MARKET UPDATE

Economic Lifecycles and Bubbles: How to navigate in the Post- Covid Economy

June 15, 2021

- The current economic cycle could see higher growth rates, but as a result risks being shorter in duration than recent expansions
- Financial conditions at the onset of this recovery are substantially stronger than the historical average
- Monetary and fiscal policy are likely to remain highly accommodative in the near-term
- The strong market recovery has led some to question if a bubble may be developing, but the historical evidence indicates that this risk is currently relatively low

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In our recap of 2020, we noted that the pandemic ended the longest economic expansion in the history of the United States. While the most recent expansion now holds the record, the prior three expansions exhibited above average longevity as well. The National Bureau of Economic Research, the body that officially defines US economic cycles, ranks the last four expansions as the first, sixth, second, and third longest, respectively, out of 34 total official economicexpansions since 1857. Though the next economic cycle is still in its infancy, it is valuable tobegin to think about how this next cycle may evolve throughout its course. At their core,economic cycles are a sequence of events, not merely a passage of time. This sequence of events is traditionally divided into four stages (recession, rebound, expansion, and peak) andhistorically have evolved with varying duration. Some cycles are short and, as was the case for the four most recent cycles, some are quite lengthy. Are the conditions in place for recent history to repeat itself, resulting in another long-lived expansion? Or, conversely, do current conditions suggest that the duration of the next economic cycle is more likely to revert toward the historical mean? Given the highly differentiated asset returns historically experienced during each stage of an economic cycle, the answer has significant implications for investment strategy. These decisions will be crucial to navigating the environment that lies ahead successfully–particularly if this cycle evolves differently than cycles in the recent past. History indicates that the conditions present at the beginning of a recovery cycle influence its duration.

The lifecycle of the stars that light up the night sky provides an apt analogy that may help identify the likely path of the economic cycle as it evolves from here. For context, let's first begin with a quick and very – and I mean very – elementary primer on astrophysics and stellar evolution:
The duration of a star's lifetime is a function of its mass – the matter that makes up the core. In short, the greater the mass of the core of a star at initial conception, the hotter it burns, and the hotter it burns, the shorter it lives. How does this brief detour into theoretical physics relate to the global economy? We can think of the lifespan of an economic cycle as similar to the lifecycle of a star. The initial conditions at the onset of a new economic cycle determine both themagnitude of the economic growth generated during the cycle and the duration of cycle. Just as the amount of matter in the core of a star determines how hot it burns and how long it exists, the initial financial conditions and macroeconomic environment present at the onset of aneconomic recovery influence the evolutionary path of the cycle.

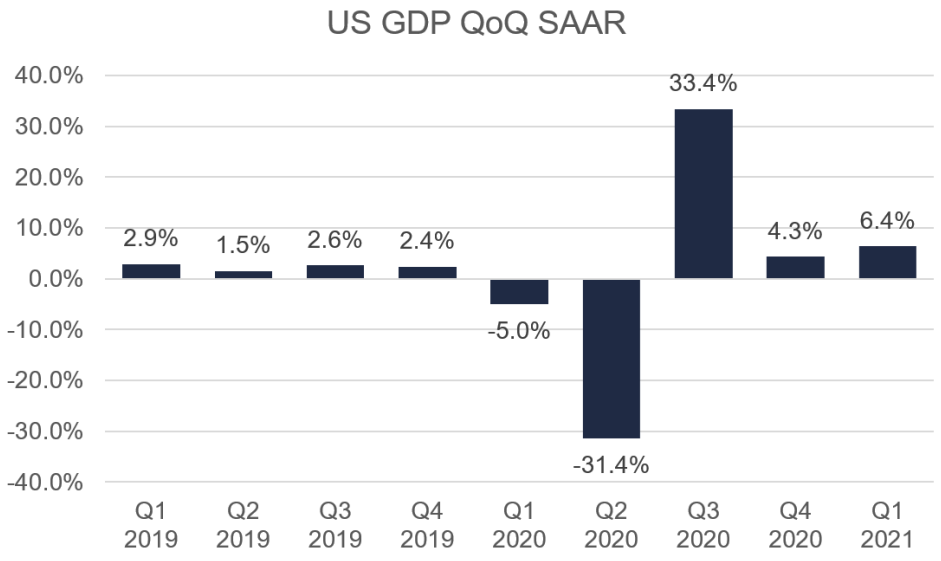
The COVID Recession in Historical Context

When viewed through this lens, several reasons emerge to suggest that this nascent economic cycle may differ materially from the cycles experienced over the past 40 years; if so, investors may require a new playbook to successfully navigate the potential pitfalls that may arise in an economic environment unlike any seen in recent decades. While every recession and subsequent recovery cycle is unique, the COVID-19 crisis differs from historical downturns in several material ways. While the financial market response has largely exhibited the "normal" patterns we expect during recession and early recovery, the timeline of this cycle has been accelerated relative to historical recessionary cycles – officially, the COVID-19 recession was the shortest on record. Based on the official National

Bureau of Economic Research (NBER) definition of a recession, questions arose as to whether we had even experienced one in the first half of 2020 due to the duration of the peak-to-trough period. The Further Comments section of the June 8, 2020,announcement issued by the NBER Business Cycle Dating Committee is illuminating:

> "The usual definition of a recession involves a decline in economic activity that lasts more than a few months. However, indeciding whether to identify a recession, the committee weighs the depth of the contraction, its duration, and whethereconomic activity declined broadly across the economy (the diffusion of the downturn). The committee recognizes that the pandemic and the public health response have resulted in a downturn with different characteristics and dynamics than prior recessions. Nonetheless, it concluded that the unprecedented magnitude of the decline in employment and production, and its broad reach across the entire economy, warrants the designation of this episode as a recession, even if it turns out to be briefer than earlier contractions."

Two defining characteristics of the COVID-19 crisis period stand out as fundamentaldifferentiators – the speed and the magnitude of both the downturn and the subsequentrecovery. Historical comparisons around these characteristics highlight the unique andunprecedented nature of the COVID-19 recessionary cycle. The next shortest recession in history was also a result, at least in part, of an exogenous shock from a global health crisis. The1918-1919 recession occurred when the WWI armistice resulted in a sharp decline ingovernment spending just as the Spanish Flu was concurrently spreading rampantly through the global population. That recession officially lasted for 7 months – 3.5 times longer than the COVID-19 recession. The Great Depression is the closest corollary in terms of the magnitude of the decline. The Crash of 1929 led to a decline in real GDP of over 25% and a 25-percentage -point increase in unemployment from peak to trough, but these declines occurred over a much longer period (four years, 1929-1933). In comparison, March and April of last year *alone* saw a 15% decline in GDP and an 11-percentage -point increase in the unemployment rate. On the other side, unlike the experience during the Great Depression, the recovery has occurred just as rapidly. The rebound in employment levels off the trough was the fastest in history, and current estimates project that GDP will recover to pre-COVID-19 levels in Q2 2021, if it has not already. Official GDP data is released with a significant lag and is subject to subsequent revisions, but the most ambitious estimates suggest that we may have surpassed the pre-COVID-19 peak in Q1.

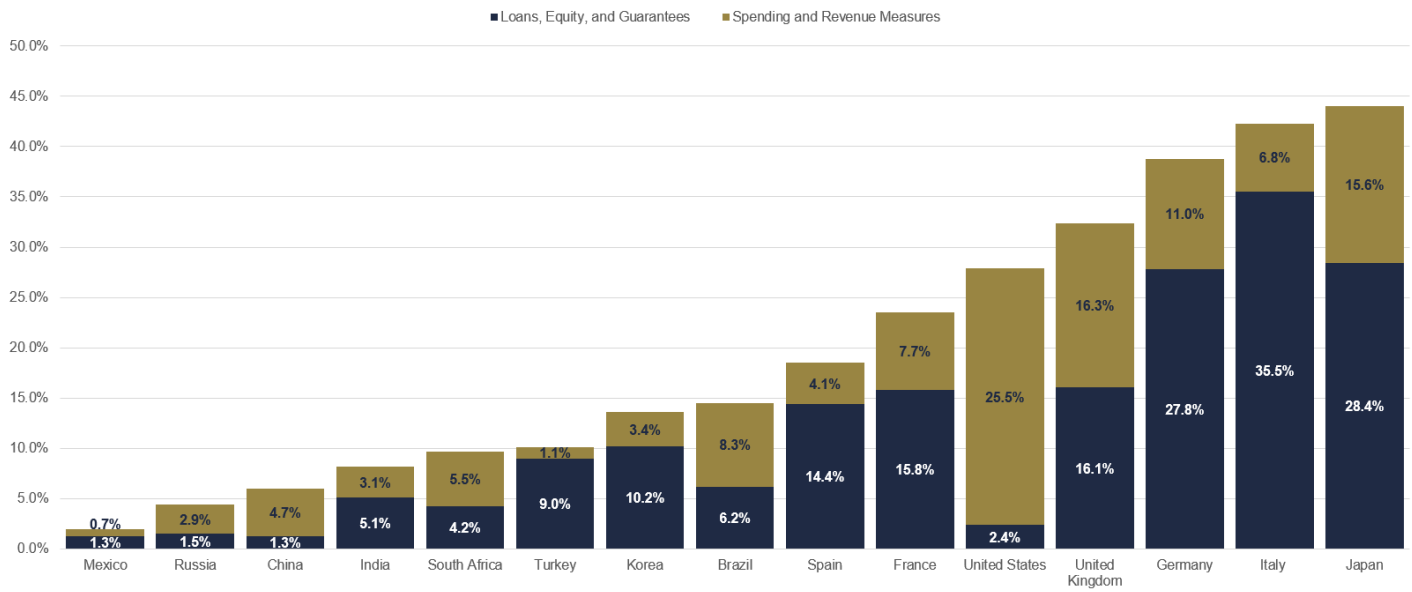


Source: Bloomberg

Stronger Initial Financial Conditions=Potential for Higher Growth Rates

Because of the unique nature of the COVID-19-induced downturn, the financial conditions present at the beginning stages of the current recovery cycle differ significantly from initial financialconditions in previous cycles. This dissimilar set of initial financial circumstances in turn means the current macroeconomic environment differs materially as well. We have several reasons to believe the difference in these initial conditions indicates this cycle will result in significantly higher economic growth rates early in the recovery cycle, but that also may shorten the length of this cycle relative to recent history.

The first reason is the fiscal and monetary policy response to the current crisis. As we havediscussed at length in past publications, the level of fiscal and monetary policy support provided by policy makers during this downturn dwarfs the policy response during every otherеconomic crisis in history. Importantly, this massive fiscal and monetary policy support wasdelivered simultaneously and on a global scale. These two policy response channels rarelyoperate at maximum capacity concurrently, given that the political limitations incumbent to the fiscal policy-making process can result in delays. During this crisis, each channel is providing maximum support at the same time. The result of the impact of this massive amount of policy support is significantly stronger initial financial conditions at the onset of this recovery than usual.

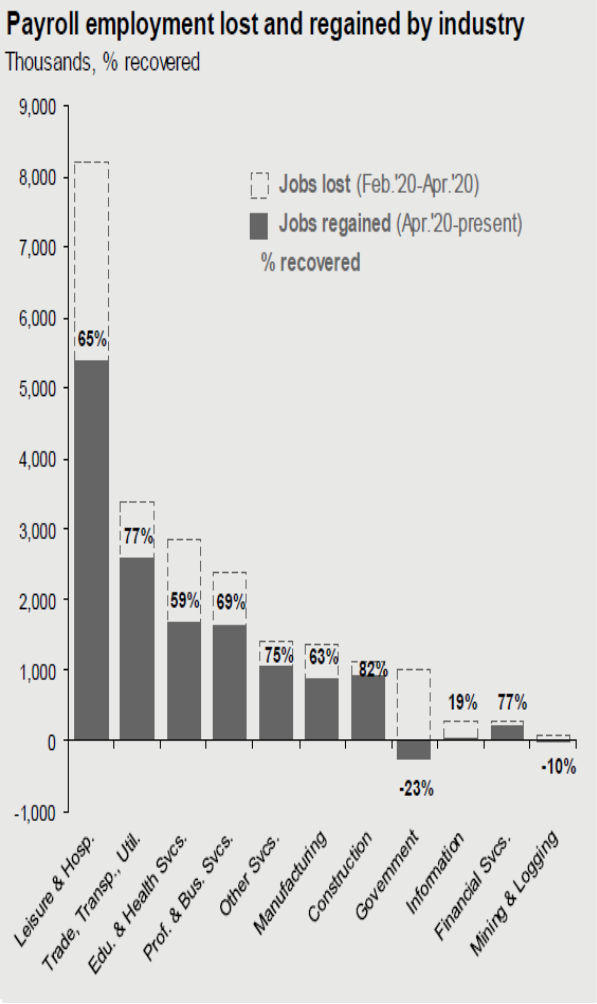


Source: Morgan Stanley Research

Governments around the world underwrote losses during this crisis to an extent we have never experienced before, creating the conditions for a spending boom once economies fully reopen. In the US alone, households received an estimated $810 billion in direct transfers in excess of estimates for realized losses. As a result, with economic activity limited by public health mandates, the savings rate over the past year hit an all-time high, not just in the US, but in Europe and China as well. The three largest economic regions in the world thus have significant pent-up resources that will be unleashed as the world economy reopens–an atypical situation at the onset of an

economic recovery, when resources are usually scarce. The excess household savings built up over the last year should provide the fuel for a consumption boom as economic activity normalizes, and consumer consumption is the most important driver of economic growth. Recent data indicate that this consumption boom is now underway.

Policy makers also shielded the private sector from much of the damage that typically occurs during a recession and then acts as a drag on growth during the recovery cycle. The private sector has not been forced to experience the painful and lengthy deleveraging process that typically accompanies recessions. Corporate cash positions are elevated relative to pre-COVID-19 levels and should support an increase in private sector investment during the recovery. The exogenous nature of the COVID-19 crisis also means that, unlike in most recessionary periods, no major economic imbalances developed that then had to be corrected during the recovery process. In total, these factors indicate that the scarring effects on the private sector that often act as a constraint on economic growth during a recovery period should be limited. In response to the surge in consumption, we expect companies to engage in significant capital expenditures to help meet demand, which should be a key driver of continued economic growth in the back half of the year. Firms have the capacity to invest because the scarring effects of the downturn were limited, and surveys indicate that corporations plan a sharp increase in business investment in the months ahead.

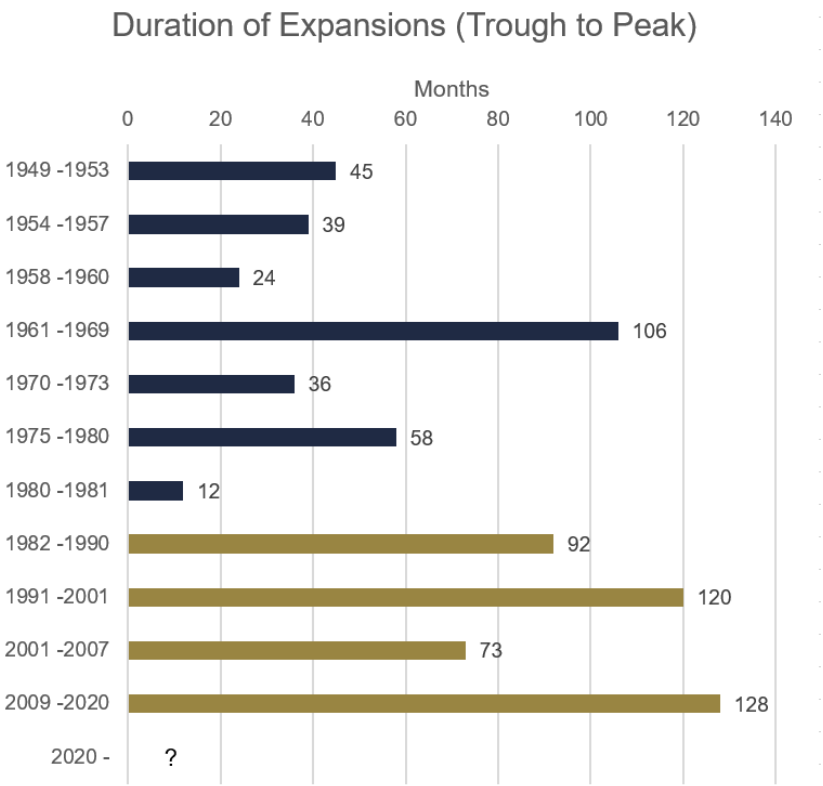


Source: JPMorgan Asset Management

Data indicate that the remaining job losses are concentrated in sectors severely impacted by the COVID-19 public health response. As economies reopen and activity in these sectors returns to pre-COVID-19 levels, labor market normalization is likely to occur at an extraordinarily fast pace during this recovery. Because the decline in demand in these sectors was artificially induced via public health mandates, the labor market will not need to endure a reallocation of labor resources that frequently accompanies a recession. This painful process typically results in stagnant or declining household income levels as workers transition to new roles, which in turn stifles economic growth rates during the recovery process. As demand returns, so will the jobs in these sectors, but the government subsidized the wages lost while these sectors were widely shut down. Accounting for the impact of direct transfer payments, income levels actually grew during the crisis. In fact, the disappointing April jobs report provided evidence that the job market may be even tighter than the unemployment rate

indicates. The situation is complex, given the differing policies across states and municipalities. Lack of in-person schooling and the need for childcare in order to return to the workforce may be playing a role. The subsidies provided by enhanced unemployment benefits are contributing, at least in part, to the labor supply issue, with an increasing number of industries reporting that jobs are difficult to fill. Once these complexities are resolved, the labor market should swiftly normalize. The April report indicated that there are currently 8.1 million open jobs, the highest number on record. The absence of long-term damage to the labor market and household incomes will be supportive of strong economic growth as economies reopen and the labor market normalizes.

Finally, the projected future path of fiscal and monetary policy suggests that growth will be exceptionally strong during this recovery. Global monetary policy makers have communicated a strong commitment to the accommodative policy tools currently in place in support of the recovery. They have also committed to returning inflation to stated target levels after a decade of disinflationary pressure. To that end, the Federal Reserve has explicitly stated that they will allow inflation to exceed their 2% target for longer after periods when inflation has consistently been below target, as is the case today. The upshot is that monetary policy will remain more accommodative for longer during this cycle relative to history. Fiscal policy makers have similarly shown little desire to cut spending or reduce other fiscal policy support measures.



Source: Morgan Stanley Research

On the contrary, calls have been ringing out for an even greater expansion of future fiscal policy support on top of the $5 trillion already delivered. While this impulse is subject to change over time based on the results of future elections, fiscal policy will likely remain extraordinarily accommodative through 2022. Highly accommodative stances from both policy channels for such a long period represent a significant shift relative to history.

As the economy reopens, the conditions laid out above will determine how hot the economy burns this cycle, which in turn will likely dictate how long the cycle lasts. Comparing the financial conditions at the start of this economic cycle to the initial financial conditions at the onset ofhistorical economic cycles suggests that this economic cycle will likely burn

much hotter in the early stages, but as a result risks being of shorter duration. Historically, shorter cycles have resulted in shorter and less severe recessions and are associated with shorter and shallower drawdowns in risk assets.

A related concern is how the abnormally strong initial financial conditions at the onset of therecovery and the potentially accelerated economic cycle will impact financial markets. Thecombination of the rise of retail trading during the pandemic, the frenetic trading activity early this year in companies like GameStop, the parabolic rise of cryptocurrencies and other niche assets, and the incredible performance of the stock market off of the March 2020 lows have some drawing comparisons to the tech bubble of the late 1990s and other similar asset bubbles throughout history. Should investors be concerned that a bubble may be developing? Studying historical financial manias is instructive. While each is unique, upon examination severalcommon characteristics have been consistently present during asset bubbles across time. Comparing the weight of the evidence, we believe there is no support for the position that the market is currently in the midst of a bubble and that there is little risk of a bubble developing in the near term.

Historical Perspective on Financial Asset Bubbles

In order to discuss whether or not the current environment represents a bubble – or risks developing into one – we must first start by defining the term. In a recent paper examining the issue, Peter Oppenheimer, the chief global equity strategist and head of macroeconomic research at Goldman Sachs, defined an asset bubble as "a rapid acceleration in prices and valuations that makes an unrealistic claim on future growth and returns." This definition can be refined further by providing two important caveats. First, price acceleration in individual companies or in a relatively narrow area of the market does not constitute a systemic risk to the broader financial system, and thus speculation and price acceleration must be sufficiently broad and occurring throughout markets to constitute a bubble. Second, not all rapid increases in asset prices result in a bubble. Asset prices can rise sharply because of genuine improvement in the economic environment or the fundamentals of the assets themselves that justify the increase. Bubbles develop when the rapid price appreciation is driven by potential developments that have yet to be realized and depends solely on promise and hope, rather than the fundamental attributes of the assets in question.

History is replete with financial manias and asset bubbles, from the Tulip Mania that gripped the Netherlands in the seventeenth century to the housing bubble that ultimately resulted in the Great Financial Crisis. While asset bubbles have occurred across centuries and in a wide variety of asset classes, each one shares a relatively similar story. A new technology or new economic era generates excitement about the boundless potential for the future, which garners the attention of the populace, first gradually and then swiftly, and investment dollars follow. Loose credit conditions and low rates allow for increases in leverage across the system, much of which starts to finance investment in the new "next big thing." These investment flows result in price appreciation in the assets in question, and fear of missing out becomes endemic in the general population, driving more and more investment – often with borrowed money. As valuations become extreme, new methods are used in an attempt to justify them, and the market becomes increasingly concentrated in the "next big thing." Corporate activity booms around the "next big thing" and after a long period of prosperity, most think they can't lose, paying higher and higher prices to get in on the action. Eventually, this bubble bursts and brings with it significant pain for the economy and financial system. Some significant historical bubbles that may contain some wisdom and warning into which we can tap to assess the current environment include:

Time Period	Asset Class
1630s	The Tulip Mania in Holland
1720	The South Sea Bubble in the UK & the Mississippi Bubble in France
1790s	The Canal Mania in the UK
1840s	The Railway Bubble in the UK
1873	The Railway Bubble in the US
1920s	The Stock Market Boom in the US
1980s	The Land and Stock Bubble in Japan
1990s	The Technology Bubble
2007	The Housing / Banking Bubble in the US & Europe

Source: Goldman Sachs Global Investment Research

The popping of each of these bubbles had a profound impact on the broader economic and financial system, and closely studying these periods can help us to identify when conditions are ripe for the formation of a possible financial bubble. Each of the financial bubbles aboveexhibited many, if not all, of the same characteristics:

	Bubble Characteristic
1.	Excessive price appreciation and extreme valuations
2.	New valuation approaches justified
3.	Increased market concentration
4.	Frantic speculation and investor flows
5.	Easy credit, low rates and rising leverage
6.	Booming corporate activity
7.	"New Era" narrative and technology innovations
8.	Late-Cycle economic boom

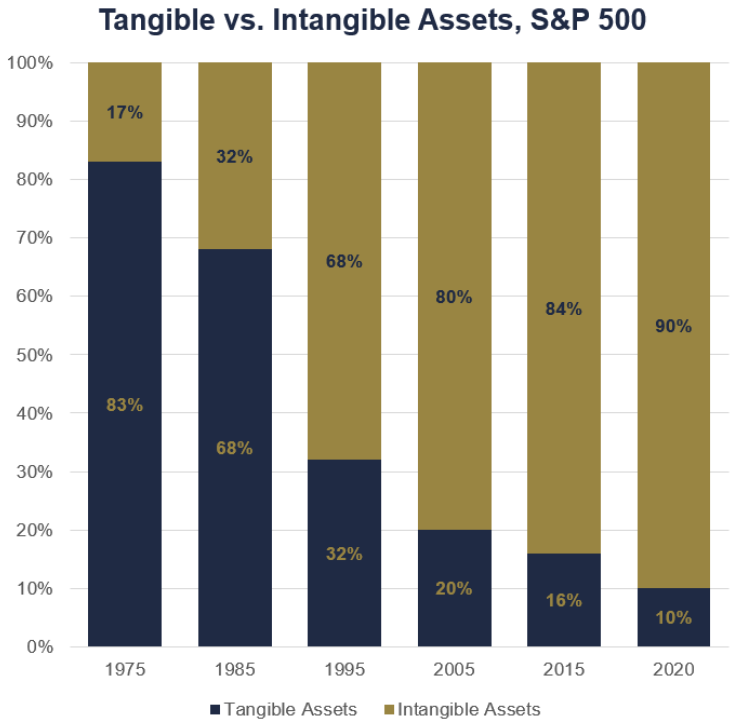
Source: Goldman Sachs Global Investment Research

After the strong rise in stock markets over the past year and activity around novel innovations like cryptocurrencies and SPACs, it's prudent to evaluate the current environment to see if any of the conditions are flashing a warning sign that could be a canary in the coal mine signaling future trouble may lie ahead.

It bears remembering that a significant rise in asset prices alone does not constitute a bubble. A sharp increase in the price of risk assets is common following a recession–such a rally mostoften occurs in the "hope" phase of a market recovery, as we've discussed in past writings.After a recession and significant drawdown, it naturally follows that prices will rebound as the economy recovers. And the rally off the bottom over the last year has been one for the record books. US stocks rallied nearly 75%, the best 12-month return since 1950. An astonishing 96% of US stocks saw gains during the period. In the face of this historic recovery, one naturally may wonder: How often do the recoveries go too far, too fast, ultimately resulting in an asset bubble? William Goetzmann, a professor at the Yale School of Management and expert in the history of finance, analyzed more than a century of global stock market data and found that bubbles –defined as a large price decline after a large price increase – are exceptionally rare. Hisanalysis found that across the globe, the frequency of bubbles is around 0.3%. "In simple terms," he writes in Bubble Investing: Learning from History, "bubbles are booms that went bad. Not all booms are bad." Tulip Mania has come to represent the quintessential bubble. BetweenNovember 1636 and February 1637, the price of tulip bulbs skyrocketed 1,900%. The pricerises had no fundamental basis, and were driven purely by speculation and greed. The price of a single tulip bulb, at one point equaling that of a well-appointed townhouse in the heart ofAmsterdam, had no basis in reality. So where do we stand today? The recent rally in globalmarkets from the depths of the crisis has the quintessential "hope" rally. These "hope" driven rallies, which occur as the economy recovers from recession, are materially different from the "hope" driven market environments that result in asset bubbles, which almost exclusivelydevelop in the late stages of a long, booming economic expansion. While markets have recently experienced a few pockets of exuberance (the GameStop saga and parabolic rise of Bitcoinimmediately come to mind), the underlying fundamentals of the economy and markets are strong. By any measure, however, equity valuations are expensive to history on an absolute basis. Are they at a level where the prices paid are making "unrealistic claim(s) on future growth and returns"?

At its core, any argument that current market values represent a bubble is built on the concept of mean reversion; that is, the belief that over time, market valuations revert to the long-term average, and thus when assets deviate from that long-term average, an investment opportunity arises to profit from the inevitable move back to the baseline. This philosophy has some major downsides, however– mainly that it operates on the implicit assumption that the environment that exists today is the same as the environment that existed in the past. Said another way, it assumes that the baseline markets revert back to is static and doesn't change over time. In technical language, the assumption is that the data set exhibits stationarity. We know that this is not the case, and failure to account for non-stationarity is a well-known error in the analysis of time-series data. One prime example of a regime shifting moment is the gold standard. When the US went off the gold standard in 1971, the impact was massive and widespread. Comparing data pre-1971 to post-1971 can lead to specious conclusions because of the impact dropping the gold standard had on the entire US monetary system. The baseline shifted.

There are several things about the current environment that indicate we have experienced a similar type of regime shift, and thus making a mean reversion call based on data from previous regimes is flawed. The first is the current monetary policy environment. The globally synchronized accommodative monetary policy environment of the last decade, which built on what many have dubbed "The Great Moderation" that was ushered in by Alan Greenspan in the 1990s, means that comparing today to an era like the 1980s, when interest rates were 15%, or to the pre-1971 period, when the US was on the gold standard, is like comparing apples and oranges. Similarly, the same is true of the current tax environment and current accounting rules relative to history.



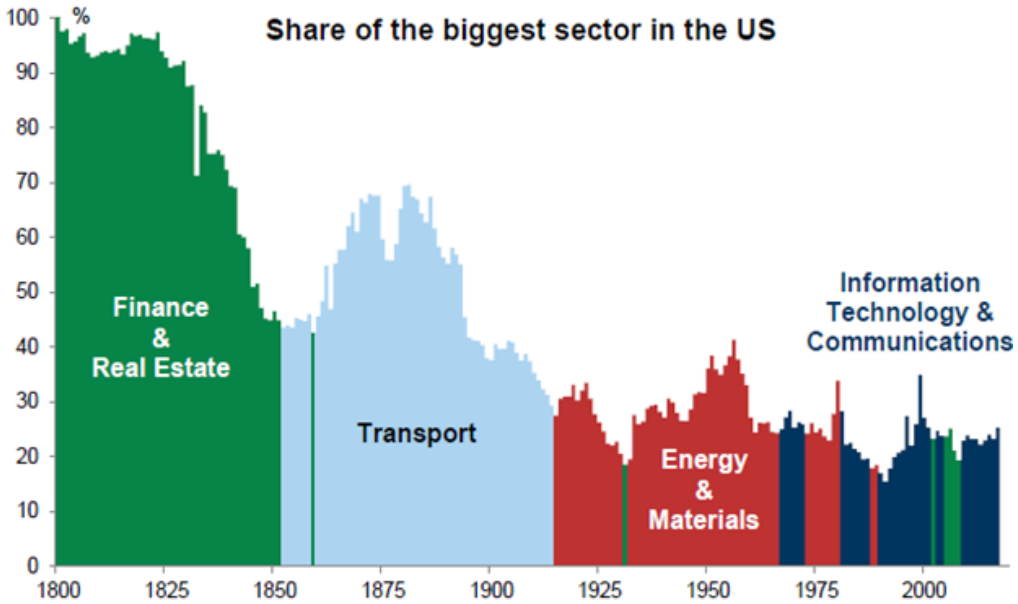
Source: visualcapitalist.com

Many arguments that we are currently in a valuation bubble point to the cyclically adjusted price-to-earnings (CAPE) ratio, which was made famous by Robert Shiller in his book "Irrational Exuberance," for which he won the Nobel Prize in Economics in 2013. The CAPE ratio adjusts the P/E ratio to account for the business and market cycles, evaluating the current price against average annual earnings over the trailing 10-year period. The CAPE ratio is currently significantly elevated relative to the long-term historical average. The only other times the ratio has exceeded this level relative to the historical average were in the lead-up to the market crash of 1929 and during the late '90s tech bubble. On the surface, this appears to be alarming, signaling trouble must surely lie ahead. But digging into the details paints a very different

picture. The CAPE ratio has been above the long-term average consistently for over three decades. In the 377 months since 1990, the CAPE ratio of the S&P 500 has exceeded the historical average in 367 of those months–97% of the time. Has the market been in a bubble for over 30 years, or might there be reasons to explain the willingness of investors to pay more for a generic dollar in earnings for the S&P 500 than they were willing to pay in previous regimes? The evidence overwhelmingly supports the latter.

In addition to the monetary policy paradigm extant for the last 30 years, another major factor indicating the current environment differs from past regimes is the rise of intangible assets. Ford, GE, and Exxon, once the dominant forces in American business, look very different from Apple, Google, and Facebook. In short, company balance sheets today look nothing like the balance sheets of the past, as this chart shows:

Today, the companies driving our economy don't invest in property, plant and equipment to the same degree as in previous eras–they invest in intangible assets like intellectual capital. Intangible assets are 1) harder to value under traditional accounting metrics and 2) do not require the high level of maintenance cap-ex that tangible assets do. This allows for far higher levels of profitability while skewing things like measures of book value. Because of this, companies today generally also are not subject to limits imposed by scarcity in the same way companies were in the past. For example, the marginal cost for Amazon to add an additional user onto its Amazon Web Services platform is practically nothing. Companies today are able to grow at higher rates with lower costs than companies in the past and also exhibit substantially more operating leverage, meaning earnings grow at an even greater rate than revenue. Factoring growth into the equation, using something like the PEG ratio, market valuation looks very reasonable to downright cheap today after the recent pullback. All of these things mean that investors are and should be willing to pay more for the types of companies that dominate our economy today than they were willing to pay for, say, a company like GE in the past. The baseline has shifted.



Source: Goldman Sachs Global Investment Research

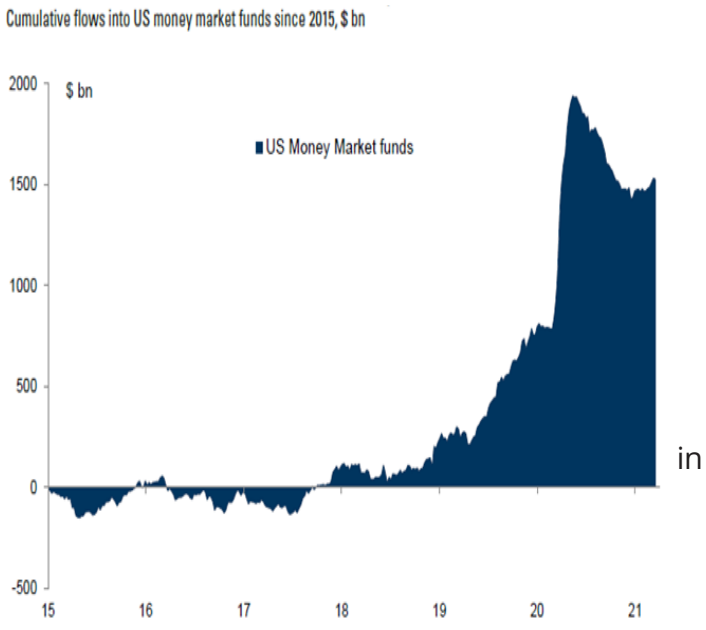
We have seen an increase in market concentration in recent years, a phenomenon also seen in the '90s tech bubble and the "Nifty Fifty" era before it. This increase in concentration is not in and of itself indicative of a bubble, and concentration today has occurred in extremely dominant firms that hold commanding competitive advantages over their rivals and operate in market segments that are continuing to grow. The dominance of a new and transformative industry has actually been the rule historically, not the exception, with the market reflecting the main drivers of the economy. In the context of history, the dominance of the tech sector today actually pales incomparison to the dominance exhibited by other preeminent sectors in the past. The mostdominant companies are also backed by strong fundamentals, another reason the currentenvironment is unlikely to be experiencing a bubble. FAAMG ("Facebook, Amazon, Apple,Microsoft and Google") have grown sales at 3x the rate of the rest of the S&P 500 and have seen net income growth 2x the rest of the index. Their performance in 2020 stands out even more. The rest of the market saw revenue contract by 4% in 2020, while the FAAMG stocks saw revenue expand by 20%. While the largest stocks today do have high valuations, those valuation levels are well below those reached during the "Nifty Fifty" era and the tech bubble. At the height of the tech bubble, the five largest stocks had a P/E ratio of 47 vs. 24 for the S&P 500 index. Today, FAAMG trades at a P/E ratio of 29 vs. 21. When factoring growth into the equation with the PEG ratio, FAAMG actually trades at a 14% discount to the median S&P 500 stock. Furthermore, those valuations are justified by superior fundamentals relative to the rest of the market. A key differentiator for these firms is the amount of operating cash flow they devote to driving future growth through research and development and capital expenditure investment. These five firms had a growth investment ratio of 64% over the last three years, compared to 11% for the median stock in the S&P 500. The investment in future growth continues to pay off; in the most recently completed quarter, FAAMG reported revenue growth of 41% year over year compared to 9% for the remainder of the index. The performance of the FAAMG stocks and others leading the market has been driven by superior growth and financial metrics relative to the median firm. In short, performance has been driven by achieved reality, not by the hope of things to possibly come in the future.

	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
	Sales Growth (Y/Y)								
FAAMG	15%	8%	18%	24%	13%	20%	20%	14%	13%
S&P 500 ex FAAMG	-6%	2%	6%	8%	3%	-4%	9%	6%	5%
	Net Income Margin								
FAAMG	19%	20%	19%	20%	18%	19%	19%	19%	17%
S&P 500 ex FAAMG	9%	9%	10%	11%	10%	8%	10%	11%	11%

Source: Goldman Sachs Global Investment Research

More broadly, we also have to evaluate risky assets relative to their opportunity costs (i.e., the other places money could be invested). Compared to history, when viewed through this lens no bubble is apparent. During the tech bubble of the '90s, investors were so sanguine on theprospects about long-term future growth that they were willing to invest in companies with little to no dividend yield–or in the late stages, low to negative earnings – even when they could earn 6.5% in a risk-free US Treasury bond. In today's market, the dividend yield on a diversified equity portfolio is equal to or greater than the yield on risk-free sovereign bonds. When the real yield (the yield after inflation) is negative, as it is today, assets with a positive yield–like the equitymarket today–are even more attractive. Equities also look cheap relative to corporate debt, with the dividend yield of the majority of stocks in the S&P 500 exceeding the yield on the samecompany's corporate debt. Many risky assets appear expensive to their own history, but less so on a relative basis. While the high valuations likely imply lower long-run returns, they do not point to a valuation bubble in the context of the lowest interest rate environment in humanhistory.

While the GameStop saga garnered widespread headlines and retail trading has increased over the last year, an examination under the surface finds little evidence of speculative excesses that threaten the stability of the financial system. Pockets of speculative activity have certainlydeveloped in niche asset classes like cryptocurrency, but this does not extend to the broader market as a whole. Households had been net sellers of equities for several years prior to the pandemic. The recent uptick in equity inflows must be viewed in that context, which suggests that households had been underinvested in the equity market heading into the pandemic and have used the drawdown as an opportunity to buy. The indiscriminate nature of stimulus payments also likely played a role, as the bulk of the payments went to excess savings rather than being spent immediately, as policy makers hoping to prop up aggregate demand would have preferred. Finally, money market balances soared last year in the early days of the crisis, and while they have declined somewhat in recent months, they remain significantly elevated–$1 trillion above the pre-COVID-19 level. This means a significant amount of cash remains on the sidelines. Manias exist when the last marginal dollar is flowing into the market, and that is far from the case today.

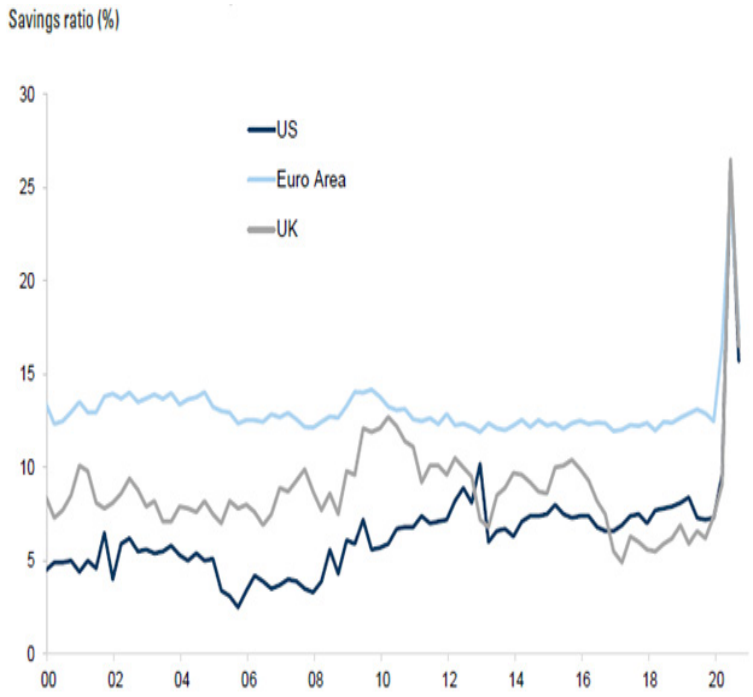


Source: Goldman Sachs Global Investment Research

Historically, bubbles have usually formed and grown in periods when interest rates are low and there is ample access to liquidity. This helps create a fertile environment in which speculation is more likely to take hold. Bubbles are also commonly fueled by easy credit conditions andlending conditions in the bank sector. Historically this has emanated from banks' growingbalance sheets. In the

railway bubbles of the 19th century, the rapid growth of new entrants and new rail lines was facilitated by easy access to money, which was made even easier by new exchange banks that would offer loans against the collateral of railway shares. The railway companies themselves also increasingly allowed private investors to buy on margin–requiring only a 10% deposit–with the railway company having the right to call the rest of the capital at any time. More recently, bank leverage was central to the Japanese bubble of the 1980s and the housing bubble that resulted in the Great Financial Crisis (GFC). Largely thanks to regulations put in place after the GFC, banks have emerged from the COVID-19 crisis in an unusually strong position, aided further by the fact that governments have largely underwritten potential losses through fiscal policy measures. While rates are low, banks have maintained or even increased credit standards in the current environment.

Bubbles have historically also seen rising leverage and a collapse in savings in the household sector in conjunction with the expanding balance sheets and increased leverage in the financial sector discussed above. The COVID-19 crisis has seen the exact opposite occur, with a substantial reduction in household debt levels and a massive spike in the savings rate. Corporate debt levels have remained relatively flat and the cost of servicing debt has actually fallen during the pandemic. The leverage taken on during the pandemic was overwhelmingly at the public level, as governments around the world engaged in an unprecedented amount of fiscal and monetary policy stimulus to combat the virus. Debt levels have soared to levels rarely seen in peacetime. While government debt levels are high by historical standards, it is not the absolute level of debt that matters; government debt is rolled over when it comes due, not paid off. The moreimportant measure in evaluating sovereign debt burdens is the cost of servicing the debt.Jason Furman and Lawrence Summers, economists at Harvard's Kennedy School of Government, argued in a recent paper that the better measure of the debt burden is real interest expense as a share of GDP, which is currently well within historically normal levels. Taken together, these elements overwhelmingly fail to support the case that the market is currently in the throes of a bubble.



Source: Goldman Sachs Global Investment Research

Booming corporate activity has also historically preceded or accompanied asset bubbles. Here we see some reason for caution in the current environment. Announced mergers and acquisitions activity is already approaching $500 billion this year, marking the best start to a year since 2000. IPO activity is also in record territory, and most concerning is the rise of nontraditional issuance in the form of special purpose acquisition vehicles, which have already raised $78 billion in capital year to date. When accounting for activity as a percentage

of market cap, however, activity looks far more reasonable and is nowhere close to the levels seen during the boom period experienced in the 2000s in the lead-up to the GFC.

Finally, bubbles overwhelmingly occur at the end of an economic boom time. The "Nifty Fifty"bubble, the Japanese bubble of the 1980s, the tech bubble of the '90s, and the housing bubble of the 2000s all arose late in the cycle after a long period of economic growth. The rally experienced off of the March 2020 lows, while now 14 months old, has been the definition of the "hope" phase of the market cycle, as we've discussed in previous pieces. We expect a transition this year to the "growth" phase off the cycle, and historically this transition has been rocky as investors may develop concerns that the recovery priced into markets may be delayed or not come to fruition at all. Short-term pullbacks, like those that occurred in 2010 and 2011 as the world recovered from the GFC, are not uncommon during this period of transition. Analyzing the sources of equity returns in historical "hope" and "growth" stages is informative. Since 1973, during the "hope" stage of equity market cycles return has been driven entirely by multiple expansion, with earnings growth actually acting as a drag of performance to the tune of 9%. During the "growth" stage of equity market cycles, earnings do all of the heavy lifting. During this market stage, EPS grew an average of 62% while P/E multiples actually contracted 30% since 1973. As the market shifts from the "hope" stage to the "growth" stage, the most likely outcome based on history is that the market will get substantially cheaper as price multiples will contract despite strong earnings growth. We still remain early in this economic and market cycle, and we will be closely monitoring the evolution of price multiples over the months ahead for signs of trouble, but if history is any guide, valuation levels will moderate.

Asset Bubble Characteristics and Risk

Common Characteristics	Any Signs?	Risks
Excessive Price Appreciation and Extreme Valuations	Selective Pockets	Moderate
New Valuation Approaches Justified	Selective Pockets	Limited
Increased Market Concentration	Yes	Moderate
Frantic Speculation and Investor Flows	Selective Pockets	Limited
Easy Credit, Low Rates, and Rising Leverage	Yes	Limited
Corporate Activity Boom	Yes	Moderate
"New Era" Narrative	Selective Pockets	Moderate
Late-Cycle Economic Boom	No	Limited

Source: Goldman Sachs Global Investment Research

As we've discussed, studying the history of bubbles shows us several important characteristics that facilitate the formation of asset bubbles and allow them to flourish, at least for a time. Few of these conditions are present today, and those that may be present are confined to nicheareas that present little risk to the broader financial system as a whole.

While some of thesecharacteristics are at least partially present, current financial conditions and the early-stageenvironment indicate that the risk of an imminent bubble that poses grave systemic risk to the global economy is currently low. This cycle may run hotter and burn shorter than those of therecent past, however, and as this cycle ages, we will be monitoring these factors closely given their reliability in signaling that a possible bubble may be developing.

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