



THE
DEADLY DECADE
SURVIVAL GUIDE

SURVIVE AND THRIVE
IN THE *ROARING 2020S*

THE DEADLY DECADE SURVIVAL GUIDE

SURVIVE AND THRIVE IN THE ROARING 2020S

Table of Contents

Introduction	1
Dalio's Paradigm Shift	2
Bitcoin and the Global Retirement Crisis	6
The Path to a 10X-30X Return	19
A New Crisis of Epic Proportions	32
How the US Dollar Could Get Dethroned	43
Bitcoin and Hyperinflation.....	52
Why Treasury Bonds Aren't Safe	66
What if Long-Term Rates Go to Zero?	72
How Stocks Could Power Higher	77
Fossil Fuels Lost – Clean Energy Won	82
Waterfall Effects and Blue Energy	85
Hallmarks of the Fourth Age of Civilization	90
The Dawn of Quantum Supremacy	106
Survive and Thrive in the Next Bear Market	116
Winning Investor Psychology	131

INTRODUCTION

For reasons you will soon understand, the patterns we are seeing now suggest the 2020s could be a repeat of the 1930s.

That could create the most “deadly decade” in 90 years, barring the years of World War II. But at the same time, the explosion of new technologies on our doorstep is more reminiscent of the 1920s than the 1930s.

So, the 2020s could be more like the 1930s and the booming 1920s combined, which would be wild. Some investors will get rich, and others could lose everything.

There will be great upheaval but great opportunity too. The “roaring 2020s” could thus be equal parts exhilarating and terrifying.

The purpose of this book is to help you prepare, both strategically and psychologically, for what is coming. There’s a lot of ground to cover, so let’s dive right in.

DALIO'S PARADIGM SHIFT

As we get ready for the year 2020 and a whole new decade, there is reason to believe big changes are coming. The next ten years of market activity could look wildly different from the last ten.

Many investors will find themselves unprepared for this — but you can be ready.

According to legendary hedge fund manager and macro investor Ray Dalio, it's possible to “navigate and immunize” a portfolio. This means the prepared investor can navigate the twists and turns of new market conditions, and immunize their nest egg against unpleasant surprises.

We pay attention to Ray Dalio's views because, with a net worth in the \$18 to \$20 billion range, he is arguably the most successful hedge fund manager of all time. Bridgewater, the hedge fund firm Dalio founded in 1975, has made more profit for clients than any other fund (in terms of total dollars extracted from markets).

When it comes to market history, Dalio's views are especially worth considering. This is because his entire money management strategy is rooted in awareness of market history. Whereas the typical quant study might go back twenty years in a single market, Dalio prefers to go back hundreds of years — or as far back as the data will go — across dozens or even hundreds of markets.

Dalio applies this exhaustive process in search of historical principles that are “timeless and universal,” to use one of his favorite phrases, and then seeks to build trading and investing strategies around those.

In a paper titled Paradigm Shifts, Dalio describes how, every so often, the whole market “paradigm” changes. A paradigm is a pattern, a

model, or a set of concepts that represents a way of thinking about something or a way of looking at something.

On a collective basis, investors will adapt a “paradigm” that represent their big picture belief as to what is happening in markets and why. After the paradigm has lasted for a while — like in the neighborhood of five to ten years or so — investors start behaving as if the paradigm is permanent and will last forever.

But just as the maximum number of investors get comfortable with the paradigm, or otherwise start to assume the paradigm is going to last forever, something important shifts or reverses or breaks and the old paradigm gets shattered. Then a new paradigm takes hold, and the process starts all over again.

In his fifty years of market experience, Dalio observes that these “paradigm shifts” tend to happen about once every ten years or so. They also tend to overlap with a change in the actual decade — for example, from 1920 to 1930 or 1970 to 1980 — demonstrating how psychology is a factor.

Last but not least, Dalio observes that the new paradigm will often completely reverse certain assumptions of the last one. This is logical too, given the way market conditions tend to go from one extreme to another over long periods of time, like a giant pendulum that swings back and forth. There is no such thing as equilibrium; the market is always heading toward someplace and away from someplace.

Below are the bullet point descriptions Dalio uses to describe the paradigms of the past century from 1920 onwards, with each decade roughly corresponding to a new paradigm.

- 1920s = “Roaring”: From boom to bursting bubble.
- 1930s = Depression.
- 1940s = War and Post-War.

- 1950s = Post-War Recovery.
- 1960s = From Boom to Monetary Bust.
- 1970s = Low Growth and High Inflation (i.e. Stagflation).
- 1980s = High Growth and Falling Inflation (i.e. Disinflation).
- 1990s = “Roaring”: From Bust to Bursting Bubble.
- 2000-10 = “Roaring”: From Boom to Bursting Bubble.
- 2010-Now = Reflation.

So what will the decade of 2020 and beyond bring? We can't know for sure. But there is a strong probability, based on the ebb and flow of market history, that the next ten years won't look at all like the last ten. And many of the conditions that feel “set in stone” as of today (2019) will go out the window.

Because paradigm shifts can be jarring — and sometimes even violent — it's important to prepare for volatility and change. For example: In a note of warning, Dalio points out that every asset class, every so often within a long-run market cycle, goes through a period of decline so painful that having too much exposure to that asset class could mean disaster.

One way to handle this is to “navigate” market changes with information and knowledge and risk management tools.

For example, it's possible to keep tabs on how different asset classes are performing just by watching and comparing them. It's also possible to rebalance a portfolio in the direction of sectors, industries and asset classes that are behaving well (and away from the one that aren't). This is hard to do manually — that is to say, without any tools — but easier to do with software.

In addition to navigating changing market conditions, Dalio's fund

seeks to “immunize” portfolios through their All-Weather strategy, which is designed to handle market storms.

The idea here is to have a range of exposures in the portfolio so that, no matter which market conditions prevail, the portfolio can preserve capital and perform decently well.

As an example of this, one portion of a portfolio might be focused on inflation-themed investments, like Bitcoin and gold and precious metals stocks, to do well in a high inflation and deteriorating fiat currency environment.

Another portion might be invested in tech stocks, to take advantage of disruptive technology trends; and yet another area might tilt bearish via long-dated put options on ETFs, to generate profits if the market declines.

To navigate and immunize with your own retirement nest egg, you can use an array of software tools to help you get going.

If Dalio is correct — and our views happen to align with his — the 2020s are going to be a wild decade, and a whole new “paradigm” relative to what we’ve been used to since 2009.

BITCOIN AND THE GLOBAL RETIREMENT CRISIS

To get straight to the point: A global retirement crisis is coming straight at us. For the United States, the time of arrival is now. The year 2019 was when the crisis reached a tipping point on American soil.

From here on out, the impacts of the global retirement crisis will ripple out and accelerate. This crisis will play out for at least a decade if not longer — all through the 2020s and perhaps even well into the 2030s.

The reality of this crisis is not a matter of speculation or opinion. The probability of occurrence is 100 percent. Understanding why is a matter of mathematics: The contours of this crisis have been known for years. Some farsighted thinkers have been warning of its dangers since the 1980s.

For decades such warnings were brushed off or ignored, seen as someone else's problem to be solved at a later date. But 2019, a year that seemed impossibly far off in the 1990s and even the early 2000s, is in fact the long-awaited "later date" made real. The clock has run out. The crisis is here.

The global retirement crisis will have an astonishingly wide range of knock-on effects. Its force will be felt by all citizens of every generation, from oldest to youngest. It will create chaotic price swings in stock and bond and real estate valuations — in both directions, wildly lower and wildly higher.

It could even put such a strain on government institutions and monetary systems — and possibly on the institution of democracy itself — there will be legitimate fears that the entire system could break.

There will be radical proposals from politicians and central bankers. These proposals will be seen as necessity rather than choice, as tens of millions of voters — on both sides of the political spectrum, left and right — demand that government “do something” about the crisis effects that will ravage many lives.

Gold will shine in this environment. Gold is a form of crisis insurance; acting as a store of value in periods of crisis and upheaval is gold’s main job. The fact gold is very good at this job explains why gold has retained its value as a form of crisis insurance and “sovereign currency” for thousands of years.

But while gold is likely to rise dramatically over the course of the global retirement crisis — which again will play out for more than a decade, starting now — Bitcoin’s rise could be even more dramatic.

Where it is conservative to estimate gold could triple or quadruple in value over the course of the 2020s, to somewhere in the vicinity of \$4,000 to \$5,000 per ounce, the price of BTC could easily rise anywhere from 10-fold to 100-fold when this happens.

Bitcoin has a far more dramatic trajectory than gold because it is starting from a far smaller base market cap — and also because, as a form of easily portable “digital gold,” Bitcoin is set to grab a percentage of gold’s market share.

Where does the 10-fold to 100-fold Bitcoin projection come from? We can start with gold’s spot price in 2019, estimate Bitcoin demand in the range of 10% to 25% of gold’s market cap, and work from there.

- At a spot price in the \$1,400 range, all of the gold ever mined is worth a little under \$8 trillion.
- If gold roughly triples in value as a result of the global retirement crisis (world supply increases very slowly, on the order of 1% a year), that would take gold’s market cap to \$24 trillion.

- A Bitcoin share at 10 to 25% of that would mean a BTC market cap of \$2.4 to \$6 trillion, which would represent a 30-fold to 80-fold increase from its early 2019 valuation.
- If gold quadruples, the high end for Bitcoin by this estimate (25% of \$32 trillion) would be \$8 trillion, implying a 112-fold price increase from early 2019 levels.

The above estimates are very back-of-the-envelope. They don't account for the fact that the total Bitcoin in circulation will expand from around 18 million to 21 million. On the other hand, the estimated number of Bitcoins "lost forever" due to key loss or hard drive mishaps runs as high as 3.78 million. And gold could more than quadruple.

The point here is less to come up with a precise number, or even a ballpark estimate, than to show clearly that BTC's price rise in the coming decade, as a result of the global retirement crisis, could be multiple orders of magnitude larger than gold's.

As a store of value Bitcoin will also be helped by its increasing ease-of-access and safe-storage options via technology infrastructure upgrades, its global brand recognition and portability across borders, and a growing preference among Millennials for digital assets over physical "stuff."

But at this point you may be asking: What are the drivers of the global retirement crisis? Why is it guaranteed to happen — and why is 2019 the tipping point? And why is the global retirement crisis likely to send the price of gold to the moon (and the price of Bitcoin to Neptune) over the next ten-plus years?

It all begins with American Baby Boomers, so that's where we will start too.

Demographics experts have long referred to Baby Boomers as the

“pig in a python” generation. That is because, like the digested contents of a pig moving slowly through a giant snake, Boomers have had an outside impact on the US economy at every stage of their lives. Their retirement stage will be no different.

The Baby Boomer generation was born between 1946 and 1964. The “boom” aspect was a result of soldiers coming back from World War II to settle down and start families, as America embraced the concepts of the nuclear family and suburban living in the 1950s.

Baby boomers came of age in the 1960s, and then became avid consumers in the 1970s. As young adults starting out, the boomers helped to drive 1970s inflation with a newfound willingness to buy on credit — something the prior generation wasn’t as comfortable with.

As the boomers entered the prime of their careers, they began to save money in earnest in the 1980s and 1990s, driving stock market and real estate values higher as consumption and credit and leverage all expanded.

The Baby Boomer generation reached a peak size of 78.8 million in 1998. In the year 2011, the first of the Baby Boomers — remember they were born from 1946 to 1964 — hit the official retirement age of 65. The “pig in the python” had finally grown old.

And now we can see why 2019 is a tipping point — the year when the retirement crisis begins.

- Though the first of the Boomers turned 65 in the year 2011, the average age was still in the mid-50s at that time. (The average age of every generation increases with the passing of time.)
- 2019 is the year when the average Baby Boomer age hits 65. The average Boomer age will continue to rise from here, hitting 75 years old by the end of the 2020s.

From here on out, a flood of Baby Boomer retirees will transform

how the US economy feels and functions. More than 3.8 million Boomers will hit retirement age in 2019, and that annual number will continue to rise well into the 2020s.

This means that, on average, more than 10,000 Baby Boomers will hit retirement age (65) every single day in 2019. And we will see that flood persist for more than a decade. There will still be more than 10,000 per day hitting retirement age in 2029, the year when the tail end of the Boomers (those born in 1964) turn 65.

This is why the global retirement crisis arrives on a timetable. Demographics is a matter of math more than guesswork. If you know when a critical mass of people were born, you can know the age of that group in any given year. And you can anticipate the economic impact of the aging process through factors like saving and spending habits.

We say it is a “global” retirement crisis because aging is everywhere. The Economist has called it “the graying of the world.” In the 1950s there were an estimated 205 million people, across the entire global population, aged 60 or over. By the year 2050 — just thirty years away — the global 60-or-older population will have increased roughly tenfold, to more than 2 billion.

In the United States, this Boomer retiree wave will touch off a crisis for a simple reason: Most of them are broke. The vast majority of Baby Boomers have saved far too little for retirement, if anything at all. We are about to see what happens when the “Me” generation retires en masse, while basically having no savings beyond the value of a home. It won't be pretty.

Once again, some basic math and statistics bears this out. In 2017, a Federal Reserve study showed that 40% of American adults couldn't come up with \$400 cash for an emergency expense, meaning they would have to borrow money or sell something in order to cover it.

This suggests 4 in 10 working age Americans are a paycheck away from being broke and possibly two paychecks away from bankruptcy.

For older Americans the picture is slightly better, because most of America's wealth is concentrated in the pockets of Boomer retirees. This is mainly because Boomers have been around longer, giving them more time to work and save.

But the Baby Boomer retirement savings picture is horrifying, nonetheless. According to Federal Reserve data, the median net worth for Americans between the age of 55 and 64 is \$187,300.

“Median” means about half of Americans aged 55-64 have a net worth higher than that number, and half of them have a net worth below it. The average net worth of older Americans is a useless statistic for our purposes here, because it is skewed dramatically higher by the fortunes of the one percent (think Jeff Bezos and Bill Gates messing up the averages).

So available statistics say the median net worth of about-to-retire Americans is around 187K. But US Census Data also says that 75% of Americans in the 55-64 age group own a home. This means two things:

The average about-to-retire Boomer has most, or all, of their net worth in their home.

The average about-to-retire Boomer has almost zero exposure to the stock market.

Other statistics on equity ownership bear this out. A 2016 white paper published by NBER, the National Bureau of Economic Research, calculated that the top 20% of American households own more than 93% of US equities. The bottom 80% of households hold less than 7% of total equity ownership.

While a great many American households have stock ownership

— more than half by some estimates — the vast majority of that ownership is trivial, representing a tiny amount of savings in a pension or a 401K.

This is a huge problem because it means the vast majority of Baby Boomers have almost no money for retirement. The net worth contribution of a house doesn't help with retirement. You can't eat your house while you are still living in it.

What about social security? Once again, the math just doesn't work. The average social security payout, according to Bureau of Labor Statistics (BLS) data, is just over \$1,400 per month, which amounts to less than \$17,000 per year. That is not enough to live on — not anywhere close.

What about pensions? According to the Pension Rights Center, one out of three retired Americans receives some form of pension, with a median of \$9,262 for private pensions and \$17,576 for government pensions. Once again, the average pension is not enough to live on — though a third of retirees rely on that income.

It gets worse: The coming wave of Baby Boomer retirees is going to trigger a multi-trillion-dollar pension crisis, both public and private, due to corporate and government entities not having enough money to pay out the pension sums that are owed. This is going to wreak havoc at all levels, all throughout the US economy.

Jeremy Gold, an actuary who recently passed away at age 75, started sounding the alarm on pensions in the mid-1980s. He saw the demographics problem way back then -- the “pig in the python” was moving along like clockwork — and he felt that corporations were heading for disaster.

Jeremy Gold was right, but nobody listened to him. The problem was just too far off for anyone to care. Here is the pension crisis problem in a nutshell:

Private corporations and state and local governments have trillions in pension liabilities.

These liabilities are payout sums that are contractually owed to retiring employees.

Pension funds are mandated to save money for their future obligations by law.

But it's possible to save less by making aggressive assumptions about rate-of-return...

And it is also possible to save less by assuming future retirees will die at an earlier age.

Think of a conversation like this.

- An actuary comes to the company CFO and says, “Bob, according to my calculations, we should set aside \$600 million this year to fund our pension plan.”
- Bob the CFO says: “\$600 million! We can’t take that kind of money out of the budget. What if we assume a portfolio return of 9% a year instead of 6%? Then we can put in less.”
- The actuary says: “A 9% return assumption is really aggressive, especially since only 60% of our funds are in conservative stocks and the other 40% are in bonds. It’s not possible.”
- Bob then says: “Okay, how about if we assume an 8% return and also assume the average retiree will have a lifespan three years shorter than average. Then we won’t have to pay out for as long a time, and can put in less for this year.”
- The actuary says: “Well, okay...”

So the company inflates the expected rate of return for its pension plan so it can put less money in... and the company estimates that

its retired workers won't live as long, so that the payout calculations are lower... and as a result the company doesn't have to put as much money in today... and twenty years from now the pension fund is bankrupt, because for years and years the company saved less than it was supposed to for obligations that were guaranteed to materialize one day.

That is the story of the pension crisis, and the trouble has been brewing for decades.

According to the Boston College Center for Retirement Research, private employer pensions across the country have a half-trillion-dollar (\$553 billion) "hole" in the form of unfunded pension liabilities. And that is just the tip of the iceberg. When you look at state government and local government pension fund liabilities, the potential shortfall runs into the trillions.

The pension crisis has been described as a "time bomb" that has been ticking for decades. But Baby Boomers are going to set off that time bomb by the sheer size of their retirement wave. Again, remember the average Baby Boomer age hits 65 in 2019.

That means the biggest wave of pensioners America has yet seen is going to be saying, "pay up, I need that monthly income!" And due to the multi-trillion dollar hole in pension fund balance sheets for private and public entities alike, the answer will be: "We can't." And then some form of hell will break loose.

When corporations fail to fund their pensions, they either get bailed out by the government or go bankrupt. When state and local governments fail to fund their pensions, the result is even uglier: Cops and teachers and firemen fighting angrily for what they are contractually owed, even as budgets for local communities are slashed.

After Baby Boomers trigger the pending multi-trillion pension fund

crisis with their huge retirement wave, we can expect to see pension bailout requests and municipal bankruptcy threats popping up left and right. We can expect to see local services slashed, which means policing and fire and waste services cut back and growing potholes in roads. It means entire sections of the country will fall into financial sinkholes, with everyone angry.

And none of this assumes a recession. All of this is likely to happen due to the weight of the “pig in the python” hitting critical mass retirement age, whether a recession comes or doesn’t come.

But of course, a recession will in fact come. They always do. Recessions are a natural part of the business cycle, and there is no way to avoid them.

But the next recession, when it comes, is going to be different in at least one large and dramatic way. It will be the first recession we see against the backdrop of the Baby Boomer retirement wave.

We have already established that the vast majority of Baby Boomers (more than 50% and probably closer to 80%) have little to no money saved for retirement — far less than what they need. We have also already established that the coming wave of Boomer retirees will trigger a multi-trillion pension funds crisis, with demands for bailouts and service cutbacks at the private, state and local level.

And the arrival of a recession, when it comes, will make all this worse. A recession will result in a giant contraction in consumer spending, which the US economy relies on.

In recent years consumer spending has powered roughly 70% of the US economy. Much of that spending has come from, you guessed it, Baby Boomers. This is partly due to how wealth has been distributed over time.

Take US housing for example. Baby Boomers have enjoyed the rise in

real estate values more than any other generation, because they are the ones with a large concentration of home ownership. Generation Xers and Millennials, on the other hand, are on the outside looking in. They have experienced the pain of trying to buy a really expensive home, or otherwise paying very high rents.

The Boomers have more savings and they like to spend — they've been that way since the beginning. But as they reach retirement age, Boomers are going to cut back on spending, which is a natural thing to do in old age.

But many boomers will cut back on spending not just lightly but aggressively, due to a lack of savings and a pension shortfall. In US economy terms, this will be like a needle scratching across a record. The earnings of consumer-facing companies will be hit. The whole US economy will go into Boomer spending withdrawal. And as stock valuations fall, the multi-trillion pension fund holes will get even bigger.

Millennials and Generation Z will feel this pain too, even though they don't have any money collectively speaking, as Boomers come for the jobs on the lower rungs of the economic ladder.

The labor force participation rate, a measure of how many people are in the workforce, has been rising for Americans 65 and older for 20 years or so. The percentage of Americans above age 65 and still in the labor force is up roughly 50% since 1998.

That was happening even before the Baby Boomer retirement wave, as the previous generation — the parents of the Boomers — had increasing trouble with retirement savings. With the Boomer retirement wave now here, the labor force participation rate for those aged 65 and over is likely to go vertical. You will see more and more older Americans taking the jobs that millennials or Generation Z kids would have taken, just to make ends meet.

Many Boomers will be angry and upset about having to work hard at minimum wage into their late 60s, or even their 70s and beyond, just to have enough money to maintain a basic existence. And many Millennials and Gen Z'ers will feel angry that the Boomers have “crowded them out” once again — they made the real estate super expensive, they racked up the national debt, and now they are taking the jobs.

What we are describing here is a recipe for national tensions at alarming levels. The temperature of the water is already starting to get hot. The next recession will bring that temperature to a boil.

This in turn will force politicians and central bankers to “do something,” anything, about citizen anger. After all, Baby Boomers know how to vote in mass numbers. And Millennials, if they figure out that trick, are on track to be an even larger cohort than the Boomers over time. Here is the bottom line:

- A global retirement crisis is coming, starting with the USA.
- Baby Boomers are the trigger, as the average Boomer age hits 65 in 2019.
- As a generation, the majority of Boomers have saved too little (almost nothing).
- The Boomer retirement wave will trigger a long-brewing pension fund crisis.
- Boomers will anger Millennials and Gen Z'ers by taking their jobs.
- In the next recession, a prime driver of spending (Boomers) will cut back.
- This will cause the US economy to potentially implode.
- Collective national anger will rise to a boiling point due to all this.

- Politicians and central banks will be under extreme pressure to “do something.”

Whatever the politicians and central bankers wind up doing, the policy impacts will be wild. We are on the road to crisis in part because of the Boomer wave as just described, and in part because of the global debt levels that have already built up.

THE PATH TO A 10X-30X RETURN

Bitcoin is a long-term investment opportunity that could generate a 10-fold to 30-fold return over the course of the next decade. That is an extremely rare thing. It is very hard to find an investable asset with a legitimate return profile in the thousands of percent, in the space of just a few years.

These types of mega-returns are what venture capital funds search for, but VCs have a lot of painful misses. The long-term returns of a successful VC fund are closer to 15 or 20% annualized, rather than anything stratospheric, because the grand slams have to pay for so many duds.

That in turn makes Bitcoin even more rare: An investable asset with a high probability of stratospheric gains, achieved within a reasonable time frame.

A startup investment is like a lottery ticket: You typically have to buy a lot of them to increase the odds of a payoff. Bitcoin is more like an insurance policy with an incredibly attractive payoff attached. If, say, a 1-2% portfolio allocation to BTC resulted in 3,000 percent gains over time, that could substantially improve the course of a retirement path — or even save a retirement plan from falling short.

It is also unheard of for an investment with vertical payoff potential to have open-ended capacity in terms of how much capital can be put in. With, say, most startup ventures and small cap investments — the investment vehicles most likely to have big returns — there are almost always size constraints on how much can be purchased.

For many investors, that means a failure to move the needle in total portfolio terms, even if the size-constrained small investment works out. As a long-term investment vehicle, Bitcoin has no such size constraints. A billionaire could put 1-2% of their liquid portfolio into

BTC without issue. (More than a few have surely done so.)

Why does this opportunity exist? Why has an investable asset come along that can offer thousands of percent upside over the next decade, along with the benefit of open-ended long-term investment capacity, and a solid probability of success to boot?

It comes down to Bitcoin's role as digital gold, and the journey BTC is set to take alongside gold.

Bitcoin is the first asset in the history of the world that handles the “store of value” job in ways directly comparable to gold — and in some ways even better than gold. The stratospheric returns we project for Bitcoin come from the world's slow-but-steady embrace of the fact that BTC really and truly is digital gold, with the BTC price going vertical in the 2020s as gold demand and BTC demand rise in tandem.

All the gold that exists above ground has a rough worth in the vicinity of \$8 trillion, give or take, at average 2019 price levels. As an interesting side note, if all of that gold were melted down and formed into a cube measuring about 67 feet on each side, the cube would fit inside a single Olympic-size swimming pool.

In the scenario we see unfolding — which will play out not in one shot, but over the course of many years — gold is likely to at least quadruple in value (if not do even better). This would put gold's total worth, in much-depreciated future US dollar terms, above \$30 trillion when all is said and done.

For Bitcoin to play a role as digital gold, it will have to catch up to gold's projected valuation expansion in the 2020s. If BTC managed to capture, say, just 10-20% of future gold's market share in this manner, that would put BTC's market cap squarely in the trillions.

And that is where the “thousands of percent return” profile

comes from. BTC is in the early stages of a historic journey from technological experiment to globally recognized store of value component on a similar footing as gold. This journey will only happen once, and perhaps will never be replicated.

To picture the logistics of it all, think about asset allocation models for institutional portfolios. Institutional investors tend to allocate assets in fixed percentage ratios that are rebalanced every month or quarter.

As a hypothetical example, an institutional portfolio might have the following allocation targets, with “rebalancing” a routine buying or selling of assets to keep the portfolio percentages in line:

- 15% in US domestic large caps;
- 15% in US domestic small caps;
- 20% in international equities;
- 30% in corporate and municipal bonds;
- 20% in private equity and hedge funds.

In the future world we anticipate, gold will become a staple of institutional asset allocation. The eventual world we foresee could have every institutional investor, as a manner of social signaling and accepted conventional wisdom, have something like 5-10% of their total portfolios allocated to gold and gold-related investments.

At the same time, these institutional investors will (in our future projections) want a smaller, but still significant, level of exposure to Bitcoin, as the price appreciation for BTC in the coming years could produce investment returns too fantastic to be ignored. This suggests a prudent institutional asset allocation of 1-2% of the portfolio to BTC, a ratio of one-tenth to one-fifth of their allocation to gold.

If this scenario more or less unfolds — again over a long period,

perhaps the better part of the 2020s — then gold’s market cap goes to \$30 trillion or more, Bitcoin’s market cap rises into the multi-trillions as part of its historic journey to becoming a full-fledged store of value asset class, and BTC as a long-term investment fulfills the potential we see.

But what will be the catalyst that gets the party started? Why does gold, and by extension Bitcoin as digital gold, have such a bright future dead ahead?

To better understand the behavior of Bitcoin as digital gold, we’ll need to first revisit the historic behavior of gold itself. Many investors assume that gold is a form of inflation hedge, but this is not actually true.

Gold is not an inflation hedge; gold is a crisis hedge, or rather a form of crisis insurance. If you look at gold through this lens, you can understand how three things about gold hold true simultaneously:

The gold price can flatten out or drift lower for extended prosperity periods.

Gold has lost value in inflationary periods, yet gained value in deflationary periods.

Gold has been a consistent store of value, truly “long-term,” for thousands of years.

On the inflation front, an easy way to criticize gold is to point out its poor performance from 1982-2000. Inflation was rising during that period, albeit at a slow and stable rate. Yet the gold price did nothing much other than decline, and eventually drifted down to a historic low around \$250 per ounce.

Based on the 1982-2000 time window, gold is not an all-purpose inflation hedge. In times of general peace and prosperity, there can be a “goldilocks” amount of inflation — not too hot, not too cold, but

just right — and the price of gold can drift or fall for many years at a time.

At the same time, gold and gold-related assets can do quite well in deflationary periods. Gold stocks were an amazing investment in the 1930s, for example, and John Maynard Keynes (the famous economist) made a fortune in the 1930s with a huge bullish position in South African gold stocks.

In the 1930s, the price of gold was fixed but the price of everything else was falling, including energy and labor. This meant that gold miners were producing an asset that held its value, even as their input costs — the energy and manpower required to run the mines — were getting cheaper by the month. This had an explosive impact on profit margins.

The thing to understand is that gold does well in times of crisis, or in general rolling periods of high uncertainty and broad-based financial instability. If inflation is moderate and times are prosperous, gold will probably be out in the cold. If things are ugly or uncertain and inflation — or deflation — is threatening to upset the natural order of things, gold is likely to be doing quite well. It responds to danger and crisis.

Gold's role as a form of crisis insurance also explains how gold has retained its store of value for thousands of years. Studies have shown that Roman Centurion soldiers in the age of Emperor Augustus, circa 27 B.C. to 14 A.D., were paid in gold at the equivalent rate of US army captains today (around \$46,000). The only way for gold to show that kind of consistency is if, after a period of falling out of favor, it makes up the lost ground by advancing powerfully.

To put it another way: If gold has a habit of drifting lower for years or decades at a time in calm prosperity periods, and yet has retained its value since Roman times, that suggests there must be windows

of time where the gold price surges — by a whole heck of a lot — as a counterpoint to all that time spent adrift when the mood is calm and inflation is modest.

And if we look back at episodes of turmoil all throughout financial history, this pattern is just what we see. Gold does well in times of crisis, when financial systems are in flux and the established order is out of whack. The 1930s were an oddity in that the gold price was fixed during that time, but the share prices of gold mining companies took on the store of value role by rising aggressively as prices elsewhere fell.

To borrow from Dr. Seuss, gold is a bit like “The Cat in the Hat” — it always comes back. This has to be true in order for gold to have retained its store of value over thousands of years. The times when gold comes back are those turbulent and sweeping periods of history when calm prosperity is out, and printing press fear and loathing are back in.

(We also know, based on history, that all sovereign governments roll out the printing presses sooner or later. In the grand scheme of things, fiat currencies have a 100% mortality rate.)

We can look forward and see that public and private pension funds are a mega-trillion bailout disaster in waiting: While pension fund shortfalls both public and private have slowly built up over decades, to the tune of many trillions, it will be the coming mass wave of baby boomer retirees, attempting to draw on those pensions en masse, who will finally break the system.

We also know that roughly half of baby boomers have no money. That statement is almost literal: A March 2019 study update from the GAO — the US Government and Accountability Office — confirmed that, among US households headed by those 55 and over (i.e. boomers), 48 percent of such households had “no retirement savings” as of 2016. None at all.

This means that, even as the underfunded US pension system starts to bend and break, tens of millions of baby boomer retirees will be staring financial destitution in the face. These strapped boomers are likely to vote — and based on a calculus of being financially in deep trouble, they are likely to vote for the candidates who promise them huge entitlements, regardless of political party.

The coming pension fund crisis, triggered by the boomer retirement wave, will demand a national bailout. The size of this bailout could make the old Savings & Loan crisis look like a drop in the bucket; in a worst case scenario, it could even make the subprime crisis look tame.

The anger at a lack of pension checks will be so widespread and nationally dispersed, political leaders will be forced to authorize a mass bailout. This is not so much a prediction as observing a train heading down a track where the bridge over a ravine is out: You know what is going to happen when the train reaches the ravine.

At the same time, a boomer population nearly 50% broke is likely to seek a grand expansion of entitlements in general terms. They will have the political clout, via sheer numbers and younger generation voters on their side too, to get those entitlements pushed through.

The average American was never much into balanced budgets anyway: A Reuters study from August 2018 showed that 70% of Americans are in favor of “Medicare for All,” including 52% of Republicans and 85% of Democrats. Implementing some form of Medicare for All — which will be a top campaign issue in 2020 — would cost more trillions. Meanwhile the Green New Deal, a climate change legislation package proposed by Democrats in Congress, could have costs running into the tens of trillions.

Trillions worth of new spending is coming — spending for pension fund bailouts, spending for entitlement expansion, and possible

spending for eye-bulging new programs like some version of the Green New Deal and Medicare for All.

In the face of all this, the political will of deficit hawks is a completely spent force. There is no appetite on either side of the aisle for reining in spending. What's more, all of this is happening against a backdrop of runaway global debt. Consider the following:

The US national debt is now above \$23 trillion, its highest level ever.

In three years if not sooner, the federal budget deficit is projected to top \$1 trillion.

The US Congressional Budget Office (CBO) projects \$12.2 trillion more debt in the 2020s.

That projection does not include likely bailouts or entitlement expansions as described.

The US is on track to soon shell out more on interest payments than military spending.

“It is hard to definitely pin down a date of ‘no return,’” says Kent Smetters, a Wharton professor of business economics and public policy. “But, under the current debt path, we currently estimate that the government will have almost no reasonable options left, outside of debt default, in about 25 years.”

To assume things will hold together for 25 years is actually optimistic. Again, that is largely because, as dire as the non-partisan CBO's budget projections look, they do not include the multi-trillion explosion in bailout costs and entitlement ramp-ups that are coming.

Remember too, though, that sovereign governments do not literally default on their debts. Instead, they de facto default through inflation. This happens by way of the printing press. When debt levels spiral out of control, the Federal Reserve simply issues the

currency necessary to buy up government debt and support the bond market. The cost is a flood of worthless currency eroding faith in the system, ultimately leading to capital flight and vicious inflation.

Meanwhile, on a global basis, the United States is far from the worst debt offender. The biggest debt monster would be China, which accumulated so much debt in the past decade, the numbers could be described as “insane.” Here are some bullet points on China via John Authers of Bloomberg:

- China’s total debt is up sevenfold since the 2008 financial crisis.
- China alone accounts for more than 50% of all emerging market debt.
- 70% of all private sector debt in the world, post-2008, came from China.

The debt-to-GDP ratio of the United States has already crept to 105%, a level not seen since the days of World War II in the 1940s. But that statistic looks downright prudent compared to China. There is no official measure for China’s debt-to-GDP ratio — none that can be trusted anyway — but unofficial estimates place it as high as 300%. For all of America’s debt risk, China’s is far worse.

Another way to mark the bizarre state of the world today is via the tally of bonds with negative yields.

From a finance theory perspective, the negative interest rate yield, as a concept, sounds bizarre and nonsensical. It is not something that was meant to exist in nature.

A negative interest rate yield means that the lender — that is to say, the purchaser of the bonds who puts up capital — is paying the borrower to borrow. Or here is another way to look at it: Buying a negative interest rate bond is like opening a savings account where, instead of earning a fixed rate of deposit, you pay a fixed rate of deposit to the bank.

As of April 2019, there were more than \$10 trillion worth of bonds with negative interest rate yields — a larger tally than the \$8 trillion worth of all the mined gold in existence.

There are, in fact, logical reasons to buy negative interest rate bonds. One of them is currency appreciation. Investors might purchase negative-yielding Swiss bonds, for example, as a way to park a large block of cash in Swiss Francs.

If the currency exchange rate moves favorably, meaning the Swiss Francs appreciate in value against the investors' home currency, the investor could wind up making more on the forex adjustment than they lost on the negative yield.

The Swiss central bank offers negative yields, meanwhile, as a way of saying “we don't really want your capital driving up the price of our local currency; if you want to park your cash in Swiss accounts, you will have to pay for it.”

Regardless of the logic, the fact that \$10 trillion worth of bonds have negative yields shows the degree to which the whole world is upside down — and awash in capital and debt. Freakish events like this only occur after long periods of gross distortion created by wildly aggressive central bank policies.

This is set to be a major problem at the onset of the next global recession or financial crisis because, in response to the last crisis, sovereign governments and global central banks already loaded up with debt to the hilt. So, what happens if the world's governments and central banks have to do it again, that is to say, respond to a new crisis with more blow-out spending?

Will China take its unofficial debt-to-GDP ratio to 500 or 1,000 percent? Will the US Federal Reserve expand its balance sheet to \$10 trillion, \$20 trillion, more? Maybe.

We don't know the point at which the system will break. But in the 2020s we are likely to find out.

In some ways, the rolling crisis era that the world is headed for may have been preordained. All that is set to happen may have been bound to happen, like it or not, simply because of how markets work and how the grand scheme of human nature works.

This applies in the sense that human nature is predictable. Financial manias followed by crisis periods have been happening in wave-like patterns for hundreds if not thousands of years, and there are multi-decade cycles of boom-and-bust prosperity all throughout financial history.

Ray Dalio, the legendary hedge fund manager worth \$20 billion or so, has long talked about the “long-term debt cycle,” also known as the debt supercycle. To briefly explain the concept:

- The long-term debt cycle is many decades in length, and comes with both an expansion phase and a contraction phase.
- In the expansion phase of the long-term debt cycle, overall debt levels are building as overall credit and leverage levels expand. This can last for decades and tends to feel prosperous.
- But then, when the long-term debt cycle ends, total debt and credit levels traverse an unsustainable peak.
- At that point, the multi-decade long-term debt cycle switches into reverse, and there are gloomier years, if not decades, of paying off excessive debt and shrinking the total amount of credit.

US debt levels (relative to GDP) were at their highest levels prior in the 1940s, due to the massive amount of military spending required to fight World War II.

After the World War II period, total US debt levels declined at a steady

pace for roughly four decades, finally bottoming out in the early 1980s.

And then, with the inflation of the 1960s and 70s tamed, and historic debt levels pared back, a new bullish phase of the long-term debt cycle began around 1982 — which has more or less continued to this day.

What is likely to happen next, if the rhythm of the long-term debt cycle remains intact, is that the US debt-to-GDP ratio could skyrocket even higher, surpassing the peak levels of the 1940s.

This debt rise to towering new heights will happen due to the multi-trillion bailouts and multi-trillion rounds of new entitlement spending as described, not to mention the way panicked central bankers will react when the next global recession hits (think quantitative easing round four, also known as “QE4” and so on). As icing on the cake there are additional sources of financial crisis risk, large and menacing in their own right, that we don’t have the space to get into here.

All of this, in turn, should ultimately cause gold to do what gold has always done in periods of rolling crisis. That is to say, gold will rise sharply in nominal price terms — hence our expectation of a quadrupling if not better — in order to continue serving as a long-term store of value with a multi-millennia track record, against a backdrop of faith in financial systems lost and printing presses running wild.

As you can imagine, the shape of events to come gives us confidence in our gold forecast. We are not trying to achieve impossible feats of timing — you can’t pin down exact dates for this type of thing — but we can look at the grand sweep of history, game out the factors already baked into the cake, and come to logical conclusions in regard to how things will go.

The twist is that a 21st century store of value — Bitcoin as digital gold — will far outshine the original gold this time, by way of a historic asset class journey never to be repeated.

A NEW CRISIS OF EPIC PROPORTIONS

There is a new crisis coming of epic proportions. Not the traditional kind of crisis, like a stock market crash or brief financial meltdown or run-of-the mill economic downturn, but a far more serious loss of faith in central banks and government institutions, coupled with a widespread loss of faith — not by all, but by many — in the prosperity generating capabilities of capitalism itself.

As we've explained, this is not a call relating to tomorrow, next week, or next month. It is an emergent reality for the next decade, stretching throughout the 2020s and beyond. Realities of the boomer retirement wave and multi-trillion pension fund bust, both decades in the making, will fuel this, along with tidal forces that run much deeper and historical cycle factors that are global.

This decade-spanning crisis will be coupled with massive tax-and-spend programs running into the trillions, with tax rates hiked sharply on the wealthy and corporations — but not by large enough amounts to cover the bills (though certainly enough to spur capital flight).

Meanwhile, the US Federal Reserve will be stoking a total loss of faith in the currency — not immediately, but soon enough — by printing mass amounts of dollars, as a function of last-ditch efforts to support the bond market and stimulate an economy reeling from anti-free-market policies. This isn't speculation as to something that will “maybe” happen, it is something that is very likely, almost dead certain to happen, based on an understanding of history and basic realities of financial physics.

At the same time, the crisis won't just be American — it will be global.

When the seams come apart for the US dollar, the world's reserve currency, there won't be any attractive fiat currency alternatives, as all other governments will be caught in a similar boat (or an even worse boat).

Economic hardship will further lead to crackdowns and wealth confiscation efforts worldwide. The 2020s on the whole could be one of the most frightening times to be wealthy, or to otherwise be sitting on a large pool of assets at risk of being inflation-depleted or confiscated, since the dark days of World War II.

The asset that benefits most from these events could be Bitcoin. Not because Bitcoin is magical or anointed somehow, but because Bitcoin is, as Victor Hugo once put it, “an idea whose time has come.”

Bitcoin was conceived by “Satoshi Nakamoto” (his or her true identity still unknown) in the aftermath of the 2008 global financial crisis, as a sort of libertarian technology solution to the grasping evils of governments run amok. And while Bitcoin was originally imagined as a seamless transaction mechanism, technologies often evolve toward use cases the original designers didn't expect — and Bitcoin's digital gold “store of value” function is arguably far more important, and valuable, than providing just another means of payment.

Bitcoin will go from strength to strength in the coming years not just due to rising acceptance of its role as digital gold — though that is a big part of it — but by benefiting from a steady source of capital inflows from the wealthy and the worried looking to move a portion of their assets out of harm's way.

There are echoes here of prior dark decades throughout the 20th century, such as the periods before and after World War I and World War II, when those with vulnerable capital sought to move what assets they could across borders, away from failing currencies and government confiscators.

Another thing history teaches us is that, in times of severe economic stress, government bonds fail in their safe haven role completely. This happens because of inflation and lost purchasing power. If, say, a ten-year government bond is yielding three percent and real world inflation is at thirteen percent, the bond holder is losing ten percent a year in real terms.

The late, great Barton Biggs, who was Morgan Stanley's first ever global investment strategist, did a study of stock and bond returns in and around the 20th century's two world wars and other general crises. What he found matches what we just described. In times of rolling crisis, particularly when the currency is impacted, bonds wind up being a terrible investment — due to inflation's impact on real returns.

This further increases the likelihood of great stores of wealth seeking shelter from the ravages of fiat currency depreciation, and not finding it in bonds — which will spur them all the more into sovereign store of value alternatives like gold — and Bitcoin.

At less than \$200 billion in market cap, Bitcoin is too small for governments to worry about. When BTC cracks a trillion in market cap, however, anti-Bitcoin sentiment is likely to rise. It will be too late, however, for governments to stop Bitcoin at that point. BTC as a safe haven asset will be too global and too decentralized.

This is another reason why BTC as a safe haven asset will not be supplanted. When it comes to value recognition and worldwide distribution, strength begets strength. Any government's future attempt to ban Bitcoin, a possibility, would thus have a similar impact as trying to ban gold.

If you prefer a second opinion, we again suggest listening to Ray Dalio. When it comes to economic forecasts rooted in logic and history and analysis, Ray Dalio is perhaps the most credible individual who ever lived.

Dalio started Bridgewater, his macro-oriented hedge fund, in 1975. Over the next forty-plus years, he built Bridgewater into the most successful hedge fund of all time by the yardstick of absolute dollar returns for clients. Dalio's personal fortune is now in the vicinity of \$18 billion.

But Dalio's credibility runs deeper than that. Bridgewater is unique in its focus on "timeless and universal" investing principles, which require deep knowledge of economic history to implement.

If you wanted to do a study of inflation's impact on government bonds, for example, Dalio would tell you it's not enough to go back fifty years. You would ideally go back 250 years. And it wouldn't be enough to look at just one country — you would ideally look at hundreds of countries.

Bridgewater's investment style, in other words, depends on deep-dive research into economic factors of every conceivable combination, across dozens if not hundreds of countries, stretching back hundreds of years — with all of that data converted into logical rule sets that determine how economies function, to better understand what is happening in the present (and what could happen in the future).

This is why Dalio is so credible. Nobody else's economic views are backed by a \$150 billion hedge fund, an \$18 billion fortune, and 45 years of experience.

And Dalio, like us, sees a potential crisis coming — maybe even a "revolution" (his word) if skillful and thoughtful solutions are not implemented quickly. (Spoiler alert: They won't be.)

In April of 2019, Dalio posted a lengthy two-part think piece titled "How and Why Capitalism Needs to be Reformed." To give you the Cliff's Notes, Dalio is deeply worried about rampant inequality trends in the United States, and sees them leading to potential crisis.

“I believe that all good things taken to an extreme can be self-destructive and that everything must evolve or die,” Dalio writes. “This is now true for capitalism,” he adds, noting that “capitalism is not working for the majority of Americans.”

Here are some of Dalio’s key points in bullet form, all relating to the US economy:

- America’s wealth gap is the highest since the late 1930s.
- The wealth of the top 1% is more than the bottom 90% combined.
- The top 40% have more than 10X the wealth of the bottom 60%.
- Most Americans in the bottom 60% are poor.
- US economic mobility (ability to climb the ladder) has stalled out.

“In addition to social and economic bad consequences,” Dalio writes, “the income / wealth / opportunity gap is leading to dangerous social and political divisions that threaten our cohesive fabric and capitalism itself.”

Dalio concludes that, if the system is not skillfully re-engineered, “we will have great conflict and some form of revolution that will hurt most everyone and will shrink the pie.” Revolutions are generally not good for the wealthy, or even the mostly well-off. You wouldn’t have liked being a part of the French aristocracy in 1789.

Dalio believes the economic gap between the top 40% and the bottom 60% of Americans is serious enough to be existential, meaning that America’s future well-being is in doubt if solutions cannot be found.

To that 40-60 split we would add the looming retirement crisis, in which half of all baby boomers, if not more, will be retiring with little to no savings — or deeply inadequate savings at best — even as a multi-trillion pension crisis looms. All of this is baked into the cake, independent of future financial crises, recession impacts or geopolitical conflicts.

On top of that, generational class warfare is now taking hold. The Millennial generation is larger than the Boomer generation, they are in terrible shape, and they are angry. As the Wall Street Journal reports:

“American millennials are approaching middle age in worse financial shape than every living generation ahead of them, lagging behind baby boomers and Generation X despite a decade of economic growth and falling unemployment.

Hobbled by the financial crisis and recession that struck as they began their working life, Americans born between 1981 and 1996 have failed to match every other generation of young adults born since the Great Depression. They have less wealth, less property, lower marriage rates and fewer children, according to new data that compare generations at similar ages...”

Millennial anger is not just sour grapes. Tuition costs have skyrocketed in the past two decades, to levels that Baby Boomer and Gen X students would never recognize, and to the point of fueling a budding multi-trillion student loan crisis.

The rapid rise of US home values — largely via cheap mortgages and artificially low interest rates — has also worked in favor of Boomers, who tend to be home owners and thus house rich, but against Millennials, who mostly cannot afford to buy at today’s inflated values, and thus tend to be renters and house-poor.

When the system “stops working” for a majority of voters, the majority eventually gets angry and agitates for change. If that change is a long time coming, the resulting backlash can be explosive.

In the 2020s we are headed for an economic scenario in which the system no longer “works” for a majority of Millennials and at least half of Baby Boomers (the half that is retiring with little-to-no savings). Together they will form a “coalition of the disenfranchised” that will demand radical change.

To properly frame where all this is going — and the tidal forces that will shape the 2020s — consider the following quote from 18th century Scottish historian Alexander Fraser Tytler:

“A democracy cannot exist as a permanent form of government. It can only exist until the voters discover that they can vote themselves largesse from the public treasury. From that moment on, the majority always votes for the candidates promising the most benefits from the public treasury with the result that a democracy always collapses over loose fiscal policy, always followed by a dictatorship.

The average age of the world’s greatest civilizations has been 200 years. These nations have progressed through this sequence: From bondage to spiritual faith; From spiritual faith to great courage; From courage to liberty; From liberty to abundance; From abundance to selfishness; From selfishness to apathy; From apathy to dependence; From dependence back into bondage.”

So what kind of backlash can we expect in the 2020s — recalling, once again, the major beneficiary of all this will be Bitcoin? We can divide the scenario possibilities into three categories: Wealth confiscation, runaway spending, and economic crisis response.

- **Wealth confiscation:** The possibility of a return to punitive tax rates on individuals and corporations the likes of which the United States has never seen, coupled with new forms of wealth confiscation the United States has never seen, to fund multi-trillion new social programs and attempt to close terrifying fiscal gaps.
- **Runaway spending:** The initiation of multi-trillion spending initiatives here, there and everywhere. Infrastructure public works programs; free college education and student loan forgiveness programs; climate change and green energy programs; a complete reworking of the US healthcare system, and so on.

- Economic crisis response: Bailouts for the coming multi-trillion pension fund crisis; bailout supplements for tens of millions of retirees with no savings; bailouts for heavily indebted corporations in the next financial downturn; and most of all, debt monetization of the bond market (in which government bond prices are supported via printing press).

There is ample foreshadowing for everything just listed. All you have to do is pick up a newspaper.

Many wealth confiscation ideas and runaway spending initiatives have already been proposed as platform planks for 2020 presidential campaigns. And some of the spending initiatives are arguably quite logical and reasonable — the question is simply where the money will come from to pay for them.

The answer, at the end of the day, is that the new trillions that are necessary will come from nowhere — meaning the government will simply issue new debt to pay for whatever is necessary.

And if the size of the government bond market grows so large that investors lose their appetite for buying US treasuries, this will not stop the train from rolling. The Federal Reserve can support the bond market indefinitely by purchasing bonds and adding them to its balance sheet. There is no limit to how big the Fed's balance sheet can get — it could hypothetically go to \$10 trillion, or \$20 trillion, or become larger than the US economy.

The trouble is that, when the Fed buys government debt, it does so by issuing US dollars. That is why the phrase is known as “debt monetization” — a country that borrows in its own currency never has to default on its debt. It can simply buy its own bonds with more printed currency.

But if you do enough of this, you wind up flooding the markets with so much printed currency that supply overwhelms demand. This

causes investors to lose faith in the currency, which is exactly how a currency crisis starts.

That is why some of the economic myths being propagated now are so dangerous.

One myth is that, because taxation rates were far higher in the 1940s through the 1960s, they can easily go much higher today without doing economic harm. Another myth is that Modern Monetary Theory, or MMT, allows for unlimited government spending.

The reality is that, even though the top marginal tax rate went as high as 91% some sixty to seventy years ago, that rate only applied to a small percentage of income for a miniscule percentage of payers, and available deductions were so generous that nobody paid so much in practice.

An actual confiscatory tax rate — one with teeth, that applied to a large and broad pool of wealth — would be likely to spur expatriation, offshoring and capital flight, the same thing being true on the corporate side. If such policies were implemented with the US economy in bad shape, the pain would likely become even worse.

As for Modern Monetary Theory, also known as “the Magic Money Tree,” it seems that MMT for the left plays a similar functional role as supply-side economics for the right: It is a way to justify spending whatever one likes, because a group of biased economists says it will all be okay.

MMT theorists are correct that a government that borrows in its own currency cannot technically default on its own debt. But they overlook the fact that runaway inflation is an unofficial kind of default. The MMT theorists admit that, if inflation gets out of hand, the government would need to raise taxes to discourage overzealous activity.

But that admission kills the whole point of MMT in the first place. If you have to slam on the brakes to stop inflation, and too much debt eventually leads to inflation (via loss of faith in the currency), then MMT was never a license to spend in the first place.

To sum up, the worst case for the US economy — in terms of future policy — would be a government that believes in confiscatory tax rates and MMT simultaneously, hobbling economic growth on the one hand while adding trillions to debt on the other. Frighteningly, this is not a far-fetched scenario: We are reaching a point where situational circumstances and voter anger may almost demand it.

But here is the thing about a US dollar crisis, which is likely to come about in the 2020s as a result of the forces just described: If the dollar is headed for a lousy decade, so is every other major fiat currency. For all of America's problems, there is no other issuer of major fiat currency in better long-term shape than the United States.

In big picture terms, the debt loads and vulnerabilities and economic prospects for China, Japan and Europe all look worse, and slow-rolling crisis in the USA would almost certainly pull the global economy into its vortex (assuming crisis does not break out in some of those other places first).

This is where we circle back around to the classic role of gold, and now Bitcoin as digital gold. In the dark historical periods when economic stress is global, the threat of wealth confiscation is elevated, and fiat currency depreciation erodes the safety of bonds, that is when safe haven alternatives can really shine. As governments and central bankers panic in unison and actively making things worse, the peace-of-mind factor in owning assets not subject to printing press or political whim becomes a must-have item for the wealthy and the worried.

When people want to hold fewer dollars, and fewer government

bonds denominated in dollars, they will look around for other assets. But other currencies will look just as bad — the euro and yuan and yen will be in the same boat — and the assets denominated in those currencies may not appeal either. This will greatly increase the attractiveness of gold, and the digital gold that is Bitcoin.

In all of this we would prefer to be wrong. But the logic of history, the weight of economic gravity, and the realities of human nature all say we are not. Fifty years ago the United States experienced what felt like cataclysmic change, and a kind of revolution, at the tail end of the 1960s.

Half a century on, at the tail end of a nearly forty-year debt and credit expansion, history appears ready to rhyme. But to quote Victor Hugo in full this time:

“No army can stop an idea whose time has come. Nothing is as powerful as an idea whose time has come. There is one thing stronger than all the armies in the world, and that is an idea whose time has come.”

Again, today that idea is Bitcoin.

HOW THE US DOLLAR COULD GET DETHRONED

The US dollar has been the world's reserve currency for more than seventy years. There has been a lot of grumbling during that time, and the US national debt has skyrocketed. This has led many to wonder:

- How long can the dollar's reign last?
- What happens if the US dollar is dethroned?
- What will be the next world reserve currency?

The third question — “What will be the next world reserve currency?” — may in fact have no answer, because “world reserve currency” as a concept is likely to go away.

In other words, the US dollar doesn't need a knock-out contender to lose its world reserve currency status. It may be that nothing at all replaces it. The world could move on to a suite of technology-driven alternatives instead, with cryptocurrency playing a key role in the transition. In fact, that is exactly what we see happening.

To understand how technology will play a role in dethroning the dollar — with the role of “world reserve currency” going away — it helps to consider the trajectory of the US Postal Service (USPS).

The USPS was born in 1775, by direction of the Second Continental Congress. Founding father Benjamin Franklin was the first ever postmaster general.

For well over two centuries — from 1775 to 2000 — the USPS played a vital role in American life. But at the end of the 1990s, just in time to usher in the new millennium, email was unleashed on a mass scale. Shortly after that, e-commerce began to take hold.

Now, in 2019-2020, it is possible to pay bills digitally across the board, most forms of print are switching to digital, and companies like Amazon are building their own delivery fleets. The USPS still exists, but it is no longer a vital service. With the rise of 3D printing and the increased use of private shipping services — including drone delivery — the role of the USPS will continue to shrink. Just as it's easy to go without a landline phone these days, it is increasingly feasible to have no USPS interaction at all.

The US Postal Service still exists, of course, and it still handles a respectable amount of volume. But the role of the USPS in American life is diminished and will continue to decline. Yet no specific thing has replaced it: There is no “next” for the USPS or “USPS 2.0.” Instead, technology-driven private solutions have taken business from the USPS in hundreds of different ways. That business is not coming back.

The same thing is set to happen, on a global scale, in respect to the US dollar's role as the world reserve currency. In the future now unfolding, there won't be a practical need for a “world reserve currency” anymore.

To understand why the dollar will be dethroned, we'll start by examining the concept of a world reserve currency. Then we'll look at the four sources of strength that make a world reserve currency attractive. After that, we'll consider the specific series of 20th century events that put the US dollar on the throne in the first place, allowing it to reign for more than seventy years.

And then we'll look to the future, and see how technology will make the US dollar like the US Postal Service — still a force in the decades to come, but a fading and declining one.

World reserve currencies have been around for a very long time. Some would argue the first ever world reserve currency was the

Roman Denarii, which saw widespread use throughout the Roman empire. For reasons that will become obvious, world reserve currencies are born of factors like commerce and military might.

Prior to the United States, multiple European countries enjoyed world reserve currency status over the past six centuries. Starting in the 1400s, the baton of world reserve currency status was handed off via naval power and riches born of plundering new lands. Portugal had it first, as one of the first nation states to crack seaborne navigation. Then Portugal was eclipsed by the plundering prowess of Spain, and Spain in turn by the Netherlands.

By the 1700s, the strongest economic power in Europe, and the holder of world reserve currency status, was France. But then France saw its finances go bust via the Napoleonic wars, and Britain took the crown via the rise of the British empire and the industrial revolution.

Coming into the 20th century, British sterling was the world's reserve currency. But Britain, like France in its earlier series of wars, wound up expending huge sums fighting World War I, and was completely insolvent — and dependent on its reluctant ally, the United States — by the end of World War II. This set the stage for the United States to dominate.

The attractiveness of a world reserve currency can be broken down into four categories. Those categories are Economics, Geopolitics, Logistics, and Liquidity. From Roman times up to the present day, every world reserve currency in its heyday has been strong in these four areas. Let's briefly look at each:

- **Economics.** A world reserve currency is typically attached to a dominant economy, preferably one with global reach. The stronger the economy, the more buying power the currency will have.
- **Geopolitics.** A world reserve currency is typically associated with a

strong military. A nation with a dominant military presence is less likely to be attacked, and has the ability to project both soft and hard power. (The strong economy helps here, because military power is expensive.)

- **Logistics.** A world reserve currency needs to be popular among merchants and financiers, easily obtainable and readily available for conducting international trade. Sellers will be happy to be paid in such a currency, and lender financing should be easy to obtain in that same currency.
- **Liquidity.** A large amount of world reserve currency has to be available to the international community of users at all times. If there is not enough of the currency in circulation, it will be hard to get financing and conduct routine business in that currency, lessening its appeal.

Britain became a true global power via the technologies of the industrial revolution, which in turn helped expand the British Empire. At its height the British Empire was the most powerful and far-flung empire in history, upon which “the sun never set,” holding dominion over 412 million people by the year 1913.

Against this backdrop it made sense that British sterling, also known as pound sterling or just “the pound,” was the world’s reserve currency. But empires are expensive to police and maintain, and wars are more expensive still. As a result, Britain was financially hobbled after the carnage of World War I.

The British economy was weak and stagnant in the 1920s, even as the US economy boomed, due to the harsh aftermath of its heavy World War I expenditures in blood and treasure. And then in the 1930s, as world trade collapsed and protectionism took hold, Britain was forced to abandon the gold standard to stave off economic collapse.

World War II was another hugely expensive fight for Britain and all of

Europe. By 1940 Britain was deeply in debt, even as the United States had accumulated the vast majority of all the gold reserves in the world.

Under these circumstances, it was natural that world reserve currency status would transfer from British sterling to the US dollar. Remember the four factors that power a world reserve currency: Economics, Geopolitics, Logistics and Liquidity. Post World War II, the US was the strongest and wealthiest country in the world, and also the one with the greatest military might.

America's strength was also bolstered by vast natural resources, a fast-growing population, booming manufacturing and financial centers, and naval control of two separate oceans — the Pacific and the Atlantic — with easily defensible borders to the north and south.

Nor did the official reserve status of the US dollar happen by accident. It was a prize eagerly and deliberately sought by policy makers in the US Treasury department.

Towards the tail end of World War II, the United States saw a roster of opportunities and threats. America's post-war strategic goals were four-fold:

- First, America wanted to stop war-torn countries from devaluing their currencies (a constant occurrence in the 1930s) in a way that harmed United States exporters and reduced trade.
- Second, the US wanted to ensure American businesses had open access to international markets, as the United States had a strong export surplus and wanted to maintain free trade ground rules with other nations.
- Third, the US wanted to help rebuild European and Asian countries — allies and enemies alike — so that they would become healthy future customers and stick with capitalism, rather than transition to fascism or communism.

- Fourth, the US wanted to establish an international system of rules and agreements that would prevent the odds of a third world war and help ensure future peace. (It was this objective that ultimately led to organizations like the IMF, the WTO and the World Bank.)

With these goals in mind, US officials coordinated with Britain to set up the Bretton Woods system in the early 1940s, and later on the Marshall Plan and GATT, the General Agreement on Tariffs and Trade.

With the Bretton Woods negotiations, the United States and Britain had two completely different aims.

The United States wanted to cement the dollar's status as the world's new reserve currency, while getting international buy-in from allies on the new plans and not causing too much fuss. Britain, on the other hand, wanted to preserve the fading British empire as best it could, and rein in America's power if it could.

Britain had John Maynard Keynes, one of the most brilliant economists who ever lived, as their Bretton Woods negotiator. But Britain was so deeply in debt to the United States, and the US was so powerful at that point, that Keynes held a metaphorical pair of deuces, while his American negotiating counterpart, Harry Dexter White, had a pair of kings.

The United States wound up getting virtually everything it wanted out of the Bretton Woods negotiations, officially cementing the dollar's role as the world's new reserve currency within a fixed currency system.

To achieve his aims, the American architect of Bretton Woods, Harry Dexter White, managed to pull off a kind of grand switcheroo. The Bretton Woods agreement portrayed US dollars and gold as being interchangeable, which was a deliberate sleight of hand on White's part.

Because US dollars were backed by gold at the time of the Bretton Woods negotiations, every US dollar was supposedly “as good as gold.” Harry Dexter White wanted the world to assume that a dollar and its equivalent gold backing were the same.

Except the Bretton Woods arrangement failed less than 30 years later, in 1971, when President Nixon abandoned the gold standard and introduced the world to the free-floating currency era. Nixon ended the gold guarantee because honoring it one-for-one had become impossible; through the extension of credit and fractional reserve banking, too many dollars had proliferated throughout the global system.

By that point though, after decades of functioning as the world’s reserve currency, the dollar was “locked in” and maintained its dominant status. Even today, in 2019, more than 60 percent of foreign exchange reserves are still held in US dollars. This is because, even without gold’s backing, the dollar’s ongoing dominance came from the four key factors as explained.

- On the economics front, the US has long been the dominant economy, for decades representing 25% of world GDP (though that percentage is declining now as the rest of the world grows).
- On the geopolitical front, the US has long been the world’s superpower, spending more on its military than the next seven countries combined.
- On the logistics front, US institutions, US investors and US corporations have long greased the wheels of world trade with trillions’ worth of US dollar financing.
- And on the liquidity front, American consumers and politicians have been happy to send large quantities of dollars abroad through deficit spending (which creates more dollars in the system).

But no dominant edge lasts forever, as the US Postal Service has shown. The ability to issue debt denominated in the world's reserve currency, and to print large quantities of that currency at will, is seen as an “exorbitant privilege” — a tax imposed by the USA on international users of the dollar-based system.

Many will be happy to see America's “exorbitant privilege” diminish, or even disappear entirely. There are even patriotic Americans who would prefer the US lose its world reserve currency status, which would force America to embrace more fiscal discipline. Like birthday cake for breakfast every day, excess privilege can be too much of a good thing.

And yet, rather than the dollar's dethroning leading to another king — with, say, China or Europe taking on world reserve currency status for the yuan or euro — we are more likely to see a technology shift that makes the whole paradigm obsolete.

There was an early foreshadowing of this at the original Bretton Woods conference, in a creative proposal from the British economist John Maynard Keynes.

As a patriotic Englishman, it was Keynes' goal in the Bretton Woods negotiations to preserve Britain's great power status to as great a degree as possible. At the same time, Keynes knew his country's world reserve status was done for. Britain had far too much war debt, and far too little gold. So Keynes focused instead on keeping America reined in, rather than letting too much power accumulate in any one country's hands.

What Keynes proposed was something called the “bancor,” meant to be a kind of international accounting unit composed of a basket of fiat currencies. By Keynes' design the bancor was not a currency itself exactly, but rather a unit of account that tracked an underlying basket of assets.

It was Keynes' hope that the bancor could sit at the heart of a new international clearing system, and thus function as a kind of world reserve currency substitute that did not give America, or anybody else, an excess ability to dominate the system.

Keynes proposal was shot down, of course, because America was dominant at the time, and America's lead Bretton Woods architect, Harry Dexter White, was hell bent on ensuring the dollar would reign as the centerpiece of the new international system.

So here is the fascinating thing about the bancor concept. Keynes' old idea, first conceived nearly eighty years ago, has been made new again with the "Libra" concept, a kind of global stablecoin, proposed by Facebook and the other founding members of the Switzerland-based Libra Association.

Like the original bancor, the Libra would be composed of a basket of fiat currencies, and possibly other assets, that could be held in fixed ratios and swapped out over time.

Also comparable to the original bancor, Libra would be controlled by a consortium of entities, with equally distributed power and no single entity holding sway over the group. This mirrors what Keynes imagined for the bancor, in respect to no country being able to claim dominant status in the new system.

And furthermore like the original bancor, Libra would require a new kind of clearing system to function.

But rather than government organizations and international bank participation, which is what Keynes had in mind for the bancor, Libra's new architecture is meant to be cloud servers and private nodes (ultimately decentralized) and blockchain payment roles and cryptographic transmission.

What's old is new again. Cryptocurrency technology now offers

the potential for a global transaction medium — if not Libra then something comparable — which is not beholden to any single nation or government, just as Keynes’ proposed for the bancor at Bretton Woods.

A global stablecoin like Libra could function as a world reserve currency in many ways, but it would also be very different. The four factors that drive world reserve currency dominance — economics, geopolitics, logistics and liquidity — would be recognizable but strangely altered.

The economic aspects of a global stablecoin, for example, could come from the sheer number of users. If, say, trillions of dollars worth of remittances and transactions take place via Libra or something like it, across a user base of hundreds of millions, that would replace the GDP component of a strong and diverse nation state.

The geopolitical aspects, meanwhile, would still be present yet also disappear. A cryptocurrency that could be used across borders, through encrypted applications that governments cannot block, would transcend the normal calculus of nation state power and military strength. Such a currency would be non-geopolitical, in that geopolitics were transcended, but also highly attractive from a geopolitical standpoint for that exact same reason.

The logistics of a global stablecoin — a kind of cryptocurrency bancor unadministered by any government — would also be easily superior, with 21st century technology enabling instantaneous payments and frictionless transactions.

Widespread use would naturally attract trade financiers and algorithmic institutions, and allow individuals to participate in trade finance on a micro-scale through “staking” and other new developments. It would also be easier to invest internationally, with

far less concern for foreign exchange fluctuation. (Instead of Libras priced in your home currency, for instance, your home currency might be priced in Libras.)

Then too, the logistics of cryptocurrency and blockchain technology mean “stores of value” of all kinds could become more liquid and accessible. This in turn would remove the need for a single dominant transaction medium or a single store-of-value mechanism for one’s savings. A suite of alternatives could be used, with software making it dead simple to adjust the mix via algorithms.

For hypothetical example, a future investor could have a portion of their long-term investment portfolio in tokens that represent a slice of green energy solar and wind projects; another tranche of tokens representing ownership of timberland and salmon fisheries; and another tranche of investment in bitcoin. This same investor could have algo settings that rebalance the portfolio monthly, weekly or even daily, at almost nil transaction cost, based on a custom set of inputs and objectives.

This same investor could have a suite of bancor-like transaction cryptos to choose from, all of them deeply liquid and instantly available. The ease of use in frictionless transactions, with near-instant settlement, would remove the need to hold large quantities of dollars (or euros, or yen, or any other fiat currency) on a general basis.

Of course, this kind of world would not mean full-on death for the US dollar. After all, the US government will still demand that US tax obligations be paid in dollars, and the US Postal Service will likely still be functional in the year 2050.

But it is not hard to see how the “world reserve currency” as a concept will fade away, becoming an irrelevant concept, in an age of cryptocurrencies where transactions are frictionless, asset baskets

are easy to create and adjust, and virtually any investment can be tokenized and accessed on a blockchain. (This also means the democratization of finance, allowing individual investors to act as micro-financiers.)

Again, whether it turns out to be Libra or something else that unleashes a bancor-style global stablecoin revolution, the wheels of change are now turning at a dizzying speed.

Technology is making great strides in setting money free, and in so doing could change the nature of money in profound ways — ultimately making the concept of a “world reserve currency” obsolete, even as the United States loses a portion of its 20th century dominance in a rapidly changing world.

To conclude: As the dollar slowly gets dethroned, and goes the way of the US Postal Service in its stately long-run decline, we see no world reserve currency replacement waiting in the wings. When the monetary monarchy fades, a new kind of monetary democracy, powered by crypto, may instead take its place.

BITCOIN AND HYPERINFLATION

What would it be like for a major currency to experience hyperinflation in the twenty-first century?

What if it wasn't a developing or frontier country like Venezuela, Zimbabwe or Argentina, in other words, but rather a rich industrial nation losing total control of its currency?

Rich world hyperinflation isn't the type of event you bet on as a likely event. But it's certainly a possible event — just as another World War is all too possible, or a shooting war between two major powers (like China and the United States).

If a rich-world hyperinflation event happened today, Bitcoin would change the game. We know this because, in its role as digital gold, Bitcoin is divisible, portable and accessible in a way that gold never was. That would make Bitcoin a go-to safe haven not just for the wealthy upper class of a convulsing country, but the broader cross-section of citizens at large.

We know that Bitcoin ATMs are spreading like wildfire across countries and continents. We know the total number of crypto wallets, now in the tens of millions, is climbing at an accelerated rate. And we know that virtually anyone with access to an internet connection can move a portion of their savings, if not the bulk of those savings, into Bitcoin without too much trouble, an option which would come in handy in the midst of a runaway inflationary event. (Citizens of Venezuela, Argentina and Iran already know this.)

Bitcoin is also a direct beneficiary of capital flight, the phenomenon where wealth flees by any available exit to escape closed regimes. This is not because Bitcoin as an asset feasts on conditions of oppression or misery or fear, but rather because Bitcoin is a potential antidote to those conditions.

When the authorities want your savings to be trapped or ring-fenced — and this is the intent of capital controls, like the kind recently imposed in Argentina — Bitcoin is a pathway to freedom.

These qualities would matter tenfold more, or even a hundredfold more, to citizens of a rich world country experiencing hyperinflation. This makes sense in that Bitcoin, like gold, is not just a sovereign store of value but a form of crisis insurance.

There is also a direct relationship between the wealth levels of a country and the sheer pressure and volume of capital flight in times of turmoil. This makes sense in that the greater the volume of wealth owned by the citizenry, the more it will jam and burst the pipes trying to find its way out.

We have seen how capital flight pressures in countries like China have helped Bitcoin, and how inflationary breakouts in countries like Argentina and Iran have helped Bitcoin. But these episodes would be nothing compared to, say, a country as rich as Japan losing total monetary control.

As of year-end 2017, Japan's private sector financial assets were estimated at \$26.4 trillion, according to Bank of Japan data. The portion of those assets that is liquid — immediately convertible into currency — is no doubt in the high trillions too. A tsunami of capital that large, surging into whatever safe havens it could find in flight from a hyperinflation event, could arguably double or triple the gold price by itself, while sending Bitcoin up more than twentyfold.

Is a Japan hyperinflation scenario plausible? Is it something that could really happen? The answer there is yes, for reasons we will explore later. Hyperinflation is something that could happen, under a particular set of circumstances, to any G7 country (though again the probability is low, and higher for Japan than some of the others).

To better understand hyperinflation, and the reasons it could happen

again to a 21st century rich-world country, we will first take a look at hyperinflation in the abstract. Then we'll consider one of the most famous cases of rich-world hyperinflation: Weimar Germany in the 1920s. After that, we'll come back around to Japan, and the slippery slope all rich-world countries will face in the coming decade.

What is hyperinflation exactly? The dictionary defines it as “monetary inflation occurring at a very high rate,” which is accurate but not very satisfying. True hyperinflation is a kind of Chernobyl meltdown of monetary policy, in which the annual rate of price appreciation spirals into millions or billions of percent.

Hyperinflation could also be called an extreme form of “bad inflation,” with bad inflation a result of currency oversupply, or a loss of faith in a monetary system, or both at the same time.

Bad inflation is a specific variety because not all inflation is bad, and there are different factors that can cause an inflationary rise in prices.

If a new health trend leads to a surge in demand for almond milk, for example, and almond farmers don't have enough supply, a rise in the price of almonds is not bad inflation, but a natural adjustment to supply and demand. The same would be true of a sleepy region in Texas or South Dakota that experiences a shale boom. If the cost of housing and food and service wages rises sharply because workers are pouring into the area, that is once again a supply-demand adjustment, and not necessarily bad inflation.

Bad inflation occurs when too much currency is pushed into circulation, which can happen through “easy money” central bank policies and runaway credit booms. As a flood of credit-driven monetary liquidity sloshes around, a rising tide lifts all boats — or rather, the boats in position to benefit from the flood. This can lead to distorted price signals, bad investment choices, and people doing crazy things.

Bad inflation also occurs when citizens lose faith in a monetary system. If citizens think the currency is bad, or debt levels are too high, or the government is out of control, they will vote with their wallets by choosing not to hold the currency. This loss of faith then becomes self-reinforcing, as the weakness of the currency causes faith to erode further, and a lack of faith fuels more capital flight.

In a genuine episode of hyperinflation, all faith in the system is lost. True hyperinflation requires more than just anger or disappointment or a sense of civil unrest. For a currency to spiral out of control, there has to be a sense the entire system is breaking down and falling apart. This is why hyperinflation episodes are typically associated with overthrown governments and failed states. If things have grown that bad, whatever order that once existed has likely descended into chaos.

Is it possible for a rich-world government to accidentally create hyperinflation? The answer there is yes, although it takes a lot more than just a handful of mistakes.

One of the most high profile cases of rich-world hyperinflation was that of Weimar Germany in the 1920s. Some people argue that, after losing World War I, the German government deliberately subjected itself to hyperinflation in order to inflate away the cost of its war debts.

While the debts were crippling, this is not accurate. Germany deliberately endured inflation to make ends meet, but the hyperinflation episode was purely a mistake — a compounding error so painful it all but tore the country apart, to the point where Germany as a nation state almost ceased to exist.

One of the fastest routes to hyperinflation, or to extreme inflation prior to that, is taking on crushing amounts of government debt. And one of the fastest ways to pile up government debt is by engaging in a multi-front, multi-year war.

This is exactly what happened to Europe in World War I, one of the bloodiest and costliest events in all of human history. The mistakes of World War I, and the financial handling of its aftermath, were instrumental in seeding World War II twenty years later.

Prior to the outbreak of War in August 1914, hardly anyone believed war was even possible. The argument at the time, still fashionable more than a century later, was that the commercial ties of international trade were too strong to allow for war.

In 1910 a book called “The Great Illusion” was published, and by 1913 it had sold over a million copies in twenty-two languages. The book was about the utter futility of war, and the “illusion” of the title made reference to the spoils of war. The very notion of war was so commercially insane, the book argued, that no sane country would engage in it, or at least not for very long.

This idea was widespread and backed by large volumes of lending and international trade. London was an international financial center, and British insurance houses wrote policies against German warships. Against this backdrop, most everyone agreed war could not happen.

Four years later, in August of 1914, World War I broke out anyway, through a series of bizarre events nobody had expected. So much for war being impossible.

After World War I began, the general consensus was that it would be short. All countries involved thought the fighting would last months at most, if not just a few short weeks. But the optimists were wrong again; the war dragged on for more than four years. By the end, there were an estimated 11 million dead and 21 million wounded. Germany took the greatest number of casualties at 2 million lost.

World War I also destroyed Europe financially. Over the course of four years, the warring governments of Europe had spent an

estimated \$200 billion, which represented about fifty percent of gross domestic product (GDP). It was like taking half the continent's wealth and turning it into cannon smoke.

After the war ended, the debts remained. Europe's warring countries had financed World War I by taxing their citizens heavily, borrowing heavily at home and abroad, and printing currency to fill in the gaps. The aftermath of World War I brought serious inflation all across Europe, with Britain's money supply increasing by 100%, France's by 200%, and Germany's by 300% (though only Germany tipped into full hyperinflation later on).

The only participant to do well out of World War I was the United States, mainly because it entered the war late, avoided serious casualties, and grew its economy by exporting huge amounts to Europe. America's GDP had grown 50% by 1919, whereas the German and French economies had contracted by 30 percent due to losses of men, capital and livestock.

Germany had the worst of it because Germany lost. The allied powers wanted Germany to pay dearly for the physical and financial carnage of World War I. The subject of "reparations" — how much Germany should pay — was a painful and controversial subject that dragged on for years. Balanced against the notion that Germany should pay as much as possible was the grudging realization that, if forced into debt bondage, the German economy would not be able to function and nothing would be paid at all.

The Germans felt the reparation amounts were painfully unfair — and some on the allied side agreed with them. There were literally dozens of European conferences between 1919 and 1922, all of them devoted to reparations talks. Through it all, France and Germany argued painfully and the Germans dragged their feet on payments.

Long before its episode of hyperinflation, Germany had subjected

its currency to plain old bad inflation. This was largely due to war financing needs, and the habit of printing currency to fill in budget gaps.

In 1914, the year the war began, a German mark was worth just under 24 cents, trading at a rate of 4.2 to the dollar. Six years later the mark was worth just 1.5 cents, trading at 65 to the dollar, with German prices 800% higher than their pre-war levels. Still, this didn't count as hyperinflation. It was only a first taste.

By 1921, economic conditions were so dire that Germany was in danger of becoming a failed state. France continued to demand heavy reparations payments, political assassinations were routinely being carried out by right-wing death squads, and the German public had started to abandon the currency. In June of 1922, one of Germany's most respected politicians was gunned down in his car. The German mark fell from 190 per dollar to 7,600 per dollar. But the worst was yet to come.

In 1923, Germany was late on a reparations payment. After years of foot-dragging, this caused French patience to snap. French and Belgian troops responded by invading and occupying the Ruhr Valley, which was Germany's industrial center.

Stripped of military power, Germany had no way to respond to the Ruhr Valley occupation other than a campaign of passive resistance. The Germans effectively went on strike, which means their heart of industry was shut down. As a result of this passive resistance strike, German output tumbled and the budget deficit exploded. The Reichsbank, Germany's central bank, responded by printing more currency. In 1922 the Reichsbank had printed roughly a trillion marks. In the first half of 1923 it printed 17 trillion marks.

Before the war, a German citizen could ride on a Berlin street car for a single German mark. By 1923 the same street car ride was 15 billion

marks. Currency notes were made available in denominations of 100 billion, and it still took thick bundles of them to buy something. Between August and November of 1923, the exchange rate went from 620,000 marks per dollar to 630 billion.

Historians have wondered why Rudolph Havenstein, the President of the Reichsbank, consented to printing so much currency it utterly destroyed Germany's financial system. Enduring the pain of high inflation was one thing. Triggering hyperinflation that tore the country apart was another thing entirely. Yet Havenstein and the Reichsbank continued to print, even as prices spiraled out of control.

The charitable interpretation is that Havenstein feared a violent uprising. This fear was not idle, as popular German politicians were already being gunned down by radicals in the streets.

At a certain point, Germany had become so indebted that printing massive amounts of currency was the only way to keep interest rates from rising sharply. Had the Reichsbank stopped printing new currency, credit could have dried up completely as a willingness to lend disappeared. This would have caused interest rates to soar, and the entire economy to grind to a halt — a form of debt deflation so brutal that the system could have been torn apart by angry mobs.

As it stood, Germany was almost torn apart anyway, with governments rising and falling at an alarming pace. The currency problem was finally brought under control when Gustav Stresemann, the new chancellor, ordered the creation of a parallel currency in late 1923. For a time the new “rentenmark” circulated in parallel with the old paper mark.

The new currency, theoretically backed by a combination of land and gold, was kept under strict supply controls. Through a combination of international aid and sound management of the currency, a measure of faith in the economic system was restored, and Germany's epic hyperinflation finally subsided.

Though the country was almost torn apart, not everyone did poorly in Germany's hyperinflation period. It was a good time to be an industrialist, for example, with large holdings of plants and equipment secured by paper debts. The hyperinflation inflated away the burden of the paper debts, while the value of the physical plants and equipment remained. Nimble speculators in real estate, art, jewelry and stocks also did well, seizing the chance to buy assets for pennies on the dollar. The sharpest traders made large fortunes.

Those who did worst in the hyperinflation period were honest savers and white collar professionals. Those who held bonds or money market instruments saw the value of their savings turn to dust. Those who had invested in a profession meanwhile — the professional class, like lawyers and doctors — found their earnings power wiped out as hyperinflation made a mockery of their salaries.

The broader lesson from Germany's hyperinflation experience is, first and foremost, "don't march enthusiastically into war unless you are sure you can win." A second lesson might be, "don't take on crippling amounts of debt." And a third, "don't print so much the system loses all control."

Unfortunately, we can't say that modern governments have learned these lessons. Another world war seems almost inconceivable today. But that is little comfort, knowing the exact same sentiment existed in the years prior to World War I.

As for avoiding crippling amounts of debt, we haven't learned that lesson either.

Japan, one of the richest nations on the planet, has an alarming debt to GDP ratio above 230%. The United States, arguably the wealthiest country in the world, has a debt to GDP ratio of 105% — nowhere near Japan's level, but frighteningly high and less than 20% from the all-time US record (about 122% after World War II).

Europe and China, by some credit and debt measures, are in even worse shape than Japan or the USA. And these ugly numbers apply after ten years of global economic growth, at the top of a prosperity cycle rather than the bottom of one.

That is why the last lesson, “don’t print so much the system loses all control,” is one that central banks haven’t really learned. If anything, today’s central bankers have the mindset of Rudolph Havenstein, the banker who presided over German hyperinflation at the Reichsbank.

Havenstein was more worried about a deflationary downward spiral, and the societal monsters that arise from an economic system grinding to a total halt, than he was about the cost of letting inflation run hot. Today’s central bankers are wired the same way, and free-spending politicians — who are the same as ever — could put them in a bind comparable to Havenstein’s (i.e. print or see the system collapse).

If, say, a country like Japan ever experiences hyperinflation, it won’t be due to central bankers losing their minds. It will be the result of a forced choice, picking the least bad situation from a truly awful array of alternatives.

One way to envision a rich-world hyperinflation event happening, for Japan in particular, is to imagine a kind of tipping point where elderly Japanese savers are no longer able to absorb newly issued mountains of Japanese government bonds (JGBs). Investors have been aware of this threat for twenty years or more, but it hasn’t happened yet.

That doesn’t mean it won’t or can’t happen, only that the timetable has been delayed. Demographics are relentless and, as Japan’s population grows steadily older, a critical mass of lifelong savers morphs into spenders, as nest eggs stop being accumulated and JGBs start getting sold rather than bought.

If this switchover leads to a massive loss of confidence in the JGB market, Japan's head central banker could face a choice comparable to Havenstein's: Print fresh currency with which to buy the JGBs, or watch spiking interest rates destroy Japan's economy.

And as we mentioned early on, if Japan or any other rich-world nation experiences a hyperinflationary episode — or even just a strong inflationary run-up, as most European countries faced during World War I — Bitcoin could prove to be a game-changer. It is the nature of such events to spur currency flight, and two of the most compelling sovereign alternatives today are gold and digital gold (i.e. Bitcoin).

WHY TREASURY BONDS AREN'T SAFE

What is the safest place you can think of to store precious valuables? Many would suggest a safety deposit box at the bank. There is usually a double-key entry system and a foot-thick steel door, not to mention the reputation of the bank itself. The “safety” aspect seems ironclad.

And yet, imagine this scenario: You have \$10 million worth of valuables in a safety deposit box, in the form of gold bullion or diamonds or precious heirlooms. One day, you check on the contents of the box — and the valuables are missing. You ask the bank to make it right. They refuse. You spend tens of thousands of dollars in a lawsuit. The judge sides with the bank. Your millions are simply gone.

This is not a hypothetical scenario: It has happened multiple times. American citizens have seen huge losses in their safety deposit box holdings — sometimes hundreds of thousands, sometimes multiple millions. Tens of thousands of safety deposit boxes see their contents “lost” every year. And the bank has limited liability — as spelled out in the fine print of the lease contract — with payout caps as low as \$500.

By some estimates, more than 33,000 safety deposit boxes each year see their contents go missing. Millions in valuables gone? The core of your retirement nest egg vanished in thin air? Too bad. The bank doesn't care. The real slogan for renting a safety deposit box should be “caveat emptor.”

Safety deposit boxes aren't the only thing that appears “safe,” but is actually booby-trapped. This problem looms on a much larger scale, in a way that could impact the retirement of tens of millions of Americans. This time, it has to do with US treasury bonds.

US treasury bonds, like bank safety deposit boxes, appear “safe” but

really aren't. In today's environment, bonds can be a dangerous asset to own in size. The danger is high precisely because the illusion of safety is so prominent. Many investors have a feeling of comfort putting 60% of their retirement account in treasury bonds — or even higher percentages, sometimes 70 or 80%. That safety is an illusion.

We'll get to treasury bonds shortly. But first, let's dig into the wild story around safety deposit boxes.

In 2019 the New York Times ran an eye-opening (and horrifying) story titled "Safe Deposit Boxes Aren't Safe." The story explains how individuals can lose their precious valuables, sometimes millions of dollars worth, without any recourse from the bank.

The problem is that banks hate the safety deposit box business. There are an estimated 25 million safety deposit boxes in the United States, but no protective regulation. And banks are trying to get away from safety deposit boxes entirely — when a new branch opens, there are typically none on the premises.

This is how the valuables get lost. It's not that a bank robber gets in. Most of the time, the bank moves the contents of a box from one location to another when a branch closes down, and the contents of the box are then lost. At other times, the bank can empty a box for lack of payment, but someone makes an error and empties the wrong box by mistake. When this happens, the valuables can disappear.

If the banks can't find your valuables after losing them in this manner, they don't make you whole. They point to the fine print, which limits their liability.

As the NYT explains, Phillip Poniz lost millions of dollars' worth of rare watches because of a bank error (they emptied the wrong box, then lost the contents). His retirement hopes were dashed by this.

Lianna Saribekyan and Agassi Halajyan, a married couple, lost

millions of dollars' worth of jewelry, cash, gemstones and heirlooms in a similar way when a Bank of America bank branch closed down. They sued the bank and won more than \$4 million in compensation and damages — until a judge reversed the verdict and cut the payment to almost nothing relative to what was lost, a little over \$152,000.

The system is designed to protect the banks, not you. If you don't read the fine print, you can lose everything due to a bank mistake. There is a similar dynamic with treasury bonds, which are widely believed to be the ultimate shelter in a storm.

It doesn't help matters that US treasury bonds are richly priced heading into the 2020s. In fact, US treasury bonds are more expensive than they have ever been, ever.

The yield on the thirty-year US treasury bond fell to the lowest in all recorded history in 2019. When bond yields go down, bond prices go up. This is not a correlation but a one-to-one mechanical relationship.

With yields plummeting, bond prices have never been this high. The logical fear is that, if interest rates ever rise sharply again, bond prices could crash. If overseas holders of US treasury bonds (like China) decide to dump their bonds en masse, treasury bond prices could also crash.

But the threat of a “crash” in bond prices is actually a red herring. That isn't where the real danger lies. The danger in holding bonds in large quantities over the next few years does not reside in the possibility of a crash. Instead, it's the threat of hidden losses created by inflation.

The possibility of a bond crash is overrated. Hedge fund managers who have tried shorting government bonds over the years have mostly lost money, and sometimes had their heads handed to them.

Why? Because central banks are happy to “prop up” the bond market with direct purchases.

If the bond market starts to look wobbly, central banks can just buy bonds with newly created currency and take the bonds onto their multi-trillion balance sheets. This isn't hypothetical. Japan has been doing it for decades. There are predictions of a looming collapse in the Japanese Government Bond market that are more than twenty years old. It hasn't happened yet because the Bank of Japan (BOJ) prevents it..

Bonds are still deeply risky though. The real risk is having most of your portfolio earning in the neighborhood of one or two percent — the current yield window for ten-year notes and thirty-year bonds — as creeping inflation eats up the value of your assets.

Many investors don't realize that inflation is a hidden form of tax. Technically speaking, the government doesn't have to collect direct tax revenue to fund itself. It can just print the currency it needs to buy what it wants. When a government (or rather a central bank) goes overboard with currency printing, the result is inflation — which indirectly confiscates value from savers and investors.

To determine the value of a payment stream, you want to know the “real” yield on an asset. The real yield is just the nominal yield (what it says on the label) minus the hidden cost of inflation. For example:

- If the nominal yield on thirty-year bonds is 2%;
- But hidden inflation is running at 12%;
- The “real” yield is minus 10% (2 minus 12).

If central banks start printing up fresh currency like crazy for new stimulus and other emergency measures, the cost of creeping inflation could create “real” yields that are negative. This is easy to do because nominal yields are so low. If the cost of inflation is higher

than the bond yield, your return is negative. You aren't making money in that situation — in reality you are losing it.

This is how the government could actively destroy the retirement accounts of tens of millions of retirees, by way of the illusion of “safe” government bonds. The real value of the account can get eaten up by inflation, like termites eating the foundation of a house.

If you have a real yield that is minus ten percent after inflation, that is like someone taking ten percent out of your banking account every year — except you don't even see it. The dollars, or treasury bonds, that sit in your account at nominal values are still there. But they are worth less with each passing year because of the hidden inflation tax.

So how do you beat a hidden inflation tax? Not with bonds and their miniscule yields. The only way to really do it is by owning assets that rise in value faster than the pace of inflation.

Remember, to get the “real” yield on something, you take the nominal (surface level) yield, or annual amount of price appreciation, and then subtract the cost of inflation. So let's say gold is rising 20% a year in an environment with 10% inflation:

- Nominal price appreciation in gold: 20%
- Hidden inflation cost: 10%
- The “real” yield is plus 10% (20 minus 10)

This leads to the \$64 trillion question: What assets can rise faster than the pace of inflation in a stimulus-driven, debt-laden, central bank money-printing environment?

There is more than one answer. It depends on which scenario we get.

For example, in a “risk-off” scenario where investors grow fearful, some of the best assets to own could be gold, gold stocks, and Bitcoin. These assets could serve as shelters in a monetary policy crisis, a geopolitical crisis, a prolonged trade war, or all of the above.

In a different scenario, however, the most inflation-proof assets could be the top-tier FANG stocks — big winners like Amazon and Google. Why? Because, from a certain perspective, Amazon and Google, and other big tech winners of that nature, can be seen as inflation-proof via their ability to conquer new markets and create new profits. They have the ability, at least in theory, to sustain earnings increases through innovation and technological expansion, even when everything else is going haywire.

This is why, if investors are still committed to equities as inflation ramps up, the FANG stocks could see their heady multiples actually expand dramatically. If investors remain bullish on stocks — a real possibility — then the Amazons and Googles of the world could see their shares in ultra-high demand as innovation-driven growth vehicles in a world of low growth.

Given that possibility, it's notable that Warren Buffett is bullish on Amazon. In a 2019 regulatory filing, Berkshire Hathaway revealed an 11% boost in the size of its Amazon stake, to more than \$1 billion!

The world is a dangerous place today. With regard to investment assets, we can't say what is "safe" and what is not. That which appears to be ultra-safe — e.g. safety deposit boxes and US treasury bonds — has actually shown itself to be risky. And some volatile assets, which appear risky on the surface, could be safer than most realize.

No matter what happens, now is not the time for complacency. We need to be vigilant and aware as different scenarios compete for dominance heading into the 2020s.

WHAT IF LONG-TERM RATES GO TO ZERO?

What is going to happen in the next few years? Where will markets go in the new decade that kicks off with 2020? What is the best way to position a portfolio for, say, the six-year window from 2020-2025?

This is an incredibly important question. Getting it right — or wrong — could mean the difference between a well-funded retirement and risk of ruin.

The question looms large because of scenario divergence. By that meaning, there isn't just one plausible scenario for what could happen in markets between now and 2025. There are at least three. And the outcome implications for each are wildly different.

This is what makes the portfolio aspect a challenge. If you are positioned for scenario “A” between now and 2025, but scenario “B” or “C” plays out instead, your portfolio won't perform anywhere near as well as it should. Worse still, the wrong positioning could lead to painful portfolio declines.

Nobody knows for certain what will happen between now and 2025. It's simply impossible to be sure. There are too many unknown variables, such as:

- Who wins the 2020 US presidential election (and what their policies will be);
- How the US-China trade war will resolve (if it resolves by 2025 at all);
- Whether the UK, Europe, China, or Japan faces a new financial crisis;

- How central banks respond to the next crisis;
- Whether a new geopolitical crisis erupts (Iran, North Korea, etc);
- Whether the US economy, or the global economy, goes into recession;
- And many more.

The good news is, we have something better than certainty. We have probability analysis, and the skills to interpret data with the help of algorithms and software.

What this means is that, instead of falsely proclaiming we “know” what is going to happen between now and 2025 — because again, it’s impossible to truly know — we can build models based on the divergent scenarios that could play out.

Then, once we’ve determined what to look for, we can use a combination of algorithms, software, and real-time observation to determine which scenario is taking hold.

If you imagine the scenarios for what happens between now and 2025 as racehorses on a track, it’s kind of like handicapping the Kentucky Derby — except this “derby” lasts two years rather than two minutes.

Today we’ll look at a dark scenario for what could happen between now and 2025. Next week we’ll consider a much more bullish scenario.

Again, both of these scenarios (and others) are plausible. Which one comes to pass is a matter of the big unknowns — the ones we know of plus others that are hidden — and how the story unfolds.

The dark scenario can be captured in a question: “What if US long-term rates go to zero?”

When bond prices go up, the yield (or interest rate) goes down. This

is not a correlation, but rather a mechanical relationship. When investors buy bonds, and push the prices up, that buying pressure pushes the yield down simultaneously.

This is why recessions and downturns are associated with rising bond prices and falling interest rates. Bonds are seen as a “safe haven” when things are bad. At the same time, low long-term interest rates are like a gloomy weather forecast. Their presence suggests weak growth or even no growth at all ahead.

In all of recorded history, US long-term interest rates have never gone to zero. In 2016, the US treasury ten-year note got down to 1.37% — an all-time low.

But what if it goes even lower in the future? That’s a real possibility, according to JPMorgan Chase analyst Jan Loeys.

“There’s a serious probability that in the next three years U.S. Treasury yields are at zero, if not negative, and the whole market is sitting at zero and negative yields,” Loeys told Bloomberg.

The “zero and negative-yielding world is like a sand trap,” Loeys added. “The quicksand scenario is a process, not an event, a slow bleed that could take three or four years.”

There is already an estimated \$13 to \$14 trillion worth of sovereign debt with “negative” yield, meaning the interest rate has fallen below zero. The idea is that, as the rest of the world struggles, the United States could succumb and get sucked into this vortex.

If this happens, it would mean a US recession or a global economic recession, and quite possibly both. It’s a dark scenario because, if it does occur, it means that growth has stalled and gone into reverse, and that central bankers have lost control.

US rates at zero could also indicate a major “flight to safety” into US treasuries. This would be due to the mechanical relationship we explained earlier. When bond prices go up, yields fall.

If something frightening happened in the world — like the threat of a shooting war with Iran — investors could pile into the safe haven of US treasuries so aggressively that their buying would make prices skyrocket. This, in turn, could push the yield below the 2016 lows (and towards zero).

There are different assets that could benefit from the “US long-term rates at zero” scenario. A big determining factor would be whether it happened quickly, as with a geopolitical shock or new financial crisis, or slowly, as with a slow rolling downturn leading into a global recession.

But regardless of what happens, the biggest benefactors of the “rates at zero” scenario would likely be the following three assets:

- Gold (physical gold and ETFs)
- Gold stocks (and gold stock ETFs)
- Bitcoin

The reason for this is because, in a world where US long-term rates go to zero, investors will be scared and central bankers will be in flat-out panic mode.

If things get bad enough for the ten-year to hit zero, you can sure be that new and aggressive central bank stimulus programs will be rolled out. There would be more talk of “whatever it takes” and “helicopter money” and so on, as central banks struggle with a phenomenon known as “pushing on a string.”

In an environment like that, the probability is very high that faith in fiat currency — almost all forms of fiat currency — would be badly eroded as central bankers fire up their metaphorical printing presses.

In a situation like this, gold would shine as both a form of crisis

insurance and an “alternative sovereign currency” which can’t be printed. Gold stocks would benefit via sharp gains in quarterly profitability (more profit in every ounce of gold they sell) and a big upward jump in the value of below-ground reserves.

Bitcoin, meanwhile, would benefit from its role as a sovereign store of value (this is the killer use case for Bitcoin) and as a portable and globally recognized form of “digital gold.”

This scenario is real, and could play out over the next few years. If it does, we’ll want exposure to the big winners in such a paradigm — and we’ll want to avoid the industries and sectors that are badly exposed.

But this isn’t the only scenario that could play out between now and 2025. There are others with dramatically different implications.

HOW STOCKS COULD POWER HIGHER

If long-term interest rates go to zero, the outcome will be viciously bearish for US equities (and global equities too). But there are other scenarios for the timeframe between now and 2025. Now we'll unpack a strongly bullish one, in which the forces of technology cause stocks to rise another 50%.

The “stocks rise another 50% by 2025” scenario is powered by technology, but perhaps not in the way you might think. It has to do with technology's impact on inflation and the business cycle.

Here is the relationship that is key to understand. We'll unpack the bullet points as we go:

- Recessions are usually caused by interest rate hikes.
- The Federal Reserve hikes interest rates to fight inflation.
- Technology is a deflationary force that absorbs inflation.
- With subdued inflation, the Fed doesn't have to raise rates.
- With no rate hikes, multiples can keep expanding for years.

That is a lot to digest. But the basic idea is that, thanks to technology, we won't see real inflation pressure any time soon; in the absence of inflation pressure, the Federal Reserve won't have to embark on the standard rate hike cycle. As a result of that, the economy can keep rolling as valuation multiples expand.

Now keep in mind, this is not a prediction of what's going to happen. It is a plausible scenario. There are other things that can kill a bull market besides interest rate hikes. But if you remove interest rate hikes from the equation, the odds increase significantly that the expansion, and the equity bull market, will last.

Keep in mind too there is no such thing as an “expiration date” for economic expansions. Australia, for example, has gone without a recession for 27 years and counting!

As the saying goes, bull markets don’t die of old age. Something has to kill them off, and that something is typically a series of interest rate hikes. David Rosenberg, Chief Economist and Market Strategist at Gluskin Sheff, is one of the world’s foremost experts on business cycles. This is how he recently put it:

“When you go to the causes of recession, it’s not oil, it’s not fiscal policy, it’s not trade. It’s always about the Fed. The Fed has created the conditions for every recession that we’ve seen in the post-World War II period.”

How does the Federal Reserve cause recessions? More or less by hiking interest rates. And why is the Federal Reserve willing to cause recessions through interest rate hikes? To fight inflation.

Too much inflation is considered dangerous to the economy. Under inflationary conditions, price signals get out of whack, and this eventually destroys economic growth.

When inflation is running too hot, companies lose the ability to tell whether rising prices mean “business is good” or whether inflation is creating a mirage. This leads to misallocation of resources, an outbreak of destructive behavior for consumers and businesses alike, and eventual economic implosion.

That is why central bankers are willing to cause recessions (by hiking interest rates) in the name of fighting inflation. But if there is no inflation to fight, they don’t have to take that step. This is where technology comes in.

The lack of inflation in the modern economy has been a “mystery” for years now. We have seen strong inflation in asset prices, but

seemingly tame or missing inflation everywhere else. This has left economists scratching their heads. There have been countless guesses as to why “normal” inflation is missing.

Some will argue, quite convincingly in our view, that technology is the key culprit. Technology is a deflationary force because it keeps prices down, and right now both the US economy and the world are in the throes of massive technological change.

Here are some food for thought examples highlighting technology as a deflationary force:

- Amazon.com is not just a relentless force for low prices in general, it forces other companies and industries to maintain lower prices too. Amazon is also on a constant hunt for new industries it can disrupt with superior operational efficiency — which again means lower prices.
- The “gig economy,” powered by part-time workers driving for Uber and Lyft, delivering food for GrubHub, or doing odd jobs on TaskRabbit and so on, means millions of people have switched from full time work with benefits to sporadic contract work at a lower average wage. These “gig economy” workers don’t show up on unemployment rolls. But they have lower income with fewer benefits than before (and the better jobs they used to have are gone).
- Digital entertainment is reducing the need to buy “stuff.” If you listen to music on Spotify, watch movies on Netflix, and keep up with friends on social media, you can replace thousands of dollars worth of entertainment spending with just a few hundred dollars per year. Even expensive items like iPhones are deflationary in that, if you factor in the cost of an iPhone upgrade every three years, the cost per month is low (and falling).

- Software is making top-tier workers more productive, which makes companies more productive than before while employing fewer workers. That kills wages and increases shadow unemployment (people forced into “gig economy” jobs). When top-tier staff become far more efficient thanks to software, mid-tier and bottom-tier staff can be let go — at which point they show up in the “gig economy” instead of the unemployment line.

Those are just a handful of examples. There are many more ways in which technology is a deflationary force in the sense of keeping prices low (or keeping wage levels from rising).

Bullish analysts will further argue that, on a valuation basis, the stock market is not expensive right now. This matters because, if the argument has merit, there is room for current valuation multiples to expand.

And why is it rational for the stock market multiple to be a little bit high? In part because corporate profits are notably high. And why might corporate profits stay notably high? Again because of technology. The same forces that keep worker wages under wraps, or reduce the need for human workers at the margins, help beef up corporate earnings.

Once again, it’s important to remember we are laying out a scenario here, rather than making a prediction. There are scenarios in which stocks decline sharply in the coming years, and most of them have wildcard variables that can’t be known in advance.

Such wild cards include the possibility of a US recession or global recession, a geopolitical crisis, a government policy backlash, a new financial crisis, extreme trade war fallout, and more. And yet, if we take interest rate hikes out of the equation, the possibility of a continued multi-year multiple expansion becomes very real.

The Federal Reserve tends to wring its hands over inflation because

inflation is one of the “boogeymen” central banks are paid to worry about. But technology may have killed the inflation dynamic.

That may sound wild, but then again we’ve never seen the likes of Amazon.com before, or the rise of a “gig economy” powered by smartphone apps, or the coming waves of mass layoffs due to software efficiency gains and large-scale labor automation.

As a result, if the US economy can muddle through all of the dangerous wildcards ahead, investors may come to realize that a structurally lower inflation outlook is a feature, not a bug, of the 21st century information age.

If that realization takes hold in a big way — along with the simultaneous realization that a Fed hiking cycle could be “out of commission” for years to come — we could then see a doubling or tripling of enthusiasm levels for the “winner take all” tech stocks — the mega-winners like Google and Amazon, along with other “disrupters among the disrupted” tech plays with a strong outlook for growth in a low-growth world.

The deeper point here is you want to be prepared for highly divergent possibilities. If you fixate on one single scenario for the next few years, whether bullish or bearish, your retirement portfolio will be in danger — because that scenario could easily be wrong or get thrown into a cocked hat.

Now more than ever, it is vital to be aware of the different configurations in which the future could unfold — and to prepare for wildly divergent scenarios, with the flexibility to go in whichever direction is required.

FOSSIL FUELS LOST — CLEAN ENERGY WON

Over the past decade or so, we have seen a battle royale between fossil fuels (like oil, natural gas and coal) and clean energy (primarily solar and wind). The verdict is now clear. Fossil fuels lost, and clean energy won. The future will be powered by solar and wind energy (and to a lesser extent, other renewable sources like hydropower). It will not be powered by coal or gas.

This isn't just a matter of opinion. The evidence is now overwhelming.

As recently as 2010 things looked different. Solar and wind was just one percent of the US energy mix at that time. In their 2010 testimony to congress on the topic of energy independence, fossil fuel executives were confident. “Coal is the future,” the CEO of Peabody Energy said.

Six years later, in April 2016, Peabody Energy was forced to declare bankruptcy, along with multiple other US coal companies. Solar and wind, meanwhile, kept getting stronger.

In April of 2019, for the first time ever, renewables supplied more energy to the US national grid than coal, according to Bloomberg. Also as of this year, renewable energy has already become the cheapest form of power for two-thirds of the planet.

Again, the evidence of clean energy dominance — in terms of future trends — is overwhelming.

The fastest growing jobs in the United States today are “solar installer” and “wind technician.” The wind industry creates almost as many American jobs as the natural gas industry — but with wind

on the way up, and gas on the way down. Natural gas lines into newly built homes and buildings are phasing out: The city of Berkeley, California just banned natural gas hook-ups for new structures, and other cities may follow. By the year 2020 — right around the corner — wind energy output is projected to top coal energy output in Texas. And while coal and natural gas still have a sizable share of the US energy mix, it is dropping by double-digit percentages.

In China, meanwhile, solar energy in 344 cities is cheaper than energy from the national grid. In at least 75 Chinese cities, solar is already cheaper than coal.

Over in India, the government hit its ambitious 20 gigawatt solar target four years early — so now they are going for a new target of 100 gigawatts by 2022. India's energy mix is already 34.6% renewable, with four of the top seven largest solar parks in the world. They are building a new solar park that will take the crown.

Coal still plays a major role in the world's total energy mix. But coal is losing market share worldwide, even in developing world countries where coal's main virtue is cheapness. Rich-world countries are shunning coal because the citizenry is demanding it — and because renewable economics are competitive. Developing world countries are moving away from coal too, shutting down plants and banning new installations, to fight against toxic levels of pollution.

The key thing is that the rise of renewable energy isn't just a matter of subsidies, environmental regulation, or moral sentiment. Fossil fuel sources are getting straight-up beaten on the economics. According to projections from Bloomberg New Energy Finance, solar and wind energy could power half the planet by 2050. They expect coal and nuclear sources to be negligible by then.

On the natural gas side, the economics favor renewable energy too. The Rocky Mountain Institute estimates that, by 2035, ninety

percent of newly proposed natural-gas-fired power plants will be more expensive and less economical to run than solar or wind installations.

The Rocky Mountain Institute further estimates that, for many of the US natural gas power plants on the drawing board today, the cost will become uneconomic — relative to cheaper clean energy alternatives — before the buyers even finish paying for them.

The fossil fuel industry had a tough year in 2019 in terms of equity performance, and it isn't just because of global growth fears or a lackluster oil price. The investment community looks at fossil fuels and they see the past.

They look at clean energy and they see the future — and this is increasingly becoming a “hard-nosed capitalist” assessment more than “save the planet” assessment. It's about the math, which comes down to tipping point economics powered by technology and scale.

WATERFALL EFFECTS AND BLUE ENERGY

In terms of global electricity generation, solar's percentage share is in the low single digits. In 2017, solar's estimated share was just 2%.

Part of the reason solar's global share is so low is because the price economics are tough. It's a "chicken and egg" type problem: In terms of production and distribution networks, you need massive scale for an energy source to be cheap.

And yet, now that the price competition threshold for coal has been crossed, solar demand is likely to explode. This is due to a kind of waterfall effect where demand rises by multiple orders of magnitude as prices decline.

To give an example: If, say, a key solar component costs \$100 per unit, demand might be "X."

If that same component falls in price to \$10 per unit — a 90% drop — demand could rise to 100X.

If it falls to \$1 per unit, demand could then rise to 10,000X or even 100,000X.

That was a generic example. But the main idea is that a substantial fall in production cost can lead to demand increases that are orders of magnitude larger, creating a massive expansion of revenue and profits for the makers of solar components. As solar gets cheaper than coal, we are seeing that kind of math kick in.

Then too, other supporting technologies are changing the game for solar. Take battery storage and machine learning algorithms for example.

Thanks to the global electric vehicle (EV) race, tens of billions of dollars are being poured into next-generation improvements for battery storage technology. As battery technology gets better and cheaper, the economics improve for storing surplus energy in local battery systems.

Combined with machine learning and algorithms that live in the cloud, this is leading to the rise of “smart” solar systems that homeowners and small businesses can use without lifting a finger.

A “smart” solar system will use algorithms to manage the energy created by the local solar array for your home or business.

Algorithms will decide whether to send power to the building for immediate use; whether to top off local battery storage for usage later on; or whether to send energy back to the grid and collect a credit.

The cost of these “smart” solar systems will fall rapidly too as more people buy them. Utilities will embrace these systems too — getting into the installation and maintenance side — to offset declining revenues from the traditional grid. As the panels, the batteries, and the hardware all get cheaper via scale-based unit economics, going solar will become a no-brainer. This is how demand goes vertical..

This process will also be accelerated by government mandates, like the California law that requires every newly built home to have a solar system after 2020.

In the United States, there is also a significant chance that “Green New Deal” legislation will pass in the next few years. If this happens, solar will be a huge beneficiary — though solar already has so much momentum on the economics side, it probably won’t need it to thrive.

Then, too, in the next few years, we could enter “the knee of the

curve” — the point where the rate of change for clean energy impact goes from geometric to exponential as the range of clean energy technologies broadly expands.

Think of a graph shaped like a hockey stick. Clean energy outputs are about to go from the flattish part of the hockey stick (the part that makes contact with the ice) to the near-vertical part (the long handle).

As we have noted, solar and wind power are now highly competitive on price economics alone. Solar is cheaper than coal in dozens of Chinese cities. Wind energy output is expected to outpace coal in Texas next year. And production costs are still falling as unit volume ramps up.

But solar and wind are only the beginning. We will also see transformative impact from exotic clean technology solutions you’ve never heard of.

The clean energy impact of the 2020s will be explosive because it’s not just clean technology that is getting cheaper and faster; it is technology capability in general that is exploding in power and falling in cost.

Take microchips for example, and the famous prediction known as “Moore’s Law.” For a long time, the big driver of progress was the rate at which more transistors could be added to a microchip.

Now, though, noted venture capitalist Marc Andreessen believes that Moore’s law has “flipped.”

Here is what that means: Instead of chips becoming ever more powerful at an exponential rate, the most powerful chips are now becoming ever cheaper — falling in cost — at an exponential rate.

The endpoint of this is, say, a wireless-enabled device with the power of a supercomputer that costs 49 cents and fits in the handle of your toothbrush.

Or imagine a computational array more powerful than the latest iPhone, but so cheap and small it gets embedded in greeting cards. That's where we're going.

As computational power becomes as cheap and freely available as tap water, a lot of the clean energy solutions that were previously nonviable — because of the price economics and the computational challenges in solving the design issues — will suddenly cross a tipping point viability threshold, and see instant wide demand given the need to replace fossil fuels.

Take “blue energy” for example.

Blue energy sounds like a new age concept, or something that strong-willed depressed people have, or perhaps a rallying call for the Smurfs. But blue energy is a real thing, and it is just one of the transformational clean energy technologies that could have a huge impact over the next decade.

Blue energy, also known as osmotic power generation, was first discovered in the 1970s by an American-Israeli chemical engineer named Sidney Loeb. It is an old idea that was too far ahead of its time, in economic terms at least — but the present-day explosion of computing power, coupled with industrial 3D-printing techniques and other new innovations, means the time for blue energy could be “now” (or some point in the next few years).

The blue energy production process exploits the result of what happens when freshwater and saltwater are mixed together in large quantities. It just so happens that fresh water and salt water mix together naturally in places known as “estuaries” — the area where a river runs into the sea.

To create blue energy, you set up a tank with a “semipermeable membrane” — a cloth-like barrier that only water can pass through — with fresh water on one side of the tank and salt water on the other.

If you do this in an estuary, the river provides the freshwater and the ocean provides the saltwater naturally.

The membrane lets water through, but not salt. This causes a pressure imbalance in the tank. Water on the “fresh” side can flow through to the saltwater side, but not vice versa.

As the pressure imbalance grows, the growing volume of saltwater gets pushed into a turbine generator. The generator then makes electricity.

It’s a brilliant idea. Mother Nature provides the setup and the basic physics — all you need is a river that runs into an ocean. The challenge is getting the economics right — figuring out how to manufacture the membranes and build the plants at an energy generation price point that is profitable.

And that challenge — the economics part — helps explain why the clean energy revolution is going to go vertical in the 2020s. There are multiple wild ways to create energy that were conceived many years ago, or even decades ago, that weren’t economically viable with 20th century technology. That changes now.

The compounding effects of 21st century technology — again, think super-cheap computing power, 3D industrial printing techniques, dramatically improved production processes, and more — will continue to lower the cost of established alternatives like solar and wind, while opening the door for even more exotic concepts like blue energy.

This will change the world of energy as we know it.

HALLMARKS OF THE FOURTH AGE OF CIVILIZATION

In the 2020s we will fully enter the fourth age of human civilization. This is a very big deal, as homo sapiens — the species of which we are all members — has only seen three other ages thus far. Including the latest one, they are:

- The Hunter-Gatherer Age
- The Agrarian Age
- The Industrial Age
- The Information Age

In the Hunter-Gatherer Age, humans learned to forage and hunt and cooperate in groups. In the Agrarian age, we learned to farm and grow crops, allowing societies to expand beyond the size of small roving bands maxed out at 150 or so.

Then, in the industrial age, we harnessed the power of electricity and the steam engine and large-scale manufacturing. And now, at the dawn of the Information Age, we are transitioning to digital economies and the era of the internet.

It might be confusing to think the Information Age is really going to take off in the 2020s. After all, hasn't the internet been around for 25 years or so, with pre-internet technology far older than that?

The answer is yes, and that is actually part of the point. We don't see new ages of civilization come around all that often — we are only on the fourth one, after all — and when a new age does show up, it takes a long time to get going.

That is because the transformative effects that power the new age

— a proliferation of game changing technology, or a radical shift in societal structure, or both — require years or even decades to crowd out the old paradigm.

For the Information Age, one of the key development factors was the laying of fiber optic cables. In the dot com bubble circa 1999-2000, investors got so excited they wildly overfunded various internet companies, and sunk countless billions into the laying of fiber optic cable capacity that would quickly go “dark.”

Over time, though, the countless miles of fiber optic cable, dark and dormant, lit up with new activity. The “bust” part of the boom-bust cycle thus wound up planting seeds of long-term growth for transformational change.

A similar thing happened with various 19th century railroad bubbles — far too much track was built, only for the wasted track to be taken up later as economic growth patterns finally caught up with the railroad optimists. This seems to be a pattern of human psychology and nature on the whole, where short-term explosions of gross excess eventually power meaningful long-term change.

Among other things, the internet has brought about “zero marginal cost” business models, where the old rules of scale no longer apply and customers can be served a billion at a time.

In the 2020s, though, we will see the transformative impacts of the information age get far more serious, not to mention far more wild and strange.

Consider, for example, how drones could replace your washing machine (and dryer, too).

To back up for a moment, one of the most visible changes of the past few years has been an explosion in the door-to-door delivery of “stuff.”

The trend started to take off years ago with the rise of Amazon Prime memberships. Then other retailers stepped up e-commerce delivery to fight back against Amazon. Then app-based delivery services like Doordash and Deliveroo and Grub Hub started delivering food like crazy. Then Uber started competing via Uber Eats, and an explosion of mobile services (where XYZ comes to your house) took off via apps. On and on it goes.

The door-to-door delivery trend is taking off because upper middle-class consumers have realized that, within a reasonable price range, their most valuable commodity is time. Even if it costs, say, an extra \$8 to have dinner delivered, that is a chunk of time saved not having to round-trip the restaurant.

The time-saving logic applies even more to consumer goods, in terms of showing up on the doorstep via mouse click. The easier it gets to click or tap or speak a phrase, and then have a desired purchase appear like magic, the more we like it.

The problem is that all this driving and delivering is wildly inefficient.

Having a large delivery truck distribute, say, 120 packages over the course of a day — typical for a UPS driver — is a waste of energy and fuel. The packages that get delivered last are like hitchhikers traipsing all over town.

From both an energy efficiency and congestion standpoint, rideshare drivers who double as delivery drivers, making constant trips to drop off a single package or a single food order, are potentially even worse than delivery trucks. It's like having your Thai food shipped to you in a 3,000-pound container (the weight of a compact car), while adding to road traffic besides (because so many others are doing the same thing).

But drones could change the economics of door-to-door delivery completely.

Drones could change door-to-door economics so radically, in fact, that washing machines and dryers could go the way of standalone cameras. You can still buy a standalone camera if you really want to. But unless you're a professional photographer, there is little point thanks to smartphones.

With drones, it comes down to factors like efficiency, energy use, and congestion.

First, drone deliveries will be far more efficient from a “rolling hardware” standpoint. The drone delivery mechanism for your package or food order might weigh, say, 30 pounds instead of 3,000 pounds plus a driver — a weight reduction greater than 99% if you count the driver. Even larger drones, designed for heavier pick-ups, would be like a roller skate in comparison to a car.

Second, drone energy use can be “zero carbon” or close. Because drones are so light relative to their payloads, they can run on electricity, which means they can draw from a central power plant powered by mass-scale solar panels or wind turbines.

And third, drones could dramatically reduce traffic congestion. The more “stuff” that gets delivered via airborne traffic, as opposed to road traffic, the more the roads are cleared for moving humans around. In heavily populated urban centers, where rideshare vehicles are already a nasty traffic problem, this will be a huge value-add.

But getting back to washing machine and dryer replacement: When drone ecosystems are fully formed — and drone delivery is already a routine thing, by the way, in places like rural China — the economics of household life will tilt even more in the direction of sheer convenience.

At a certain point, the drone pickup-and-delivery system becomes like a courier that is available 24 hours a day, 7 days a week. Except this courier service is far more reliable, and far more readily available, than any human-based service could ever be.

At that point, it literally becomes easier to give your laundry to a drone courier to be professionally washed and dried off site and returned, than to have standalone laundry facilities in your house (that go unused the vast majority of the time).

For another angle on this: Try to picture a drone delivery network as a physical world version of the internet.

In the way the digital internet ships packets of information from point A to point B, drones could approach the same level of seamlessness in moving “stuff” around, while bypassing present-day problems of congestion, cost, and energy waste. The tipping point is when humans start interacting with drones as casually as they do with smartphones.

Trends like these are going to create new business models, some of them so strange they can’t even be conceived of yet.

It’s worth remembering that, when Airbnb got going in 2008-2009, their concept seemed so bizarre that they were literally laughed at. Even the venture capital investors who gave Airbnb funding thought the idea was ridiculous — but invested anyway on a “you never know” basis.

In the 2020s, factors like the rise of drone delivery will change certain industries so much that doors will open nobody knew existed. As this happens, companies whose profit margins appear safe today could see their business models collapse.

And yet, while drone possibilities are exciting, they are a drop in the bucket in comparison to what could happen with self-driving cars.

Self-driving cars will completely transform urban city landscapes, and possibly even change the nature of real estate as we know it. This transformation will both create and destroy trillions of dollars in wealth, not just in the automotive industry but all the industries adjacent to it.

Headed into 2020, self-driving cars are a disappointment relative to expectations. They were supposed to be dominating the roads by now, and they obviously aren't. The "minor details" of making self-driving technology sufficiently reliable turned out not to be so minor. Instead, they were huge.

But the timing delay doesn't change the ultimate impact self-driving cars will have. And the fact that expectations ran far ahead of actual delivery is not surprising. This is actually a common phenomenon.

Any technology that is sufficiently game-changing needs to attract investment capital to be developed and built out at scale. As a result of this need, the technology and its surrounding components experience a "hype cycle."

The hype is used to drum up large amounts of investor capital: Without the hype, you don't get the large quantities of investment necessary to fund the new build-out.

Then, too, the hype is naturally attached to short-term expectations because investors are impatient. When short-term expectations prove too optimistic, investors feel disappointed or lose interest. But then the actual development happens — just over a longer time frame — and transformation follows.

The internet itself went through a process like this. By the end of 1999, investors were convinced the internet would change the world. Then the dot com bubble popped and expectations were dashed.

Except now, years later, we know companies like Amazon and Google and Apple (and later Facebook) really did change everything, which means the internet changed everything — it just took more time than initially allotted.

The 3D-printing industry is another candidate for this. Investors got excited about 3D printing way too early. The companies couldn't

live up to the original hype, and the personal focus of the first 3D-printing wave was likely wrong (an industrial focus makes more sense). But eventually, and likely by the late 2020s, industrial-scale 3D printing will be huge.

The aggressive development of self-driving car technology is immune to sentiment shifts at this point. The tech giants know the self-driving space is a trillion-dollar opportunity, and they also know whichever tech giant wins will have a massive scale-and-profit edge over its rivals.

As such, the tech giants are going all-out on self-driving and will continue to do so no matter what. There is too much at stake to do anything else. First prize is world domination, second prize is a ten-figure return on investment, and third prize is a set of steak knives. Never before in history has a single technology seen such a well-funded assault in terms of capital, talent, and resources at scale.

Self-driving cars will transform cities and urban centers, and even the nature of real estate itself, by their indirect impacts — the second-level and third-level effects.

Take the problems of overcrowding and unaffordable housing, for example. The most desirable cities are becoming impossible to live in without a top-tier income. As of this writing, nobody knows how this problem will be solved, and there is a great deal of hand-wringing over it.

Now imagine a self-driving bus that feels like a first-class train car. There is free WiFi and great coffee and a minimum of noise (maybe classical music or smooth jazz). There are even workspace partitions that set up like a mini-office; the whole thing is a rolling co-work space.

This self-driving bus — again, basically a co-working space on wheels — has its own self-driving lane that human-driven cars aren't allowed

to use. It gets you into the city in less than an hour. Meanwhile, your work day doesn't have to wait: You can get to work as soon as you settle in your seat.

The bottom line is that a combination of self-driving bus services (and single occupant private car services) can ultimately make the worker-commuting distance irrelevant.

People will get used to starting work in a well appointed self-driving vehicle; from that point, it won't matter if they live farther out. This, in turn, will make it easier for cities to support perimeter neighborhoods — a kind of outer ring that could be 100 miles in diameter.

Low-cost yet high quality transportation, which functions as rolling co-working space, removes the distance problem. Oh, and by the way: There is no traffic to speak of for these commuters, because the self-driving lane always runs at 70 or 80 miles an hour.

As a result of this change, housing within the city can become a luxury good. In conjunction with that, city housing costs will fall as supply options expand. It will no longer be a burden to live outside the city, and many families will intentionally prefer new homes in a newly built perimeter neighborhood.

But that is only the beginning. The even more radical change will be no more human-driven cars in the heart of the city itself — which means no more parking spaces.

In this scenario, only self-driving cars are allowed into the city center. After dropping you off, your self-driving car goes and parks itself in a garage or lot five miles away. This parking area can be super high density because no human drivers have to navigate it. If your car is old fashioned and non-self-driving, you would park it at the equivalent of an airport lot outside the city.

In the city proper, meanwhile, there aren't any human drivers other than special permit vehicles. This means reclaiming all the parking spaces and parking lots, which means new opportunities for real estate.

A study from Woods Bagot, an international architecture firm, estimated the city of Los Angeles to have 27 square miles worth of parking space. The study further estimated LA county on the whole to have 101 square miles of parking space, more than four times the surface area of Manhattan.

Getting rid of parking lots — and parking spaces in general — will create mind-blowing opportunities.

The reclaiming of parking-related land will get underway at scale just as the next generation of 21st century building materials comes into its own. It will also happen alongside a complete rethink of how an urban center can look and feel when traffic is taken out of the picture.

Even if self-driving transport vehicles still operate within the city, by the way, they will do so at far greater efficiency and speed. When you remove the human driver and add a central control system, self-driving cars can travel almost bumper to bumper in a perfectly choreographed stream. They can navigate complex interchanges, pass through underground tunnels, and do many other things a human driver never would or could.

Before the self-driving era kicks off, we are already catching glimpses of how top-tier cities will transform themselves. The competitive challenge for cities will be attracting and retaining educated knowledge workers, whose clustered presence attracts top-tier companies and high-end service businesses.

Cities like New York, Atlanta and Los Angeles already have big initiatives adding beauty to the landscape — taking ugly industrial

structures and capping them off with green parks and gardens. Concepts like this will accelerate and expand as parking lots and traffic disappear.

The developments discussed here are baked into the cake in part because they don't require sharing the road with humans. Self-driving commuter transport vehicles can have their own lanes and routes, and urban centers can phase out human drivers entirely. This is overwhelmingly the rational thing to do, and after a few cities figure it out, the rest will copy them.

The key here is forgoing mixed-use roads for "self-driving only" lanes and city zones, which will happen. This, in turn, solves the "last mile" problem of trying to teach a self-driving car to anticipate what an unreliable and unpredictable human will do. Humans will get used to this in the same way present-day city dwellers are comfortable subways.

It may be that, a generation or two from now, the idea of "driving your own car" will sound as odd as "flying your own plane." Those who drive their cars would then be like people flying an aircraft — either professionals or hobbyists.

On the investing front, there will be huge winners from this transformation — and huge losers too.

You wouldn't want to be in the car insurance business, for example, or own a string of auto body repair shops, or have your net worth tied up in gas stations and restaurants associated with highway rest stops. Those and many other business models will be toast.

The transformational impact of self-driving cars won't happen tomorrow. As we turn the corner into 2020, we are still gearing up for these changes to accelerate.

But the number of electric vehicles (EVs) in operation will rise

dramatically in the next few years as new EV factories come online — that will naturally accelerate the trend — and self-driving car technology is still advancing rapidly behind the scenes.

Within two or three years, we are likely to see a proliferation of urban pilot programs, where self-driving experiments backed by local transport authorities start showing up in many cities. By the second half of the 2020s, that is to say 2025-2030, the real changes will start to be felt.

Then, too, if we had to pick a single company to bet on — in terms of dominating the information age — a strong candidate would be Amazon.

Not all that long ago, Apple became the world's first company to hit a trillion dollars in market cap by executing brilliantly in the smartphone space. Amazon followed suit, hitting the trillion-dollar milestone roughly a month behind Apple.

But while the smartphone industry has likely peaked — with profit margins and replacement rates coming down as consumers keep their phones longer — the biggest profits for Amazon are still well ahead. Not only that, Amazon is poised to generate mega-scale returns in multiple different industries.

For these reasons and more, Amazon is likely to be worth not just a trillion, but multiple trillions over the next decade or two. The current positioning for Amazon is so powerful and so dominant, the only real threat it faces is a forced government break-up. And even then a break-up might not be bad.

It is possible, maybe even likely, to see Amazon split itself up down the road into multiple trillion-market-cap companies.

It is hard to state how much potential Amazon holds, but here is one way to think about it. At the time of this writing, Amazon has a

price-to-earnings ratio above 80. Meanwhile Berkshire Hathaway, the conglomerate founded by Warren Buffett, has a price-to-earnings ratio of 8.

That means the price-to-earnings ratio of Amazon is literally ten times that of Berkshire Hathaway. And yet, if you had to put your life savings into one stock for the next 20 years (not recommended of course), Amazon would easily be the safer bet — even at ten times the cost.

Why is this the case? Because Amazon is the disrupter, whereas the companies Berkshire owns are an assortment of the disrupted (or the soon-to-be disrupted). Amazon has shown a willingness to disrupt almost every industry it touches, and its advantages just keep getting bigger. As of this writing in 2019, the growth-and-profit opportunities spread out in front of Amazon look better than ever.

To get a handle on how much Amazon can grow, consider the following metaphor from Jitendra Waral, a Bloomberg Intelligence senior analyst. “Amazon’s end market is 16 percent of global gross domestic product, excluding China,” says Waral. “To put this in context, if Amazon’s end market was the Empire State Building, it still is on the third floor.”

Amazon has a high price-to-earnings ratio in part because its growth footprint is so global. No other company can claim a credible path to handling transactions worth 16% of world GDP ex-China, or more than half of all e-commerce in the United States.

But Amazon is also valued so highly because its “value per user” is off the charts.

Aswath Damodaran, a professor at NYU Stern and the world’s foremost expert on valuing companies, has done excellent work showing how the value of a user can vary widely from one technology company to another. The connection to user value comes with how much future profit potential that user holds.

The revenue from a Netflix subscriber, for example, is highly predictable but also static. Netflix won't get more than \$11 per month or whatever it charges. Meanwhile the value per user of, say, Twitter will be far lower, because Twitter has no subscription revenue and only moderately profitable advertising options.

Facebook has a high value per user even though it is a free service, on the other hand, because users spend so much time on Facebook, and there is so much data available providing new ways to monetize them.

Amazon's value per user leaves other big tech companies in the dust. That is because Amazon can monetize its user base sixty-four ways from Sunday, in ways that make the user happy rather than irritating them. Amazon has barely scratched the surface here.

If you have an Amazon Prime account — as somewhere around 100 million American households do — consider everything Amazon knows about you from the stuff you buy. It knows your clothing size, your entertainment preferences, your general lifestyle habits, the general demographics of your entire household, and a whole lot more. If you also shop at Whole Foods, the data set goes even deeper.

Here is one thing Amazon could do with this data: They could run the most profitable health insurance company in the world. How? By using their data set to offer health insurance exclusively to households with favorable statistics. This would allow Amazon-backed health insurance to offer more coverage at a lower cost than everybody else.

Amazon is almost certainly going to do that, by the way (offer bespoke health insurance to select households via big data). It is only a matter of time. They have already teamed up with JP Morgan and Berkshire Hathaway to find better healthcare solutions for the 1.2 million employees of the combined three companies.

Healthcare is a huge market waiting to be disrupted. Amazon is just now rolling up its sleeves. They recently spent almost \$1 billion on PillPack, an innovative pharmacy company, as an appetizer.

As Amazon gets deeper into the healthcare business, it can do a deep-dive forensic analysis of which segments of the healthcare industry are profitable to run as businesses (and which ones are not). Amazon will use its scale and scope to offer low-profit segments as a third party platform provider — and directly enter the high-profit areas as a competitor.

Healthcare is going to be shockingly profitable for Amazon, on a multi-trillion revenue scale. But that's not even their biggest new thing. Neither is the cloud, another industry Amazon dominates that is growing like a weed into a multi-trillion-sized opportunity space.

The biggest big new thing for Amazon, as of this writing, is advertising. When you think about it this makes sense. Amazon has a deeper and broader “big data” trove on consumer transactions than any other company in the world. The next closest competitor is a hundred miles behind. Google knows what you tend to search for, and Facebook knows what you like to click. But only Amazon has the data on what you are actually purchasing, and the pattern of clicks that led you to buy.

After a series of experiments, Amazon rolled out its “Amazon Advertising” division in September of 2018. Michael Olson, an analyst with Piper Jaffray, predicts the revenue from Amazon Advertising will surpass the revenue from Amazon Web Services (the juggernaut cloud business) by 2021.

That isn't because Amazon's cloud business will stop being a monster. It is because the advertising business will be an even bigger monster. And the whole thing works like a flywheel, with different parts of the juggernaut reinforcing each other. Like Amazon's acquisition of

Whole Foods, for example, which gives them a beachhead in grocery delivery and the “brick and mortar” space.

Amazon Prime members who shop at Whole Foods get insane deals in exchange for scanning their codes in, which gives Amazon more big data, which lets them sell perfectly targeted advertising — on behalf of third parties as well as themselves. The flywheel just keeps getting bigger.

Then, too, there is the big data Amazon collects by way of being the world’s biggest e-commerce platform. The millions of third-party providers selling on Amazon now run the gamut from tiny mom and pop shops to global brands like Nike and Apple — the latter two because they have no choice. Amazon has the ability to scrutinize buying patterns and profitability metrics on virtually all of the business that streams through its platform — allowing it to pick and choose the most profitable industries to clone and compete in directly.

This is why it is perhaps likely that, some day, Amazon will break itself into multiple companies (if the government doesn’t try first). Over the long haul, Amazon could have a trillion-dollar market-cap advertising business all by itself. And a trillion dollar cloud business all by itself. And a half-trillion dollar e-commerce business all by itself, and so on. If the company ever breaks up voluntarily, it will be based on a sum-of-parts valuation deeming the individual pieces more highly valued separate than together.

We are still only scratching the surface here. But by now you are asking, isn’t there some way to beat Amazon? Isn’t there some other company that could rise up?

The answer is no. Short of a forced dismantling at the hands of government, or a nuclear catastrophe wiping out Amazon HQ, there is essentially no way to beat Amazon now. They are too far ahead in the areas that count. The time to stop them was years ago, and no one did.

Here are some statistics to underscore that point. As Alexis Madrigal of The Atlantic recently reported, Amazon now has 288 million square feet of space across all its properties. Most of that is warehouse space. The total square footage for Whole Foods retail stores is less than 20 million square feet, and the square footage for all of the AWS data centers is less than 10 million square feet.

So Amazon has nearly 260 million square feet of warehouse logistics space. In the past three years alone, Alexis Madrigal observes, Amazon has added enough new space to match 590 Wal-Mart supercenters. How do you catch up to that? You don't.

The core business of e-commerce is physical, dominated by stuff that ships and things you can drop on your foot. Amazon spent years and years building out its logistics centers, forgoing profits quarter after quarter, with half of Wall Street wondering whether the CEO might be crazy or Amazon's investors might be crazy.

Amazon's management trained its investor base to wait and wait and then wait some more for profits, and then took every penny of revenue it had, for years on end, and plowed it back into huge logistics expansion (of the physical warehouse sort) that was so aggressive it bordered on insane. It was a "dominate or die" type bet; Amazon's management followed a strategy so risky that either the vision would work out or the company would be crushed.

As we can see now, the vision worked out. But the profit-generating phase is just beginning. When a company like Amazon takes more than two decades (it was founded in 1994) plowing almost every nickel back into reinvestment, and then gets the vision right, the result is another ten to twenty years, at least, of moving toward full realization of the embedded profit opportunity.

It is truly the beginning of a new age — a wildly profitable age — for Amazon.

THE DAWN OF QUANTUM SUPREMACY

There is only one real threat to Bitcoin left: The threat posed by quantum computing. A sufficiently powerful quantum computer could hypothetically break the cryptographic code that keeps Bitcoin secure.

This means that, at least in theory, a government or corporation possessing a quantum supercomputer could — again, at least in theory — either steal the world's Bitcoin, hack the accounts of users at will, or destroy the Bitcoin blockchain.

This topic is at the forefront of crypto investors' minds because, this month, in October of 2019, Google — the leading corporation in the field of artificial intelligence — announced the long-sought milestone of “Quantum Supremacy.”

Quantum Supremacy refers to the tipping point when quantum computers overcome standard computers. In a paper published in the science journal *Nature*, Google claimed demonstration of Quantum Supremacy via the solving of a math problem, in a matter of minutes, that would have taken a classical supercomputer 10,000 years.

This sounds bad for Bitcoin. Who can trust the code-based security of cryptocurrency, if quantum computing means all the codes can be broken? But the picture is far more complex than that. To explore the dynamics of quantum computing is to feel a bit like Alice in Wonderland, tumbling down the rabbit hole. For instance:

- A quantum computer powerful enough to break Bitcoin would also be powerful enough to hack every credit card transaction, decode virtually any encrypted message, and essentially wipe out

the security of the entire global financial system, thus hitting the global economy like an EMP (electromagnetic pulse) detonation made out of code.

- The coming age of quantum computing, and the arrival of “Quantum Supremacy,” will require equally powerful countermeasures of “Quantum Resistance” to protect financial transactions and government secrets. The powerful solutions applied here will be layered into the blockchain.
- A world in which quantum computing is a powerful reality — which is still a long ways off — is a world so technologically advanced, via the combination of quantum computing and artificial intelligence, that molecular assembly will not be far-fetched. This suggests that, via mechanisms like quantum 3D printing, nano-assemblers could transform base materials into gold.
- Bitcoin is actually more about social technology than computer science technology. By that meaning, the most valuable layer is not the underlying code, but the global community of people and institutions that collectively recognize Bitcoin’s value. It is the social layer that is hardest to replicate, and a human support network will bridge Bitcoin to a state of quantum resistance.
- The Google announcement is a huge milestone, but full-scale quantum computing power is still at least a decade away, and possibly many decades away. The whole world now has a compelling incentive to evolve commercial-grade quantum cryptography tools, and Bitcoin security protocols will be at the leading edge of that evolution.

Before we get into quantum computing details, it may be helpful to review why all other threats to Bitcoin have been vanquished.

In some ways Bitcoin is like a crocodile. When crocodiles first hatch,

they are tiny and vulnerable. All manner of local predators, from herons to snapping turtles to catfish, can swallow them up for a snack. But if the crocodile lives long enough, it effectively becomes immortal: A full-grown croc fears no other predator except man.

At ten years old, Bitcoin has survived long enough to reach full-grown status. No government can shut it down. No crypto competitor can replace it. And all the arguments against it have fallen away — apart from the quantum computing threat.

Skeptics have long argued that Bitcoin has no intrinsic value, that it isn't worth anything. This argument is vanquished by non-replicable global network effects. No other digital asset is globally recognized, and globally accepted, the way Bitcoin is. To understand the value of these network effects, imagine trying to create, from scratch, an asset that is readily accepted in more than 100 countries, with commercially supported infrastructure and technology layers that grow stronger by the day. It can't be done.

Skeptics further used to argue that Bitcoin could be replaced by some other digital asset. But again, this misses the point of global trust and network effects. Bitcoin has the support of multiple large financial institutions, along with rapidly growing trading desk and derivatives support. The recognition of Bitcoin as a sovereign store of value is like a flywheel that compounds: The greater the recognition, the more that Bitcoin's dominance reinforces itself through added layers of support logistics.

Skeptics may still insist that Bitcoin is too energy intensive to be ethical or practical. But this argument, too, has already fallen by the wayside. The vast majority of Bitcoin mining is powered by renewable energy sources — and we have barely tapped a small fraction of earth's renewable energy sources (sun, wind, hydro, and geothermal).

In addition to that, Bitcoin mining operations tend toward areas of energy surplus, mopping up excess or low-cost energy in out of the way places, rather than straining power grids in high-density areas.

And Bitcoin's energy cost should anyway not be weighed in a vacuum: It should be compared to the costs associated with other forms of money. Like the horrific environmental costs of gold mining, for example, or the staggering costs of storing and transporting physical gold, or the gargantuan ongoing costs of securing and maintaining the global financial system.

What about the argument Bitcoin's transaction speeds are too slow, making it a failure on the consumer payments side? This misses the point that, as a sovereign store of value, the proper comparison is not to payments made in stores, but gold bullion sitting in vaults. Ask yourself which task has less friction, transporting \$200 million in gold or \$200 million in Bitcoin. The second is easier by orders of magnitude.

Consumer payments can be enabled by superfast networks sitting on top of a more robust network, in the same manner credit card transactions sit on top of a more secure banking layer. Bitcoin transactions at the core level only have to be more secure and frictionless than physical gold transaction, a job accomplished easily.

Last but not least, skeptics argue Bitcoin could be stamped out by sovereign governments or replaced by central bank digital currencies. But there is no way to shut down a truly decentralized asset — no servers to impound, no human executives to intimidate or jail.

At the same time, as a symbol of economic liberty, efforts to ban or outlaw Bitcoin would amount to a free advertising campaign promoting the benefits of monetary sovereignty. Meanwhile central bank digital currencies, or CBDCs, will still be subjected to the whims

of the printing press — fiat in their very nature — and thus not true competitors to Bitcoin at all.

As a ten-year-old digital asset, Bitcoin has passed a series of tests no other store of value can match. Then, too, Western governments have effectively slammed the door on global stablecoins, leaving Bitcoin to stand alone — or stand alongside gold rather — as the only sovereign alternative to fiat money.

This is why we say, in terms of Bitcoin's immortality, that quantum computing is the last true threat. And to preview our conclusion, this threat will be navigated too. Bitcoin is likely to survive, and thrive, as one of the most important monetary innovations in thousands of years.

Quantum computing is a threat to the world due to the basic nature of cryptography.

Here is the gist of how modern cryptography works: Take two large (very large) prime numbers and multiply them together. The resulting product, also a prime number, is almost impossible to reverse engineer. If you don't know at least one of the prime numbers you started with, there is no simple way to go backwards. If you do know one of the original primes, however, you can easily derive the other one.

That simple fact about large prime numbers — that you can't go backwards without knowing part of the equation — enables the encryption process for trillions of dollars worth of e-commerce transactions. It also provides the basis for secure communications worldwide, from emails to bank transactions to emails to secret government databases.

In 1994, a Bell Labs mathematician named Peter Shor came up with a way to crack the prime number equation that enables modern encryption methods — to work backwards and get the original

primes without knowing one of them first. This method, known as Shor's algorithm, could have broken the world's encryption methods a quarter century ago, but for one important detail. Shor's algorithm is so complex and powerful, no classical computer can execute it. You need a quantum computer to make use of it.

Modern computing is based on bits. A bit has a single value, either 0 or 1. All computer programs, at the most basic level, are essentially an unbroken string of 0s and 1s.

A quantum computer, in contrast, is based on qubits, which is short for "quantum bits." A qubit, which takes advantage of quantum effects, has the ability to be a 0 or a 1 simultaneously, a phenomenon known as superpositioning.

Through the combination of superpositioning and quantum entanglement effects, a quantum computer thus has the potential to be millions of times more powerful than any classical computer. As the number of qubits in a quantum computer increases, the computing power increases exponentially.

This is why the quantum computing revolution will eventually break down modern encryption methods. A quantum computer powerful enough to run Shor's algorithm in real time could strip away encryption layers instantaneously.

If a single corporation or government had full-fledged quantum supremacy in today's world, it would be like the 1992 movie *Sneakers* with Robert Redford and Dan Aykroyd. In that movie, a shadowy organization had the ability to instantly decrypt any private message, or to read any communication at will. For everyone else, it would be a nightmare.

This makes the quantum computing threat comparable to the Y2K bug. Heading into the year 2000, there was widespread fear that computer systems everywhere would break, due to the double-digit rollover of calendar systems from '99 to '00.

The Y2K threat was real, but the actual arrival of the year 2000 turned out to be a non-event, thanks to the widespread motivation to prepare in advance. The corporate world developed such a healthy fear around what might happen as a result of Y2K, corporate IT departments actually did something about it and averted the problem.

A similar sense of urgency — though without the hard date — is now developing around the quantum computing issue. We don't know when full-fledged quantum computing will actually arrive. But we do know the attitude is “better safe than sorry.” Because the problem is so big, and also a matter of national security, there are computer scientists the world over working on next generation cryptography solutions.

The ultimate answer to “Quantum Supremacy” — an area in which quantum computing dominates — will be the development of “Quantum Resistance,” in the form of widespread quantum cryptography adoption.

Just as it is possible for a quantum computer to perform orders of magnitude faster than a classical computer, it is possible to develop quantum encryption methods orders of magnitude harder to crack. Figuring out how to do this is non-optional: All digital commerce and secure communication systems depend on it.

Google earned true bragging rights for its quantum computing feat, in which a math problem was solved in minutes that could conceivably take a modern computer ten thousand years. At the same time, the wild conditions under which Google conducted the experiment demonstrate why a real quantum computer is likely years down the road, if not decades down the road.

To achieve the quantum supremacy milestone, Google used a specially designed processor dubbed Sycamore. This processor

contained 54 qubits in a two-dimensional grid. In order for the qubits to calculate properly, Google used liquid helium to cool the processor to a temperature just above absolute zero, which is minus 273 degrees Celsius or minus 460 degrees Fahrenheit.

This is problematic for at least three reasons. First, estimates suggest a functional quantum computer would need between 1,000 and 10,000 qubits — so 54 qubits is a drop in the bucket by comparison. Second, a temperature just above absolute zero (the coldest temperature allowable by physics) can hardly be recreated easily at scale. And third, in order to beat encryption layers in real time, the levels of sophistication and complexity in error reduction will have to increase by orders of magnitude.

All of this combines to suggest the world's first quantum computer is probably at least five years away — and it might even be twenty-five to fifty years away. It isn't yet clear that Google, or anybody else, will be able to scale up such an experimental process any time soon.

It is at least theoretically possible that, deep in the bowels of some government agency, a fully functional quantum computer already exists. This is highly unlikely. But even if it is true, that agency has very strong incentive to keep its technology secret, and to focus it on matters of utmost national security — like intercepting the military communications of a rival power, or gaining override status to nuclear codes.

In practical terms, this means we won't see quantum computing attacks on cryptocurrency in the near future — not for years at minimum. And in the meantime, Bitcoin security is not sitting still. The Bitcoin signature algorithm is already in the process of being improved, with a steady roster of improvements to come. By the time quantum computing is available on a commercial basis, with quantum-enabled apps on your smartphone, the Bitcoin blockchain will long have since upgraded.

One of Bitcoin's key advantages is the global community of developers and technologists who support it. Even as these words are being written, coders are hard at work on upgrades to the security infrastructure of the Bitcoin blockchain.

Thanks to the nature of the quantum computing challenge, and the multi-year preparation window we know is available (if not much longer), the Bitcoin community will have time to layer quantum resistance into the blockchain. Basic adjustments to the Bitcoin protocol can thus serve as a bridge between the prior age and the upcoming quantum age.

Then, too, we know that Bitcoin's underlying code structure can evolve much faster than the legacy systems with equal exposure to the quantum computing threat, like the transaction systems underpinning trillions of dollars worth of e-commerce.

This means that fantastically wealthy entities, like the big tech companies and the money center banks, have life-or-death incentive to push the development of quantum resistant cryptography breakthroughs. Bitcoin can piggyback off the innovations uncovered by these efforts.

This also goes back to one of the most important things Bitcoin has achieved: Global acceptance as a sovereign store of value alongside gold. This is no small thing. And while Bitcoin has not survived a major financial crisis as of this writing — it has not seen one in its ten years of life between 2009 and 2019 — it has shown itself to be a sovereign store of value alongside gold, and perhaps the hardest form of “hard money” ever to exist. (Bitcoin is the only global commodity with a fixed deflationary supply curve that is guaranteed to hit zero, meaning that, at a point not too far off, no more Bitcoins will be created, ever.)

All of this increases the odds Bitcoin will not just survive, but thrive,

in the transition to a quantum-driven world. It is also helpful to remember this world could look more even more radically different than we can imagine.

If the promise of quantum computing is unleashed, this will happen alongside groundbreaking developments in artificial intelligence, genetic engineering, renewable energy development, and 3D printing. All of these areas, in conjunction with quantum computing, could then build on each other in an accelerated self-referencing feedback loop.

A world like this could be so radically different and disorienting it invokes the old zen saying: “The bad news is you are falling through the air. The good news is that there isn’t any ground.”

Bitcoin might feel comfortably familiar in the midst of all that flux. In that respect the social technology layer, and the immutability of human nature, might remain one of Bitcoin’s biggest edges. As such the future looks bright for Bitcoin, whether quantum computing arrives in five years or fifty.

SURVIVE AND THRIVE IN THE NEXT BEAR MARKET

Are you ready for the next bear market? Have you thought about what the next bear market will be like... and how you will handle your portfolio when it comes?

If you haven't given much thought to the topic, you aren't alone. Most investors have little idea what to do in bear markets.

That is also why many investors get clobbered in bear markets – financially and emotionally – with devastating impact on their long-term retirement goals.

It's a good idea to avoid that (obviously). The proper mindset was captured by Pericles, a Greek statesman from the 5th century BC: “Our job is not to predict the future, but prepare for it.”

We don't know when the next bear market will begin... and our job is not to guess. The current bull run for US equities, which is now the longest in history by various measures, could yet keep going like the energizer bunny for three months... six months... even longer.

But sooner or later – and sooner is a real possibility – it will come to an end. And another bear market will come.

First Trust, a portfolio wealth manager, did a study of S&P 500 performance dating back to 1926. They divided the S&P 500's performance into bull and bear market periods, and defined “bear market” as follows:

From when the index closes at least 20% down from its previous high close, through the lowest close reached after it has fallen 20% or more.

Based on that definition, the S&P 500 has seen eight separate bear

markets since 1926. The average bear market length, according to First Trust, was 1.4 years. And the average cumulative loss was 41%.

The longest bear market, after the 1929 crash, was 2.8 years. The shortest, after the crash of 1987, was just 3 months.

Keep in mind, though, that First Trust measured from the point of 20% decline to the bottoming-out price. In terms of investor psychology, a bear market can feel like it is longer, because the final bottom can only be determined with hindsight. Many will consider the bear to be ongoing for months or even years after a new bull run has started.

What can we learn from this data?

The 17th century English philosopher Thomas Hobbes once described the life of man as “nasty, brutish and short.” Fortunately the life of man has improved. But that is still a good description of bear markets. Equity bear markets can be painful... and bloody... and they come to an end faster than most would expect.

We can also see that bear markets are potentially devastating for retirement assets. An average cumulative loss of 41 percent – not just on an individual stock holding, but for one’s entire nest egg – is a very tough pill to swallow.

Bear markets can also devastate mental capital, which is just as important as financial capital.

An investor’s mental capital represents their sense of well-being, their emotional resilience, and their ability to make wise decisions under pressure.

When financial capital is hit, investors lose money. But when mental capital is hit, they lose their nerve and their capacity to be rational, which is sometimes even worse.

For unprepared investors, the real pain of a bear market is not just the potential for a 41% haircut from start to finish. It is also in the magnification of losses through leverage and the lack of ability to bounce back when a new bull run begins.

Many investors use “leverage,” which essentially means adding borrowed money to their own capital in order to increase returns. (This is not an exotic concept. If your stock trading account is qualified to use margin, as many are, that means you have the ability to buy \$200 worth for stocks for every \$100 in capital.)

Leverage becomes very popular towards the end of a long bull market run. As investors grow more confident, their willingness to use leverage increases. The amount of optimism and leverage tends to peak even as the bull run reaches its climax. This magnifies the pain of the bear market that follows.

Then too, when the average investor experiences a bear market, their mental capital is depleted. This takes away their capacity to react rationally and pursue solid opportunities once the bear market has ended.

This is why bear markets can extract a double or triple cost. Not only do they inflict harsh losses on a stock portfolio, they take away the capacity to generate returns in the next bull phase... which can then reinforce a sense of frustration and despair when the investor realizes a new bull run has taken off without them! It's a truly vicious cycle.

That is the bad news.

The good news is that, by having a rational plan and using the right tools, it is possible to sidestep all of this... and to actually take advantage of the opportunities that bear markets create.

When a bear market comes, the investor's first job is to preserve

financial capital. This means “avoid losing too much money.” Their second job is to preserve mental capital. This means “avoid losing your nerve.”

As a side note, bear markets are where “buy-and-hold” strategies tend to fall apart... because the buy and hold approach is just too costly, both financially and mentally, in the face of the brutal losses.

It is one thing to be confident in buy-and-hold when the major stock indices have been gently rising for years on end. It is another thing when the markets feel like a never-ending sea of red, and have felt that way for six months or more.

As it turns out, preserving financial capital and mental capital is a two-for-one deal. Investors can preserve both by managing their risk, which means sizing positions properly and cutting off exposure to losses before they grow large.

This is where the benefit of having a plan comes in – as Pericles said, not predicting the future but preparing for it.

And to implement that plan... especially in a time of emotional stress... it’s helpful to have the right tools in place, and a sense of familiarity and comfort with those tools, so that you can make the right moves when the time comes.

Preserving financial and mental capital is a crucial step.

You can do that by having a risk management plan, which includes the tools to manage and execute that plan. Sizing your positions properly is a big part. Having access to reliable signals that warn you when an individual stock (or the entire market) has turned is another big part.

But there is another key step to surviving and thriving in bear markets – knowing when to get back in.

Advocates of buy and hold tell investors to hold on like grim death when a bear market comes. They caution against getting out because, as the buy and hold advocates put it, “you’ll never know when to get back in.”

Except you can in fact “know when to get back in...” as long as you have a plan and the tools to execute!

There are logical ways to define when a bear market is ending.

There are also opportunities within bear markets where various industries, sectors and individual stocks are experiencing bull trends, regardless of what the broad market is doing.

With the right tools, you can identify these opportunities – not in a vague or squishy way, but as defined by signals (provided via easy-to-use software) that tell you the transition is real.

And this is the place where bear markets provide opportunity – not for all investors, but the ones who were prepared.

It is always the case, almost by definition, that tremendous opportunities are available in a bear market aftermath. That is because most investors were ravaged by the claws of the bear... and were thus forced to sell at rock bottom prices.

The biggest and most powerful bull runs begin the moment the bear market ends. Having a healthy supply of financial and mental capital in those situations is a huge advantage indeed.

Being financially and mentally healthy at the end of a bear market – which means preserving financial and mental capital all throughout the course of the bear – is one of the best things you can do.

Coupled with that, you need the tools and the signals to alert you to new opportunities... both during the bear market’s duration (there are always stocks going up – this was even true in the 1930s) and especially when the new bull begins.

Investing in markets without a plan is like going on a road trip without any maps, or going into battle without knowing what kind of war you are fighting. It doesn't make much sense. And the plan itself then requires the tools to execute. But if you have a plan the proper tools to execute, the landscape looks very different.

This is especially true in the context of bear markets – a topic which invites the discussion of “downside protection strategies.”

Bear markets are typically short and unpleasant affairs – like a bad relationship that mercifully doesn't last too long. The main job with a bear market is to survive it – to come out the other side with both financial and mental capital intact.

This is a harder job than it sounds. The temptation for many investors, when faced with a bear, is to either freeze or panic, or worse yet, to freeze until the bear market is almost over, and then panic at the low point.

One of the first and most successful downside protection strategies was devised by the original hedge fund manager, Alfred Winslow Jones.

Alfred Winslow Jones not only dreamed up the whole concept of hedge funds – and the 20% fee structure, based on Phoenician sea captains taking 20% of profits for a successful voyage – he was one of the greatest money managers ever.

In the 34 years of running his hedge fund partnership, Jones only had 3 down years. In his first two decades of performance, from 1949 to 1968, Jones earned a cumulative return of roughly 5,000 percent, a result that would have turned \$10,000 into \$480,000 while crushing the market averages.

Alfred Winslow Jones was born in Melbourne, Australia, and came to the United States when he was four years old. After an interesting

and varied career which included a stint in the US Foreign Service, a doctorate in Sociology, and flirtation with becoming a Marxist –, Jones became a journalist for *Fortune* Magazine.

While doing research for a 1949 *Fortune* article titled “Fashions in Forecasting,” the breakthrough insight Alfred Winslow Jones had was that leverage and short selling – betting that stocks would fall rather than rise – could be used as a means of reducing risk, rather than increasing it.

In the 1940s, the pain of the 1929 stock market crash and the 1930s Great Depression decade was still fresh. Leverage (using borrowed money to buy stocks) and short-selling (wagering stocks would fall rather than rise) were seen as the tools of 1920s era speculators, too risky for responsible investing.

Alfred Winslow Jones discovered the opposite.

He realized that, deployed properly, leverage and short-selling could, at least in theory, make the investing process safer and more profitable at the same time.

As Sebastian Mallaby recounts in his excellent biography of hedge fund industry legends, *More Money Than God*, Jones explained his philosophy with the following example via private prospectus in 1961:

Bull Market Result	
TRADITIONAL INVESTOR	HEDGED INVESTOR
30% gain on \$80,000 worth of stocks Gain: \$24,000	30% gain on \$130,000 worth of stocks 10% loss on \$70,000 worth of shorts Net gain: \$39,000–\$7,000 = \$32,000
Bear Market Result	
TRADITIONAL INVESTOR	HEDGED INVESTOR
10% loss on \$80,000 worth of stocks Loss: \$8,000	10% loss on \$130,000 worth of stocks 30% gain on \$70,000 worth of shorts Net gain: \$21,000–\$13,000 = \$8,000

In the example Jones used, two investors have equal stock-picking ability.

But the traditional investor does the traditional thing – goes 80% long stocks and holds 20% cash – while the “hedged” investor does something different.

In Jones’ example, the hedged investor uses leverage to double his total exposure to the market – from 100K to 200K – and then takes another aggressive step, pairing \$130K worth of long stock investments with \$70K worth of short positions (which profit when stocks fall rather than rise).

If the shorts are selected with care, the hedged investor can outperform the traditional investor in bull and bear markets alike.

In a bull market, the hedged investor loses money on their short picks – but they more than make up for it with greater gains on their increased long-side exposure.

And even better, in a bear market, the traditional investor can wind up in the red while the hedged investor still makes money, because the shorts gain more in value than the amount the longs decline!

This is why Alfred Winslow Jones referred to being “hedged” – the idea was to reduce overall levels of risk by hedging one’s bets, which was done through a careful leverage-and-short-selling combination.

The concept worked spectacularly for Jones and his investors. He started his partnership in 1949 right before the *Fortune* article was published, raising \$100K of which \$40K was Jones’ own money.

Nobody really paid attention to what Alfred Winslow Jones was doing – or how well he was doing – for another 17 years.

That changed in 1966 when another *Fortune* journalist, Carol Loomis, wrote a glowing article titled “The Jones Nobody Keeps Up With.”

After Jones' methods were explained – with his 17-year track record to back them up – interest levels in the Jones technique exploded. Over the next three years 130 hedge funds were formed – including Quantum Fund, one of the most successful hedge funds of the 20th century – and the hedge fund industry was born.

So how can you take advantage of Alfred Winslow Jones' big insight?

Well, for the last ten years or so, downside protection hasn't been much of a worry. Markets rose and rose, and passive investing strategies seemed to dominate the market.

Now, though, the kind of downside protection used by Alfred Winslow Jones – the actual “hedging” of longs with a corresponding group of shorts – can have a lot more value. And one limited-risk way to get exposure to the short side of the market is with put options.

Short-selling is not easy. Without the proper training it can be dangerous. But by purchasing put options – a type of options contract that rises in value when an instrument falls in price – it is possible to see bear market gains on stock declines while limiting initial risk.

Using put options as tools to limit the risk, it thus becomes possible to devise bear market protection strategies in the style of the “hedged” approach Alfred Winslow Jones used, while limiting the strategy risk for investors who use them.

Another point in favor of put options is something that top performing hedge fund managers know: Bearish positions in a portfolio can make it easier to hold bullish ones.

In other words, if you have positions that are bearish – that benefit when markets fall – it can make it easier to maintain positions that are bullish (which tend to profit when markets rise).

The way this works is through a concept known as hedging. There are different kinds of hedging – and many different types of hedge

— but the simple thing to understand is that a hedge is a form of insurance.

The whole reason commodity futures markets were invented, for example, was so that grain buyers and sellers could use futures contracts to take out insurance, or “hedge,” against the inherent business risk in volatile commodity prices.

For example, if a farmer has a large quantity of wheat coming to harvest, the farmer has business risk — possibly even bankruptcy risk — if the wheat price falls sharply before his crop is sold in the cash market.

So the farmer can sell, or go “short,” wheat futures contracts that earn a profit if wheat prices decline. The farmer can do this far in advance of the actual cash sale, while the wheat is still growing in the ground.

If the wheat price then falls, and the wheat futures position is sized properly, the profit from the bearish futures trade offsets the loss from selling physical wheat at a lower price in the cash market. If the price of wheat rises instead, the loss on the futures position is covered by the gains from a higher cash price.

The end users of commodity products have business risk in the other direction. For example, if a food processing company has to buy wheat to make its products, the food processing company would be hurt if the price of wheat rose sharply before its purchase orders were completed.

So the food processing company would go long wheat futures contracts — thus taking a bullish position, the opposite of what the farmer did — to hedge against the price of wheat rising rather than falling. This reflects the food company’s business risk as a buyer of wheat, versus the farmer’s as a seller.

In the stock market, the term “hedge fund” originally implied the hedging of market risks, which goes back to “insurance” against the impact of undesirable price movements. But rather than using futures contracts, for hedge funds this was done via bearish stock positions to offset the downside risk of bullish ones.

If a hedge fund manager wanted to invest in Ford but not the rest of the auto industry, for example, they might take a bullish position in Ford, but then take a bearish position in other automakers. This would reduce the overall market exposure risk of being long Ford. A bearish automaker position might also let the hedge fund manager take his long Ford position in far larger size, because the downside risk is less.

Another reason hedge fund managers like bearish positions is because they can lower the “beta” of a portfolio, which reduces market risk and lessens volatility.

In the stock market, beta is a measure of two things: How volatile a stock is, and how correlated the stock is to the larger market.

Beta is a mathematical calculation based on correlation and historical price movement, and as such it also applies to other instruments than stocks: ETFs, options, futures, indexes and so on. But the most popular use of beta is applying it to stocks, and at a higher level applying it to entire stock portfolios.

In general terms, if a stock has a beta of 1.0, that means it is has about the same level of risk and volatility as the market. So if the S&P 500 rose 10%, a stock with a beta of 1.0 would also be expected, in general terms, to rise 10%.

If a stock has a beta of 1.5, that means it is 50% more volatile than the market on average. If the S&P rises 10%, a 1.5 beta stock could be expected to rise 15% (a multiple of 1.5X).

It also holds in the downward direction: If the S&P falls 10%, a stock with a beta of 1.5 would be expected to fall 15% on average.

A beta between 0 and 1 means less risk than the market. So a stock with a beta of 0.5 would only move half as much (50% as much) as the broader market.

It is also possible to have a negative beta, where the value is between 0 and negative 1. This happens when the correlation is negative.

For example TBF, the ProShares Short Treasury ETF, will have a negative beta relative to its treasury bond benchmark, because TBF falls when treasury prices rise (and rises when treasury prices fall).

Beta can also be calculated for an entire portfolio. This is done simply by calculating the beta for each position in the portfolio, adjusting it for position size, and then taking the net of all the betas together.

So a stock portfolio with a beta of 1.5 would be 50% more volatile than the market on the whole, while a stock portfolio with a beta of 0.5 would be half as risky as the market.

These are just mathematical estimates, of course, but they are based on logical calculations using historical data. (Because the future is not yet written, the past is what we have to go on — while always remembering the past is a guide, not a guarantee.)

For most hedge fund managers, the big goal is delivering steady investment returns with less volatility than the market. This is where bearish positions in a portfolio can pay off.

A bearish position in a portfolio — whether it is a short position in a stock or ETF, a long-dated put option, or something else — will have a negative beta by definition. It is expected to profit if the market declines.

This in turn means that bearish positions mixed in bullish ones tend to lower the overall beta of a portfolio, which lowers the expected amount of overall volatility and risk. The results of this can be quite valuable.

For example, say that two portfolios both deliver 15% gains over twelve months, but portfolio A has lower beta, and manages to deliver those 15% gains with half the volatility of portfolio B.

In market terms portfolio A would be considered more efficient, and investors in portfolio A would have an easier time sleeping at night. If these results were replicated over time, the money manager running portfolio A would have a lot more success than the one running portfolio B.

The impact on total portfolio volatility, through the lowering of beta, explains why bearish positions in a portfolio can make it easier to hold bullish positions.

In market environments that are volatile or risky, it can be good to have positions that will profit even if the market falls. And even in markets that are calm and bullish, delivering returns with lower beta can mean better sleep at night.

WINNING INVESTOR PSYCHOLOGY

The phrase “months of boredom punctuated by moments of terror” is more than a century old. You can find it in the New York Times’ “Current History of the European War,” published in 1915, as a description of infantry work in the trenches.

The concept still applies to modern warfare today. It also applies to investing, to the extent that markets switch between long periods of calm and occasional bursts of hair-raising volatility.

In preparing for the turbulent 2020s, investors could do worse than learning from US Navy warship crews.

In the United States Navy, warship crews prepare for high stakes moments by developing something called a “battle rhythm.” The routines of the battle rhythm ensure a calm and smart response in the midst of dangerous situations. Investors can adopt this concept too.

For the US Navy, a smooth response is critical because the wrong move could be disastrous. If a military incident is wrongly interpreted as a hostile action, a shooting war could be the result, with a cascading series of events then spiraling out of control. And naval conflict on the high seas is now a recurring theme:

- On June 7th, 2019, a billion-dollar US warship barely avoided a collision with a Russian destroyer 200 miles off the coast of Japan. The Russian ship had closed within 100 feet and seemed determined not to change course.
- In October of 2018, a Chinese destroyer nearly struck the USS Decatur.

- The US Navy is now on high alert in the Middle East due to tanker attacks near the Strait of Hormuz, one of the most geopolitically sensitive waterways in the world.

The greater the risk of conflict, the more important it becomes to maintain flawless execution in every situation. The Wall Street Journal explains how warship crews accomplish this in a recent piece titled, “In Menacing Seas, the Navy Relies on Battle Rhythm.”

Here is how WSJ reporter Sam Walker describes it:

“A battle rhythm isn’t quite as dramatic as it sounds. It has very little to do with firing weapons and everything to do with setting a routine...

Once the captain’s cadence is honed to perfection, the crew begins to function at a uniform pace. Department leads organize their own workflows around it, devising new synergies that make the ship’s operations more efficient.

The ultimate goal, of course, is to help the crew prevail in a crisis. When a team does the same things at the same times at the same pace for months, the thinking goes, habits form. Muscle memory begins to crowd out the mind space that might otherwise be flooded with panic and hesitation.

In other words, a crew in sync wins at war because it makes good decisions quickly and unconsciously with minimal oversight.”

There is a neuroscience concept at work here known as “automaticity,” which is the ability to carry out tasks with minimal conscious effort.

Think of the difference between learning to drive a car versus driving a car for decades. The teenager has to think about everything, and consciously focus on every important aspect of the driving experience. For the experienced driver, driving requires little conscious effort at all. The difference is automaticity, which is acquired via practice over time.

Automaticity — which is powered by familiarity, habit and routine — becomes crucial in high stress situations, and especially crisis situations, because the stress of the event crowds out the ability to think and focus. In times like these, the mind and body fall back on routines learned by heart. If a high quality routine is not available, the mind may substitute a bad one — or worse yet a panic reaction..

This explains why it's important to establish routines and habits well before a crisis starts. If a Navy warship captain, or an investor for that matter, tried to devise a high-stress response plan in the midst of a real-time situation, it would probably be too late.

The time to develop established routines and methods — and then practice them to perfection — is during the calm period before the storm hits, which is exactly what the battle rhythm is all about.

Another way in which Naval patrols and investing are similar is that, when it comes to high stakes situations, 5% of the actions can drive 95% of the results.

In other words, the career success of a Naval warship captain may not be judged by the thousands of hours when nothing happened; it will likely be judged by the small handful of hours when mission critical decisions were made.

Similarly, one of the biggest challenges in preserving and growing investment capital over decades is not sticking with an intelligent when things are calm; it's sticking with the plan when volatility hits.

Investors can develop their own battle rhythms by creating routines and planning out scenario responses in advance. With routines that are deeply familiar, it's easier to “keep calm and carry on” in the midst of raging volatility storms. And if scenario responses are planned out in advance, a checklist of actions reduces the “cognitive load” of having to decide things in the moment, making it easier to stay on track.

Investment software can play a role in devising battle rhythms by helping investors make concrete decisions. This happens through a combination of information and alerts: The software can present data in an informationally useful way, giving the investor visibility on exactly what's happening; and the software can also provide alerts, giving the investor a reliable “heads up” when action is needed.

If you have a plan to exit a position if the trailing stop is hit, for example — and if you have a natural routine in which you pay attention to price alerts and follow through on them automatically — the mental energy requirements for decision-making will be lower in high-stress periods.

Developing a battle rhythm also has a payoff in calm periods — not just those rare windows of time when volatility storms hit — to the extent that a well-designed routine encourages day-to-day best practices.

If you establish a habit of practicing high-quality investment discipline on a small scale, over hundreds or thousands of day-to-day decisions accumulated across decades' worth of investing, you create the opportunity to compound the gains from all those good decisions over time.

Another key aspect of navigating the 2020s will be avoiding “GroupThink.”

As a rule, markets behave rationally much of the time — but certainly not all of the time. And at various points in the market cycle, irrational behavior can lead to extremes. Mr. Market is like the typical human being in this way: Logical and grounded most of the time, but occasionally way out of bounds.

For investors, these irrational periods are when markets are at their most dangerous. It only takes one major lapse to gravely damage a portfolio. There are two concepts — Groupthink and the Bandwagon

Effect — that explain what happens when investors exhibit irrational behavior en masse.

There is also a famous study, first conducted in the 1950s and updated with brain scans half a century later, that show how peer pressure shapes perception. Not only can peer pressure change what you think, it can change what you see!

Fortunately, there are two powerful techniques for avoiding these pitfalls. We'll look at the various terms and the psychology study, and then cover the techniques that can help you inoculate.

The term “Groupthink” was popularized through the work of Irving Janis, a research psychologist at Yale University, who published a book on the concept in the early 1970s.

Groupthink is literally when a group of people winds up thinking in the same way, the pull of the group extinguishing independent perspective. This can happen through a desire to promote harmony or a desire to minimize conflict, two sides of the same coin. It can also happen when alternative views are ignored or avoided, or when dissent is frowned on or suppressed.

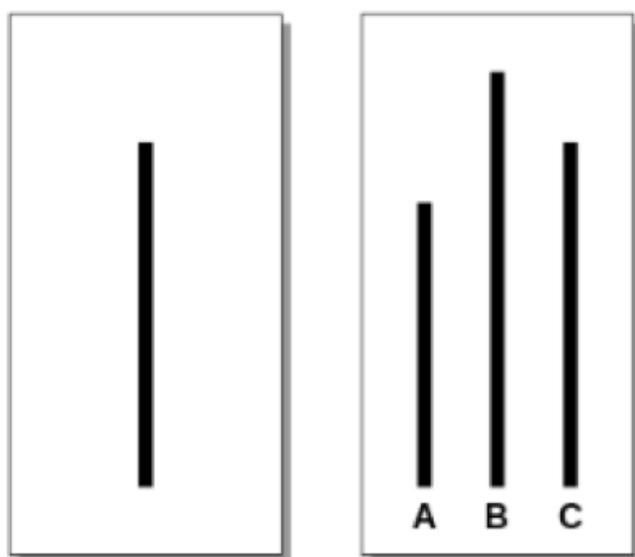
The Bandwagon Effect has much older origins as a psychology term, dating back to the mid-19th century. In the 1840s, an entertainer named Dan Rice toured the country campaigning for Zachary Taylor, who would then become the twelfth president of the United States.

Rice traveled around the country in a bandwagon. As part of the act, he would encourage supporters to “jump on the bandwagon” in support of candidate Taylor. This was viral marketing in its earliest form, thirty years before the light bulb was invented. Because it worked (Taylor won the election), politicians of all stripes started using bandwagons in their campaigns. To “jump on the bandwagon” thus became a cynical description of going along with the crowd.

The most famous peer pressure and conformity study was conducted in 1951 by Solomon Asch, a pioneer of social psychology. For the experiment, Asch would ask eight students to participate in a “perceptual study” — but in reality it was a psychological experiment.

Seven of the eight students Asch used were actors. The idea was to have the actors give a false answer to obvious perceptual questions, and then see if the eighth student — the real participant in the experiment — would change their answer too.

The group would be shown cards with lines on them like the below (via Wikipedia) and answer questions like, “which of the three lines (A, B or C) corresponds to the reference line?”



The group was set up so the real student would always answer last, and thus be influenced by the actors. For the first two trials in the experiment, the actors would give the correct answer (which was obvious). For the remainder of the trials, the actors would give a false answer in unison.

Asch found that, in the control group with no actors, the error rate of participants was less than 1%. (The questions were extremely

simple.) But when the actors were present, the error rate climbed to nearly 37%, and 75% of all participants gave an incorrect answer — showing they were swayed by the actors — at least once.

When it comes to the old saying “Who are you going to believe, me or your own eyes?” it is clear that, a lot of the time, we wind up trusting our peers more than what we see. But the reality is even stranger than that, as was discovered almost half a century later.

In his excellent book *Think Twice*, Michael Mauboussin explains how, in the 1990s, a neuroscientist named Gregory Berns did a new version of the Asch experiment, with the added twist of using a functional magnetic resonance imaging (fMRI) machine to scan the brain activity of the participants.

What Berns and his Emory University colleagues discovered was that, as the participants gave their wrong answers to visual puzzles as prompted by confederate peers, the parts of the brain that handle judgement and deliberate action were not activated — only the parts that process visual information.

This meant that actual perception had shifted: The participants who answered wrongly were experiencing an altered visual reality based on manipulated peer input. “Seeing is believing what the group tells you to believe,” Berns concluded.

Berns found something else interesting that confirms the power of groupthink even more. For the subjects who resisted the temptation to go with the group — the contrarians who stuck with their guns on what they saw, even as their peers said something different — the amygdala brain region showed a spike of activity.

The amygdala is the part of the brain that handles fear and distress. In conditions of sudden danger the amygdala triggers the “fight or flight” response. This shows that, at the level of the subconscious, going against one’s peers can be a hostile or frightening act. As social

beings, we humans are truly wired to “get along to go along” and ‘go with the flow.’”

So how can investors avoid the pull of Groupthink and the dangers of the Bandwagon Effect? There are two basic techniques, both of them simple yet powerful, that can help you avoid these traps.

The first technique is consciously deciding, as an investor, who you self-identify with as a group. Human beings are social by nature, and we all have various groups — professionally, socially, spiritually — that we see ourselves as being a part of.

Meanwhile the majority of investors have poor results and fail to achieve their long-term goals. This is a sad reality, but statistics demonstrate it is true.

On the other hand, there is a small group of winning investors who are successful in markets, and who generate above average returns from markets while achieving their big goals over time.

If you choose to deliberately self-identify with the winning investor group, and you make a habit of doing this, you will naturally want to think like that group and behave like that group.

This can manifest itself in small things, like asking “what would winning investors do” when faced with a decision. It can also manifest itself in big things, like learning specifically where the habits of winning investors diverge from the habits of the crowd, and then consciously embracing those habits.

The second thing you can do is take what Daniel Kahneman and Amos Tversky called “the outside view,” which can help counterbalance the “inside view” that is swayed by emotion and peers. To roughly paraphrase:

- The “inside view” focuses on personal circumstance, personal details, and personal experience: It is your gut feel about a specific

situation at hand, based on anecdotes and evidence and details in front of your nose, and it can also be your desires or what your emotions are telling you.

- The “outside view” focuses on comparable experiences that other people or groups have had; forms of evidence and data that are not colored by your own experience or gut feel; and an attempt to look at the situation and assess it as a neutral third-party observer, remaining as data-driven as possible.

To adopt the “outside view” is to think like a researcher comparing a data sample to other data samples. It is also like stepping outside of your own shoes: Watching the situation as if you were someone else, to remove the distortions of emotion and peer pressure from the decision-making process.

For example: It is easier to self-identify with the winning investor group if you can actually see and emulate what winning investors are doing — and that is the exact rationale (along with mountains of data and backtesting) behind our “Billionaire’s Club” investment screens, which show you what the world’s best investors are doing.

It is also easier to take “the outside view” when you have access to data, presented in a clean and powerful way, that lets you see the state of markets — and your personal portfolio — in a clear and objective light.

Data organized and presented objectively can help make you more rational as an investor, while putting a focus on the right metrics; following the actions of the best investors in the world, and benefiting from incorporating their decisions into your own portfolio, can then add to investment success; and all of this can lead to greater self-identification with the “winning investor” group as opposed to the crowd, reinforcing a virtuous feedback loop.

Last but not least, honing intuition could be critically important in navigating the 2020s.

What does it mean to have good intuition, or even expert-level intuition? And is it possible to develop this with investing?

The answer is yes. You can develop an intuitive sense of investing — what some would call “gut feel” — where your gut is trained to do the right thing, and the proper move to make simply “feels” right.

When you have this as an investor, making the correct decision comes naturally most of the time. You don’t have to force the issue or fight against yourself.

It doesn’t mean you always avoid mistakes or losses — even the greatest investors in the world make judgement errors and take losses from time to time.

But it does mean your intuition as an investor can be your ally rather than your enemy, which is a very big thing. When your intuition has been trained to steer you in the right direction, it means you can “trust your gut” and lean into it, with intuitive signals reinforcing your odds of investment success.

There is a technical term for what we are describing here. Expert-level intuition is more formally known as “recognition-primed decision making.” There is something called the recognition-primed decision model, or RPD for short.

“RPD strategy” is the study of how experts make intuitive decisions in complex situations. To call it “recognition-primed” is to acknowledge the force behind all this is not mystery or magic, but rather rapid-fire subconscious interpretation of signals from the environment.

Expert intuition, also known as recognition-primed decision making, applies to all kinds of fields and all kinds of situations, some of them with very high stakes. One of the most famous examples is the real-world study of a firefighting crew, via cognitive researcher and intuition expert Gary Klein.

In this real-world example, the team is fighting a fire in the back of a house. The fire is small but the flames are oddly persistent. Efforts that would normally douse the flames continue to fail. For whatever reason, the fire refuses to die out. Meanwhile the living room feels oddly warm.

The team leader is puzzled at first. Something doesn't add up. Suddenly all his instincts scream "Danger!" He scrambles the team out of the house, and moments later the living room floor collapses.

It turns out there was a raging fire in the basement of the house. The firefighters didn't know this, but the instincts of the fire commander picked up subtle clues that something was off. His experience told him "this is not how fires are supposed to behave."

When the fire commander told Gary Klein this story, he thought it was ESP, or a kind of sixth sense, that saved his men that day.

But Klein knew it was the power of recognition — the ability of the subconscious to pick up information from small cues and subtle hints, based on experience, and to take the right action as a result (getting everyone out of the house).

Daniel Kahneman, the behavioral science pioneer whose Nobel-prize-winning research helped shape our software, also talked about expert intuition in a recent interview. (Kahneman is still sharp and professionally active in his mid-80s.)

Kahneman pointed out that, to develop expert intuition in a complex field, you generally need three things. To summarize, those three things are:

- A regular world (consistent and repeating environment)
- A body of experience (familiarity with different scenarios)
- Rapid and clear feedback (accurate performance signals)

These conditions are available to investors (with a little help from software), which is why the development of expert intuition as an investor is possible.

The stock market is a “regular world” in the sense that the same things tend to happen over and over again. The stock market never truly repeats — the future always contains a twist on the past. There are always novel combinations of new technologies, new companies rising or falling, and so on.

But at the same time, though market history does not repeat, it certainly “rhymes.” The same factors drive investor behavior year in and year out, so much so that investor behavior is roughly the same today as it was 100 years ago.

Meanwhile the same fundamental metrics have an impact on company profits, the same long-term cycles (for example high-inflation versus low-inflation periods) continue to oscillate, and so on.

This regular world allows you, as an investor, to develop a body of experience over time that maintains long-term value, because future environments will have characteristics and factors you can recognize.

You can experience different scenarios and internalize them. With the more painful and unpleasant scenarios, you can ideally observe others experiencing them and learn once removed!

But in order to turn a body of experience into expert intuition, an investor needs clear feedback on the decisions that are made. If you don’t know whether a decision is good or bad, it is hard to develop a sense of “feel” as to whether that same decision would be right for a similar scenario in the future.

And this is where software and a disciplined investing approach, with structure and rules, truly pays off.

If someone says they have 20 years of experience in the market, but

they never developed any logical rules or structured way of doing things in all that time, the 20 years of experience has not necessarily helped them. There was no method for turning market feedback into a set of logical, repeatable decisions that were refined for quality's sake and can be made over and over again.

If you do create a set of rules and set out to improve them, however, you give your intuition something to build on. You can interact with the market and get feedback on your decisions, to determine whether they were good or bad.

If you do this consistently over time, you can develop the natural “feel” — the expert intuition — we are talking about.

We know this because we know where real intuition comes from: Interaction with a regular, repeating world, in order to develop a body of experience, with rapid and clear feedback to shape decisions.

This also explains why the tracking and analyzing capability of investment software can be so valuable.

Great software can help you analyze the current state of markets and make wise decisions in the moment. But it can also track results from the past and give you meaningful ways to learn from the data of your own investing history, which is equally important.

When you put it all together, it is possible to develop good intuition, or even expert-level intuition, as an investor. The benefits to doing this are more than just financial — they make investing a more fun and enjoyable process, in part because it literally becomes easier. (Having trained your instincts, you no longer fight or sabotage yourself.)