

JULEX CAPITAL

The 60/40 portfolio . . . Does it work?

Rob Brown, PhD, CFA

Julex Capital Advisory Board Member, Website www.robrownonline.com



40 Grove Street, Suite 140, Wellesley, MA 02482

Phone 781-489-5398

Email info@julexcapital.com

Web www.julexcapital.com

- Where did it come from
- It's origins where from the institutional buy-side of our industry
 - Defined benefit pension plans
 - Corporate
 - Municipal and Taft-Hartley
 - State and federal
 - To a much lesser extent . . . foundations and endowments

- **If you follow certain general precepts**

- Identify your investment time period,
- Specify your desired risk level,
- Determine the stock/bond split that delivers said risk level,
- Develop a relatively constant/stable roster of asset categories to select from,
- Diversify across asset categories, ever greater diversification is better,
- Mix asset categories according to their expected means, standard deviations, and correlations (use an optimizer)
- Rebalance regularly so as to maintain the intended asset mix,
- Minimize costs, both direct and indirect,
- Avoid market timing,
- Bring adequate patience to the table, giving sufficient time for the portfolio to deliver its intended result,
- Remain humble, don't think that you can outsmart the market,
- Ignore the news and the talking heads, and
- Don't stir the pot, i.e., avoid the numerous behavioral biases

You will receive certain benefits

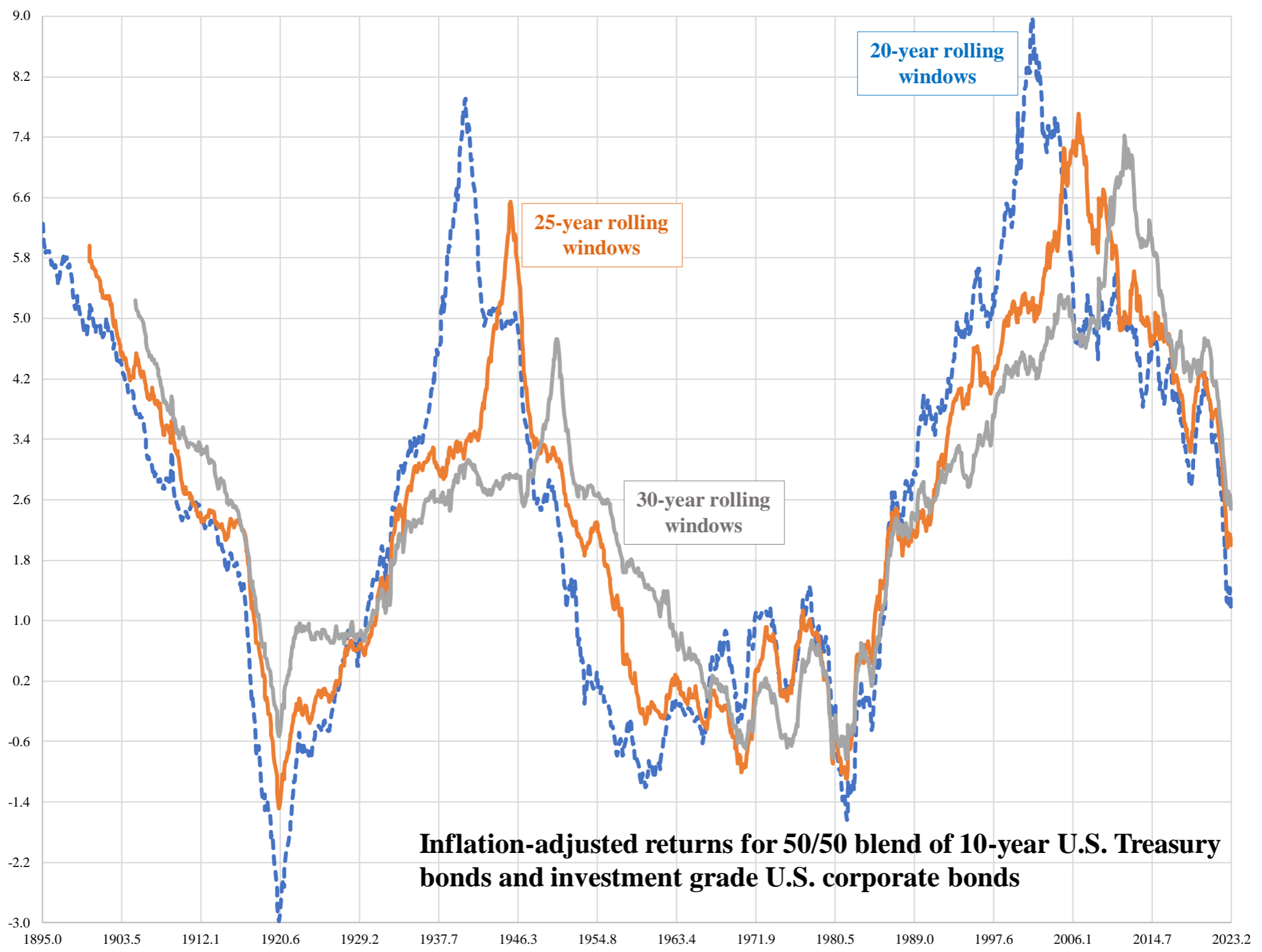
- Experience a relatively dependable result,
- Earn a satisfactory rate of return,
- Outperform 80% to 85% of their less disciplined peers,
- Realize a high probability of achieving any reasonable and properly defined investment goal (i.e., *“it’s just science”*),
- Achieve the approval/blessing of those who pass judgement upon them (since they’ve followed convention and accepted practice), and
- Earn 7% per annum , as stated by the largest U.S. retail investment management firm: “The goal of the 60/40 portfolio is to achieve . . . annualized returns of roughly 7%” (Aliaga-Diaz 2022)

But for this to work . . . certain assumptions must hold true

- Necessary, required assumptions about the behaviors of underlying asset categories
- Instability
- Regime change
- Risk without return
- Ex-post cherry picking
- Episodic eras
- Trending and momentum

Instability

Mean, standard deviation, and covariance array . . . must be sufficiently stable
They just can't be moving all over the place



Inflation-adjusted returns for 50/50 blend of 10-year U.S. Treasury bonds and investment grade U.S. corporate bonds

Regime change

Summary statistics can't change radically at a "specific point in time" in conjunction with significant local and/or global developments

An asset can't behave one way before "1920" . . . and radically differently after "1920"

		U.S. corporate bonds (investment grade)	10-year U.S. Treasury bonds	International stocks	Gold bullion	International treasury bonds (GDP-weighted)	U.S. stocks	60/40 portfolio	Diversified commodities
Regime change (when it happened)		Jun 1914	May 1902	May 1950	Jun 1931	Jun 1920	Jan 1906	Feb 1920	Aug 1939
Return (annualized geometric mean)	<i>Before</i>	4.9	4.8	0.6	-1.2	-0.7	7.9	2.6	0.2
	<i>After</i>	3.0	1.2	7.6	1.7	3.1	6.5	5.6	2.7
Risk (annualized standard deviation of monthly returns)	<i>Before</i>	3.3	4.1	17.6	3.4	6.5	12.4	7.6	15.7
	<i>After</i>	6.6	6.6	13.9	15.3	9.3	17.9	9.5	13.8
Return per unit of risk	<i>Before</i>	1.51	1.16	0.03	-0.36	-0.11	0.64	0.34	0.01
	<i>After</i>	0.46	0.19	0.54	0.11	0.33	0.36	0.59	0.20
Autocorrelation (one month relative to the prior month)	<i>Before</i>	0.11	0.04	0.07	0.18	0.03	0.26	0.25	0.35
	<i>After</i>	0.24	0.19	0.13	0.04	0.11	0.07	0.10	0.08
Correlation (relative to other asset categories, the median)	<i>Before</i>	0.64	0.48	0.23	0.60	0.48	0.11	0.62	0.20
	<i>After</i>	0.41	0.24	0.34	0.10	0.30	0.18	0.40	0.13

Notes relevant to date of associated regime change

The US entered the 1910s as a country with a relatively undeveloped economy that operated in isolation from foreign interests. The inauguration of Woodrow Wilson as U.S. president in 1913, and with innovations from an up-and-coming new breed of bankers and businessmen, the 1910s brought awesome changes to the U.S. economy. Particularly with its entry into World War I (1914–18), the United States proved to the nations of the world that it had become a modern industrial power.

Agriculture, which had been the primary employer throughout the previous century, was gradually being replaced by industry. The US was expanding its economic interests around the globe and emerging as a world power. This business expansion meant increased wealth as raw materials became cheaper to obtain, driving prices down and consumption up. The decade was further marked by major technological innovations, such as the birth of the automobile and aviation industries.

Europe and Japan had to spend the immediate postwar decade undergoing extensive reconstruction, heavily dependent on official aid from the United States, yet over time Europe and Japan closed the technological and productivity gap with the United States.

In 1933, President Roosevelt took the U.S. off the gold standard when he signed the Gold Reserve Act in 1934. This bill made it illegal for the public to possess most forms of gold. People were required to exchange their gold coins, gold bullion and gold certificates for paper money at a set price of \$20.67 per ounce.

WWI ran from 1914 to 1918. The European Great Depression started in 1929 and ran through 1939. WWII ran from 1939 through 1945. European reconstruction began in earnest in 1947.

Although the 1900s had a generally optimistic economic outlook, the confidence of many Americans was shaken by the sharp stock market drop in 1907. The first sign of financial panic was a run on the Knickerbocker Trust Company of New York, which collapsed the banking and credit system. Confidence was restored because of the actions of the U.S. Treasury along with capitalists under the leadership of J.P. Morgan, who stabilized the banks and corporations with their own funds.

US prosperity soared in the 1920s as the manufacturing of consumer goods increased. Washing machines, vacuum cleaners, and refrigerators became everyday household items. By 1934, 60% percent of households owned radios. By 1922, 60 radio stations broadcast everything from news to music to weather reports. Most of them used expanded credit offered by a booming banking industry. From 1926 to 1929, the number of people flying in planes increased from 6,000 to 173,000.

The 1950s saw the beginning of the reconstruction of a new global economy. Between 1950 and 1973 the annual real GDP growth of developed market economies averaged around 5 percent. This growth was smooth, with none of the major recessions seen in the interwar years. In the 1960s, the US began a permanent balance of trade deficit. In 1971 the US abandoned the gold standard and adopted a pure fiat currency, initiating a long-term period of US Dollar decline.

Risk without return

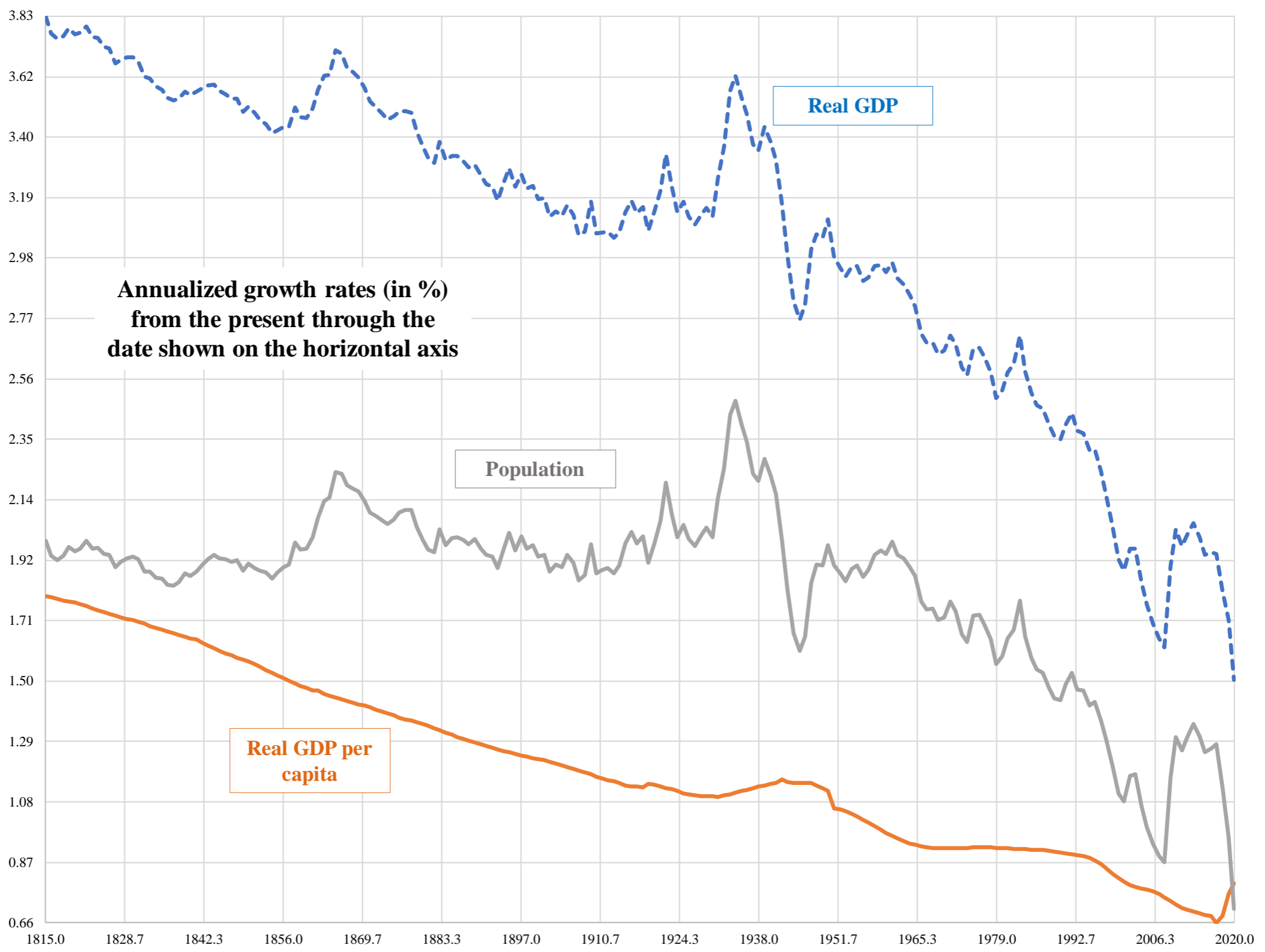
An asset can't deliver a cumulative loss over 40 years . . . if you reinvest every single penny
Asset categories can't deliver risk . . . and no return . . . over numerous consecutive decades

Asset category	Number of years real return was negative	Start of losing period	End of losing period	Cumulative loss (in %)
	131.1	Jan 1875	Feb 2006	-0.3
Gold bullion	12.4	May 2010	Oct 2022	-1.7
	1.5	Feb 2008	Aug 2009	-4.2
	90.2	Dec 1894	Feb 1985	-0.1
International treasury bonds (GDP-weighted)	17.8	Dec 2004	Oct 2022	-1.2
	3.8	Jun 1879	Apr 1883	-0.3
	86.7	Dec 1894	Sep 1981	-0.2
10-year U.S. Treasury bonds	19.4	May 2003	Oct 2022	-0.7
	4.7	Feb 1889	Oct 1893	-0.2
	45.8	Jan 1936	Oct 1981	-0.6
U.S. corporate bonds (investment grade)	28.5	Jan 1892	Jul 1920	-0.6
	11.0	Feb 2012	Feb 2023	-0.1
	39.7	Aug 1980	Apr 2020	-1.4
Diversified commodities	32.1	May 1917	Jun 1949	-3.0
	21.6	Dec 1950	Jul 1972	-5.4
	21.2	May 1961	Jul 1982	-1.3
U.S. stocks	19.8	Aug 1929	Jun 1949	-5.5
	16.4	Mar 1905	Aug 1921	-2.6
	18.7	Aug 1914	Apr 1933	-0.2
International stocks	16.9	Jan 1936	Dec 1952	-0.5
	15.3	May 2007	Sep 2022	-2.1
	25.7	Apr 1895	Dec 1920	-0.1
60/40 portfolio	15.4	Dec 1936	May 1952	-0.1
	10.5	Jan 1972	Jul 1982	-1.5

Ex-post cherry picking

Can't draw conclusions by restricting your analysis to the best time period in history . . . and then for that time period also select the best performing single country

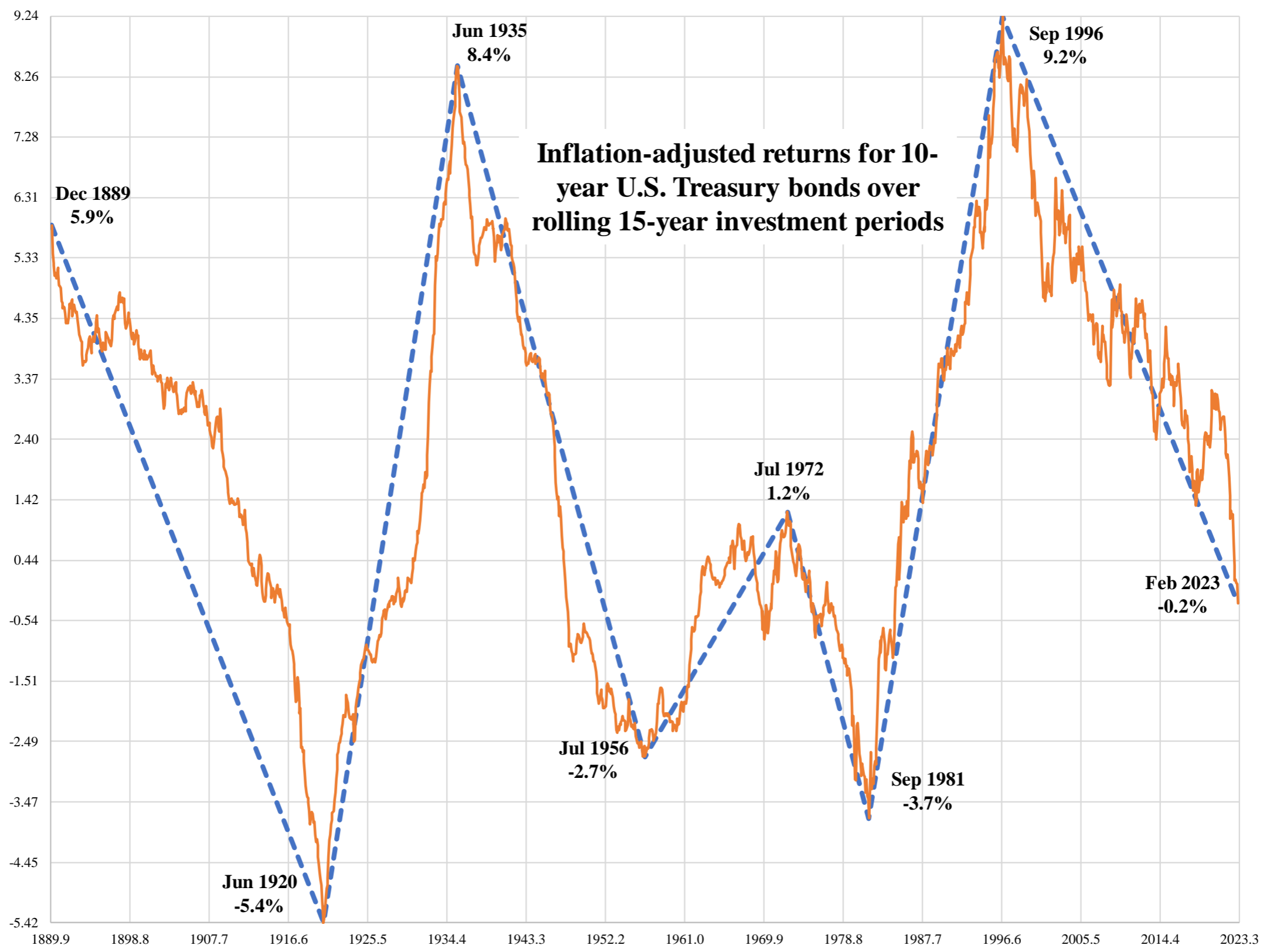
In other words . . . you can't use U.S. stock and bond returns over the last 74 years

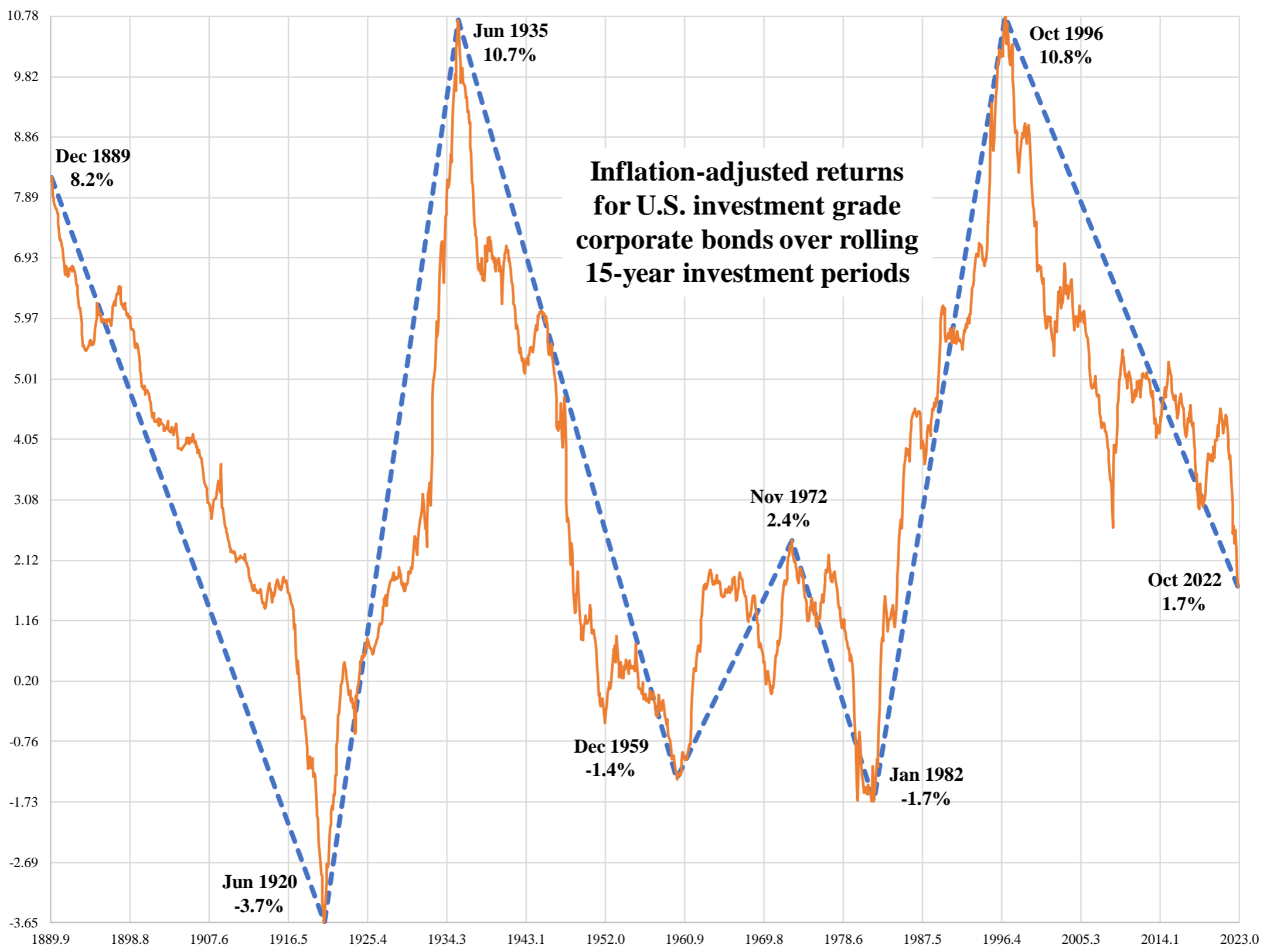


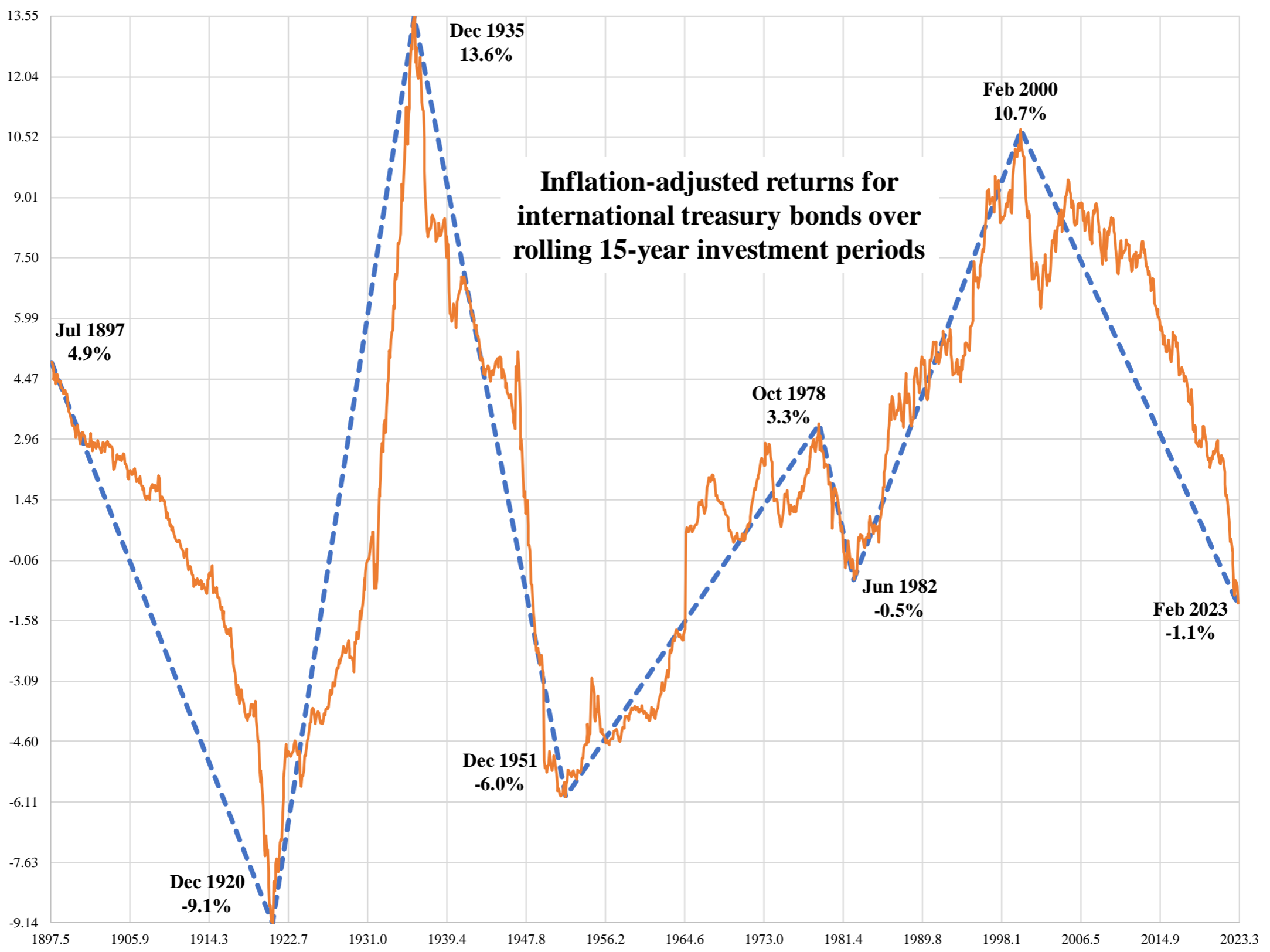
Episodic eras

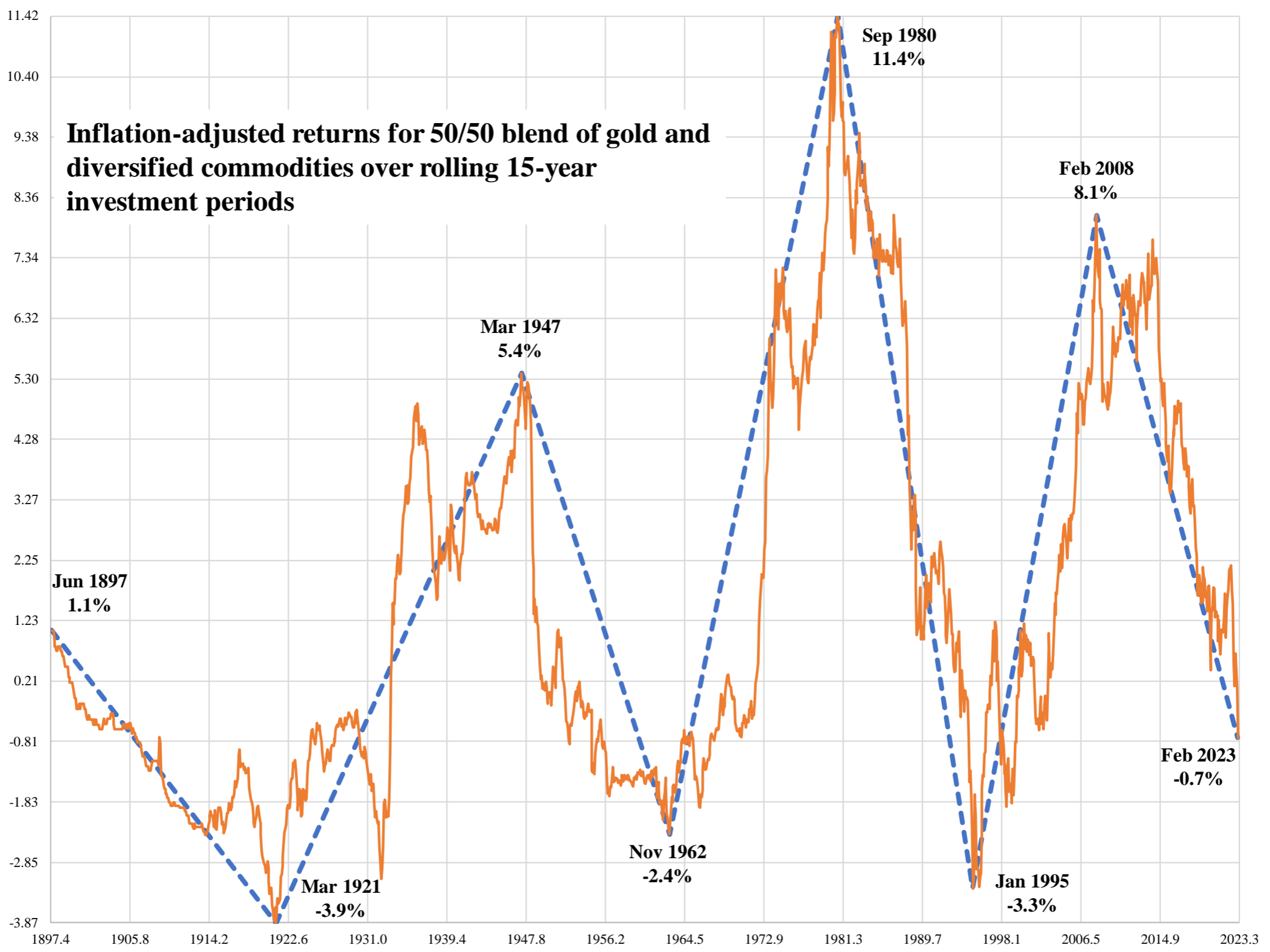
Interest rates don't go up for 40 years . . . and then go down for 40 years

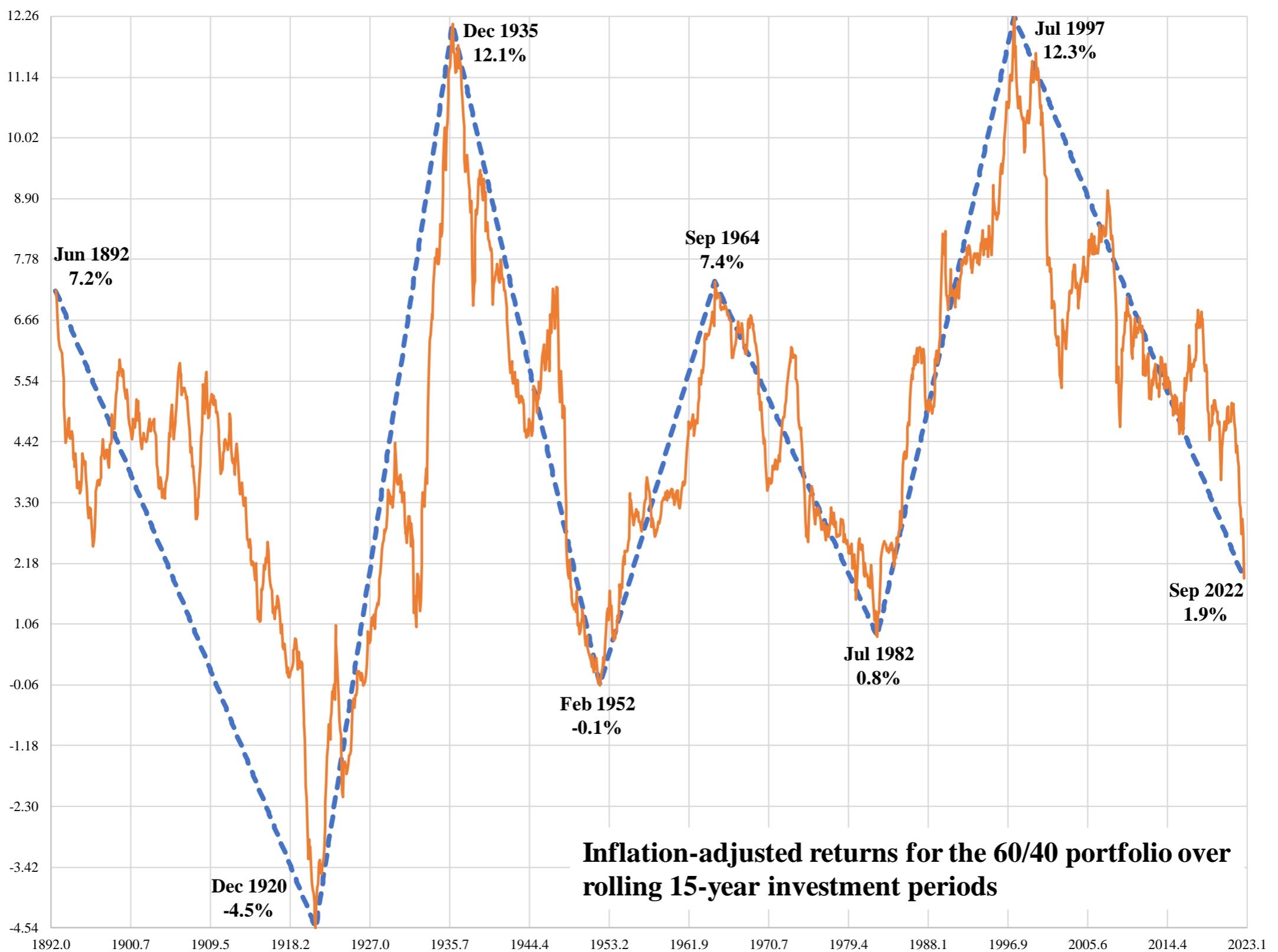
Return patterns are not inherently episodic in nature











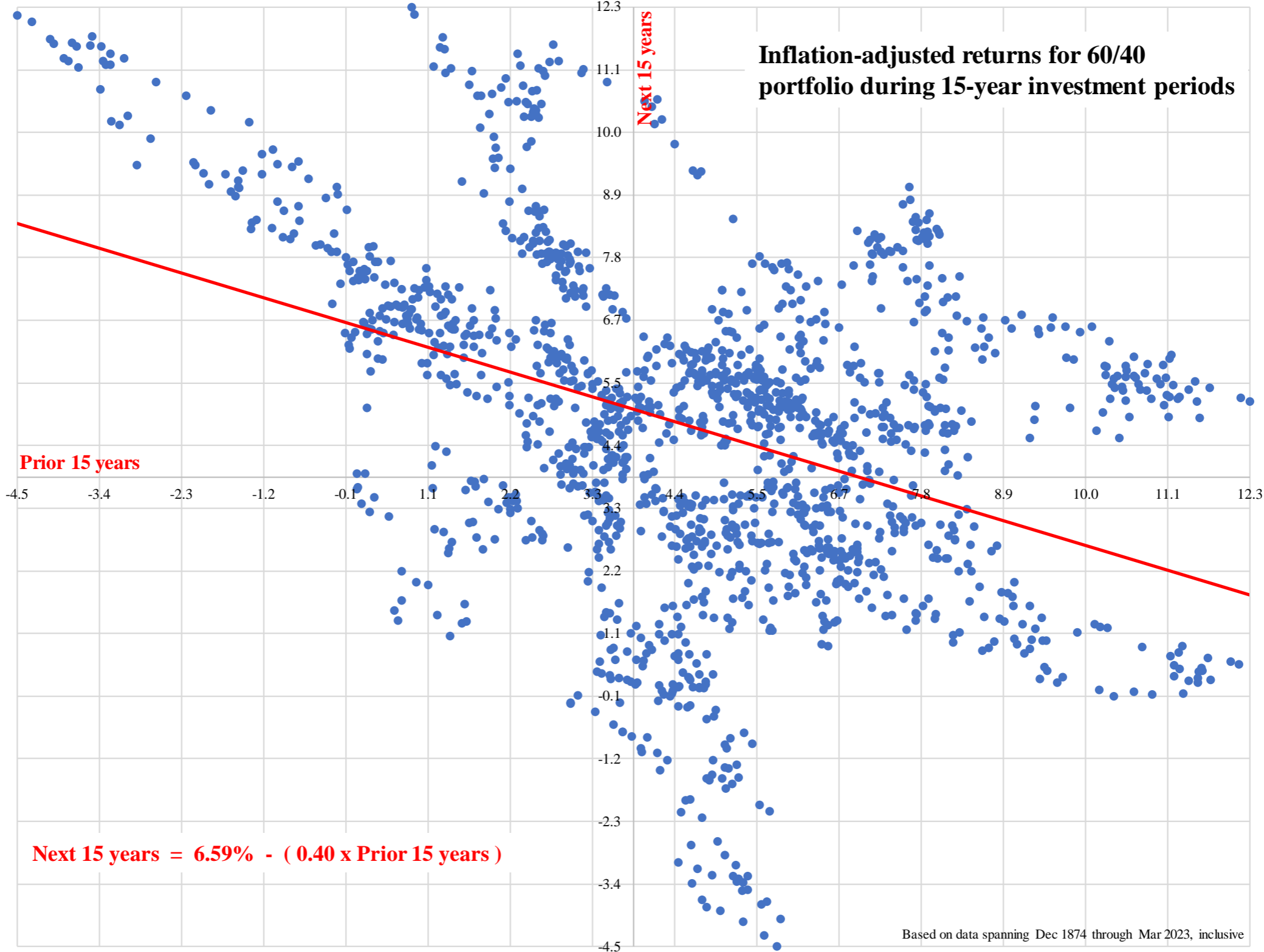
Inflation-adjusted returns for the 60/40 portfolio over rolling 15-year investment periods

Trending and momentum

Trending and momentum are not so strong that long-term returns are inherently and powerfully negative related with past returns

Low past returns can't imply high future returns . . . and vice versa

Inflation-adjusted returns for 60/40 portfolio during 15-year investment periods



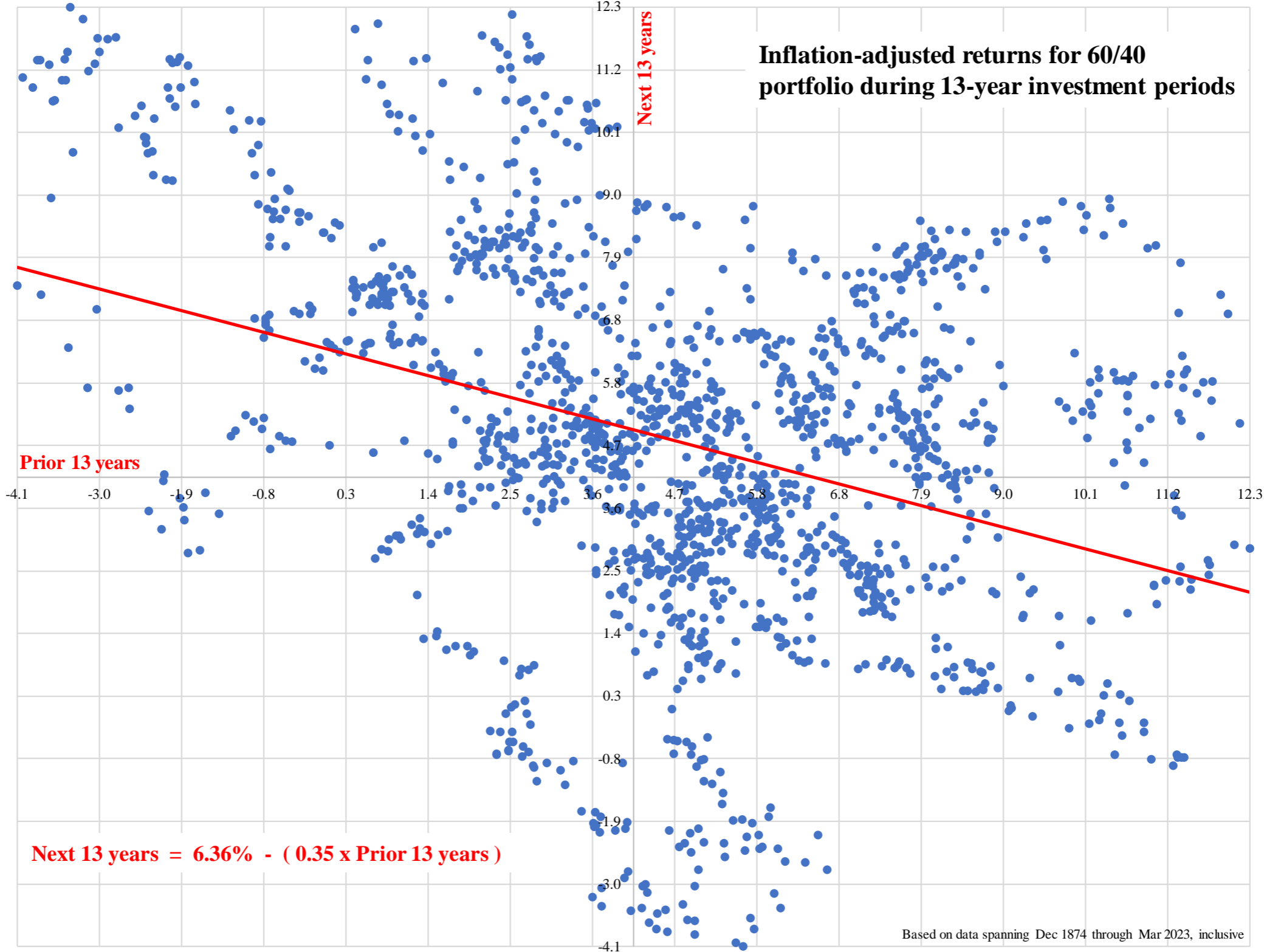
Prior 15 years

Next 15 years

Next 15 years = 6.59% - (0.40 x Prior 15 years)

Based on data spanning Dec 1874 through Mar 2023, inclusive

Inflation-adjusted returns for 60/40 portfolio during 13-year investment periods



Based on data spanning Dec 1874 through Mar 2023, inclusive

But does any of this matter?

Is the damage done, big enough, that we should care

Recall

That the software you're using today . . . assumes iid log-normal distributions (or worse)

Results for 15-year investment holding periods

		Percentile level expressed in %												
		0.5	1	2	3	5	10	20	30	40	50	75	85	95
U.S. bonds	Actual live results	-3.8	-3.0	-2.4	-2.2	-1.5	-1.0	0.2	0.9	1.7	2.9	4.8	5.7	7.4
	Results based on iid lognormal distribution using the same mean and standard deviation (as with the actual live data)	-0.8	-0.6	-0.3	-0.1	0.3	0.8	1.5	1.9	2.3	2.7	3.7	4.3	5.2
Ultra-diversified global 60/40 portfolio	Actual live results	-3.6	-3.2	-1.5	-0.7	0.2	1.2	2.6	3.5	4.3	4.9	6.3	7.3	9.4
	Results based on iid lognormal distribution using the same mean and standard deviation (as with the actual live data)	-1.1	-0.7	-0.2	0.1	0.7	1.6	2.6	3.3	4.0	4.6	6.4	7.4	8.9

Based on data spanning Dec 1874 through Mar 2023, inclusive

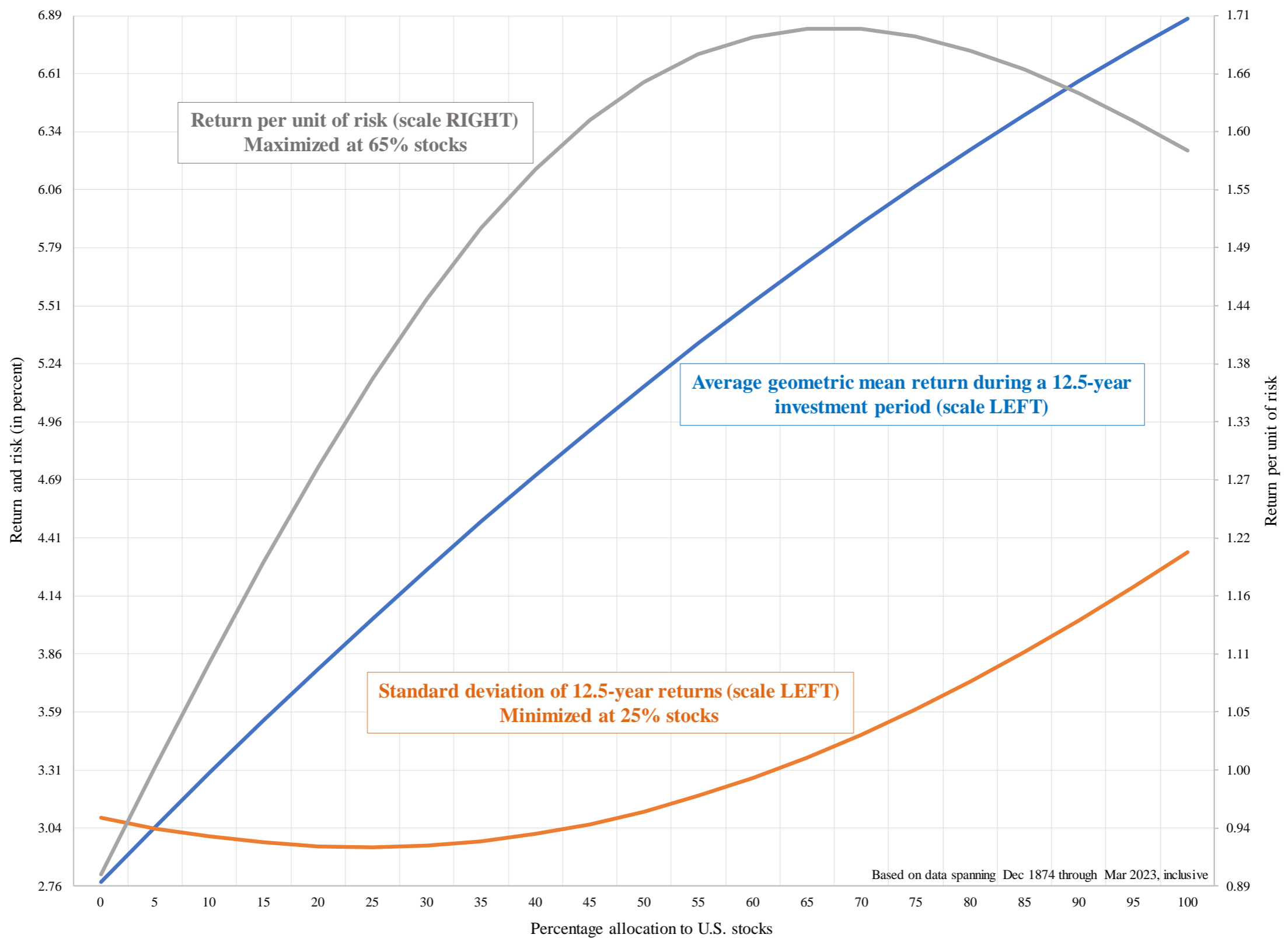
U.S. bonds is defined as 50% 10-year U.S. Treasury bonds and 50% investment grade U.S. corporate bonds

Mean and standard deviation: (a) U.S. bonds 0.2374% and 1.591% (b) Diversified 60/40 portfolio 0.4162% and 2.586%

And the damage doesn't end there

Think about how TDFs (target date funds), 529 plans, default-options of DC plans, and robo advisors

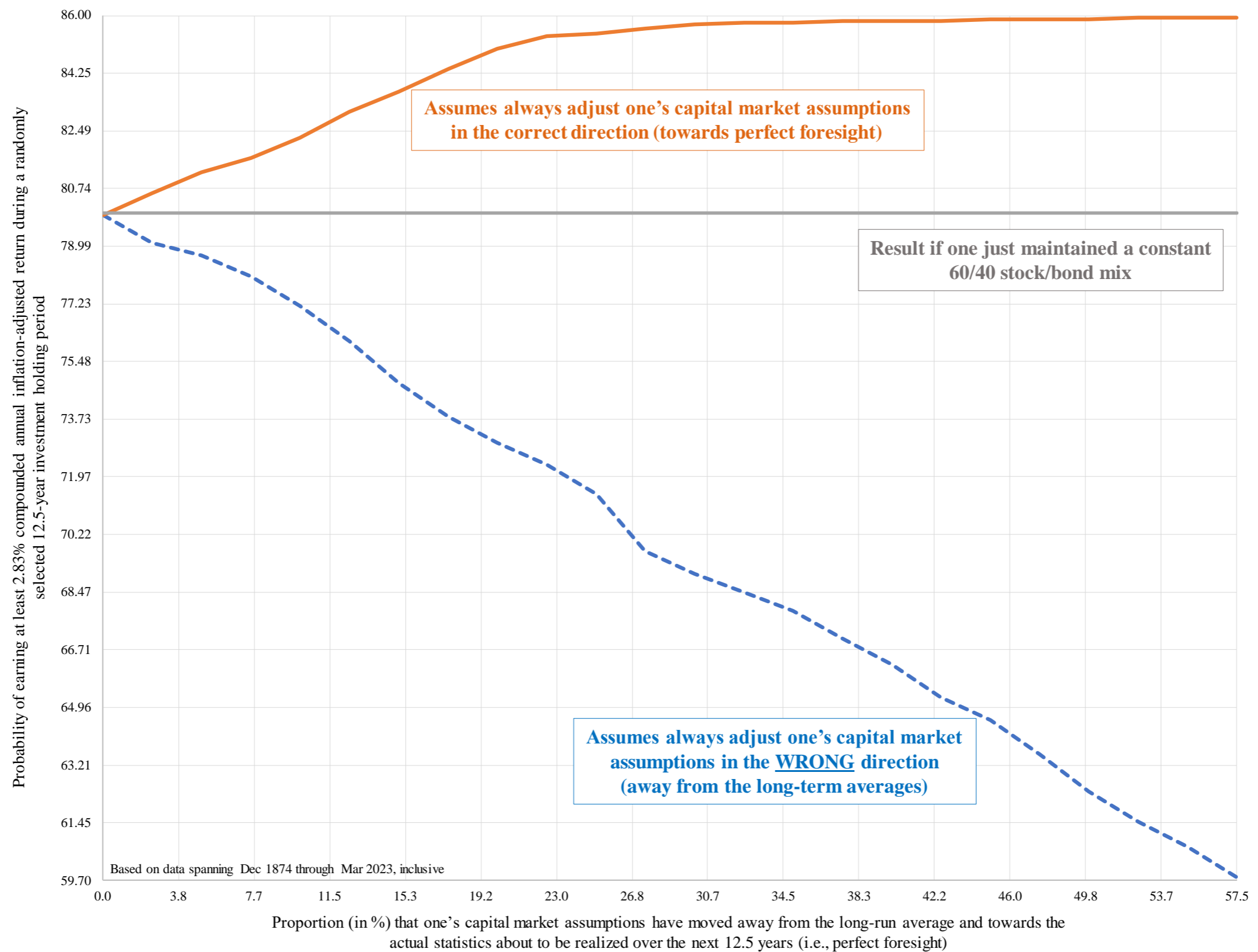
They're built on nothing more than the following simple exhibit



So what's our industry's pushback?

We have forward-looking capital market assumptions

Because they are forward-looking they avoid all of the problems just mentioned



Assumes always adjust one's capital market assumptions in the correct direction (towards perfect foresight)

Result if one just maintained a constant 60/40 stock/bond mix

Assumes always adjust one's capital market assumptions in the WRONG direction (away from the long-term averages)

What's the solution

Drop the reliance of portfolios built using expected means, standard deviations, and correlations

Drop reliance on an approach that relies on sufficiently accurate forecasts of the applicable future

Dec 1874 - Jun 1891		Jun 1891 - Dec 1907		Dec 1907 - Jun 1924		Jun 1924 - Nov 1940		Nov 1940 - May 1957		May 1957 - Oct 1973		Oct 1973 - Apr 1990		Apr 1990 - Sep 2006		Sep 2006 - Mar 2023	
DJIA	7.7	S&P 500	4.9	DJIA	6.3	Germany	16.3	S&P 500	10.9	Japan	16.3	Japan	9.7	Spain	11.8	Denmark	6.8
IG Corp Bnds	7.6	DJIA	4.1	S&P 500	3.4	South Africa	13.0	Canada	10.8	Ireland	13.1	Ireland	7.6	Ireland	10.4	DJIA	6.5
S&P 500	6.3	IG Corp Bnds	3.3	IG Corp Bnds	0.8	DJIA	10.3	DJIA	9.7	South Africa	10.9	UK	7.3	Denmark	9.7	S&P 500	6.5
10-yr Treas	5.2	10-yr Treas	2.2	90-day T-Bill	-0.5	India	8.5	France	5.2	Australia	10.9	Germany	7.1	India	9.4	New Zealand	5.0
90-day T-Bill	4.0	Int'l Treasury	1.7	10-yr Treas	-1.3	Australia	8.5	UK	4.6	New Zealand	10.8	France	6.9	Australia	9.3	Gold	4.9
Int'l Treasury	3.5	90-day T-Bill	1.6	Gold	-3.9	New Zealand	8.2	Australia	3.9	Germany	10.6	India	6.3	DJIA	9.0	India	4.8
Gold	0.1	Gold	-1.0	Int'l Treasury	-4.3	Japan	7.8	Denmark	2.4	Spain	9.8	Denmark	6.0	Int'l Treasury	8.6	Australia	3.2
Commodities	na	Commodities	na	Commodities	na	S&P 500	7.4	Commodities	1.8	Denmark	9.5	South Africa	5.7	UK	8.5	South Africa	3.2
Australia	na	Australia	na	Australia	na	Denmark	7.3	New Zealand	0.9	UK	8.0	DJIA	5.0	New Zealand	8.5	Canada	2.4
Canada	na	Canada	na	Canada	na	Int'l Treasury	7.1	Spain	0.9	S&P 500	5.4	S&P 500	4.9	S&P 500	8.2	IG Corp Bnds	2.1
Denmark	na	Denmark	na	Denmark	na	Canada	7.1	South Africa	0.3	Canada	5.0	IG Corp Bnds	4.6	Canada	7.6	Germany	2.1
France	na	France	na	France	na	IG Corp Bnds	6.7	Ireland	-0.1	DJIA	4.6	Australia	4.1	France	6.9	France	1.9
Germany	na	Germany	na	Germany	na	Ireland	6.7	IG Corp Bnds	-0.5	Commodities	4.6	Int'l Treasury	3.0	Commodities	6.3	10-yr Treas	0.6
India	na	India	na	India	na	UK	5.7	India	-1.3	India	3.4	Commodities	2.7	IG Corp Bnds	5.5	Int'l Treasury	0.4
Ireland	na	Ireland	na	Ireland	na	10-yr Treas	5.5	10-yr Treas	-2.8	Gold	3.3	Canada	2.5	10-yr Treas	4.9	UK	0.3
Japan	na	Japan	na	Japan	na	Gold	4.4	90-day T-Bill	-3.1	France	2.7	10-yr Treas	2.3	South Africa	4.8	Japan	0.1
New Zealand	na	New Zealand	na	New Zealand	na	Spain	2.8	Gold	-4.0	Int'l Treasury	2.4	Gold	1.7	Germany	4.3	90-day T-Bill	-1.4
South Africa	na	South Africa	na	South Africa	na	90-day T-Bill	2.7	Int'l Treasury	-4.2	IG Corp Bnds	1.9	90-day T-Bill	1.7	90-day T-Bill	1.2	Ireland	-1.4
Spain	na	Spain	na	Spain	na	France	1.1	Japan	-7.5	90-day T-Bill	1.1	New Zealand	1.3	Gold	0.2	Commodities	-2.5
UK	na	UK	na	UK	na	Commodities	0.9	Germany	-17.7	10-yr Treas	0.6	Spain	-0.8	Japan	-2.0	Spain	-5.5

	Frequency beat the 60/40 portfolio (in %)	Average return (in %)	Standard deviation of returns (in %)	Average ÷ standard deviation	Percentile outcomes						
					0.5%	1%	2%	3%	4%	5%	50%
Ultra diversified 60/40 portfolio	na	5.6	2.65	2.10	0.18	0.27	0.56	0.86	1.10	1.28	5.61
Move stocks into U.S. Treasuries when BAA current yields surprise to the upside	94.7	6.7	3.08	2.17	0.55	0.69	0.90	1.08	1.24	1.63	6.98
Equal-weight the 12 asset categories (drawn from 19) that trended the most strongly	99.7	8.8	3.10	2.84	0.70	0.79	1.00	1.25	1.76	1.94	8.95
Exclude 5 top performing asset categories over the prior 20 years, equal weight the rest	83.5	6.6	2.74	2.40	1.33	1.41	1.55	1.71	1.85	2.13	6.85
Portfolio allocated equally across the three above strategies	99.4	7.4	2.79	2.65	0.94	1.02	1.24	1.52	1.71	1.94	7.61

Results based on data spanning Jan 1919 through Mar 2023, inclusive

For more information contact



Jeff Megar, CFA
Email jeff.megar@julexcapital.com
Office 781-772-1378



Liam Flaherty
Email liam.flaherty@julexcapital.com
Office 781-489-5398

The problems with liquid alternatives (the Larry Siegel perspective)

Friday

June 2nd

11:00 a.m. EASTERN

This information in this presentation is for the purpose of information exchange. This is not a solicitation or offer to buy or sell any security. You must do your own due diligence and consult a professional investment advisor before making any investment decisions. The use of a proprietary technique, model or algorithm does not guarantee any specific or profitable results. Past performance is not indicative of future returns. The performance data presented are gross returns, unless otherwise noted.

The risk of loss in trading securities can be substantial. You should therefore carefully consider whether such trading is suitable for you in light of your financial condition. All information posted is believed to come from reliable sources. We do not warrant the accuracy or completeness of information made available and therefore will not be liable for any losses incurred.

The investment performance shown, if indicated, is HYPOTHETICAL. It is based on the back tests of historical data. Hypothetical performance results have many inherent limitations, some of which are described below. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program.

One of the limitations of hypothetical performance results is that they are generally prepared with the benefit of hindsight. In addition, hypothetical trading does not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risk in actual trading. For example, the ability to withstand losses or adhere to a particular trading program in spite of trading losses are material points which can also adversely affect actual trading results. There are numerous other factors related to the markets in general or to the implementation of any specific trading program which cannot be fully accounted for in the presentation of hypothetical performance results and all of which can adversely affect actual trading results.

The composition of a benchmark index may not reflect the manner in which a Julex portfolio is constructed in relation to expected or achieved returns, investment holdings, portfolio guidelines, restrictions, sectors, correlations, concentrations, volatility, or tracking error targets, all of which are subject to change over time.

No representation or warranty is made to the reasonableness of the assumptions made or that all assumptions used to construct the performance provided have been stated or fully considered.

All data and statistics were provided by Global Financial Data, Inc. and NDR, Inc. (unless otherwise indicated in the exhibit)

This information in this presentation is for the purpose of information exchange. This is not a solicitation or offer to buy or sell any security. You must do your own due diligence and consult a professional investment advisor before making any investment decisions. The use of a proprietary technique, model or algorithm does not guarantee any specific or profitable results. Past performance is not indicative of future returns. The performance data presented are gross returns, unless otherwise noted.

The risk of loss in trading securities can be substantial. You should therefore carefully consider whether such trading is suitable for you in light of your financial condition. All information posted is believed to come from reliable sources. We do not warrant the accuracy or completeness of information made available and therefore will not be liable for any losses incurred.

Some part of the investment performance shown is HYPOTHETICAL. It is based on the back tests of historical data. Hypothetical performance results have many inherent limitations, some of which are described below. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program.

One of the limitations of hypothetical performance results is that they are generally prepared with the benefit of hindsight. In addition, hypothetical trading does not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risk in actual trading. For example, the ability to withstand losses or adhere to a particular trading program in spite of trading losses are material points which can also adversely affect actual trading results. There are numerous other factors related to the markets in general or to the implementation of any specific trading program which cannot be fully accounted for in the presentation of hypothetical performance results and all of which can adversely affect actual trading results.

The composition of a benchmark index may not reflect the manner in which a Julex portfolio is constructed in relation to expected or achieved returns, investment holdings, portfolio guidelines, restrictions, sectors, correlations, concentrations, volatility, or tracking error targets, all of which are subject to change over time.

No representation or warranty is made to the reasonableness of the assumptions made or that all assumptions used to construct the performance provided have been stated or fully considered.