
Specifically, what primary surplus is required?

Approximately:
$s^* = d * (r-g)$
s^* is the debt stabilising primary balance; d is the debt/GDP ratio; r is the average interest rate paid on government debt and g is the growth rate. r and g can be in nominal or real terms.

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UK does well on s*



Source: IMF WEO October 2026

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Greece

Scenario:.	Golden Years 2001-2008	Crisis Years 2009-2011
Debt stock, end previous year, % of GDP (d)	116%	134%
Interest rate paid on € debt (i)	5.45%	5.07%
Nominal GDP growth (n)	7.06%	-2.15%
Debt stabilising primary surplus (s*)	-1.75%	9.85%
Actual Primary surplus (s)	-1.54%	-6.01%
Debt sustainable?	YES!	NO
Debt stock end 2040	114%	326%

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Greece

Scenario	2012 Before haircut	2012 after haircut	'120 in 2020'
Debt stock, end previous year, % of GDP (d)	163%	154%	154%
Interest rate paid on € debt (i)	5.1%	5.1%	5.1%
Nominal GDP growth (n)	-1.4%	-1.4%	5.7%
Debt stabilising primary surplus (s*)	10.7%	10.1%	-0.9%
Actual Primary surplus (s)	0.3%	0.3%	3.0%
Debt sustainable?	NO	NO	YES
Debt stock end 2020	286%	270%	120%

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3. AI and the boost to growth

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Four explanations of growth

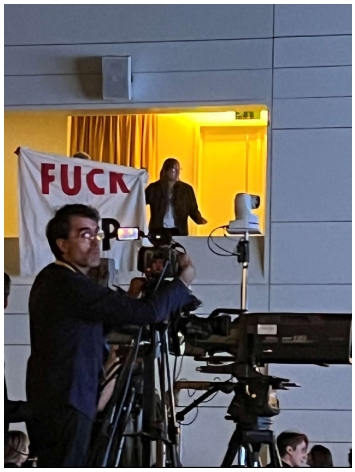
1. Narratives – e.g. Adam Smith
2. Harrod-Domar model – it's all about investment
3. Solow – the importance of productivity
4. Acemoglu and others – quality of institutions

Source: Daniel Suskind Growth: a reappraisal (Randon House 2025)

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Brussels Economic Forum





Paul Temperton's photos. Thursday 4 May 2023.

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Productivity



"Productivity isn't everything... but in the long run it is almost everything."

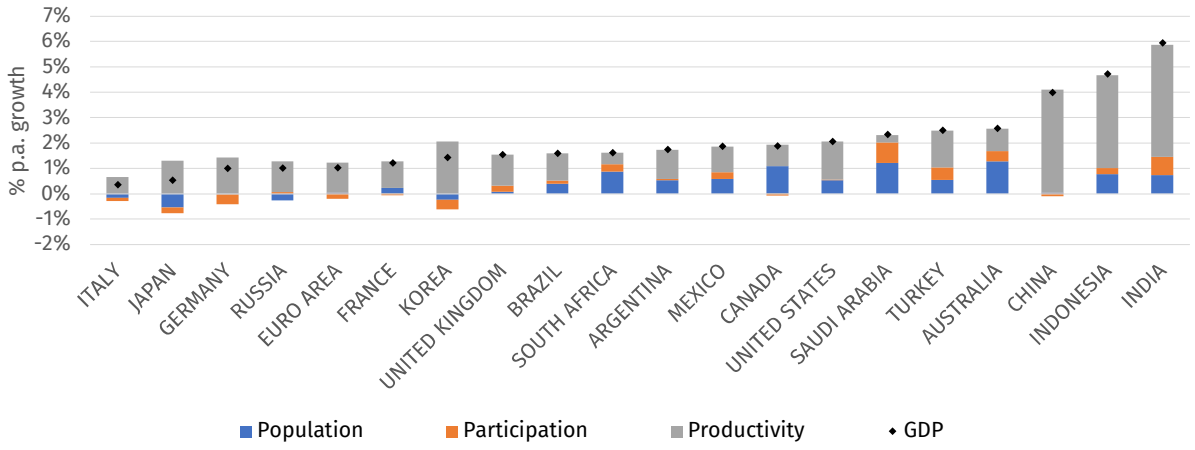
Paul Krugman

Source: Martin Wolf *The long wait for a productivity resurgence* Financial Times 13 June 2018.

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Potential GDP growth



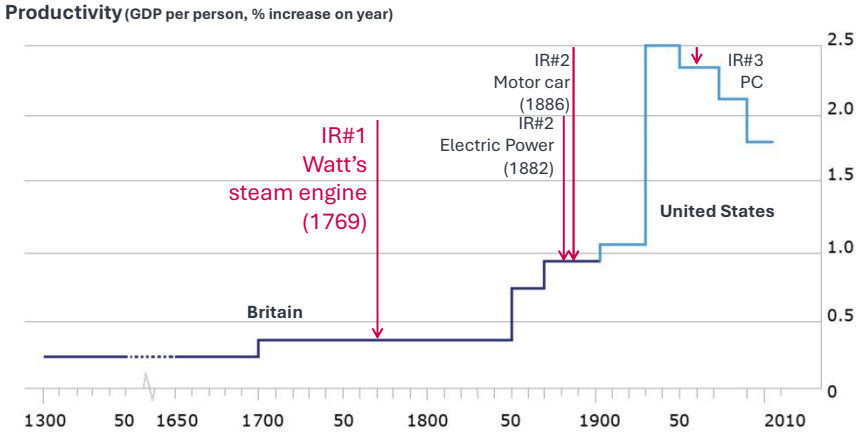
Source: Oxford Economics via LSEG and Tier Co calculations. 21 October 2026.

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Running out of ideas?

IR#3 not as productive as IR#1&2



Source: Robert J. Gordon The Rise and Fall of American Growth Princeton University Press 2016.

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Estimates of boost to growth from AI

McKinsey Global Institute: Estimates 0.1% to 0.6% annually from generative AI alone through 2040, or 0.5% to 3.4% annually when combined with all other workplace automation technologies. [1]

Goldman Sachs: Projects that generative AI could raise aggregate labour productivity growth by roughly 1.5 percentage points over a 10-year period.

OECD: Estimates that AI will contribute 0.25% to 0.6% per year to U.S. Total Factor Productivity (TFP) growth, translating to roughly 0.4% to 0.9% in annual labour productivity growth, and 0.4% to 1.2 percentage points annually for the UK.

Literature Reviews: General macro-level projections span 0.4% to 1.3 percentage points annually in the U.S. and 0.2% to 0.8 percentage points in Europe.

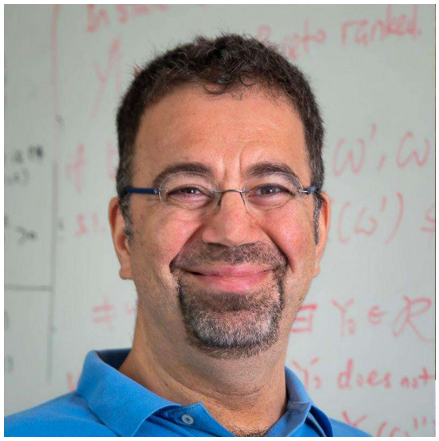
IMF: AI has the potential to lift global growth by up to half a percentage point annually*.

* Comment at the IMF Bangkok meeting Curtain raiser event by Krystalina Georgieva.

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Nobel prizewinners' estimates: Daron Acemoglu



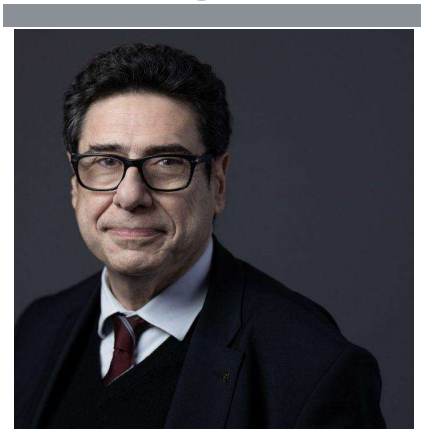
Daron Acemoglu — the sceptical estimate - 0.07–0.1 percentage points a year US productivity growth, over the next decade. This uses a task-based approach.

Source: Daron Acemoglu "The Simple Macroeconomics of AI," Working Paper, 2024.

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Nobel prizewinners' estimates: Daron Acemoglu



Philippe Aghion — the optimist.

Based on past technological revolutions, AI can improve productivity growth by 0.8 to 1.3 percentage points annually.

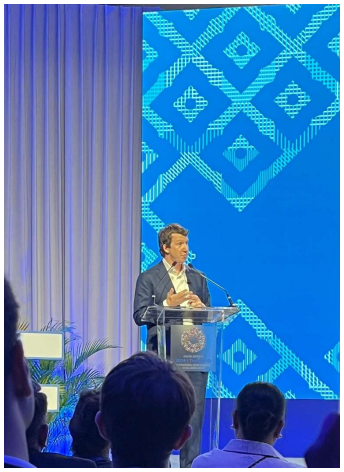
Based on a task-based framework (the one used by Acemoglu) the gain is 0.68 percentage points a year US TFP growth.

Estimates do not take into account effect of AI in the production of ideas (so the impact could be larger).

Source: Aghion and Bunel "AI and Growth: Where do We Stand?" www.frbsf.org June 2024

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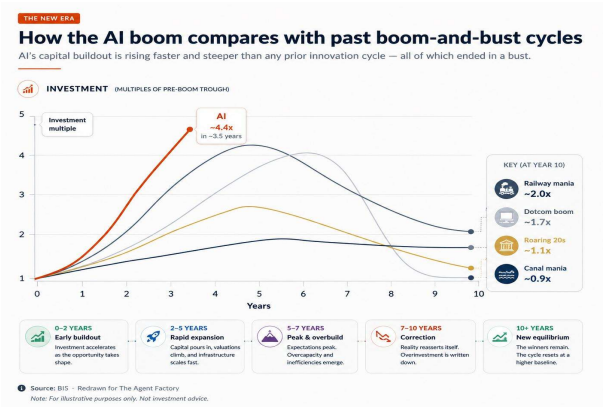
"US GDP, currently US$30 trillion, could increase to US$44 trillion by 2040."

Source: Paul Temperton's photo from IMF Bangkok Per Jacobsen lecture; estimates presented by Jack Clark.

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Comparison with previous booms: BIS



Source: BIS June 2026.

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Comparison with previous booms: Brookings

Table 1. Selected U.S. Capital-Expenditure Booms

Episode	Period	Size (% of GDP)
Canals	1836–1841	0.66
Railroads	1870–1890	2.24
Electrification	1905–1925	0.50
Highways	1956–1973	1.13
Telecom and fiber	1996–2003	1.10
AI buildout	2025–2032	3.63

Notes: Size is average annual capital expenditure as a percentage of GDP over the indicated period. Appendix C provides sources and further details.

Source: Brookings Papers on Economic Activity September 24-25, 2026.

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Canal mania - 1790s-1830s



Canals were expensive, fixed infrastructure investments. They lowered transport costs and opened up inland markets, but competing schemes could build too much capacity or choose routes that never earned adequate returns.

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Railway mania – Britain in the 1840s



British railway investment in 1847 has been estimated at around 7% of national output. Investors financed a rapid expansion of the network, followed by a severe financial correction.

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Roaring 20s – radios, cars electrification



Commercial radio, talking pictures, TV, penicillin, Birdseye frozen food, Model T Ford, electric fridges, sliced bread, pop up toaster, transatlantic flight and Prohibition.

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Dot com boom – late 1990s to 2000



Investment in computers and software reached about 4.4% of US GDP in 2000. The subsequent collapse wiped out enormous amounts of equity value, and much of the telecommunications infrastructure built around the boom was initially underused. But the internet, fibre networks and computing capacity created the foundations for later digital businesses.

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AI boom 2023 onwards



Spending by AI hyperscalers estimated at around US$1 trillion in 2026.

Differs from other booms in that data centres need regular updating.

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AI on a Raspberry Pi?



"As simple AI models become far more efficient, they may no longer need to use the super-expensive graphics processing units (GPUs) designed by the US chipmaker Nvidia and may be able to rely on the old-fashioned central processing units (CPUs) now manufactured by Raspberry Pi. Whereas he had previously forecast that this evolution would take several years, he now suggests it may happen in months."

Source: Eben Upton, Raspberry Pi founder, Lunch with the FT 18 September 2026.

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UK public sector investment: HS2

Passenger services from Old Oak Common to Birmingham Curzon Street are expected to start between May 2036 and October 2039.

The full line from Euston to Handsacre Junction (where HS2 will join with the West Coast Main Line) is expected to open between May 2040 and December 2043.



Source: www.hs2.org.uk

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UK public sector investment: Housing

Labour government target to build 1,500,000 houses by end of current parliament.

Planning delays, scaffolder shortages and Ebbsfleet jumping spiders



Source: HS2 boss Mark Wild, The Sunday Times 8 March 2026.

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UK private sector investment

- Planning requirements, especially environmental impact, and the costs involved
- Variable policy stance
- Skills shortages
- High borrowing costs

Source: Factors cited by Ben Chu on BBC Radio Sounds series "The Growth Conundrum"

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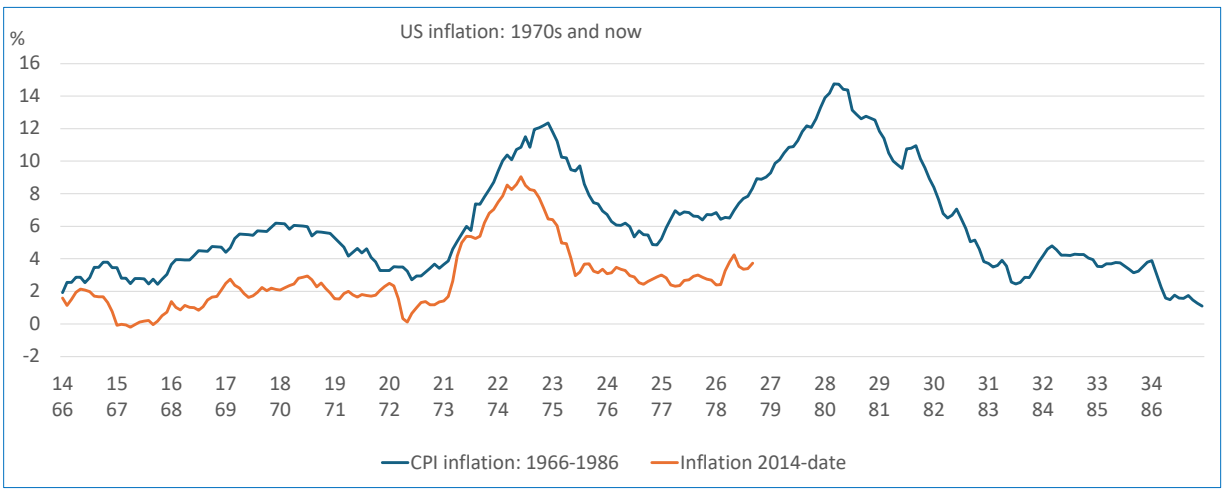
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Inflation

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Inflation: seen it all before?

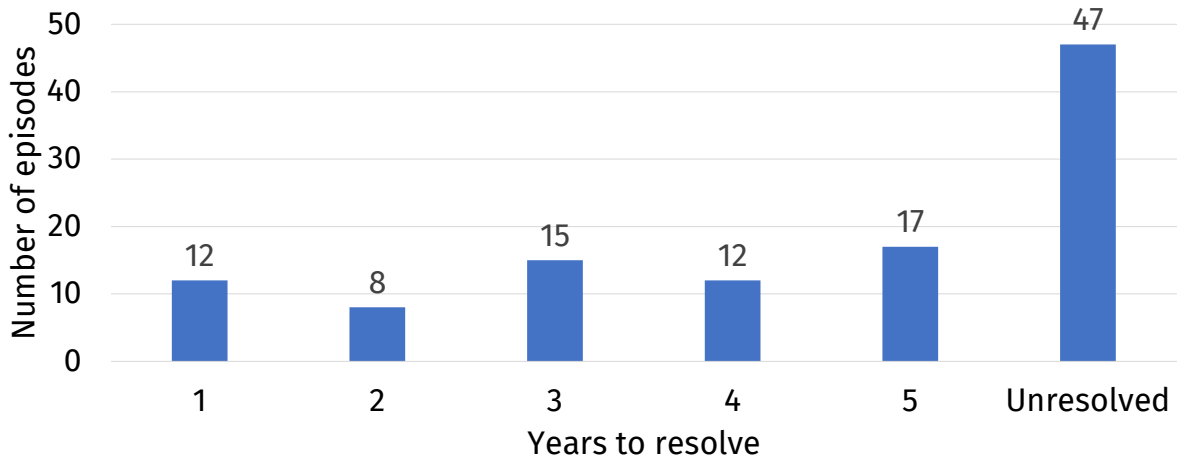


Source: LSEG and TIER Co. 27 October 2026.

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IMF on 7 lessons from 100 inflation shocks



IMF Working Paper presented at IMF World bank Marrakech Meetings, 10 October 2023

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IMF on 7 lessons from 100 inflation shocks

- Inflation is persistent, especially after terms of trade shocks
- Most unresolved episodes involved “premature celebrations”

Countries that resolved inflation:

- had tighter monetary policies
- implemented restrictive policies more consistently
- contained nominal exchange rate depreciation
- had lower nominal wage growth
- had lower growth in the short-term (1-2 years) but stronger growth over the long term (5 years)

IMF Working Paper presented at IMF World Bank Marrakech Meetings, 10 October 2023

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Fiscal Theory of the price level



The overall price level is determined by government fiscal policy—specifically the size of government debt and expected future budget surpluses.

Main proponent is John Cochrane (the Grumpy Economist). He argues that inflation gets out of control when people lose confidence that a nation's debt will be repaid, and start to expect and prepare for inflation.

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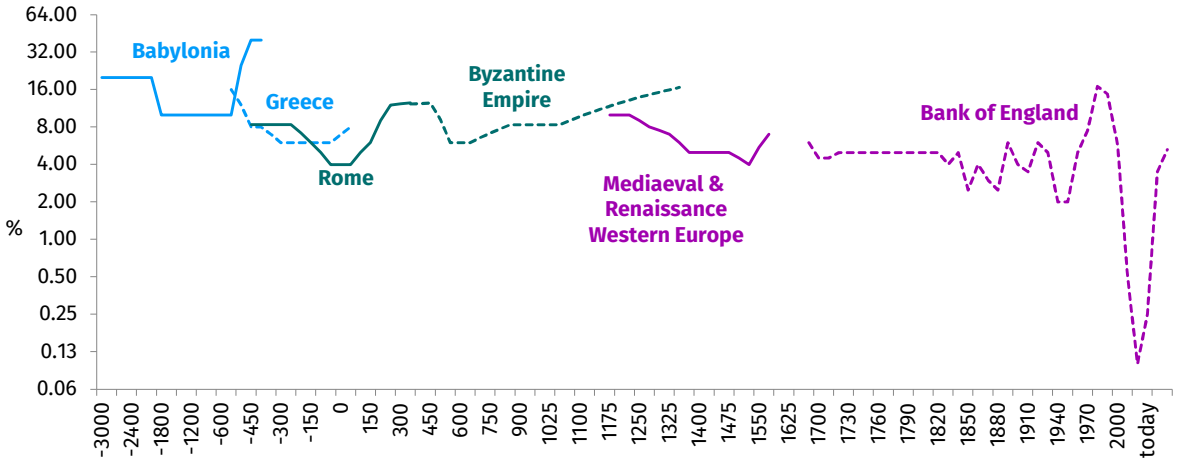
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Interest rates

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Interest rates: 5,000-year history

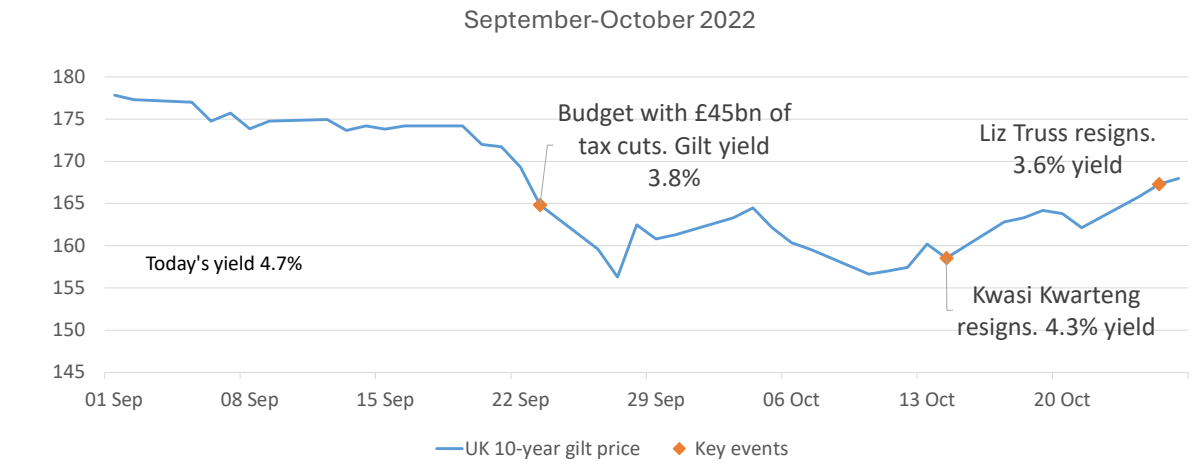


Source: Sidney Homer and Richard Sylla, A History of Interest Rates and Bank of England, as at 19 October 2023.

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The Liz Truss moment: an example for the world



Source: LSEG and TIER Co.

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Conclusions

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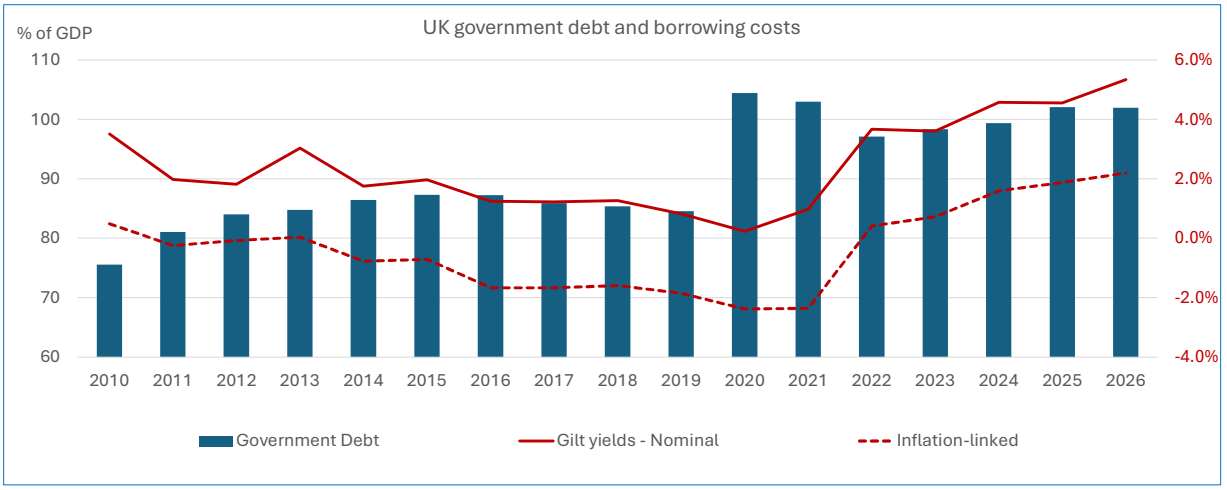
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Apendix

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Austerity or expansion?



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The changing role of the IMF



Michel Camdessus watching President Suharto of Indonesia sign the IMF agreement in Jakarta. It included a $43bn bailout, an agreement including austerity measures, dismantling of state monopolies and banking reforms. 15 January 1998.

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Debt stabilization arithmetic

$$D_t = D_{t-1} + i.D_{t-1} - S_t \quad (1)$$

Where:

D_t = public debt at time t

D_{t-1} = public debt at time t - 1

i = interest rate paid on debt outstanding

S_t = primary budget surplus

(i.e. surplus excluding interest payments)

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Rearrangement of terms:

Expressed as a proportion of GDP in period t (Y_t):

$$\frac{D_t}{Y_t} = \frac{D_{t-1}}{Y_t} + \frac{i.D_{t-1}}{Y_t} - \frac{S_t}{Y_t} \quad (2)$$

GDP in period t (Y_t) is equal to the previous period's GDP (Y_{t-1}) multipled by the growth rate of GDP (n):

$$Y_t = Y_{t-1}(1+n) \quad (3)$$

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Rearrangement of terms:

Replacing Y_t in the first two arguments on the RHS of equation gives : (2)

$$\frac{D_t}{Y_t} = \frac{D_{t-1}}{Y_{t-1}(1+n)} + \frac{i(D_{t-1})}{Y_{t-1}(1+n)} - \frac{S_t}{Y_t}$$

$$\frac{D_t}{Y_t} = \left(\frac{1+i}{1+n}\right)\frac{(D_{t-1})}{(Y_{t-1})} - \frac{S_t}{Y_t}$$

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Expression for debt/GDP ratio:

Using lower case letters to denote variables as a % of GDP:

$$d_t = d_{t-1}\left[\frac{1+i}{1+n}\right] - s_t \qquad (4)$$

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Expression for debt stabilising primary balance:

In order to stabilise the debt/GDP ratio we need

$$d_t = d_{t-1} \quad (5)$$

The primary balance required to achieve this (s^*) can be obtained by combining equations (4) and (5) to give:

$$s^* = d_{t-1} \cdot \left[\frac{i - n}{1 + n} \right]$$

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