

## 2<sup>nd</sup> Quarter Commentary

July 2024

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This Commentary coincides with the imminent going-public of Horizon Kinetics, which itself coincides with the 30<sup>th</sup> anniversary of Horizon's founding in 1994. Those three decades coincidentally bookend the beginning, and what now appears to be the ending, of a uniquely profitable period for U.S. corporations and the U.S. stock market. The particular factors and trends that brought us to today are important to understand, so that their dissipation—and, worse, reversal—in some cases can point to the specific risks to standard asset allocations and how to avoid them. Indexation, in its modern guise, is a throughline in this entire cycle.

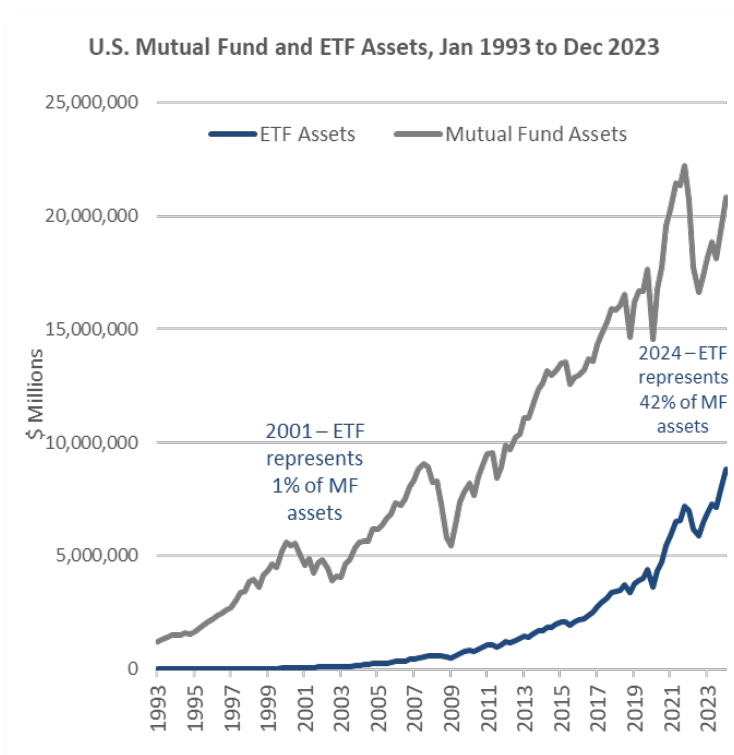
## I. Born at the Beginning of the Indexation and Financialization Cycle

The first ETF in U.S. history—the S&P 500 SPDR (SPY)—debuted in 1993. When Horizon Kinetics was created in late 1994, SPY had assets of \$424 million,<sup>1</sup> or 0.03% of mutual fund assets in the U.S. ETF assets didn't break 1% of the total until late 2001.

In 2008, Horizon started paying attention to the manner in which ETFs were changing the nature of indexation. By that point, the ETF market had grown to nearly one-tenth the size of the mutual fund market, in terms of assets. With lower fees, intraday pricing and transactability, ETFs were simply a better mousetrap than mutual funds.

In the past three decades, ETFs have changed the investment world. Not just valuations (still a subject of debate by some), but also sector and, startlingly, global sector weightings.

Being valuation blind by both definition and regulation, and also being the marginal buy-trade for decades, ETF asset flows have had a way of magnifying existing trends—unlike active managers, who can decide to stop buying, to sell, or even take the other side of a trade by shorting.



Source: St. Louis Fed

<sup>1</sup> Source: <https://fred.stlouisfed.org/series/BOGZ1LM564090005Q# and LM654090000.Q>

For instance, by the mere fact that investor enthusiasm might have caused one index constituent to rise sharply, it then becomes a higher weight in the index. That's obvious. And it's obvious that the stock has just become more expensive.

Yet, paradoxically, the next day's new money in that index is automatically and disproportionately allocated to that security, making it a yet higher weighting, which then draws even more inflows to that stock. That's just a mechanistic outcome.

Because of this—what to call it?—fuel injection, or structurally determined

momentum investing aspect of today's indexation practice, it's helpful to understand the phenomena and

trends that preceded and fed it. Because there is every sign that those initial supporting factors are now ending, even as indexation continues to course along, with ever more money-weight, a highway that might be running out of roadbed.

## ❖ Contrarian Research Report ❖ Compendium

December 2008

### *Murray's Musings*

#### *Exchange Traded Funds*

An Exchange Traded Fund (ETF) is just a fund with a certain decision rule, which is the rule for inclusion. All companies having the desired characteristics will be included, and will be weighted in accordance with some other rule, like market capitalization or some other decisive factor.

In this section of the report: 1) Does the mere existence of, now, nearly 800 hundred ETFs, with well over 500 in registration, ultimately have an impact upon the valuation of securities? 2) Do ETFs ultimately impact the volatility of securities, even if they don't have an impact on the valuation? 3) If the answers to those questions are yes, as I believe they are, why is it so?

In theory, each security has its own constituency of the people who choose to hold it, as well as those who very closely follow it and who might buy or sell, potential transactors.

ETFs introduce a different constituency of investors who will transact without any genuine understanding of the investment merits of the company. By merely creating an ETF based on, say, micro-cap companies are either overvalued or undervalued, money would flow into or out of that sector simply because an ETF now exists that would buy, or sell short, the broad expanse of micro-caps. Those buy/sell decisions are made on a completely different level. The unifying thread of all the holdings in such an ETF is the decision rule that they are all created equally in that they'll either be included, or excluded, irrespective of their individual investment merits. Money gravitates from one ETF to another based on each one's inclusion rules. As the money moves between funds, the prices of the underlying securities will react in ways that have very little to do with their fundamentals.

If one accepts this initial premise, it seems that the natural constituency and valuations of companies are being altered by this new ETF constituency. The natural constituency will always be present, but the alien constituency will come and go. At the moment, the alien constituency has arrived, and has made its presence felt.

*Setting the Stage of a One-Time Cycle (No Rinse & Repeat)*

How many are aware, in the gut-felt way that shapes their decision making, that one can live through 30 years of zero appreciation in the U.S. equity markets? It's happened more than once.

For almost 17 years from Dec. 1965 through August 1982, the S&P 500 price rose by only 1.6% per year.

Yet, by August 1992, a great swath of investors (other than perennial exceptions to common sentiment, perhaps the likes of Jim Grant of *Grant's Interest Rate Observer*<sup>2</sup>) were doubtlessly ebullient about their 10-year performance. That is, if it was at all close to the market's 244% appreciation, which was 13% a year. But that was merely recovery from the 1982 bottom, which was *down* over 60% from 1965.

There are volumes of analysis and commentary about the causes of the recovery from the destructive one-decade inflation that ended in 1982, and of the causes of the then-longest (10-year) economic recovery that commenced in 1991. The first was credited to Federal Reserve Chairman Paul Volcker's singularly dramatic interest rate increases and willingness to cause a deep recession to break the inflation cycle. The second was largely credited to the singularly active monetary policy adjustments of Fed Chair Alan Greenspan from 1987 to the period that seems to fascinate economists, the 1990s.

In 1994, the first thing that economists, portfolio managers and traders did on the morning of a Fed committee meeting was scour the news for any hint of Chair Greenspan's next fed funds rate policy move. They were monomaniacally focused on money supply growth and its inflationary impact. The

"I'm baffled. I find it hard to believe....What I'm puzzled about is whether, and if so how, they suddenly learned how to regulate the economy. Does Alan Greenspan have an insight into movements in the economy and the shocks that other people don't have?"

*Milton Friedman, May 2000*

Opening quote in

[https://scholar.harvard.edu/sites/scholar.harvard.edu/files/mankiw/files/us\\_monetary\\_policy\\_during\\_the\\_1990s.pdf](https://scholar.harvard.edu/sites/scholar.harvard.edu/files/mankiw/files/us_monetary_policy_during_the_1990s.pdf)

**Monetary Policy Lessons from the 1990s for Today**

Shadow Open Market Committee Meeting

Princeton Club, New York City

October 2, 2015

The Fed under Paul Volcker put the economy through a severe recession in the early 1980s to bring inflation down. Even so, the Fed's credibility for low inflation was not yet secure in the early 1990s...Remarkably, the Greenspan Fed did deliver price stability. By the end of the 1990s the bond rate was around 6 percent and core CPI was running at 2.5 percent, even as the unemployment rate drifted down to 4 percent.

<sup>2</sup> On page 73 of his 1998 book, *The Trouble with Prosperity*, Mr. Grant quotes investment banker and intellectual wit Robert Lovett writing about the illusion of permanent safety or reliably reliable rules and regulations. It resonates with our dubious attitude toward the presumed return expectations inherent in rules-based investing, such as indexation as practiced. Citing a roster of government defaults and other broken assurances, Mr. Lovett wrote: "We merely must recognize that in dealing with people in mass or with governments, one is dealing with something very similar to a natural or elemental force. No one would consider for one moment entering into a contract with the Pacific Ocean by which it agreed to stay calm, or of accepting the promise of the North Wind to blow only once each quarter."

economist at our alma mater, Bankers Trust Co., would send a special monthly review of the monetary aggregates like M1 and M2, along with the implications of associated statistics like money velocity and changes in the central bank's balance sheet.

In the race for information advantage, some would reportedly scan news photos to peek at the size of the briefing binder Greenspan would carry from his car to the Federal Reserve Board Building on Constitution Avenue. Highly regarded economists marveled at his virtuosity in matching monetary policy to the myriad constantly produced economic statistics. *(No such agita today about money supply or government balance sheets, eh?)*

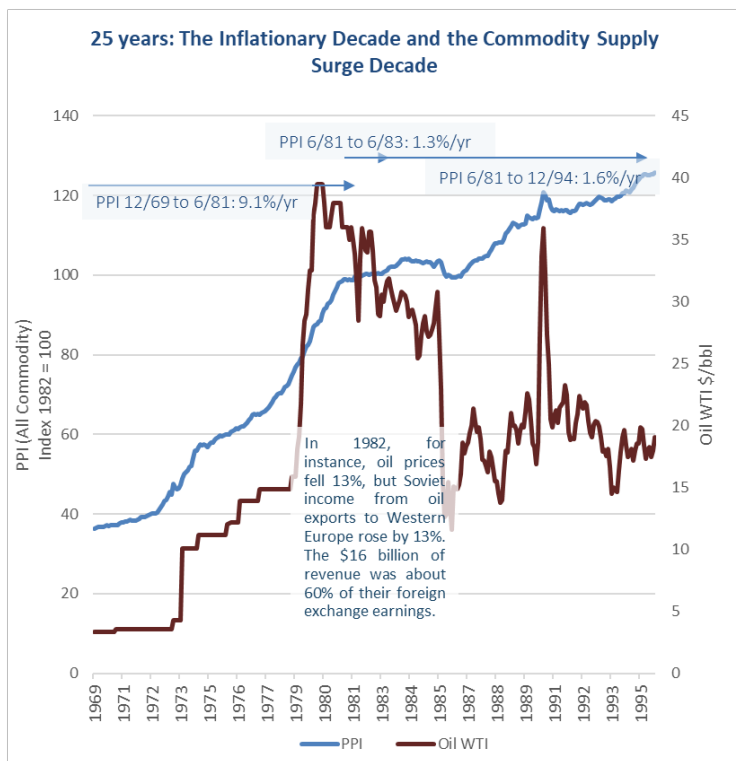
The focus of many such papers is on the variety of domestic fiscal and monetary policy changes that took place, along with prominent econometric model variables like productivity, food and energy prices, employment, and international balance of payments. They can be agonizingly detailed and subtle.

Yet, they don't mention the global disinflationary economic miracles that commenced in the 1980s.

### *The Four Disinflationary and Growth Miracles*

We are not economists, but to our untrained eyes, those looked like BIG, obvious, momentous events. But they were exogenous, independent of anything within the power of the Federal Reserve or U.S. fiscal policy to effect, and were not encoded into those policy models. If a factor isn't in the matrix, does it exist?

The **first economic miracle** for the U.S. was the collapse of the Soviet Union and a **hard commodity supply surge**. Beginning in the years before the 1989-1991 period, the Soviets needed external hard currency—cash to pay for everything from grains to modern machinery. With poor technology and no manufactured products to export, they began to sell the only thing they really had. The Soviets possessed an abundance of almost every conceivable natural resource, from metals to oil to diamonds, so they began to put all manner of hard assets on the world market. Having previously kept itself economically segregated from the West, this was an entirely new source of supply for the Soviet Union. When it actually collapsed, the cash need was more desperate, resulting in even more commodity supply pressure.



Source: St. Louis Fed

In 1982, for instance, oil prices *fell* 13%, but Soviet income from oil exports to Western Europe *rose* by 13%. The \$16 billion of revenue was about 60% of foreign exchange earnings. This, in our humble opinion, not the Federal Reserve, is what broke the commodity basis of inflation in the U.S.

That was the first miracle. If miracle is too fanciful, then let's call it the first of a number of fortuitous, powerful, one-time systemic disinflationary events that set the stage for the economic, corporate profit, and financial market benefits that followed.

The **second massively disinflationary force**, beginning in 1979, was from China, which faced a similar economic circumstance and was likewise in desperate need of foreign exchange. Lacking commodities to sell, the country could only offer the world market its greatest resource: human capital. That extremely low-cost **1-billion-person labor pool** enabled a massive global labor arbitrage.

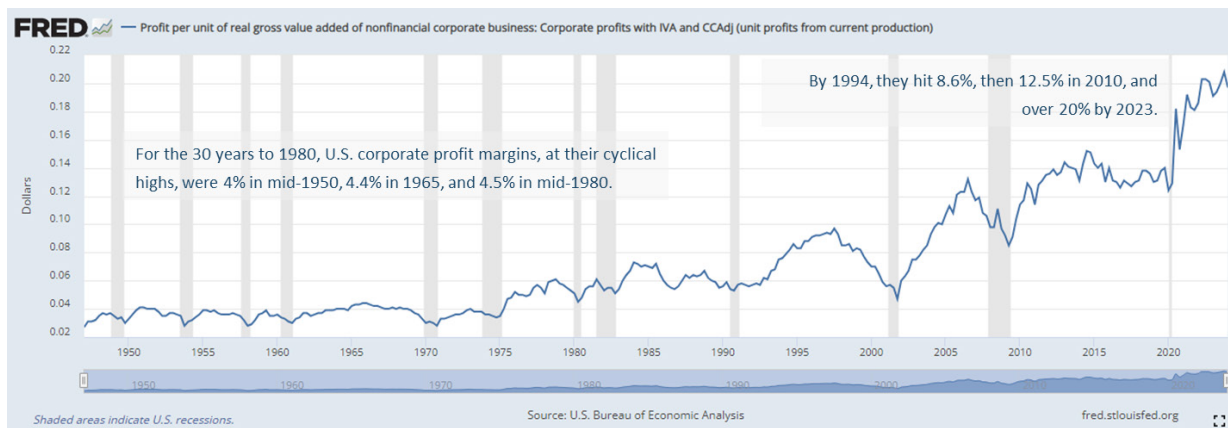
Also previously walled off from western economies, China created special economic zones for foreign investment and new regulations inviting investment capital. The major developed economies could then outsource production to these low-cost labor markets, leading to much higher profit margins for top U.S. industrial companies. The China example was later adopted by other low-wage nations, including India, Malaysia, and Vietnam. It could be that 3 billion such workers entered the global labor market. This ended the power of labor in the U.S. to raise real wages.



All of this benefitted corporate profit margins to historically unknown levels, due to the decline in commodity and labor costs. An illustrative depiction is the Bureau of Economic Analysis calculation of the history of U.S. corporate profit margins. For the 30 years through 1980, at their cyclical highs, margins were 4% in mid-1950, 4.4% in 1965, and 4.5% in mid-1980.<sup>3</sup> By 1994, they hit 8.6%, then 12.5% in 2010, and over 20% by 2023.

Is “normal” the 30 or 40 years through 1980, or is it the 30 or 40 years since then? In which case, which is the aberration? It’s a good thing to know.

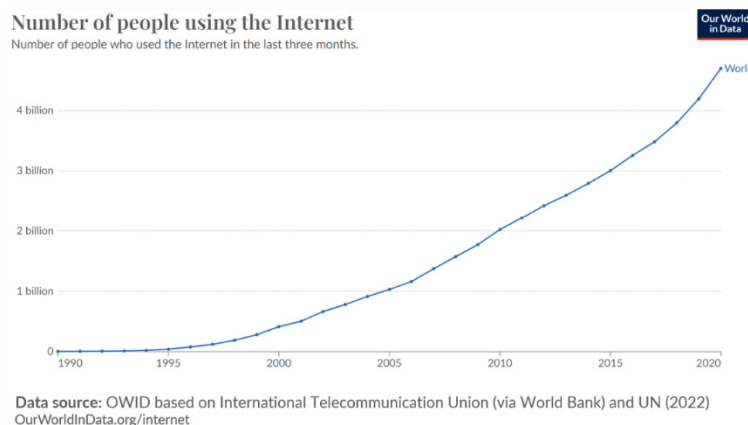
<sup>3</sup> Source: <https://fred.stlouisfed.org/series/A463RD3Q052SBEA#>



**Miracle number three** was the **opening of previously denied areas** to American business. That was not just Russia and China, but also Poland and other former Soviet-orbit countries, as well as quasi-socialist nations in South America.

This was about more than just sales growth. U.S. consumer products companies were presented with entirely new populations of buyers. What is the incremental profitability to a cereal or soap maker, a pharmaceutical company or machine tool manufacturer, of sales to Russia when there is no competition to spend against? And when the R&D and marketing expenditures have already been made, when the production infrastructure is already in place?

**A fourth growth aberration**, as if three once-in-centuries historical anomalies weren't enough: **the internet**. In Horizon's first full year, 1995, our associate Peter Doyle endeavored to interest Murray and me in the internet. Wanting to impress us with its capabilities, and knowing we were dubious, he asked us to join him at the out-of-the-way desk with a computer wired for internet access one day. He bade us to ask him any factual question, and he would find the answer for us. Sadly, he failed, because the competing search engines of the time were rather inadequate. Google was not yet a glimmer in the eyes of Larry Page and Sergey Brin. It was like looking in a million-page phone book with pages, some of which had been mislabeled and others lightly shuffled. This is the same associate who, a bit later, was involved in establishing Kinetics and the Internet Fund.



In 1994 and 1995, there was a figurative handful of people on the internet globally. By 2005, there were 1 billion; now there are 5.4 billion. That is what enabled the phenomenal growth of Amazon, Apple,



Facebook, Google, and other internet-based companies. Which is also why this can be called an aberration, because in a world of 8.1 billion people, customer count can go from zero to 5.4 billion only once.

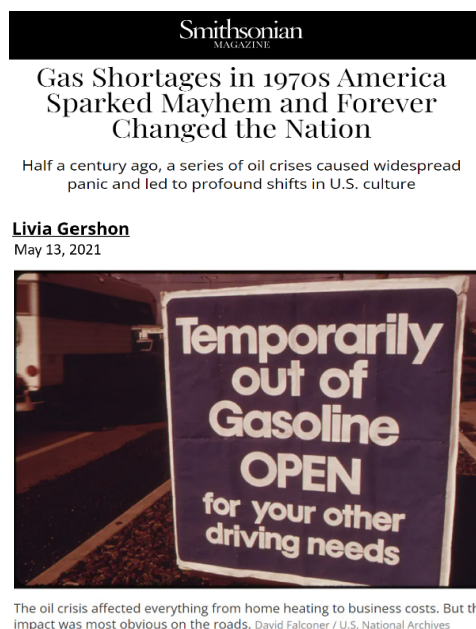
## *II. Fresh-By Date Warnings for the Miracle Market Cycle—Expirations and Reversals*

Market history has a way of recurring, but not often enough for the prior era's lessons to inform the next generation. The experience that investors accumulate over some "normal" stretch of 30 years, even with an MBA or CFA education, can't by itself prepare them to understand that normal can change.

Three decades, long in a professional life, is a short chapter in market history. Without a grounding in context, it can be startling to see what the published statistics miss. But with a little step-back perspective, this last 30- or 40-year period shows as a distinct, identifiable anomaly that does NOT represent normal. It represents a non-repeatable pendulum-like sweep of particular geopolitical events in one direction. The factors that set that pendulum in motion and imparted the necessary potential energy<sup>4</sup> are pretty much exhausted. Worse, some are in the process of reversing.

This cycle began with the ending of a decade-long commodity- and monetary-inflation based cycle, during which the average price level doubled. Recent events suggest another such cycle is gaining potential energy.

In light of today's realities, let's evaluate the now-inflationary going-forward impact of the last cycle's commodity supply and opening-of-denied-areas miracles.



The oil crisis affected everything from home heating to business costs. But the impact was most obvious on the roads. David Falconer / U.S. National Archives

<sup>4</sup> Potential energy, the Britannica version, is stored energy that depends upon the relative position of various parts of a system. A spring has more potential energy when compressed or stretched. It is a property of a system and not of an individual body or particle, and arises when parts exert forces on each other, the magnitude being dependent on the configuration, or relative position, of the parts. <https://www.britannica.com/science/potential-energy>

The Geopolitical Angle

The recent strategic expansion of the BRICS bloc from five to 10 members means that Russia no longer depends on the U.S. or western Europe for hard currency. This is unlike yesteryear’s OPEC oil cartel, which could withhold oil from the world market, yet needed almost all other critical supplies from the rest of the world. This makes for an awkward bargaining position. Nevertheless, OPEC wrought significant economic and inflationary damage on the developed market nations.<sup>5</sup>

BRICS+ is a wholly other animal. It’s a self-sufficient trading bloc. Whatever volumes of oil China and India might need can be provided by the Gulf nations. Whatever manufactured goods the Gulf nations require can be provided by China and India. The BRICS bloc has the coal, the metals, the labor pool.

China’s GDP<sup>6</sup> already exceeds that of the U.S. The BRICS+ GDP exceeds the combined economic output of the U.S. and the European Union. Versus the before-time, this has profound implications for U.S. corporate growth and profitability.

Example: Last year China took steps toward withholding certain strategic minerals from the U.S. in response to the U.S. denying China access to advanced semi-conductor manufacturing systems. GDP supports the ability to project economic and military power. If China feels empowered to sanction the U.S., then its relative leverage positions have already changed dramatically.

Until the 1980s, the U.S. had been the leading exporter of rare earth elements. With the opening of China to international manufacturing and trade, the country’s labor cost savings and absence of environmental regulations meant U.S. producers voluntarily ceded much of this market to China. Thereafter, the U.S. didn’t have a choice: China supplies three-quarters of America’s rare earth elements imports. Without them, phones don’t work. Neither do laptops, electric vehicles, nuclear weapons, almost everything.

BRICS Economies GDP, Measured by Purchasing Power Parity (PPP)

	GDP, 2022 (\$ trill.)
Brazil	\$3.250
Russia	\$4.027
India	\$10.079
China	\$25.684
South Africa	\$0.807
Total	\$43.847

Recently Joined BRICS Members (as of Jan 2024)

	GDP, 2022 (\$ trill.)
Saudi Arabia	\$1.827
Iran	\$1.369
Egypt	\$1.419
Ethiopia	\$0.294
United Arab Emirates	\$0.707
Total	\$5.616

BRICS+ **\$49.463**

United States **\$21.538**  
European Union\* **\$26.640**  
**\$48.178**

Source: CIA World Factbook

\* Est. 2024, per I.M.F., via Wikipedia

“Between 1978 and 1995 China’s annual production [and exports] of rare earth elements increased by an average of 40% per year, causing prices for these metals around the world to decline sharply. As prices dropped, competing producers either went out of business or steeply reduced their production, unable to meet the so-called China price.”<sup>9</sup>

<sup>5</sup> Source: <https://www.smithsonianmag.com/smart-news/1970s-gas-shortages-changed-america-180977726/>

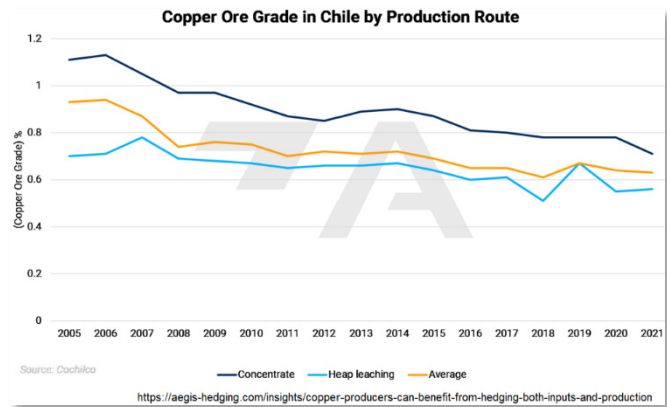
<sup>6</sup> On a purchasing power parity basis, which is the realistic economic output measure used by the CIA, undistorted by constantly changing currency levels.

<sup>7</sup> Source: <https://www.sciencehistory.org/education/classroom-activities/role-playing-games/case-of-rare-earth-elements/history-future/>

### Geology, Regulatory Policy and Microeconomics

Until recently, natural resource supply limitations were not a consideration; there was always more. Today, rare earths are but one element, so to speak, of an expanding list of supply constrained commodities. In the case of electrification metals for electric vehicles, solar panels, wind turbines, and electricity storage batteries, demand is burgeoning for everything from lithium to iron ore (for steel), copper, nickel, cobalt, et al.

In eras past, that demand would be met with likewise burgeoning mining activity, as was the case in 2014. Hard commodity producers massively increased their production capacity to supply China's rapid infrastructure growth. When China demand slowed and prices collapsed, miners and drillers were caught at the peak of their spending/borrowing/production bubble. Merely to stay solvent, they slashed operational expenses and expenditures. That was a nearly one-decade process.

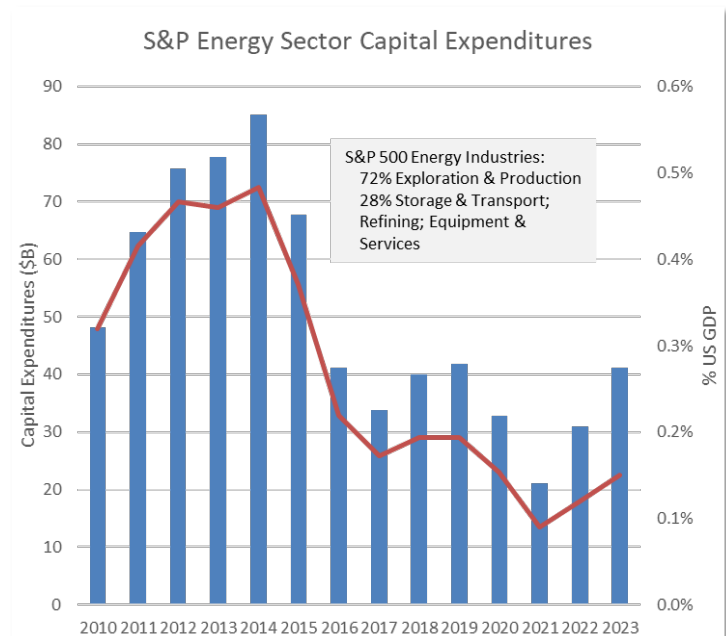


The extent of that contraction has been hidden from view, because production continued at the same levels, a legacy of 2014's excess capacity. What was cut back were:

- The capital expenditures necessary to replace the reserves being extracted
- Years of high-grading—extracting the highest-grade, most profitable ores and reserves first—a natural cost savings tactic, which means that remaining reserves are poorer and more expensive to extract

The accompanying charts paint a picture.

In 2022, the energy sector spent 64% less on capital expenditures than in 2014. Technology has improved, of course, and U.S. production is booming.



Source: Bloomberg

**Halliburton Company (HAL) and  
Schlumberger Ltd. (SLB)  
Combined Selected Financial Data**

(\$ mill)	Revenue	PP&E	Capital Expend.
2014	\$81,450	\$27,871	\$7,259
2015	\$59,108	\$25,532	\$4,594
2016	\$43,697	\$21,353	\$2,853
2017	\$51,060	\$20,097	\$3,480
2018	\$56,810	\$20,554	\$4,186
2019	\$55,325	\$18,811	\$3,254
2020	\$38,046	\$12,637	\$1,844
2021	\$38,224	\$12,289	\$1,940
2022	\$48,388	\$11,868	\$2,629
2023	<u>\$56,153</u>	<u>\$13,228</u>	<u>\$3,318</u>
<b>Change:</b>	<b>(31.1)%</b>	<b>(52.5)%</b>	<b>(54.3)%</b>

Source: Company reports

Meanwhile, there's been a decade of rising demand. Recall the palpable fear in 2020—during the pandemic's near cessation of discretionary travel—that oil demand would be permanently impaired, that the price would head toward zero, or at least low enough to bankrupt much of the energy sector.

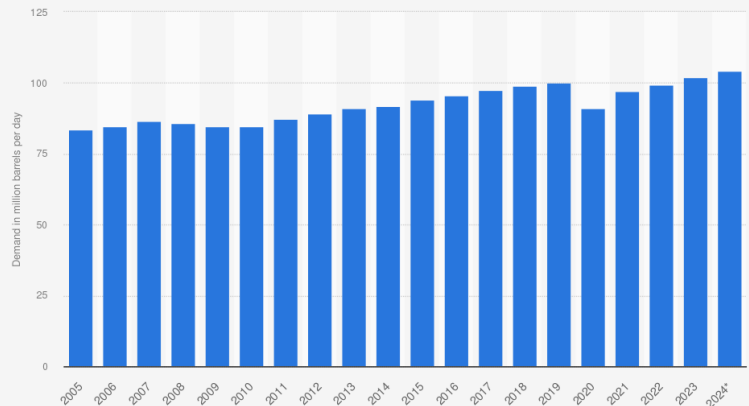
It was incumbent upon us to explain why that could not happen. And to explain why it might not be the best idea in the idea toolbox, irrespective of how low their shares had fallen, to sell out of the energy royalty or oil service companies. Such is the evergreen tension between marketplace fog-of-war reflexes and a long horizon view.

Global daily oil production this year: 4%-plus above 2019.

It's much the same story with other commodities, each with their own particulars.

Irrespective of oil companies' benefit from technology improvements, their equipment suppliers' revenues are down 31% from 2014, and capital expenditures are down over 50%. More importantly, their property, plant, and equipment (PPE)—their capacity to produce more of the product necessary for oil companies to produce more product—is also down over 50%.

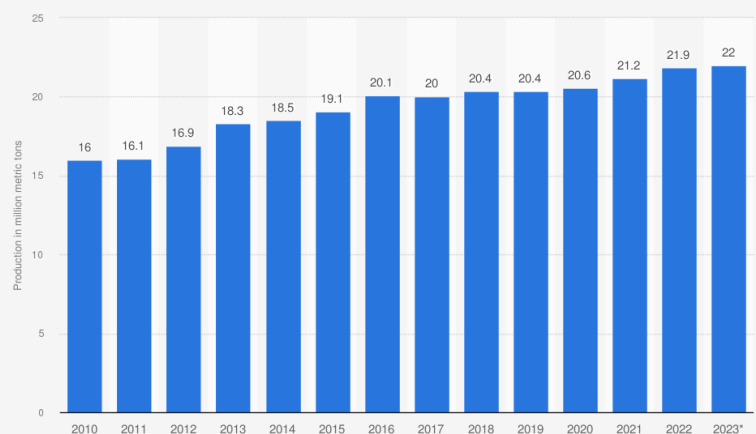
**Demand for crude oil worldwide from 2005 to 2023, with a forecast for 2024 (in million barrels per day)**



Source:  
OPEC  
© Statista 2024

Additional Information:  
Worldwide; 2005 to 2023

**Mine production of copper worldwide from 2010 to 2023 (in million metric tons)**



Source:  
US Geological Survey  
© Statista 2024

Additional Information:  
Worldwide; 2010 to 2023

Copper demand is increasing for electrification projects, whether fine gauge copper for electric vehicles (multiples more are required than for combustion engine cars) or for the 29 metric tons of heavy-gauge copper required for a single 3.6MW offshore wind turbine.<sup>8</sup> But while copper production in the six years prior to 2016 rose 3.9% annually, the annual increase was only 1.4% in the following six.

Again, reasons include a decade of reduced capital expenditures, high-grading, and the exhaustion of older mines. It's difficult to locate, secure, and get regulatory approvals for new mines. The start-to-finish timeframe is estimated by the knowledgeable to be a decade at minimum.

A substantial supply shortfall is the logical inference. At the street level, it seems that an old bad habit—stripping copper from public and private property—has become problematic enough to warrant a *New York Times* article.

Oil and copper are just a convenient window on the broader problem. The more sector-diverse S&P Global Natural Resources Index doesn't look any different. It's apportioned 60% to the Materials sector (metals, fertilizers, and the like) and 35% to Energy. Capital expenditures by the companies in this index are over 40% lower than in 2013.

That figure understates the disinvestment in production capacity, because global prices in the 10 years from 2013 rose 51%.<sup>9</sup> It will cost far more than just catching up to the prior peak's capital expenditures to replace or expand PPE, and to employ labor.

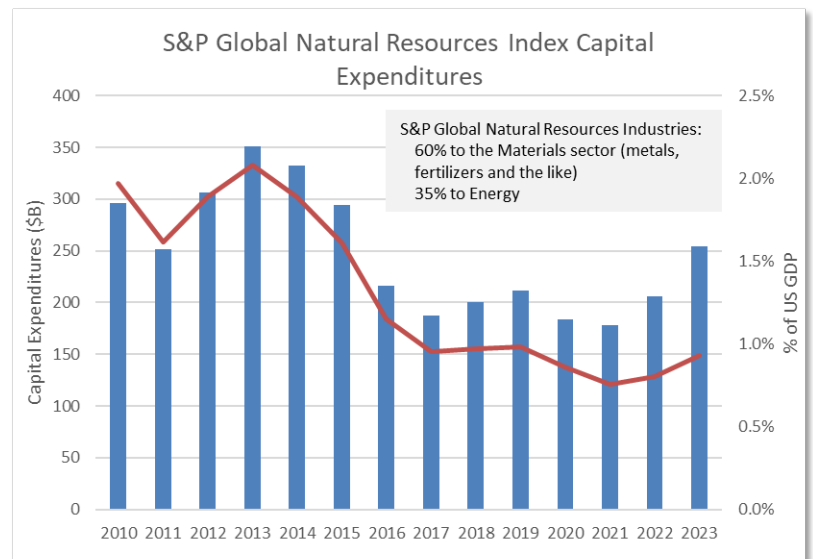


The 6th Street Bridge in Los Angeles has been cast into darkness after its wiring was stolen.

### ***Metal Thieves Are Stripping America's Cities***

Across the country, copper and other valuable materials have been stolen from streetlights, statues and even gravesites, costing millions to repair.

By Michael Corkery Photographs by Mark Abramson  
July 9, 2024



Source: Bloomberg

<sup>8</sup> Source: <https://www.energymonitor.ai/tech/renewables/weekly-data-why-keeping-an-eye-on-copper-is-vital-for-the-energy-transition/>

<sup>9</sup> Data drawn from IMF (2024). *Global inflation rate from 2000 to 2022*. Statista. Statista Inc.  
<https://www.statista.com/statistics/256598/global-inflation-rate-compared-to-previous-year/>

All of this simply says that humanity is becoming resource supply constrained in a way it never has before. Not that more base metals and rare earth elements and lithium can't be located and extracted. It's just that:

- Production costs will be higher.
- It will take a way long time, in marketplace timeframes, to increase supply.
- That will happen in the face of expanding, inelastic demand, which means higher prices. These are critical raw materials that are embedded across the spectrum of economic goods, so higher costs would be broadly inflationary.

This big, visible systemic set of facts and trends isn't a topic of discussion by economists or market strategists—not one that's reached the financial news programs. Perhaps because there aren't any such prior historical data to populate the databases upon which econometric models iterate. The iron law that price is what restores imbalances between supply and demand has not been repealed. The serendipitous saviors of the '80s and '90s, with their bounties of natural resources and human labor, no longer exist.

Let's close this section with a look at the **new-cycle inflationary influence**, with an eye toward the **global labor supply arbitrage and opening of denied areas**.

We'll keep it short—same thing, basically. China's manufacturing labor costs relative to the U.S. have risen by multiples since the 1980s, albeit still deeply discounted. Vietnam, Mexico and India are way cheaper, assuming similar worker efficiency. Which is beside the point, because those labor pools have been open to the world for a long time. They are already part of the equation. There is no new source of 1-2 billion low-wage workers.

Plus, the risk to U.S. corporate profits is not just about the dissipation of a disinflationary and growth vector. An active reversal is taking place, as well. One easy-to-implement policy example is China's threat to limit rare earth elements exports to the U.S.

Beyond withholding product, China has been directing its workforce—and its now-advanced technology prowess—toward its own value-added, finished product exports. This shifts its position from being an outsourced manufacturer in service of U.S. corporate customers to direct competition with those customers. There's more to say on this, which we will shortly.

The blessing of the global labor arbitrage phenomenon has good odds of maturing into a curse.

### III. Indexation as a Tool to Concentrate Risk? A Paradox and...A Risk

Why wrap all of this into a discussion of indexation? Because that is how investing and asset allocation is now done. ETFs have been absorbing the marginal dollar of new investment assets for over 20 years. In creating liquidity-based money flows, ETF-based passive investing has altered the market structure and massively distorted industry sector and geographic sector weightings. That changes where risk exposures reside.

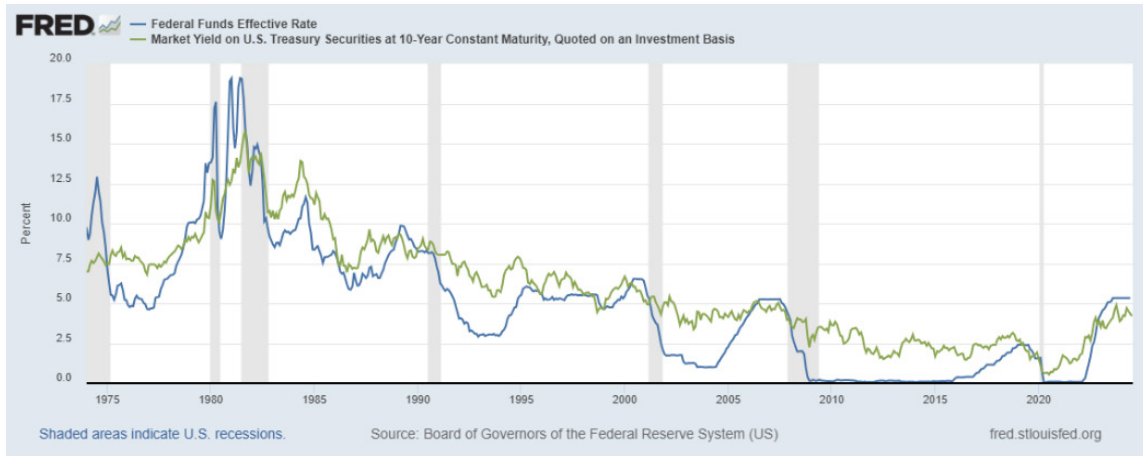
### How We Got “Here” – Concentrated, Risky and Vulnerable

Some pictures, not intended to be comprehensive, will sketch where we are and how we got here. Unlike the exogenous events discussed so far, many of these were discretionary domestic fiscal and monetary policies. Some will look familiar from prior Commentaries. Why repeat old charts? It’s a question that comes with the habit of reading research analysis like it’s news. Read it in the morning, throw it away when the next batch comes in. I mean, who re-reads last month’s newspaper?

Except, analysis is not news. Yeah, we wrote a few times about government interest expense crowding out other portions of the federal budget, but if that trend doesn’t stop getting bigger, then it’s even more important now than it was before. People watch reruns of *Seinfeld*, but history and economic analysis? Not so much.

Each of these charts shows how extreme something is. The next question is how sustainable it is.

First chart: The great disinflationary forces facilitated a *decades-long* Fed policy of ever lower interest rates, eventually to seven consecutive years at zero (if less than 0.2% may count as zero). Followed by another two at zero (!! ) Is that really what the U.S. economy required? Were we that bad off?



Year	Marginal Corp. Tax Rate
1979 – 1986	46%
1987 – 1993	34%
1994 – 2017	35%
2018 – 2023	21%

Source: <https://corporatetax.procon.org/federal-corporate-income-tax-rates/>

Following the extravagant gift to corporate profits of lower commodity and foreign labor costs came the gift of lower corporate tax rates to large companies. To the tune of 25 points, and the availability of myriad tax reduction and avoidance strategies.

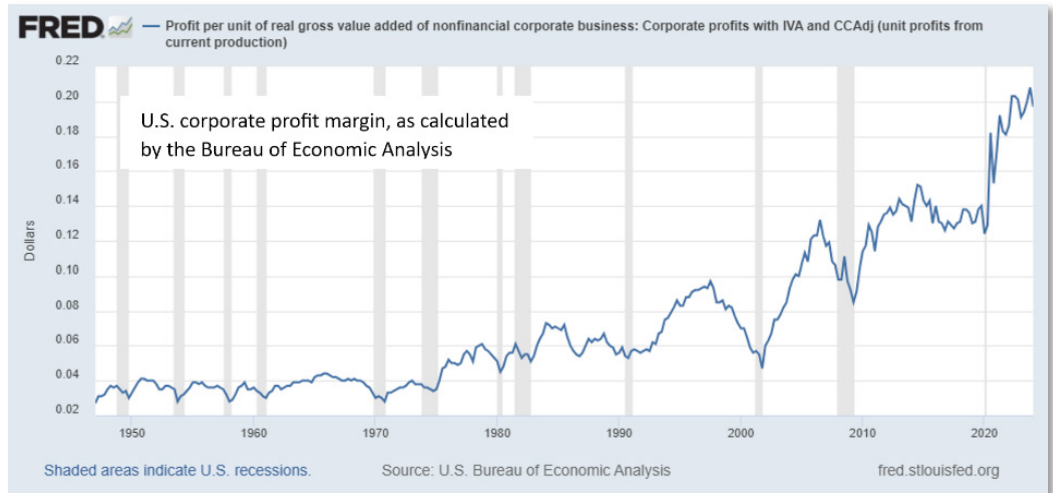


This continuously raised U.S. corporate profit margins, eventually beyond the most avaricious dreams of industrial magnates of eras past.

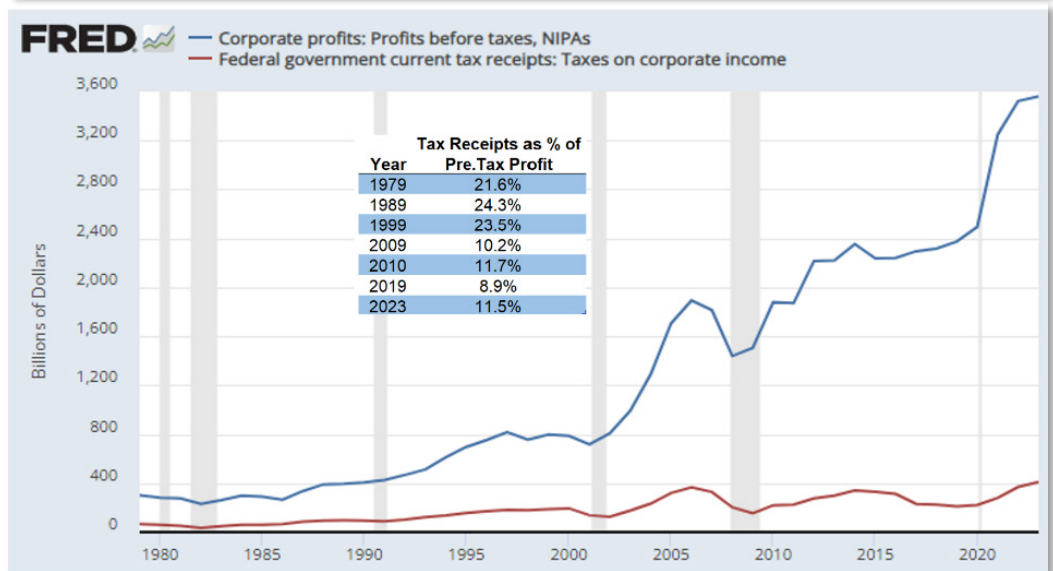
Those massively ballooning corporate profits did not accrue to the U.S. Treasury, and foregone tax revenues did not go toward debt reduction.

Federal debt leverage now exceeds the 1946 historic high. That debt was incurred in exigent circumstances, paying for full federal mobilization of the economy during World War II. In these United States

of America, men up to the age of 45 were subject to military service. The U.S. military eventually numbered 16 million. That was one-third of men over the age of 14, including the elderly and infirm.<sup>10</sup> As a side benefit, the pre-World War I “guns vs. butter” debate about military spending tradeoffs was proven true: soldiers were issued free guns, and American civilians were issued butter ration stamps.

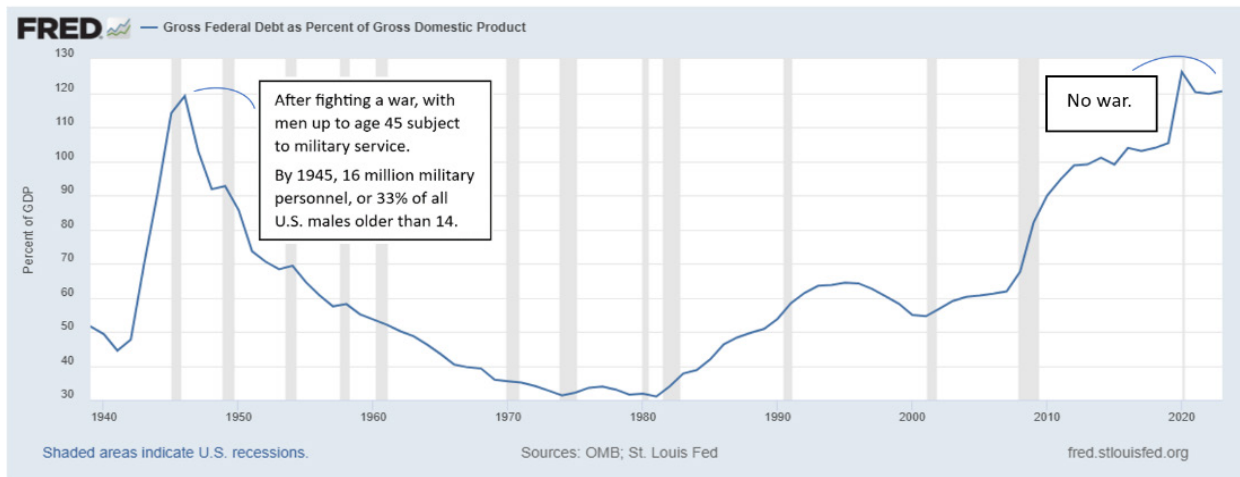


<https://fred.stlouisfed.org/series/A463RD3Q052SBFA>

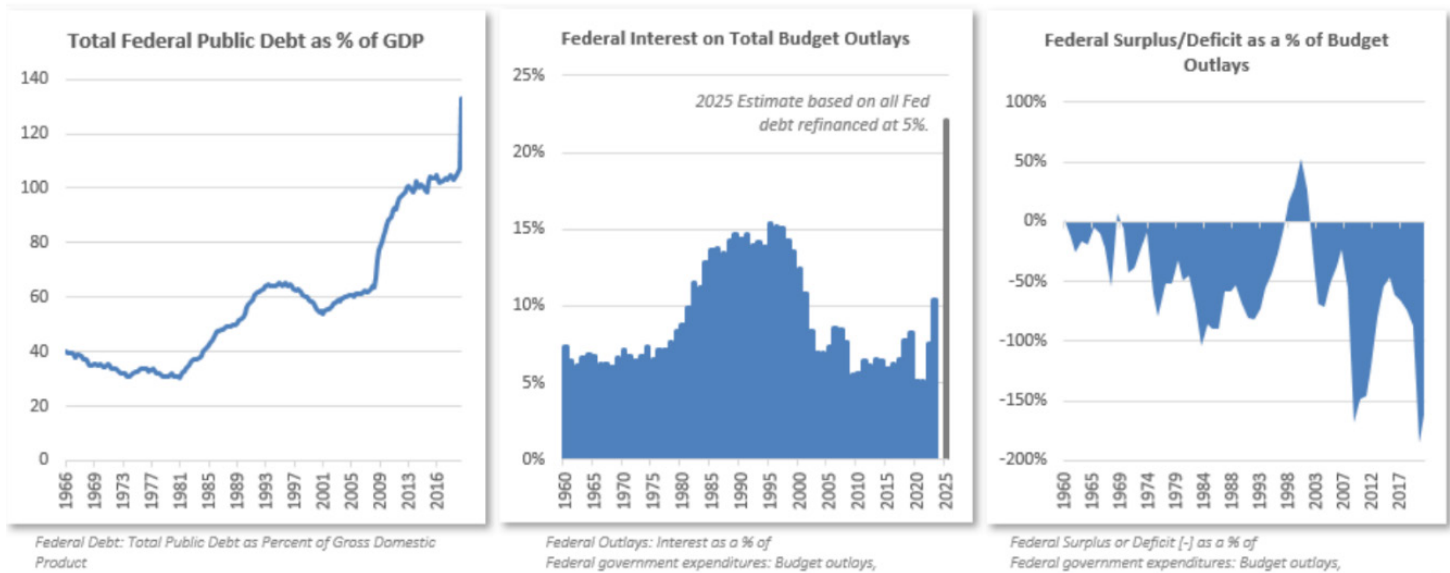


<sup>10</sup> Source: <https://www2.census.gov/library/publications/1945/compendia/statab/66ed/1944-02.pdf>





The federal government's current financial position is depicted in these next charts. One wonders what manner or scale of emergency spending the U.S. can afford with a balance sheet that looks as if the country just finished an all-out multi-year overseas air, marine and ground war.



Source: St. Louis Fed, <https://www.cbo.gov/data/budget-economic-data#3>

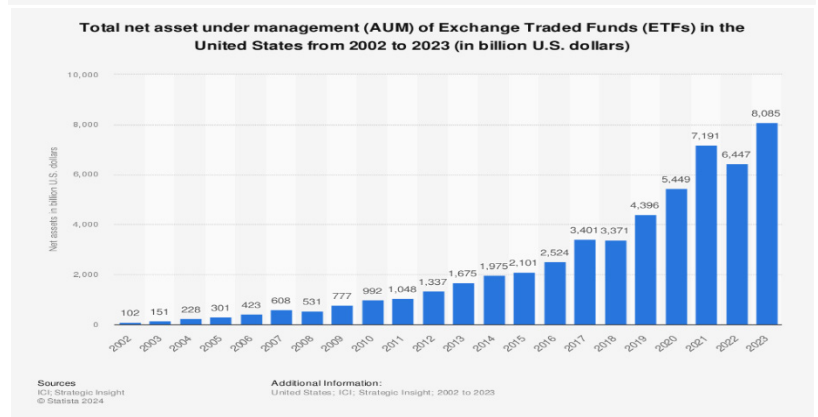
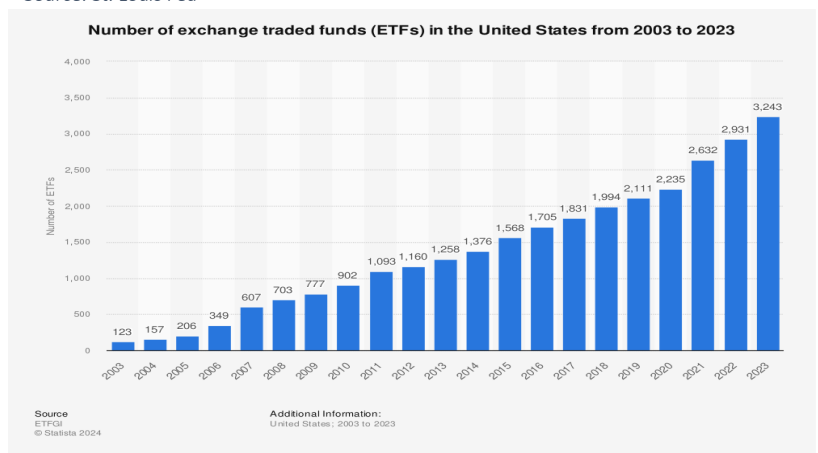
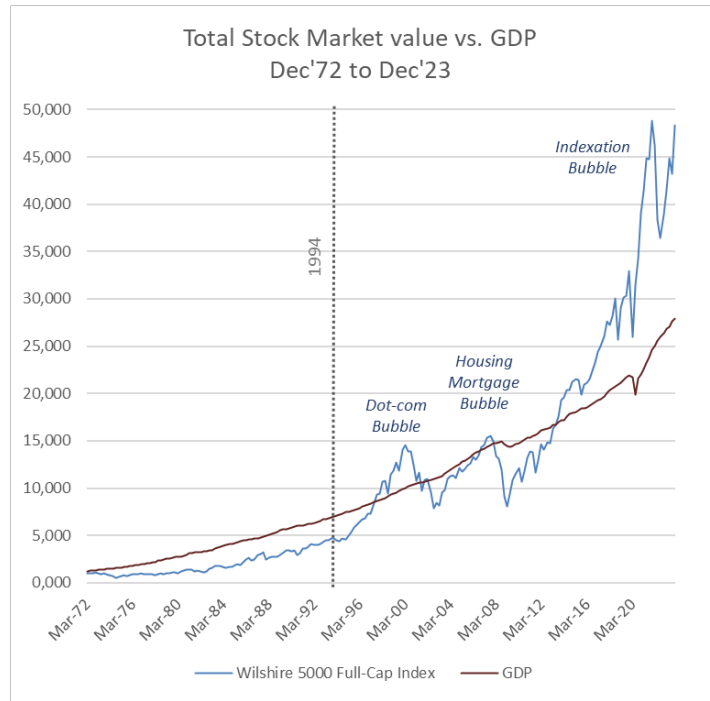
But you also get this great looking mirror-image picture of the government finances charts: the total amount of money in the stock market. The total market value of stocks relative to GDP is probably the simplest, least-adulterated equity valuation measure there is.

The ocean of investment capital required to produce that burgeoning stock market capitalization was enabled by the financialization of the economy through monetary policy. What we want to understand about that stock market valuation—right there at the top-right corner of this chart—is how it got there, and its makeup.

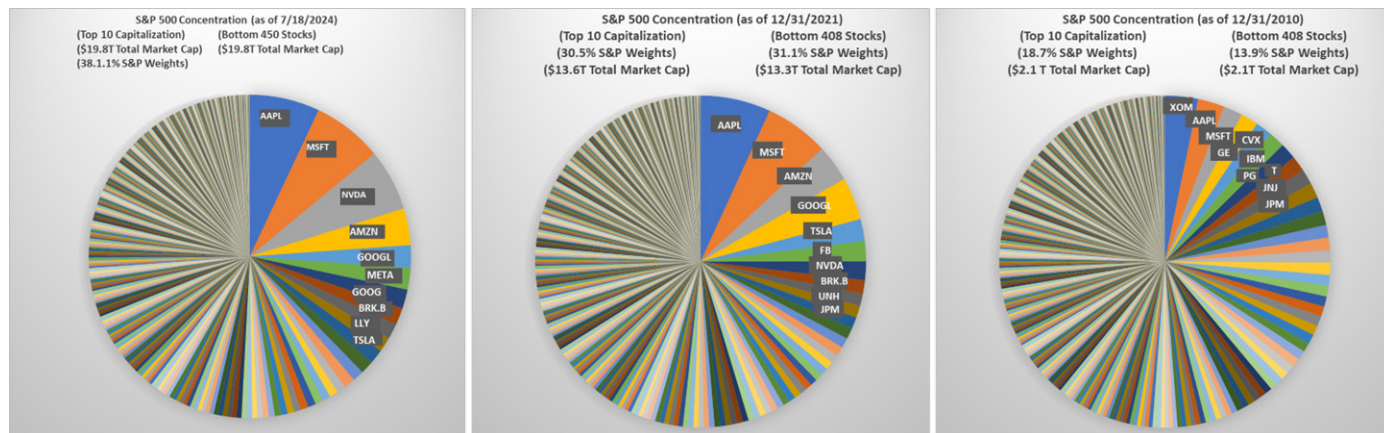
It got there partly on the wave of the ETF investing. There are now as many (or more) ETFs than there are stocks in the stock market. The Wilshire 5000, which was created to encompass the entire market, now contains only 3,370 companies. It did contain 5,000 in 1990, but the rest are gone.

The scarcity of stocks to fulfill the index mandate is partly because index funds have accumulated so much in assets that they can only allocate money to large-cap companies. They wouldn't be able to buy enough ordinary-sized companies. Even if they did, they couldn't trade out of them timely. They have to concentrate on the largest.

Another concentrating factor: any equity index will eventually un-diversify itself. This is just a feature of normal distributions in statistics. Eventually, the few extremely successful companies will have enormous weightings in relation to everything else. Because they're indexed, those companies' shares mechanistically accrue even more buying power and higher weights with new inflows. The



progression of concentration in the accompanying pie charts, merely from 2010-2021 to June 2024, is something to behold.



When we first researched ETFs, they were a *de minimis* factor in the market, so there could be no decisive debate about whether they could impact prices.

But with passive AUM market share long past 50%, indexation has gone from an abstraction—designed as an unbiased and stable measure of market performance—to a dominant manager of, and competitor for, assets. Can valid arm’s length measurements of the market be provided by a party that is in fact altering the market by its active participation? That’s taboo in the hard sciences, because it is known that the results will be skewed.

## *You Gonna Believe Me, Or Your Lying Eyes?*<sup>11</sup>

The market structure changes are not just about higher concentrations, they’re also about the vacuum “down below.”

The Russell 3000 was designed to measure the performance of the largest 3,000 stocks in the U.S.—now only 2,925 companies—and covers about 97% of the value of the equity market.<sup>12</sup> The iShares Russell 3000 ETF (IUV) uses a representative sampling method to replicate the index and has 2,670 companies.<sup>13</sup> As an asset allocator, what don’t you own that you think you do own?

- 53% of the holdings in the Russell 3000 have a weight of 0.00%. More precisely, they have a weight of 0.005% or less, which is rounded down to 0.00%.
- If a 0.01% weight, as far as any possible investment impact, can be considered effectively zero, then another 22% of the holdings have a zero weight.
- All of this means that 75% of the constituents of the Russell 3000 have zero weight.

<sup>11</sup> Used variously in literature and cinema, but popularized in the Marx brothers 1933 film “Duck Soup” (“But I saw you with my own eyes.” “Well, who ya gonna believe, me or your own eyes?” Syndicated advice columnist Dorothy Dix introduced the “lying eyes” element in 1948. <https://quoteinvestigator.com/2018/07/31/believe-eyes/>

<sup>12</sup> Russell 3000 Index: <https://research.ftserussell.com/Analytics/FactSheets/temp/f12c5f19-7c20-457a-a4b0-86633125e756.pdf>

<sup>13</sup> iShares Russell 3000 ETF (IUV) as of July 18, 2024

With the gigantic scale on which the largest money managers operate, most equities are statistically irrelevant to them.

#### IV. The Emergent Risks to the Primary Indexes

In this section we'll focus on two main themes: **Information Technology, a new domestic limiting factor;** and **China as a direct threat to the top of the S&P 500**, this time as an exogenous risk.

##### *The IT Sector's Endogenous Dilemma*

Just to state it without belaboring the point: The 10 largest positions in the S&P 500 are about 38% of the entire index. The largest seven IT companies, all in that top 10, are 33% of the index. What should one expect from the S&P 500, then, in broad brush strokes?

Logically, if the 15% annualized five-year return (through June) was dominated on the way up by the largest 10 positions, and if the annualized return of the remaining 98% of the names was 7.4%, then what is the risk exposure of the market in reverse? In reverse, you're not really exposed to 500 stocks, you're exposed to the 2% of the names that are 40% of the exposure.

1 Year	Ann Return %	Contrib %	5 Years	Ann Return %	Contrib %	10 Years	Ann Return %	Contrib %
Total Return	24.6		Total Return	15.0		Total Return	12.8	
Top 5	76.4	47%	Top 5	34.2	41%	Top 5	30.3	33%
Top 10	60.2	62%	Top 10	32.9	53%	Top 10	27.0	43%
Residual 98%	13.1	38%	Remainder	7.4	47%	Remainder	7.2	57%

Source: Factset, Bloomberg, based on the iShares S&P 500 ETF (IVV)

The original risk-resilient nature of the S&P 500 resided both in its security diversification and the sector weightings. The weightings comported, for the most part, with the actual contributions of those sectors to the economy. The IT sector certainly doesn't represent one-third of the U.S. economy. Who would propose that Microsoft, at a 7% weight, contributes twice as much to the GDP as the entire energy sector, which is a 3.7% weight? It's a ludicrous assertion. But not a ludicrous index holding, it seems.

A lot is riding on the continued appreciation of the IT sector. That ride faces a couple of speed bumps. One sits among the cloud computing and data center providers. The largest of that crowd also happen to be the largest IT companies. The smallest company in the accompanying list is Hewlett Packard, which is #300 in the S&P 500 right up there in the 93<sup>rd</sup> percentile.

Top 15 Holdings: First Trust Cloud Computing ETF (SKYY)		Rank
Microsoft		1
Amazon		3
Alphabet/Google		4
Oracle		5
IBM		6
Cisco Systems		12
Adobe		13
Hewlett Packard		14

Top 10 Data Center Cos.*	
1	Microsoft Azure
2	Amazon Web Services
3	Google Cloud
4	Meta/Facebook

Data centers, which house the servers for cloud-based data storage and services, have been growing torridly for years. Artificial Intelligence computing has only just begun, so its massive growth has hardly made an impression on the statistics to date. Even so, the ordinary business issues that arise in such circumstances—supply versus demand—are becoming apparent.

On the one hand, construction in primary geographic markets rose 46% in 2023 (and by over 200% in Atlanta). On the other hand, vacancy rates for data centers in major markets is near a record low of less than 4%, and lease rates in 2023 rose 19%.<sup>14</sup> That spells higher input costs.

Two of the major input costs are the capital expenditures to build the centers, and operating costs, which are dominated by electric power.

### *Capital Expenditures*

Datacenters are asset-intensive. Adding more involves acquiring land and constructing facilities. This is a departure from IT companies' legacy businesses.

One reason for IT firms' exceptionally high profit margins is that the internet—the physical infrastructure, the landline cable upon which these firms' businesses were built—already existed. It was largely a capital-free ride. Data centers must be built from scratch, and it's old-economy expensive. In the past three years:

- The cumulative net income of Microsoft, Amazon, Meta and Alphabet was \$570 billion. They spent \$418 billion of that on purchases of property and equipment.
- They just about doubled the amount P&E on their balance sheets.
- Their revenues, on average, rose 1.6x over the three years; their net P&E rose 1.9x.

One would think IT firms are spending profitably. This next measure is rather simple, but nonetheless:

- Their total-company revenues generated per dollar of property and equipment on the balance sheet have fallen in each of the last two years, from an average \$3.40 to \$2.87 to \$2.59 in 2023.

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<sup>14</sup> \*Source: <https://www.cbre.com/insights/reports/north-america-data-center-trends-h2-2023>

## Hyperscale & A.I. – A Resource Story



### Things you won't find in a 10-K:

Microsoft's total water consumption has increased at a **23.18%** annualized rate since FY2020.

Microsoft's total energy consumption has increased at a **28.62%** annualized rate over the same period.

### 1.2 Energy

Table 6 – Energy consumption within the organization (MWh)

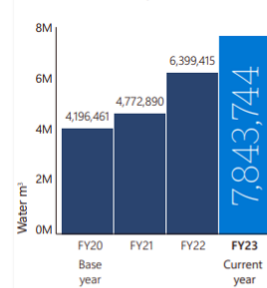
	FY20	FY21	FY22	FY23
Total energy consumption <sup>1</sup>	11,283,502	14,133,987	18,644,872	24,007,868
Non-renewable fuel consumed	449,304	446,417	473,137	413,955
Natural gas	218,557	249,443	273,964	150,972
Crude oil/diesel	147,297	143,370	117,195	160,754
LPG/propane/jet fuel	40,450	4,245	34,152	54,239
Gasoline	43,000	49,359	47,826	47,990
Electricity, heating, cooling, and steam	10,834,198	13,687,570	18,171,735	23,593,913
Electricity	10,770,714	13,621,517	18,153,454	23,567,502
Cooling (chilled water)	51,026	54,953	7,393	12,090
Hot water/steam	12,458	11,100	10,888	14,321
Total renewable electricity consumption <sup>2</sup>	10,244,377	12,969,393	18,153,454	23,567,502
Renewable energy credits and PPAs	10,244,059	12,969,246	18,153,218	23,564,161
Onsite renewable energy	318	147	236	3,341

1. Only reported categories and values are applicable to Microsoft's energy consumption. Renewable fuels, electricity sold, heating sold, cooling sold, and steam sold categories are currently not applicable. Reported values for FY23 expressed in gigajoules (GJ): total energy consumption equals 86,428,325 GJ, and total non-renewable fuel consumed equals 1,490,239 GJ.

2. Reported values represent Microsoft's total renewable energy consumption expressed in MWh from onsite, renewable energy credits, power purchase agreements (PPAs), and green power tariff programs. Values reflect Microsoft's renewable electricity consumption at the time of reporting.

Source: Microsoft

### Total water consumption

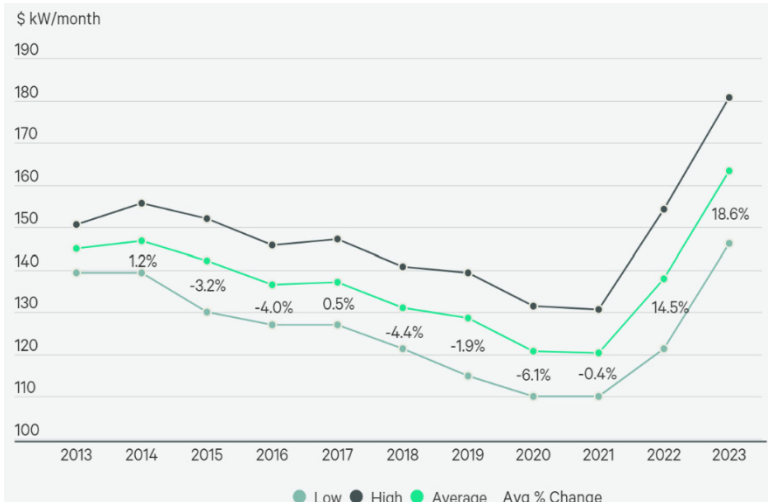


Find out more in our Data Fact Sheet

Ordinary capital-intensive businesses have certain practical limits on return on capital. Data centers are capital intensive and not proprietary, so their profitability will be much lower than what the IT companies have known to date.

All else equal, that will impact profitability and earnings growth. There's nothing wrong with that, in isolation. It's just that investors don't pay high valuations for that sort of business. This has the appearance of an arms race toward what might become a commoditized technology.

### Average Asking Rental Rate with Y-o-Y % Change for Primary Markets



\*\*Rental rates are quoted asking rates for 250–500 kW at N+1/Tier III requirements.  
Source: CBRE Research, CBRE Data Center Solutions, H2 2023.



### Electric Power

When realtors speak about data center supply, the volume of new construction, and lease rates, it is all denominated in MW of electric power. This accompanying excerpt of a review from the world's largest commercial real estate services firm, CBRE, is pretty clear: Electric power is the lifeblood and currency of data centers.

On the demand side, the H100 model of AI chips that NVIDIA expects to have sold by the end of 2024 might require about 0.5% of total U.S. electricity production.<sup>15</sup> Which is an awful lot, as will be shown, but only the beginning.

Nvidia just started selling the H100 this past year, so all of that electricity demand will be incremental, and likely increasing rapidly over the next few years. The H100, which draws 700 watts of power, replaced the A100 chip, which drew 400W. The recently announced Blackwell B200 chip, entering production next year, is expected to draw 1,000W. Each upgrade cycle could be in the millions of incremental units, each requiring greater power needs than the prior generation. Data centers currently account for 3% of the world's electricity demand,<sup>16</sup> so the growth projections imply copious amounts of incremental power demand in the near future.

Data centers are only a portion of the vast additional electric power needs of the technology sector.

5G wireless services, in the process of buildout, consume considerably more energy than the incumbent 4G. AI has hardly begun to find its various use cases. Self-driving cars and electric vehicle charging stations are but two more examples for which general adoption would mean vastly increased electric power demand.

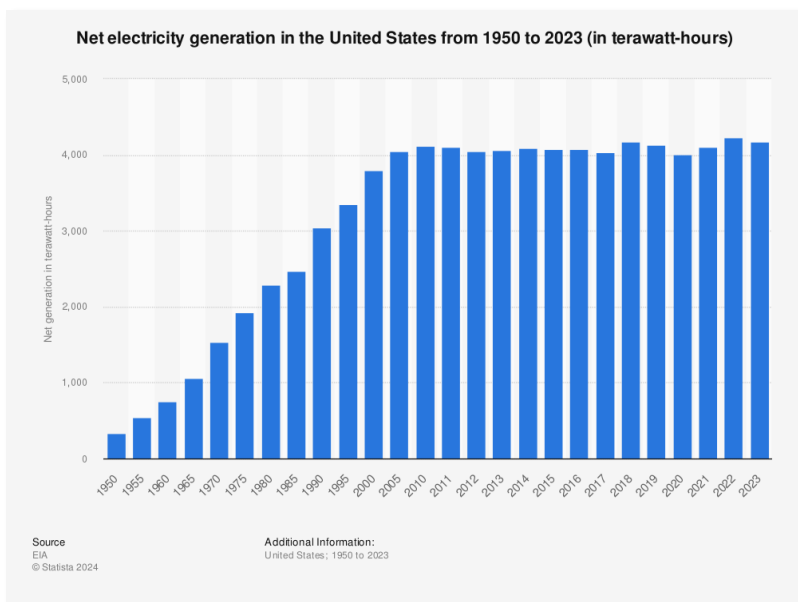


<sup>15</sup> Nvidia expects to have sold 3.5 million of its H100 Graphic Processing Units (GPUs) by the end of 2024. Referred to as AI GPUs, each consumes 700 watts of power. If run 24/7 for one year, the 3.5 million H100 chips would consume 21.5 Terawatt hours. <https://www.tomshardware.com/tech-industry/nvidias-h100-gpus-will-consume-more-power-than-some-countries-each-gpu-consumes-700w-of-power-35-million-are-expected-to-be-sold-in-the-coming-year>

<sup>16</sup> Based on data from the International Energy Agency.

On the supply side, the U.S. produced 4,055 TWh of electricity in 2005. Last year the figure was 4,178 TWh. Essentially zero increase in 18 years.

We need not elaborate here upon the regulatory and other impediments to a rapid and substantial increase in electric power production, other than to say accommodating this demand growth by technology companies appears unlikely. There is only one nuclear reactor under construction in the U.S., and the country has an installed base of 92 reactors. Coal plants are being decommissioned. Wind and solar, because of their intermittency issues, are unsuitable to power datacenters.



This pending supply/demand imbalance will almost certainly result in considerably higher electricity prices across the electric grid. There is the question, if energy prices rise inordinately, of who gets the electricity? Electric vehicles, consumers, government offices, hospitals, data centers? When the public welfare becomes a sufficient issue, it becomes a political and regulatory issue.

But the incremental electricity needs to be generated first, otherwise it simply will not be available at any price—although there are other pathways for the IT companies to secure more power, to be discussed shortly. In whatever manner this will be resolved, none of these growth or profitability impediments are reflected in the valuations of the IT sector.

### *Indexation's China Problem*

The most prominent features of the dominant global equity index, the MSCI ACWI, are:

- The U.S. weighting, as of July 23<sup>rd</sup>, which is 65%.
  - U.S. companies are nine of the top 10 constituents, and 14 of the top 15.
  - The IT sector weighting is officially 25%, but 32% when including Amazon, Google and Facebook.
- The China weighting is 2.8%.

### **MSCI ACWI**

#### **Country Weights**

	Weighting
United States	63.40%
Japan	5.28%
United Kingdom	3.54%
France	2.77%
China	2.75%
Canada	2.70%
Switzerland	2.20%
Germany	1.99%
Taiwan	1.83%
India	1.82%

Source: iShares MSCI ACWI ETF (ACWI). As of July 23, 2024



This profile must be compared with a listing of the world's largest economies:

- China's GDP now well exceeds that of the U.S.
- China's share of global GDP is 33%, 12x its equity index weight.
- The U.S., with a 20% smaller GDP than China, therefore has 23x the index weight of China.

These are outlandish distortions and have been increasing over time. Irrespective of the various reasons, this would not be a problem without a catalyst to change it.

A catalyst is now in evidence: China's economy itself and its strategic ambitions.

Economic capability ultimately translates into scientific and technological capability. These are increasingly on display, as China is demonstrating across a variety of global-scale markets.

- With 1.6 million of the 3.5 million patent applications in 2022, China now accounts for 47% of global applications; the U.S. for a mere 17.2%.<sup>17</sup>
- China is on the road to designing and producing substantially all its semiconductor needs within the decade. Last year, it developed a proprietary chip—despite stringent sanctions against technology transfer—to produce an iPhone equivalent for its domestic market. And at a lower price. One fifth of Apple's business is in China. Moreover, the Chinese phone will be put on the global market.
- China's electric vehicles, via BYD, have moved from internal markets to the global market. They outsell Tesla, and at a lower price.
- China's commercial aircraft company, COMAC, developed and received certification for two planes, initially for China Eastern Airlines in 2022, that are now being sold to other Asian airlines. They still use engines made by a China-GE joint venture, but will doubtless eventually use engines of Chinese design and manufacture. The threat is not merely to Boeing, but to the dozens of sizable S&P 500-constituent Boeing suppliers.
- Last month, China landed its second scientific probe on the far side of the moon. It will then return to Earth with soil samples. China is the first nation to land a craft there. Talk about ambitions for economic dominance and a practical display of technological prowess!

**Country GDP Weights, E2023**  
(PPP calculation method)

	<u>Weighting</u>
China	32.8%
United States	26.0%
India	13.8%
Japan	5.9%
Germany	5.6%
Brazil	4.2%
France	4.0%
United Kingdom	3.8%
Italy	3.3%
Canada	2.3%

Source: Underlying data from  
worldbank.org

*The New York Times*

***China Lands Spacecraft on Far Side of the Moon***

The landing brings the Chang'e-6 mission a step closer to being the first to return a sample from the part of the moon that's never seen from Earth.

By Yan Zhuang  
Published June 2, 2024

<sup>17</sup> According to the World Intellectual Property Organization.

China is moving from a low-margin outsourced manufacturing role, which it occupied for the past 30 or 40 years, into higher-margin businesses—and into direct competition with the U.S. It must be regarded as a viable challenger, not only to U.S. global commercial dominance, but also to the U.S.-dominant global equity index model. Investors in the U.S. and abroad completely underappreciate the threat.

This complacency comes from the dominant piece of empirical evidence supporting indexation, Roger Ibbotson's historical performance study by asset class: the *Stocks, Bonds, Bills, and Inflation Yearbook* (SBBI). The study commenced in 1926, and supports the proposition that one can earn robust returns by simply buying and holding a diversified portfolio of U.S. equities for a long period of time.

The study's great flaw, which could not be empirically apparent until now, is that there has been no nation that could compete economically with the U.S. since the 1920s. Therefore, the wealth of price and return statistics in the century-long study, which are an integral element of every asset allocation model, make no suggestions about U.S. prospective equity returns from this point forward. There simply isn't data for it. Not in the model.

As the challenge to American commercial dominance from China and elsewhere becomes more visible, it will come as a great shock to U.S. and global equity investors. The possibility of much lower valuations of the dominant incumbent companies—and seriously negative index returns—should be carefully considered, just as the Ibbotson figures need to be reconsidered.

Aside from the IT sector, the major S&P 500 firms are mostly global franchises, typically with more revenues from outside the U.S. than from within, with very stable and modestly growing customer bases. If Chinese companies manage to challenge this paradigm, it is really a challenge to indexation.

The reason: Indexation is supposed to be the holistic solution to the idiosyncratic risk, or security selection, problem. All competitors in each industry are in the same portfolio, which is the index. One company's decline is balanced by its more successful competitor's rise. The only big risk is systemic. But China is almost wholly outside the index, so it defines exogenous systemic risk. On the one hand, its very substantial growth potential won't be captured by the index. On the other, whatever creative destruction it inflicts on the index can't be offset by the success of Chinese equities.

## V. A Solution for AI's Electric Power Challenges, and a Value Investor's Back Door In

A popular narrative, proven so in the S&P 500 sector weightings, is that AI technology is the investment theme of the future, whereas energy is one of the past. In reality, the two are inextricably joined. Therein lies a problem for AI, a benefit for certain hard asset companies—and, in the asset allocation realm, unique investment possibilities.

### *Calculating the Odds*

An outrageous amount of capital is being spent on AI and data centers by IT companies, presumably to fuel alluring future profits. An investment challenge is that you can't know how it will evolve. It could be an arms race to own an ultimately commoditized business. There's no shortage of world-changing technologies that were ultimately foisted upon others by the market share winners because their products

became commodities: radios, televisions, personal computers. Automobiles changed the world and made virtually no return on capital for generations.

Even when true winners emerge, the odds of identifying them is more a wager than an investment. Which household-name computer or PC maker should have been owned once Microsoft emerged? None. Search engines were among the earliest, hottest household-name IT companies: AltaVista, Ask Jeeves, Excite, Lycos. Then along came Google. It was even worse in the white-hot fiberoptic cable sector, because they were true asset-intensive, low-return businesses masquerading as IT: Corning, Level 3 Communications, RCN. They just collapsed. Some version of this happens with every new growth industry.

### *Scoping Out an Angle*

A different approach is to identify related businesses that can be more effective beneficiaries of the growth in the sector than the ostensible growth companies themselves. In this case, by identifying a limiting factor for AI growth, which would make that factor very valuable.

One is electric power. Again, it has to be uninterruptible, so wind and solar energy are not options because sunshine and wind are highly intermittent. And enormous additional quantities of power are needed. Except U.S. power production has been flat for almost two decades, largely due to limited demand growth. We are now at a crossroads where a decade of energy efficiency gains for traditional power are intersecting with what may be the largest secular demand increase since the industrial revolution. So how might a rapidly aging grid be modernized and adapt to potential annual demand growth of up to 3%?

Coal-fired plants are a no; they're being rapidly decommissioned. Nuclear power plants, even assuming the absence of public opposition, take a decade or longer to build, given existing regulatory protocols. It bears repeating that there is just one nuclear reactor under construction in the U.S. (China has 21; just one more developing economic power differential with the U.S.<sup>18</sup>)

There should be expansion opportunities for electric utilities, but that is a long process, generally capped by regulated rates of return. Nevertheless, utilities may have a terms-of-trade advantage over technology companies and ultimately perform better. But, with a 2.7% dividend yield on the iShares U.S. Utility index, one can't look to a discounted valuation as a margin of safety or to aid future returns.

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<sup>18</sup> Source: <https://www.statista.com/statistics/513671/number-of-under-construction-nuclear-reactors-worldwide/>

Silver is a key input in both the technology and renewable energy sectors, so price appreciation can be profitably captured through a silver royalty company like Wheaton Precious Metals. For our part, we already have that exposure. Oil is not much used for electric power generation, so that's not an option.

This leaves natural gas as a growth pathway in the expansion of data centers, cloud computing, and artificial intelligence. Natural gas has been replacing coal for electric power generation on pretty much a 1:1 basis for decades.

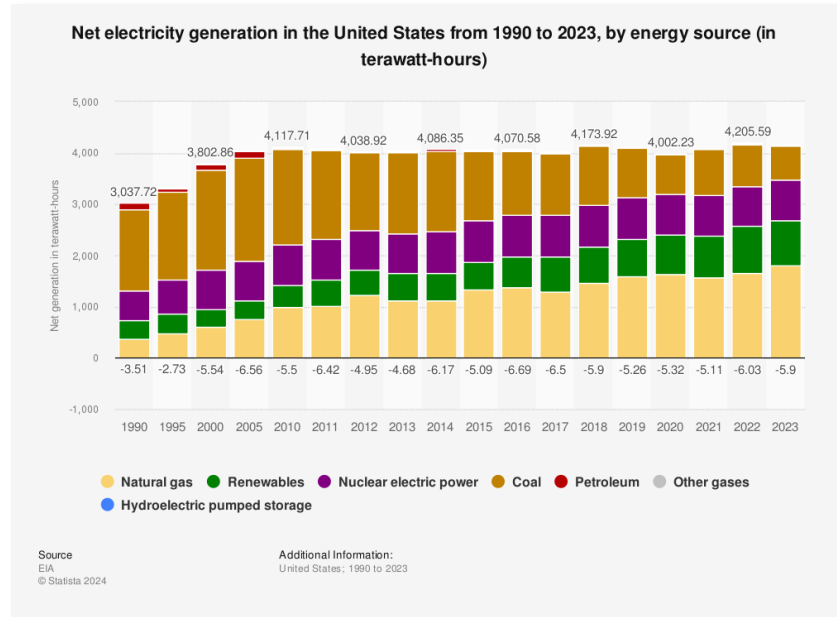
With that information in hand, the long-horizon mind turns again to hard assets—these might well be the superior investment path.

To preface that proposition, there is a reasonably select number of critical resources in the world. The modern post-industrial economy might be driven by a battle for resources very much akin to those in the pre-industrial economies two and three centuries ago. How many wars were fought for access to markets? An indication of how seriously this is being taken in some corners is China's very assertive, many years-long pursuit of relationships with suitably malleable governments around the world to secure strategic minerals.

Datacenter and AI companies, for their part, are aggressively searching out and acquiring sites suitable for their large facilities. These require sufficient power and other specialized infrastructural support. The cities of choice to date are now saturated, with nearly non-existent incremental capacity (which primarily means power availability), and rising prices. A way around direct purchase of electric power is to make your own. There is one major commodity in the U.S. that is not at all in short supply, and with which you can make your own electric power.

### *The "Play," Exposition from the Proscenium*

That's natural gas. In the Permian Basin, which is the most prolific, lowest-cost oil producing region in the U.S., a very large ratio of natural gas is produced alongside oil, whether it's wanted or not. Large enough quantities that natural gas is far cheaper, on a BTU-equivalent or barrel-of-oil equivalent basis, than oil. It can readily power electric generators at a lower cost than grid-available electricity. Moreover, as a feature of the local geology, the proportion of gas produced with each barrel of oil in the Permian is rising over time, which coincidentally fits with the forward demand profile of data center operators.



The Permian has other relevant critical resources that are unique to Texas and required by datacenters. Aside from abundant uninterrupted power, there are vast tracts of land with minimal residential population, and lots of water. Water for cooling, which can be 90% more efficient than air cooling for the huge banks of servers in data centers, can be very valuable.

Datacenters' power requirements are spread, roughly, between computational processes (40%), cooling (40%), and other IT applications (20%). Although the area is arid, roughly 3 to 5 barrels of subsurface non-potable water are produced with each barrel of oil—again, not a choice, but a geological feature. The area is also ideal for both solar and wind power, separate from the direct, uninterruptable power needs of the servers, and Texas has an unregulated power grid (ERCOT). Moreover, the land position allows for underground sequestering of the carbon emitted from gas generators.

Does this idealized combination of attributes not seem like a fanciful made-up scenario? Which providentially appears to intersect with Texas Pacific Land Corp, sitting right at the center of the Permian Basin drilling and water activity? Make no mistake, as politicians lately are apt to say, it will not be overlooked by the datacenter industry.

It should be noted that AI datacenters can work in the out-of-the-way Permian. That is because training large language models doesn't require the low latency (minimized distance and signal delay) that necessitates that other activities (like, say, stock arbitrage) co-locate their computers close to large metropolitan areas.

As yet, people don't appreciate just how important and prolific the Permian Basin is. Texas keeps district-by-district track of oil production in the state. The Permian activity of which we speak takes place primarily in the central part of Oil & Gas District #8. District 8 is responsible for about 20% of all oil and gas production in the U.S. In the 2020 Covid crisis year, when U.S. oil production dropped an unheard of 2%, District 8 volume was up 8%. From 2019 to today, while U.S. production has been booming, up 14%, District 8 volume is up 24%.

The accompanying side by side maps show the counties of District 8 alongside the land and royalty acreage of TPL.

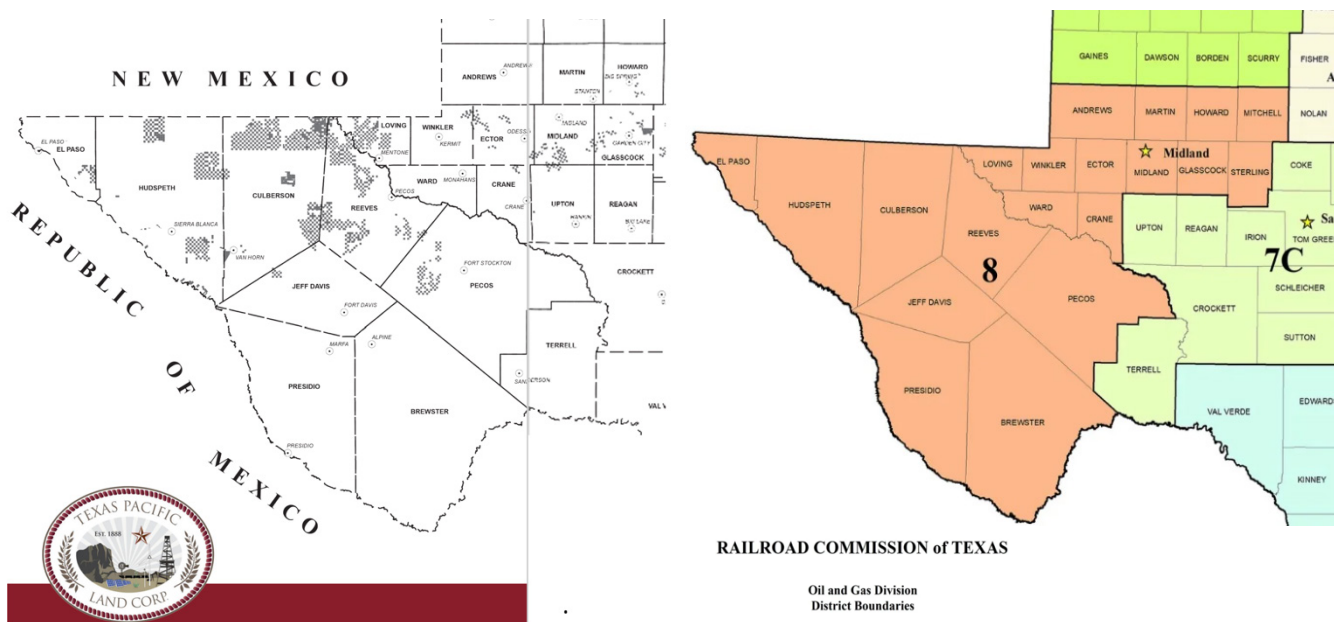
**Crude Oil Production: U.S. vs. District 8**  
(000 barrels/day)

	U.S. *	Texas **	
		Statewide	District 8
Dec '19 to Dec '20	11,452	3,702	2,040
Dec '20 to Dec '21	11,251	3,804	2,198
Dec '21 to Dec '22	11,889	3,869	2,313
Dec '22 to Dec '23	12,864	4,082	2,486
Dec '23 to Mar '24	13,069	4,136	2,536
2021 / 2020	-1.8%	2.8%	7.8%
2022 / 2021	5.7%	1.7%	5.2%
2023 / 2022	8.2%	5.5%	7.5%
Mar '24 / 2023	<u>1.6%</u>	<u>1.3%</u>	<u>2.0%</u>
<b>Mar '24 / Dec '20</b>	<b>14.1%</b>	<b>11.7%</b>	<b>24.3%</b>

\* <https://www.eia.gov/petroleum/production/#oil-tab>

\*\*<https://www.rrc.texas.gov/oil-and-gas/research-and-statistics/production-data/monthly-crude-oil-production-by-district-and-field/>

It might be recalled that one of TPL’s strategic advantages is the checkerboard pattern of its legacy mile-square sections. These are effective in capturing tangential activity by other parties that cross TPL’s land, such as power lines, pipelines, and roadways, for which TPL is compensated by lease arrangements.



A limitation of this checkerboard arrangement is that, being mostly non-contiguous, it is less effective for larger-scale land use. An integrated hyper-scale data center—inclusive of the associated infrastructure for the building itself, such as for generators, gas pipelines for the generators, water-related facilities, and so forth—might require 1,000 acres or more. Most of TPL’s acreage are square mile “sections” of 640 acres.

## The “Play,” Resolution

Now for LandBridge Company. This company, stock ticker LB, created in 2021, is a landowner in the Permian Basin. Its IPO occurred on June 28<sup>th</sup>. For easy orientation, most of what there is to describe about it is exceedingly similar to TPL, but with a different and important orientation.

Starting with about 70,000 acres it has, through a series of transactions, amassed 220,000 surface acres and 8,000 gross mineral acres in Sector 8 and a few counties in New Mexico that are contiguous with or proximate to the Texas border.

Just as for TPL, LandBridge receives a mix of oil and gas royalties, resource sale revenues (like sand and brackish well water), surface use leases, and royalties from third party land use. All these properties—in both senses of the term—derive from their primary asset, the land.

Land is the most enduring and, possibly, continually productive investable asset one can own. It can develop new higher use cases over time. On a per capita basis, the supply of land has been shrinking since the dawn of civilization (according to some, that would be Mesopotamia 6,000 years ago).



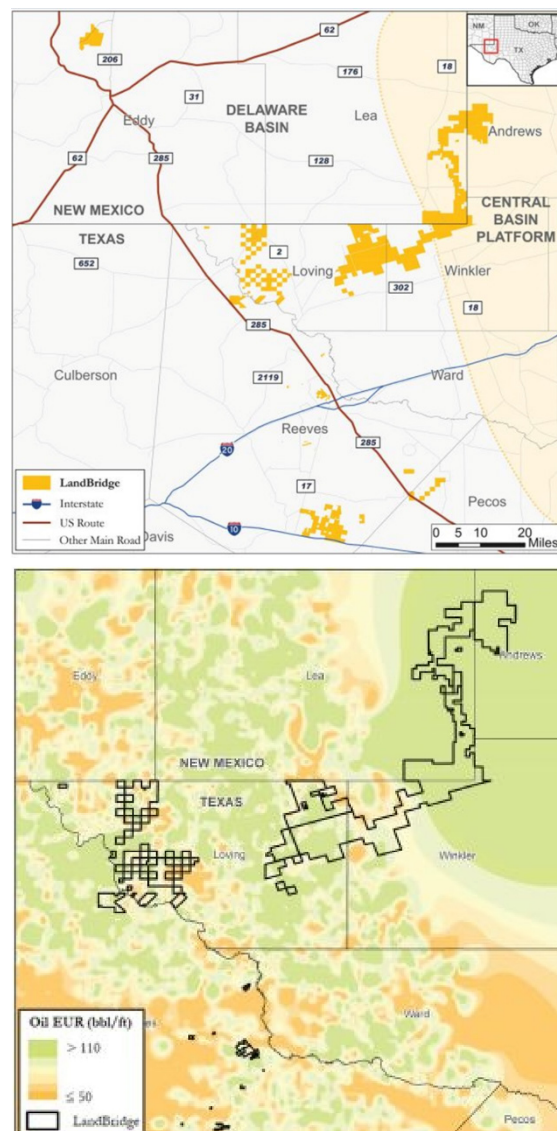
The primary difference between the LandBridge and TPL land—and which was a strategic choice that creates a different asset exposure and growth profile—is LandBridge created as large a set of contiguous-acreage footprints as it could. There’s a two-fold purpose.

The primary one is for growth through water management services. The private equity firm that sponsored this venture, Five Point Energy, controls one of the largest water infrastructure businesses in the Permian Basin, called WaterBridge. Permian wells generate water cuts (the water-to-oil ratio) of 3:1 to 5:1, which continue through the end of well life, which could be 30 years.

This means that, whatever oil and gas is produced, water will require three to five times the infrastructure to handle three to five times that volume. That is a limiting-factor class of challenge for drilling in the Permian, and a significant per-barrel cost for the oil companies. That cost has been rising sharply, because the alternatives are limited. Trucking water away is expensive because water is so heavy and the volumes are enormous, and pipeline systems are expensive. The most effective solution is local, via underground storage and recycling, both of which require extensive...land.

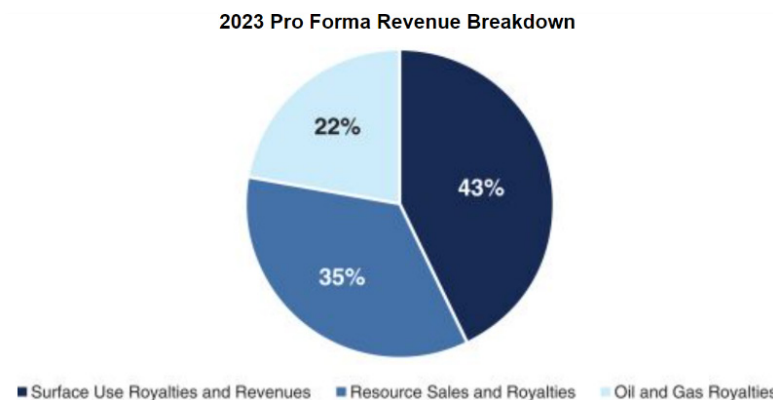
Accordingly, LandBridge sited its properties in and around the most active drilling and richest reserve portions of the Permian, which means in and around the largest drillers. A strategic complement to this land position is Five Point’s WaterBridge subsidiary, which has approximately 174 produced water handling facilities and 4 million barrels/day of total capacity. These pipelines are strategic because they encircle and crisscross the area. The weight of water necessitates disposal in close proximity to oil wells, and hence their contiguous land acreage is as close to a legitimate monopoly as one might get.

The accompanying maps show the same central counties as for TPL, along with the depiction of the largest reserves (green is good; yellow not so good). It bears mentioning, and attests to the value of contiguous properties, that in 2022, TPL and WaterBridge created an alliance on about 64,000 acres. The filled-in footprint allows WaterBridge to expand the infrastructure for its oil drilling-produced water management operations, and similarly allows TPL to deliver its source/aquifer water across an underutilized expansion area.



The combination of rising volumes and rising prices, delivered through a royalty structure, wherein the capital costs are borne by arm's length third party operators, should be extremely profitable.

The anticipated scale of expansion is easily large enough to qualify LandBridge as a growth company. At present, oil and gas royalties are less than a quarter of total revenues, and will be crowded downward further by the expansion of the Resource Sales & Royalties and Surface Sales & Royalties segments. Surface Sales & Royalties will also benefit from the extensive physical infrastructure that must accompany higher water storage and processing volumes. That is a decidedly different earnings and growth profile, at least for the foreseeable future, than TPL's.



As to the glamorous side of the **Surface Sales & Royalty** segment, this is where IT and AI meet the Permian Basin. This locale has unique and cheap land, plentiful and cheap gas, the possibility of cheap liquid cooling (via water treatment, like desalination, which can turn excess well water from a liability into an asset), and an unregulated power grid for connection with wind and solar power installations.

Each of these developments—the datacenter itself, related roads, power lines, wind and solar, carbon capture, water cooling—has a potential recurring, royalty type revenue stream back to LandBridge. To this end, LandBridge has delineated a half-dozen suitable locations for a future hyperscale datacenters. If you build it, will they come? A favorable experience by early data center projects could, in the most positive scenario, make this central portion of Section 8 the growth platform that the AI/Big Data Set/Data Center industry desires and requires.

This is a general introduction to the character and the *raison d'être* of LandBridge. You can see why it is a flavor of quintessential hard asset that has, as of yet, extremely limited investor awareness, much less index inclusion. It is much like TPL, which has found its way into many more indexes since our last review.

To conclude, the preponderance of evidence says the past 30-year period of a disinflationary economy, continually expanding corporate profit margins, and continually expanding equity valuations, is an aberration—rather than just normal economic and stock market progress. Part and parcel of these interwoven trends has been the concentration of exposures, and loss of diversification and resilience, within indexation. Distortions can continue indefinitely without a catalyst to trigger a shift to a new equilibrium. Catalysts are now in plain sight, and they're not "normal" microeconomic or domestic policy catalysts. U.S. dominance economically, and as expressed in indexes, is clearly being challenged by China, with profound implications for corporate profitability and valuations. If one sees this clearly, more informed investment choices can follow.



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