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May, 2021

Inflation and the Shape of Portfolios

A Changed Policy Environment, the Market and Factor Outlook, and the Changing Needs of Asset Owners

BERNSTEIN

GLOBAL VIEW
MAY 2021

INFLATION AND THE SHAPE OF PORTFOLIOS

A changed policy environment, the market and factor outlook, and the changing needs of asset owners

The prospect of higher inflation is one of the key macro forces that is likely to act on markets in coming years. There remain strong deflationary forces, but our claim is that we are in a new policy environment with a desire and ability to achieve higher inflation.

We think investors have a duration problem that will require a rethinking of portfolios and core assumptions of pension saving. We have had a taste of this in recent losses on bonds and Growth stocks, but ultimately it will be felt in many cross-asset portfolios.

Investors will seek to increase exposure to real assets. Despite high valuations and falling margins, we outline why equity allocations need to increase too. Within equity, Value likely finds ongoing support. We discuss how crypto and tokenized assets may aid asset allocation.

All this goes beyond merely enumerating trades that might work as inflation rises to also rethink the basis of allocation decisions. Factors will need to be used alongside asset classes, and investors need to be clear on inflation being the ultimate benchmark.

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PORTFOLIO MANAGER'S SUMMARY

The prospect of higher inflation is one of the key macro forces that is likely to act on markets and drive reallocation of portfolios in coming years.

We make the case that after the inflationary "blip" of the reopening trade, when prices are driven higher by increased demand meeting tight supply, inflation will find an equilibrium level above the pre-pandemic rate. However, this is not a given. There are significant deflationary forces, the principal one being slack in the labor market. In addition, there is ongoing deflationary pressure from technology and automation; the risk of zombie companies; and the question mark on consumers' willingness to spend in the long term (once the reopening spending wave has abated). Set against all this, we make the claim that we are in an utterly different policy environment where there is both a desire and an ability to achieve higher inflation than before the pandemic.

This prognosis implies that investors have a duration problem. This is not just the increased duration of many fixed income assets as yields have fallen in recent decades, but that simple cross-asset portfolios, e.g., those using 60:40 or other simple passive combination of stocks and bonds, have been shielded from this duration issue by a deeply negative correlation of stocks and bonds. This is under threat if inflation rises.

Investors will not only need to seek return streams that work as inflation rises, but also maintain diversification. Allocation to real assets should increase and, despite high valuations, we make the case for a positive outlook for equities and think that equity allocations will need to rise. This also implies a more positive outlook for Value strategies.

In the latter part of this *Blackbook* we discuss whether cryptocurrencies and real assets tokenized on the blockchain can help from a return and diversification perspective.

However, this goes beyond merely enumerating trades that can work. A higher level of inflation and the prospect of higher bond yields will be an alien environment for many market participants and upend long-held assumptions about markets. Adapting to this will be a challenge for both asset owners and asset managers, and require new thinking about the shape of portfolios and the methodology of investing.

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SIGNIFICANT RESEARCH CONCLUSIONS

The last year has seen a significant increase in inflation expectations. This has gone beyond simply a recovery from the deflationary shock of the pandemic, with expectations of inflation now significantly above where they were on the eve of lockdown in early 2020. We think inflation is going to be one of the key forces driving reallocation in portfolios over the next few years. The impact of rising yields has been felt in the rotation from Growth to Value stocks, but this is just the tip of the iceberg. We make the case in this *Blackbook* that there is now the first plausible narrative for a sustained rise in inflation. This will require a rethinking of both equity and cross-asset portfolios. This *Blackbook* attempts to lay out this narrative that cuts across the policy environment, the capital market outlook, forces within the equity market, and the needs of asset owners.

We need to divide the outlook for inflation into two parts. There is a strong case for a "blip" higher in inflation in 2021 and into 2022. This almost mechanically follows from the pent-up desire to spend by many households due to the pandemic and that increase in demand meeting tight supply. On top of this is the impact of fiscal stimulus. This will likely lead inflation higher in the near term; we discuss what to look out for in this respect in our chapter "High-Frequency Signs of Inflation." However, the key question for investors is whether this inflation can persist beyond the "reopening trade."

A NEW POLICY ENVIRONMENT

We think there is indeed a case for a sustained higher level of inflation than before the pandemic. This is not, however, a given as there remain strong deflationary forces. Preeminent among these deflationary forces is the slack that exists in labor markets, making it unlikely that wages will lead inflation. An increased incidence of "zombie" companies in the wake of the pandemic may well also be deflationary, and there is the persistent impact of technology and automation, which have exerted a downward pull on price increases for at least a decade.

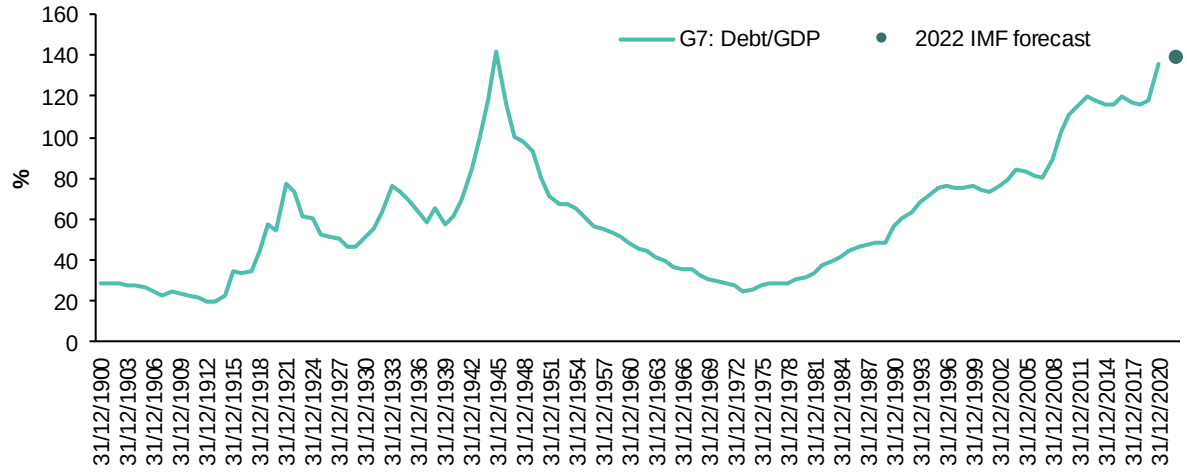
A possible further deflationary force could come from the demand for savings. The savings rate shot up to historically high levels in 2020 as people were unable to spend, but that is presumably temporary. Indeed, it is the increased propensity to spend that is likely to be the principal driver of a near-term increase in prices as excess savings are spent. But what might the pandemic do to long-term saving intentions once the initial rush to spend has passed? Although we make the case in this *Blackbook* that equities and some other return streams can continue to deliver positive real returns, from a cross-asset perspective we think that, on average, nominal returns on financial assets are going to be lower, even on a pre-tax basis. If we layer on the view that inflation and taxes are both going up, then it implies that in the medium term the average savings rate has to increase above the level that held prior to the pandemic (although not as high as the exceptional levels seen during lockdown). A higher savings rate would be deflationary, or more specifically it would lower

the velocity of money and, *ceteris paribus*, require a greater increase in the money supply for a given level of inflation.

This is a *Blackbook* about inflation. Why are we detailing all these deflationary forces? These deflationary forces show that considerable work needs to be done by policy makers to overcome deflation and to maintain inflation at a higher level. The critical point is, we argue, the pandemic has led us to a totally different policy environment. This is already hinted at in central bank willingness to "look through" short-term price increases and to take a longer-term averaging approach to inflation. But we think there is a more fundamental policy change than that.

The level of debt as a percentage of GDP across the OECD is back at the level reached at the end of World War II (see Exhibit 1). Unlike then, it seems hard now to grow out of this debt and so inflating out of it is more likely. Thus, there will likely be a long-running political desire for inflation.

EXHIBIT 1: **G7 government debt to GDP (GDP-weighted)**



Note: Government Debt/GDP for G7 countries, weighted by Nominal GDP denominated in USD. The dot at the end assumes a 10% increase in government debt levels across the G7, but does not factor in the coming fall in GDP.

Source: GFD and Bernstein analysis

Merely wishing for inflation is not sufficient. However, the pandemic has also allowed a radical change in fiscal policy with an acceptance that governments can expand their support, keep debt levels high, and even hand out cash directly to individuals. Directly handing out cash to individuals has a much more plausible case to be inflationary than QE ever was with its narrow focus on lifting the prices of financial assets. Moreover, such support fits well with a political agenda that is likely to focus on narrowing inequality across society.

In fact, we suggest the combination of (1) high unemployment, or a lower participation rate, (2) wider inequality post the pandemic than existed before, and (3) a political acceptance of direct cash handouts does imply a movement toward some form of universal basic income (UBI) is possible, even likely, in some advanced economies in the next five years.

The genie is out of the bottle, in the sense that such direct support is politically possible in a way that was inconceivable before the pandemic.

Our chapter "Six Books for the Post-Pandemic World" makes the case that the way investors should think about this is to accept that we are in a totally new policy regime. The books are, on purpose, an eclectic mix; one is by a professor of art and theory, some are profoundly anti-capitalist, and one is a work of fiction. But, we think, between them they give us a language to understand post-pandemic policy. Most possible permutations of this, we think, lead to a higher level of inflation.

Our central case is that real rates remain low even as inflation rises. However, from a strategic perspective there is a demographic case that could lead to higher inflation and higher real rates. In the chapter "Inflation, Demographics, Wages, and the Shape of Investment Portfolios," we lay out the thesis that if most of the reduction in inflation over the last 40 years came about because of demographic forces, then that mechanism is about to go into reverse, e.g., the reduction in the Chinese working-age population and the retirement of baby boomers. According to this narrative, the huge loss of labor bargaining power of the last 40 years is about to change, and a reduction in the supply of labor could mean inflation can be led by wage inflation. This would be accelerated by any political swing that encouraged re-unionization and empowered gig-economy workers. In this scenario, there would be no need to keep real rates anchored at a low level — both inflation and real rates could rise.

In our chapter "ESG — An Inflationary Force," we suggest that an entirely different form of inflationary pressure might come from ESG. Some of this is the more obvious impact of the increase in input prices from a combination of a push to decrease the financing of new capacity in traditional commodity extraction and the cost of changing power sources. Then, there is the willingness of consumers to pay more for ESG-compliant products. But above and beyond that, there is a more macro element in the extra costs that are implicit in a pushback against gig economy working practices and offshoring of labor.

WHAT DOES INFLATION MEAN FOR PORTFOLIOS?

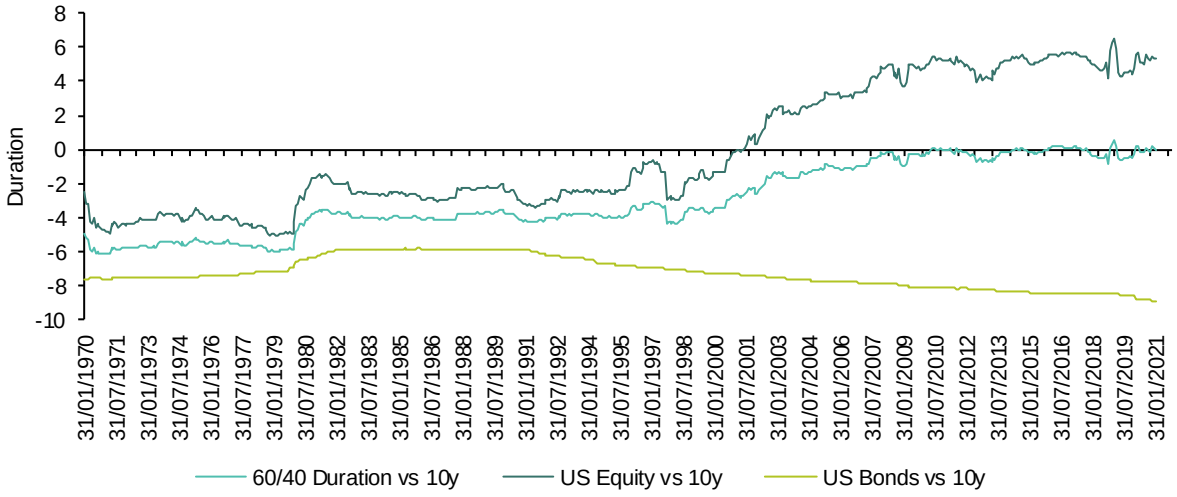
Once we lay out this policy outlook, the rest of the *Blackbook* is firmly focused on the question of how investors should respond to higher inflation. Before we get into specific investment views, we think, in general, investors have a duration problem (see the chapter "Why the World Has a Duration Problem"). Addressing this is going to be a theme both within equity portfolios and in cross-asset investing. This implies there is a need for a fundamental rethinking of the shape of investment portfolios.

The move up in yields in recent months has had a clear impact on Growth stocks and bond portfolios. However, the impact of this on many cross-asset portfolios has been masked by historical diversification between stocks and bonds that now looks vulnerable. While we have seen some rotation within equities, we think the scale of the reallocation of assets that may be needed overall is very large indeed and will likely become a central challenge for investors in years to come.

The duration of fixed income portfolios has become the most extended in 50 years as yields have moved down. But it turns out that many cross-asset portfolios that rely on 60:40 or

analogous approaches have been shielded from this by the very negative correlation of stocks and bonds in recent years. As the level of inflation and volatility of inflation rise, that diversification may be less strong, which would expose such portfolios to greater interest rate risk.

EXHIBIT 2: **Duration of bonds and 60:40**



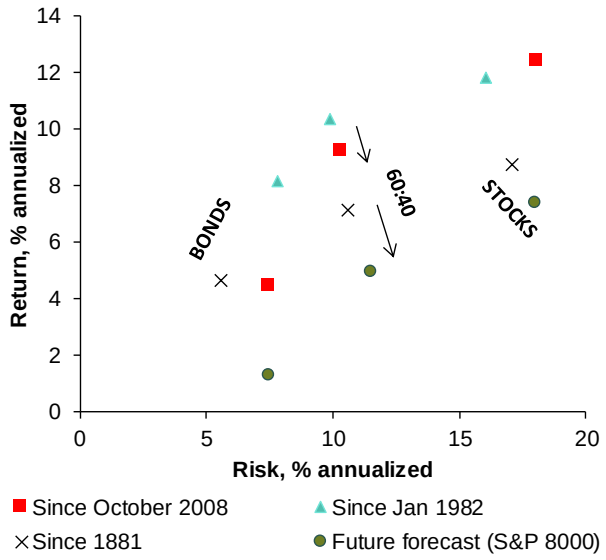
Note: Duration is calculated running a regression of Bond, Equity, and 60:40 monthly returns against the monthly change in US 10-year yield on a 10-year rolling basis.

Source: Datastream, Robert Shiller's database, GFD, and Bernstein analysis

The implication of this duration problem is that investors need to generally migrate to shorter duration assets or return streams. More fundamentally than that, it undermines the ethos of a 60:40 portfolio or any portfolio structured along similar lines with a large allocation to passive broad-market equities and fixed income. For 40 years, the assumption has been that such a portfolio can outperform inflation and control risk, but an outlook of moderately higher inflation would break this both from a return perspective and a risk perspective. This is not just about finding assets that still "work" as inflation rises, but also looking at the stability of the covariance of assets as inflation rises too.

Exhibit 3 shows the return vs. risk for US stocks, bonds, and a 60:40 combination of the two over various periods. It turns out that the period since 1982 happens to have been the best period ever for the return-risk trade-off of 60:40, as both stocks and bonds delivered strong returns and diversified each other. Even since the Lehman bankruptcy, despite more volatile returns from stocks and lower returns from bonds the 60:40 point did not move much in return-risk "space" as the correlation between the assets became even more negative. This looks likely to unwind from both a return and a risk perspective now. If we assume 8-10% return p.a. from stocks but a return from bonds in line with current yields and a correlation that moves up, then the return-risk trade off from 60:40 seems set to be slightly below the level achieved over the last 140 years. This could be a wake-up call for approaches that still rely on this working.

EXHIBIT 3: **Return-Risk trade-off of 60:40 portfolio**



Note: The scatter and table show annualized total return and risk for US equities, US bonds, and a 60:40 equity:bond portfolio. Future forecast is assuming same volatility for stocks and bonds as since October 2008 and 0.1 correlation coefficient. Future equity forecast is modeled based on S&P 500 rising by 7% p.a. over the next 10 years. The 10-year annualized bond return is assumed to be equal to current US 10-year yield.

Source: Datastream, Robert Shiller's database, GFD, and Bernstein analysis

EXHIBIT 4: **Nominal duration of assets and factors (1950-2020)**

Duration (10 year yield)	beta	t-stat
10 year US Government Bonds	-7.31	-17.27
US Credit	-5.13	-11.25
US Low Vol (LS)	-4.15	-2.73
US Equity Income (LO)	-2.15	-1.80
US Equity	-1.50	-1.32
US Banks (relative)	-1.04	-1.11
US REITS (relative)	-0.62	-0.41
US Value (LS)	-0.07	-0.07
Fixed Income Carry (LS)	0.05	0.14
Fixed Income Value (LS)	0.52	1.25
US Equity Cashflow (LO)	0.56	0.30
US Real Estate	0.96	2.88
US Equity Value (LO)	1.29	0.66
Gold	3.26	1.20

Note: Table shows the results from a regression of nominal asset and factor returns YoY against YoY change in US 10-year government bond yield for the period 1950-2020. Equity factor returns are from Ken French database; fixed income factors are from AQR; US Real Estate returns are from Robert Shiller's database; US Credit is the ICE BofA US Corporate Index; gold series is from 1970; banks and REITS and credit series are from 1973; and equity cash flow series is from 1963. The t-stat is the Newey-West t-stat adjusted for autocorrelation.

Source: Ken French database, AQR, GFD, Datastream, FRED, Robert Shiller's database, and Bernstein analysis

What does this mean for assets that are candidates for inclusion in a portfolio? In Exhibit 4, we show a ranking of empirical duration of factors and assets. Here a negative sign is long duration in the conventional sense and vice versa. The shortest-duration assets on this basis are gold, equity value, real estate, equity cash flow yield, and fixed income carry. Banks also screen as short duration as do equities overall.

EQUITY MARKET OUTLOOK

What is the outlook for the equity market overall in this? We deal with this in two chapters ("Oops — I Hit My 10-Year Price Target With Eight-and-a-Half Years to Go … What Do I Do Now?" and "Valuation Rhapsody"). The principal, *prima facie*, "problem" for the market is valuation. In absolute terms, its valuation is at the top end of its 140-year range. Metrics such as the Shiller PE have historically not been very useful for making tactical forecasts, but over longer horizons it is one of the best things we have. On that basis, with the Shiller PE at 36x, equity valuation is at the top end of the historical range, and the link between valuation and 10-year forward returns over the last 140 years implies the S&P yields a return only in line with inflation.

A second problem is corporate margins or, in a broader sense, the profit share of GDP. These have risen to very high levels in an environment that has been very favorable to large

corporates. From a social and policy perspective, the writing seems to be on the wall. We think the next 10 years will be marked by a swing of the policy pendulum away from shareholders and toward labor; this will dent pre-tax margins. On top of that, it seems highly likely the tax rate that corporates face will rise, so post-tax margins seem set to fall even more. High valuations and declining margins do not sound like an auspicious set-up for equity returns. But then there are broader considerations that make us more positive.

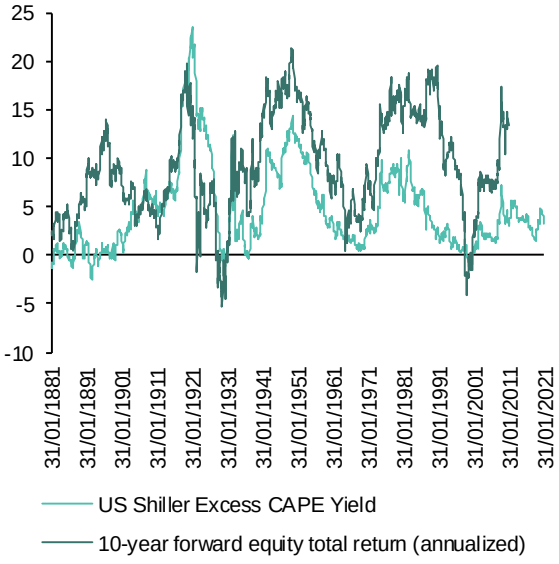
Household equity allocation is at the top end of the 70-year range (see Exhibit 5). Usually that would be taken as a negative signal for future returns. However, given the inflation outlook and the prospect of low returns from bonds this seems like a low hurdle. Equity allocations are "only" at the top end of their 70-year range? They should be through the top end of that range. Moreover, relative to low yields, the current valuation of equities can be justified (see Exhibit 6) and this implies a positive real return. Our central view on the macro backdrop is one where inflation rises, but real rates remain low. Unless inflation moves very far and becomes "unanchored," this is a positive environment for equities. Generally, this implies that investors should overweight real assets, and we would include equities as a real asset as corporate revenues are linked to inflation and, once stripped of the financial engineering of buybacks, corporate earnings growth tends to be positive in real terms.

EXHIBIT 5: **US household: Total equity share of total financial assets (%) — including pension assets and private equity**

Note: Shows the portion of US household and non-profit sector total financial assets allocated to equities. Equities is defined here as directly held corporate equities + mutual fund shares (includes ETFs) + non-corporate (i.e., privately held) equity + the equity portion of public and private pension fund assets. The data is quarterly. The latest data point is Q3 2020.

Source: FED and Bernstein analysis

EXHIBIT 6: **Cyclically-adjusted equity risk premium and forward excess returns**



Note: Risk premium defined as cyclically-adjusted (i.e., 10-year average inflation-adjusted) earnings yields less real yields on government bonds.

Source: Robert Shiller's database, GFD, and Bernstein analysis

More generally, there is a need to assess the whole range of possible return streams in the context of their returns and correlation to equities as inflation rises. Exhibit 7 shows the

average return of a range of assets/factors since 1970 conditioned on the level of inflation in a given year (the factor strategies are shown here long-short). Equities are one of the most effective assets to hold as inflation rises, at least until inflation reaches the 5% level. Within equities, Value factors do well as inflation rises, and within Value it is the more "mean reversion" type of factors, such as Price-to-Book (P/B) that do better compared with more income-oriented ones, such as Dividend Yield.

Elsewhere, FX Carry strategies do progressively better as inflation rises, and Gold and Commodities also score well on this basis. Real assets are also effective inflation hedges in theory. We show in Exhibit 8 that real estate indices are positively exposed to inflation, and so are REITS. However, this time we would be much more cautious on near-term exposure to real estate, given the scale of the current recession and the exposure of the sector to the structural headwinds from the pandemic.

EXHIBIT 7: **Factor and asset performance in different inflation regimes**

Since 1970	US Equities Total Return, yoy	US Bonds Total Return, yoy	Equity: Price to Book, yoy	Equity: Dividend Yield, yoy	Equity: Momentum, yoy	Equity: Variance, yoy	FI Momentum, yoy	FI Carry, yoy	FX Carry, yoy
<-1	-23.12	7.63	-2.53	-4.97	-46.11	-8.43	-4.72	1.46	-7.10
-1 to 0	-8.75	10.63	-6.46	-3.17	-2.95	25.66	4.48	2.64	-5.31
0 to 1	2.54	4.39	-9.18	-0.57	12.61	16.44	0.90	1.85	-5.43
1 to 2	14.68	8.98	0.96	1.66	5.68	5.72	1.12	3.02	1.90
2 to 3	17.94	5.97	4.32	-0.59	4.27	-2.01	-0.25	0.54	4.63
3 to 4	12.86	11.19	3.75	2.44	11.51	4.92	0.31	2.04	3.59
4 to 5	10.98	8.75	4.66	1.71	5.89	10.69	0.12	0.41	4.98
>5	5.19	5.29	8.51	4.45	12.86	6.60	0.31	4.66	2.01

Since 1970	US REITS, yoy	Real Estate Index, yoy	GSCI Commodity Index, yoy	Brent Oil, yoy	Gold, yoy	US Energy relative, yoy	US Metals & Mining relative, yoy	Silver, yoy	High Yield Bonds, yoy
<-1	-37.47	-9.25	-53.16	-42.59	7.86	-11.56	-15.63	-1.98	-0.17
-1 to 0	-11.10	-4.34	-42.22	-42.91	2.40	-8.41	-19.51	-11.55	-4.72
0 to 1	3.67	3.95	-34.74	-39.21	-5.11	-20.19	-27.82	-13.80	-2.31
1 to 2	17.71	5.37	-8.32	-11.06	4.35	-8.73	-9.11	2.75	8.66
2 to 3	22.50	4.26	9.31	15.37	7.00	-1.72	6.03	11.04	12.85
3 to 4	21.90	4.68	18.98	19.68	10.58	4.54	1.41	11.78	8.82
4 to 5	4.20	4.04	21.51	17.57	5.74	6.69	6.73	-2.32	5.92
>5	9.41	8.00	20.10	39.07	21.39	5.70	1.57	22.90	1.48

Note: Returns for Energy, REITS, and Metals & Mining are from 1974, returns for FX Carry are from 1975, returns for GSCI Commodity index and Oil are from 1971, and High Yield Bond returns are from 1987. Equity PBK, Dividend Yield, Momentum, Variance, Residual Variance and FI Momentum, FI Carry and FX Carry factor strategy returns are Long-Short. Energy and Metals & Mining sector returns are relative to broader US equity market. Real Estate Index returns are from Robert Shiller's Real Estate return database.

Source: Ken French database, AQR, Robert Shiller's database, FactSet, FRED, Datastream, and Bernstein analysis

Exhibit 8 shows the correlation of assets and strategies with equities predicated on inflation levels. The first column shows that bonds become a less useful diversifier as inflation rises. The most striking result to us is that Value, Income, and Low Volatility strategies within the equity market become better diversifiers from a passive long-only equity position as inflation rises. The importance of value as a diversifier does not seem to be constrained to equities, as Carry strategies within Fixed Income markets (between short- and long-dated debt) and FX Carry strategies (between the debt of countries with differing levels of yields) also tend to have lower correlation with equities at higher levels of inflation. Gold retains a low correlation with equities as inflation rises, but REITS and high-yield bonds have a correlation with equities that increases with inflation and, hence, become less attractive.

EXHIBIT 8: **Factor and asset correlation with US equities in different inflation regimes**

Since 1970	US 10y Bonds	Equity: Price to Book	Equity: Dividend Yield	Equity: Momentum	Equity: Variance	FI Mom	FI Carry	FX Carry
<1	-0.09	0.19	-0.18	-0.27	-0.21	0.09	0.26	0.27
1-2	-0.22	0.26	-0.36	-0.24	-0.32	0.15	0.05	0.33
2-3	0.00	0.10	-0.13	-0.09	-0.30	0.06	-0.07	0.15
3-4	0.00	-0.02	-0.41	0.04	-0.51	0.12	-0.06	0.12
4-5	0.24	-0.10	-0.40	-0.05	-0.50	0.00	-0.12	-0.04
>5	0.31	-0.05	-0.50	0.05	-0.63	-0.22	-0.16	0.03

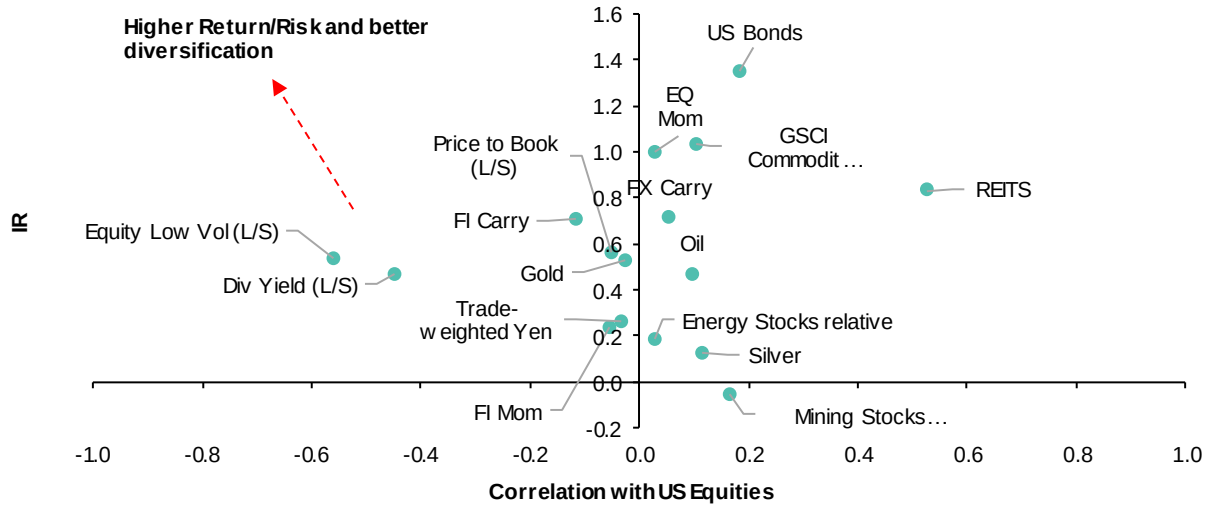
Since 1970	GSCI Commodity Index	Oil	Gold	Silver	Energy Stocks relative	Mining Stocks relative	REITS	Real Estate Index	High Yield Bonds
<1	0.15	0.17	0.13	0.17	-0.16	0.27	0.32	0.22	0.51
1-2	0.13	0.21	-0.11	-0.04	0.02	0.11	0.39	-0.03	0.56
2-3	0.07	0.08	0.05	0.12	-0.11	0.02	0.33	-0.08	0.57
3-4	0.20	0.23	0.03	0.22	0.12	0.18	0.44	-0.10	0.64
4-5	-0.04	-0.02	-0.14	0.16	-0.09	0.17	0.49	0.02	0.51
>5	0.09	0.03	-0.02	0.01	-0.01	0.15	0.62	0.00	0.62

Note: Returns for Energy, REITS, and Metals & Mining are from 1974, returns for FX Carry are from 1975, returns for GSCI Commodity index and Oil are from 1971, and High Yield Bond returns are from 1987. Equity PBK, Dividend Yield, Momentum, Variance, Residual Variance and FI Momentum, FI Carry and FX Carry factor strategy returns are Long-Short. Energy and Metals & Mining sector returns are relative to broader US equity market. Real Estate Index returns are from Robert Shiller's Real Estate return database.

Source: Ken French database, AQR, Robert Shiller's database, FactSet, FRED, Datastream, and Bernstein analysis

In Exhibit 9, we look across all periods where inflation was greater than 3%. On the vertical axis, we plot the return-risk (information ratio) of a given holding and on the horizontal axis we plot the correlation of the asset with equities. The attractive assets are in the top left as these have a higher return-risk and better diversification from a passive long equity position. On this basis, Equity Low Volatility, Equity Income, Gold, and Fixed Income Carry look appealing. We would stress that the path to higher inflation can be painful for low volatility strategies, but once that higher inflation level is reached it becomes attractive.

EXHIBIT 9: **Return-Risk vs. correlation with US Equities when inflation >3%**



Note: Correlation is calculated as average 12-month rolling correlation with US equities based on monthly returns. IR is calculated as YOY return of the asset divided by annualized standard deviation. Returns for Energy, REITS, and Metals & Mining are from 1974, returns for FX Carry are from 1975, and returns for GSCI Commodity index and Oil are from 1971. Equity PBK, Dividend Yield, Momentum, Low Variance, Low Residual Variance and FI Momentum, FI Carry and FX Carry factor strategy returns are Long-Short. Energy and Metals & Mining sector returns are relative to broader US equity market.

Source: AQR, Ken French database, Datastream, and Bernstein analysis

FACTORS AND INFLATION

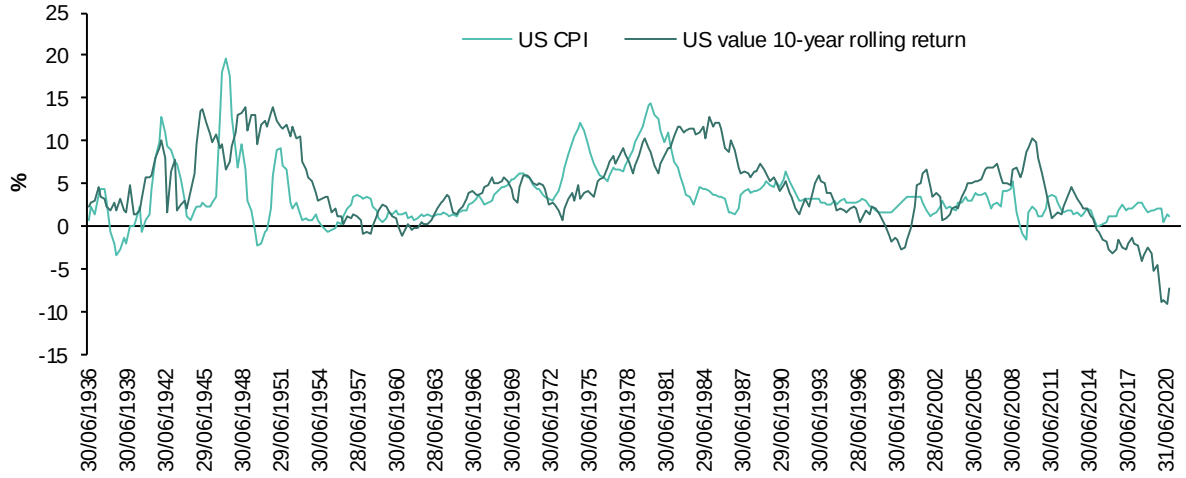
Within equities, one of the most important themes is likely to be pricing power, i.e., the ability to pass on price increases. This is not only likely to be important in determining the relative performance of stocks within the market but also be a driver of net capital flow into the equity market in coming years.

The rotation into Value since November 2020 is the strongest pro-Value rotation that has taken place since 2009. Value has outperformed across the board, both across the market and within sectors. Small cap Value has also outperformed. This, however, is but a blip in the persistent underperformance of Value vs. Growth that has been in play since the financial crisis in 2007.

Value has a very long-run positive relationship with the direction of inflation (see Exhibit 10). Tactically, we think there is room to go further in this rotation as long as inflation expectations remain on a steady upward path. Valuation spreads remain at all-time highs within the market (see Exhibit 11 and Exhibit 14).

Low Volatility is the most vulnerable part of the market tactically to rising inflation expectations. There has been a persistently negative relationship over the past 20 years. It underperformed during the last two periods of rising inflation expectations, in 2016 and post the financial crisis.

EXHIBIT 10: **Is inflation all that was missing for Value?**



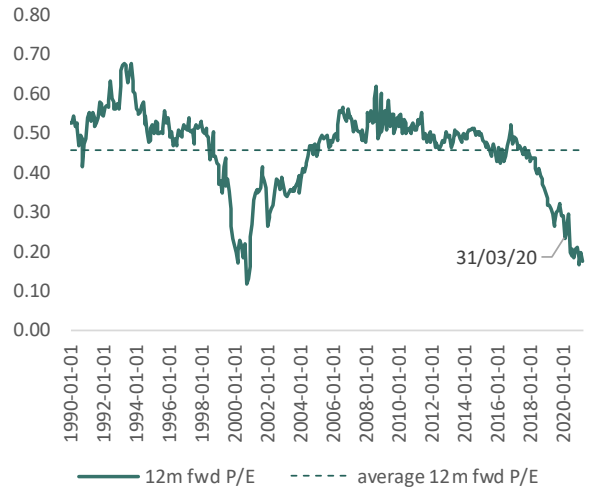
Source: Ken French database, Datastream, and Bernstein analysis

While we think the Value rotation has room to run further, on a longer-term horizon we are overweight Sustainable US Growth. The absolute level of real rates is likely to stay low for an extended period — this inherently benefits companies with growth in cash flows forecast out into the future. The persistence of growth for high-growth companies has increased in recent years. The ability to maintain superior growth along with lower discount rates means long-duration equities can maintain a high multiple.[1] Please see the chapters

[1] Portfolio Strategy: Why US growth can continue to shine

"Value Rotation," "Banks as the Ultimate Short-Duration Trade," and "Low Volatility Vulnerable to Rising Inflation Expectations — Tactical Short."

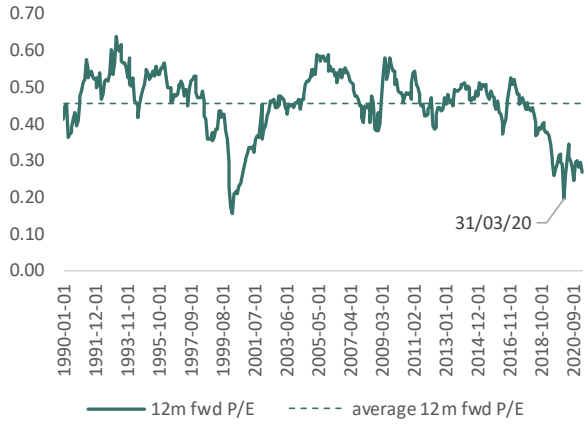
EXHIBIT 11: **US: Valuation (12-month forward P/E) of Composite Value**



Note: Shows the valuation of a Composite Value factor. It shows the ratio of the median 12-month forward P/E of the cheapest quintile to the median 12-month forward P/E of the most expensive quintile for the MSCI US. Stocks are equally weighted within quintiles. Data as of April 12, 2021.

Source: MSCI, FactSet, and Bernstein analysis

EXHIBIT 12: **Europe: Valuation (12-month forward P/E) of Composite Value**



Note: Shows the valuation of a Composite Value factor. It shows the ratio of the median 12-month forward P/E of the cheapest quintile to the median 12-month forward P/E of the most expensive quintile for the largest 300 stocks in the MSCI Europe. Stocks are equally weighted within quintiles. Data as of April 12, 2021.

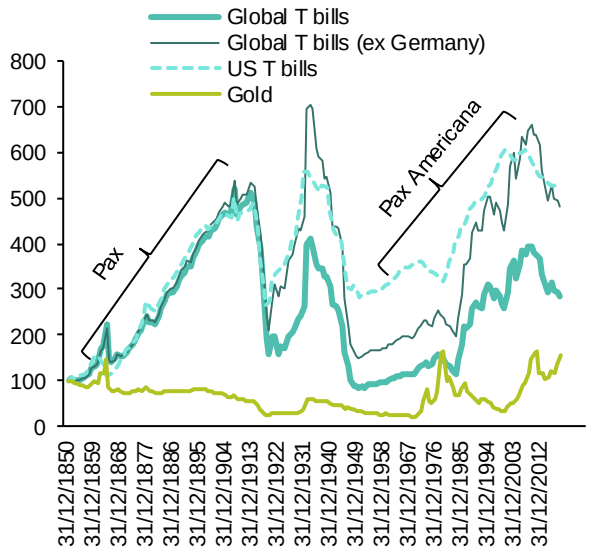
Source: MSCI, FactSet, and Bernstein analysis

GOLD, CRYPTO, AND TOKENIZED ASSETS

An inflationary outlook inevitably leads to the question: "What about gold?" We think this environment does indeed increase the attractiveness of gold — and potentially over other non-fiat cash-like assets such as cryptocurrencies.

Over very long horizons, the real return of gold is barely greater that zero, but that might be more attractive than some longer duration lower-risk assets (see Exhibit 13). Moreover, as shown earlier in this chapter, the low correlation of gold with equities persists at higher levels of inflation, making it important as a diversifier, when such things are scarce. Famously, one cannot value gold, but one can value nearly everything else! We show in Exhibit 14 that the five-year forward return of gold relative to a 60:40 portfolio tends to increase with higher starting multiples; so, at high multiples such as we have today, gold tends to be additive to a 60:40 portfolio rather than a drag. We can also show that the worst time to own gold relative to 60:40 is when starting bond yields are highest, clearly not a situation that holds today.

EXHIBIT 13: **No such thing as a risk-free asset?**



Note: Expressed in real terms using US CPI as the deflator. Global T bills use an equal-weighted average of the US, the UK, Holland, France, Prussia/Germany, and Australia T bills, with Italy, Japan, Switzerland, and Belgium joining as the data becomes available or as the countries were created.

Source: GFD and Bernstein analysis

EXHIBIT 14: **Gold vs. 60:40 – average (annualized) return conditioned on equity valuation bond yield**

Gold - 60/40: 5 Year Return

		BY Low				*BY High*	
		1	2	3	4	5	Avg
Shiller Cheap	1			10.8	9.3	-16.7	-8.1
	2	-5.6	-4.5	7.3	-5.2	-15.0	-3.5
	3	-12.1	-1.9	-16.0	-15.5	-17.5	-11.4
	4	-4.6	13.3	-17.8			4.5
Shiller Exp	5		7.7	0.4			3.3
	Avg	-9.3	8.0	-5.3	-2.1	-16.4	

Note: Shows the forward return of gold relative to a 60:40 portfolio (based on US equities and bonds) conditioned on starting levels of equity valuation and bond yields. The horizontal axis shows the level of bond yields from low to high and the vertical axis shows starting levels of valuation of equities (divided into quintiles) from low to high.

Source: Datastream, Robert Shiller's database, and Bernstein analysis

We make the case in this *Blackbook* that the increased demand for gold that follows from this inflationary outlook also potentially creates more institutional demand for cryptocurrencies. We cover the main arguments on this topic in the form of a dialogue as we find that is the best way to represent the strong differences of opinion toward the potential of crypto as an asset class (see the chapter "A Dialogue Concerning Cryptocurrencies"). The main argument in favor is that the total change in the policy environment makes a convincing case for an effective debasement of fiat currencies and also a rethinking of the meaning of sovereign risk-free assets. There are strong arguments against as well. Bitcoin specifically is one of the most anti-ESG assets, so the surge in its popularity sits awkwardly with the embracing of ESG across the investment industry. There is also the possibility that regulators may seek to clamp down on cryptos if they get in the way of the implementation of either fiscal or monetary policy (e.g., if central bank digital currencies were launched with an attempt to push interest rates more deeply negative).

We also explore the idea that the demand for bitcoin is positively linked to price — see the chapter "Is Bitcoin a Giffen Good?". We conclude that technically bitcoin is not a Giffen good, but with increased scale it does attain the appearance of being more broadly acceptable and, thus, some of the constraints on demand are weakened.

The real place for the blockchain in asset allocation may, however, not be in crypto but in the ability to tokenize real assets — see the chapter "Tokenization of Real Assets — the Blockchain in Asset Allocation." The key issue is not just that tokenization is a useful new technology, it is that this new technology has become available just as asset owners are

going to have to meaningfully increase their exposure to real assets. Tokenization opens the prospect of making new assets investible, and of lowering the cost of access to existing investible real assets. Asset tokenization is at an earlier stage of development than crypto, but we think tokenized assets are likely to become a significantly larger part of portfolio allocation for asset managers and asset owners in coming years.

INFLATION AND PORTFOLIOS

Where does all this leave us? This *Blackbook* seeks to make the case that we face an environment of higher inflation than before the pandemic. In the near term, this inflation derives from the mechanical effect of the reopening trade and tight supply, but from 2022 onward we think there is a case that inflation continues, driven by the likelihood that we face a very different policy environment. For investors this marks a profound change from recent decades and has significant implications for the shape of portfolios.

Financial assets have outperformed real assets in the recent decades of falling inflation and rising asset prices. An outlook of lower nominal returns on average across financial asset classes and higher inflation implies a need to rotate to a larger allocation to real assets. We would include equities as part of this, given revenues and, hence, dividends, have a link to inflation. Investors will be dusting off data on "what works" when inflation rises. This work implies Value, Commodities, Real Estate, Momentum, and Carry can all work. Within equity markets, Banks and commodity cyclicals can do particularly well. However, it is not just about finding return streams that work when inflation rises. An inflationary future calls for more fundamental changes in the methodology of investment and portfolio construction that go beyond enumerating particular trades. At the total portfolio level, it seems likely that finding diversifying assets will become harder. Thus, it will be equally important to allocate to return streams that can maintain diversifying characteristics if the level or volatility of inflation rises. Given the likely need to maintain a large equity weighting, it is diversifying equity risk at higher levels of inflation that is particularly important.

The death of 60:40 has long been pronounced. We have said as much ourselves in previous work.[2] But the prospect of higher inflation undermines 60:40 both from a return and a risk perspective. This is important as it has implications for much of the target date market and also for the whole set of assumptions that underlie the current received wisdom of investing. Higher inflation will focus attention on inflation measures as the true benchmark for many investors (DC pensions, endowments, family offices, and individuals saving for retirement). In addition, it seems likely to accelerate the need to use more factors alongside traditional asset classes, increase allocations to real assets, and also possibly create more demand for crypto and tokenized real assets.

[2] The Next 10 Years of Investing and A Cross-Asset View of Equities

SIX BOOKS FOR THE POST-PANDEMIC WORLD

HIGHLIGHTS

We are in an utterly new policy environment, the shape of which is not yet fully apparent.

The investment community has barely begun to adjust portfolios to reflect this. The change is yet to come either in portfolio positioning, in the intellectual basis for a methodology of investing, or in investment praxis.

This is partly a "review essay" of what we regard as some of the key books that provide a provisional language for the post-pandemic world; but rather than just be a review of a series of books, this essay is also an attempt to stitch a narrative from them and then from that derive normative statements about portfolios, allocation, and investment. There are several themes that form a structure that provide a provisional language for post-pandemic investment.

- **A political attempt to address inequality.** The gap in income was wide before the pandemic and is now even larger. A political response seems necessary. There may also be some longer-term demographic forces that could help reduce this, but they will be too slow to be enough by themselves.

- **The labor-capital split.** The last 30 years have seen a huge swing in favor of capital. We think the pendulum will now move the other way. Expect pre-tax and post-tax margins to fall.

- **Saving for retirement.** Raising retirement ages sufficiently to keep the dependency ratio constant is probably politically hard. Individuals have had to bear a greater share of the risk of funding retirement and that is not going to change. To achieve this implies a higher savings rate (which is disinflationary) and a new way of thinking about what a retirement portfolio should look like. Retaining purchasing power will become harder.

- **Automation.** Is this something that destroys jobs and implies high unemployment or a key to sustaining real growth as the working age population falls, or could it be an enabler to rethink the nature of work? Not just the pace of automation, but its objective is also up for discussion and adaptation.

- **Demographic change.** As the working age population ages, how does this impact growth, wages, acceptability of immigration, labor bargaining power, demand for savings, and potential for inter-generational tension? These last two points form a pair with the relative pace of demographic change and automation, a key input into the path of labor bargaining power and wages.

At the heart of this essay chapter, we discuss the books specified in Exhibit 15. Some have been published during the pandemic, others predate it, but we think the pandemic makes them more relevant or accelerates their message.

EXHIBIT 15: **Books reviewed in this essay**

- **Jonathan Crary - 24/7: Late Capitalism and the Ends of Sleep (2013)**
- **Scott Galloway - Post Corona: From Crisis to Opportunity (2020)**
- **Charles Goodhart and Manoj Pradhan - The Great Demographic Reversal: Ageing Societies, Waning Inequality and an Inflation Revival (2020)**
- **Stephanie Kelton - The Deficit Myth: Modern Monetary Theory and How to Build a Better Economy (2020)**
- **Alex Williams and Nick Srnicek - Inventing the Future: Postcapitalism and a World Without Work (2015)**
- **Yanis Varoufakis - Another Now: Dispatches from an Alternative Present (2020)**

Source: Bernstein analysis

We recognize that the collection may appear eclectic. After all, Yanis Varoufakis' contribution is a work of fiction and Jonathan Crary is a professor of modern art and theory. Some of the authors are espousing profoundly anti-capitalist (or rather, post-capitalist) theories, while others are firmly within a capitalist frame of reference. Yet we think that all are important in defining an intellectual basis for a post-pandemic policy environment and, hence, a basis for investing.

We have explored some of these issues in three previous essays:

Portfolio Strategy: The hiatus of intimacy and rhythm: Investing after the pandemic,

Fund Management Strategy: Post-Capitalism and Chronophobia - Towards a new regime for retirement and financial markets, and

Portfolio Strategy: Inflation, investing and the coming of MMT.

Here we attempt to extend that and bring their narratives together.

Jonathan Crary's *24/7: Late Capitalism and the Ends of Sleep* was written five years before the pandemic, although the subsequent exhibition in London that was based on it ended only one month before the pandemic became truly global. Thus, it felt like an incredibly prescient comment on a society and culture that has been challenged by the pandemic.

On one level, Crary's work is about the incessant nature of contemporary life with its "always on" demand, but there is a deeper exploration here about the interplay between the needs of capitalism and personal time and individual consciousness.

He suggests the endless advancement of tech products should not be seen as just devices, but instead as "various services and interconnections that quickly become the dominant or exclusive ontological templates for one's social reality." The claim is that this leads to a mass synchronization of consciousness and memory, a standardization of memory. This can be

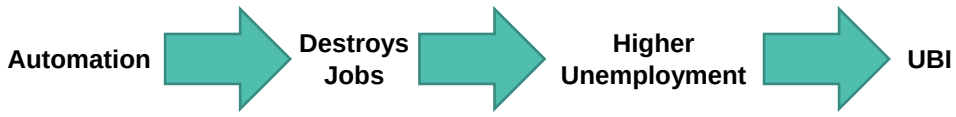
seen as the extension of a view of capitalism observed by Marx who suggested that it inevitably leads to a homogenization of time.

The one bastion is sleep and dreaming. Indeed, Crary suggests that sleeping is an affront to capitalism in that "shockingly" nothing of value seems to be extractable from it. Yet, at any rate.

Williams and Srnicek in *Inventing the Future: Postcapitalism and a World Without Work* present the possibility of a world without work. The starting point is the situation of precarity that described a large portion of the labor force in the US and the UK prior to the pandemic, those without formal full-time work, or as they pithily describe it, those who suffer the "misery of not being exploited."

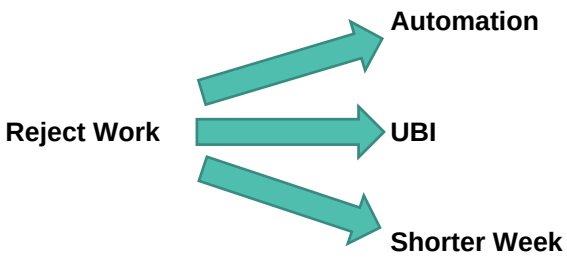
Rather than seeking to perpetuate a Marxist debate about the antagonism of labor and capital, they suggest instead moving beyond that dichotomy. Usually, the argument from the left is that automation threatens jobs and, hence, necessarily leads to a need for universal basic income (UBI) to restore social justice (see Exhibit 16). However, in this book, there is a total inversion of that thought process. We describe it pictorially in Exhibit 17. Rather than automation leading to a destruction of jobs that may lead governments scrambling to offer UBI, the authors suggest the process runs in reverse. To some, their discussion of automation might sound like an echo of Keynes' musing about greater automation leading to increased leisure time. But this is more radical. They start by rejecting work and from that starting point they then *demand* both automation and UBI.

EXHIBIT 16: **Socialist argument for UBI**



Source: Bernstein analysis

EXHIBIT 17: **Post-capitalist argument for UBI**



Source: Bernstein analysis

Much of the authors' criticism is aimed at the left, for being over-obsessed with what they call "folk politics" that does not lead to meaningful change and a lingering aversion to data-intensive modeling. The message outlines a utopia rather than necessarily a realistic policy option. However, this is a part of two huge forces. UBI is a much more tangible policy goal after a year of furlough schemes and stimulus checks. Also, the pace and objective of automation and its implication for the nature of work and pace of wage growth is a recurring theme in this essay.

Stephanie Kelton's *The Deficit Myth: Modern Monetary Theory and How to Build a Better Economy* has probably been the most read of the books discussed here in the population of finance professionals. If one were to seek evidence of a change in thinking among investors and politicians, then we can find it in the wide readership and reference to modern monetary theory (MMT) in public debate. Indeed, Kelton herself makes the distinction between MMT as a description of the economy and as an actual policy objective. This is a nice distinction that reminds one of Osiander's introduction that was inserted into the work of Copernicus. Indeed, it is as a description that MMT is likely to be most influential in the near term. Though the post-pandemic reality of higher deficits and direct government cash handouts render the policy prescriptions less alien to many.

A central message is that government overspending is not measured by the size of a deficit but by the rate of inflation. Thus, if there is high unemployment, then the deficit is too small. It then follows that it would be desirable to have a government jobs guarantee program.

Scott Galloway's *Post Corona: From Crisis to Opportunity* reflects on the problem of inequality and the system of governance that has enabled a privatization of profits on the way up but socialization of losses when there is failure. He also makes the broader claim that letting companies go bankrupt is an important part of reducing inequality and addressing the labor vs. capital split in the economy.

Goodhart and Pradhan's *The Great Demographic Reversal: Ageing Societies, Waning Inequality, and an Inflation Revival* is the subject of a separate chapter "Inflation, Demographics, Wages, and the Shape of Investment Portfolios" so we will deal with it only briefly here. The basic message is that most of the decline in inflation over the last 40 years should not be regarded as the result of the effort of central bankers, but instead was caused by demographic forces. The opening up of China and the former USSR to the global economy, the entry of baby boomers into the workforce, and also the significant increase in female participation in the workforce all increased the supply of labor. When one also considers the decline in workers' rights, first from the long decline in trade union membership and latterly from the rise of the gig economy, all this translates into a huge shift in bargaining power from labor to capital. What is interesting is that a lot of this was one off or else about to go into reverse. The Chinese working age population is about to start shrinking, baby boomers are retiring, and the increase in the female participation rate was largely a one-off event. Thus, their narrative is that wages will rise.

They also point to an inflationary force from the increase in longevity, implying a marked increase in spending very late in life as care costs increase. Thus, they outline a future where inflation rises, while real growth likely declines as the working age population shrinks (barring some huge rise in productivity).

Yanis Varoufakis' *Another Now: Dispatches from an Alternative Present* is technically a work of fiction. But it is an attempt to sketch a utopian alternative to capitalism. It turns on the interplay of characters in our world with their doppelgangers in an alternative present, with much of the action set in the future, but with long reflections back on the present. The device works very well as a method of comparing our capitalist reality with a socialist alternative.

For purposes of our discussion here a few themes stand out. There is the realization that people have come to during the pandemic of the immense power that governments have both in the regulation of daily life and in the ability to provide direct economic support. The apparently unbroken narrative of recent years of shareholder primacy and powerless governments received a rude awakening. There is a lot of discussion of the governance of corporates and the role of employees in corporate decision making that we won't discuss here.

The alternate reality is a very different one, that no longer has any stock markets or any commercial banks. Instead, all citizens have accounts directly with the central bank through which they receive direct payments from the government. There are elements of this that sound like a possible future of central bank digital currencies if they were allowed to grow to replace cash.

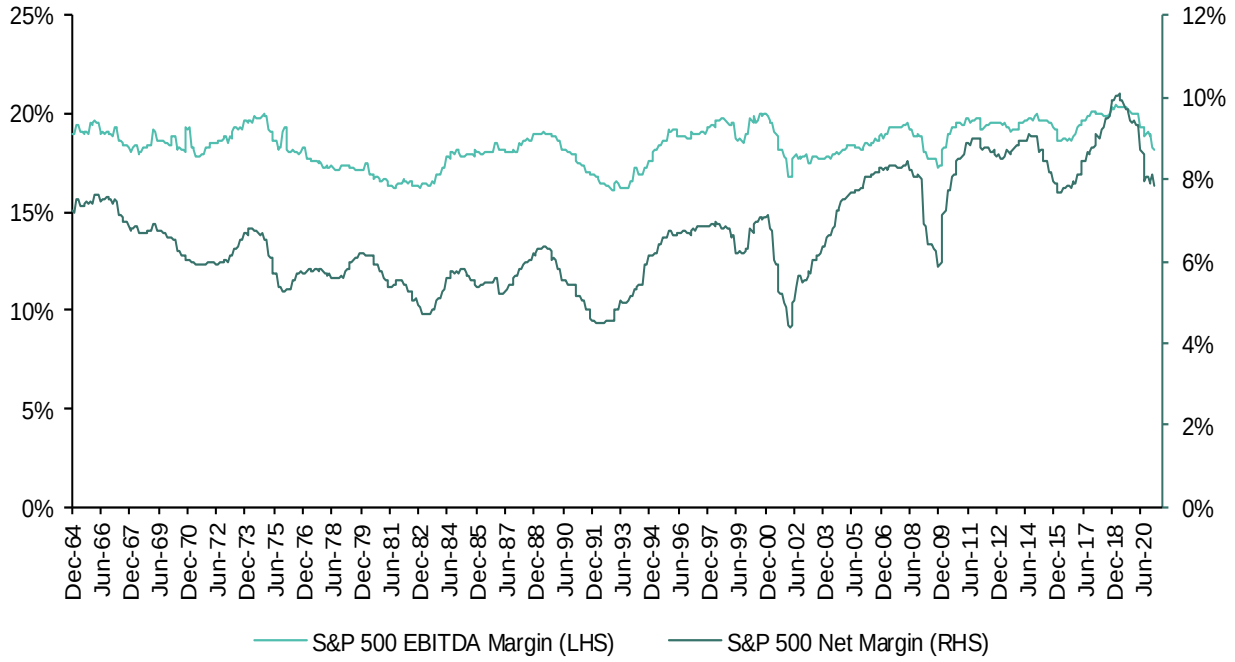
Synthesis?

Rather than this chapter just be a review of these books, we want to achieve two more things. One is to attempt to draw out a synthesis if there is one, or at least to extract common themes. We then want to apply that to what it means for portfolios.

One significant common theme is the view that there needs to be a transfer of power from capital to labor. Essentially, a swing of the pendulum back from where it has got to in the last 30 years. The authors all have different views on how this might be achieved. Crary, and Williams and Srnicek (both published well before the pandemic) present this as a political aspiration, Varoufakis presents this (fictionally) as a rising up against free markets, and Goodhart and Pradhan have a very different take — for them a political rupture is not necessarily needed, demographics is going to achieve this.

Wrapped up in this is a reduction in inequality, but it has clear implications for corporate margins and the profit share of GDP. Pre-tax margins have been higher over the last decade, but the most marked change has been post-tax margins which have been at the top end of the historical range (see Exhibit 18).

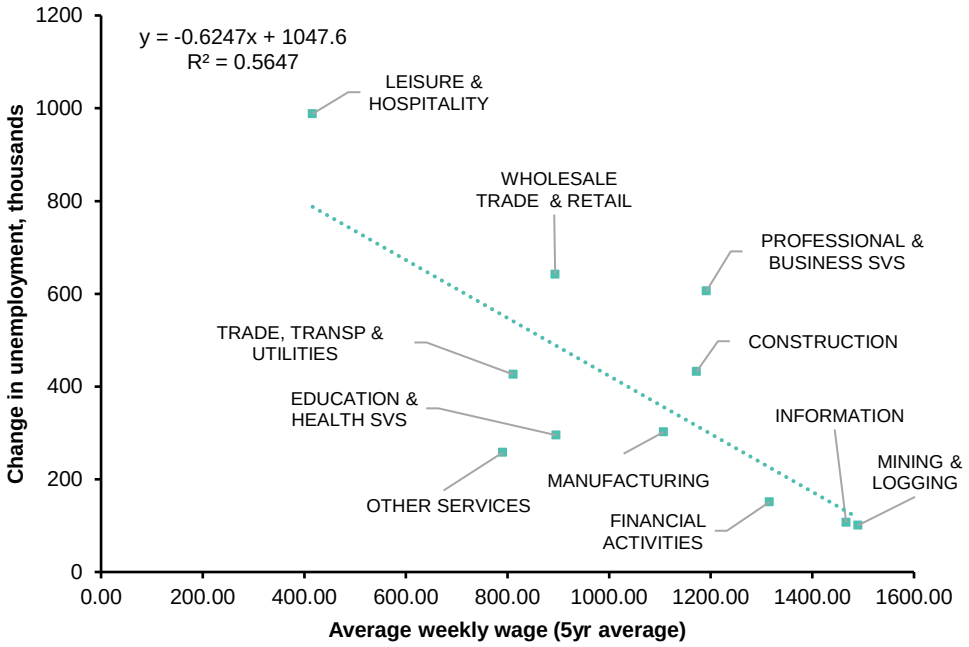
EXHIBIT 18: **Corporate margins are set to be lower as the pendulum swings from capital to labor**



Source: FactSet and Bernstein analysis

Several of the books refer to the idea of UBI. Our take on this is that all the ingredients are now here. High unemployment after the pandemic (the idea that the scale of the recession leaves a scar of unemployment but also the specific social-distancing nature of lockdown will have brought forward years of automation), plus higher inequality (the way that the increase in unemployment has been felt across the income spectrum and also by different groups in society — see Exhibit 19), and the political acceptance of handing out cash directly to citizens. These imply a path of some form of UBI that was unimaginable before. Though we note that the Goodhart and Pradhan view implies that UBI would not be needed. Either way, the practical implication is the idea of a floor for the price of labor. This would be more comprehensive than a minimum wage, as the latter only impacts those who have jobs.

EXHIBIT 19: **The increase in unemployment during the pandemic has been worse for lower paid jobs: change in unemployment rate and average hourly earnings by industry**



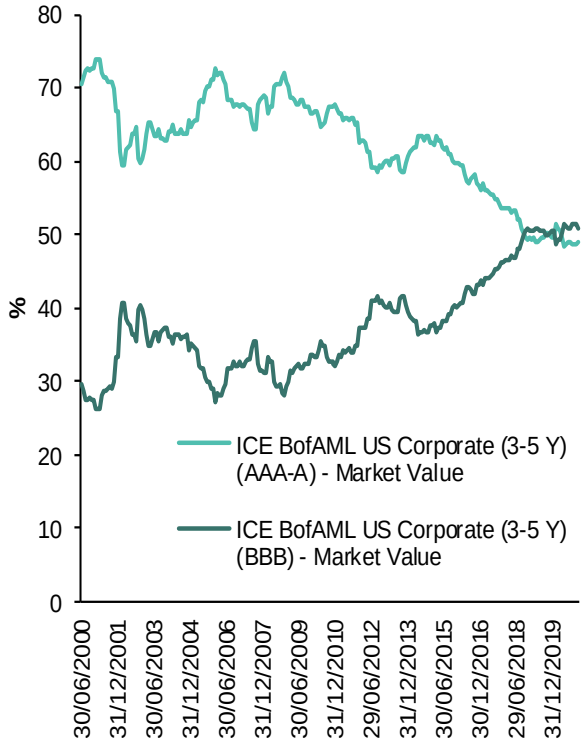
Source: Datastream, Bureau of Labor Standards (BLS), and Bernstein analysis

We suggest that almost universally these books suggest higher inflation. Some of them don't tackle the issue directly, while Kelton, and Goodhart and Pradhan explicitly outline that view (albeit for very different reasons). Alongside a switch in the balance between shareholders and labor, it is a view that the regime shift we are witnessing leads to higher inflation that is one of the most important practical breaks with recent decades for investors. Alongside this there is also an implication of higher deficits. The Kelton and Varoufakis view would be that they don't matter — or rather that they might even be too small.

There is a theme of governance failure. Over the decade prior to the pandemic, the main buyer of equities in the US (and latterly in Europe and Japan as well) were corporates themselves rather than investors (see Exhibit 20). The key performance indicators that set the pay of corporate management teams are nearly universally less than three years. There has been a huge incentive to issue lower quality debt (given the demand for yield) and to use that to buy back stock, see Exhibit 21). The problem with this is that it makes the overall system less robust. We have gone as far as to suggest that this is a failure of ESG.[3] It is all the more odd, given the long time horizons of the main pool of investment capital, which are assets for retirement saving.

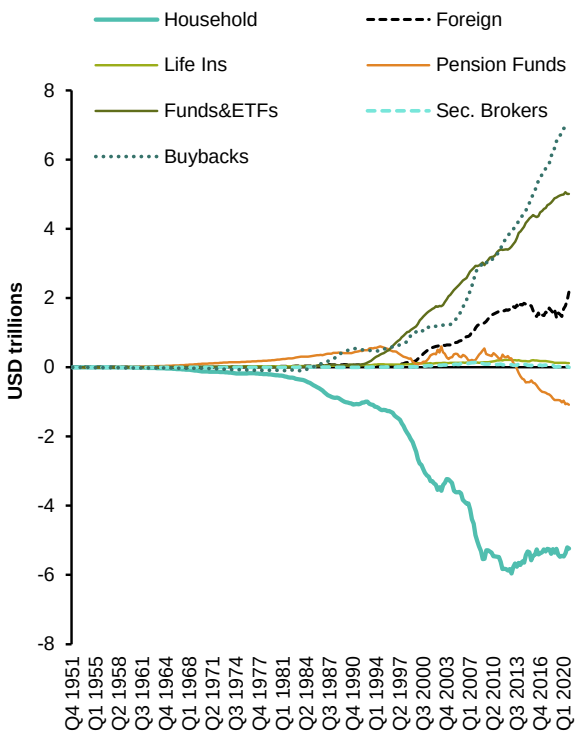
[3] Fund Management Strategy: Management incentives, buybacks and the failure of ESG

EXHIBIT 20: **Corporate debt quality was declining long before the pandemic; proportion of investment-grade debt rated BBB vs. above BBB**



Source: FactSet and Bernstein analysis

EXHIBIT 21: **Corporates have been the main buyers of US equities**



Note: Flow into US corporate equities from sectors of the economy as defined by the US flow of funds financial accounts (Z1).

Source: US Federal Reserve and Bernstein analysis

A perhaps more controversial theme is the role of Tech. Are the development cycles of Tech companies there for profit maximization or integrated into a view of the future of work? Well, we think we know the answer to this, but the books presented here suggest this might change to end the perception of the "privatization of profit and socialization of failure."

The other theme that comes from many of these books is that it seems politically infeasible to cut retirement payouts after a decade of stagnant real wages. There will be attempts to extend the retirement age, but recent work from the OECD suggests that there will have to be an increase in the retirement age of eight-and-a-half years in the next few decades to keep the dependency ratio the same; that would seem like a tall order to bring about.[4] Austerity also seems to be an impossible option — or political suicide for anyone suggesting it. So what gives? Presumably a combination of more tax, increased savings (so even lower velocity of money), and a willingness to see higher deficits.

[4] https://voxeu.org/article/effect-population-ageing-pensions

And disagreements?

There are also many areas of disagreement between these books, or areas which are left unclear. One should expect nothing less from a set of books from such varied disciplines and different viewpoints. If we focus on the ones most relevant for financial market participants we would highlight:

Real rates. There is no clear prognosis for the path of real rates from these books. Goodhart and Pradhan imply a slight move up in rates. In our own work, we think it more likely that real rates are held at negative or zero levels for a long time. Some of these books imply a pricing of sovereign default might be warranted, implying an upward movement.

Level of inflation. We have argued that the implication from the majority of these works is structurally higher inflation. However, they don't imply a clear view of what level.

We think this can come about through policymakers needing it as a way out of debt levels (soft default); the UBI and MMT discussion implies an ability to manufacture inflation. Goodhart and Pradhan imply inflation led by wages and labor bargaining power. However, we have no historical example of steering a global economy out of a shutdown while having feet firmly on both monetary and fiscal accelerators. While we think the presence of both inflationary and deflationary forces implies a moderately higher inflation, we don't think anyone can realistically claim to know what coefficients to place on these various forces.

Thus, there is a possibility of an inflationary overshoot. Indeed, the main fear from those who oppose MMT has been exactly the risk of it unleashing hyperinflation.

Savers vs. Creditors. Yet another topic that is left unclear is the relative power of savers vs. creditors. We have suggested several times in this essay and in our recent research that there will be a need for savings to increase. Yet, at the same time any possibility that real rates may need to be anchored low, either to maintain stimulus or simply to keep the cost of debt below the growth rate, implies hardship for savers. Varoufakis' work has echoes of central bank digital currencies, which we have addressed separately,[5] that again has an implication of a difficult world for savers. We don't think this debate has been public enough yet, with the possible exception of in Germany. We expect it to grow as part of the political debate.

[5] Portfolio Strategy and US Payments: CBDCs - Why, why now, and should we be worried (excited) yet?

INFLATION, DEMOGRAPHICS, WAGES, AND THE SHAPE OF INVESTMENT PORTFOLIOS

HIGHLIGHTS

- This chapter is part book review and part expression of a view on asset allocation. Goodhart and Pradhan's (GP) recent book, *The Great Demographic Reversal*, makes the structural case for higher inflation. We were already proponents of a higher inflation outlook, but their view is the inflationary outlook will be driven by demographic forces rather than by policy choices.
- GP argue that the decline in inflation over the last 40 years is primarily the result of a massive one-off increase in the labor force, not a mark of the success of central banks. The entry of China and former Soviet Bloc countries into the world economy, the entrance of more women into the labor force, and all baby boomers reaching working age reduced the bargaining power of labor vs. capital. But, they argue, this is all about to go into reverse. Moreover, an increase in longevity would lead to a significant increase in spending in later years as medical and care costs rise.
- We discuss the outlook for inflation in this context, especially as a higher level of unemployment post the pandemic might be a deflationary force.
- This implies a significant shift in the shape of investment portfolios for asset owners. It suggests a need to increase exposure to real assets including equities, but also to long-short and factor strategies, some of which have not worked for a long time, thereby implying investors might need a lot of convincing to change. The notion of risk might need to change. Risk defined as volatility of returns may need to unavoidably increase to respond to the bigger risk of failing to preserve purchasing power.
- Within asset classes, this suggests a shift to shorter duration, but the exact nature of this depends on the path of inflation and the mechanism that drives it. Does a shorter duration imply a positive view on all Value-type exposures or only some of them? While this implies a shift away from long duration, there may still be a role for long duration within equities, but the path of real rates is crucial.
- This also leads to a greater need for hedges against debasement risk and for replacements for traditional high-grade fixed income assets.

DETAILS

This chapter is part book review and part an outline of strategic asset allocation in response to the likely shape of the post-pandemic world. The crucial macro questions that will frame investing in coming years are: Will there be inflation, and if so what will the policy response be? We think on balance the outlook will indeed be inflationary, but recognize that there are strong deflationary forces.

The recent book by Goodhart and Pradhan, *The Great Demographic Reversal: Ageing Societies, Waning Inequality, and an Inflation Revival*, is an important contribution to this debate. The case we previously outlined for inflation is essentially a policy-driven one — i.e., that the political desire for inflation to deal with debt levels is supported by the political acceptability of a much more direct form of fiscal support than was possible prior to the pandemic. These pro-inflationary forces are faced with an array of deflationary ones: likely high unemployment, lower velocity of money, and the prevalence of zombie companies. In addition, there are more structural deflationary forces that have been in place for decades in the form of automation, demographics, and globalization. We have discussed these in our recent *Blackbooks* (A Cross-Asset View of Equities and A New Paradigm for Investing).

The GP thesis is that this demographic force is in fact changing direction and is pivoting from a deflationary to an inflationary one. Thus, a policy engine to "manufacture" inflation might not be needed. Indeed, if this is the case, then policy makers could find that their fiscal and monetary support is going to magnify an underlying inflationary trend. It is already hard enough to try to steer a middle path between inflation being too low or too high, but this could make it more so. For investors, this accelerates the need to search for inflation hedges, to be sure that the benchmark is right, and to possibly increase risk levels materially in portfolios.

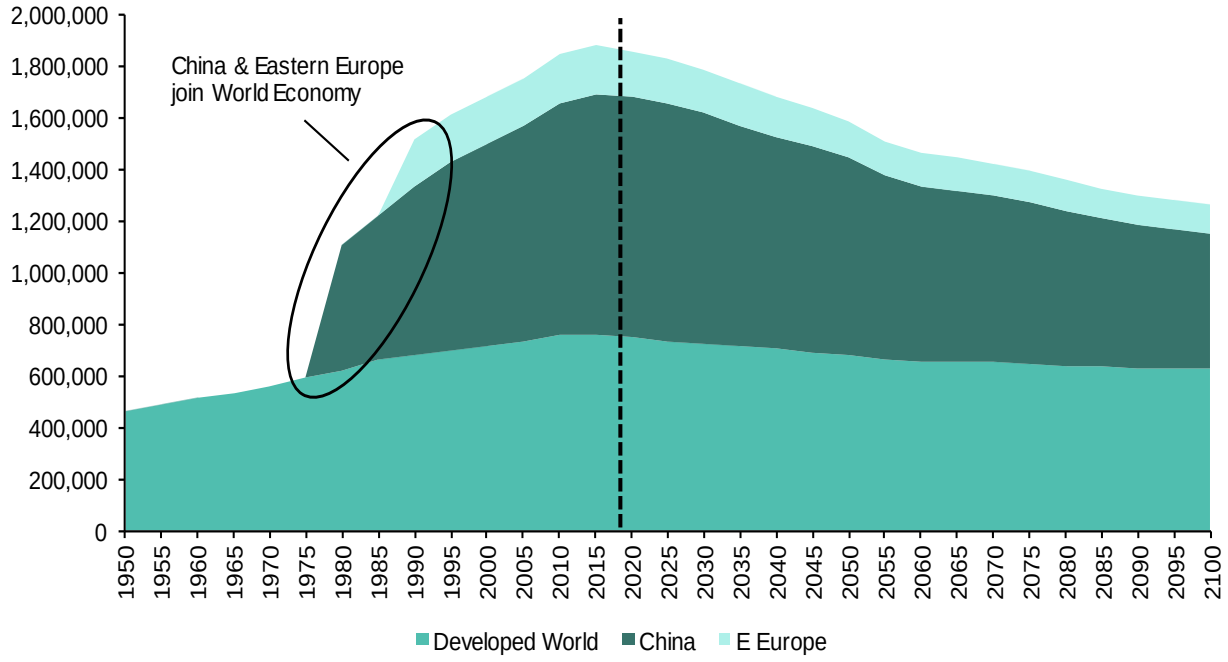
GP phrase their book in terms of economics and choices for policy makers. We find ourselves in agreement with much of the core tenets. We then use that as the basis for a broader discussion of the implications of this for strategic asset allocation and, in particular, for the choices that need to be made by asset owners, particularly pension funds.

Falling yields for 30 years have been mainly about demographics, not central banks

The starting point for the book is the view that much of the shift down in yields over the last 30 years has been driven by demographics in the broadest sense and that this is about to reverse. In fact, GP suggest the pandemic will mark the watershed between environments of falling inflation and rising inflation. One problem with arguments based on demographics is that usually one has to wait a long time for the effects to show up, but the massive policy changes in the wake of the pandemic could materially accelerate this process. The advantage of demographics-based arguments is that these changes tend to be more predictable than many other more transient effects that investors try to forecast.

GP claim that several forces have come together to drive the economically-important part of the demographic changes of the last 40 years. The opening of China and the former USSR massively increased the pool of global labor (see Exhibit 22), as did the entry of many more women into the labor force. This also coincided with the baby boomers all finally entering the potential workforce. If we add in the impact of de-unionization, particularly in the US and the UK (see Exhibit 23), then the last 30 years has seen a huge erosion in the bargaining power of labor vs. capital. This has effectively flattened the Phillips curve. Any reductions in unemployment did not translate into an ability for labor to negotiate higher wages.

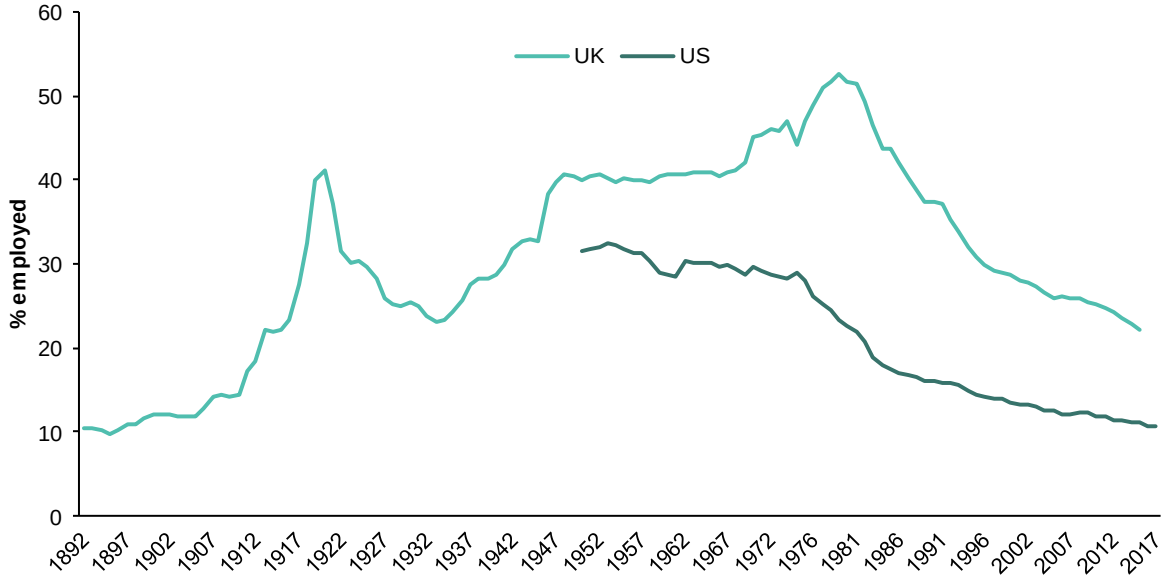
EXHIBIT 22: **The decline in working population from demographic changes over the next 30 years will remove 30% of the extra workers who joined the global economy from China and the Soviet Bloc**



Note: Size of population in regions shown aged 20-65.

Source: UN Population Division and Bernstein analysis

EXHIBIT 23: **Unionization rate in the UK and the US**

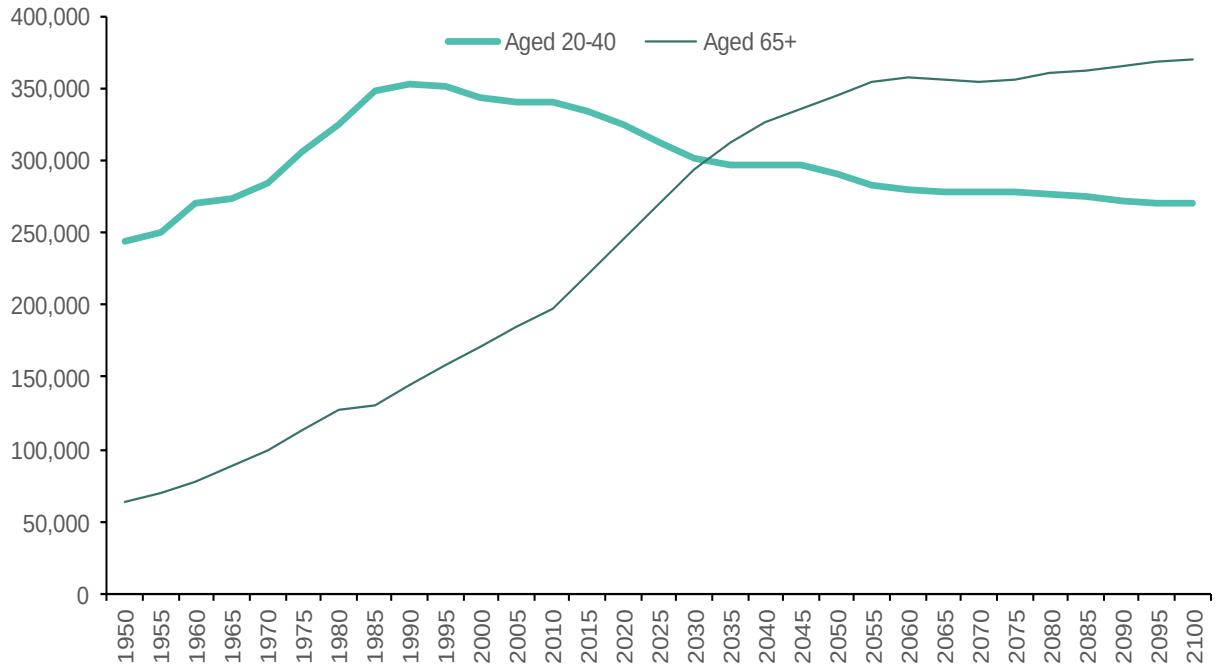


Source: Datastream, BLS, Thomas, R and Dimsdale, N (2016) "Three Centuries of Data - Version 3.0," Bank of England, and Bernstein analysis

GP also have a very specific view on longevity and inflation. They claim spending will increase much more later in life, mainly due to healthcare costs, and that a coming significant increase in the age of many societies (ex Africa and India) will be highly inflationary. They argue that increasing longevity will lead to an increased population that are dependent on intensive support, e.g., those suffering with dementia. Thus, expenditure is likely to rise materially later in life (and these caring jobs are ones that are less able to be automated).

GP point out that in the response to this, it is often assumed that part of the solution is that the retirement age rises and pension payouts are cut. They think this is politically very hard and we tend to broadly agree. After several decades when real wages for the average worker have stagnated, after the failed attempt at austerity, and after the economic impact of the pandemic, it seems to us that it will be very hard to cut pension payouts and raise the retirement age. We published Exhibit 24 a few years ago and update it here. We show that for the OECD overall, there is only a decade left before the over 65s will out-vote those of working age under 40. Moreover, the old tend to actually turn up to vote, so in practical terms this point could be reached sooner. This sets the stage for potential inter-generational tension between those of retirement age and those in the fastest-growth stages of their careers when it comes to the level of taxes and pension generosity.

EXHIBIT 24: **10 years left for the young to out-vote the old? Number of voters of retirement age vs. those under 40, all developed countries**



Source: UN Population Division and Bernstein analysis

Recent work from the OECD by Boulhol and Geppert (2018)[6] shows the increase in retirement age that would be required to keep the dependency ratio constant. For the

[6] https://voxeu.org/article/effect-population-ageing-pensions

OECD overall, they suggest that to keep the dependency ratio constant, the retirement age would have to increase by 8.4 years by 2050. There are variations between countries. In Sweden and Finland, the increase in retirement age would only be 4.5 years, but in Spain it would be 11.5 years, while in South Korea the more rapid aging of the population would require an increase of 15.5 years. Given recent experiences in Europe, e.g., Greece and France, to increase the retirement age even slightly, it seems highly unlikely these required increases in retirement age are plausible. An acceptance of higher immigration seems equally politically unfeasible.

One area where we disagree with GP somewhat is on future need for savings. They claim it will be politically very hard to cut pension payouts; so, with the safety net remaining in place individuals won't have to save more. We agree safety nets will remain in place, but many people want to have a retirement income considerably more than the public safety net. Also, the size of pension pots should increase with longevity. If we incorporate our own view that the real return on cross-asset portfolios is set to be lower than the average achieved over the last 30 years, it implies savings will have to increase and find an equilibrium above the pre-Covid-19 level. Other things being equal, this implies a further decline in the velocity of money and, hence, potentially has a disinflationary effect.

Although we very much agree with GP that higher inflation indeed seems to be likely, we would argue that the forces in favor of and against inflation are more finely balanced. For us it is the political economy and a desire and ability for politicians to manufacture inflation that is the deciding issue. In addition to the potential for lower velocity of money we would add that it seems likely the post-pandemic world is one with more zombie companies, whose presence may be disinflationary. Are governments really going to be in a position to let lots of companies fold over the next year and thereby push up unemployment? The bankruptcy rate in France last year was the lowest in 30 years, but no one is pretending that is a reflection of economic reality (Portfolio Strategy: Will they let the Bankruptcies clear?).

Despite us agreeing with GP on the end outcome of inflation, the biggest risk to inflation in our view is unemployment and the lack of wage inflation, which is GP's strongest pro-inflationary argument. Why this difference? What is going on here? This is partly a timing issue. We think, after the social distancing and lockdowns end, significant slack will remain in labor markets compared to the pre-pandemic level. The first reason for this will be the number of companies whose business models won't survive once temporary and extraordinary pandemic support is removed (unless governments step in to make support permanent; but then see our earlier comment on zombie companies). Second, because of the particular nature of the social distancing requirement, we suspect it will have effectively brought forward job losses that would have occurred in future years due to automation.

This is an outlook where aggregate wage inflation is likely to remain low. We suspect this could be the dominant narrative for the first few years after the pandemic, while the demographic force could become stronger on longer horizons.

GP recognize the "debt trap" that many economies find themselves in and suggest inflating out of current debt levels is the most likely and least painful path. They suggest austerity as a path out of debt is no longer politically feasible. This is not just an issue for the public sector though; they suggest the buildup of low-quality debt in the non-financial sector

represents a failure of governance. We agree. Despite the growing appetite for ESG-driven investment over the last decade, there was insufficient attention devoted to posing the macro ESG question of whether it was right to allow companies to lever up and defer investment to buy back stock.

This desire to inflate out of a debt trap implies that we will see the relationship between politicians and central banks changing to one of greater tension. Like GP, we agree it is the politicians who will win this debate (how can it be otherwise?). Thus, central bank independence is likely to diminish. This leads to an outlook of negative real rates for an extended period.

What does this mean for key macro variables?

This demographic framework creates large forces on key economic variables. Primarily, it implies higher inflation as wages rise, the labor share of GDP increases, and inequality decreases. There are other forces at work here, e.g., productivity. A recent paper by the chief economist of Google, Varian (2020)[7] pointed out that there is a key balance between the amount of *supply* of labor that will contract due to demographic forces vs. the *demand* for labor that likely shrinks as productivity improves. The bargaining power of labor depends on which one of these moves the most. Forecasting changes in productivity is very difficult though; in the meantime, the size of the working population is set to grow at a slower rate than overall population growth. GP assume that on balance this leads to a decline in real growth.

The focus of GP is on inflation, but this demographic argument has huge implications for real growth. Real growth can be thought of as a product of size of working population and productivity. If we take the view that productivity is harder to forecast than demographics, then it gives a central tendency of real growth that is set to decline.

The GP narrative is an explicitly global one. They point out that it is the only basis on which economics can attempt to describe a "closed system." There are, however, interesting regional implications. One notable line of argument on this point of real growth is that of Zeihan (2014). He makes the point that whatever the absolute demographic challenges, the US has a relative demographics advantage. The aging in the US is set to be less dramatic than in major allies in Europe and Japan and also less than in competitors (China). In addition, the US has a relatively low share of GDP related to export. Zeihan's conclusion is that the US doesn't actually need the "international order" that it is subsidizing as much as other countries. One possible consequence is a somewhat Trumpian world view in which the US can extract a "better deal" from the rest of the world. At the very least, it suggests the US can stay aloof from severe regional struggles elsewhere.

An environment of rising inflation suggests nominal yields are set to rise. But what about real yields? GP are dismissive of the link between real yields and real growth, and instead focus on the balance between desired savings and desired investment. Their thesis is that the decline in real yields has been driven by an excess of desired savings. Thus if, as they suggest, desired savings does not need to rise and given social safety nets remain in place,

[7] https://voxeu.org/article/automation-versus-procreation-aka-bots-versus-tots

then this downward pressure on real yields will slacken. They also suggest a slight upward pressure on real yields from shifts in changes to private and public sector investment.

This is an area where we find their argument less convincing. We think this is assuming that the long end of the rates curve is left entirely to market forces, whereas there is likely some degree of ability to control it. The strong desire of governments (though not necessarily central banks) will be to keep the cost of debt below the growth rate and thereby keep rates anchored low. Moreover, central banks and governments might find themselves in agreement that despite the demographic argument outlined here there are still deflationary forces if savings do in fact remain high (a reflection of low nominal returns on investment) and lingering unemployment post the pandemic. This depends to some extent on how forcefully one agrees with their demographic argument. If the demographic effect is so strong as to overrule other forces, then this provides a route for a possible increase in real rates. If it is more balanced by other forces then we think it more likely that inflation can rise while real rates remain flat.

We have argued in our research that *despite* deflationary forces, on balance we do see a higher inflationary environment, and that is without assuming a demographic support for inflation. Our argument is that the political pressure is there to keep stimulus in place because of high unemployment and wide inequality. We assume these forces cause a political shift to support workers' rights in negotiations with corporates, e.g., through unionization. We also think the mix of unemployment, inequality, and political acceptance of direct cash handouts are the ingredients that lead to either overt or covert UBI. This can create a strategic case for inflation. However, if the GP thesis is correct, then this shift in policy (fiscal and monetary) could be coming just at the same time as demographics pushes in an inflationary direction. The implication is an outlook with potentially even higher inflation with increased bargaining power of labor from a demographic point of view, potentially with UBI as an extra force.

We argue that the scope for policy error is large and that it is going to be hard to steer the economy in the post-pandemic world. We simply do not have collective experience in having full-on fiscal and monetary support at the same time, not to mention the political and social uncertainties of removing furlough schemes and other measures of support. Perhaps even more than predicting higher inflation, the forecast should be one of greater volatility of inflation.

Another angle of the discussion here is the outlook for corporate margins. The implication is that bargaining power is going to switch from corporates to labor either via straight demographic advantage or more driven by explicit policy changes. GP make the point that there has been a significant failure of governance in the last 10-20 years that has led to underinvestment by corporates (the cash was spent on buybacks instead). Again, we agree and have written on this.[8] Thus, corporate margins and profit share of GDP seem set to decline and find an equilibrium level below that reached in the decade before the pandemic, even before taxes. Post-tax margins seem set to be lower.[9]

[8] Portfolio Strategy: Inequality, Independence and Illiquidity - a future for public markets
[9] Portfolio Strategy: Paths of Policy - or can the market survive 2% yields?

We note that in all of this central banks are likely to lose independence. Maybe this was always going to be inevitable as they progressively "ran out of ammunition" as rates declined. More of the "heavy lifting" of cushioning the economy over the course of the business cycle will be done by governments rather than by central banks. In addition, there will be a need to keep rates low even as inflation rises. GP suggests that this latter point will bring politicians and central bankers into conflict. The bottom line is that there will be more "politics" in making economic forecasts and less time trying to second guess the reaction function of independent technocratic central banks. This seems likely to make the big-picture macro forces inherently less forecastable over the business cycle.

So, what should investors do?

What should investors do? The first thing is to make sure the benchmark is the right one. For many investors (DC pension plans, endowments, sovereign wealth funds, family offices, etc.) we argue the real benchmark should be inflation. It didn't matter so much if this was the explicit forecast in recent decades as with hindsight it has been relatively easy to beat inflation with investments in capital markets, i.e., financial assets have beaten real assets by a wide margin. But the low starting level of yields, forces that may favor labor over capital, and the potential for demographic inflationary forces make a plausible case for a strategic pivot in the contrasting performance of financial assets vs. real assets. Not that assets can always be neatly partitioned into being one or their other — plausibly equity and some real estate assets (e.g., REITS) could be considered both.

In one sense, the asset allocation message is easy — buy inflation protection, or to be more specific, buy assets that can deliver positive real returns but also achieve diversification among themselves. Some critical issues that make this more complicated are:

- The low level of yields across asset classes, implying lower nominal returns in general.
- Investors have become used to stocks and bonds providing mutual diversification, which may not hold anymore.
- Declining yields have mechanically increased the duration of fixed income assets, increasing the overall portfolio sensitivity to interest rates.
- Policy risks: A lot more of the outlook comes down to second-guessing political decisions not central bank technocratic response functions. This makes forecasting inherently harder.
- Some of the key allocations required might not have worked for over a decade. Thus, investors may require a lot of convincing or may lag their reallocations in response to evidence of inflation.
- The notion of risk might need to change. Risk defined as volatility of returns may need to unavoidably increase to respond to the bigger risk of failing to preserve purchasing power.

Where does this leave asset owners? We suggest this leads to an allocation that is very overweight real assets: equities and other "hard" real assets (real estate and infrastructure),

see the chapter "Tokenization of Real Assets — Blockchain in Asset Allocation." This also suggests a preference for short-duration assets such as income strategies and the Value factor. Lower nominal returns in aggregate combined with higher inflation also suggest an increased need for long-short returns. The problem both for short-duration and for many long-short strategies will be persuading investors that strategies that have been so out of favor for so long are now set to have their time in the sun.

Equally important to finding assets that can deliver positive real yields are finding assets that can still be diversifiers. We have discussed in prior research that the stock-bond correlation may become less negative.

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ESG: AN INFLATIONARY FORCE

HIGHLIGHTS

- Inflation and the possibility of higher inflation is likely to be the single most important narrative driving markets this year and over the next few years. It is possible that we are entering a new regime — one of higher inflation driven by policy.
- We think ESG is likely to be an additional inflationary force — a completely separate inflationary force *alongside* the macro narrative outlined above. ESG is likely to drive both consumer price inflation and, more significantly, wage inflation higher.

DETAILS

Inflation and the possibility of higher inflation is likely to be the single most important narrative driving markets this year and over the next few years. It is possible that we are entering a new regime, one of higher inflation driven by policy. New policy tools and mindsets are emerging — one which is much more open to higher levels of fiscal spending, running higher deficits, and handing out cash directly to citizens (see the chapters "Six Books for the Post-Pandemic World" and "Inflation, Demographics, Wages, and the Shape of Investment Portfolios").

We think ESG is likely to be an additional inflationary force — both on consumer prices and wages. A completely separate inflationary force *alongside* the macro narrative outlined above.

There are three separate angles by which ESG might lead to higher inflation. First, there is the cost of transitioning to a greener economy — this will have to be shared by governments, corporates, and consumers. Second, there is the willingness of consumers to share the burden of this cost. The size of change and investment required to reach the "net-zero" economy is so systemic that it needs to be driven by policy and collective action. Companies will not be able to absorb all the cost and it is inevitable that some of this will be passed on to consumers. There is evidence that there is already some willingness from consumers to share this cost.

The last angle is that ESG may be a driver of wage inflation. This is a much more macro angle to ESG and one that is much less discussed — but could be a very significant part of the outlook for inflation over the longer term. Wage inflation is the stickier component of inflation. It has been absent over the past few decades and is necessary for longer term inflation to hold. The social factors around, e.g., reducing inequality, labor rights, and onshoring manufacturing, may be the force that has been needed to ignite wage growth.

ENVIRONMENT – THE COST OF TRANSITIONING TO A GREENER ECONOMY – DRIVING CONSUMER PRICE INFLATION HIGHER

There is a *lot* of investment required to pay for the transition to a net zero emissions economy. Businesses are pledging "net-zero-something" targets by the minute.

As an aside and upfront — we think this investment is necessary. ESG and sustainable investing has the objective of preventing longer-term increases in costs, e.g., supply chain disruptions due to physical risks of climate change (severe drought, wildfires, and rising sea levels), unsustainable natural resource consumption, stranded assets in fossil fuel or petrochemical industries, buildings which are not energy efficient, and costs to industries resulting from longer-term shifts in climate patterns. Or an abrupt "inevitable policy response" to climate change further down the line in a sudden and reactive manner, e.g., a big increase in carbon taxes. Or longer-term costs on governments due to displacement of workers (from automation) or mass migration from developing countries due to drought. In the longer term, the objective of ESG is to reduce costs and increase sustainable returns for the overall economy. In the shorter term, this could be a driver of both consumer and wage inflation.

Climate mitigation steps required to reduce emissions:

- Energy — transitioning to renewable energy sources;
- Buildings — retrofitting buildings to become more energy efficient;
- Transport — transitioning to electric vehicles, decarbonizing shipping and air transport;
- Land use and forestry — reducing deforestation;
- Agriculture — increasing soil carbon storage;
- Carbon tax — taxes which penalize heavy emitters;
- Industry and manufacturing — developing more energy efficient processes and products to facilitate carbon capture, power storage, recycling efficiency, etc.; and
- Pollution — design out waste, shift away from landfill, invest in re-usage, recycling, and the circular economy.

Social factors also increase company costs — labor rights, working conditions, health and safety, and living wage — both in the company itself and in the supply chain.

Will these costs be passed on to consumers?

Governments have started investing fiscal dollars into the energy transition. Corporates will have to increase investment in new technologies, materials, and infrastructure if they are to keep up and honor their net-zero commitments. Shifting to sustainable practices will result in lower corporate margins over the long run for incumbents.

This cost is also going to have to be shared by consumers. There is some evidence that consumers are willing to pay more for goods that are sustainably produced. A survey by

McKinsey[10] showed that 60-70% of US consumers were willing to pay more for sustainable packaging.

Looking at the official composition of the CPI Index, the transition to a greener economy impacts almost all sectors.

Housing is the largest component. Retrofitting buildings, increase in cost of raw materials, energy efficient technologies, increase in health & safety measures — all point toward higher costs in the short term (although lower in the longer run due to efficiency gains).

Transportation. Consumers pay higher costs up front for electric vehicles and airlines pass on carbon emissions taxes via higher fares.

Food & Beverages and Apparel. Costs of premium recycling material and more efficient water usage are passed on via higher prices to consumers.

Energy is an important part of this basket. The cost of non-renewable sources of energy (fossil fuels) may increase due to a decrease in supply as companies eventually stop exploration.

Much attention is given to reducing emissions from Energy. Not as much to Waste. 55% of emissions come from Energy, 45% from products and food.[11] Recycling, waste management, and the circular economy need systemic change and investment if companies are to live up to their promises. The market is not prepared for this — there isn't enough recycling polymer material in the supply chain to meet EU targets and company commitments in reducing plastic waste and packaging. Recycled polymer material is now twice as expensive as virgin polymers.[12] Collective change and investment are needed to develop new waste and recycling technologies and infrastructure[13] and this cost impacts all sectors.

The size of change and investment required to reach the "net-zero" economy is so systemic that it needs to be driven by policy and collective action. However, the momentum behind this is not going away. Companies will not be able to absorb all of the cost and it is inevitable that some of this will be passed on to consumers, driving up consumer price inflation.

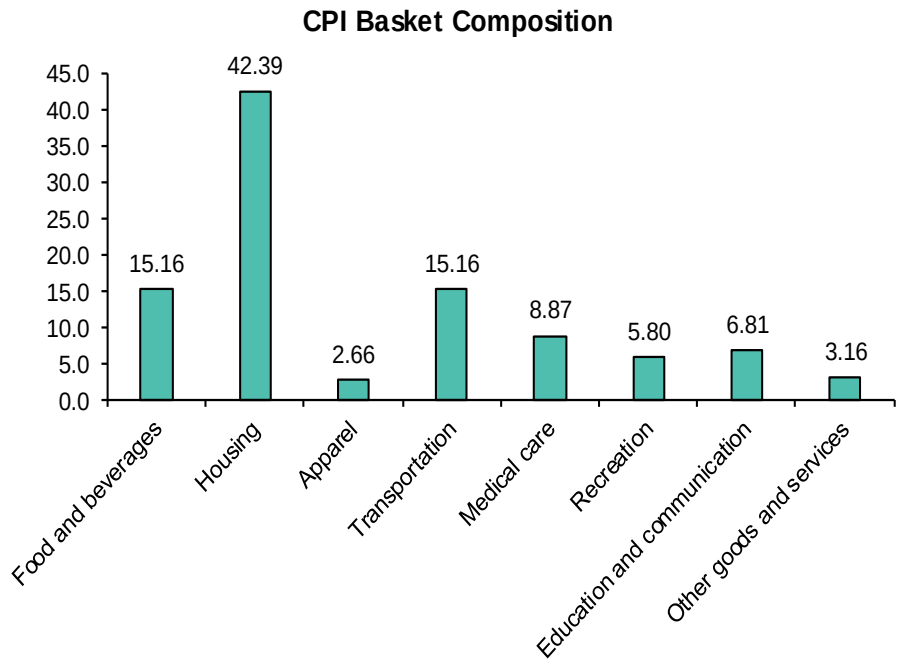
[10] https://www.mckinsey.com/industries/paper-forest-products-and-packaging/our-insights/sustainability-in-packaging-inside-the-minds-of-us-consumers#

[11] Beyond Boilerplate ESG: Ellen MacArthur Foundation - Redesigning our economy for circularity

[12] Beyond Boilerplate: Planet Tracker makes wake-up call to the plastics packaging industry

[13] Nestlé: Beyond Boilerplate ESG. Plastic isn't the next coal. Systemic solutions to get to zero landfill & litter

EXHIBIT 25: **Consumer Price Index basket composition**



Note: Relative importance of components in the Consumer Price Indexes: US city average, December 2020

Source: BLS and Bernstein analysis

WAGE INFLATION, HIGHER COST OF LABOR, REVERSE OF GLOBALIZATION

When we talk about the very real possibility of entering into a higher inflationary regime over the next few years, many challenge this view by pointing to wage inflation and the lack of it, and the fact that this is the stickiest part of inflation. The narrative is that without an increase in wages, inflation cannot take hold in the broader economy.

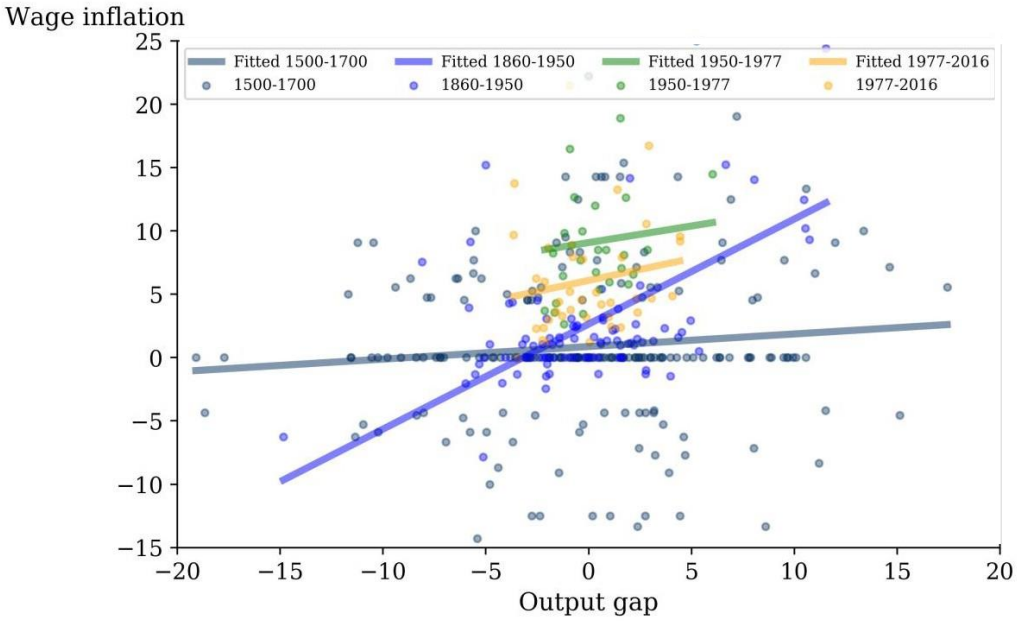
This is a problem for governments. Traditional policy measures have failed to ignite any form of wage inflation in recent decades. Real earnings growth has been frustratingly flat since the 1980s (although ironically the pandemic caused a jump in hourly earnings last year, see Exhibit 26). The Philips curve is broken — there has been very low unemployment for the last number of years, but this has not fed through into inflation (see the chapter "Six Books for the Post-Pandemic World" and Portfolio Strategy: The hiatus of intimacy and rhythm: Investing after the pandemic).

ESG forces and, in particular, the focus on reducing some of the negative social effects caused by globalization, e.g., rising inequality, unemployment, and increased dependency, may finally start to move the needle on wage inflation.

EXHIBIT 26: **Median weekly real earnings, US**

Sources: Federal Reserve Bank of St. Louis and Bernstein analysis

EXHIBIT 27: **Philips curve**



Source: Bank of England

Reverse of offshoring

Governments are becoming more "vocal for local." They have long been pushing for reshoring of manufacturing in an attempt to stop the leakage of employment and the increasing inequality that globalization and offshoring to countries with lower labor costs has contributed to. The pandemic has accelerated this with supply chain disruptions causing industries and companies to reconsider their dependencies on other nations. President Biden has just ordered a 100-day security review of America's supply chains. The EU has pledged to be self-sufficient in batteries by 2025 and has ambitious targets to boost chip manufacturing.

Reverse offshoring leads to lower unemployment in developed countries, which leads to increased labor bargaining power, which leads to increased wage growth.

Labor rights, living wage, the gig economy

President Biden has been pushing for an increased federal minimum wage to $15 per hour. The last time the federal minimum wage was increased was in 2009, to $7.25 per hour. The labor movement and support for unions is gathering steam in the US — again supported by President Biden, who has been unusually outspoken and union-friendly since his election. In 1950, 32% of US employment was unionized, today 11% is.

The gig economy is also under pressure to increase wages. In the UK, Uber lost its battle with the Supreme Court over work rights. Drivers now have to be paid at least the national living wage and enrolled in pension plans with contributions from the company. Deliveroo felt this pinch last week when its share price dropped more than 25% on the first day of trading post IPO. Part of this was attributed to investor concerns over increasing regulation on the gig economy.

Reverse offshoring and better labor rights are both wage inflationary forces. The momentum behind ESG, the shifting of the pendulum toward stakeholders, and the increasingly pressing need for governments to reduce inequality all point toward the possibility of wage inflation finally starting to take hold in the economy.

There are other strong wage *deflationary* forces in the background — automation stands out as an immediate issue. Governments, however, need to find a way to stop automation turning into mass unemployment by retraining workers or funding new projects. Otherwise, inequality will skyrocket even higher. Or, the alternative could be a world where UBI becomes the norm. Given the overhaul in policy since the pandemic, this is not beyond the bounds of possibility (see the chapter "Six Books for the Post-Pandemic World".).

In either case, ESG forces are likely to push wage inflation higher.

HIGH-FREQUENCY SIGNS OF INFLATION

HIGHLIGHTS

- In this chapter, we show a selection of higher frequency indicators that are already showing signs of rising inflation or where we expect evidence of inflation to appear in the near future.

- The rising importance of inflation is clearly illustrated by the sharp rise in interest in the topic in recent months. In the US, Google Trends search volume is showing the strongest interest in inflation-related searches since 2004.

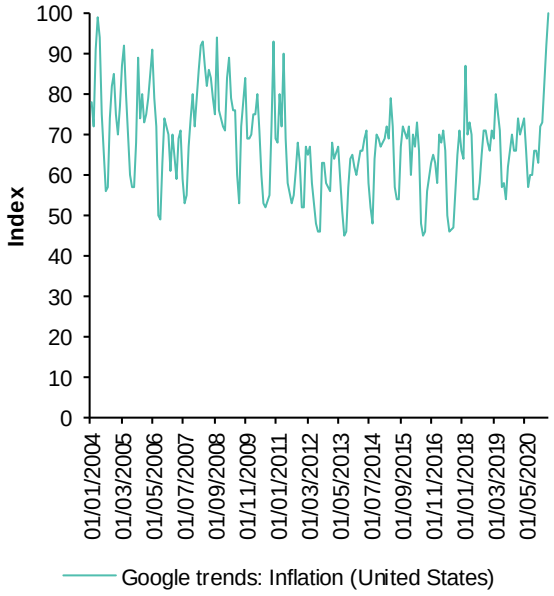
- The latest US CPI reading of 1.7% is still considerably below the pre-pandemic level and the last 30-year average of about 2.3% as it is still coming off the sharp deflationary shock caused by the pandemic. However, inflation expectations in the US are already at 2.4% and have surpassed the pre-pandemic level.

- A number of higher frequency indicators that we summarize here are already showing signs of rapid price increases:
  - Commodities are continuing to see strong price increases — the Bloomberg commodity index is up 34% compared to March 2020 and the Agricultural commodity subset is showing even stronger growth at 44%. This is accompanied by continuing strengthening of inflation-sensitive currency pairs, such as AUD-JPY and CAD-USD, which suggests these increases are likely to be sustained.
  - As tight inventory levels and the need for restocking in light of recovering demand collides with supply bottlenecks and supply chain disruptions, prices are rising rapidly across all modes of transport ranging from shipping to air freight. Container shipping rates from Hong Kong to Los Angeles are up 270% compared with last year, air freight rates are up 85% and road transport costs are close to the highest level since 2014.
  - A number of consumer-related areas are also showing signs of inflation. Used vehicle prices in the US are rising at the fastest rate since at least 2002 and the increased demand for driving has recently pushed US gas prices above the pre-pandemic level. US domestic airline fares are already 27% higher than March 2020, although they are still considerably below pre-pandemic levels.
  - The US Consumer Confidence Index has just jumped above the historical average and US retail sales are growing strongly as well. Meanwhile, the expectations for the next six months of the members of the US National Restaurant Association have just hit the highest level ever.

DETAILS

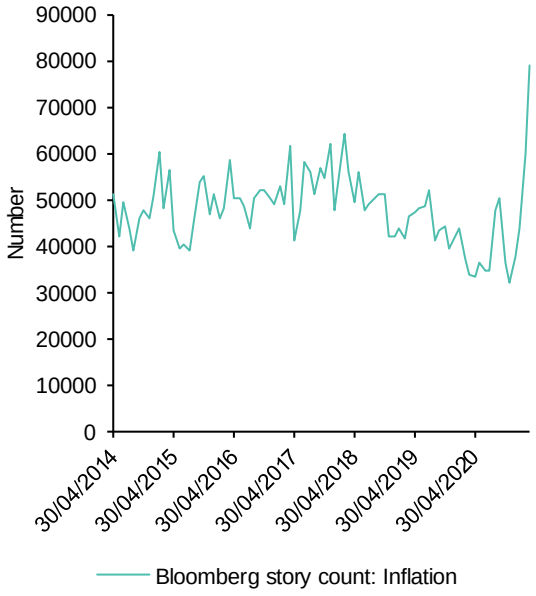
The topic of inflation has certainly captured people's attention lately. In the US, Google search volume related to inflation is running at the highest level since 2004 (see Exhibit 28). And the number of Bloomberg stories related to the topic of inflation has also soared in recent months (see Exhibit 29).

EXHIBIT 28: **Google Trends**



Source: Google and Bernstein analysis

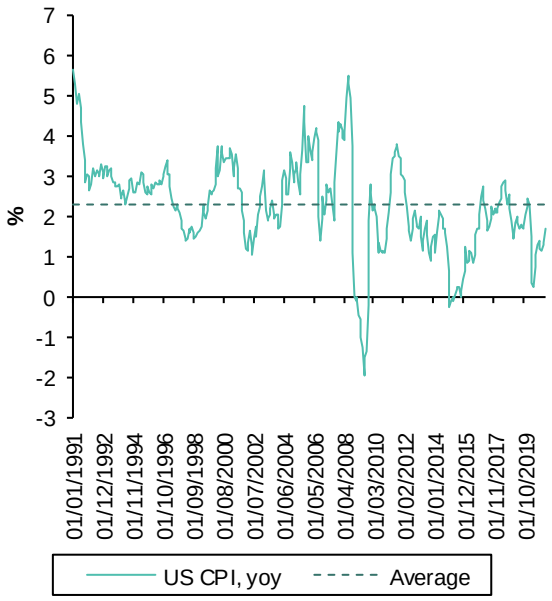
EXHIBIT 29: **Bloomberg news stories related to inflation**



Source: Bloomberg and Bernstein analysis

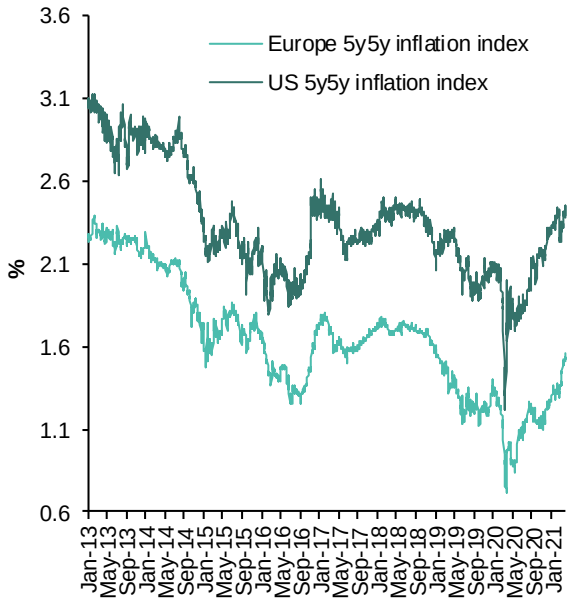
The latest US inflation reading of 1.7% is still considerably below the pre-pandemic level and the average over the last 30 years (see Exhibit 30). However, inflation expectations proxied by the 5y5y index moved sharply higher in recent months to 2.4% currently, which is already above the pre-pandemic level (see Exhibit 31). In Europe, inflation expectations have also recovered strongly since the trough in March 2020.

EXHIBIT 30: **US CPI**



Source: Datastream and Bernstein analysis

EXHIBIT 31: **US and Europe inflation expectations**

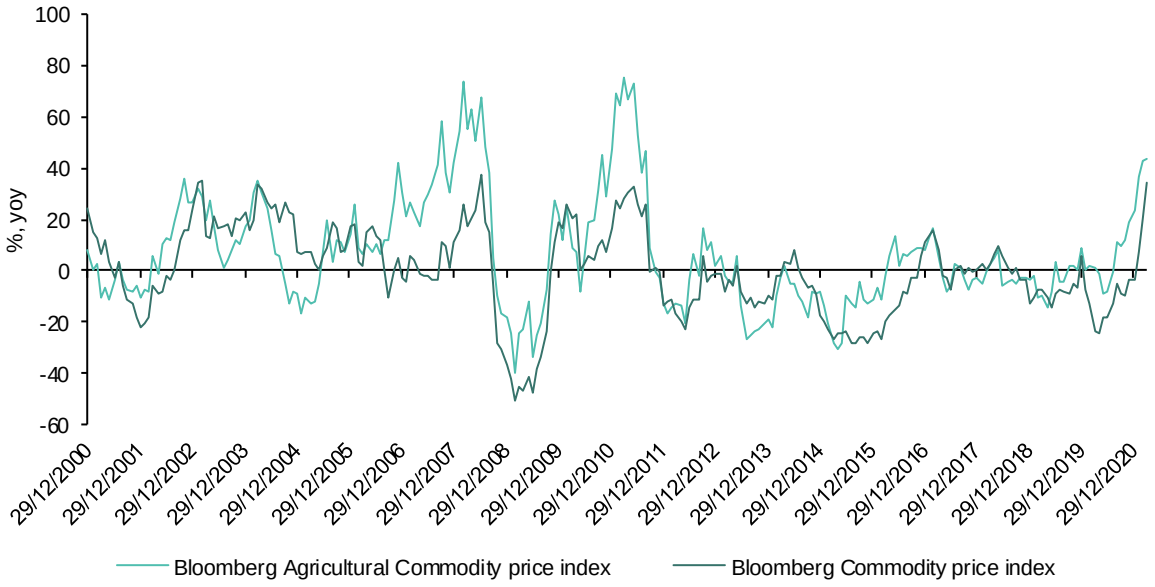


Source: Bloomberg and Bernstein analysis

Commodities

Commodities is one area that is currently showing perhaps the strongest evidence of inflation — the Bloomberg commodity index has risen by 34% compared with March 2020. Agricultural commodity prices are rising at an even faster rate of 44% YOY (see Exhibit 32).

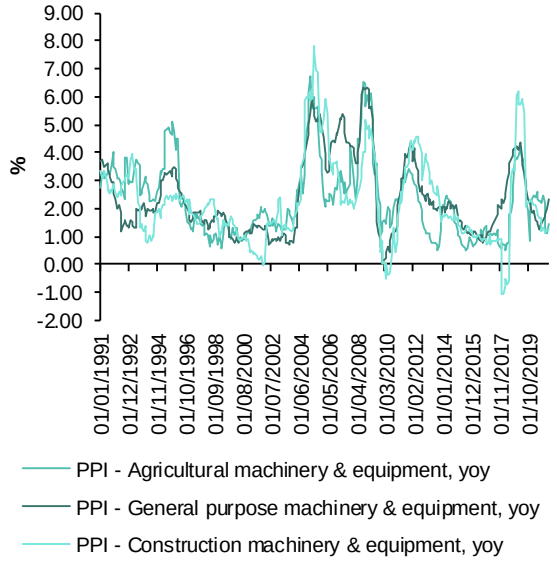
EXHIBIT 32: **Commodity price indices**



Source: Bloomberg and Bernstein analysis

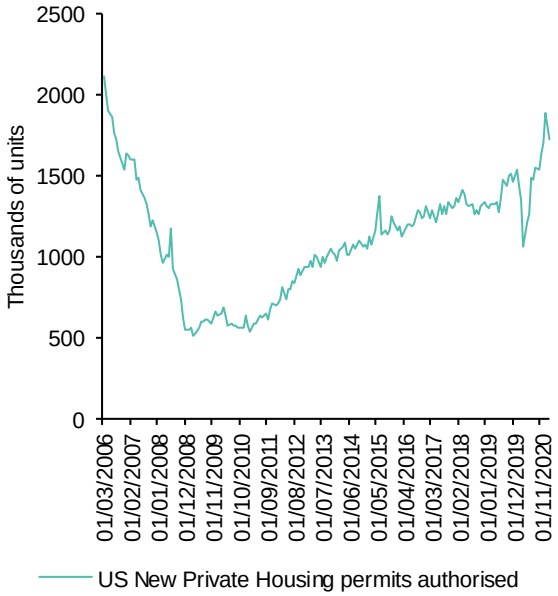
While it's not yet evident in the PPI data (see Exhibit 33), our industrial sector analysts expect strong agricultural commodity prices to spur a significant agricultural machinery capex cycle.[14] Meanwhile, the prices for general purpose and construction equipment and machinery should be strongly supported by continued strength in the US housing market and President Biden's infrastructure stimulus package (see Exhibit 34).

EXHIBIT 33: **Machinery PPI**



Source: Datastream and Bernstein analysis

EXHIBIT 34: **US new housing permits authorized**



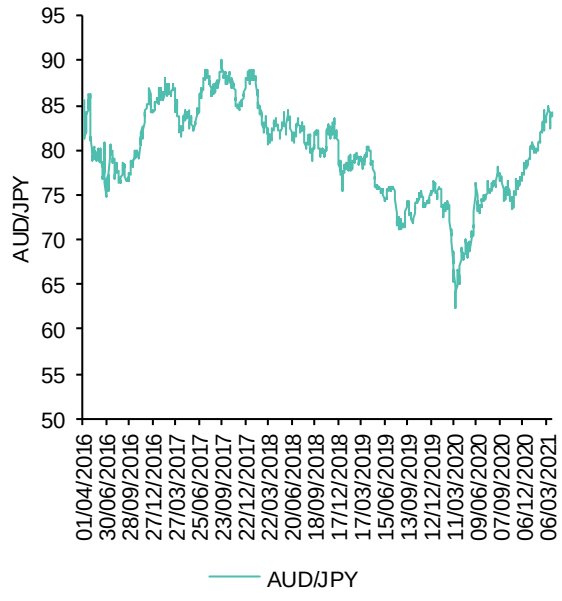
Source: Datastream and Bernstein analysis

As we show in Exhibit 35 and Exhibit 36, commodity-linked and inflation-sensitive currency pairs, such as AUD-JPY and CAD-USD are continuing to strengthen, suggesting recent commodity price increases are expected to be sustained.

Manufacturing companies are starting to incorporate the expected input cost increases into their business plans. According to the latest Empire State manufacturing survey, the difference between companies that expect prices to be higher in the next six months vs. those that expect lower prices is now at 60% — the highest level since 2012 (see Exhibit 37). We expect companies that have pricing power to pass most or at least a big portion of the increasing cost of inputs to end-consumers.

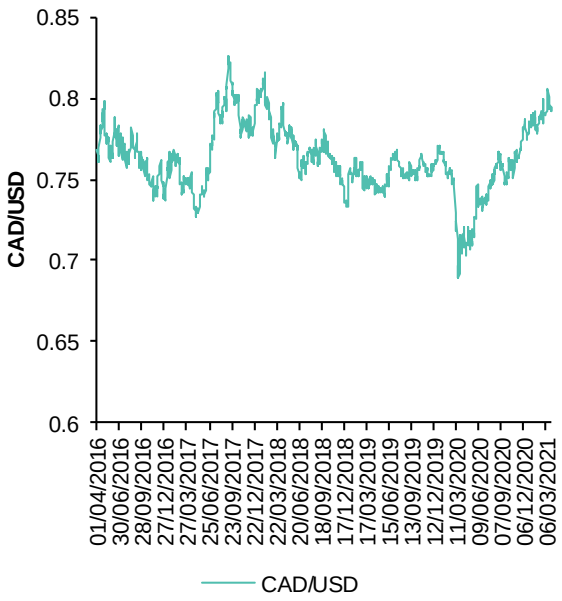
[14] US Chems/US Machinery: High crop prices + good yield + bailouts = highest farm earnings since 2012/exceptional 2021 for ag cos

EXHIBIT 35: **AUD vs. JPY exchange rate**



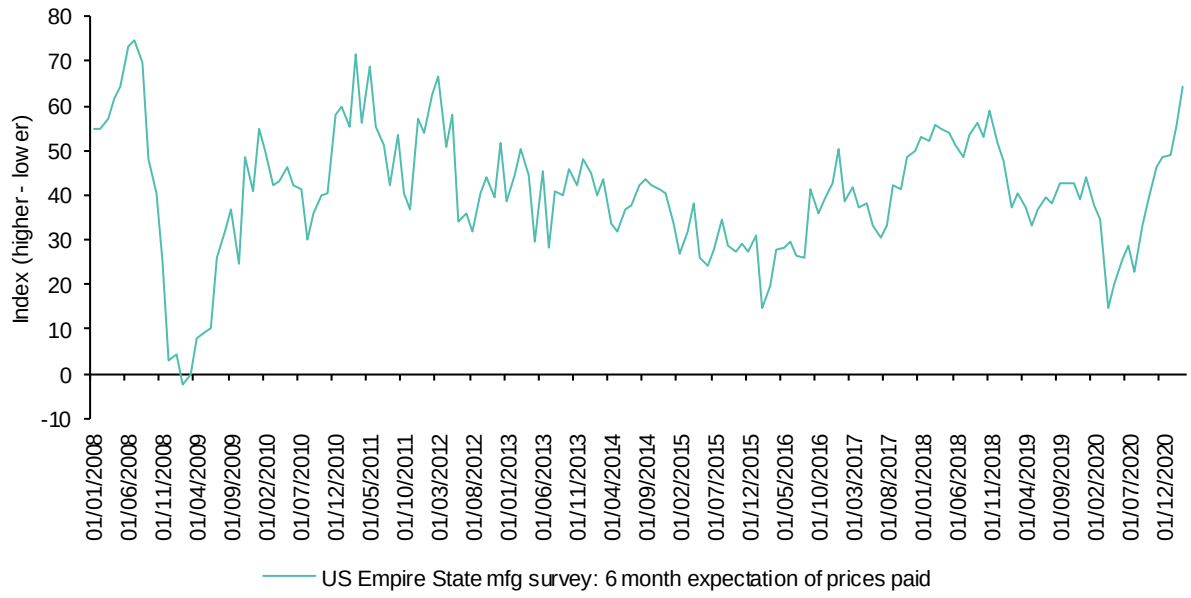
Source: Bloomberg and Bernstein analysis

EXHIBIT 36: **CAD vs. USD exchange rate**



Source: Bloomberg and Bernstein analysis

EXHIBIT 37: **Manufacturers expect higher input prices in the next six months**

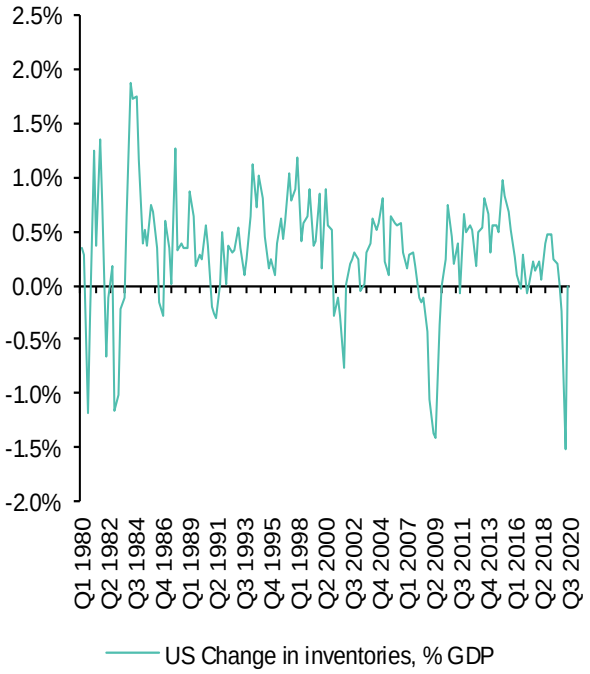


Source: Datastream and Bernstein analysis

Transport, logistics, and supply constraints

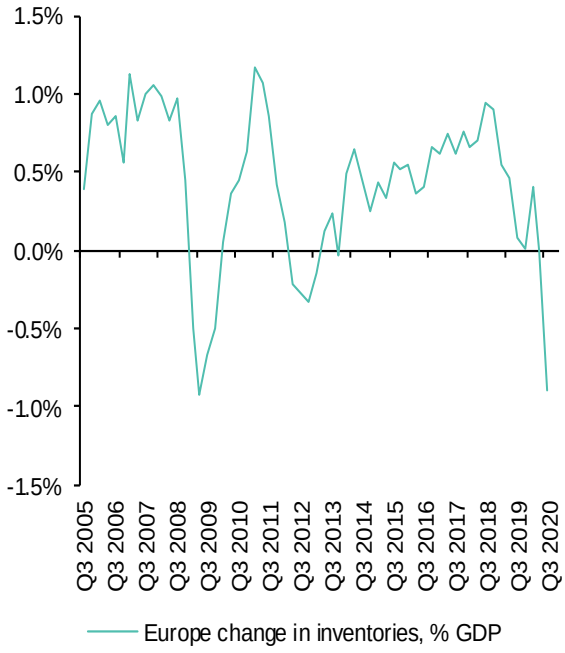
Inventory levels in Europe and the US were running quite low even before the Covid-19 pandemic induced destocking shock (see Exhibit 38). Now, the strong need to restock inventory is facing supply constraints and logistical challenges caused by the pandemic, which creates a strong tailwind for rapid price rises.

EXHIBIT 38: **US change in inventories**



Source: Datastream and Bernstein analysis

EXHIBIT 39: **Europe change in inventories**

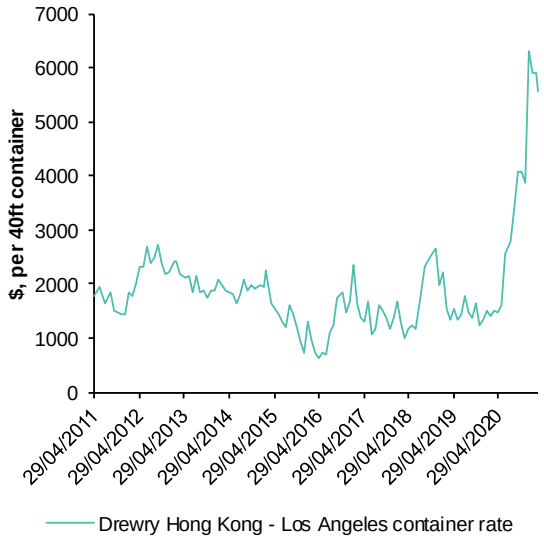


Source: Datastream and Bernstein analysis

This is clearly evident in the transport sector as prices are soaring across all modes of transport from shipping to air freight. The cost of container shipping from Hong Kong to Los Angeles is up by a staggering 270% compared with 2020 (see Exhibit 40). Air freight rates are up by 84% YOY and road transportation costs are close to hitting the highest level since 2014.[15]

[15] Global Transport: Tracking the inflection of the global air cargo shortage (Q1/21 chartbook)

EXHIBIT 40: **Container shipping rates have soared**

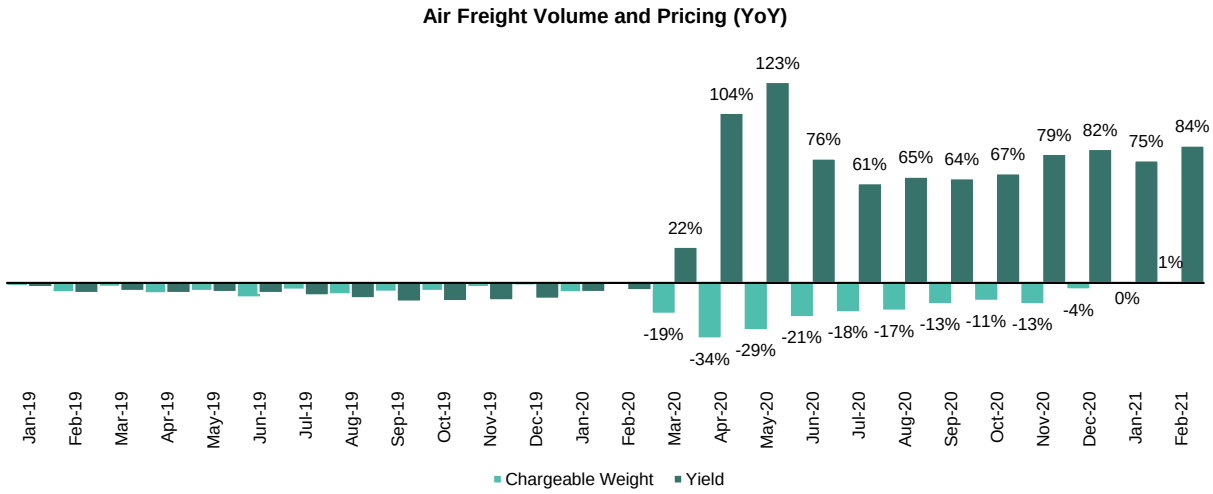


Source: Bloomberg and Bernstein analysis

EXHIBIT 41: **Road transportation costs are rising too**

Source: Bloomberg, www.truckstop.com, and Bernstein analysis

EXHIBIT 42: **Air cargo yields**

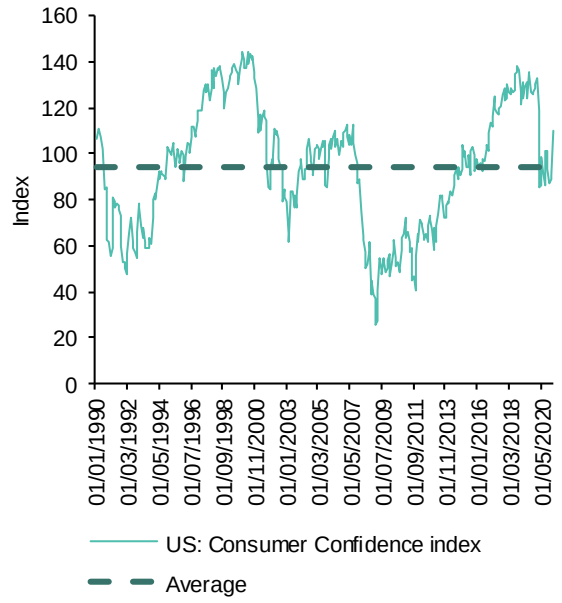


Source: WorldACD, Bernstein European Transport team, and Bernstein analysis

Consumer

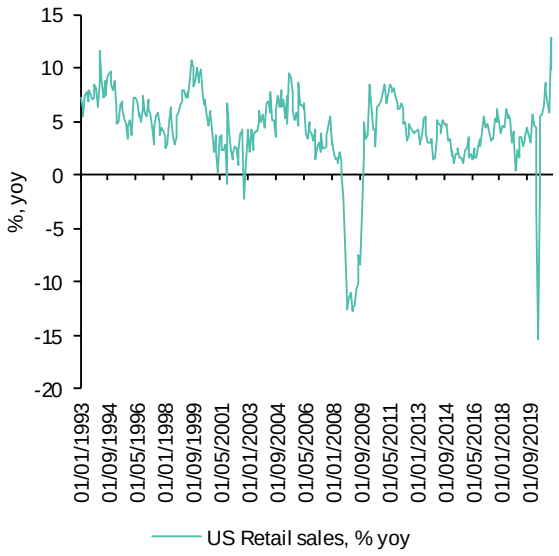
US consumer confidence took a substantial hit from the Covid-19 pandemic, but as lockdowns and restrictions are starting to ease the confidence is starting to recover as well. As we show in Exhibit 43, the US Consumer Confidence Index has recently jumped above the historical average. Moreover, US retail sales are growing strongly at 10% YOY (see Exhibit 44).

EXHIBIT 43: **US consumer confidence is recovering**



Source: Datastream and Bernstein analysis

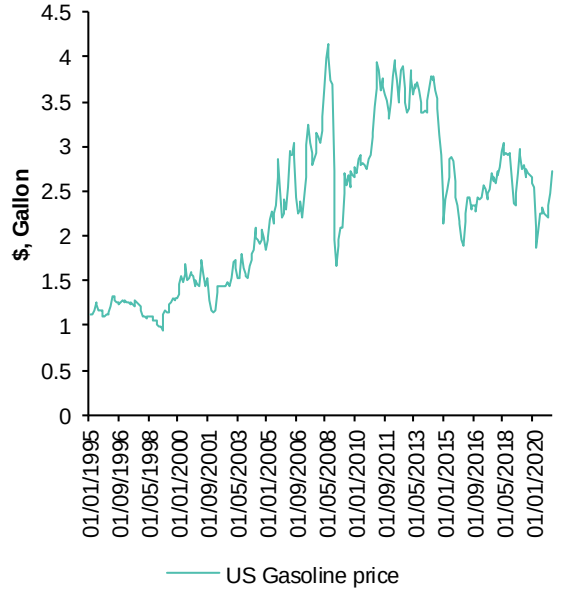
EXHIBIT 44: **US retail sales**



Source: Datastream and Bernstein analysis

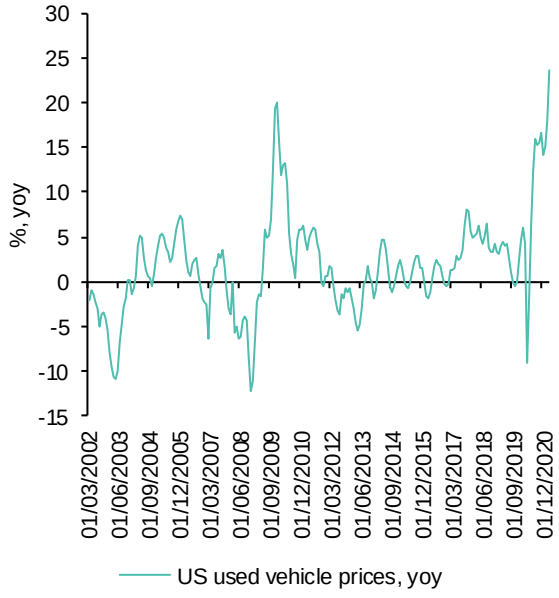
US used vehicle prices are increasing at the fastest pace over the last 20 years (see Exhibit 46). And the increased demand for driving and OPEC maintaining oil supply discipline are starting to have an impact on gasoline prices. As we show in Exhibit 45, the cost per gallon of gas in the US has recently surpassed the pre-pandemic level.

EXHIBIT 45: **Gasoline prices are already above pre-pandemic level**



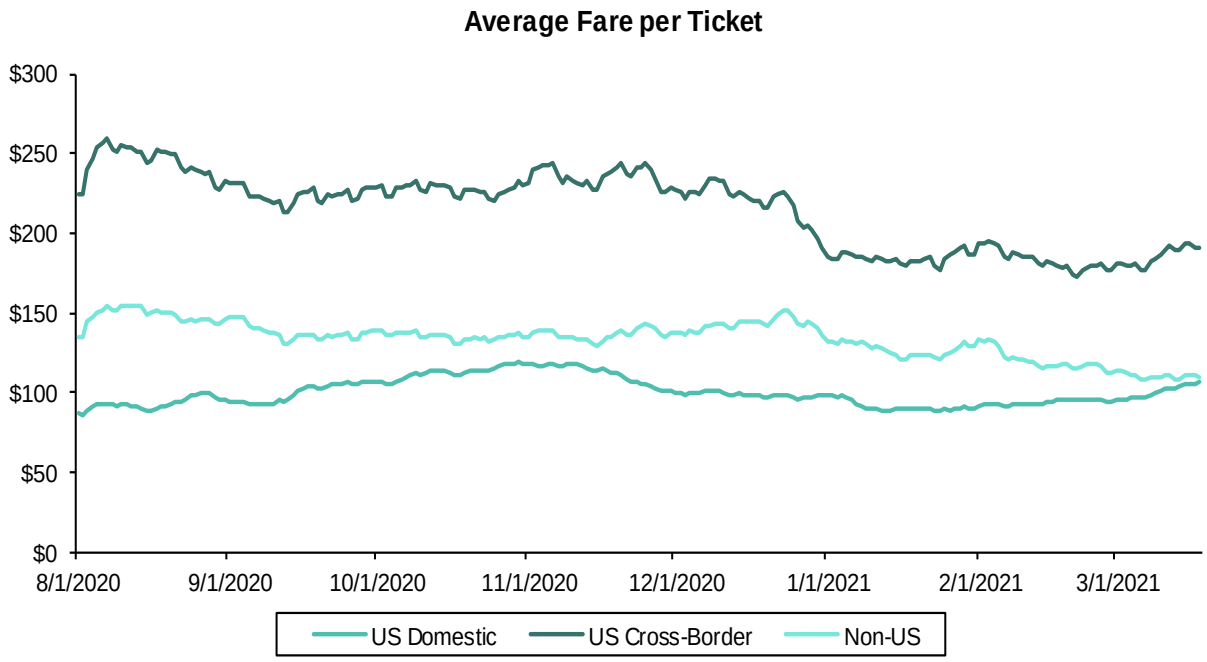
Source: Datastream and Bernstein analysis

EXHIBIT 46: **US used vehicle prices (Manheim index)**



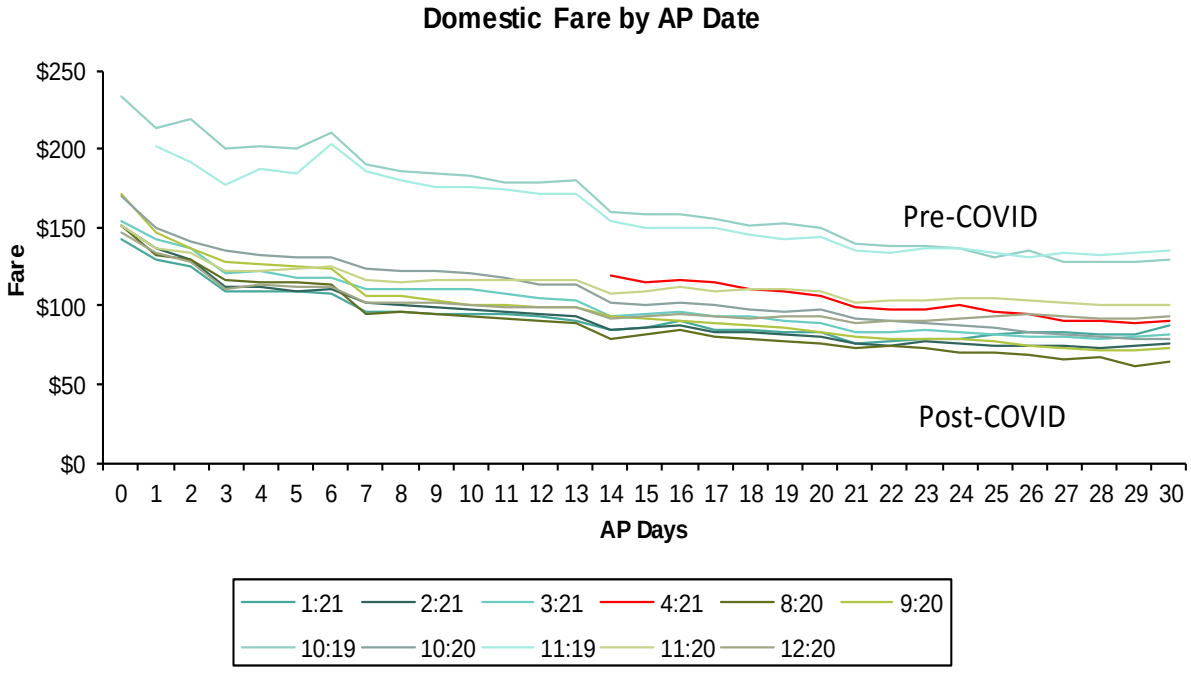
Source: Bloomberg , Bernstein analysis

EXHIBIT 47: **Recent US airline fare trends**



Source: ARC, Bernstein European Transport team, and Bernstein analysis

EXHIBIT 48: **US domestic fares**

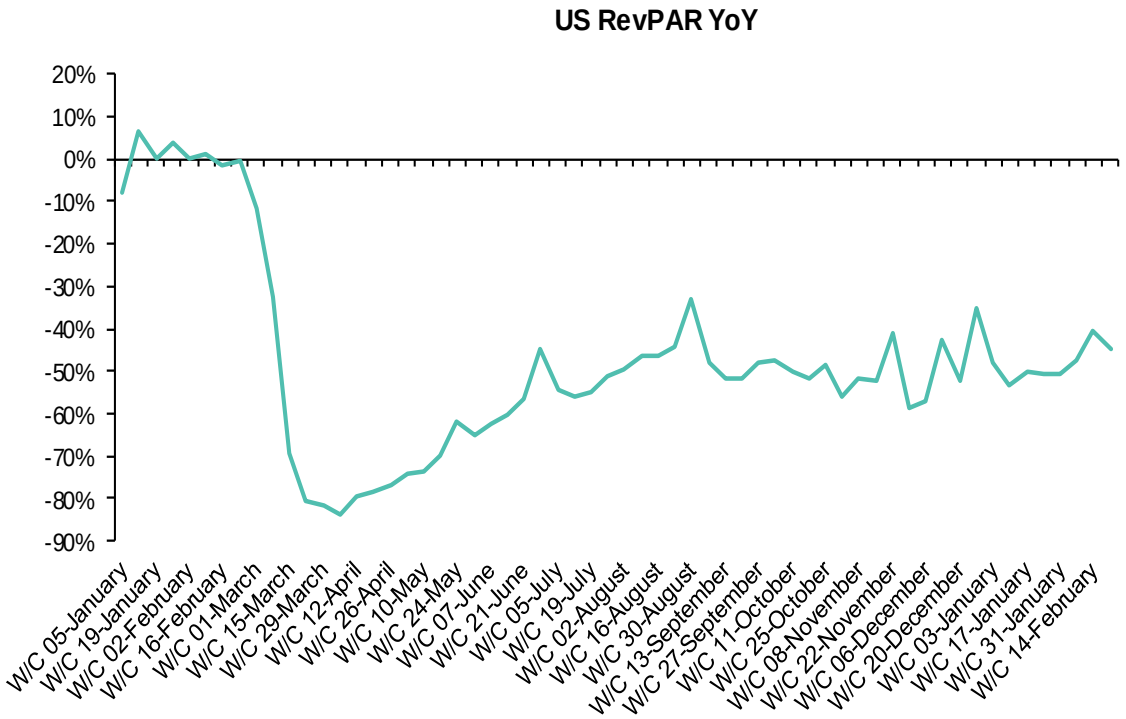


Source: ARC, Bernstein European Transport team, and Bernstein analysis

Pent up demand for travel has also started to be reflected in domestic airline ticket fares that have been ticking up in recent months — fares for domestic travel are now 27% higher than similar purchases in March 2020.[16] While they are at the higher end of the level seen during the Covid-19 pandemic so far, they are still considerably below the pre-pandemic level (see Exhibit 48).

A similar trend can be seen in US hotel prices (see Exhibit 49). The revenue per available room has been steadily inching higher since the trough in March 2020 but remains well below the pre-pandemic level.[17] However, as the US vaccination program progresses and more people are able/willing to travel we expect the pricing trend to accelerate going forward.

EXHIBIT 49: **US hotel RevPAR improvement has been steady**



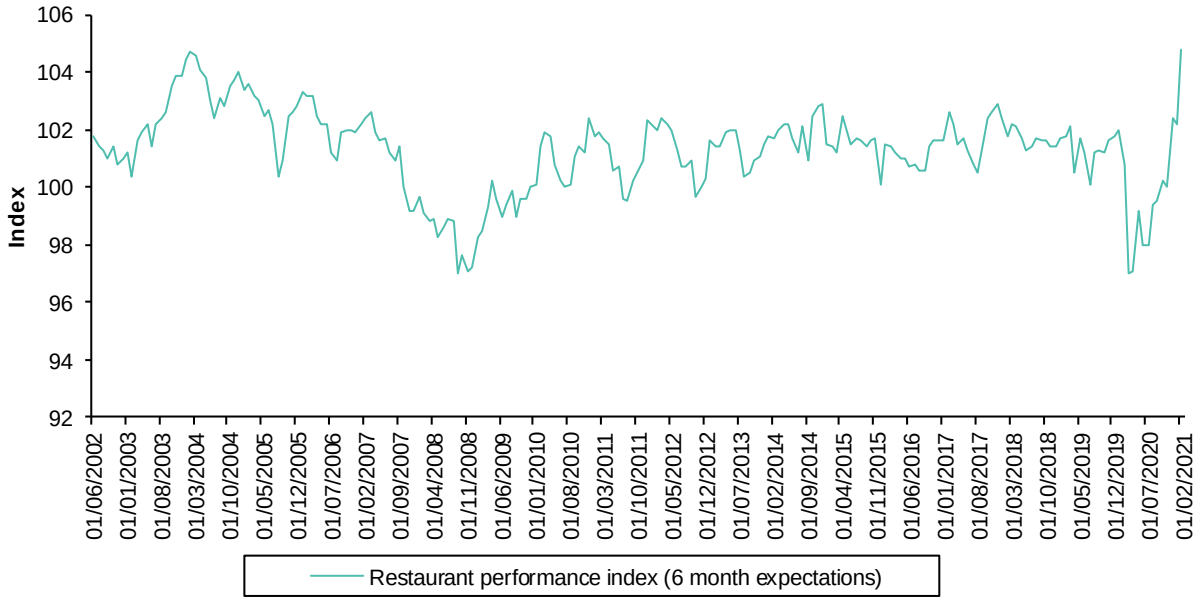
Source: STR, Bernstein Global Hotels & Leisure team, and Bernstein analysis

Meanwhile, optimism is already returning to the US restaurant sector (see Exhibit 50). The restaurant industry expectations index for the next six months compiled by the National Restaurant Association is the most positive since it was started in 2002. Those restaurants that managed to survive during the pandemic are likely to see improved pricing power as the reduced number of options meets strong demand for dining out.

[16] U.S. Airlines: Demand trends continue to strengthen

[17] Global Hotels & Luxury Goods: Coronavirus...Calm before the storm

EXHIBIT 50: **US restaurant performance expectations index**



Source: Bloomberg, National Restaurant Association, and Bernstein analysis

WHY THE WORLD HAS A DURATION PROBLEM

HIGHLIGHTS

- We think investors have a duration problem. As yields have moved up in recent months it has had a clear impact on Growth stocks and bond portfolios. However, the impact of this on many cross-asset portfolios has been masked by historical diversification between stocks and bonds that now looks vulnerable. While we have seen some rotation within equities, we think the scale of reallocation of assets that may be needed overall is very large indeed and becomes a central challenge for investors in years to come. We discuss what this means for portfolios today.

- The duration of fixed income portfolios has become the most extended in 50 years as yields have moved down. But it turns out that many cross-asset portfolios that rely on 60:40 or analogous approaches have been shielded from this by the very negative correlation of stocks and bonds in recent years. As the level of inflation and volatility of inflation rise that diversification may be less strong, which would expose such portfolios to greater interest rate risk.

- Ultimately, this is a problem for a lot of the capital allocated for retirement saving as it has increasingly relied on a passive long position in equity and bond portfolios.

- We discuss what kind of reallocation needs to be made to lessen this duration problem. One step will be the need to regard factors as fungible with traditional asset classes in asset allocation, and a greater allocation to long-short returns in the process.

- We show a ranking of duration of factors and assets with the shortest duration assets being gold, equity Value real estate, equity cash flow yield, and fixed income Carry. Banks also screen as short duration.

- A difficulty for investors comes from disentangling the outlook of inflation vs. real yields, a topic in our recent research on the policy outlook. This means that a simple application of historical sensitivity to nominal yields may not be possible.

- The bottom line is we think the rotation in response to this duration problem and a shift up in yields has much further to go. Investors need to increase exposure to real assets, of which equities is a significant part, but they also likely need to increase allocation to factors such as Value within equities and bonds, and non-fiat short-duration assets, e.g., gold and, potentially, cryptocurrencies.

DETAILS

The cracks are already plain to see. Holders of US 10-year bonds have lost 6% so far this year, the NASDAQ has underperformed the S&P by 1.7%, and the ARK Innovation ETF has lost 22% since mid-February. The narrative is all about the upside risks to inflation and bond yields, and there is plenty of scope for more pain to be felt. Within their respective asset classes, these are all examples of long-duration assets, inherently more sensitive to increases in bond yields. Yes there is a clear tactical story here, but also there is, for the first time in over a decade, a realistic narrative about why inflation could be on a structurally upward path given the fundamental change in the policy debate.

So far so obvious. However, we worry that investors are not remotely prepared for how painful this could be. First, bond yields have declined for the best part of 40 years; so, the vast majority of people have not experienced a significant and sustained increase in bond yields in their investing career. Second, yields in 2020 reached the lowest level ever (in fact the lowest, as far as anyone can tell, in 5,000 years).[18] As yields decline, the duration of high-grade fixed income portfolios increases, thereby increasing the risk of such assets when any subsequent increase in yields occurs. Third, and probably most significant of all, we think this represents a risk to many multi-asset portfolios, especially for 60:40 type structures and, by corollary, to the entire target date market. This has so far been masked by the deeply negative correlation of stock and bond returns, but any upset to that and the interest rate risk of such portfolios would become more apparent.

We suggest all this constitutes a duration problem for investors. While recent weeks have seen a forceful rotation within equity markets in favor of Value and away from Growth/Momentum, this has only begun to scratch the surface of the valuation spread within equities, let alone the implications for the large holdings of passive long positions in high-grade bonds and belief in 60:40, 80:20, or any other such supposedly "passive" balanced fund combination.

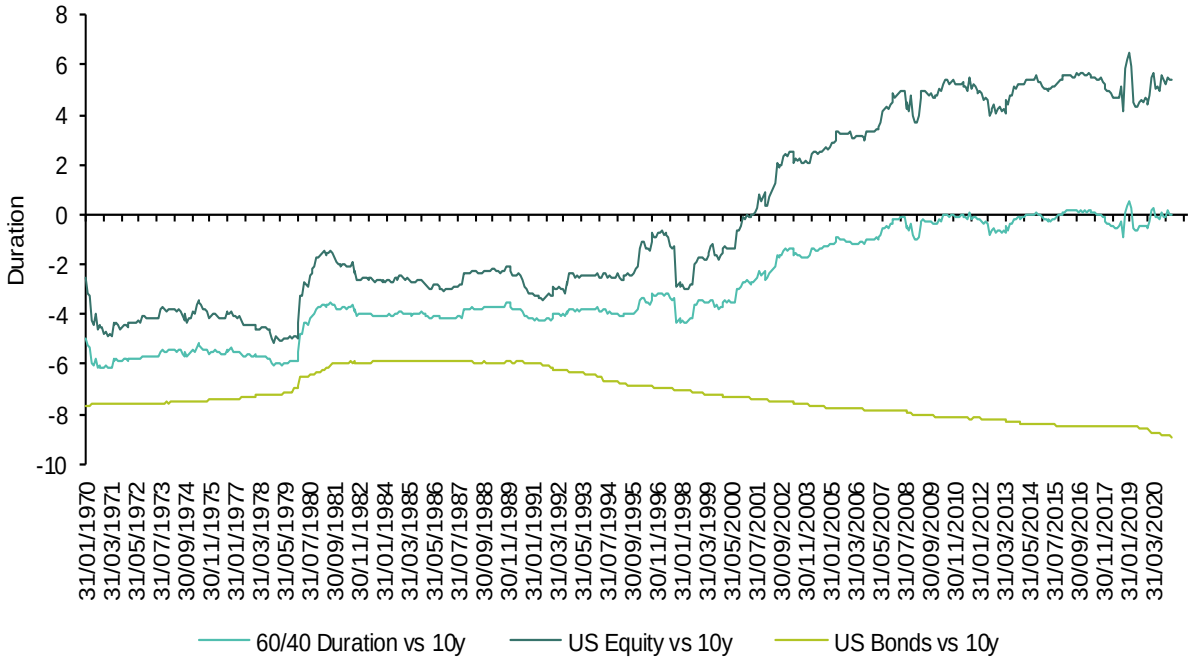
As one pension fund client asked us recently: *why are not more people talking about this*?

Exhibit 51 tries to summarize this in a concise way. It shows the empirical duration of stocks, bonds, and 60:40. We are well aware from when we show this slide to clients in meetings that not everyone likes looking at the world in this way, but we think it is important — and likely to become more so. We define empirical duration as the first derivative of the price of an asset with respect to the change in yields that usefully allows one to compare returns across asset classes and factors. A large negative number implies long duration in the usual sense of the term. On this basis, the lower line in Exhibit 51 shows that as yields have moved lower, the duration of 10-year bonds has become longer than at any point in the last 50 years. The shift down in yields over the pandemic period has pushed this to even more extreme levels. What is in a sense odd is that the duration of 60:40 portfolios on this basis hasn't shifted at all in the last decade, despite the duration of the 40% allocation to fixed income having increased. This is because the correlation of stocks and bonds has become even more negative at the same time — in a sense, equities have become negative duration. This happens to have exactly offset the duration of the fixed income holdings.

[18] See: https://www.bankofengland.co.uk/-/media/boe/files/speech/2015/stuck.

As inflation and the volatility of inflation rise, it is likely to push the correlation of stocks and bonds away from its current deeply negative levels. If that happens, stocks will no longer offset the long duration of bonds and result in cross-asset portfolios being exposed to greater interest rate risk.

EXHIBIT 51: **Duration of bonds and 60:40**

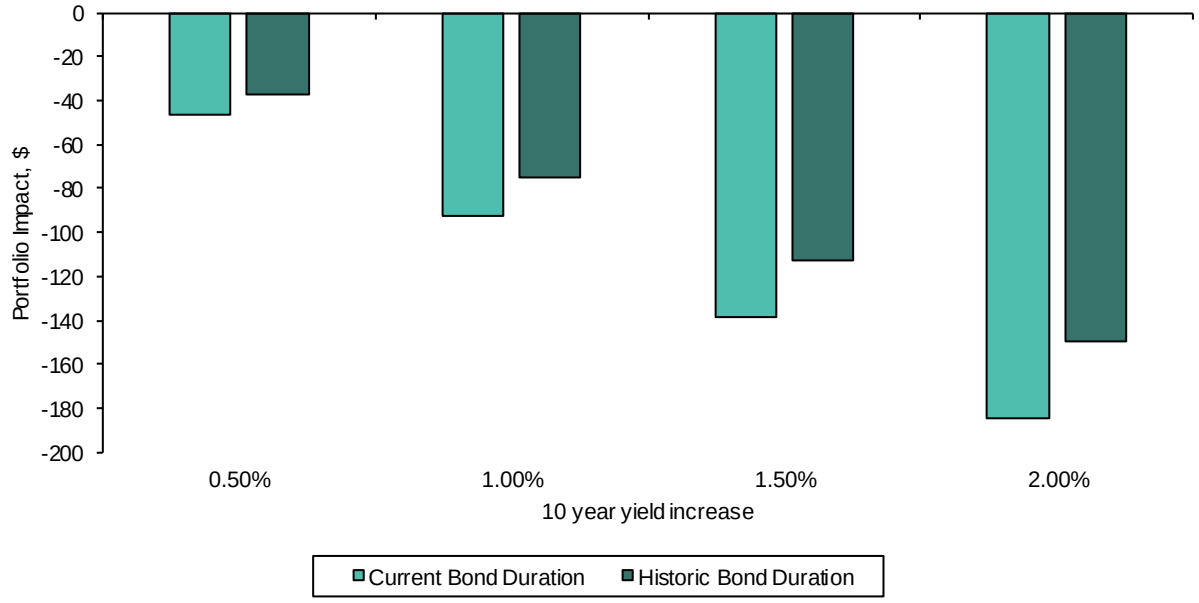


Note: Duration is calculated running a regression of Bond, Equity, and 60:40 monthly returns against the monthly change in US 10-year yield on a 10-year rolling basis.

Source: Datastream, Robert Shiller's database, GFD, and Bernstein analysis

To try to make this issue more tangible, in Exhibit 52, we show this expressed in terms of the dollar impact on a 10-year bond portfolio. The chart shows the impact to the value of a $1,000 portfolio under different scenarios of rates rising by 0.5% to 2%. We run this analysis using the current bond duration of -9.3 and the historical duration of -7.5 based on the average 10-year interest rate of 5.9% since 1980.

EXHIBIT 52: **Duration impact to a bond portfolio**

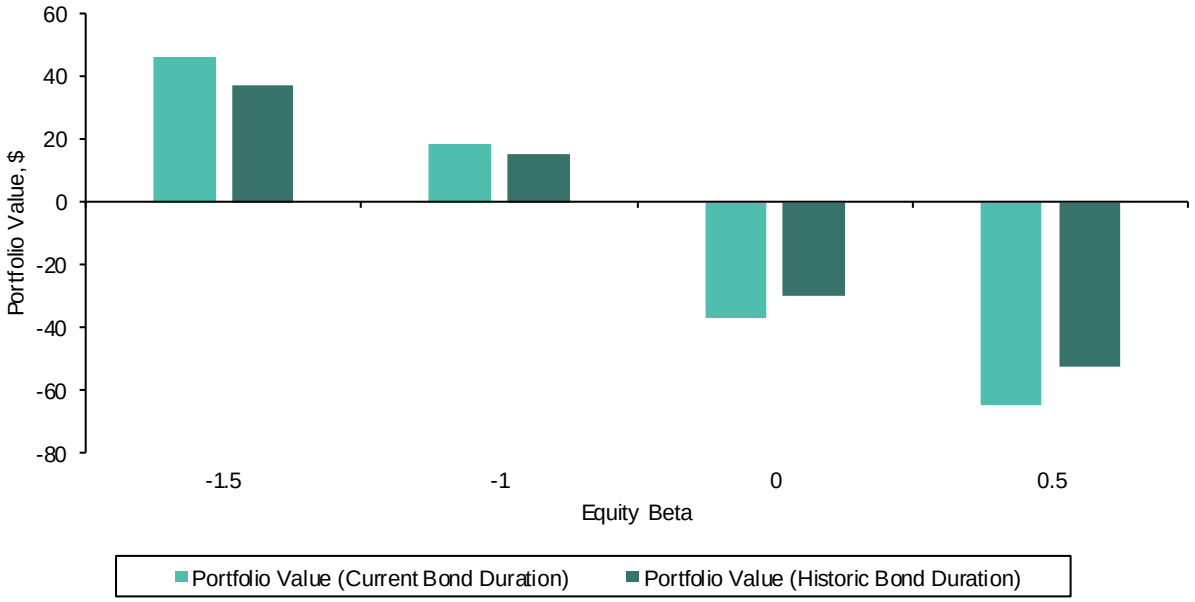


Note: The dollar impact of a $1,000 portfolio under different interest rate rise scenarios (0.5% to 2%) assuming either current bond duration of -9.3 or historical bond duration of -7.5.

Source: Datastream and Bernstein analysis

In Exhibit 53, we show the dollar impact on a $1,000 value 60:40 portfolio assuming a 1% rise in bond yields. For the bond portion of the 60:40 portfolio, we estimate the impact using the current duration of -9.2 and the historical duration of -7.5 as in our previous example. For the equity part, we model the different scenarios using different equity beta to bonds ranging from -1.5 to 0.5 representing a range of equity-bond correlations that become progressively less negative.

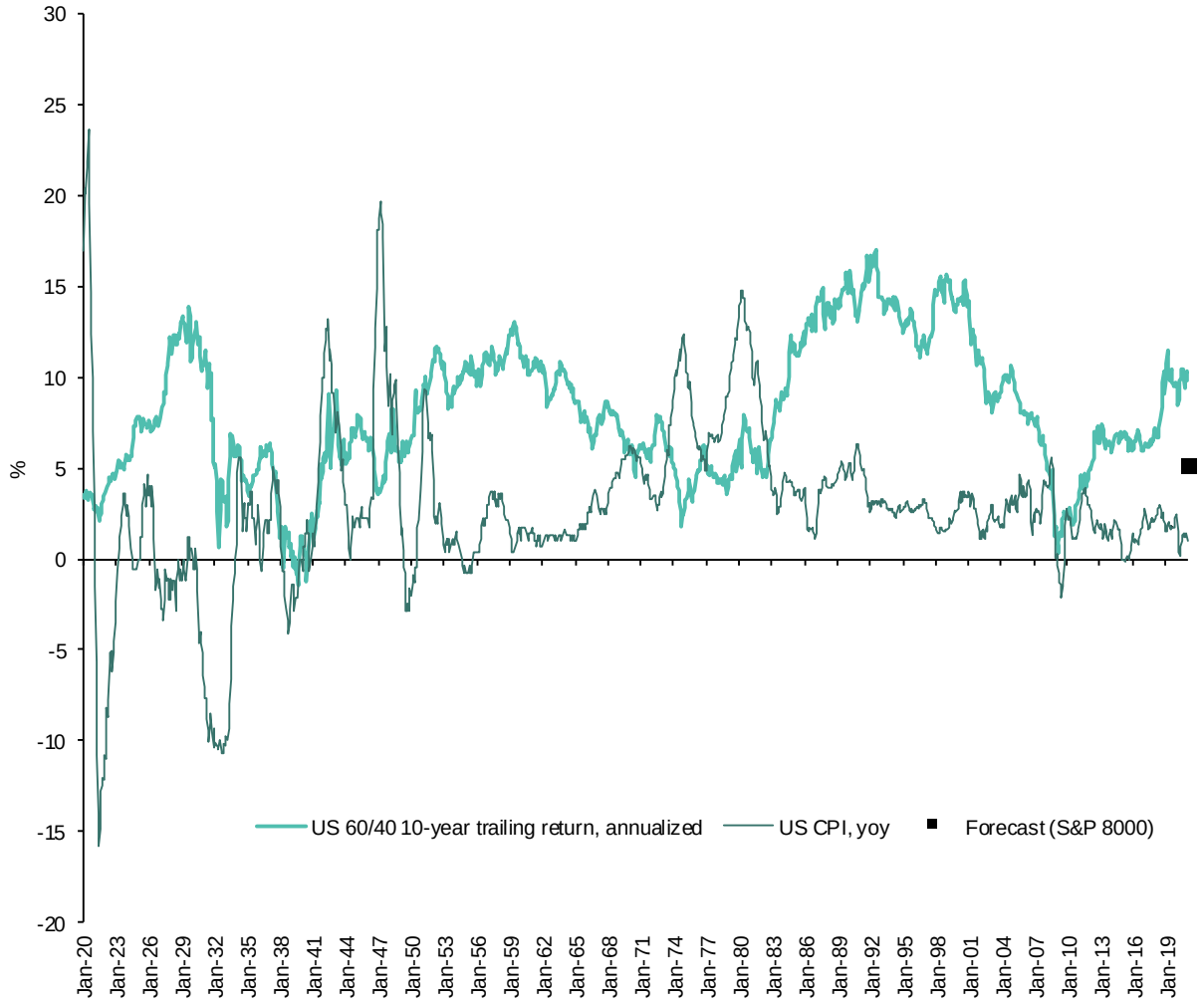
EXHIBIT 53: **Impact of 1% increase in 10-year rate to 60:40 portfolio under different scenarios**



Source: Datastream and Bernstein analysis

Equity investors have started to reallocate into shorter duration with the switch from Growth into Value, but from a cross-asset perspective we think there is much further to go. Ultimately, we think this shows up as a need to abandon 60:40 and other approaches that are analogous to that which rely on a passive long-only allocation to stocks and bonds. We show in Exhibit 54 that 60:40 approaches happen to have beaten inflation by a wide margin over the last 40 years. But even assuming 8-10% p.a. returns from equities, it seems likely that the spread of 60:40 over inflation will be less over the next decade and that is without even factoring in the potential for significantly higher inflation.

EXHIBIT 54: **60:40 portfolio vs. inflation**

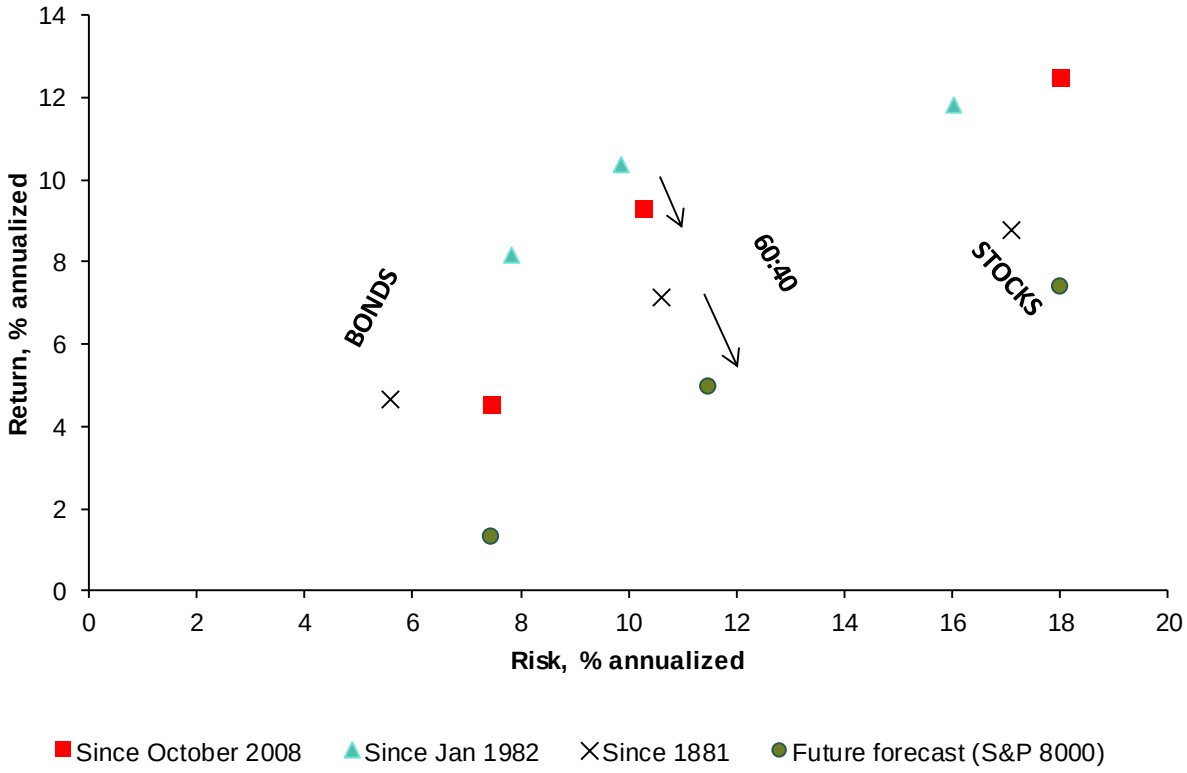


Note: The black square represents a scenario for 60:40 returns based on the outlook for equities where S&P is projected to rise by 7% p.a. over the next 10 years. The forward return to Bonds is assumed to be equal to the current rate of US 10-year yield.

Source: Datastream, GFD, and Bernstein analysis

On a risk-adjusted basis this is starker. Exhibit 55 shows the return vs. risk for US stocks, bonds, and a 60:40 combination of the two over various time periods. It turns out that the period since 1982 happens to have been the best ever for the return-risk trade-off of 60:40 as both stocks and bonds delivered strong returns and diversified each other. Even since the Lehman bankruptcy, despite more volatile returns from stocks and lower returns from bonds, the 60:40 point did not move much in return-risk "space" as the correlation between the assets became even more negative. This looks likely to unwind from both a returns and a risk perspective now. If we again assume 8-10% return p.a. from stocks but a return from bonds in line with current yields and a correlation that moves up, then the return-risk trade-off from 60:40 seems set to be slightly below the level achieved over the last 140 years. This could be a wake-up call for approaches that still rely on this working.

EXHIBIT 55: **Return-Risk trade-off of 60:40 portfolio**



Note: The scatter shows annualized total return and risk for US equities, US bonds, and a 60:40 equity:bond portfolio. Future forecast is assuming same volatility for stocks and bonds as since October 2008 and 0.1 correlation coefficient. Future equity forecast is modeled based on S&P 500 rising by 7% p.a. over the next 10 years. The 10-year annualized bond return is assumed to be equal to current US 10-year yield.

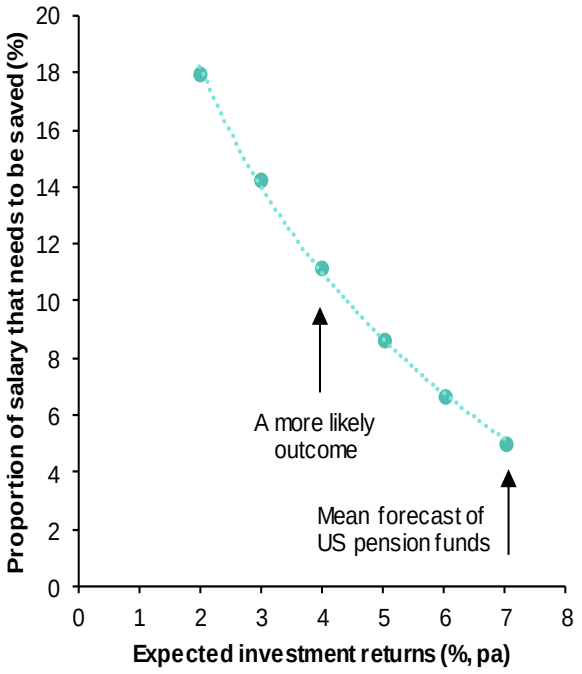
Source: Datastream, Robert Shiller's database, GFD, and Bernstein analysis

Exhibit 56 shows a simple illustrative model that links the proportion of salary that is saved as a function of assumed investment return. We assume someone starts work aged 20 earning $25K p.a. and experiences salary growth of 2% p.a. and retires aged 65. Upon retirement, we assume they purchase an annuity that pays out $35K every year and that they die aged 100. We assume they pay into a savings product each year and this allows a simple analysis of the scale of the change required to the proportion of salary that is saved as we vary the assumed investment return. Thus, if the expected returns fall from 7% to a more likely 4%, the savings rate has to rise from 5% to 11% to maintain the same level of income from savings in retirement.

Exhibit 57 illustrates the impact of diminishing diversification. It shows how the cost of immunizing against a pension outcome at or below the "hardship" level rises as equity-bond correlation rises. To quantify the impact of asset class returns we construct a simple lifetime savings model. We assume someone starts work aged 20 earning $25K p.a. and experiences salary growth of 2% p.a. and retires aged 65. Upon retirement, we assume they purchase an annuity that pays out $35K every year and that they die aged 90. We assume they pay into a savings product each year that has an expected return of 4% p.a. We set the standard deviation of stocks and bonds to be the same as their 100-year trailing

level and then vary the correlation between the asset classes from -1 to +1. We define the "hardship" level as a shortfall of $10K below the target annual pension entitlement of $35K. The chart shows the amount of saving needed to anchor the probability of the hardship level at 10%. As the stock-bond correlation turns positive, the required savings rate increases meaningfully.

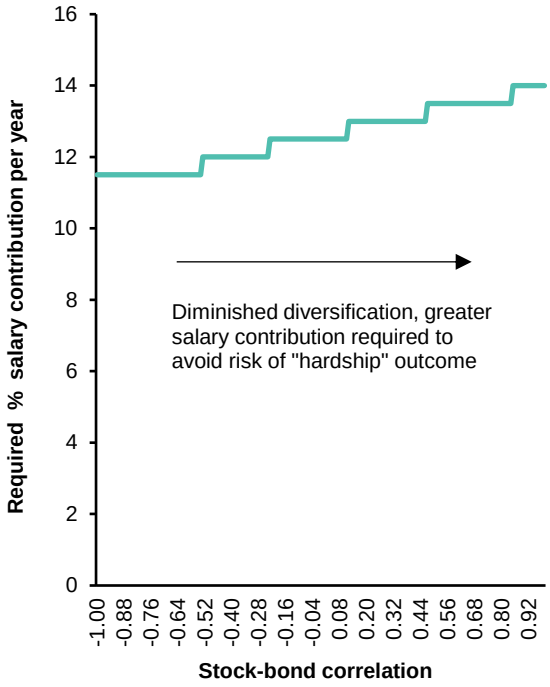
EXHIBIT 56: **Proportion of salary that needs to be saved as a function of investment returns**



Note: The relationship between the proportion of salary that needs to be saved each year and expected investment returns. To quantify the impact of asset class returns we construct a simple lifetime savings model. We assume someone starts work aged 20 earning $25K p.a. and experiences salary growth of 2% p.a. and retires aged 65. Upon retirement, we assume they purchase an annuity that pays out $35K every year and that they die aged 90. We assume they pay into a savings product each year and this allows a simple analysis of the scale of the change required to the proportion of salary that is saved as we vary the assumed investment return.

Source: Bernstein analysis

EXHIBIT 57: **The tangible cost of stock-bond correlation: required % salary contribution each year vs. asset class correlation**

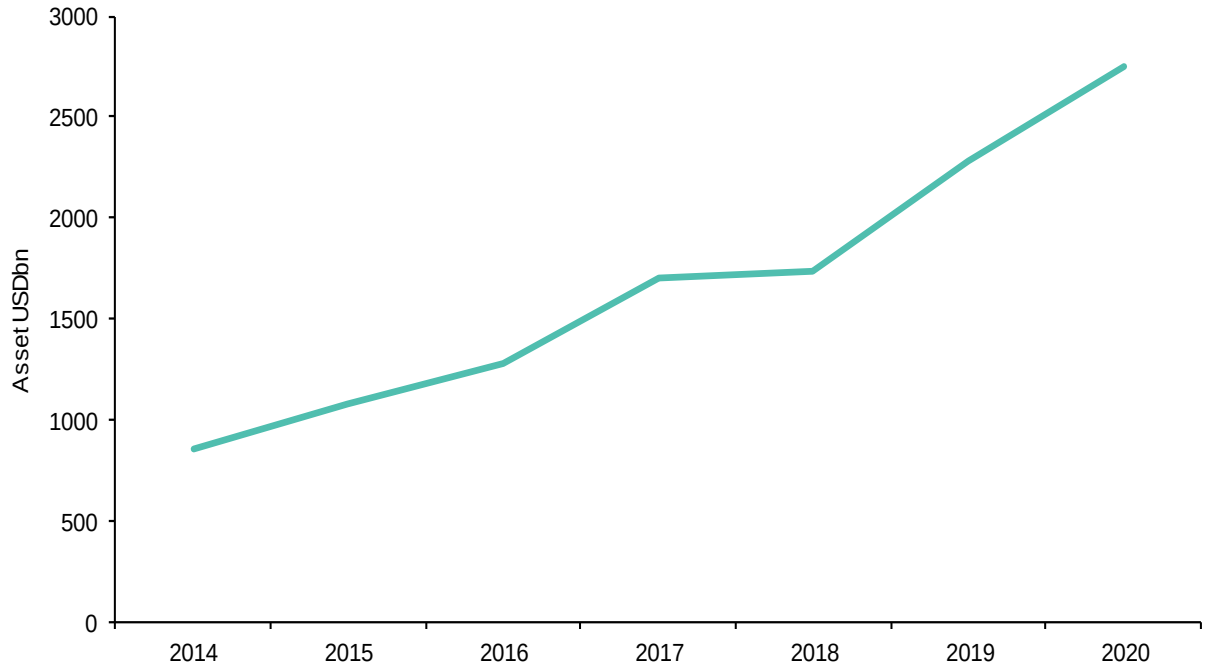


Note: Shows how the cost of immunizing against a pension outcome at or below the "hardship" level rises as equity-bond correlation rises. To quantify the impact of asset class returns we construct a simple lifetime savings model. We assume someone starts work aged 20 earning $25K p.a. and experiences salary growth of 2% p.a. and retires aged 65. Upon retirement, we assume they purchase an annuity that pays out $35K every year and that they die aged 90. We assume they pay into a savings product each year that has an expected return of 4% p.a. We set the standard deviation of stocks and bonds to be the same as their 100-year trailing level and we then vary the correlation between the asset classes from -1 to +1. We define the "hardship" level as a shortfall of $10K below the target annual pension entitlement of $35K. The chart shows the amount of saving needed to anchor the probability of the hardship level at 10%.

Source: Bernstein analysis

How big is this problem? If we view this as a proxy for the target date market, then there is a lot of capital (and retirement risk) resting on this issue. The total global AUM for Target Date funds and Collective Investment Trusts is estimated by Morningstar to be $2.8Tn currently (see Exhibit 58).

EXHIBIT 58: **Total target date fund assets**



Source: Morningstar "2021 Target-Date Strategy Landscape" report (data as of December 31, 2020) and Bernstein analysis

What to do about it?

So, what is the implication of this? Yes, there has been the beginnings of a rotation in recent months within equities into Value stocks and away from Growth. There has also been a frenzy of equity buying — though how much of that is a strategic reallocation vs. a tactical play on reopening and reflation remains to be seen. But, we think there is a significant reallocation that still needs to take place. There is a very large pool of savings that essentially relies on a passive long allocation to equities and bonds. This has indeed been a successful strategy for many decades. The difficulty is that it is always hard to convince people of the need for change when something has worked for so long. However, as we have said before, if the pandemic does not count as a regime change, we would struggle to imagine what does! We think this could galvanize investors to the need to change their portfolios. An attempt to mitigate what is very substantial duration risk is an important part of this.

In Exhibit 59, we show a ranking of empirical duration of factors and assets. Here, a negative sign is long duration in the conventional sense and vice versa. The shortest duration assets on this basis are gold, equity Value real estate, equity cash flow yield, and fixed income carry. Banks also screen as short duration and so do equities overall.

We do not have anything like enough history for cryptocurrencies to add them to this. They have behaved as a pro-risk asset recently, but we have made the case that as they mature they can be gold-like. Thus, we would potentially include them in this allocation alongside gold as another "non-fiat short-duration asset." (See the chapter "A Dialogue Concerning Cryptocurrencies".)

EXHIBIT 59: **Nominal duration of assets and factors (1950-2020)**

Duration (10 year yield)	beta	t-stat
10 year US Government Bonds	-7.31	-17.27
US Credit	-5.13	-11.25
US Low Vol (LS)	-4.15	-2.73
US Equity Income (LO)	-2.15	-1.80
US Equity	-1.50	-1.32
US Banks (relative)	-1.04	-1.11
US REITS (relative)	-0.62	-0.41
US Value (LS)	-0.07	-0.07
Fixed Income Carry (LS)	0.05	0.14
Fixed Income Value (LS)	0.52	1.25
US Cashflow (LO)	0.56	0.30
US Real Estate	0.96	2.88
US Equity Value (LO)	1.29	0.66
Gold	3.26	1.20

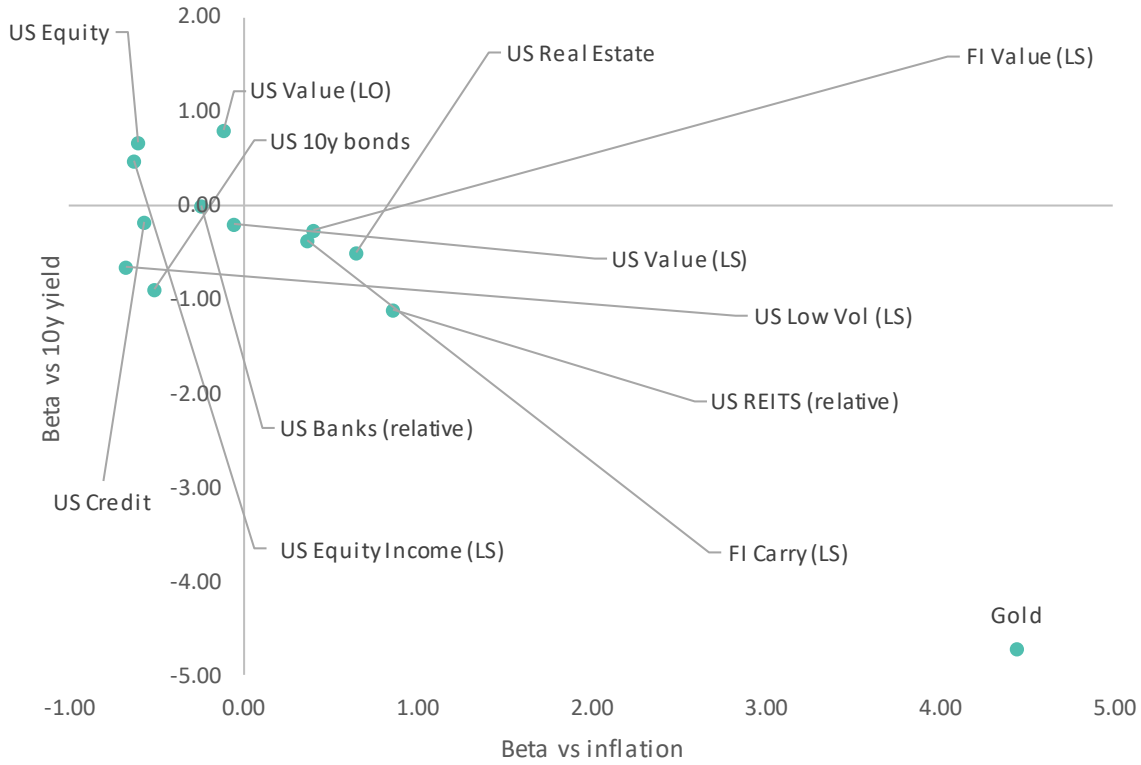
Note: Table shows results from a regression of Nominal asset and factor returns YOY against YOY change in US 10-year government bond yield for the period 1950-2020. Equity factor returns are from Ken French database, Fixed income factors are from AQR, US Real Estate returns are from Robert Shiller's database, US Credit is the ICE BofA US Corporate Index, Gold series is from 1970, Banks, REITS, and Credit series are from 1973, and Equity Cash flow series is from 1963.
The t-stat is the Newey-West t-stat adjusted for autocorrelation.

Source: Ken French database, AQR, GFD, Datastream, FRED, Robert Shiller's database, and Bernstein analysis

A difficulty for investors comes from disentangling the outlook of inflation vs. real yields. This has been a topic in our recent research on the policy outlook (see the chapter "Six Books for the Post-Pandemic World"). This means a simple application of historical sensitivity to nominal yields may not be possible.

In Exhibit 60, we show the betas of different assets and factors vs. the 10-year bond yield and inflation during 1970-2020. The betas are estimated by running a regression of nominal YOY returns against either the YOY change in US 10-year real bond yields or the YOY change of the US CPI.

EXHIBIT 60: **Asset and factor returns vs. real yields and inflation (1970-2020)**



Note: Equity factor returns are from Ken French database, Fixed income factors are from AQR, US Real Estate returns are from Robert Shiller's database, US Credit is the ICE BofA US Corporate Index, and Banks, REITS, and Credit series are from 1973.
The betas are estimated running a regression of nominal YOY returns against either the YOY change in US 10-year real bond yields or the YOY change of the US CPI.

Source: Ken French database, AQR, GFD, Datastream, FRED, Robert Shiller's database, and Bernstein analysis

Duration is not the *only* thing that matters. Clearly, there is an over-riding need for positive real returns. However, along with that there needs to be a discussion of overall portfolio risk. We have made the case that in order to achieve positive real returns, many asset owners will have to increase risk levels (for more details see: Fund Management Strategy: Let's play Twister, let's play Risk). The shift of interest rates down to historically low levels has increased the interest rate sensitivity of savings assets. Moreover, this has occurred over such a long period that to respond to it involves rejecting many of the assumptions in investing (e.g., that the building blocks of asset allocation can only be asset classes, that cross-asset portfolios don't have a duration problem).

The bottom line is that we think the rotation in response to this duration problem and a shift up in yields has much further to go. Investors need to increase exposure to real assets, of which equities is a significant part, but they also likely need to increase allocation to factors such as Value within equities and bonds and non-fiat short-duration assets, e.g., gold and, potentially, cryptocurrencies. There is a crucial role for asset managers in designing (necessarily active) responses to this in the way people save for retirement.

OOPS! I HIT MY 10-YEAR PRICE TARGET WITH EIGHT-AND-A-HALF YEARS TO GO ... WHAT DO I DO NOW?

HIGHLIGHTS

- In 2019, two of Bernstein's strategists had a disagreement about whether the 10-year forward S&P target should be 4000 or 8000. Now that we have passed that lower target, what should the forecast be? Simply adopting the higher forecast as the house view because we have passed the lower one might sound like an act of thesis creep of epic proportions. Yet, can the emergence of a post-pandemic policy regime justify this?

- We argue that we are now in a very different policy environment. For the first time in at least a decade there is a plausible narrative for why inflation may rise. In addition, there are also reasons why rates may not respond as quick to inflationary signals. This leaves us with the prospect of persistent low real yields that can justify market valuations.

- In absolute terms, valuation appears to be an impediment to returns. The Shiller PE at 36x is at the top end of the 140-year range. But valuation has failed to be a guide for equity returns for over a decade. An investor who followed valuation would have sold equities years ago. Policy has trumped valuation. Moreover, the lack of other appealing assets that offer the prospect of positive real returns means flows into equity are likely to continue. "There is no alternative" (TINA) is not enough to make a fundamental justification for returns, but it can beget significant flow.

- A decomposition of returns into the constituents to real growth also suggests positive returns. However, this points to one source of concern in the likelihood that corporate profit share of GDP may shrink as the policy pendulum swings away from shareholders.

- We also present a very different way to get to a market return forecast, which is to aggregate the idiosyncratic return of individual stocks. This approach to forecasting returns is also positive.

- We highlight tactical sources of concern from extended sentiment and more strategic concerns should inflation become unanchored.

- Finally, we note that even a bullish target for US equities does not obviate the need for a reform of broadly-accepted approaches to cross-asset investment. On this basis, the real return from 60:40 is still likely to be sharply lower and with a significantly smaller return-risk ratio.

- **8000 becomes our new end-decade target for the S&P.**

DETAILS

The rip higher in equities over the last year has made a mockery of many forecasts. Back in late 2019, Bernstein strategists had an argument over two very different S&P forecasts. Inigo argued that the S&P would only get to 4000 over the next decade, while Alla argued for 8000. When two strategists have a 100% difference in their price targets it's probably worth writing about it in a research note rather than confining the discussion to the pub in Mayfair, Portfolio Strategy: S&P 4000 or S&P 8000? Our strategists disagree.

With the S&P now past the lower of those forecasts, we felt we should revisit this discussion. Should investors load up on equity beta or does the recent move higher portend a dire outlook?

Inigo: So, we are on the cusp of hitting my 10-year price target eight-and-a-half years too soon. This is one of those awkward things that happens when one is in the business of making forecasts. What should one do? Either I need to edge up my forecast in an act of potential thesis creep of truly epic proportions or take the view that we face the prospect of zero nominal returns from equities for eight years. Given equities tend not to deliver flat, smooth returns, the latter outlook more likely implies a large crash at some point, either preceded or succeeded by a rally.

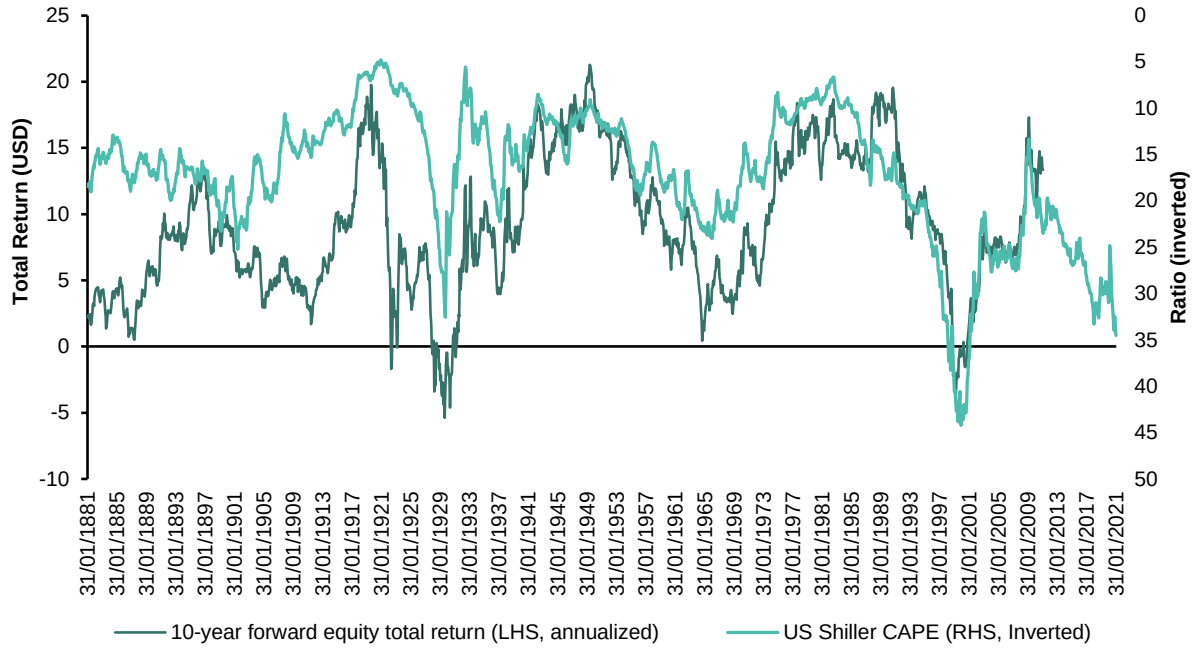
Of course, having got to 4000 doesn't *necessarily* mean that I have lost the argument. But the idea that the nominal level of the S&P will be the same eight-and-a-half years hence seems too horrible an outcome to countenance. More importantly, I suspect that it is too horrible for politicians and other policymakers to countenance, at least if they want to persist in the notion that individuals need to carry the risk of saving for their retirement. Thus, given those alternatives, I find it easier to accept that I was wrong. So, I am belatedly changing my view to agree with that of my colleague and taking 8000 as our S&P target for the end of the 2020s.

So, what has changed? I mean other than the obvious point that we have got to 4000 already. The charge of thesis creep is one that needs to be answered. I think the answer lies in the way the policy environment has changed. Has the rally of the last year simply brought forward returns from future years? I think there is more to it than that. As discussed in the chapter "Six Books for the Post-Pandemic World," we think the policy environment has utterly changed in the wake of the pandemic. Not all of this will be positive for equities — a point that we will come back to in the context of margins — but the most important point is that for the first time in at least a decade there is a plausible case for inflation. If this became "unanchored," it could undermine the outlook. However, we would argue that a moderate level of inflation would be positive. Moreover, it seems as if there is also a good case that interest rates may rise much more slowly in response to any inflation. The acceptance of semi-permanent higher debt and acceptance of massive direct fiscal measures (be it stimulus checks, furlough schemes, or infrastructure investment) is something that would have been much more unlikely if there had been no pandemic. So, we think this is a case of: "When the facts change, I change my mind. What do you do, sir?"

One can lay out the thesis for the higher index target, but also outline the risks and constraints. The key constraint is valuation. This cannot be dismissed lightly. There are a few distinct sources of return that can drive an investment. This could come from mean-reversion, a risk premium, or as the result of a specific catalyst that is forecast to emerge.

Forecasting catalysts is hard, so in this context mean-reversion has been one of the most powerful forces in investment. Long-run market returns have tended to respond to valuation metrics such as the cyclically-adjusted or Shiller PE. While the Shiller PE tends to be relatively useless at guiding market returns over the next year, 10 years forward it is one of the best guides we have got. With the Shiller PE at 36x, this is at the top end of the historical range. A "face value" reading of the link between it and 10-year forward returns over the last 140 years implies the S&P yields a return only in line with inflation (see Exhibit 61).

EXHIBIT 61: **Shiller PE and 10-year forward returns**



Note: Shiller PE defined as price divided by 10-year average inflation-adjusted earnings, plotted against 10-year forward nominal total returns.

Source: Robert Shiller's database, GFD, and Bernstein analysis

Alla: But valuation hasn't been a limit to equity returns in over a decade! This shows us that policy trumps valuation. The market is going up! If one had followed valuation — be it Shiller PE or another metric such as forward PE, market cap/GDP, or Tobin's Q — then one would have progressively reduced equity weight for the last five years; on some trading rules one would have even shorted equities. It would have been a disaster! If a metric is so wrong for such a long time isn't it time to stop using it?

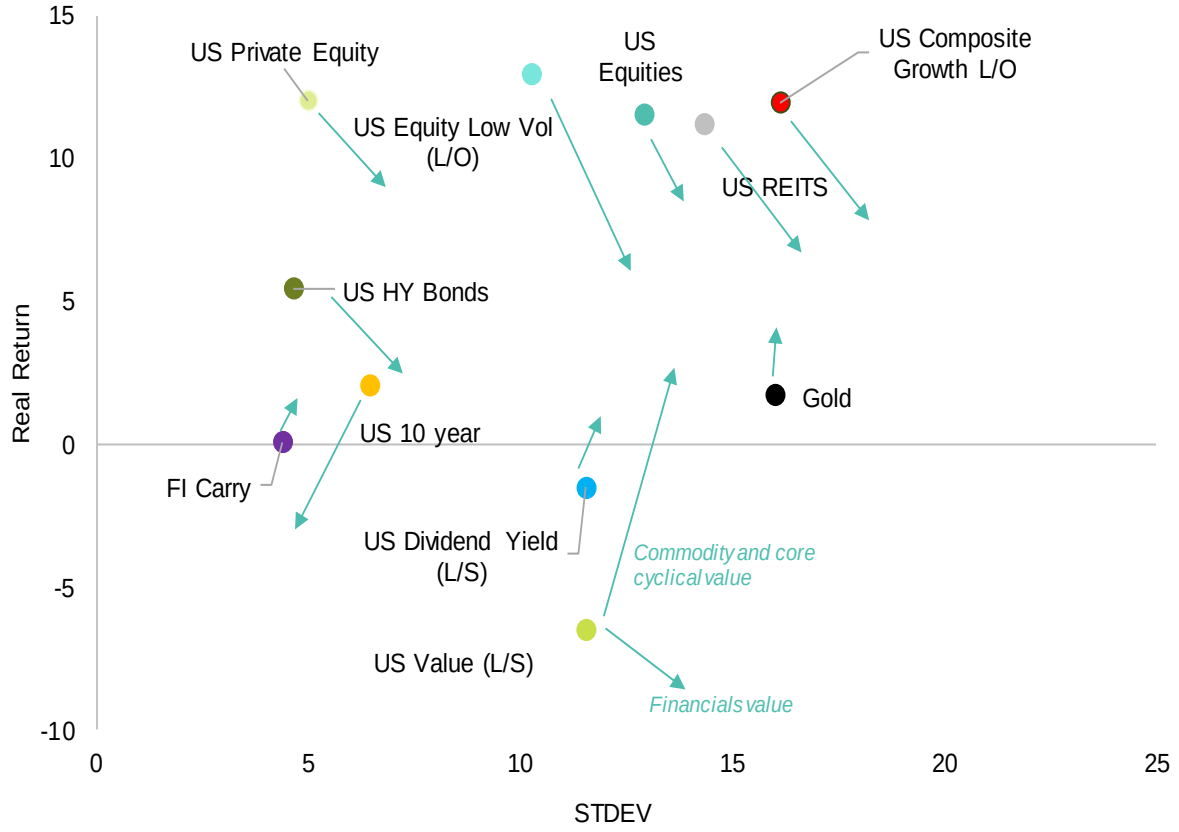
Specifically, there are two arguments against valuation being a limiting factor. If real yields stay low then it can justify valuations on long-duration assets such as equities and then there is "TINA." In a low-return world (in a cross-asset class sense) what else are investors going to buy? (see the chapter "Valuation Rhapsody").

This chapter is about long-run return from equities, but in the context of other assets offering the prospect of lower returns than they have on average in recent decades. Yields on 10-year government bonds imply returns that are likely to be negative in real terms for

the US — let alone European or Japanese bonds. There have been increasing allocations to private equity in recent years to make up for the anticipation of lower returns elsewhere. The best decile of private equity funds may indeed continue to deliver, but the build-up in dry powder and with lower credit costs seeming hard to achieve, it seems likely the average return from private equity will be lower than that achieved in recent years, and one should note that the dispersion from private equity funds is much wider than for active public equity funds (Fund Management Strategy: The folly of privacy?). If we add in the likelihood that inflation could be at least slightly higher than in the past, then real returns on many assets are likely to fall (see Exhibit 62).

We have made the case[19] that part of the answer to this is to use factors in strategic asset allocation and also to more explicitly rely on idiosyncratic alpha (IA) blended with asset class betas. But in addition to those broader changes to the methodology of asset allocation, investors may have little choice but to buy more equities.

EXHIBIT 62: **Return-risk trade off to deteriorate**



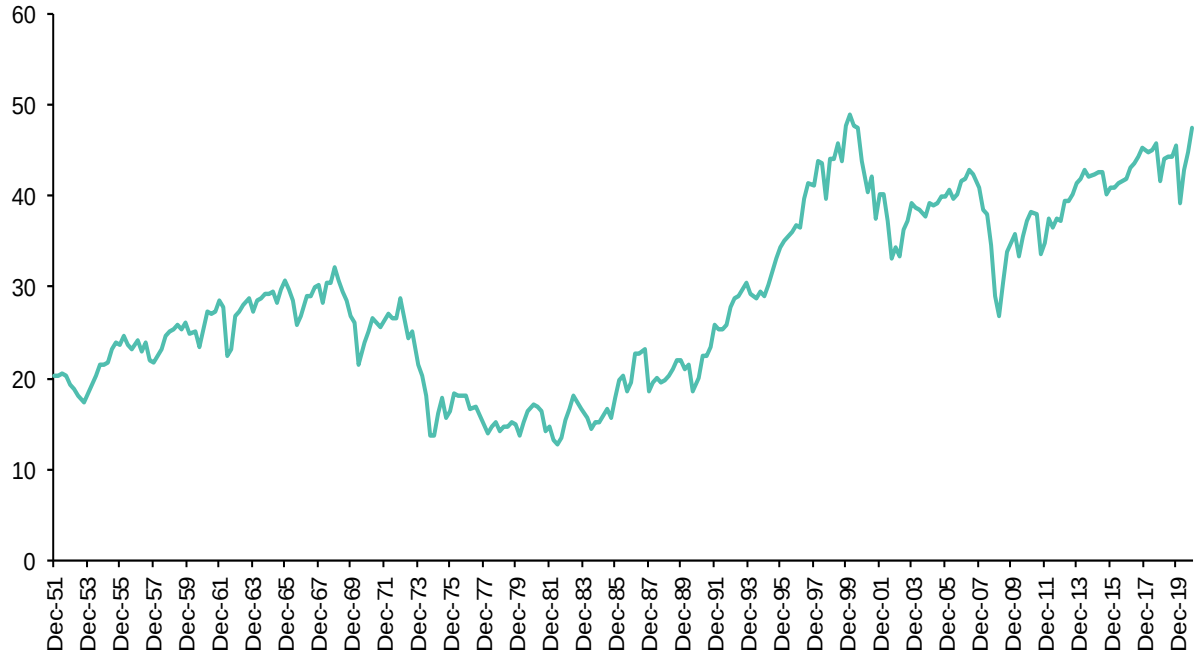
Note: The dots represent the last 10 years of real returns and volatility for the major return streams investors can buy. The arrows represent Bernstein portfolio strategy team's forecasts for the next 5-10 years.
US private equity data is compiled from 1,562 funds, including fully liquidated partnerships, formed between 1986 and 2019. All returns are net of fees, expenses, and carried interest. Data is provided at no cost to managers. Data provided as of 2020 Q1.

Source: Cambridge Associates, Ken French, FactSet, Datastream, FRED, and Bernstein analysis

[19] We outlined our preferred approach to asset allocation in the *Blackbook*: A New Paradigm for Investing.

The allocation of US households to equities is *toward* the top end of the post-war range, but remarkably it is not yet quite *at* the top of that range (see Exhibit 63). Given the outlook for inflation and rates and given the starting level of yields for fixed income, we would argue that the equity allocation should be above the top end of its historical range.

EXHIBIT 63: **US Household: Total equity share of total financial assets (%), including pension assets**



Note: The portion of US household and non-profit sector total financial assets allocated to equities. Equities is defined here as directly held corporate equities + mutual fund shares (includes ETFs) + non-corporate (i.e., privately held) equity + the equity portion of public and private pension fund assets. The data is quarterly. The latest data point is Q3 2020.

Source: US Federal Reserve and Bernstein analysis

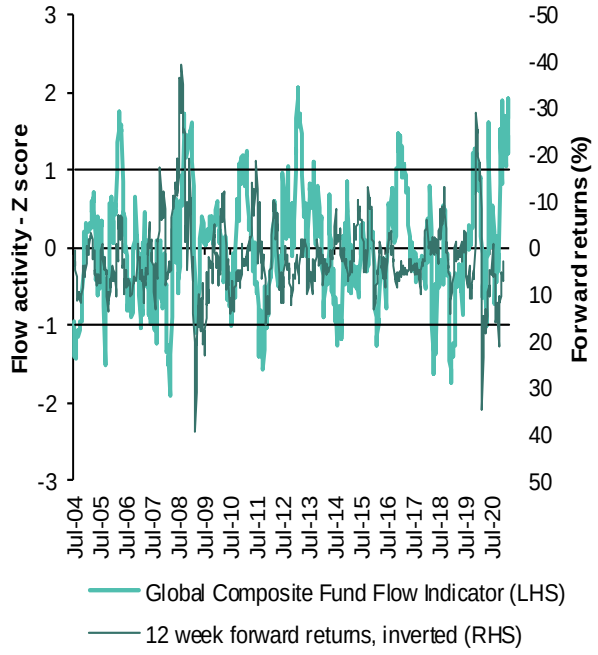
Inigo: This debate is all very well, but it is very strategic and linked to how policy may evolve. Can I just mention that there are some tactical concerns investors should have as well. The market has become highly sensitive to shifts in bond yields and inflation. As we have discussed in other research, we think there is likely to be a lot of volatility in inflation in 2021. In part this stems from the likelihood of a "blip" in inflation as economies reopen and increasing demand hits tight supply. In addition, the measurement of inflation is going to be more complicated than normal this year as whole swathes of the baskets of goods used for computing inflation have been things that citizens have been unable to buy. On top of this, there is a high degree of uncertainty about the policy response to inflation. All this amounts to higher-than-usual scope for volatility in equities being driven from the flow of inflation data in coming months.

In addition, there are potential signs of exuberance. Analysts covering US companies have been upgrading their estimates at the fastest rate in 30 years. OK, fair enough — the "cycle" (if we can even use such a term anymore) has been the biggest in many centuries. But it does imply that the recent pace of upgrading cannot be maintained.

Investors have been buying equities at a record rate too. Since the beginning of November last year, we have witnessed 11 of the 15 largest weekly equity fund inflows in history. Specifically, this has pushed our tactical flow-based sentiment indicator to +1.65 standard deviations, close to its highest level in eight years (see Exhibit 64). We have pointed out in recent research that we have been choosing to ignore the fact that this is technically telling us to tactically sell equities because the amplitude of the current cycle implies there will be large flows into a reflation trade. Also, a recurring theme in this chapter is that investors should be buying more equities.

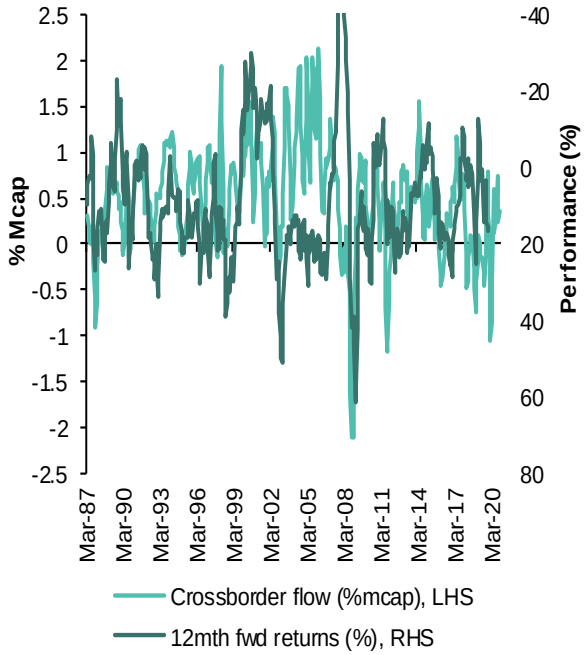
A slower-moving measure of flow-based sentiment is not as extended. If we track total cross-border flows, then it has picked up, but is suggesting that total purchases of equities by investors not in the same region (i.e., US buying of Asia and Europe, and Asian buying of US and Europe, etc.) is running at an annual rate of 0.3% of market cap, which is consistent with positive forward returns (see Exhibit 65).

EXHIBIT 64: **Global fund flow sentiment indicator**



Source: EPFR global and Bernstein analysis

EXHIBIT 65: **Global cross-border equity flow indicator**



Note: Combined net purchases of overseas equities for US, UK, euro area (post 1997), Germany (1987-97), France (1993-97), and Japan (post 1997). Data derived from external sector portfolio investment data published in the financial accounts of central banks. The series is monthly flows smoothed over three months, annualized and normalized by the market cap of the Datastream World index.

Source: US Fed, ECB, UK ONS, Japanese MOF, Bundesbank, Banque de France, Datastream, and Bernstein analysis

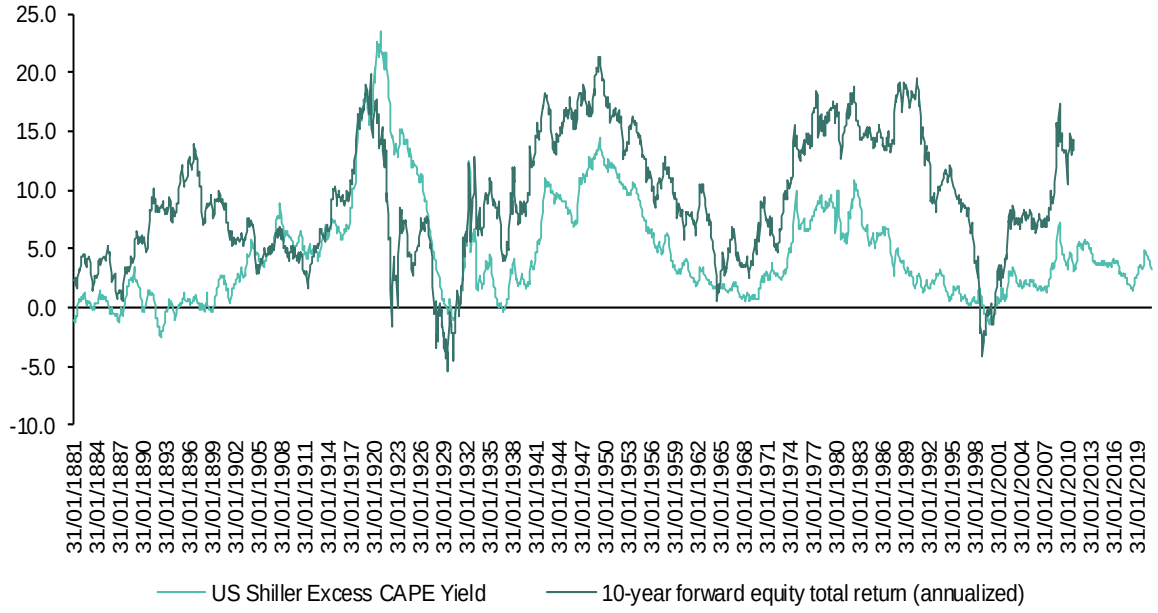
Alla: The obvious rejoinder on these tactical points is that we are, at the same time, seeing a $1.9Tn fiscal package being unleashed in the US. At the same time, the global debate about fiscal support has been evolving and indicates a likely more relaxed approach to deficit levels. It's not MMT, but it borrows some of the MMT language. But anyway, this is

not even a discussion about timing, it is about expected returns in the long run, given the policy environment and capital market outlook.

Inigo: I agree the outlook for real rates remaining low means the equilibrium level of valuations has likely changed. Yes, the ultimate point of a valuation metric is mean-reversion, but for extended periods of time (e.g., a decade) the mean that one is "reverting to" can change. In order to account for the low discount rate we face today, a more appropriate model is perhaps the equity risk premium, here defined as the excess yield of equities over bonds. As we are making a long-term forecast here, we use a risk premium with a cyclically-adjusted earnings level to remove the (sizable) uncertainty about 2021-22 earnings.

Using cyclically-adjusted earnings, the US equity risk premium implies an excess return of stocks over bonds of 3.5% p.a. for the next decade (see Exhibit 66). I would also add that relative valuation might be more appropriate anyway, as I am not sure there is any such thing as a risk-free rate anymore, in which case any notion of absolute valuation may no longer be possible.[20]

EXHIBIT 66: **Cyclically-adjusted equity risk premium and forward excess returns**



Note: Risk premium defined as cyclically-adjusted (i.e., 10-year average inflation-adjusted) earnings yields less real yields on government bonds.
Source: Robert Shiller's database, GFD, and Bernstein analysis

But if we want to attempt an absolute return forecast, one way is to decompose the various sources of return or shareholders. We can write:

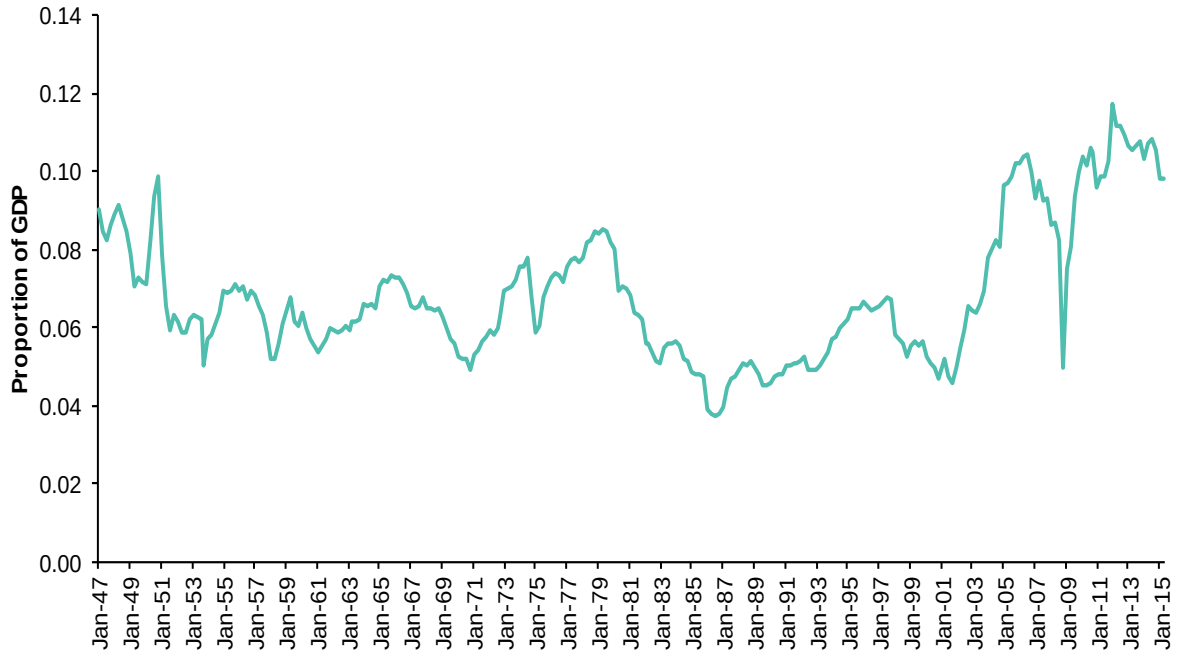
Real equity return = dividend yield + buyback yield + real growth per capita + population growth + change in profit share of GDP + multiple expansion/contraction

[20] Global Quantitative Strategy: The end of Pax Americana and what it means for the market

Here we are subsuming margin expansion/contraction as part of the broader measure of profit share of GDP, as we see the pressures on the two as being related.

Let's assume — for the purposes of argument — that the multiple and margin remain constant. The issue with the multiple we have already discussed: it is high but could maybe be maintained through a combination of low real yields and TINA-type arguments on the part of investors begetting more flow (we recognize that the latter argument is somewhat circular). Profit share of GDP has been elevated (see Exhibit 67) and it seems more likely that it falls rather than rises, which we discuss later. But let's be generous for now and assume flat margins and profit share as our base case.

EXHIBIT 67: **Corporate profit share of GDP**



Source: FRED and Bernstein analysis

This also depends on the prognosis for buybacks. For the last 10 years, corporates have been by far the biggest buyers of equities, far out-stripping investors. The last decade has also been an environment that has encouraged levering up corporate balance sheets and issuance of debt to undertake buybacks. We think there are limits to how long this can be maintained; there is a growing chorus that it leads to greater inequality and constitutes a governance failure — i.e., corporate management teams are measured on too short a horizon that leads to lower capex and greater debt issuance to complete buybacks. Again, in our base case let's assume the future is like the recent past, but then see how this could change the result.

The UN population growth projection for the US is 0.6% p.a. The achieved real GDP per capita average growth over the last 30 years has been 1.5% p.a. (and long-run consensus forecasts have tended to be in a similar range). The US dividend yield is 1.5%. The 10-year average net buyback yield (i.e., buybacks less issuance as a percentage of market cap) has

been 1.5% (although given the last 12 months of pandemic-influenced markets, it has been only 0.3%).

With no change in multiple or profit share, the decomposition of returns simplifies to:

Real equity return = dividend yield + buyback yield + real growth per capita + population growth

What does this imply in terms of real return? Plugging in numbers to the above equation we get:

Real return = 1.8% + 1.5% + 1.5% + 0.6% = 5.4%

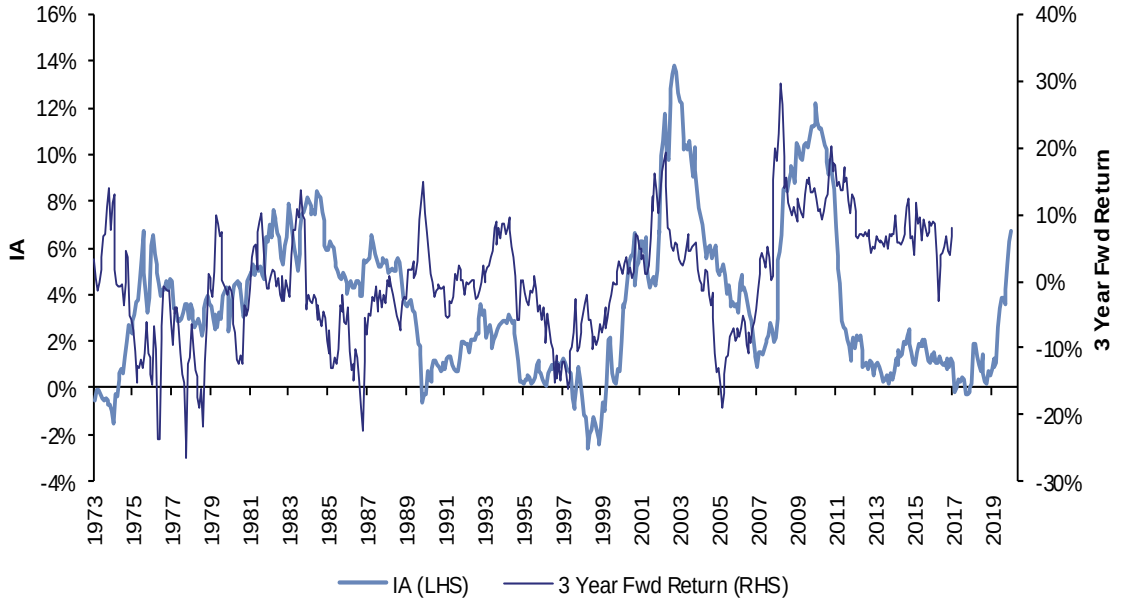
This is in real terms. If we assume inflation at 2% p.a. over the forecasting horizon, this leaves us with 7.4% p.a. nominal return.

A move to restrict buybacks could dent this return. Though actually in the long-horizon context of this chapter that might not be a bad thing. We have argued in recent research that there has been a governance failure in recent years that has encouraged buybacks at the expense of capex. For long-run returns, any potential increase in the real growth rate resulting from increased capex could be a more sustainable source of returns. There is the potential for inflation to be slightly higher than this 2% level, given the evolution of the policy framework in the light of the pandemic and the desire of politicians to inflate out of the current debt level.

Alla: There is also an alternative, very different route to getting to an expected market return. From the point of view of the asset owner, the investment choices have been revolutionized by the acceptance of passive as the dominant vehicle for investing new funds. On the one hand, this is very helpful for lowering the overall fee paid for investing, but it reveals a deeper point about investing too. The emergence of cheap vehicles for market and factor beta allows investors to genuinely separate cheap beta from alpha. We recently laid out in detail what this means at the individual stock level (as opposed to the fund level) in Alphalytics: Which stocks carry Alpha?.

Every stock brings with it a bundle of exposures — to asset classes, sectors, factors, and idiosyncratic returns arising from what that company alone has done. We can strip individual stock returns of simple factor exposures such as Value, profitability, etc., leaving an idiosyncratic return for each stock. We can show there is a persistent link between the average trailing IA of stocks and the forward return on the market (see Exhibit 68). We can understand this in terms of the ability of stocks to generate idiosyncratic returns as being a more persistent feature of the stock rather than the overall return, which includes factor exposures that may be more prone to macro influence over the course of the cycle. On this basis, the 10-year trailing average IA of US stocks implies a forward return of 10.9% p.a. (on a total return basis as an excess return over cash).

EXHIBIT 68: **Three-year trailing IA vs. three-year forward return (vs. one-month T Bill), equally weighted across c.1,000 large-cap US stocks**



Note: Universe is the 1,000 large-cap US stocks; rebalanced annually

Source: Fama French Factor Library, FactSet, Bloomberg, and Bernstein analysis

Inigo: Can I be a misery guts and just lay out what can go wrong with this thesis please? Not that I'm trying to back away from it at all, but just so that we are going in eyes-open and to preempt some obvious questions. The message that high valuations are OK presupposes that a lot of things go right.

The biggest risk is that yields rise further than we expect. This is where tactical and strategic concerns coalesce. The composition and speed of this matters. We made the case recently (Portfolio Strategy: Paths of Policy - or can the market survive 2% yields?) that this rise is mainly through a shift in inflation expectations and also happens gradually then the equity market can shrug it off. The rapid increase in real yields in late February was worrying in this regard. But real yields have declined since then.

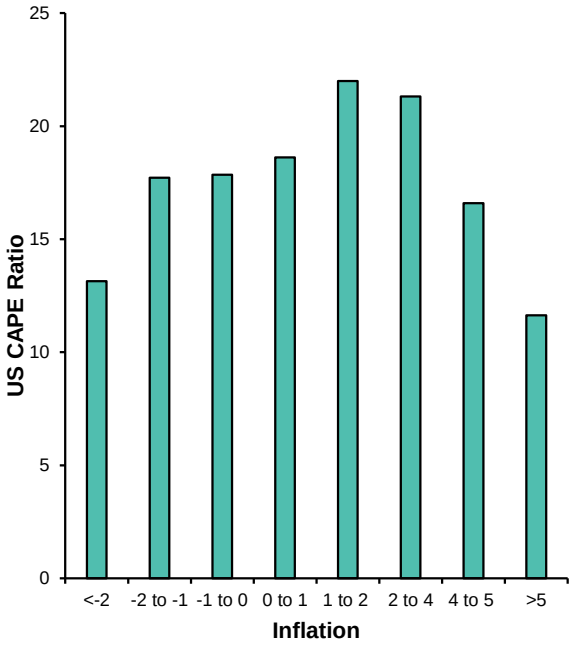
Can the economy be steered with enough precision? We have never been in a situation remotely like this before, with a reopening of the economy and full fiscal and monetary support to such a degree. Moreover, in the background, we have a political discourse that is inching toward using MMT as a description, even if not adopting it as a policy goal. Our central case is that inflation finds an equilibrium level in 2022 that is somewhat above the pre-pandemic level but that it remains under control. Underlying this, we assume a balancing of the pro-inflationary forces of political desire to keep cost of debt low and the tolerance of a much more proactive fiscal policy vs. the deflationary forces of unemployment, lower velocity of money, automation, and the risk of zombie companies. However, we freely admit it would be hard to claim that we can know with a high degree of certainty what coefficients to put on these various forces. Thus, the risk of an inflation overshoot is non-negligible.

In Exhibit 69 and Exhibit 70, we show that inflation levels up to c.4% mark have been consistent with equity multiples being maintained, but at levels beyond that multiples fall. The speed with which yields move matters as well, and a rapid move up would likely be destabilizing.

In the next three to six months, it is likely that inflation will move a lot higher. The market needs to be able to distinguish between an inflation "blip" on the back of a reopening trade and a mismatch in supply and demand, vs. a move higher in inflation due to a policy error. Will investors be able to distinguish between these two? What complicates this is that the measurement of inflation is likely to be impaired by the uncertainty about composition of the baskets of goods used, given restrictions on how money could be spent on many of them over the last year.

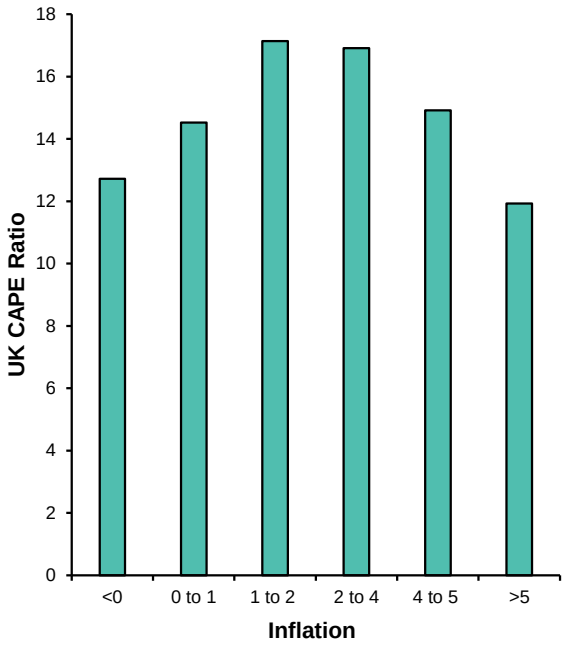
A rapid move in inflation and yields is the event most likely to destabilize the bullish thesis.

EXHIBIT 69: **US cyclically-adjusted PE (CAPE) vs. inflation regime**



Source: GFD, Datastream, Robert Shiller's database, and Bernstein analysis

EXHIBIT 70: **UK CAPE vs. inflation regime**

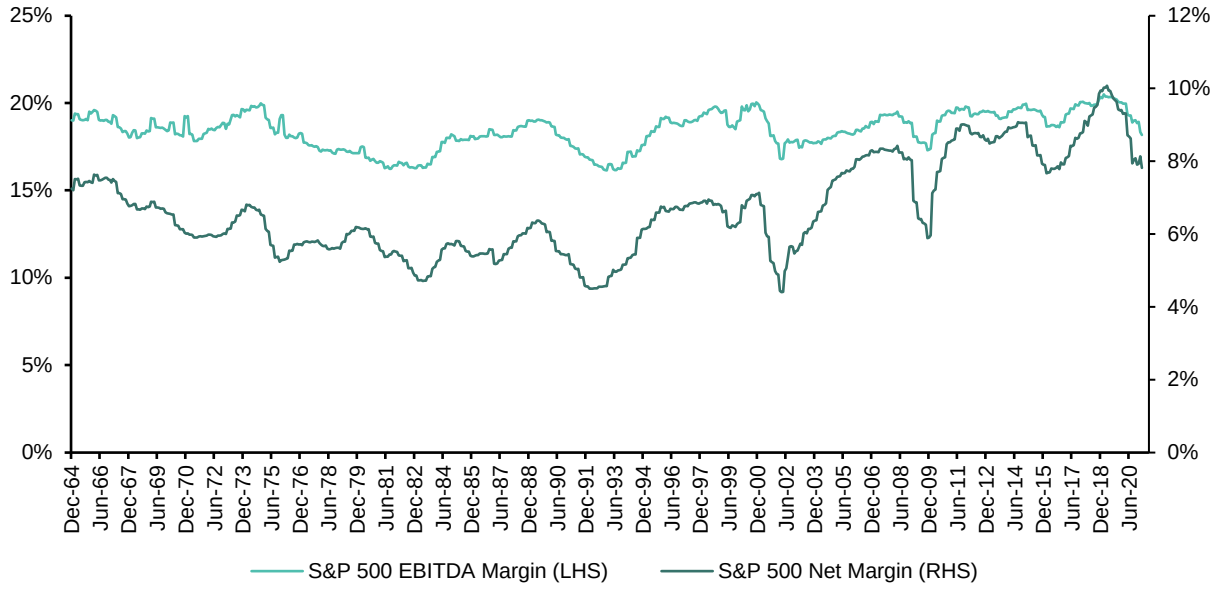


Source: GFD, Datastream, Robert Shiller's database, and Bernstein analysis

Another strategic concern that is particularly relevant when it comes to justifying current valuations is the medium-term outlook for corporate margins. Pre-tax and post-tax margins have been generally higher in recent years. This has been most pronounced for post-tax margins, which for the last decade have averaged levels not seen in the last 60 years (see Exhibit 71). We think a general policy shift in favor of labor at the expense of capital will decrease pre-tax margins,[21] and at the same time taxes are likely to rise.

[21] Portfolio Strategy: Six books for the post pandemic world

EXHIBIT 71: **US pre- and post-tax margins**



Source: FactSet and Bernstein analysis

More generally, we can place this pressure on margins in the context of the cost of compliance with ESG in the broadest sense of that term. Improved environmental standards and properly pricing in negative externalities on the environment lead to a medium-term increase in costs for corporates. But the policy-driven upward pressure on wages and taxes can be seen in the light of the cost of complying with a broader macro interpretation of the "S" and "G" aspects of this. In this context there could also be pressure on buybacks, hence influencing the return calculation we presented earlier in this chapter. It is both "micro" ESG in terms of the cost of compliance at the individual corporate level and "macro" ESG in the sense of how this influences policy that amount to a compression in margins.

If we zoom out from this there is another risk in the background: low growth means need for more debt for every unit of growth, but that is ok as rates are low, but rates are only low because growth is low. This pushes the amount of debt up in a secular way as it has since the 1970s. But hang on, is this circular? Does it prompt inter-generational issues? Is it sustainable? To address that requires an even broader debate on policy choices and the funding of retirement. A topic we will return to in a future essay.

However, despite these risks, 8000 becomes our eight-and-a-half year forward price target.

Team: So, if we bring all this together, and revert to speaking as a team, what does it mean for a multi-asset portfolio implications? We have been arguing in recent research that the whole model of 60:40 portfolios is wrong[22] and needs to be replaced with a blending of

[22] Portfolio Strategy: Duration in equities good, duration in bonds bad

asset classes and factors and a structure based on a split between IA and beta.[23] Such a portfolio will likely have to rely more on long-short returns such as Value and Carry, have a higher allocation to real assets, and also likely include a greater allocation to non-fiat currency, such as gold and, potentially, crypto.

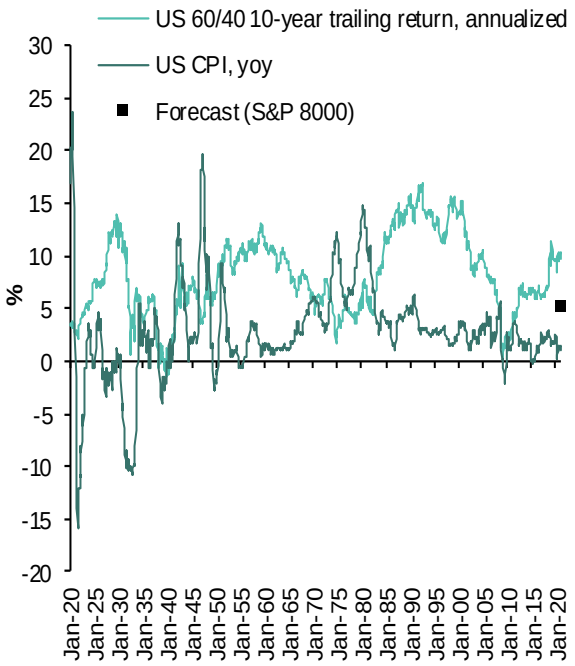
But to use 60:40 as a guide for now, what does this imply? If we set the 10-year forward target on US bonds as the level of the 10-year yield and 8000 as the S&P target, then it implies a 10-year forward annualized return of 60:40 of 5% p.a. in nominal terms. We argue that for most asset owners the true benchmark is inflation. In Exhibit 72 we show that relative to inflation, 60:40 has done very well for the last 40 years, but even this somewhat bullish equity target implies lower spread over returns from 60:40 in future.[24]

This impact is more stark on a risk-adjusted basis (see Exhibit 73). Even the marked increase in equity volatility since the global financial crisis did not significantly increase the volatility of 60:40 because the correlation of stocks and bonds became more deeply negative. To the extent that rising inflation and rising volatility of inflation threaten this, then the return-risk ratio of 60:40 would fall. Even with our bullish equity target, but assuming an increase in stock-bond correlation to +0.1, the return-risk ratio of 60:40 would fall to 0.4. This compares to a return-risk ratio of 1.0 since 1982. The bottom line is that a bullish equity view does not obviate the need to reform broadly-held assumptions about cross-asset investing.

[23] A New Paradigm for Investing

[24] We discuss how the new policy environment implies a need to change asset allocation assumptions in the chapter "Six Books for the Post-Pandemic World."

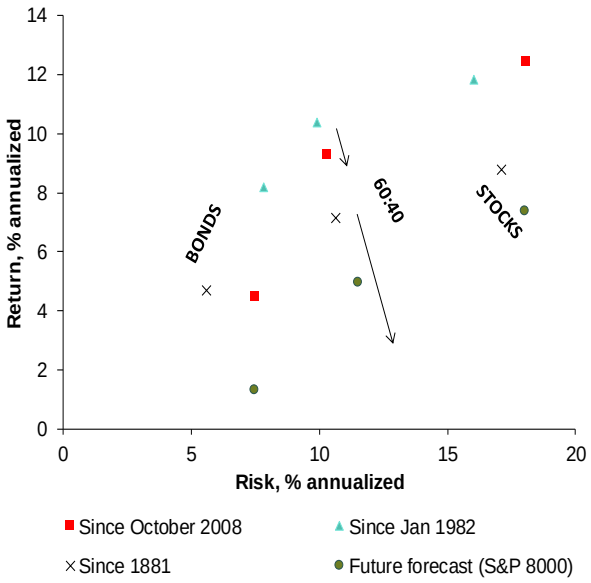
EXHIBIT 72: **60:40 portfolio vs. inflation**



Note: The black square represents a scenario for 60:40 returns based on the outlook for equities where S&P is projected to rise by 7% p.a. over the next 10 years. The forward return to bonds is assumed to be equal to the current rate of US 10-year yield.

Source: Datastream and Bernstein analysis

EXHIBIT 73: **Risk-Return trade-off of 60:40 portfolio**



Note: The chart shows annualized total return and risk for US equities, US bonds, and a 60:40 equity:bond portfolio. Future forecast is assuming same volatility for stocks and bonds as since October 2008 and 0.1 correlation coefficient. Future equity forecast is modeled based on two scenarios — of S&P 500 reaching 4000 and 8000 level in the next 10 years. The 10-year annualized bond return is assumed to be equal to current US 10-year yield.

Source: Datastream, Robert Shiller's database, GFD, and Bernstein analysis

VALUATION RHAPSODY

HIGHLIGHTS

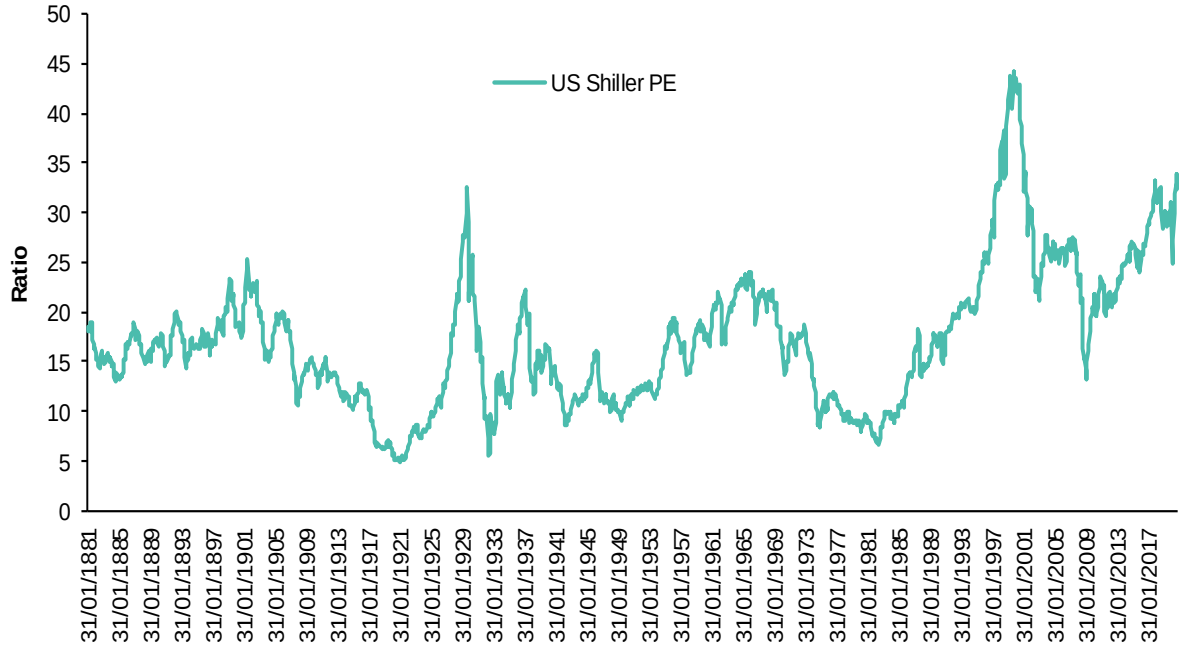
- The retail investing frenzy of early 2021 begs the question of "does valuation matter?". Of course, even voicing the question rings alarm bells. However, this question is being asked both for the market overall and within the market. We discuss the reasons why the equilibrium level might be different, but we don't want to reject the idea of valuation altogether.
- We would distinguish between reasons for specific valuation levels to matter less now vs. potential reasons why the very idea of valuation may be questioned altogether. The former comes down to the prognosis for rates and the "TINA" argument. For the latter, one could argue the market is so policy-led that valuation is less of a force, or that with discount rates so low there is too much error in any notion of NPV to make it useful.
- The more existential possibility is that if there is no such thing as a risk-free rate anymore, is absolute valuation even a possibility.
- We conclude there are good reasons why valuations do not need to mean-revert but equally that we do not want to abandon the idea of valuation altogether.

DETAILS

Is this the real life?
Is this just fantasy?
Caught in a landslide
No escape from reality
Open your eyes
Look up to the skies and see.

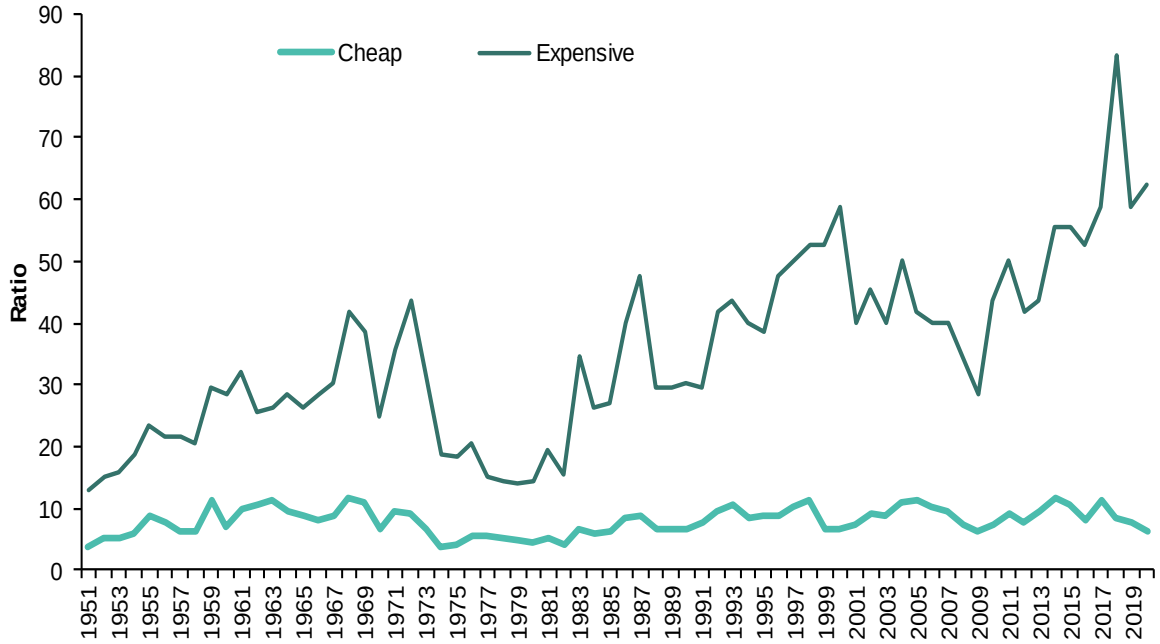
Freddie Mercury might have called the market right when it comes to valuation. After a quarter of significantly stepped-up retail participation, much of which had nothing to do with fundamental valuation and after bitcoin — an asset that has no fundamental valuation — has had one of its biggest runs in years, maybe the idea of valuation as a constraint sounds quaint. After all, for the market overall, the Shiller PE on US equities is at 34x (see Exhibit 74). Equally, the valuation spread within the equity market is at a seven-decade extreme (see Exhibit 75). Moreover, it's not just equities, as yields on credit are at their lowest in history. One could go on. Yes there is a re-opening narrative for what the bounce can look like, assuming successful vaccine rollouts, and policy makers have explicitly supported the market. But how much of this is already in the price? For all the tactical narrative for 2021, there is still a future of massively higher unemployment, increased taxes, and a list of possible pressures on corporate margins.

EXHIBIT 74: **Shiller PE for US equities**



Source: Robert Shiller's database and Bernstein analysis

EXHIBIT 75: **Valuation spreads are at 70-year extreme levels (trailing PE ratio)**



Source: Ken French data library and Bernstein analysis

Inflows into equities are running at a pace that is at the upper end of the 30-year range, and we think that, on balance, more inflows are going to come. So, maybe valuation just doesn't matter?

Ooh yeah, ooh yeah
Nothing really matters
Anyone can see
Nothing really matters — nothing really matters to me.

Even posing the question of whether valuation matters makes us feel profoundly uncomfortable. Inevitably, raising the question leads to an outpouring of views from investors — either of disdain at the apparent hubris in making such a claim vs. the cries of "it's different this time because ... ". The argument over valuation at the overall market level and about the spread within the market share common themes which we go through in turn.

Reasons why high valuations are OK (or why valuation may not matter quite as much)

It might not be that valuation "doesn't matter" but just that the equilibrium level has changed.

Real rates are pinned low: With rates low, the equilibrium valuation for the market has changed. The idea of rates being "lower for longer" is hardly new. Broadly, we agree with that prognosis, though the exact form that takes clearly matters a great deal. As we have discussed in recent research (A Cross-Asset View of Equities), we think there is a good case that inflation can rise moderately but real rates do not rise as much as would usually be expected, given a move in inflation. This has very different implications for the valuation of cash flows with different durations and inflation sensitivities.

In Exhibit 76, we show the expected performance, rebased to 100, for a 10-year bond, a TIPS security, and a Growth stock, and their sensitivities to real rates and inflation. Assuming an ability of the Growth stock to pass through at least some inflation, then low real rates but a higher inflation outlook supports the multiple for long duration in equities.

EXHIBIT 76: **Cross-asset analysis of sensitivity to inflation and real rates**

US 10-year bond sensitivity to inflation and real rates

Real Rate \ Re-based Inflation	1	2	3	4	5
0	100.00	90.83	82.55	75.08	68.33
1	90.83	82.55	75.08	68.33	62.23
2	82.55	75.08	68.33	47.21	56.72
3	75.08	68.33	62.23	56.72	51.73
4	68.33	62.23	56.72	51.73	47.21

US 10-year TIPS sensitivity to inflation and real rates

Real Rate \ Re-based Inflation	1	2	3	4	5
0	100.00	100.00	100.00	100.00	100.00
1	90.56	90.56	90.56	90.56	90.56
2	82.06	82.06	82.06	82.06	82.06
3	74.39	74.39	74.39	74.39	74.39
4	67.48	67.48	67.48	67.48	67.48

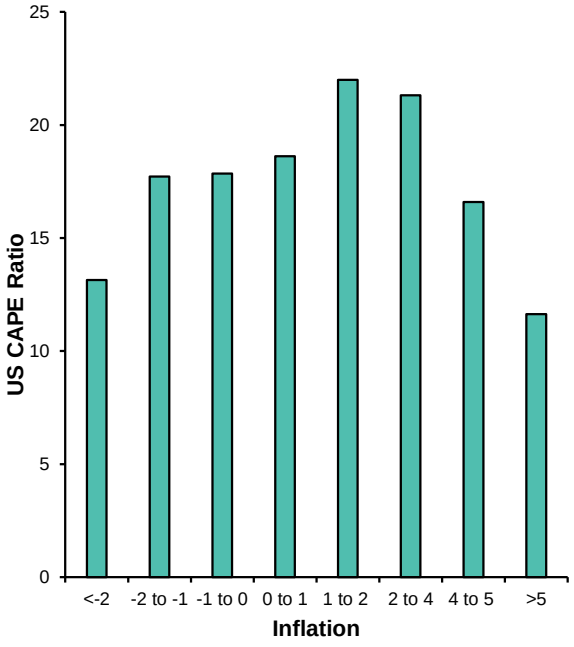
US Growth sensitivity to inflation and real rates

Real Rate \ Re-based Inflation	1	2	3	4	5
0	100.00	112.51	126.48	142.05	159.40
1	95.26	107.17	120.47	135.30	151.82
2	90.76	102.10	114.77	128.89	144.63
3	86.49	97.29	109.36	122.81	137.80
4	82.44	92.73	104.22	117.04	131.32

Source: FactSet, IBES, and Bernstein analysis

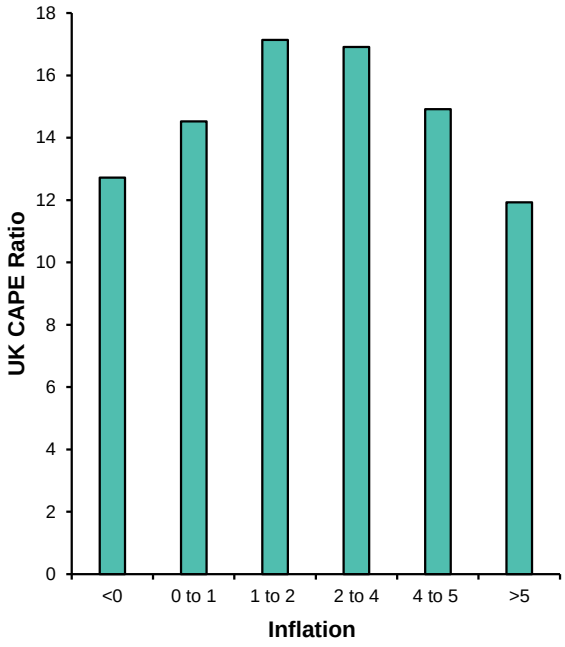
If inflation rises gradually to the 3% range, then we think the multiple on equities can be supported. Historically, it is only at higher inflation levels that multiples fall (see Exhibit 77 and Exhibit 78). Though the path matters, a rapid increase would be more destabilizing. So, a critical issue for 2021 is whether the market can distinguish between price increases due to a supply-demand mismatch (which seems likely in H1) or a price increase that could be the result of a policy error.

EXHIBIT 77: **US CAPE vs. inflation regime**



Source: GFD, Datastream, Robert Shiller's database, and Bernstein analysis

EXHIBIT 78: **UK CAPE vs. inflation regime**



Source: GFD, Datastream, and Bernstein analysis

TINA

The other powerful reason to suggest that we should accept a different equilibrium valuation is the argument that "there is no alternative." This is not an argument to be bullish, but merely the idea that there are few assets that can plausibly deliver positive real returns, so investors have to buy equities. We think there is something to be said for this. The irony is that TINA was cited as an argument for equities in 2019; since then the world has utterly changed — so can it be right that the narrative could still hold? Covid-19 has dragged forward many things, including returns, but it does leave a case for equities (and real assets in general) being relatively more attractive than the other options.

The problem with TINA as an argument is that it is like trying to apply a normative argument to something that is beyond the control of any one person. Just because equities are better than the other options and that one *should* invest in them is not sufficient to make the case that the market goes up. The central force here has to be that it creates more buying pressure.

- There are other alternatives, but inflation-protected assets are in limited supply. There are commodities, real estate, gold, and infrastructure. But with real estate and infrastructure being the income-producing ones that can be valued more easily, there is ultimately limited supply, cost of access can be high, and in some cases, asset owners already have maxed out their allocation. Thus, equity exposure looks to be an allocation that could in theory be expanded.

- There is also a more tactical reason which is that since Covid-19, money market fund exposures materially increased, but we think those assets will move elsewhere, given the unattractive rates on cash.

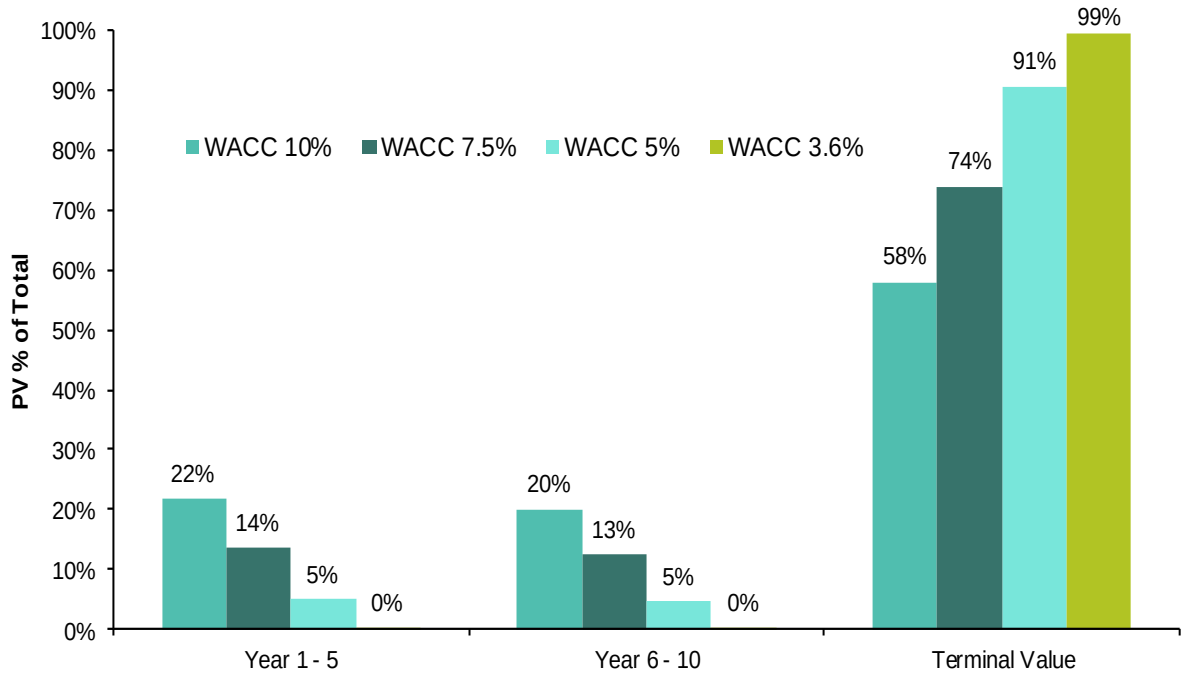
Reasons why valuation could just be fundamentally broken as a device

There are also possible reasons why valuation might just be broken as a metric.

Policy: One possibility is that the policy environment might be taken as a more radical change. Rather than there being a case for real rates being low and, hence, valuations being higher, maybe we are in an environment where the role of policy is just the dominant force. In that case, the prognosis for markets at any given point depends on the likely path of policy at each point in time rather than valuation. Then, the job of a financial analyst becomes second-guessing political decisions, an unenviable prospect.

Death of DCF and limits of forecasting: The low level of discount rates raises profound questions relating to the limits of forecasting. Usually, the need to discount far-off cash flows saves our collective embarrassment about the difficulty of forecasting corporate cash flows far into the future. One issue with DCF models has always been the weight on the terminal value. The problem is now, for many companies, the vast majority of NPV is derived from cash flows so far off that we have no hope in plausibly forecasting them. This is especially true for Growth companies (see Exhibit 79).

EXHIBIT 79: **Proportion of NPV set in future years: high-growth company**

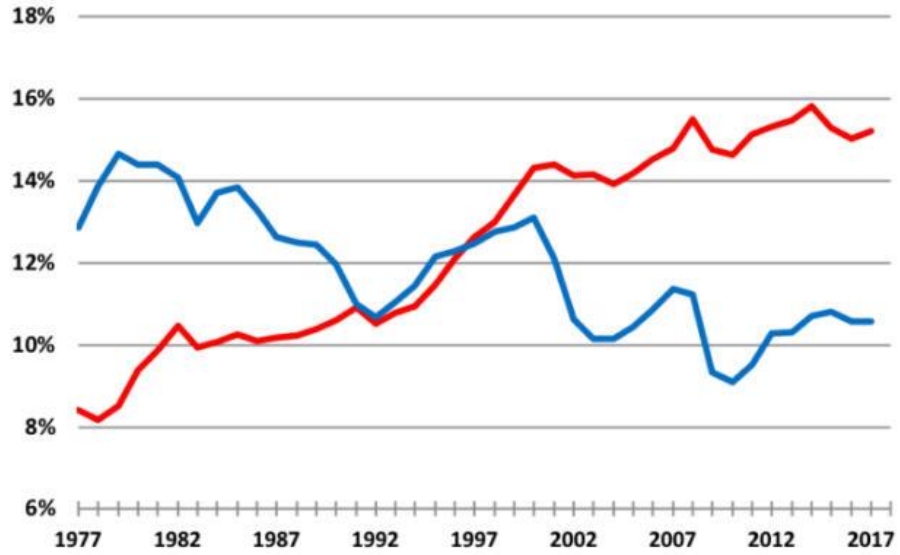


Note: For the analysis we use a three-stage DCF model. We assume a 10% growth rate in the first stage (years 1-5), then fade the growth rate over years 6-10 to a terminal growth rate of 3.5%. We vary the WACC from 10% to 3.6%.
See Global Quantitative Strategy: Death of the DCF model?.

Source: Datastream and Bernstein analysis

Intangible vs. tangible assets: The majority of asset investment by corporates — and an even higher proportion of future growth potential — is in intangible rather than tangible assets (see Exhibit 80). In some cases, the investment in these may just be expensed as an operational charge each year as opposed to much of the investment that takes place in tangible assets. Thus, there could be a measurement problem in the determination of what constitutes value. Maybe valuation measures are impaired unless a lot of adjustments take place.

EXHIBIT 80: **US investment rates, 1977-2017 (non-residential business investment relative to business sector gross value added)**



Note: Capex normalized by gross value added (i.e., profits) split by tangibles (blue/gray) and intangibles (red/black).

Source: Unpublished update to Corrado and Hulten (2010) using methods and sources developed in Corrado and Hao (2013) and in Corrado *et al.* (2016) and Corrado *et al.* (2017) for INTAN-Invest© and the SPINTAN project, respectively

No risk-free rate? The strongest pushback on the notion of valuation is the idea that maybe there is no longer such a thing as a risk-free rate. We discussed this in detail in Global Quantitative Strategy: The end of Pax Americana and what it means for the market. Modern portfolio theory and most valuation techniques ultimately assume there is such a thing as a risk-free rate. However, we think there is a plausible argument that the existence of such a rate is regime dependent and that in the world today there is no such thing. In this case, only relative valuation is possible, not absolute valuation. In that case, the best we can get for valuation is to describe investments as a set of nested risk premia. One of the arguments for no risk-free rate is the scale of government debt and the associated debasement risk of fiat currencies. This is linked to the case for gold and cryptocurrencies; appropriately, assets for which valuation is not possible.

Conclusion: more Dante than Freddie Mercury

How can this end? Maybe Dante is more appropriate than Freddie Mercury for the prognosis from here. With markets priced for perfection at multiples rarely seen before, the case for "*Inferno*" would be easy enough to outline. However, if policymakers have ulterior motives to pin real rates low and if more investors are forced to increase equity weights

then — for the moment at least — it seems that Paradiso is achievable. But where our money would be is Purgatorio. In our minds this means a cap on returns and the market exposed to bouts of volatility driven by policy or flow shift, albeit with overall volatility subdued by central banks.

So, in practical terms, what does this mean? If we express the equity risk premium as the spread between cyclically-adjusted earnings and the real yield on 10-year debt, then the current risk premium at c.3% lies in the middle of the post-WWII range. So, while the market is not "cheap," the valuation case against it is much less extreme on this basis. Meanwhile, we think that at least some of the justification for valuation spreads across the market is there. It rests on two things: the greater persistence of growth for high-growth companies and real rates remaining low.

In Exhibit 81, we show an analysis of how the justified PE multiple varies with different assumptions about the discount rate and the decay rate — the time over which the growth rate declines to the long-term average (for more details see: Portfolio Strategy: Why US growth can continue to shine).

Just to be clear, we think there is a tactical case for Value in the short term in 2021 and also for specific subsets within Value (ex Financials) on a longer-term basis as inflation rises. But at the same time, we think the core Growth companies in the US can maintain their multiple — the key proviso being there is visibility or belief in that long-run growth rate.

EXHIBIT 81: **Justified PE multiple based on discount rate and growth decay time**

		Discount Rate						
		5.5	6	7	8	9	10	11
Decay	2	60.21	30.11	15.05	10.04	7.53	6.02	5.02
	4	63.72	31.86	15.93	10.62	7.97	6.37	5.31
	6	67.23	33.62	16.81	11.21	8.40	6.72	5.60
	8	70.74	35.37	17.69	11.79	8.84	7.07	5.90
	10	74.25	37.13	18.56	12.38	9.28	7.43	6.19
	12	77.76	38.88	19.44	12.96	9.72	7.78	6.48

Note: Analysis assumes 27% payout ratio and that earnings growth starts at 11% and declines to 5% in the long run.

Source: FactSet, IBES, MSCI, and Bernstein analysis

To say that valuation doesn't matter is, we think, too cavalier. Yes, there is a plausible case to be made that the equilibrium level has changed. It is also clear that it can be over-ridden by policy decisions. This seems to us to be mainly a reason why the market can maintain its multiple rather than a reason to be hugely bullish and to remove constraints on the outlook. Soon, the debate will turn to what is the medium-term case for inflation and what is the medium-term case for margins in 2022-23. Moreover, within the market there is a massive distinction between a Momentum trade that is much more expensive than normal and very much tied to rates vs. an argument for true growth, which seems more sustainable. We are happy to own core Sustainable Growth in the US, but we want to neutralize exposure to Momentum.

VALUE ROTATION

HIGHLIGHTS

- The rotation into Value that started in November 2020 is the largest pro-Value rotation that has taken place since 2009. In the longer run, this rotation is but a blip in the persistent underperformance of Value vs. Growth that has been in play since the GFC in 2007.

- Value has outperformed across the board. All measures of Value have had sharp outperformance, both across the market and within sectors. Small Cap Value has also outperformed Small Cap Growth.

- News of the successful Covid-19 vaccine was the catalyst for the rotation, as the market moved to price in a strong recovery from the pandemic. The rotation into Value has gone hand in hand with a sharp move upward in nominal yields, inflation expectations, and a steepening yield curve, as the market has priced in strong economic growth and rising inflation.

- The size and nature of the fiscal stimulus and tools employed during the pandemic, combined with loose monetary policy, have driven expectations of inflation higher. Value has a very long-run positive relationship with inflation. Since the 1930s, Value has outperformed when inflation has been rising, and underperformed during periods of falling inflation.

- Tactically, we think there is plenty of ammunition left in the rotation for it to go further. Valuation spreads remain at all-time highs across the market. Value stocks are now starting to become Momentum stocks. Despite being upgraded at the fastest pace in 30 years, there is still some way to go for the earnings estimates of Value stocks to catch up with their pre-pandemic levels. Value stocks remain the most uncrowded part of the market. Inflation is almost mechanically set to increase this year, coming off such a low base last year.

DETAILS

The rotation into Value that started in November 2020 is the largest pro-Value rotation that has taken place since 2009 (see Exhibit 86). Since November 6, 2020 (when news of the successful vaccine trials hit), cheap stocks have outperformed expensive stocks by 30% in Europe and by 20% in the US, as of mid-April 2021. The last rotation into Value of this magnitude started in March 2009 when Value staged a swift recovery post the crisis which lasted six months.

Value has outperformed across the board. All measures of Value have had sharp outperformance, both across the market and within sectors. Small Cap Value has also

outperformed Small Cap Growth (see Exhibit 88). Small-cap stocks have also sharply outperformed large-cap stocks over this period.

News of the successful vaccine was a catalyst for the rotation, as the market moved to price in a strong recovery from the pandemic. The rotation into Value has gone hand in hand with a sharp move upward in nominal yields, inflation expectations, and a steepening yield curve, as the market has priced in strong economic growth and rising inflation.

The size and nature of the fiscal stimulus and the tools employed, combined with loose monetary policy, have driven expectations of inflation higher. Value has a very long-run positive relationship with inflation (see Exhibit 89). Since the 1930s, Value has outperformed when inflation has been rising, and underperformed during periods of falling inflation.

Rising inflation expectations and the improving outlook for economic growth have pushed up yields. The US 10-year nominal yield is at 1.63% (April 2021) up from 0.8% in November 2020. The US 10-year breakeven inflation rate is at 2.3% up from 1.65%. The three-month 10-year yield curve has steepened by 100bps (see Exhibit 90 and Exhibit 91).

In the longer run, this rotation is but a blip in the persistent underperformance of Value vs. Growth that has been in play since the GFC in 2007 (see Exhibit 84).

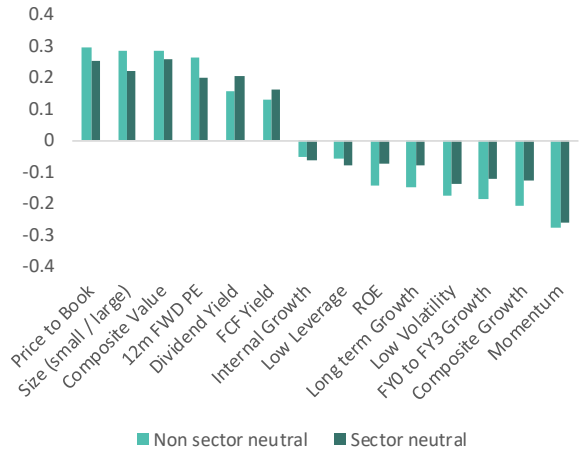
Tactically, we think there is ammunition left in the rotation for it to go further. Valuation spreads remain at all-time highs across the market. Value stocks are now starting to become Momentum stocks. Despite being upgraded at the fastest pace in 30 years, in some cases there is still some way to go for the earnings estimates of Value stocks to catch up with their pre-pandemic levels. Value stocks remain the most uncrowded part of the market.

The bigger question for the Value rotation to persist is whether inflation can carry on rising beyond 2021. If we do move into a longer-run regime of higher inflation, then the Value trade can carry on for longer.

More strategically, Value has been hindered over the past decade or more by a number of structural challenges.[25] Low yields inherently benefit long-duration assets and those with growing cash flows forecast far into the future (Value is a short-duration asset); technology destroying moats around typical Value industries; a higher proportion of intangible assets, questioning whether typical measures to Value companies are still appropriate; and continual rotation into passive funds, which have been inherently pro-Momentum. These challenges have not gone away.

[25] Global Quantitative Strategy: Has Value met its Waterloo?

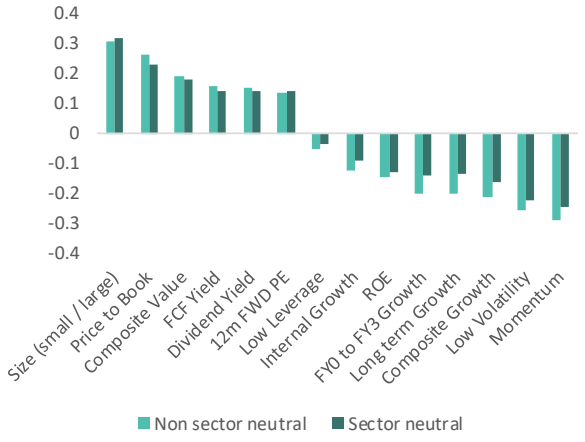
EXHIBIT 82: **Value is outperforming across the board: European factor performance since November 6, 2020**



Note: Performance of long-short factors in Europe since November 6, 2020. Universe is the largest 300 stocks in the MSCI Europe.

Source: MSCI, FactSet, and Bernstein analysis

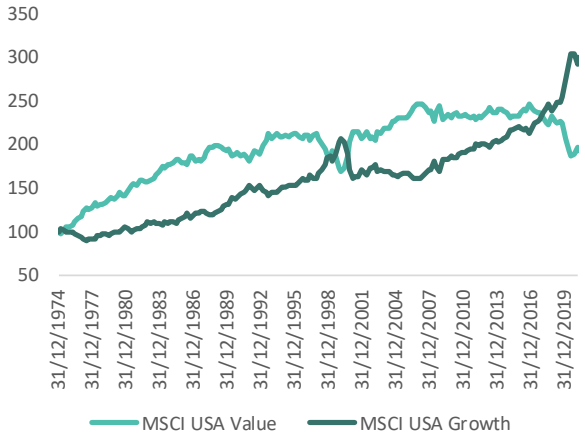
EXHIBIT 83: **Value is outperforming across the board: US factor performance since November 6, 2020**



Note: Performance of long-short factors in the US since November 6, 2020. Universe is the MSCI US.

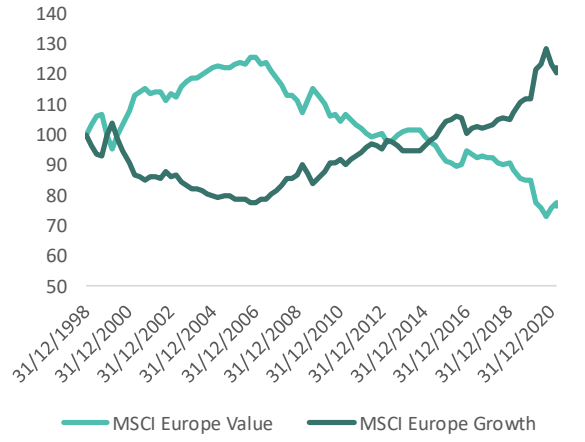
Source: MSCI, FactSet, and Bernstein analysis

EXHIBIT 84: **Long-run performance of Value vs. Growth: US**



Source: MSCI, Bloomberg, and Bernstein analysis

EXHIBIT 85: **Long-run performance of Value vs. Growth: Europe**



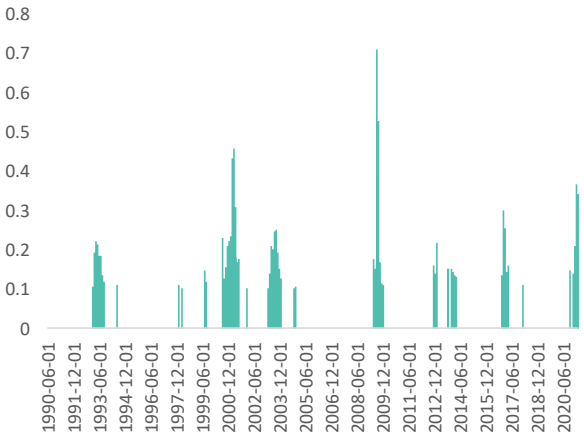
Source: MSCI, Bloomberg, and Bernstein analysis

EXHIBIT 86: **This is the largest Value rotation since 2009: US Deep Value (P/B) – six-month trailing returns >10%**

Note: Periods where six-month trailing return of a long-short P/B factor was >10%.

Source: MSCI, FactSet, and Bernstein analysis

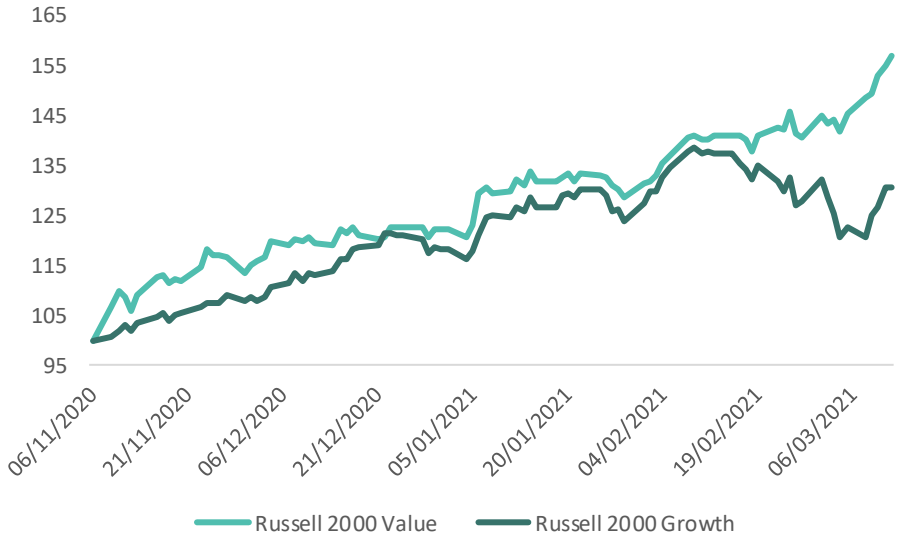
EXHIBIT 87: **This is the largest Value rotation since 2009: Europe Deep Value (P/B) – six-month trailing returns >10%**



Note: Periods where six-month trailing return of a long-short P/B factor was >10%.

Source: MSCI, FactSet, and Bernstein analysis

EXHIBIT 88: **Small Cap Value outperforming Small Cap Growth**



Note: Performance of the Russell 2000 Value and Growth indices since November 6, 2020.

Source: Bloomberg and Bernstein analysis

Drivers behind the rotation

News of the successful vaccine in November 2020 was a catalyst for the rotation, as the market moved to price in a strong recovery from the pandemic. The rotation into Value has gone hand in hand with a sharp move upward in nominal yields, inflation expectations, and a steepening yield curve as the market has priced in strong economic growth and rising inflation. The early recovery phase of a cycle is when Value does best — this is its time to shine (see Exhibit 122).

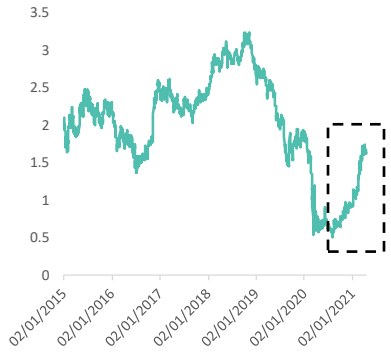
The size and nature of the fiscal stimulus and the tools employed, combined with loose monetary policy, have driven expectations of inflation higher. Value has a very long-run positive relationship with inflation (see Exhibit 89). Since the 1930s, Value has historically outperformed when inflation has been rising, and underperformed during periods of falling inflation.

Rising inflation expectations and the improving outlook for economic growth have pushed up yields. The US 10-year nominal yield is at 1.63% (April 2021) up from 0.8% in November 2020. The US 10-year breakeven inflation rate is at 2.3% up from 1.65%. The three-month 10-year yield curve has steepened by 100bps (see Exhibit 90 and Exhibit 91).

EXHIBIT 89: **US Value 10-year rolling return vs. inflation**

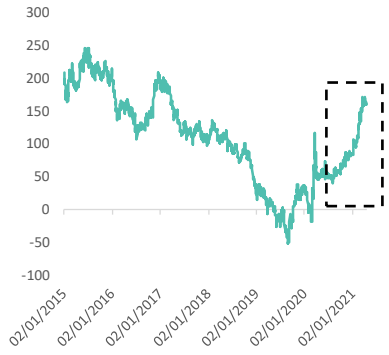
Source: Ken French database and Bernstein analysis

EXHIBIT 90: **US 10-year nominal yield**



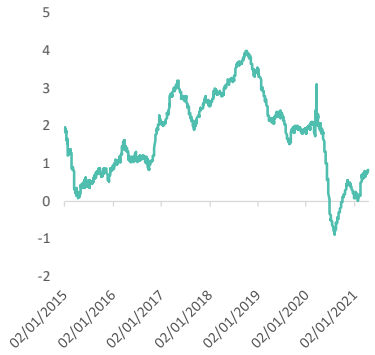
Source: Bloomberg and Bernstein analysis

EXHIBIT 91: **US three-month 10-year yield curve**



Source: Bloomberg and Bernstein analysis

EXHIBIT 92: **US 10-year real yield (10-year TIPS)**



Source: Bloomberg and Bernstein analysis

Value stocks are now becoming Momentum stocks and are being upgraded at the fastest pace ever

Sharp rotations within the market result in a changing composition for Momentum. Momentum has been heavily skewed toward Technology and heavily short Financials for a number of years. It is now starting to shift toward Value. There is a significant overlap emerging between Value stocks and Momentum stocks — a number of Autos, Banks, Materials, and Energy stocks are now screening as both Value and Momentum. This is unusual and has not happened since 2016 — the last period of short but meaningful Value outperformance (see Exhibit 93).

The sector composition of Momentum has completely flipped. In the US, it is now long Financials and short Technology — the opposite of what it has been in recent years (see Exhibit 97). In Europe, it is now exposed to Consumer Discretionary, Industrials, and Materials on the long side, and Healthcare and Consumer Staples on the short side.

Coming into the year, the valuation of Momentum had surpassed all previous highs. The P/B of high Momentum stocks was 8x that of low Momentum stocks in the US and 7x in Europe. The ratio is now close to 1x in both regions (see Exhibit 95).

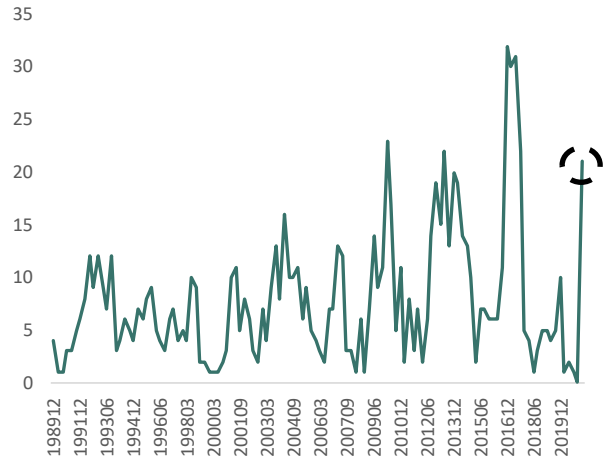
Agreement between Value and Momentum is the holy grail of quant investing. Many quant models are (or at least were) built to overweight stocks where there is agreement between Value and Momentum, i.e., to overweight stocks which are cheap but which also have earnings momentum and/or price momentum. It was a very successful combination.

Earnings revisions for Value stocks are being upgraded at the fastest pace in 30 years. Exhibit 99 and Exhibit 100 show the net upgrades for Value stocks relative to expensive stocks in Europe and in the US, respectively. This is at first glance alarming and would normally be a contrarian signal. However, given the size of the collapse in earnings last year, we think this pace of upgrades is to be expected. Moreover, earnings have been upgraded for the whole market at a record rate, and "only" to see 15% net positive earnings revisions in the context of the current cycle does not seem to us to be extreme.

The sectors that have had the largest increases in earnings estimates over the past six months are led by Consumer Discretionary, Energy, Materials, and Financials, and these are the sectors that are outperforming. The earnings upgrades in Value sectors are driving share price performance.

The rotation has also caused factor correlation to reduce in the US. Value is no longer as heavily negatively correlated with Momentum. This is another boost for quant managers in particular and further increases their chances of outperformance.

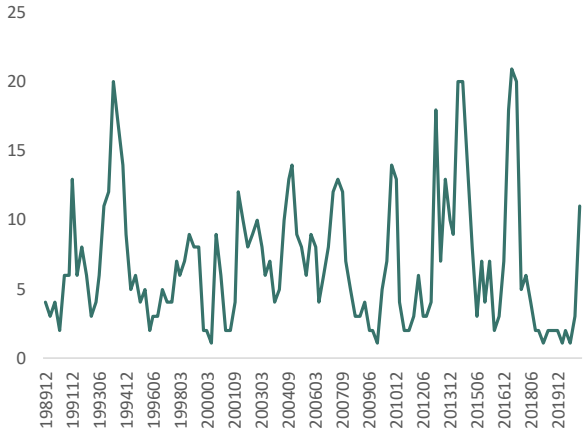
EXHIBIT 93: **Number of stocks screening as both Value and Momentum: US**



Note: Number of stocks that screen as the top quintile of Value (defined as P/B) and Momentum (defined as 12-month Price Momentum) in the MSCI US, rebalanced quarterly. Last rebalanced on March 31, 2021.

Source: FactSet, MSCI, and Bernstein analysis

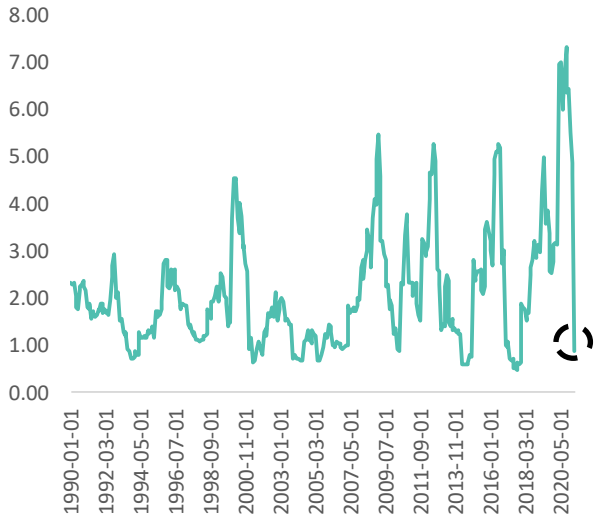
EXHIBIT 94: **Number of stocks screening as both Value and Momentum: Europe**



Note: Number of stocks that screen as the top quintile of Value (defined as P/B) and Momentum (defined as 12-month Price Momentum) in the largest 300 stocks in the MSCI Europe, rebalanced quarterly. Last rebalanced on March 31, 2021.

Source: FactSet, MSCI, and Bernstein analysis

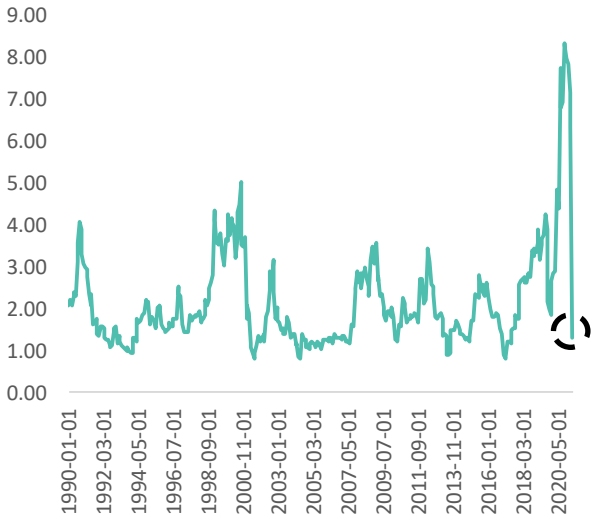
EXHIBIT 95: **Momentum has completely derated: valuation of Momentum – Europe**



Note: Valuation of a long-short 12-month Price Momentum factor as of April 13, 2021. Chart shows the ratio of the median valuation (P/B) of the top quintile to the bottom quintile. Universe is the largest 300 stocks in the MSCI Europe.

Source: MSCI, FactSet, Bernstein analysis

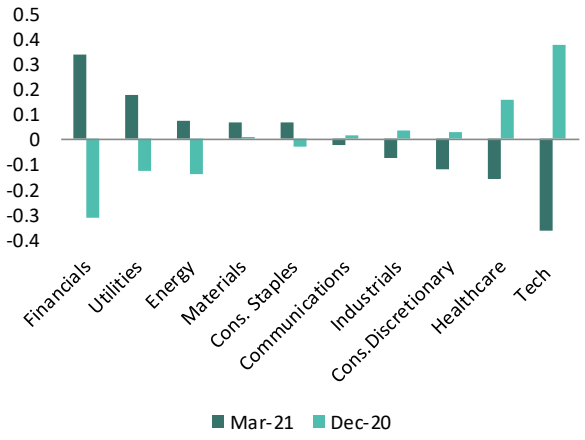
EXHIBIT 96: **Momentum has completely derated: valuation of Momentum – US**



Note: Valuation of a long-short 12-month Price Momentum factor as of April 13, 2021. Chart shows the ratio of the median valuation (P/B) of the top quintile to the bottom quintile. Universe is the MSCI US.

Source: MSCI, FactSet, and Bernstein analysis

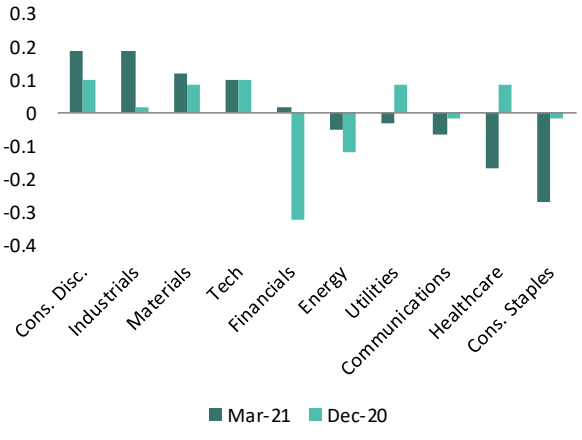
EXHIBIT 97: **Momentum exposure in the US as of end March 2021: long Financials and short Tech!**



Note: Net sector exposure of a 12-month Price Momentum long-short factor rebalanced as of March 31, 2021.

Source: MSCI, FactSet, and Bernstein analysis

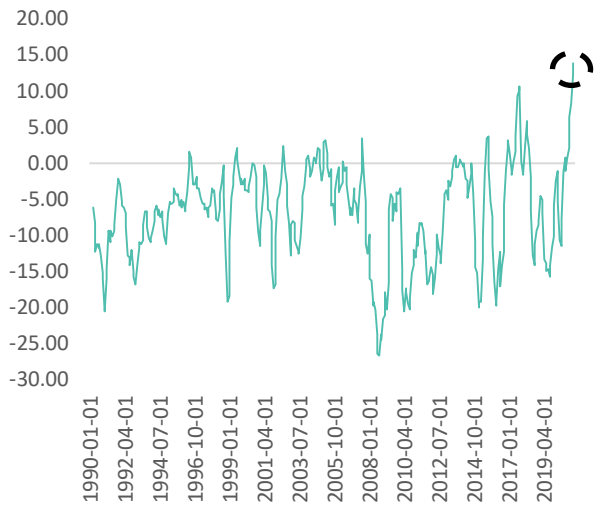
EXHIBIT 98: **Momentum exposure in Europe as of March 2021**



Note: Net sector exposure of a 12-month Price Momentum long-short factor rebalanced as of March 31, 2021.

Source: MSCI, FactSet, and Bernstein analysis

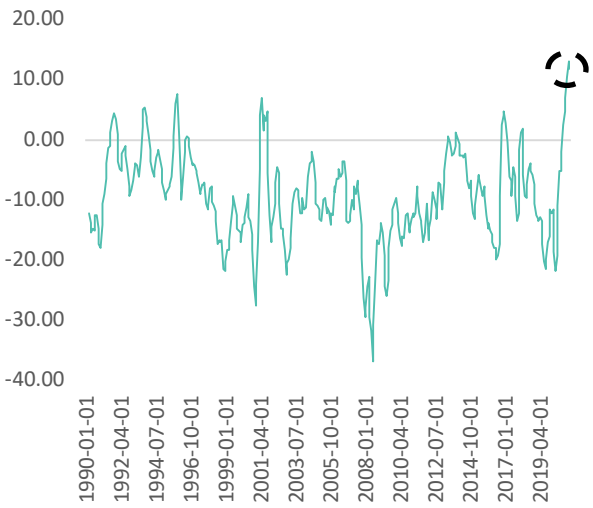
EXHIBIT 99: **Value stocks are being net upgraded at the fastest rate ever: Earnings Revisions Balance for Composite Value – Europe**



Note: Net earnings revisions balance of cheap vs. expensive stocks. Composite Value defined as a blend of P/B, 12-month forward P/E, and Dividend Yield. Universe is the largest 300 stocks in the MSCI Europe. Data as of April 12, 2021.

Source: MSCI, FactSet, and Bernstein analysis

EXHIBIT 100: **Value stocks are being net upgraded at the fastest rate ever: Earnings Revisions Balance for Composite Value – US**



Note: Net earnings revisions balance of cheap vs. expensive stocks. Composite Value defined as a blend of P/B, 12-month forward P/E, and Dividend Yield. Universe is the MSCI US. Data as April 12, 2021.

Source: MSCI, FactSet, and Bernstein analysis

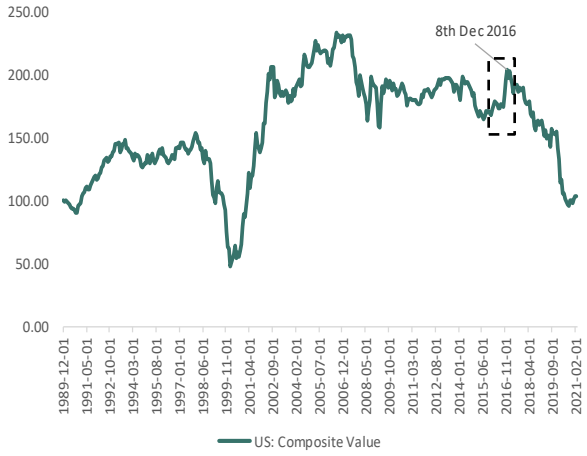
What ended the last Value rally?

Perhaps it is useful to look back at the 2016 Value rally (the most recent meaningful period of outperformance of the factor).[26] In the US, the P/B factor outperformed by 16% (long-short) during September-December 2016. This was abruptly halted by the Fed hiking rates in December 2016. The timing of the ending of the rally coincides exactly with the timing of the first Fed hike on December 14, 2016 (see Exhibit 102), when it increased the target rate by 25bps from 0.375% to 0.625%. Value outperformed in anticipation of the hike and peaked on December 8, 2016 (see Exhibit 101).

Central bank action could again play a crucial role in determining the length of this Value rally. H2 2016 was also a period of rising nominal yields, rising inflation expectations, and a steepening yield curve. Recent language from the Fed has indicated that it does not project rates increasing until beyond 2023. We are not suggesting the Value rally will continue until the next Fed hike (although it could) — but certainly we think there is more ammunition left in the Value trade.

[26] Portfolio Strategy: What will end this Value rally?

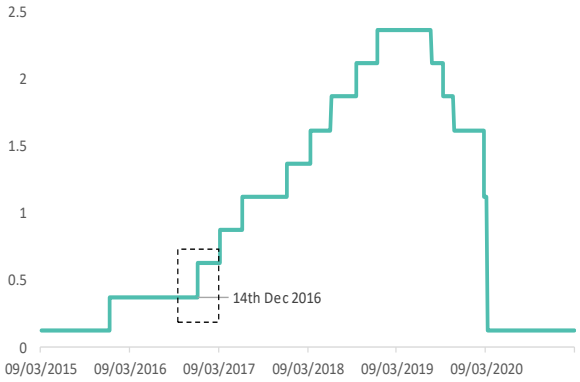
EXHIBIT 101: **Value rally in 2016 was halted by the Fed hike**



Note: Performance of a long-short US P/B factor.

Source: MSCI, FactSet, and Bernstein analysis

EXHIBIT 102: **Fed target rate: 25bps increase in December 2016**



Note: Federal funds target rate midpoint.

Source: Bloomberg and Bernstein analysis

Ammunition left in the Value rotation

Valuation spreads have been persistently widening within the market since the GFC, and have hardly budged despite the Value rotation (see Exhibit 103 to Exhibit 110). In the US, the most expensive quintile of the market (based on a blend of Value measures) trades at 77x 12-month forward earnings, whereas the cheapest quintile trades at 14x (see Exhibit 105). Valuation spreads remain at all-time highs in the US, and close to all-time-highs in Europe.

Value stocks remain the most **uncrowded** part of the market. The Bernstein Crowding factor[27] measures ownership metrics (active bets and trade persistence), sentiment (price momentum and sell-side analyst buy ratings), and high expectations (aggressive earnings forecasts combined with high multiples). Value factors are the least crowded, and Growth factors are the most crowded (see Exhibit 111 and Exhibit 112). Banks and Insurance companies in particular remain uncrowded (see Exhibit 115 and Exhibit 116).

Looking at the crowding of sectors, Value sectors (Energy and Financials) are the most uncrowded sectors (see Exhibit 113 and Exhibit 114).

Earnings estimates for Value stocks have room for further upgrades. In some cases they have not yet reached their pre-pandemic level, e.g., in the Energy, Banks, and Consumer Discretionary sectors (see Exhibit 117). The 12-month forward EPS estimates for the Energy sector are 40% below post-2019 peak, Banks are 30% below in Europe and 10% below their peaks in 2019 in the US.

Value stocks' earnings estimates in Europe (12-month forward) have not yet recovered to their pre-pandemic level; they are still 9% below their pre-pandemic peak (see Exhibit 118). In the US, Value stocks have just recovered to their pre-pandemic level (see Exhibit 119).

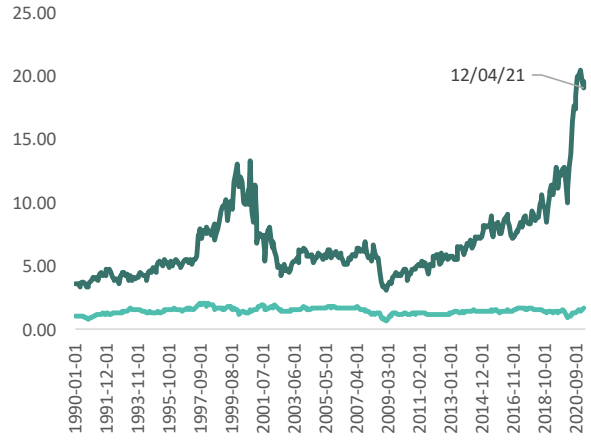
[27] Quantitative Research: Is It Crowded In Here?

This is before considering any further boost to earnings from the continuing improving macro outlook and potentially higher inflationary regime.

Our fundamental analysts also believe there is further earnings upgrade potential in the Banks, Energy, and Auto sectors — for bottom-up fundamental reasons, outside of the top-down macro argument. Our European and US Banks analysts both think there are more earnings upgrades to come through.[28]

This alignment of positive top-down macro conditions and bottom-up fundamental views is a powerful narrative for Value and for further upside from here, despite the already large rotation we have seen.

EXHIBIT 103: **Valuation (P/B) of long and short legs of Composite Value: US**



Note: Median P/B of the top and bottom quintile of a Composite Value factor (blend of P/B, 12-month forward P/E, and Dividend Yield). Universe is the MSCI US.

Source: MSCI, FactSet, and Bernstein analysis

EXHIBIT 104: **Valuation (P/B) of long and short legs of Composite Value: Europe**

Note: Median P/B of the top and bottom quintile of a Composite Value factor (blend of P/B, 12-month forward P/E, and Dividend Yield). Universe is the largest 300 stocks in the MSCI Europe.

Source: MSCI, FactSet, and Bernstein analysis

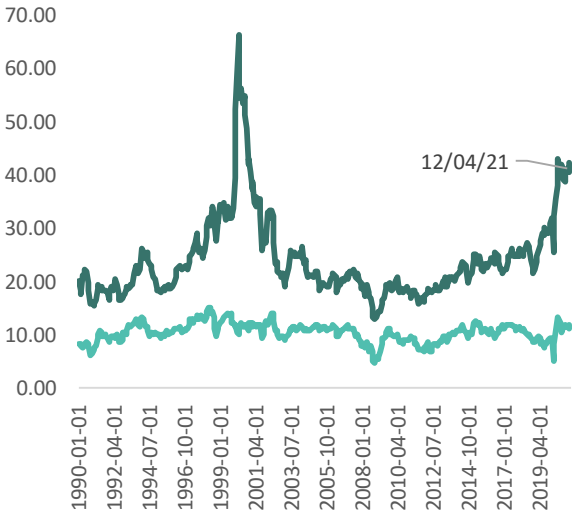
[28] See Autonomous: European Banks - More to Go and Autonomous: US Banks - Will Valuations Start to Matter Now?.

EXHIBIT 105: **Valuation (12-month forward P/E) of long and short legs of Composite Value: US**

Note: Median 12-month forward P/E of the top and bottom quintile of a Composite Value factor (blend of P/B, 12-month forward P/E, and Dividend Yield). Universe is the MSCI US.

Source: MSCI, FactSet, and Bernstein analysis

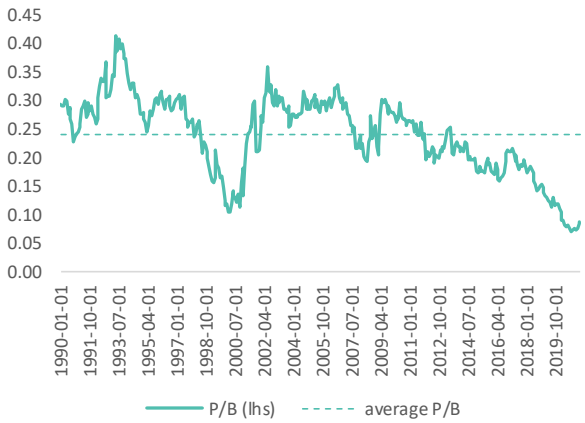
EXHIBIT 106: **Valuation (12-month forward P/E) of long and short legs of Composite Value: Europe**



Note: Median 12-month forward P/E of the top and bottom quintile of a Composite Value factor (blend of P/B, 12-month forward P/E, and Dividend Yield). Universe is the largest 300 stocks in the MSCI Europe.

Source: MSCI, FactSet, and Bernstein analysis

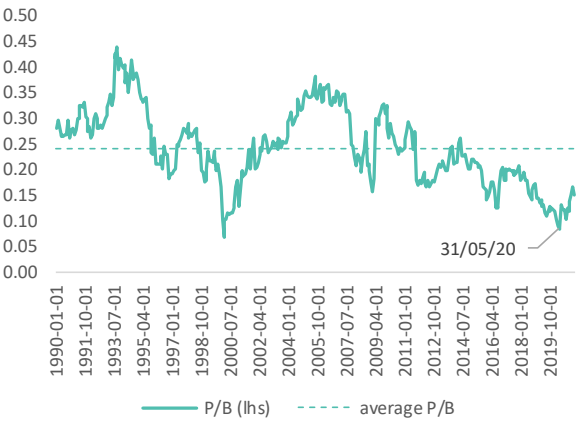
EXHIBIT 107: **US: valuation (P/B) of Composite Value**



Note: Valuation of a Composite Value factor. It shows the ratio of the median P/B of the cheapest quintile to the median P/B of the most expensive quintile for the MSCI US. Stocks are equally weighted within quintiles. Data as of April 12, 2021.

Source: MSCI, FactSet, and Bernstein analysis

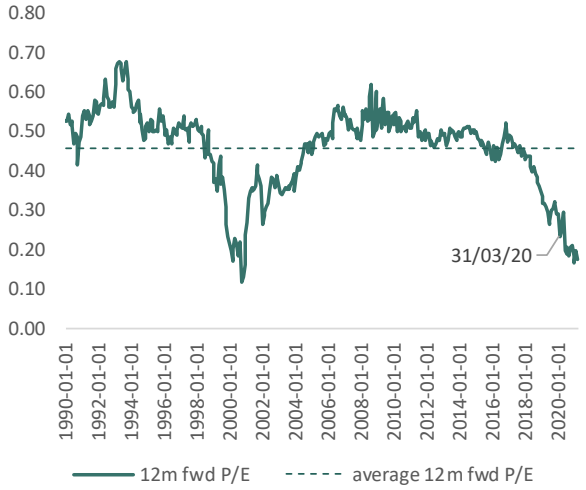
EXHIBIT 108: **Europe: valuation (P/B) of Composite Value**



Note: Valuation of a Composite Value factor. It shows the ratio of the median P/B of the cheapest quintile to the median P/B of the most expensive quintile for the largest 300 stocks in the MSCI Europe. Stocks are equally weighted within quintiles. Data as of April 12, 2021.

Source: MSCI, FactSet, and Bernstein analysis

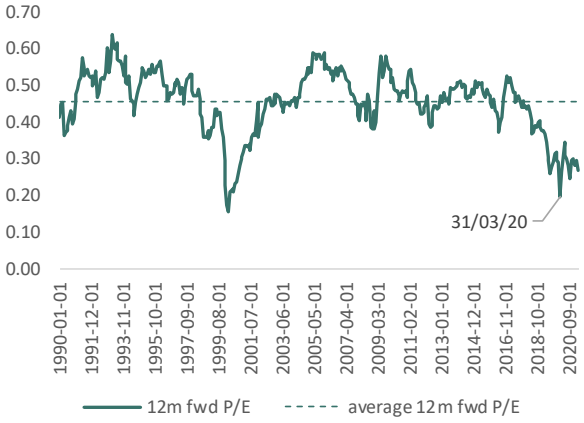
EXHIBIT 109: **US: Valuation (12-month forward P/E) of Composite Value**



Note: Valuation of a Composite Value factor. It shows the ratio of the median 12-month forward P/E of the cheapest quintile to the median 12-month forward P/E of the most expensive quintile for the MSCI US. Stocks are equally weighted within quintiles. Data as of April 12, 2021.

Source: MSCI, FactSet, and Bernstein analysis

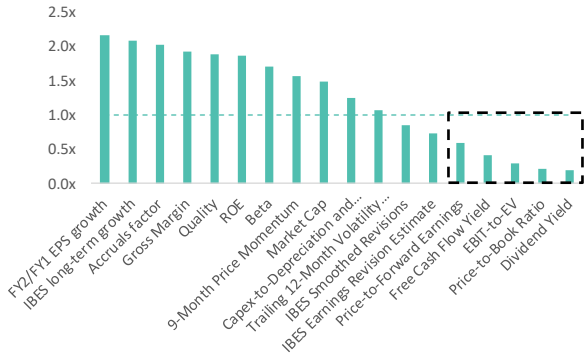
EXHIBIT 110: **Europe: Valuation (12-month forward P/E) of Composite Value**



Note: Valuation of a Composite Value factor. It shows the ratio of the median 12-month forward P/E of the cheapest quintile to the median 12-month forward P/E of the most expensive quintile for the largest 300 stocks in the MSCI Europe. Stocks are equally weighted within quintiles. Data as of April 12, 2021.

Source: MSCI, FactSet, and Bernstein analysis

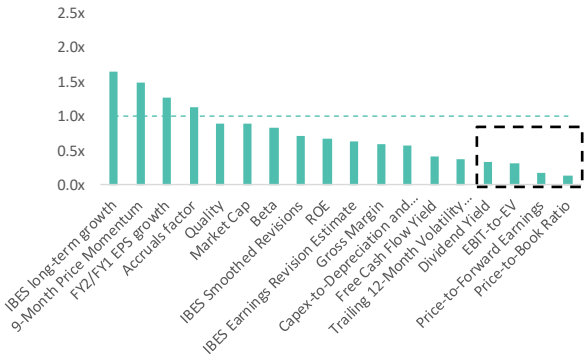
EXHIBIT 111: **Crowding in the US: Value remains the least crowded part of the market**



Note: Data as of April 13, 2021. Percentage of crowded companies as a multiple of random change for the top quintiles (e.g., highest growth, cheapest multiple), largest market cap.

Source: Bernstein US quant team and www.bernsteinresearch.com

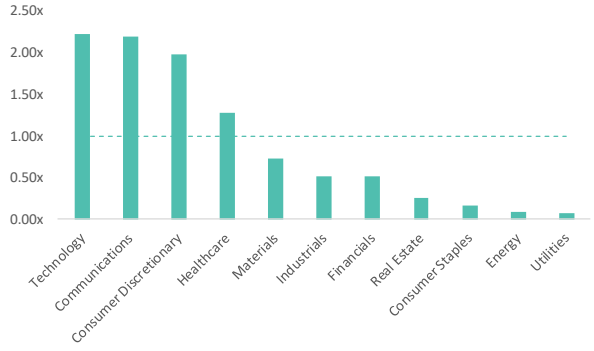
EXHIBIT 112: **Crowding in Europe: Value remains the least crowded part of the market**



Note: Data as of April 13, 2021. Percentage of crowded companies as a multiple of random change for the top quintiles (e.g., highest growth, cheapest multiple) , largest market cap.

Source: Bernstein US quant team and www.bernsteinresearch.com

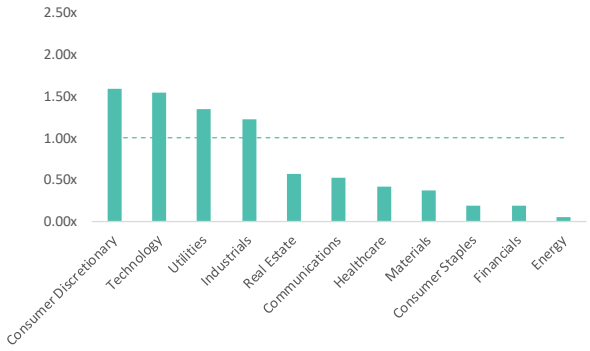
EXHIBIT 113: **US sector crowding: Value sectors are uncrowded**



Note: Data as of April 13, 2021. Percentage of crowded companies as a multiple of random chance grouped by sector.

Source: Bernstein US quant team and www.bernsteinresearch.com

EXHIBIT 114: **Europe sector crowding: Value sectors are uncrowded**



Note: Data as of April 13, 2021. Percentage of crowded companies as a multiple of random chance grouped by sector.

Source: Bernstein US quant team and www.bernsteinresearch.com

EXHIBIT 115: **US: current crowding status of industry groups in comparison with three months ago**

Sorted from Most Crowded to Least Crowded Industry

North America: Current Crowding Status of Industry Groups In Comparison with 3 Months Ago *As of March 2021*						
	% Crowded Market Cap: Industry / Region			% Crowded Stocks: Industry / Region		
Industry Group	**Current**	**3M Ago**		**Current**	**3M Ago**	**Sector**
Technology Hardware & Equipment	2.10x	1.88x	↑	1.39x	1.27x	↑ Technology
Automobiles & Components	1.94x	1.91x	↑	1.23x	1.55x	↓ Consumer Discretionary
Media & Entertainment	1.93x	1.64x	↑	1.15x	1.06x	↑ Communications
Software & Services	1.70x	1.63x	↑	1.45x	1.57x	↓ Technology
Retailing	1.62x	1.67x	↓	1.34x	1.21x	↑ Consumer Discretionary
Food & Staples Retailing	1.37x	1.22x	↑	0.65x	0.60x	↑ Consumer Staples
Semiconductors & Semiconductor Equipment	1.29x	1.50x	↓	2.23x	2.37x	↓ Technology
Health Care Equipment & Services	1.19x	0.84x	↑	1.41x	1.32x	↑ Healthcare
Consumer Durables & Apparel	1.15x	1.07x	↑	1.16x	1.18x	↓ Consumer Discretionary
Commercial & Professional Services	0.61x	0.54x	↑	1.36x	1.25x	↑ Industrials
Telecommunication Services	0.58x	0.54x	↑	0.53x	0.68x	↓ Communications
Food, Beverage & Tobacco	0.56x	0.86x	↓	0.77x	0.77x	→ Consumer Staples
Utilities	0.50x	0.39x	↑	0.43x	0.35x	↑ Utilities
Consumer Services	0.47x	0.50x	↓	1.20x	1.20x	→ Consumer Discretionary
Capital Goods	0.46x	0.42x	↑	1.21x	1.05x	↑ Industrials
Materials	0.46x	0.39x	↑	0.77x	0.83x	↓ Materials
Pharmaceuticals, Biotechnology & Life Sciences	0.46x	0.68x	↓	1.34x	1.37x	↓ Healthcare
Diversified Financials	0.34x	0.20x	↑	0.53x	0.76x	↓ Financials
Real Estate	0.19x	0.21x	↓	0.47x	0.52x	↓ Real Estate
Banks	0.14x	0.08x	↑	0.70x	0.66x	↑ Financials
Energy	0.13x	0.05x	↑	0.29x	0.23x	↑ Energy
Transportation	0.09x	0.07x	↑	0.60x	0.47x	↑ Industrials
Household & Personal Products	0.05x	1.32x	↓	0.79x	0.73x	↑ Consumer Staples
Insurance	0.03x	0.02x	→	0.06x	0.16x	↓ Financials

Note: Concentration of crowding of industries. A level of 2.0x means twice as many industry stocks are in the top quintile of crowding than you would expect by random distribution.

Source: Bernstein US Quant team and Bernstein analysis

EXHIBIT 116: **Europe (DM): current crowding status of industry groups in comparison with three months ago**

Sorted from Most Crowded to Least Crowded Industry

Europe (DM): Current Crowding Status of Industry Groups In Comparison with 3 Months Ago *As of March 2021*							
	% Crowded Market Cap: Industry / Region			% Crowded Stocks: Industry / Region			
Industry Group	Current	3M Ago		Current	3M Ago		Sector
Semiconductors & Semiconductor Equipment	3.78x	3.31x	↑	2.91x	2.92x	↓	Technology
Retailing	2.75x	2.58x	↑	1.50x	1.66x	↓	Consumer Discretionary
Transportation	2.00x	1.25x	↑	1.19x	1.00x	↑	Industrials
Consumer Durables & Apparel	1.83x	1.88x	↓	0.87x	0.97x	↓	Consumer Discretionary
Household & Personal Products	1.69x	1.43x	↑	0.55x	0.50x	↑	Consumer Staples
Capital Goods	1.57x	0.92x	↑	1.25x	1.21x	↑	Industrials
Utilities	1.37x	1.54x	↓	1.18x	1.28x	↓	Utilities
Software & Services	1.26x	0.77x	↑	1.55x	1.56x	↓	Technology
Telecommunication Services	1.15x	0.35x	↑	0.47x	0.41x	↑	Communications
Technology Hardware & Equipment	1.02x	0.77x	↑	2.40x	1.59x	↑	Technology
Automobiles & Components	0.94x	1.48x	↓	0.95x	1.66x	↓	Consumer Discretionary
Media & Entertainment	0.69x	0.54x	↑	1.01x	1.02x	→	Communications
Materials	0.68x	0.80x	↓	1.14x	1.11x	↑	Materials
Health Care Equipment & Services	0.59x	1.42x	↓	1.61x	2.15x	↓	Healthcare
Consumer Services	0.58x	0.06x	↑	0.62x	0.30x	↑	Consumer Discretionary
Diversified Financials	0.58x	0.57x	↑	0.73x	0.67x	↑	Financials
Commercial & Professional Services	0.56x	0.73x	↓	0.73x	0.89x	↓	Industrials
Food & Staples Retailing	0.47x	0.08x	↑	0.82x	0.25x	↑	Consumer Staples
Pharmaceuticals, Biotechnology & Life Sciences	0.44x	1.40x	↓	1.64x	1.55x	↑	Healthcare
Energy	0.33x	0.52x	↓	0.40x	1.04x	↓	Energy
Real Estate	0.29x	0.68x	↓	0.30x	0.38x	↓	Real Estate
Food, Beverage & Tobacco	0.27x	0.20x	↑	0.71x	0.46x	↑	Consumer Staples
Banks	0.20x	0.03x	↑	0.15x	0.06x	↑	Financials
Insurance	0.16x	0.37x	↓	0.30x	0.36x	↓	Financials

Note: Concentration of crowding of industries. A level of 2.0x means that twice as many industry stocks are in the top quintile of crowding than you would expect by random distribution.

Source: Bernstein US Quant team and Bernstein analysis

EXHIBIT 117: **Industry earnings upside: current discount from peak EPS pre-pandemic (since 2019)**

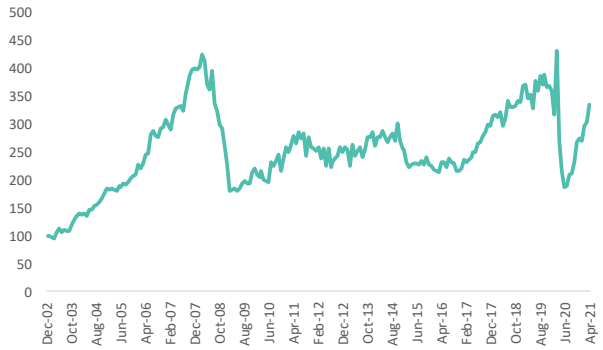
Europe % current to previous peak EPS	
Industry	**Current / Peak EPS**
Cons. Services	0.4
Energy	0.6
Media / Ent	0.7
Retailing	0.7
Banks	0.7
Software	0.8
Real Estate	0.8
Telecom Services	0.9
Transport	0.9
Cap Goods	0.9
Autos	0.9
Food,Bevs, Tobacco	0.9
Prof. Services	0.9
Cons. Durables	1.0
Health Equip/Services	1.0
Pharma / Biotch	1.0
Hhold Personal Products	1.0
Food/Drug Retail	1.0
Utilities	1.0
Insurance	1.0
Tech Hardware	1.0
Diversified Financials	1.0
Materials	1.0
SemiConductors	1.0

US % current to previous peak EPS	
Industry	**Current / Peak EPS**
Cons. Services	0.4
Energy	0.6
Real Estate	0.8
Cap Goods	0.8
Transport	0.9
Banks	0.9
Telecom Services	0.9
Autos	0.9
Food/Drug Retail	1.0
Utilities	1.0
Media / Ent	1.0
Software	1.0
Prof. Services	1.0
Cons. Durables	1.0
Diversified Financials	1.0
Food,Bevs, Tobacco	1.0
Health Equip/Services	1.0
Hhold Personal Products	1.0
Insurance	1.0
Materials	1.0
Pharma / Biotch	1.0
Retailing	1.0
SemiConductors	1.0
Tech Hardware	1.0

Note: MSCI European and US industries with the ratio of Current to Post January 2019 peak earnings. Earnings are 12-month forward IBES consensus EPS. Data as of April 12, 2021.

Source: MSCI, IBES, and Bernstein analysis

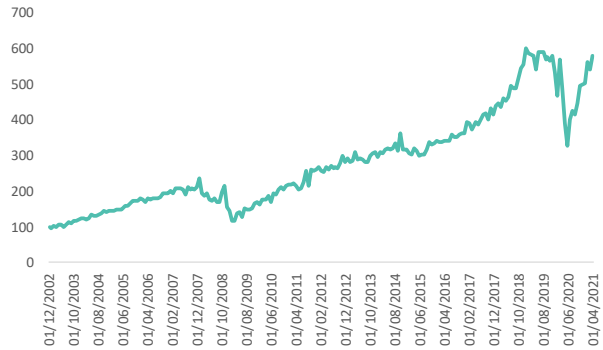
EXHIBIT 118: **Value stocks' earnings estimates (12-month forward) are 9% below pre-pandemic levels: Europe**



Note: Earnings are backed out from the 12-month forward P/E ratio and the performance index of the cheap quintile of stocks from our Europe Composite Value basket. We define Composite Value as screening on an equal-weighted blend of P/B, 12-month forward P/E, and Dividend Yield. Data as of April 13, 2021.

Source: MSCI, IBES, FactSet, and Bernstein analysis

EXHIBIT 119: **Value stocks' earnings estimates (12-month forward) are just back to pre-pandemic levels: US**



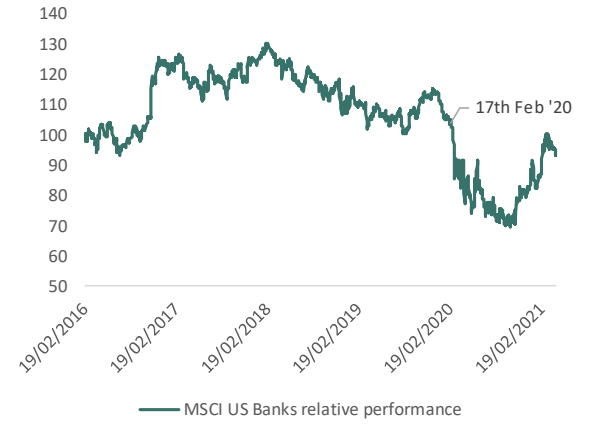
Note: Earnings are backed out from the 12-month forward P/E ratio and the performance index of the cheap quintile of stocks from our US Composite Value basket. We define Composite Value as screening on an equal-weighted blend of P/B, 12-month forward P/E, and Dividend Yield. Data as of April 13, 2021.

Source: MSCI, IBES, FactSet, and Bernstein analysis

Banks stocks are at the heart of the Value trade

While Value is performing across the board, Banks are at the heart of the Value trade, particularly Banks in Europe. While they have staged a strong rally since November last year, they have still not made up for the loss over the past 12 months (see Exhibit 120 and Exhibit 121). We have a tactical long position on Banks and think they can outperform further as part of the Value rotation. They are inherently a short-duration sector and will benefit if yields continue to increase.[29] Bank stocks remain very uncrowded. See the chapter "Banks as the Ultimate Short-Duration Trade?".

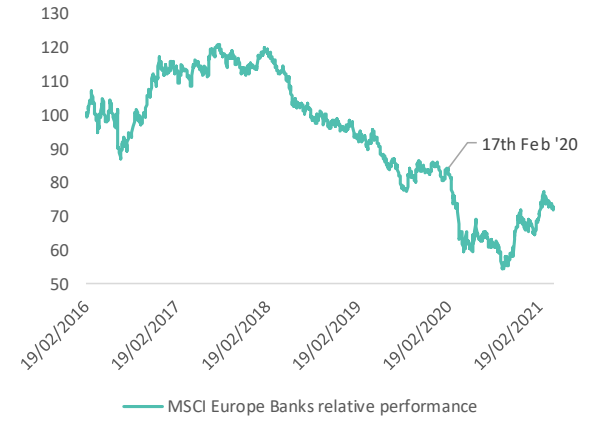
EXHIBIT 120: **US Banks relative performance**



Note: Performance of the MSCI US Banks Index relative to benchmark

Source: MSCI, Bloomberg, and Bernstein analysis

EXHIBIT 121: **European Banks relative performance**



Note: Performance of the MSCI Europe Banks Index relative to benchmark

Source: MSCI, Bloomberg, and Bernstein analysis

[29] Portfolio Strategy: Banks as the ultimate short duration trade?

EXHIBIT 122: **Economic cycle (OECD lead indicator)**

Economic Cycle (OECD lead indicator)

Factor	All Periods	Recession	Recovery	Expansion	Slowdown	t-stat			
US: Composite Value	2.80	6.08	9.99	-7.09	4.77	0.46	1.19	-1.67	0.27
US: Price to Book	0.22	-4.21	17.15	-4.45	-4.73	-0.71	2.66	-0.97	-0.87
US: 12m FWD PE	4.98	9.29	7.32	-3.55	8.76	0.53	0.38	-1.55	0.54
US: DY	-1.35	4.15	-6.68	-8.52	7.52	0.65	-0.92	-1.27	1.19
US: ROE	3.97	12.19	-6.38	0.03	11.16	1.51	-2.37	-1.11	1.75
US: LTG	0.38	-5.13	1.99	8.98	-4.88	-0.67	0.27	1.65	-0.84
US: Internal Growth	1.17	4.73	-5.79	3.84	1.47	0.78	-1.83	0.78	0.07
US: FY0FY3 Growth	-0.54	-11.00	8.55	8.38	-7.33	-1.88	1.72	2.19	-1.20
US: Composite Growth	1.42	-1.12	-0.90	9.60	-3.12	-0.35	-0.41	1.37	-0.70
US: Momentum	2.86	8.20	-12.84	8.79	7.19	0.49	-1.76	0.96	0.63
US: FCF Yield	6.89	15.80	7.70	-1.77	8.04	1.50	0.15	-2.01	0.21
US: Low Vol	-0.67	13.32	-20.84	-7.49	17.04	1.28	-2.66	-1.26	2.65
US: Low Leverage	1.74	0.37	-1.54	11.10	-4.10	-0.18	-0.61	1.56	-1.02
US: Residual Value	1.11	0.76	12.69	-4.09	-3.01	-0.07	2.51	-1.27	-1.02
US: Combined Yield	4.03	13.98	-2.19	-6.11	14.16	1.02	-0.88	-1.74	1.20
US: Combined Sustainable Yield	1.09	11.36	-1.95	-4.78	2.26	2.04	-0.67	-2.25	0.34

Note: Annualized return for factor portfolios in different economic cycles from January 1990 to September 2019. Factor returns are defined as the long-short return of the top-bottom quintile from the 500 largest stocks in the MSCI US index. Portfolios have been rebalanced quarterly and returns are on equal-weighted total return basis. Periods of economic cycles are defined by the normalized seasonally adjusted composite leading indicator from the OECD. The universe of the indicator is based on the OECD + the six major non-member economies. We divide up the world into four phases, with an expansionary level (>100) and positive first differential of the leading indicator being classified as an "expansion," an expansionary level with negative first differential being a "slowdown," a contraction level (<100) and positive first differential being classified as a "recovery," and a contraction level with negative first differential being a "downturn."

Source: MSCI, FactSet, Reuters, and Bernstein analysis

LOW VOLATILITY VULNERABLE TO RISING INFLATION EXPECTATIONS – TACTICAL SHORT

HIGHLIGHTS

- Tactically, we want to short the Low Volatility factor because of rising inflation expectations that have scope to go further. This is a play on reflation and rising nominal yields continuing in the coming quarters and goes hand in hand with our recent tactical upgrade of Value.
- The relationship between Low Volatility performance and inflation expectations has been persistent over the last 20 years — the strategy underperformed during the last two periods of rising inflation expectations in 2016-17 and post the GFC.
- Along with being vulnerable to the reversal in the direction of yields and inflation, Low Volatility stocks are trading at valuation extremes in both Europe and the US. Investors should tactically reduce exposure or short these names as they are likely to underperform over the coming months.
- Longer term and more strategically, Low Volatility stocks have a place in a multi-asset portfolio if high-grade Fixed Income assets deliver negative real returns and become less effective diversifiers of equity risk. We show that an equity Low Volatility trade can have attractive return and diversification properties in a multi-asset portfolio if inflation attains a high level above 3%. It is the *path* to 3% inflation or higher that can be painful for the Low Volatility strategy.

DETAILS

Tactically, we want to short Low Volatility because of rising inflation expectations that have scope to go further. This goes hand in hand with the tactical upgrade of Value.[30] If one believes the move in inflation expectations and yields has further to go, then one should reduce exposure tactically to Low Volatility stocks. Along with being vulnerable to the reversal in the direction of yields and inflation, Low Volatility stocks are trading at valuation extremes in both Europe and the US. Investors should tactically reduce exposure or short these names as they are likely to underperform over the coming months. Exhibit 139 and Exhibit 140 list the top quintile of Low Volatility stocks in Europe and the US, which are rated Market-Perform or Underperform by Bernstein analysts.

Inflation expectations — scope to move higher

The key macro themes coming into 2021 revolve around the path of inflation and yields. Our view is that tactically there is room for inflation and nominal yields to rise further over the coming quarters. This is due to a number of well-documented factors — CPI prints are

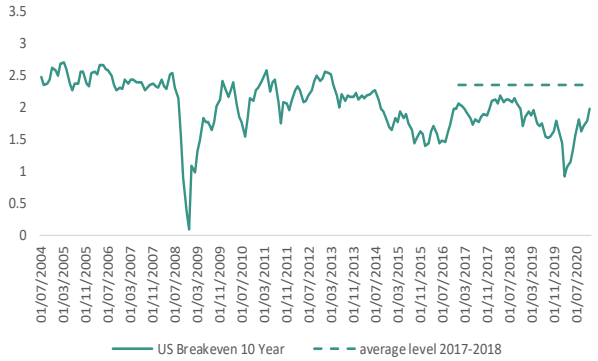
[30] January 5, 2021: Portfolio Strategy: The Market, Sentiment, Value and the Banks

coming off a low base, supply constraints and tight inventory levels, costs of shipping, higher levels of savings implying a pent-up ability to spend, government checks and stimulus, etc.

Aside from these direct short-term effects, there are reasons to believe that higher inflation levels are here for the longer term also: changes in policy direction and the much bigger role of government presence on both Wall Street and main street (which will be hard to reverse), the need to inflate away government debt, and the retreat from globalization.

Forward-looking market-based inflation expectations have been rising steadily since H2 2020. The US 5Y5Y is at 2.3% and in Europe is at 1.3% — both back at 2019 highs. However, there is scope to go further — even just to get back to inflation expectations levels of 2017-18 (see Exhibit 123 and Exhibit 124). The higher inflation expectations in 2017-18 were partially driven by tax reforms in the US — which could reverse, given the new administration. However, the opposing forces listed earlier, we believe, are bigger and longer lasting than this.

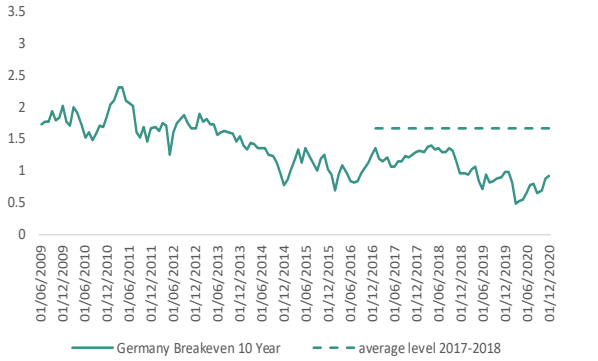
EXHIBIT 123: **Market based inflation expectation levels – US; room to go further**



Note: Level of US 10-year breakeven rate

Source: Bloomberg and Bernstein analysis

EXHIBIT 124: **Market based inflation expectation levels – Europe; room to go further**



Note: Level of German 10-year breakeven rate

Source: Bloomberg and Bernstein analysis

Low Volatility has a negative relationship with expected levels of inflation and bond yields (nominal and real)

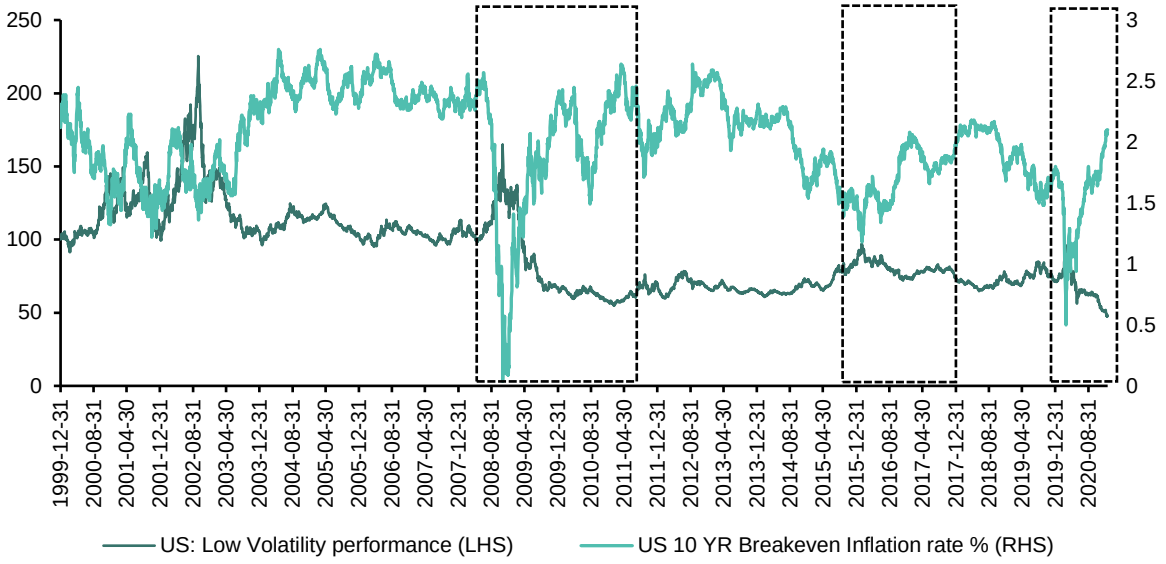
Rising inflation expectations and yields hurt Low Volatility strategies. During previous periods of increasing inflation expectations (2016-17) and post the GFC, Low Volatility strategies underperformed (see Exhibit 125). The direction of inflation expectations and the performance of Low Volatility are almost a mirror image of each other. This is intuitive — in these periods, rising inflation expectations were accompanied by macro recoveries, rising yields, and outperforming cyclical stocks.

This relationship has been persistent over the last 20 years. Exhibit 126 and Exhibit 127 show the persistent negative correlation between performance of Low Volatility and inflation expectations over the past 20 years.

It is important to note that during the most recent 20 years, inflation levels were clearly contained (<3%). If inflation was to rise rapidly to higher levels in the next few quarters and be seen to be "out of control," then this would be a much different situation, and from that point Low Volatility could strategically be a defensive play to have in the portfolio (see Exhibit 138).

Low Volatility also naturally has a negative relationship with yields (nominal and real) — and previous bouts of underperformance of the strategy were accompanied by rising nominal yields (see Exhibit 128 to Exhibit 130).

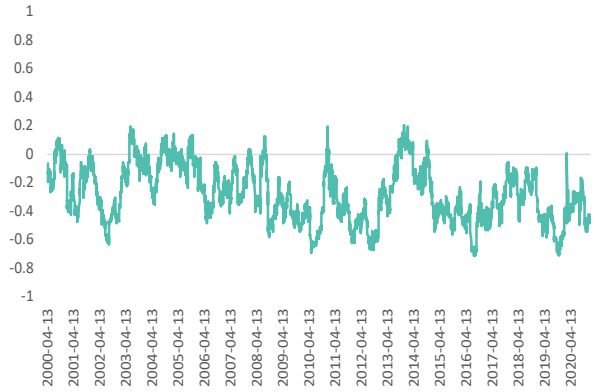
EXHIBIT 125: **Low Volatility underperformed during previous periods of increasing inflation expectations – during 2016-17 and post the GFC**



Note: Performance of a US Low Volatility long-short strategy alongside the US 10-year Breakeven Inflation rate. Low Volatility is defined as 12-month trailing standard deviation of stock returns.

Source: MSCI, Thomson Reuters, and Bernstein analysis

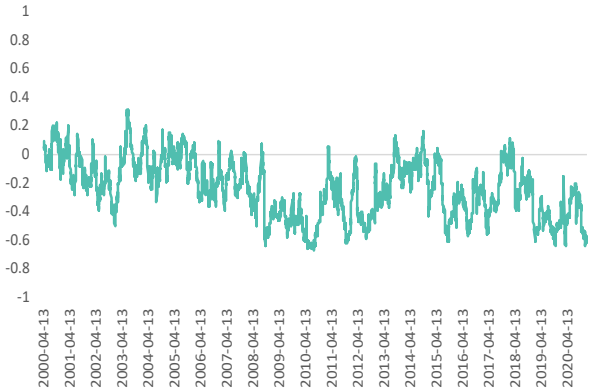
EXHIBIT 126: **Low Volatility has a negative relationship with inflation expectations – US: correlation of Low Volatility in the US with inflation expectations**



Note: Correlation between daily returns for a long-short US Low Volatility factor and daily changes in the level of the US 10-year breakeven inflation rate, using a rolling 60-day window.

Source: MSCI, Thomson Reuters, and Bernstein analysis

EXHIBIT 127: **Low Volatility has a negative relationship with inflation expectations – Europe: correlation of Low Volatility in Europe with inflation expectations**



Note: Correlation between daily returns for a long-short European Low Volatility factor and daily changes in the level of the US 10-year breakeven inflation rate, using a rolling 60-day window.

Source: MSCI, Thomson Reuters, and Bernstein analysis

EXHIBIT 128: **Low Volatility also has a persistent negative relationship with yields – both nominal and real**

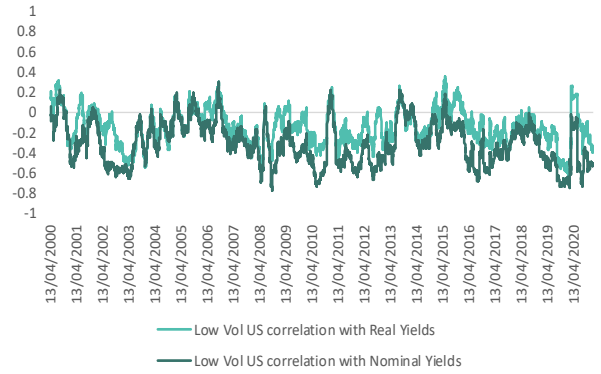
	US	
	Correlation of Low Volatility with Nominal Yields	Correlation with Real Yields
Average	-0.30	-0.14
Current	-0.52	-0.37

	Europe	
	Correlation of Low Volatility with Nominal Yields	Correlation of Low Volatility with Real Yields
Average	-0.30	-0.18
Current	-0.63	-0.40

Note: Average and current level of correlation between a Low Volatility strategy vs. nominal and real US 10-year yields. Using daily data with a 60-day lookback window, data starting in 2000.

Source: MSCI, Thomson Reuters, and Bernstein analysis

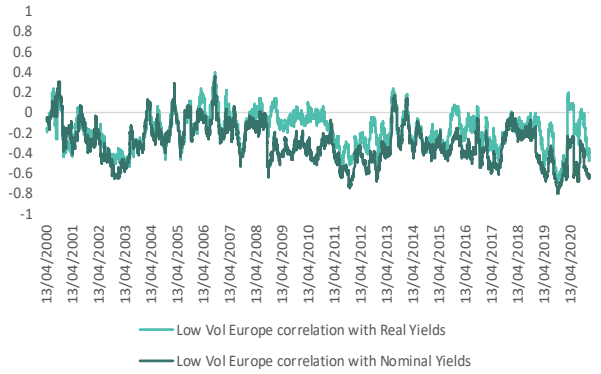
EXHIBIT 129: **Correlation of Low Volatility US with Nominal and Real Yields**



Note: Correlation between daily returns for a long-short US Low Volatility factor and daily changes in the level of the US 10-year government bond yield (nominal and real), using a rolling 60-day window.

Source: MSCI, Thomson Reuters, and Bernstein analysis

EXHIBIT 130: **Correlation of Low Volatility Europe with Nominal and Real Yields**



Note: Correlation between daily returns for a long-short European Low Volatility factor and daily changes in the level of the US 10-year government bond yield (nominal and real), using a rolling 60-day window.

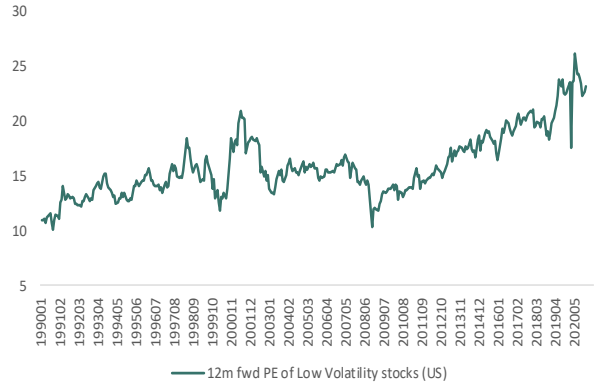
Source: MSCI, Thomson Reuters, and Bernstein analysis

Are Low Volatility stocks expensive? Yes, at all-time-highs

Low Volatility stock valuations are at historical extremes. Both in Europe and the US, the quintile of stocks that have had the lowest volatility over the past 12 months are trading at extremes. In Europe — the highest ever — with an average forward-looking P/E of 23.5, and in the US, at almost an all-time-high of 22.6. Note the valuation spreads on a sector-neutral basis for each region have a similar profile.

We know valuations alone are clearly not a catalyst for reversal. Since the GFC, Low Volatility stocks have been becoming more and more expensive — in line with the equity market in general. A reversal of the macro trend of falling yields, which has supported this rerating, plus a continued move upward in the direction of inflation expectations make Low Volatility stocks vulnerable to further underperformance (see Exhibit 131 and Exhibit 132).

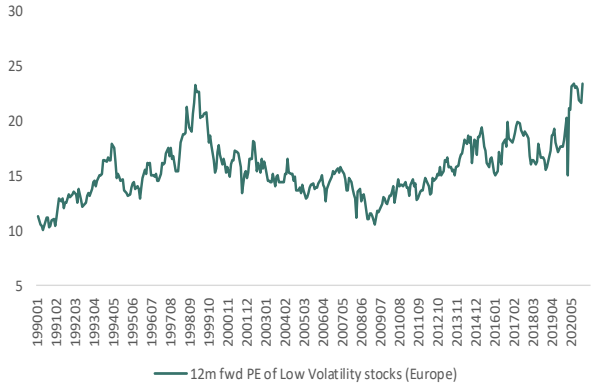
EXHIBIT 131: **12-month forward P/E of Low Volatility stocks: US**



Note: Median 12-month forward P/E for the top quintile of Low Volatility stocks. Universe is the MSCI US, rebalanced quarterly.

Source: MSCI, FactSet, and Bernstein analysis

EXHIBIT 132: **12-month forward P/E of Low Volatility stocks: Europe**



Note: Median 12-month forward P/E for the top quintile of Low Volatility stocks. Universe is the largest 300 stocks in the MSCI Europe, rebalanced quarterly.

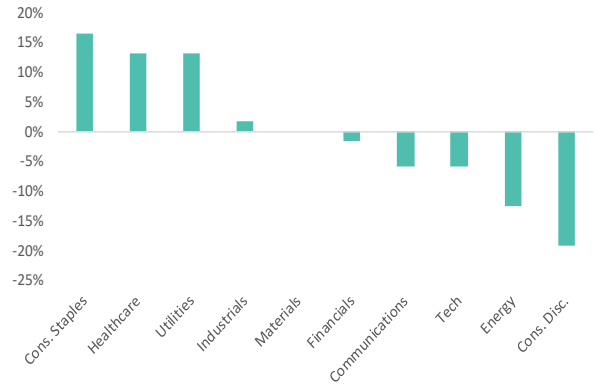
Source: MSCI, FactSet, and Bernstein analysis

What is the sector exposure of Low Volatility now?

In the US, Low Volatility stocks are concentrated in Consumer Staples, Healthcare, and Utilities. In Europe, similarly, they are concentrated in Consumer Staples, Healthcare, and Materials. The group of low volatility stocks is short Energy and Consumer Cyclicals in both regions. Being short Low Volatility aligns with the tactical long call we have on Value.

Note that strategically and longer term, we like Consumer Staples. We also like it in a multi-asset perspective as a replacement for high-grade Fixed Income. However, if a reflation trade is the dominant leading force in H1 2021 with Banks in the lead, then the sector will underperform tactically from an equity fund perspective (see Exhibit 133 to Exhibit 135).

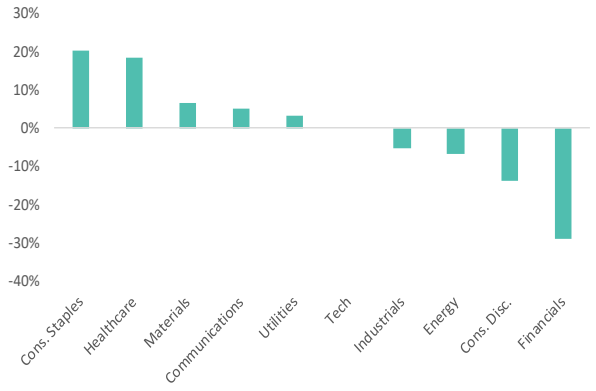
EXHIBIT 133: **Sector exposure US**



Note: Net sector exposure of a long-short Low Volatility strategy in the US as of end December 2020. Universe is the MSCI US.

Source: MSCI, FactSet, and Bernstein analysis

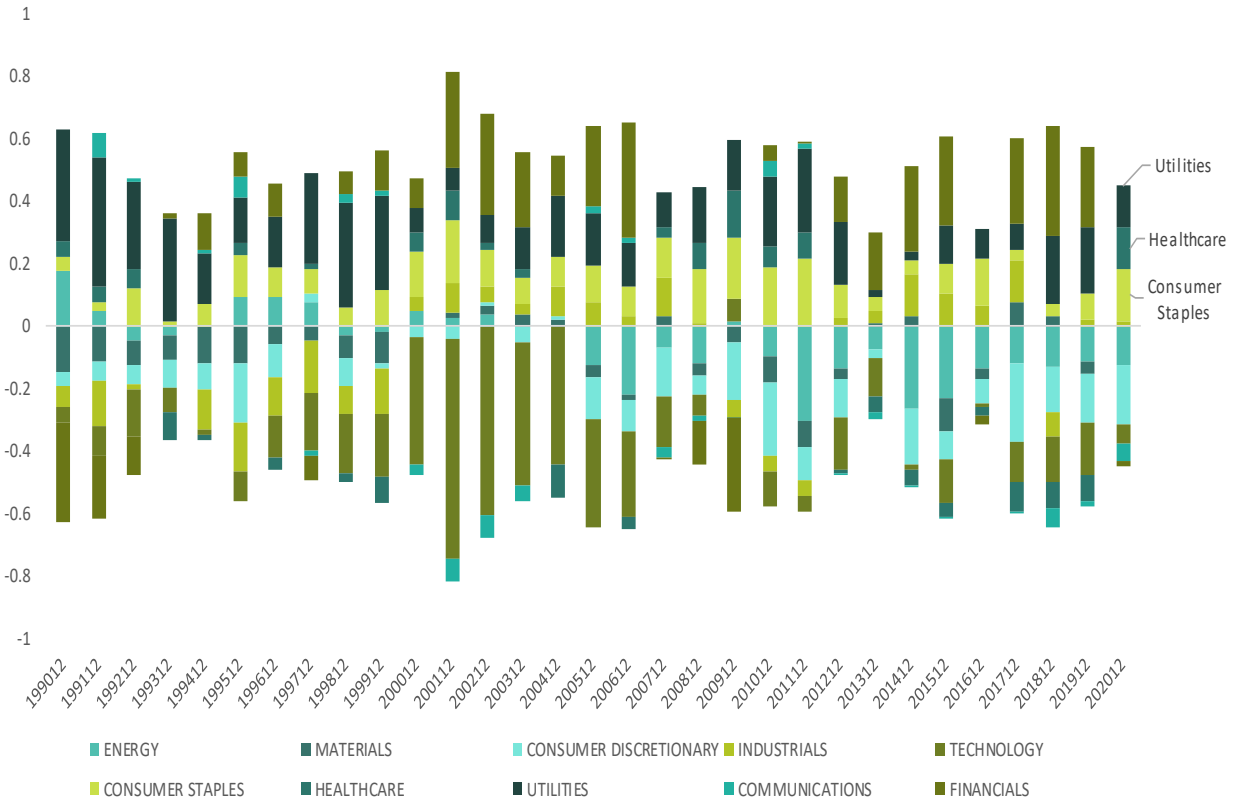
EXHIBIT 134: **Sector exposure Europe**



Note: Net sector exposure of a long-short Low Volatility strategy in Europe as of end December 2020. Universe is the largest 300 stocks in the MSCI Europe.

Source: MSCI, FactSet, and Bernstein analysis

EXHIBIT 135: **Historical composition of Low Volatility factor (long-short) in the US**



Note: Net sector exposures of a long-short Low Volatility factor historically. Low Volatility defined as trailing 12-month standard deviation of price. Universe is the MSCI US. Quarterly rebalance.

Source: MSCI, FactSet, and Bernstein analysis

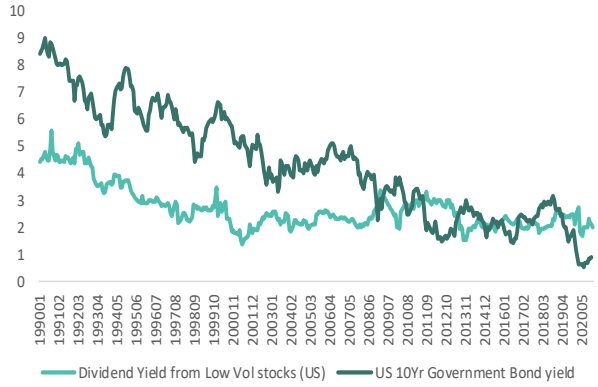
More strategically and on a longer-term horizon, we think Low Volatility equities have a place in multi-asset portfolios as a replacement for high-grade Fixed Income. It can also play a role as a hedge against rapidly rising or "out of control" inflation. This view is much longer term in nature than the tactical call (six to 12 month horizon) to sell Low Volatility stocks.

More *strategically*, we think a long position in Low Volatility warrants a place in a multi-asset portfolio as a substitute for high-grade Fixed Income. The dividend yield from these stocks has been relatively stable, averaging at 2.4% in the US and 3.1% in Europe over the past 10 years (see Exhibit 136 and Exhibit 137). Even if the dividends do not recover to pre-pandemic levels, the spread of yield vs. that on government bonds is stark. Asset owners may be forced to shift into Low Volatility equities as a replacement of part of the Fixed Income portion of their portfolio. This would give support to Low Volatility equities on a longer term and more strategic basis.

Also, while this is not our base case assumption, Low Volatility in a portfolio plays a hedge as a diversifier. Once inflation reaches a high level (e.g., above 3%) then Low Volatility can

have an important role to play.[31] Exhibit 138 shows the risk-return and diversification levels of various assets in past periods where inflation was higher than 3% (since the 1970s). Low Volatility equities stand out as the asset with the most negative correlation to equities.

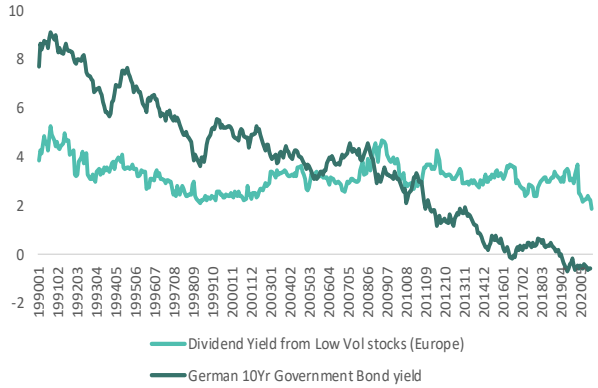
EXHIBIT 136: **Yield differential between US Low Volatility stocks and US 10-year bond yield**



Note: Median dividend yield of the lowest volatility stocks (Q1) in the MSCI US alongside the nominal yield on the US 10-year government bond.

Source: MSCI, Thomson Reuters, and Bernstein analysis

EXHIBIT 137: **Yield differential between European Low Volatility stocks and German 10-year bond yield**

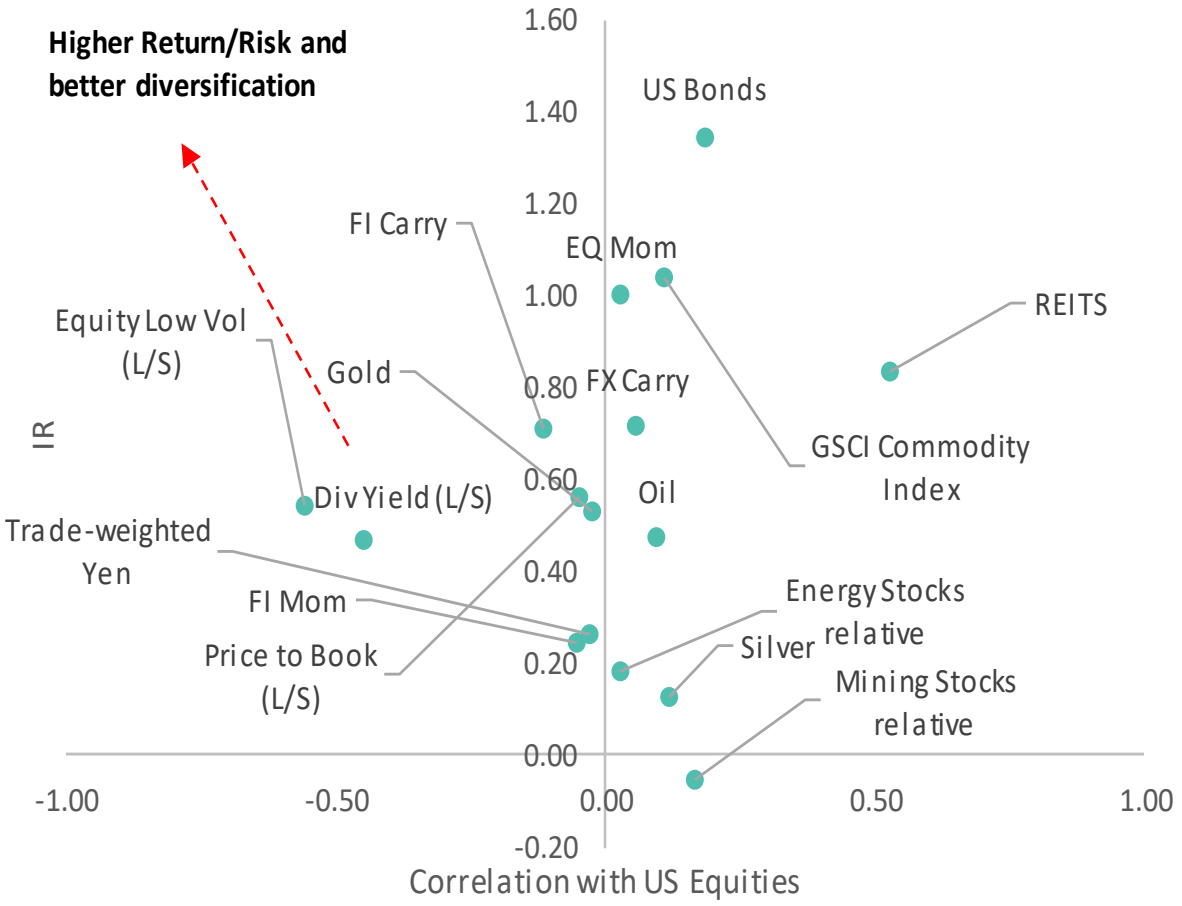


Note: Median dividend yield of the lowest volatility stocks (Q1) in the MSCI Europe (largest 300 stocks) alongside the nominal yield on the German 10-year government bond.

Source: MSCI, Thomson Reuters, and Bernstein analysis

[31] September 2, 2020: Portfolio Strategy: Inflation, investing and the coming of MMT

EXHIBIT 138: **Return/Risk vs. correlation with equities when inflation >3%**



Note: Correlation is calculated as average 12-month rolling correlation with US equities based on monthly returns.
IR is calculated as YOY return of the asset divided by annualized standard deviation.
Returns for Energy, REITS, and Metals & Mining are from 1974, returns for FX Carry are from 1975, and returns for GSCI Commodity index and Oil are from 1971.
Equity PBK, Dividend Yield, Momentum, Low Variance, Low Residual Variance and FI Momentum, and FI Carry and FX Carry factor strategy returns are Long-Short.
Energy and Metals & Mining sector returns are relative to broader US equity market.

Source: AQR, Ken French database, Datastream, and Bernstein analysis

EXHIBIT 139: **European Low Volatility stocks rated Underperform or Market-Perform by Bernstein analysts**

REGION	SECTOR	COMPANY	IBES ESTIMATED LONG TERM GROWTH RATE	12M FWD P/E	BERNSTEIN ANALYST RATING
EUR	CONSUMER DISCRETIONARY	HERMES INTERNATIONAL	18.3%	60.3	M
EUR	CONSUMER STAPLES	BEIERSDORF	9.0%	30.7	M
EUR	CONSUMER STAPLES	HENKEL STAMM	-2.3%	20.2	M
EUR	HEALTHCARE	STRAUMANN HOLDING	19.8%	56.9	M
EUR	HEALTHCARE	MERCK KGAA STAMM	8.8%	21.6	M
EUR	MATERIALS	GIVAUDAN	9.0%	40.2	U
EUR	MATERIALS	KONINKLIJKE DSM	14.6%	30.5	U
EUR	UTILITIES	ENDESA	62.7%	13.5	M
EUR	UTILITIES	SNAM	2.4%	13.2	M

Note: Low Volatility is defined as 12-month trailing standard deviation of stock returns. Universe is the largest 300 stocks in the MSCI Europe, rebalanced quarterly.
O= Outperform rating, M= Market-Perform rating, U = Underperform rating (as of May 5, 2021). Further details of the research and important disclosures of the above covered securities are available on Bernstein Research website: www.bernsteinresearch.com

Source: MSCI, FactSet, and Bernstein analysis

EXHIBIT 140: **US Low Volatility stocks rated Underperform or Market-Perform by Bernstein analysts**

REGION	SECTOR	COMPANY	IBES ESTIMATED LONG TERM GROWTH RATE	12M FWD P/E	BERNSTEIN ANALYST RATING
US	COMMUNICATIONS	AT&T	1.0%	9.4	M
US	COMMUNICATIONS	VERIZON COMMUNICATIONS	3.0%	11.4	M
US	CONSUMER DISCRETIONARY	DOLLAR GENERAL CORP	13.6%	22.9	M
US	CONSUMER STAPLES	PROCTER & GAMBLE CO	9.1%	23.4	M
US	CONSUMER STAPLES	PHILIP MORRIS INTL	10.9%	15.4	M
US	CONSUMER STAPLES	KIMBERLY-CLARK CORP	3.7%	17.8	M
US	CONSUMER STAPLES	HERSHEY CO (THE)	7.6%	23.9	M
US	CONSUMER STAPLES	CONAGRA BRANDS	6.3%	14.3	M
US	CONSUMER STAPLES	COSTCO WHOLESALE CORP	8.6%	36.1	U
US	CONSUMER STAPLES	COLGATE-PALMOLIVE	7.5%	24.5	U
US	CONSUMER STAPLES	JM SMUCKER CO	-0.4%	14.9	U
US	CONSUMER STAPLES	GENERAL MILLS	4.2%	16.4	U
US	CONSUMER STAPLES	PEPSICO	9.3%	23.5	U
US	CONSUMER STAPLES	CAMPBELL SOUP	1.4%	15.9	U
US	CONSUMER STAPLES	KELLOGG CO	2.9%	15.7	U
US	HEALTHCARE	BRISTOL-MYERS SQUIBB CO	7.4%	8.7	M
US	INDUSTRIALS	PACCAR	22.2%	16.8	M
US	INDUSTRIALS	CATERPILLAR	-1.1%	28.1	M
US	INDUSTRIALS	NORFOLK SOUTHERN CORP	13.9%	24.2	M
US	TECHNOLOGY	TEXAS INSTRUMENTS	10.0%	28.9	M

Note: Low Volatility is defined as 12-month trailing standard deviation of stock returns. Universe is the MSCI US, rebalanced quarterly.
O= Outperform rating, M= Market-Perform rating, U = Underperform rating (as of May 5, 2021). Further details of the research and important disclosures of the above covered securities are available on Bernstein Research website: www.bernsteinresearch.com

Source: MSCI, FactSet, and Bernstein analysis

BANKS AS THE ULTIMATE SHORT-DURATION TRADE?

HIGHLIGHTS

- We have made the point in this *Blackbook* that investors have a duration problem. The movement up in yields has so far played out in the rotation from Growth to Value, but ultimately we think it has more impact still to come on the shape of portfolios. We make the case that Banks are fundamentally a short-duration asset and so can play a role in the rebalancing of portfolios.
- Banks have outperformed, but we think that yields have still further to rise and so there is scope for further outperformance.
- We compare the short-duration nature of Banks to gold, which is potentially another very short-duration trade. While there are some similarities, there is a huge difference in the pro-cyclical nature of Banks that means they can benefit from the ongoing cyclical upswing and gives them positive exposure to any potential upward move in real yields as opposed to just inflation.

DETAILS

We make the point in the chapter "Why the World Has a Duration Problem" that investors face a massive duration problem. The move up in bond yields over the last six months — and a more recent move in real yields — has played out in the rebound in Value over Growth stocks. We think there is further to go in this rotation, but also in a cross-asset sense the reallocation of assets might only have just begun. We think there is a good chance that demand for short-duration assets might significantly increase, and we make the case in this chapter that Banks could see significant support in the process.

The background to the trade is the case for why bond yields and inflation will likely move higher. We have covered the case for this in our more strategic chapter "Six Books for the Post-Pandemic World." Beyond the reopening jump in inflation in 2021, we think it is likely inflation will remain above the pre-pandemic level mainly because of the fundamental shift in the policy environment and policy options are available. This outlook for even moderately higher inflation has huge implications for equity and cross-asset portfolios.

Value trades tend to be short duration. The stocks that make up such trades are higher yield and so in a discounted cash flow analysis, more of their NPV is made up from cash flows that are in the near future. The other way of thinking about this is that many Value stocks tend to be in highly cyclical industries where it is fundamentally hard to make an N-year ahead forecast for cash flows, so more of their forecastable value lies in the near future. The other kind of Value stock tends to be in heavily regulated industries such as part of the Utilities sector where growth tends to be low. There are such things as potentially longer-duration Value trades, but these tend to be more idiosyncratic turnaround stories.

The Banks sector tends to feature prominently in Value trades. In fact, Financials have been overweight in our Composite Value factor in the US and Europe every year since 1990. If investors need to shorten the duration of their portfolios and buy more Value exposure, then Banks seem a natural part of that.

In Exhibit 141, we show a ranking of empirical duration of factors and assets (i.e., the first derivative of the price of the asset with respect to yields). Here, a negative sign is long duration in the conventional sense and vice versa. The shortest duration assets on this basis are gold, equity value real estate, equity cash flow yield, and fixed income carry. Banks also screen as short duration, and shorter duration than equities overall.

EXHIBIT 141: **Empirical duration of assets and factors vs. 10-year yield**

Duration (10 year yield)	beta (historic)	t-stat (historic)	beta (last 10y)	t-stat (last 10y)
10 year US Government Bonds	-7.31	-17.27	-9.50	-49.08
US Credit	-5.13	-11.25	-4.14	-8.31
US Low Vol (LS)	-4.15	-2.73	-4.09	-0.97
US Equity Income (LO)	-2.15	-1.80	10.86	4.80
US Equity	-1.50	-1.32	4.90	4.43
US Banks (relative)	-1.04	-1.11	11.80	5.06
US REITS (relative)	-0.62	-0.41	-6.59	-2.68
US Value (LS)	-0.07	-0.07	5.67	2.43
Fixed Income Carry (LS)	0.05	0.14	3.08	3.10
Fixed Income Value (LS)	0.52	1.25	1.19	0.85
US Equity Cashflow (LO)	0.56	0.30	17.51	6.73
US Real Estate	0.96	2.88	3.37	5.55
US Equity Value (LO)	1.29	0.66	15.86	6.03
Gold	3.26	1.20	-13.40	-5.81

Note: Results from a regression of nominal asset and factor returns YOY against YOY change in US 10-year government bond yield for 1950-2020. Equity factor returns are from Ken French database, fixed income factors are from AQR, US real estate returns are from Robert Shiller's database, US credit is the ICE BofA US Corporate Index, gold series is from 1970, Banks, REITS, and credit series are from 1973, and equity cash flow series is from 1963.
The t-stat is the Newey-West t-stat adjusted for auto-correlation

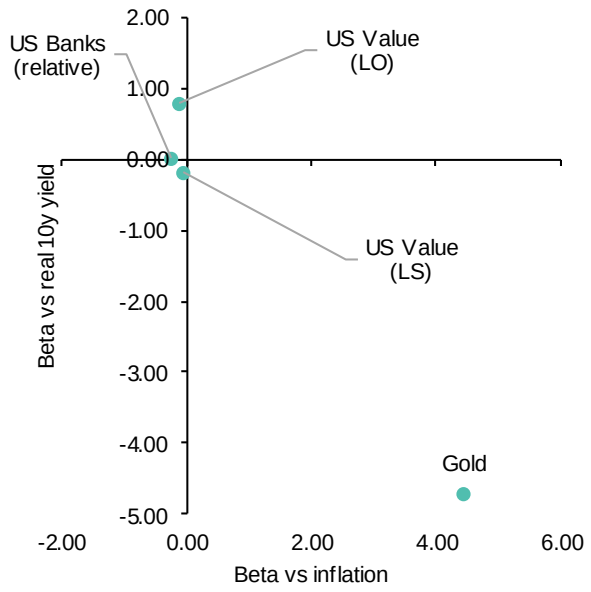
Source: AQR, Datastream, Ken French database, Robert Shiller's database, FRED, GFD, and Bernstein analysis

So, banks are empirically part of the short-duration Value trade. But we argue they are also *fundamentally* short duration in an even more emphatic way than other Value stocks. Their very profitability is linked to the level of short-term yields and also the steepness of the curve. In this sense, there are two kinds of maximally short-duration trades, one is to hold gold (or possibly crypto), where there is no cash flow at all, or else Banks, where profitability is positively linked to the level of short-term rates and the steepness of the curve.

In Exhibit 142 and Exhibit 143, we show the sensitivity of Value, Gold, and Banks to real yields and inflation since 1970 and over the last 10 years. It is estimated from a regression of nominal YOY returns against the YOY change in US 10-year real bond yields (or10-year TIPS) and YOY change in the US CPI index (or the 10-year breakeven rate).

On this basis, gold is attractive and gives a positive return as inflation rises, but is hurt by rising real yields. One can think of this as real yields being a proxy for future real growth, and as that picks up, gold is less attractive. Banks respond well to both nominal and real yields rising. After all, beyond their link to the path of yields, in very basic terms, they are clearly pro-cyclical assets and benefit from an upswing in economic activity.

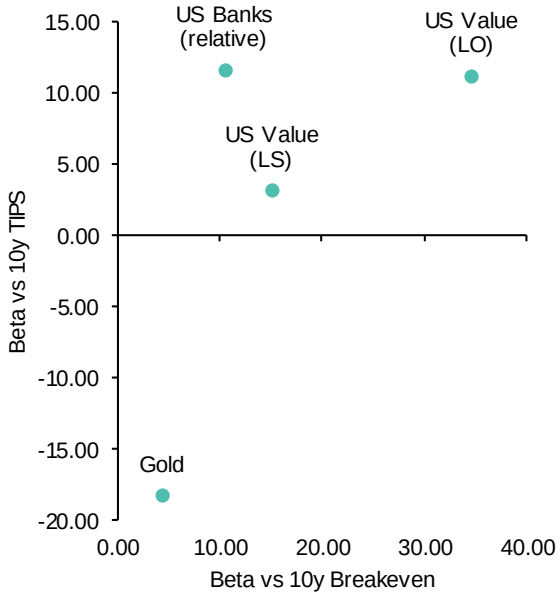
EXHIBIT 142: **Returns vs. real yields and inflation (1970-2020)**



Note: Beta from regression of assets shown vs. real yields and inflation.

Source: Ken French database, Datastream, and Bernstein analysis

EXHIBIT 143: **Returns vs. real yields and inflation expectations (2010-20)**



Note: Beta from regression of assets shown vs. real yields and inflation.

Source: Ken French database, Datastream, and Bernstein analysis

As we mentioned at the beginning of this chapter, our view is that inflation finds a new equilibrium level above the pre-pandemic level. We also think it is likely that real yields remain low. Both Banks and Gold could do well in such an environment. There is certainly a possibility that real yields could rise somewhat if inflation moved significantly higher (not our central case). In this circumstance, Banks would continue to perform very well; our Autonomous colleagues refer to this as the "Goldilocks" scenario for banks (see: Global Banks: Inflation Winners, 6 July 2020).

We show in Exhibit 144 and Exhibit 145 that Banks in the US and Europe have a highly significant positive exposure to both nominal and real yields, whether expressed as distinct univariate regressions or as a single bivariate regression.

Banks and the Value factor have outperformed significantly this year. But in the scheme of things this is not a large move. The scale of the outperformance is comparable to that of the brief Value rally of 2016 (see Exhibit 146 and Exhibit 147) and valuation spreads are still very wide. But this time the stakes are so much larger. We are faced with a significant reopening trade with fiscal stimulus in addition. Moreover, there has been possibly the most material change to the policy environment in decades, creating a realistic possibility of a structural shift toward higher inflation.

If yields are rising, Value and Banks have further to go.

EXHIBIT 144: **US Banks relative monthly returns regressed against monthly changes in bond yield, breakevens, TIPS yield, and yield curve (10y-3m)**

		Summary			
Period	Variable	INT	BY chg	TIPS chg	BE Chg
10 year	BY Only	0.02	10.57		
	t-stat	0.07	5.48		
10 year	TIPS Only	0.07		14.11	
	t-stat	0.20		6.81	
10 year	TIPS, Breakeven	0.10		15.04	13.91
	t stat	0.35		8.35	6.34

Note: Regressions of monthly relative returns of DS Banks index (relative to market) vs. nominal 10-year US bond yields (in the last 10 years) and monthly changes in US 10-year TIPS yield, US 10-year breakevens, and US 10-year-three-month yield curve.

Source: Datastream, Bloomberg, and Bernstein analysis

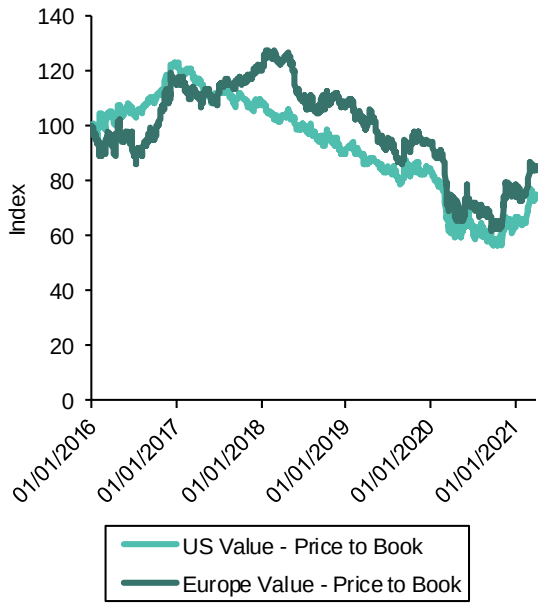
EXHIBIT 145: **Europe Banks relative monthly returns regressed against monthly changes in bond yield, breakevens, TIPS yield, and yield curve (10y-3m)**

		Summary			
Period	Variable	INT	BY chg	TIPS chg	BE Chg
10 year	BY Only	-0.39	6.79		
	t-stat	-1.22	3.96		
10 year	TIPS Only	-0.41		5.82	
	t-stat	-1.24		2.92	
10 year	TIPS, Breakeven	-0.38		6.58	11.19
	t stat	-1.27		3.61	5.05

Note: Regressions of monthly relative returns of DS Banks index (relative to market) vs. nominal 10-year US bond yields (in the last 10 years) and monthly changes in US 10-year TIPS yield, US 10-year breakevens, US 10-year-three-month yield curve.

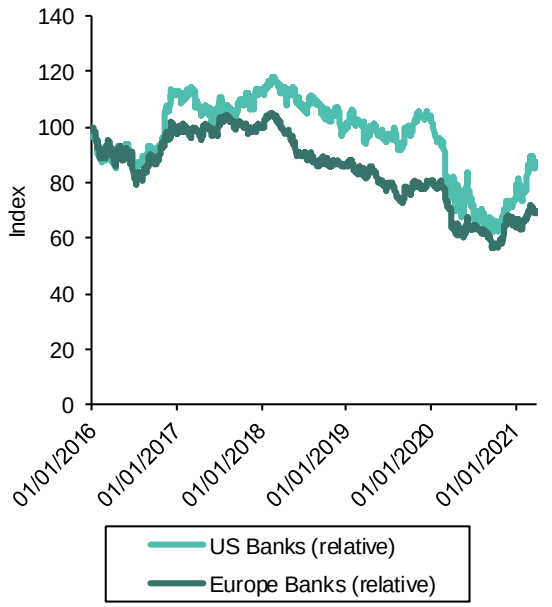
Source: Datastream, Bloomberg, and Bernstein analysis

EXHIBIT 146: **Europe and US Value (P/B) performance**



Source: Datastream, FactSet, and Bernstein analysis

EXHIBIT 147: **Europe and US Banks relative performance**



Source: Datastream, FactSet, and Bernstein analysis

A DIALOGUE CONCERNING CRYPTOCURRENCIES

HIGHLIGHTS

In our conversations with investors we are struck at how many hold diametrically opposing views on the role of cryptocurrencies in asset allocation. Thus, this piece takes the form of a dialogue. We use Galileo's famous *Dialogue Concerning the Two Chief World Systems* as a template. This debate takes place in the same location and like that dialogue takes place over four days. Day one considers the policy environment post the pandemic and how this changes the needs of asset owners. Day two considers regulation and the risks to cryptocurrencies on that front. Day three considers how cryptocurrencies fit into a broader portfolio and Day four considers more general issues such as what is money and the impact on traditional banking.

Interlocuters:

- Sagredo (*an intelligent layman*)
- Salviati (*a macroeconomist and strategist*)
- Satoshi (*new arrival to the city, possibly more than one person*)

Day 1

Sagredo: My friends, we have come through this pandemic and seen our lives turned upside down in so many ways. Now there seems to be a hope of things returning to some kind of normal (although I noticed there were still police in the Piazzale Roma checking vaccination cards when I passed by this morning). But now there is time to consider the future and what I particularly wanted to discuss with both of you is how should I invest my savings? The market has gone up more than I could have ever expected, I have invested in it of course, though heavens knows if it can go up a lot more. I also have a fair amount of bonds in my pension as I was taught many years ago, but last year I decided I should also hold a lot of cash in the bank as, well you know, things seemed so uncertain. But now I hear talk of inflation coming, of money printing and debasement of currencies. I seem to be penalized for thrift or planning for the future, as if I save money in cash or bonds it will lose value. Inflation exceeds interest rates and now the stage seems set for this to be the case for years, heaven forbid.

Salviati: Yes, this is true. Governments have decided that they can print more money and have as much debt as they like. The cover, they believe is that with interest rates low the old restriction on deficits and balancing books no longer apply; not that our government here ever felt particularly restrained on that front before, by the way I should add. Indeed, the cry now is that it would be irresponsible not to use such low cost of borrowing to borrow more to help us grow out of the recent crisis. Yes, indeed inflation seems to be the inevitable result; governments will want to inflate away the debt they have amassed during the pandemic.

What is more, the emergency needs of the pandemic have freed the hand of government in other areas of policy in a way that we could not have imagined before the pandemic. Out of necessity governments directly handed out cash to citizens. What other choice did they have after all? But now that genie is out of the bottle, it is not clear how easy it will be to stop. But anyhow, by the mechanism of handing out cash to citizens, this is more plausibly an engine of inflation than any number of the bond buying programs we have seen over the past decade.

So yes, you are very right to fear debasement. With the whole world in the same boat, so to speak, and the same conclusion being reached by many governments, it seems highly likely that all currencies are debased together.

Sagredo: But how can the authorities be so confident they can gently nurture a moderate level of inflation with such fearsome monetary and fiscal support conjoined? Is there a textbook where I can read how to steer an economy like that? Has it been done before?

Salviati: No, indeed it has not! It is possible that with so much stimulus inflation appears quickly and prices increase rapidly. At the moment such an eventuality seems far off, but it cannot be dismissed entirely.

Sagredo: Then what is to be done?

Salviati: Hold some gold, that is the answer. If inflation appears modest then your holdings in equities will do well; I believe you own the stocks of banks do you not? Very wise for such an eventuality, but gold will also do well alongside stocks if inflation picks up modestly. Moreover, it is a hedge against the less likely eventuality that inflation cannot be controlled and rises even further. If it passes 3%, then stocks and bonds sell off, and gold would do well.

So gold is the answer to this particular problem. Rather than holding all of the liquid part of your savings in cash, hold some of it in gold.

Sagredo: This sounds wise, but tell me my friend is this a new development, or is there precedent for this?

Salviati: Yes, indeed there is precedent! Look back over the last 200 years and all major currencies have inexorably lost their value against gold. Sometimes, that loss of value is rapid though revolution (the ruble in 1917) or war (the yen in the 1940s). But sometimes it is slow (sterling and the dollar since the war). All fiat currencies have eventually depreciated against gold.

Satoshi: I have been listening to the two of you debating. There is a lot that I would agree with here. Yes, we are indeed in untested waters and for the first time in many decades we can really talk about a likely source of inflation. With the indebtedness of governments back at the level last seen at the end of the war**.** But this time with no obvious growth path out, the risk of debasement is real. Yes, it is plain to see that the world has changed and that limits on government debt don't seem to be a concern anymore — do you remember the Tea Party? But there is a new way.

That is all very well, what you say about gold being the safe holding to have in such an environment. But we live in an age when assets are digital and payment is digital. Why are we talking about holding gold? I for one, do not intend to start carrying gold around.

This illustrious city used to mint gold ducats that were used as an international currency for centuries. I suppose I wouldn't mind carrying some ducats in my purse next time I am shopping, for the novelty of it. Though I am not sure the shopkeepers would be that happy and, anyway, I have stopped carrying a purse. We pay for things digitally now. And what happens if I want to make a large purchase such as a house or, in fact, if my advice is called on by a pension plan to decide how to invest. Should they be employing lorries to move gold? There is a much better way.

Cryptocurrencies are a much better store of value and means of payment in a digital world, and they are free of the debasement problems that beset fiat currencies. There has been a case for cryptocurrencies ever since the problem of mutual trust was solved using the blockchain. Maybe that only appealed to a niche group before the pandemic, but now, as you two say, everything has changed.

Once institutions that are entrusted with running pensions and endowments agree on this, they are going to have to hold a lot more cryptocurrency as a hedge against inflation and debasement. The value of cryptocurrencies will have to rise materially.

It is also likely to be a means of payment in a world of digital payment and with debasement risk of traditional fiat currencies.

Salviati: Yes, yes that's all very well. The technology is undoubtedly very clever, I will grant you that. But even if one can make payments in cryptocurrencies such as bitcoin, that does not make it money. It should be plain for all to see, but let's say it very clearly — bitcoin is not money.

Sagredo: That is a statement that sounds easy to make, but how can one be so sure? May I ask the most basic of questions. What, exactly, is money? I did not really think this question was worth considering before. It sounds dangerously philosophical and after all Montaigne warned us to philosophize only by accident. But despite that, I think this has become a practical question if we really face a new environment of greater debt, the likelihood of universal basic income, negative real rates, and debasement.

Salviati: Money derives its value from the requirement to pay one's taxes in it. Governments give value to money in this way. If we have to pay our taxes in a certain currency then there is a demand for it. That is not the case with bitcoin, nor will it ever be.

Sagredo: What about Zug?

Salviati: All right, all right. I will grant you Zug! Yes, the residents can pay their taxes in bitcoin there. But it is small and, moreover, has built its reputation on the possibility of low taxes. Don't expect any major country to follow that path.

Satoshi: I have to interrupt you here. I fundamentally disagree with you. Bitcoin is money. What makes it any different from other forms of money? Who says that a government has

to demand payment in a currency for it to be money? Can you pay your taxes in gold? Try doing that and tell me how you fare. No, there are other forms of money and cryptocurrencies can be among them.

I have to mention Aristotle at this point.

Salviati: Please no Aristotle! With all respect that is due to the Philosopher. If I remember correctly, three people with names remarkably similar to ours had a famous conversation in this very city nearly 400 years ago. The topic was whether the Earth is at the center of the universe rather than the nature of money, but one of the interlocutors was overly fond of quoting Aristotle and it didn't enhance his point.

Satoshi: All I mean to say is that in Nicomachean Ethics there is a famous passage where Aristotle talks about the origin of money. He sees it as a unit of account. It makes the incommensurable commensurable. If that is the requirement for a thing to be money then bitcoin passes the test.

Sagredo: This is a very good point. I do indeed see that cryptocurrencies could indeed be money. But tell me, I'm confused, what is the relationship between money and commodities?

Salviati: Very well said. Another view of money is that its value is innate, it comes from the nature of the asset being used. Gold, I think you will all agree is a commodity that has value that derives from its scarcity and that value has been agreed upon for thousands of years.

By contrast, let's be clear, bitcoin is not a commodity.

Satoshi: Oh! Again I have to say that I fundamentally disagree with you. Bitcoin is a commodity. It is scarce and there is demand for it, and from its scarcity it derives its value as with other commodities.

Sagredo: I am listening to you but I am now even more confused. One of you says that bitcoin is money the other says it is not. One of you says it is a commodity and the other says it is not. I revere the intelligence of both of you. Yet, how can you disagree so vehemently on such fundamental and seemingly basic points?

Tell me, if bitcoin is a commodity what use does it have? I mean, surely to be a commodity it is not enough to be scarce, the thing in question also has to have a use.

Satoshi: Oh! That's easy to answer. Bitcoin is a commodity for which we have not yet discovered a purpose. Though crypto assets in general could well have uses as the underlying technology is used in more and more applications, for example, the tokenization of real assets.

Sagredo: A commodity with no use? That sounds nonsensical to me.

Satoshi: Really? What use does gold have? Yes, I grant you there are a few applications in industry where it is needed, but that is a tiny fraction of its demand. Jewelry is very pretty I grant you, but is that a use?

Sagredo: Yes, I see what you mean. So, maybe crypto assets can be money and can be a commodity. But even if we leave those questions to one side, if the world has indeed changed — as it seems to have — and given we live in a digital age, it seems that as a store of value cryptocurrencies can only go from strength to strength.

I hear the bells of the Salute, let's leave our conversation there for the day.

Day 2

Sagredo: Yesterday's discussion left me feeling cryptocurrencies should have a place in my asset allocation, at the very least alongside gold. Dear Satoshi, you have definitely given me something new to consider. By the way, I was thinking, your name does not sound at all Italian. You certainly don't seem to live here in Venice do you? Where do you hail from? Presumably, you are from Japan?

Salviati: Ha! Our friend always keeps very tight-lipped about his origins, so don't expect to get anything out of him on that front. I never really understood why he wanted to be so mysterious about it and what the fuss was all about frankly. Presumably, he is relishing the mystery about his provenance as he thinks it makes him seem more intriguing. In fact, I am never even sure if there is one of him or many of him.

Satoshi: Where I come from is not relevant to our debate here, all that matters are the ideas.

Sagredo: Very true. So coming back to my point. I wonder, is it as easy as you describe? Buying cryptocurrencies is not the same in nature as deciding to allocate to a currency that for such and such reason one expects to outperform. Cryptocurrencies are not issued by a state. While that has advantages, does it also bring up the question of whether states will allow it to prosper?

Salviati: Well said! Yes, it is the very advantages that cryptocurrencies offer that leave them open to being banned.

Sagredo: You mean the charge that they are used for criminal activities?

Salviati: Yes, there is that. Lagarde made that point recently. Having said that, this charge against them has been made for as long as they have existed. If it was such a problem it might have triggered a more whole-hearted regulatory response already. No, I think there is a new and more likely regulatory problem.

After the pandemic it is even more evident than ever before that the economy is dependent on the ability of a sovereign to stimulate growth. If cryptocurrencies were in use to a significant degree, their presence could impede the ability of the sovereign to perform that function.

There is a more general point too. The pandemic likely marks a change of the power of governments vs. other agents in the economy. Governments have had to step in to keep the economy going, to pay people, and also plainly have seen more direct power being exercised over what kinds of functions can continue. We should expect more government as a semi-permanent feature.

Sagredo: Surely this makes it even more attractive to have assets such as cryptocurrencies that are not subject to such sovereign power? Indeed, I am thinking of the case of Cyprus, when deposits held at commercial banks were cancelled at the height of their economic crisis. If holding cryptocurrencies had been an option then, surely more people would have found that highly advantageous.

Salviati: Yes indeed, but that is not the relevant question. Instead, the key question is will governments allow it? Governments don't like competition. Moreover, they can make a strong argument that an instrument that impeded the ability to stimulate the economy could be contrary to the common good.

Sagredo: But can it be banned? After all, anyone can access cryptocurrencies with just a phone.

Salviati: Yes it can be effectively banned should a government wish it. That is easy to achieve for institutional holders. But it also works for individuals; for example, one could prevent commercial banks accepting deposits that came from a sale of cryptocurrencies; there are other ways to dampen its use.

Satoshi: May I step in at this stage? The risks that our friend is outlining seem only theoretical in nature. Yes, I grant you that one could take the view that a cryptocurrency can be competing with a sovereign, but that is really very far from reality. First, there is the question of scale. Bitcoin, the largest cryptocurrency, has a market cap of "only" $572bn. So, it is equivalent to a single large listed company in terms of asset size. How could this be said to compete with the supply of money for a sovereign? M2 Money in the US has a size of $19.5Tn and in the UK of nearly £3Tn.

Second, there is the question of exactly how the asset is used, even if it is used as a means of payment (which is a use that only some holders are going to put it to). If the driver of the water taxi who brought me here this morning set his fare in bitcoin, then I grant you that would have a practical effect on prices. Of course, it would take many merchants to do the same thing, but if they did, then the nature of price setting could indeed be said to have been changed by the presence of a different currency. But, in fact, he did nothing of the sort. He was happy to accept payment in bitcoin (he knows my preferences and I used him before in the journey across the lagoon from the airport), but his rate was set at €100. He simply translated that price into bitcoin at the point of the transaction and then I paid. Such a transaction has no impact on the way that prices are set in this city, so it's nothing for policy makers to worry about.

I would also point out that if a government really wants to ban something, then cryptocurrencies are not the only possible target. Have you forgotten the 1930s when significant saving in gold was effectively banned in the US?

Sagredo: Yes indeed, it does sound as if the prospect of banning cryptos is a very distant prospect. Indeed by not banning them so far, despite a clamor for such a ban from some circles, it suggests implicit acceptance of them.

Salviati: Don't be lulled into a false sense of security by arguments about how small cryptocurrencies are now compared to the amount of money in total. At the moment, they

have only been bought by individuals and by a very small number of asset managers in their portfolios. But pension funds with an obligation to look after many beneficiaries are considering investing in bitcoin as an inflation hedge. Once a pension fund buys into cryptocurrencies, then the window of opportunity to ban them will have closed. Can one imagine the clamor if retirement assets take a hit by such a political decision. I'm just saying, I don't think the time horizon has to be so long.

Satoshi: I'm very glad you brought up pension funds! I want to talk about the social contract.

Sagredo: What has the social contract got to do with anything?

Satoshi: It is key to my argument, so hear me out please. Since the war**,** it has been understood that there is such a thing as retirement that people may enjoy when they reach a certain age. In some countries it was understood that companies would pay the cost of this, but over the last 30 years there has been a gradual shift in many countries whereby the risk of saving enough for retirement has been passed to individual citizens. Yet, this only works if people have appropriate assets which they, or their agents, can buy. Assets that will not only retain purchasing power but also grow in real terms, and also have diversifying return streams to lower the overall level of portfolio risk. If such a return stream is not available, this social contract is at risk.

I would assert that in a world of lower nominal returns and higher inflation, cryptocurrencies are key to investing. Moreover, it's not our core topic so far, but it also implies that there is a significant need to use blockchain as a route to making more real assets investable by tokenizing them.

Salviati: Be that as it may. In the meantime, I think gold can serve this purpose well. Anyhow, large pension funds will not buy until they have an explicit green light from regulators and I don't see that as being imminently forthcoming.

Sagredo: Maybe I need to hear what the regulators think about this before I do anything. There is a new incoming chairman of the SEC who appears to possibly have a more positive view on cryptocurrencies.

Salviati: That is not all. We have all heard much talk in recent years of investing needing to be environmentally, socially and governance (ESG) aware. Indeed, at the current pace the idea of non-ESG active investing is soon going to be relegated to a secondary activity within the equity market at least.

Yet, the power consumed by bitcoin mining machines is huge, estimated to be on the scale of a small country. How can this be compatible with ESG investing? I suspect that so far the two have existed in parallel worlds. Presumably, the large pension funds that are some of the strongest proponents of ESG investing would have eschewed cryptocurrencies anyway as they would want to be cautious from a regulatory perspective. But at some point the ESG question needs to be answered.

Sagredo: Surely the carbon footprint of bitcoin can be reduced? The mining machines can be upgraded to become more efficient, and if the power was from renewable sources then the problem would diminish.

Salviati: Yes indeed, in theory. However, most bitcoin mining is currently in China, with Russia and Kazakhstan also very significant locations for bitcoin mining. So renewable-powered mining seems hard to achieve in the near term.

Sagredo: I was at first more positive on the potential for this form of investing. But all this talk of banning or restrictions makes me uneasy. Even a hint of such a development could very materially impact the price. I will have to sleep on this to think if I can accept that risk.

Day 3

Sagredo: Good morning my friends. So both of you have given me much to think about; on the outlook for inflation and savings in general, on the risk of debasement, but also on the risks of investing in cryptocurrencies. But it seems to be never proper to think of investing in terms of any one individual asset in isolation, be it a security or a broader market. I am aware that probably the majority of investment research is written from the point of view of a single asset, but that makes me uneasy.

Salviati: I could not agree more! What matters is the overall total portfolio. So the goal has to be how all assets fit together. It is the difference between thinking of investing as being a series of views on individual stocks vs. thinking of it as a portfolio. It is the latter that has to be the goal.

Satoshi: Ah! Here is a point that we can all three agree on. I never for the life of me understood why the focus of discussion in investing seems to obsess about the attractions of assets on an individual basis. The only thing that matters is the overall return stream on the whole portfolio. The variances and covariances of all the assets matter as much as the returns. Indeed, variances and covariances tend to persist longer than returns do.

Sagredo: Wonderful! we all agree. Let's make that a key tenet of our approach. So, if we use that to analyze my portfolio, what can we learn? Let's leave aside the question of how much bitcoin could go up by if it is more broadly adopted. Let us also leave aside our discussion yesterday about the risks of it being banned. It seems to me that cryptocurrencies could have a role as diversifiers in a portfolio aside from their potential for returns.

Satoshi: Your reasoning seems most excellent to me. Yes, in the world after the pandemic, there is a reason to think that inflation could emerge and persist to a greater extent than we have seen for years. This means that hedges for inflation will have renewed prominence. This is made even more important if one considers that the correlation of stock and bond returns could rise from its current negative level to zero, or even see both asset classes be positively correlated. The assumption that stocks and bonds are mutually diversifying has been a cornerstone of asset allocation for decades, yet if one looks back over hundreds of years, that has not been the norm. If stocks and bonds cannot offer diversification, then the overall risk of portfolios will rise materially.

Cryptocurrencies can play a very important role here as a hedge. Their diversifying properties become more important as inflation and debasement risk rises.

Salviati: I have to say I fundamentally disagree with you once more! What you say may sound attractive in principle, but that's not what you see if you actually look at the data. What

happened when Covid-19 hit and the world went into lockdown? Bitcoin fell rapidly along with stock markets and the correlation of stocks and bitcoin increased. Just at the very point when diversification became more valuable, it no longer diversified. Such is often the way with hoped-for hedges. They work well enough on a quotidian basis, but when they are really needed they fail.

Sagredo: Yes, I noticed that too. But now that the initial shock of the pandemic has receded into the past, surely that is less of a concern.

Salviati: Not at all! Just look at the correlation of bitcoin with Tesla. Indeed, the correlation of it with the Momentum trade more broadly. How can an asset be said to offer de-risking diversification when it is co-moving so strongly with a Momentum trade which is itself precariously expensive compared to normal, and seemingly at the whim of retail flows that have been driving so much of market returns in recent quarters?

Satoshi: Yes, I grant you that of late bitcoin, for example, has become correlated with the Momentum trade. I am after all data-driven, and that is what the recent data tells us. However, I think you are looking at it in the wrong way. The argument for cryptocurrencies as diversifiers is not based on their performance over a short recent window, but over the longer term in the post-pandemic policy environment.

Sagredo: You say it has a claim to be a diversifier in the long term. But is not the long term merely a concatenation of short terms?

Satoshi: When it comes to investing I don't think that is the case. There are certain modes of investing, certain ways of forming views that can work in the short term, for example, using more Momentum or technical-driven price signals. Then there are other techniques such as taking a view on how policy evolves or mean-reversion of valuation that work in the long term.

Salviati: Let's think of the broader portfolio. If modest inflation returns, the core overweight in a portfolio should be real assets. I would count equities as a real asset in a sense, and key to the portfolio, given the size of the equity market. Thus, equities should be overweight. Alongside that, I would add other real assets and also long-short return streams, for example, carry trades and also an exposure to Value or sustainable yield via the equity market.

Sagredo: Yes, I agree on the attraction of real estate. It's not exactly what one would call a diversified portfolio, but much of my assets are accounted for by this palazzo on the Grand Canal in which we are sitting right now.

Salviati: A very wise investment, real estate. I approve. It's also an exquisite building.

Sagredo: Thank you. Though, mind you it also reminds me that much as I say I am a long-term investor, it also reminds me of my needs for liquidity. Palazzi are, after all, not exactly liquid investments. What is more, the building is resting on wooden piles driven into the sand and it, like much of this city, is slowly sinking. I have had an estimate to underpin the whole building with steel pylons. You have no idea of the expense! I need liquidity. If I invest in bitcoin, is it just too volatile to play a role in the liquid part of a portfolio?

Satoshi: But our viewpoint is too narrow here. The role of blockchain in asset allocation is not only related to the use of cryptocurrencies. Potentially, a much bigger role is by making investible what is currently uninvestible and by making liquid what is currently illiquid.

I am referring here to the role of asset tokenization. All the attention is on cryptocurrencies, which may be fair enough, as asset tokenization is at such an early stage. But it has huge potential to grow.

Sagredo: Forgive me, I am not familiar with this at all. Please explain.

Satoshi: Of course. At the moment if one wants to buy exposure to real assets, one has a few possibilities. One can go to a specialist fund investing in a certain type of such assets, but then fees may be higher than for normal investments. One can buy the assets directly, but that creates costs of monitoring the assets and assumes one has skill at investing in such things. Another alternative is to buy exposure to securities that can give exposure to certain subsets of such assets, such as REITS. That is all very well. But two developments are happening in tandem that have the potential to change this very materially.

The ability is being developed to issue tokens on a blockchain that represent the ownership of such assets. It can be argued that is an attractive development anyway in its own right. However, what makes it really significant is that this is happening just at the time that asset-owner demand for real assets is set to grow considerably. It is the confluence of these two forces at the same time that makes this significant.

Sagredo: I'm not an expert in this area, but explain two things to me: What is the advantage of this compared to the current options? And is this just an asset-backed securitization?

Satoshi: Yes, some of the assets that will be tokenized could, in theory, be bought already; but, this has the prospect to significantly improve liquidity. This is because it eases fractional ownership; it also reduces the time for settlement and has the prospect of automating some aspects of compliance.

On your other point, yes, I think that asset-backed securities are a great analogy, and like them, these assets could be effective hedges against inflation. Moreover, tokenization lends itself to being applied to rather idiosyncratic hard assets, which could be key for allowing access to infrastructure and real estate.

Sagredo: The more we talk, the more I discover that there are so many facets to this conversation. My main conclusion from today is that the whole approach to forming a portfolio in the post-pandemic world needs to change. I think we all agree on that at least. I do worry about the risks of regulations changing, but there seem to be various ways blockchain becomes useful for asset allocation in future.

Day 4

Sagredo: Is it me or are we meeting later for the conversation today? Maybe I'm just impatient to hear your thoughts on these fascinating topics.

Salviati: I think it's you as my watch says I'm on time. But let's start straight away with our discussion then! Our conversation has moved from a consideration of the change in the

policy framework post the pandemic and how this influences the changing needs of asset owners and what role cryptocurrencies may play in that on day one. On day two, we considered the regulatory setting and what risks this created for cryptocurrencies. On day three, we thought about the portfolio implications of the post-pandemic world and where cryptocurrencies and tokenized assets might fit into that picture.

I propose that today we talk about some more general issues that the creation of cryptocurrencies raises. There is the prospect of central banks launching their own digital currencies. One can imagine these could become desirable as a way to impose more deeply negative interest rates. If there was no prospect of being able to withdraw cash and hoard it under a mattress, then it is easier to impose such negative interest rates. At the same time, in the wake of the pandemic, it seems likely that we will unfortunately be left with much more stark inequality across society. This means the clamor for wealth taxes will grow. As we discussed when we thought about the risks of banning, we need to consider whether cryptocurrencies could exist in parallel with central bank digital currencies.

Moreover, if companies and individuals hold some combination of central bank digital currencies and cryptocurrencies, what happens to the commercial banks? Ever since the early Renaissance, commercial banks have been key to credit creation. Without fractional reserve banking, much of the growth we have seen would not have been possible. Society needs bankers to be free to extend credit, unhindered by being limited to having to match that one-for-one with the deposits they happen to hold.

Yet, if citizens hold cryptocurrencies or central bank currencies in digital wallets rather than holding their cash in a bank, then deposits at commercial banks seem set to fall and with it the available source of credit. There is, therefore, a risk that commercial banks are crowded out and with it a source of credit.

Satoshi: I think you are taking this too far. You are assuming that central banks already have digital currencies and are also assuming that cryptocurrencies are vastly larger in size than they are currently. The deposits held at banks exceed the stock of cryptocurrencies many times over.

Sagredo: Is that necessarily such a bad thing? In fact, I am just returned from Heraklion and I happened to have dinner with a friend of mine, Yanis. He was suggesting it was possible to move to a system of central bank digital currencies and downplaying the role of commercial banks as a source of credit. He suggested that could be part of forming a fairer society and could work in conjunction with a form of universal basic income. He has just written a very interesting work of economic fiction on this topic. It seems sadly inevitable that after the pandemic that inequality, which was already bad before, becomes significantly worse. Addressing this is surely going to be a powerful force in politics over the next decade.

Salviati: Yes, I grant you that I am projecting into the future. But this is not happening in isolation. We have seen a material and seemingly inexorable decline in the productivity of debt. Each unit of growth in the world today requires more debt to generate it than before. Thus, the availability of credit is of utmost importance. Policymakers need to think carefully if there is an impact on the supply of credit.

Sagredo: The supply of credit we can all agree is important. But what about the supply of money itself? The supply of fiat money has increased at a record rate during the pandemic. It comes back to our first point about do we find ourselves in a world where fiat money is at risk of debasement. I like the idea of bitcoin as the supply is limited. It is a deflationary currency in a sense.

Satoshi: A very astute remark!

Salviati: Not so fast! Yes bitcoin is famous for having a limited supply. But there are many cryptocurrencies. In fact, there are already more cryptocurrencies than fiat currencies and new ones are being created. So, the supply of cryptocurrencies, in general, is not limited at all.

Satoshi: But an institutional investor who is making an allocation to cash could, in theory, choose from scores of possible currencies in which to deposit his capital. However, in practice only half a dozen currencies are really candidates for a sizeable allocation in portfolios, apart from in some very specific cases.

This is one area where cryptocurrencies and fiat currencies share some similarities. An investor in such assets only realistically has a small number of different assets they will be willing to invest in. If one considers only the largest half-dozen or dozen cryptocurrencies as the possible investment set, the supply is well limited in practice.

Salviati: If we are to accept this as money, are there any limits on what can count as money? I hear tell that some conceptual artists have recently proposed that potatoes can be a form of money (https://youtu.be/9HS763kRYIQ). Yet, surely their massive supply would render that claim difficult.

Satoshi: I'm not so sure. If the US can create $3Tn over the last year, then it seems ironic to suppose that a hard limit on supply is a necessary condition for money. My only personal preference would be to create digital representations for them to avoid being tied to any physical token.

Also, such arguments do not do justice to the technological beauty of bitcoin. The way that it uses blockchain to solve the issue of trust is a truly new development and a technology that happens to be coming along at just the right time. When people understand just how different the policy environment is, demand for cryptocurrencies will increase. More importantly still, the demand for asset tokenization will increase.

Salviati: I do not deny that the policy environment has changed and that this creates a demand for cryptocurrencies and tokenized real assets to a degree that was unknown before. But I think we come back again to this fundamental question of how much power will sovereigns wish to concede? Just as they will be wary of allowing a competitor currency, will regulators be really wiling to cede control on how assets are securitized or rendered investible? I can see a case for gold in this world, but can cryptocurrencies have a complementary role alongside it?

Sagredo: Yes indeed, this debate leaves me appreciating the potential role of cryptocurrencies and tokenized assets, but also aware of the potential dangers. It seems to me that this is ultimately a political and maybe a social question.

Leaving aside the technology itself, if I think about the underlying forces at work here, it seems to me to point to some very deep questions about society and the economy about which I have to admit I am still confused.

Acceptance of higher debt levels seems greater after the pandemic. It is claimed that is permissible because interest rates are low. Yet interest rates are low because growth and productivity are low. Low growth means we need more and more debt to generate a given level of growth. Surely that is circular? How far can that go on? Does it not pose questions of inter-generational fairness? Can we have another decade of more debt being required for every unit of growth and rates remaining low? I think this debate has left me with a better understanding of the role of cryptocurrencies, yet more fundamental questions about how to invest.

My friends, the gondola is waiting to take us to the Rialto. Let us leave the debate there, it is time for dinner. After all this talking I'm hungry and we deserve a glass of Barolo.

IS BITCOIN A GIFFEN GOOD?

HIGHLIGHTS

- The recent rapid price increase of bitcoin raises an interesting question about how demand for the asset works. Does scale beget acceptance? Does this make bitcoin behave like a Giffen good, where demand and price are positively correlated? We discuss the positive and negative linkages between scale and price for this asset and what this means about its potential for a role in portfolios.

- Despite its potential for a punchy conclusion, we think bitcoin fails the technical test for a Giffen good. Any positive link between price and demand does not derive from an income effect. What could drive a positive link, however, is the fact that as it grows in scale, other assets become less good substitutes.

- The main source of demand for bitcoin as a potential store of value in institutional portfolios is the belief that we are in a new policy world where debasement risk is real. An increase in the market cap of bitcoin removes barriers and gives it the aura of apparently being a more "mature" asset and also, crucially, implies implicit acceptance from lawmakers despite concerns, e.g., about its role in money laundering.

- However, there are two aspects that threaten a negative link between scale and demand. The first is bitcoin's status as arguably the most anti-ESG asset imaginable (alongside SPACs perhaps). Increased scale would worsen the power-consumption problem for questionable social utility. The other potential risk is if bitcoin was a risk to the implementation of monetary policy. This is a distant prospect at present, but is a non-linear function of its scale.

- Wait! Isn't it just ludicrous to talk about an *investment product* as having a positive relationship between demand and price. Aren't we meant to buy low and sell high? Yes, though in the near term to the extent that scale implies more acceptance, then such a link could be possible.

- We think a fundamental valuation of bitcoin is simply impossible and reject claims for such a narrative, e.g., by assuming a given pool of investors allocate a certain proportion of capital to it. However, comparing it to such asset pools can be instructive for scaling.

- The value of bitcoin is approaching half the value of gold held for investment purposes. Who is to say how big it should be vs. gold? Maybe this is not a basis for argument — except as it approaches the same size as gold, an act of thesis creep is necessary. One would have to start claiming it is better than gold, and we are not sure we want to take that step for an asset that has been accepted for a couple of years vs. one that has been accepted for 5,000 years.

- Bottom line is that we are still at an early stage in the institutional adoption of crypto in asset allocation. We think its use can grow. However, it does warrant a discussion of the link between price and demand for this asset.

DETAILS

The recent rapid price increase of bitcoin raises an interesting question about how demand for the asset works. There is a strong sense that as the price goes up, so does acceptance and demand for the asset. Given the supply of bitcoin is famously limited, any increase in demand feeds straight though to price. There are two kinds of assets that have a positive relationship between demand and price: Giffen goods and Veblen goods. The latter refers to luxury goods that are conspicuous emblems of consumption for which price is key as the basis of demand. That does not apply at all to bitcoin. But is bitcoin a Giffen good? And what does this imply about the asset's role in portfolios?

A paragraph on economics "101": A Giffen good is one for which demand increases as the price rises. To state the obvious, usually, demand for an asset falls as the price goes up. Specifically, this can be thought of as being driven by two separate forces. There is a substitution effect, whereby consumers prefer to buy either perfect or imperfect substitutes as the price of a good increases. There is also the income effect, whereby consumers can bluntly afford less of an item as its price increases. For a Giffen good, however, the income effect works differently. When viewing the cross-section of consumers across an economy, there are some goods where demand rises as income falls and vice versa, the main example usually being basic foodstuffs that are a staple and essential, especially for those with low incomes. There are also likely to be no good substitutes. But as incomes rise, the consumers in question would rather migrate to higher quality alternatives. For such an asset, if its price increases, then it effectively crowds out others from the list of potential goods that can be bought by a consumer with constrained income.

Since the onset of the pandemic, demand for bitcoin has clearly materially increased and there is a palpable sense that its increased size has begotten more demand, especially in the very specific sense that it may have now become a legitimate asset to be held in institutional portfolios, which was not realistically the case a year before.

So is bitcoin a Giffen good? Well actually our conclusion is technically "no" it is not. But the distinction is subtle and goes to the heart of the potential role of this asset in portfolios.

The reason that, for us, it fails the definition of a Giffen good is that while the demand does seem to have increased with price over the last year, this does not, we think, have anything to do with an income effect of investors. After all, one can hardly claim that bitcoin is a basic staple, nor that it is a good that consumers (or investors) would migrate away from if they have higher income. The opposite would seem to be true, in fact. In the jargon, bitcoin is not an "inferior good" in the sense of a good that consumers migrate away from when incomes rise.

No, the reason the demand potentially increases with price is, we think, more to do with the substitution effect and the way this may differ from many other assets. Unlike classic Giffen goods, where the assumption is that there are no good substitutes, we suggest there is

actually a positive and reinforcing link between price and non-availability of substitutes. We would claim the ability of other goods (cryptocurrencies, gold, and cash in fiat currencies) to be effective substitutes for bitcoin becomes less good as its price increases.

The main source of institutional demand for bitcoin comes from the realization that we may be in a new policy environment that debases fiat currencies, while what tempers that demand (relative to gold, for example) are fears about regulatory crackdowns, volatility, and security. An increase in the market cap of bitcoin gives it the aura of apparently being a more "mature" asset and also, crucially, implies at least implicit acceptance from lawmakers despite concerns, e.g., about its role in money laundering. The broader acceptance creates the impression that it is harder to ban. Greater institutional adoption could also potentially reduce the volatility of bitcoin even further. Institutional adoption is still at a very early stage. There have been cases of asset managers adding bitcoin to their portfolios, but this has been small in scale; to our knowledge no asset owners have made this transition. One could make the case that we are at the very beginnings of this process and that price and demand could remain positively correlated for some time to come. Thus, we would conclude that while not technically meeting the definition of a Giffen good, bitcoin could plausibly share many characteristics.

Hang on a moment!

Hang on a moment! We are talking about an *investment product* here, not basic human staples such as potatoes, which could well be considered Giffen goods. Surely, the most basic rule of all for investing is to buy low and sell high (well, we would add a second equally basic rule on the diversification of risk in the overall portfolio). So how on earth can it ever make sense that demand for an investment asset increases with price? Moreover, we would suggest that for bitcoin there is no possible concept of fundamental valuation, given the lack or either cash flows or a meaningful interest rate. This would make any positive link between price and demand sound more akin to the price of tulips in the 17th century than a serious candidate for a portfolio.

Despite this, we think the case for us being in a new world from an inflation and policy outlook is very real (see the chapter "Inflation, Demographics, Wages, and the Shape of Investment Portfolios"). We think there is a serious case for this to be a game-changer in terms of demand for assets that are a potential hedge against debasement risk. We discussed the case for and against bitcoin in this respect in our chapter "A Dialogue Concerning Cryptocurrencies."

Keeping the argument firmly focused on the Giffen-like nature or otherwise of this asset, we think there are two more germane counter-arguments that could introduce a possible negative link specifically between price and demand, where scale could endanger demand.

The first of these is ESG, where limitation on demand is not ameliorated by higher price. The power consumption of bitcoin puts it on a par with a small/midsized country. This seems like a very high price to pay for limited social benefit — unless that is regarded as the price of (unregulated) trust? Increased adoption would potentially cement bitcoin's status as one of the most anti-ESG assets imaginable (alongside SPACs perhaps, one of them failing on E and the other on G). This has not really been adequately addressed by the investment community, as so far, some of the most active ESG investors (e.g., pension

funds) have eschewed bitcoin. If it becomes seen as a more mainstream investment, then we suspect that this ESG question and how the power consumption of bitcoin can be addressed will become a more urgent topic.

The other potential conflict between scale and price is regulation. We alluded earlier in the chapter to the idea that increased scale implied implicit regulatory acceptance, hence reinforcing a positive dynamic between price and demand. However, we need to distinguish between two kinds of regulatory threats. On the one hand, there is the concern about money laundering or bitcoin's use in other illicit activities. However much this is a point of discussion, the fact is this concern has always been there and the longer authorities choose to not respond, the more it implies that maybe they are happy to live with this. But there is a second and distinct other regulatory threat for which the demand-price link may be non-linear. At its current size, demand can increase with price. However, if bitcoin was huge and was used to actually set prices in an economy (as opposed to prices simply being converted into bitcoin at the point of exchange for those who wish to transact that way), it could curtail the ability of a sovereign to stimulate the economy. That is the territory that raises red flags and in which we think there would be a meaningful risk of a regulatory effort to curtail its use.

So what?

We have discussed in our prior research on cryptos that the reason we changed our mind on the asset[32] was because we believe we are in a new policy regime, unlike the one that has set the investment landscape for the last 40 years. There are, of course, big questions about the acceptability of bitcoin as an investment asset, hence the point of putting pen to paper for this chapter.

This paints a potentially positive story in directional terms, subject to the ESG and regulatory risks we described. The realization of a new policy landscape and the scale begetting some form of acceptability as an investment imply the price can rise. However, as there are no cash flows and — at present at least — no sense of an interest rate, we suggest any notion of fundamental valuation is simply not possible. After such a rapid rise, how can we know if the move has been too far?

It would be really easy to write a chapter saying "if group x allocated y% to bitcoin it would have to be worth z." We think using such statements as a forecast are pretty useless. After all, who is to say that group x is the right group, or that they should invest y%? Why not 0.1y or 10y? Such a route is certainly not a path to a "fundamental valuation." However, it can frame the debate in terms of ranges or statements of plausibility (which we realize is a far weaker statement than valuation, but is realistically all we think is possible).

The most important comparison is, we think, against gold. Fundamentally, *all* our arguments that are potentially arguments in favor of bitcoin are first and foremost arguments in favor of gold, to wit: The need for a hedge against debasement risk, the need for assets that can still diversify equity risk even when inflation is higher (bonds cannot), and to compensate for a world in which there are no longer any risk-free assets.

[32] Portfolio Strategy: Cryptocurrencies in asset allocation - I have changed my mind!

Now, there is some leeway for what counts as gold held for investment. The narrowest definition, and the one that feels most right to us is that $2.5Tn of gold is held specifically for investment (see Exhibit 148). There is a further $5.2Tn which is held as jewelry; it could be argued that some of this is held as a store of value, potentially an inter-generational store as well. Ether way, we exclude gold held by central banks from this analysis.

EXHIBIT 148: **Gold use by category**

Above-ground stocks (tonnes)	2020	USD tn
Jewelry	93,253.1	5.2
Official Holdings	34,210.6	1.9
Private Investment	44,384.4	2.5
Bars & Coins	40,620.5	2.3
ETFs	3,763.8	0.2
Other fabrication and unaccounted	29,448.0	1.6
Total	**201,296.1**	**11.2**

Note: Gold market capitalization is calculated at $1,734/oz.

Source: Metals Focus, Refinitiv, World Gold Council, and Bernstein Global Metals & Mining research

In Exhibit 149, we show how large bitcoin is compared to the value of gold held for investment using the narrow and broader measures of the quantity of gold, at various possible prices for bitcoin. The somewhat shocking conclusion is that at today's price of nearly $51,000, the market cap of bitcoin is close to 1$Tn, that is, it is already almost half the value of gold specifically held for investment or about one-seventh of the value of gold if we add in jewelry.

Now, we admit we have no way of saying whether it is "right" that the value of bitcoin is half the value of gold, or three-fourths the value of gold, or some other number. Who knows? However, what is relevant here is that at the point when it has a value that is the same as gold (which would require another doubling from today's level), any further arguments for a material upside to bitcoin imply that we have to be comfortable with saying that bitcoin is as good as or even better than gold.

We have no problem with the statement that the new policy environment creates a much greater need for gold-like assets, but we are not ready to make the statement that bitcoin is better than gold. One has been a widely accepted store of value for a year at best, the other has been accepted for 5,000 years. One would have to be a very firm evangelist for the preeminence of digital assets to make such a claim. This in no way makes us negative on bitcoin. We still think that on balance its role in instutional portfolios is going to rise not fall. But it puts the scale of future moves into context.

EXHIBIT 149: **Bitcoin vs. gold market cap**

Gold mcap private investment			Gold mcap private investment + Jewelry		
% of Gold mcap	Implied BTC mcap, $bn	Implied BTC price	% of Gold mcap	Implied BTC mcap, $bn	Implied BTC price
1%	25	1341	1%	77	4131
10%	250	13414	10%	770	41314
20%	500	26828	20%	1540	82629
30%	750	40241	30%	2310	123943
40%	1000	53655	40%	3080	165258
50%	1250	67069	50%	3850	206572
60%	1500	80483	60%	4620	247886
70%	1750	93896	70%	5390	289201
80%	2000	107310	80%	6160	330515
90%	2250	120724	90%	6930	371830
100%	2500	134138	100%	7700	413144

Source: World Gold Council, Datastream, and Bernstein analysis

A similar argument can be used to scale bitcoin relative to the size of various investor pools. Such arguments are inevitably more sketchy as who is to say how large the allocation to bitcoin should be? However, at the current price, this suggests it is equal to around 1% of the size of Global High Net Worth (HNW) portfolios (see Exhibit 150).

EXHIBIT 150: **Bitcoin vs. Global HNW portfolio allocation**

% Allocation to BTC	Implied BTC mcap, $bn	Implied BTC price
0.50%	400	21462
1%	800	42924
5%	4000	214620
10%	8000	429241
20%	16000	858481
30%	24000	1287722
40%	32000	1716963
50%	40000	2146203

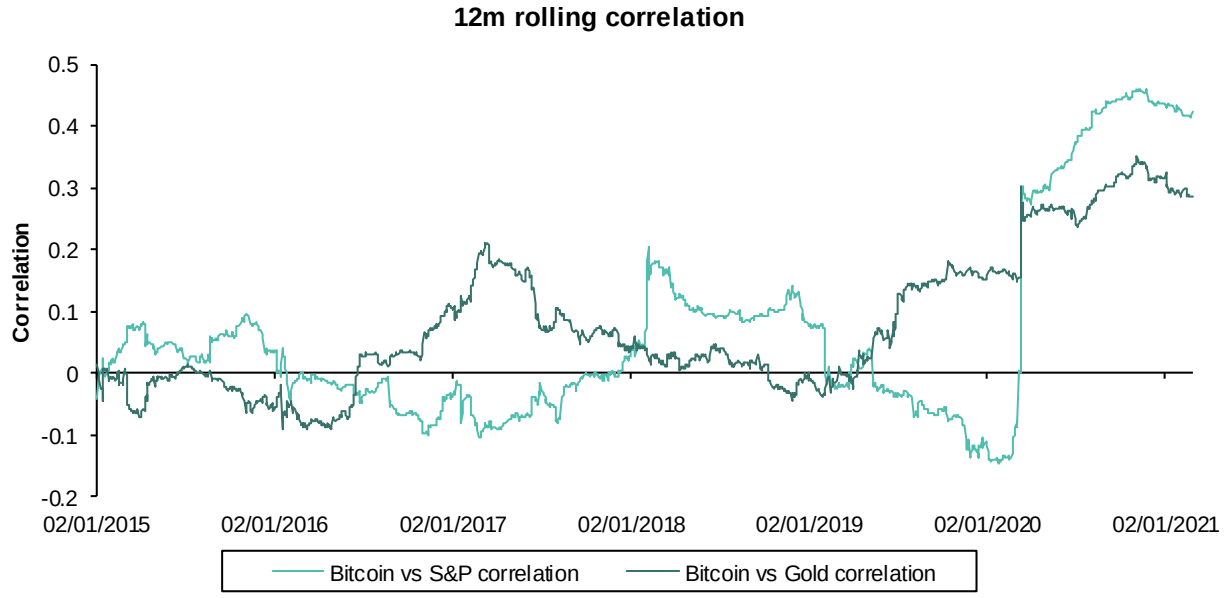
Note: HNW is defined as households with financial assets greater than $1Mn.

Source: Oliver Wyman, Datastream, and Bernstein analysis

Does bitcoin have a potential role in pension allocations? Its lack of income counts against it and gold for that matter. The real inflation "hedge" for a pension is to own real assets such as equities. Having said that, over the last 150 years, the real return on gold has been zero, which is unexciting but in real terms more attractive than the prospects for some other assets. If a case can be made that cryptos can perform a similar function to gold, then maybe a case can be made for a non-zero allocation in such portfolios. However, the real reason to own is likely to be diversification. Such a claim might be laughable, given the recent jump in correlation between bitcoin and equities (see Exhibit 151) (not to mention a positive correlation between bitcoin and the Momentum factor!). Also, while the volatility of bitcoin has declined relative to equities, it is still high. So, the recent data points to it being a high-risk asset, not a diversifier. However, we think if a view of fiat currency debasement

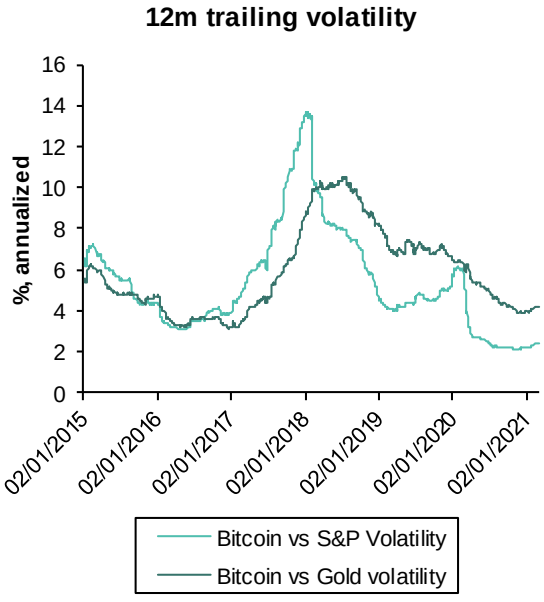
and higher inflation takes hold, there is a case for diversification potentially (see Exhibit 152 and Exhibit 153).

EXHIBIT 151: **Bitcoin correlation with US market and gold**



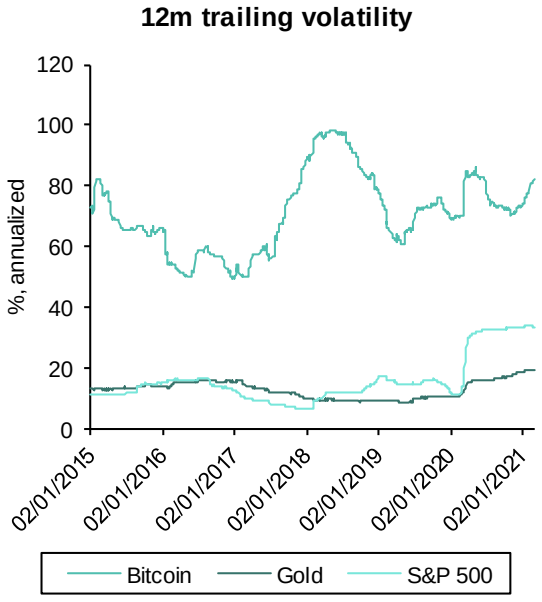
Source: Datastream and Bernstein analysis

EXHIBIT 152: **Bitcoin volatility vs. S&P 500 and gold**



Source: Datastream and Bernstein analysis

EXHIBIT 153: **Bitcoin, S&P 500, and Gold volatility**

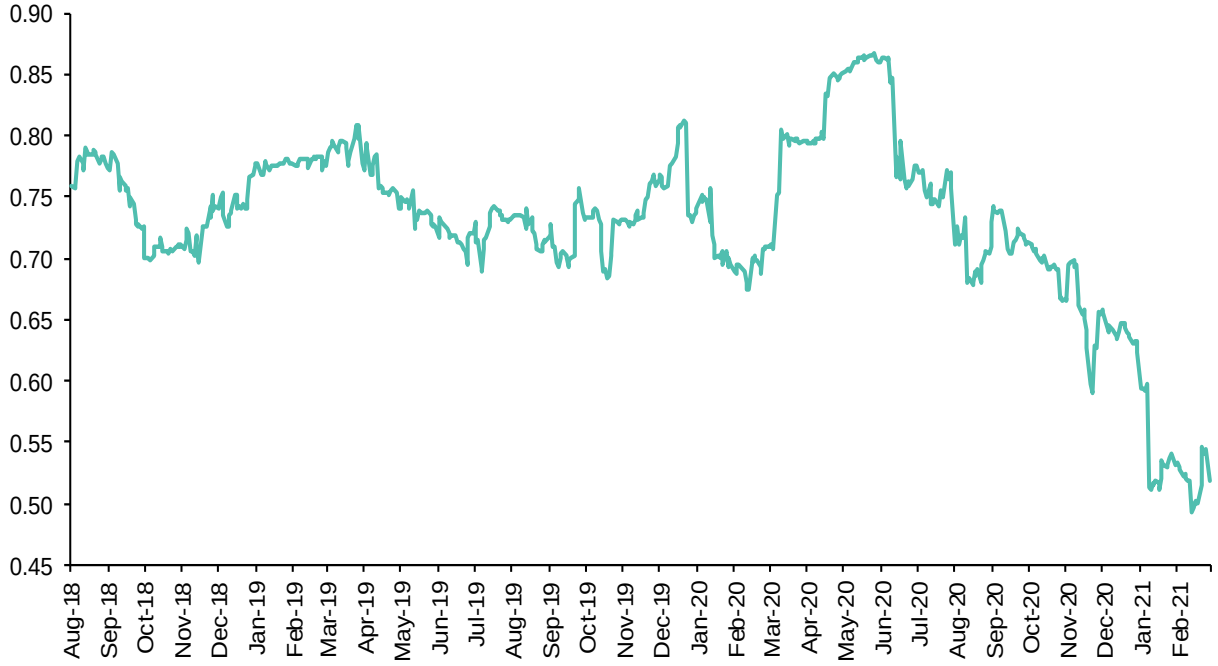


Source: Datastream and Bernstein analysis

Finally, we point out that the pairwise correlation of the major cryptos is continuing to fall. This is not making any great claims for diversification at all. However, it is interesting to note

that this correlation is falling even as inflation expectations and demand for crypto in aggregate is growing (see Exhibit 154).

EXHIBIT 154: **Cryptocurrency average pairwise correlation**



Note: Average pairwise correlation of daily price returns over a rolling three-month lookback window for cryptocurrencies: Bitcoin, Bitcoin cash, Dash, EOS, Ethereum, Ethereum Classic, Litecoin, Monero, XRP, and Zcash.

Source: Bloomberg and Bernstein analysis

TOKENIZATION OF REAL ASSETS – BLOCKCHAIN IN ASSET ALLOCATION

HIGHLIGHTS

- This chapter is about the conjunction of two big themes. Asset owners are going to need to increase exposure to real assets in coming years. At the same time, the tokenization of assets via blockchain has the potential to make more real assets investible and with greater liquidity.
- There are any number of almost evangelical claims about asset tokenization being made today, but we think the key aspect from the point of view of asset allocation is how this enables an increase in real-asset exposure for asset owners. This is the source of demand that could mean this technology is coming along just at the right time.
- The advantages of tokenization include the potential to increase liquidity for assets through greater ease of fractionization of ownership, the ability to automate some aspects of compliance, and shorter settlement times. This also potentially makes some assets investible that hitherto were not.
- We see similarities with the development of the ABS market. Much of the ABS market is made up of loans and other cash flow streams bundled into securities. There is a possibility that tokenization could lend itself to more hard, real assets such as real estate and infrastructure.
- The other potential similarity with the ABS market is in the tokenization of assets to act as an inflation hedge. We show that ABS can act as an inflation hedge in portfolios, and we think that tokenized real assets can do that as well.
- At the moment this area is in its infancy. We think asset managers have an opportunity to use their brand as a trusted steward of assets to help asset owners gain access to tokenized real assets. At the moment the market is tiny, but we think demand for real assets could accelerate this considerably.
- This chapter is distinct from our view on cryptocurrencies. We had a change of heart on their role in asset allocation and upgraded them at the end of November 2020. We think in the medium term, institutional allocation to cryptos will rise. What this has in common is the use of blockchain technology to allow much-needed new return streams into strategic asset allocation.

DETAILS

This chapter is about the conjunction of two big themes. First, we think the outlook for inflation and the outlook for capital markets will fuel considerable growth in asset-owner demand for real assets in coming years. Second, developments in blockchain technology

and the ability to tokenize real assets could provide a route to access real assets at lower cost and in a much broader way.

We have written recently[33] why we have become more bullish on cryptos because of the risk of debasement of fiat currencies as a result of the need to provide ongoing unprecedented monetary and fiscal stimulus in the wake of the pandemic. This chapter is distinct from this and not part of the same call. The only common thread with the case for cryptocurrencies is the needs of asset owners in the presence of inflation and the fact that there happens to be an underlying reference to blockchain technology. Aside from that, this chapter is different and more of a structural call about the future development of money management than an asset allocation call *per se*.

The web is awash with almost evangelical claims as to the merits of asset tokenization. Nearly all of these as far as we are aware are from a technological standpoint. There does indeed seem to be a good basis to the claim that tokenization of assets will take off as it mitigates some problems that exist in trading certain types of asset, lowers costs, and potentially democratizes access. But in this chapter, we make the claim that it is the coming significant demand for real assets within asset allocation that could be a big driver of this change. Asset tokenization is a financial technology that might be arriving just at the right time. It is the juxtaposition of these two topics that is the basis for change in the money management industry.

Here is the problem: demand for real assets

We think demand for real assets is going to rise. Why is this? It is a result of the change in the policy environment, the outlook for capital markets, and the needs of asset owners that we have outlined in the rest of this *Blackbook*. Asset owners need return streams that have a pay-off linked to the real economy. Put another way, if financial assets no longer outperform real assets in the way they have for the last 40 years, what can investors turn to?

The core of real assets are physical goods such as infrastructure and real estate. We have made the point in this *Blackbook* that equities can count too. But with the demand for real-asset exposure growing materially, other assets will be needed. This can include assets that can already be bought but which maybe have a high price tag (e.g., private equity) and where there is an investor demand to lower the fee, or other assets, e.g., specific areas or real estate and infrastructure where it is currently hard to obtain exposure.

What is tokenization?

Tokenization of real assets is the process of converting the ownership rights to an asset to a digital token on a blockchain. The tokens are initially created through a Security Token Offering (STO), which is similar to an IPO in equity markets, and represent an ownership interest in an asset.

Why this is useful essentially comes down to increasing the ease of access and liquidity for some assets, and potentially drawing some assets into the realm of what is deemed investible, which hitherto were outside the bounds of mainstream institutional portfolios.

[33] Portfolio Strategy: Cryptocurrencies in asset allocation - I have changed my mind!

The increase in liquidity comes from the ease of fractionalizing ownership and from the potential to automate some of the compliance aspects of owning such assets and also from the possibility of real-time settlement, hence, alleviating credit risks.

The tokens can then be traded on the secondary market. This process can be performed for assets that have a readily observed price such as an asset that is already traded in a market, or else for assets where the price has to be assessed. It is for the harder-to-access markets that there is real opportunity presented by this technology. For many such assets there are, in principle, ways to access them already, but the prospect of tokenization makes access potentially cheaper and easier. Also, it might allow other assets that previously were not investible to become so.

To illustrate the process, we present an example of a use case of tokenizing real estate assets — in this case the St. Regis Aspen Resort project, led by a real estate asset management and advisory firm Elevated Returns LLC.[34] Instead of launching a publicly traded REIT via an IPO, it chose to issue a securitized token — Aspen Coin — that represents ownership of Aspen Digital Inc, a corporation formed with the sole purpose of owning the St. Regis Aspen resort. The project raised $18Mn in funding.

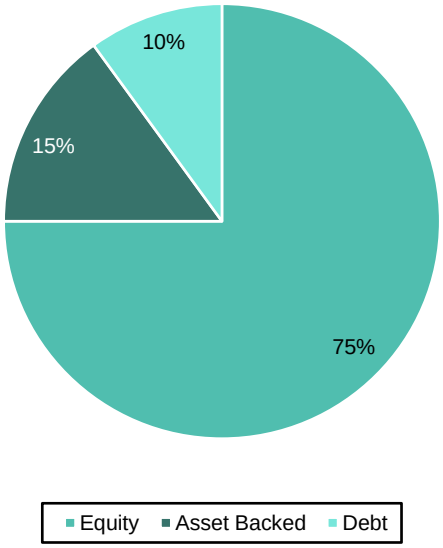
While the STO process is generally faster and cheaper than an IPO, it still needs a large ecosystem to support it, including legal support to certify assets, broker dealers to facilitate secondary trading, and asset custodians. An ecosystem is emerging to cover all these aspects from custodianship to issuance to compliance and trading.

Currently, the amounts raised by STOs are tiny in the scheme of things; but the industry is growing fast. According to a study by Blockstate,[35] since 2017, projects have raised more than $950Mn. The number of STOs has gone from five in 2017 to 55 in 2019. The amount of money raised has gone up from $66Mn to more than $450Mn over the same period. The Blockstate report also notes that most STOs are currently backed by companies' equity, and that asset-backed projects represent only 15% of the total (see Exhibit 155). It is the move into asset-backed tokens that we think represents the most interesting aspect from an asset-allocation perspective.

[34] Smith, Julie and Vora, Manasi and Benedetti, Hugo E and Yoshida, Kenta and Vogel, Zev, Tokenized Securities and Commercial Real Estate (May 14, 2019). Available at https://ssrn.com/abstract=3438286.

[35] https://blockstate.com/global-sto-study-en/

EXHIBIT 155: **Distribution of asset classes tokenized**



Source: Blockstate and Bernstein analysis

Why tokenize?

The key benefits of tokenization are the potential to fractionalize ownership of assets where that is not usually easy to achieve and generate greater liquidity for illiquid assets, but it has a number of other advantages as well:

Fractionalization: Rather than owning the asset outright, tokens allow investors to own even very small fractions of the asset, thus expanding access to retail and smaller institutional investors.

Liquidity: Greater investor access due to fractionalization increases asset liquidity. Tokens can also be exchanged on secondary markets. In addition, token trades have a much faster settling time than the current T+3/T + 2 market standard at the moment.

Customization: Tokenization allows a very high degree of individual features in a contract, e.g., providing exposure to single or several rooms in a single building or certain parts of a big infrastructure project.

Automation: Smart contracts enable automation of compliance, document verification, and seamless transfer of cash flows among other features.

Lower fees: As a result of automation and a smaller number of required intermediaries, tokenization has a much better cost efficiency, allowing for lower fees.

Data transparency: Blockchain provides an immutable, secure, and readily accessible record.

Cons are much less often discussed in the sources we have looked at, but we identify the following:

- No or very limited track record of real-asset token performance.
- Verification and enforceability — who verifies asset authenticity and who is responsible for enforcing the contract?
- Reputational/career risk for institutional investors as early adopters.
- Evolving regulatory framework, particularly across different countries.
- ESG concerns — how energy efficient is it to maintain these various blockchains?
- Scams/hacks/cybersecurity .
- Lack of common standards — tokenization is going to involve multiple platforms with different protocols that might not be compatible with each other.

In the background, we highlight a further negative point, which is that as with any new area where capital flows in fast, inevitably some of it will be misallocated and it will be hard for investors to overcome the information asymmetry inherent in a new area. One way to overcome this is for established asset managers to enter this area. While they may not have as much history of expertise, they can use their brand to promote trust in investments based on tokenization.

Crowdfunding vs. tokenization

One of the most cited advantages of tokenization is that it will enable access to smaller investors without funds for a large minimum investment or provide exposure to investors who don't want to finance and manage the assets. A relatively recent innovation — crowdfunding platforms aim to solve these problems as well. Using real estate as an example, a crowdfunding platform connects real estate developers or real estate professionals seeking financing with individual investors looking to gain exposure to the asset class. A number of crowdfunding platforms, such as Crowdstreet, DiversyFund, and Fundrise, offer exposure to diversified real estate portfolios, commercial real estate, or real estate-linked debt with initial investments of as little as $500. However, the fees on these platforms are quite high, as they can easily add up to more than 3% annually. Some of these platforms are available only to accredited investors. In addition, as they are not publicly traded, most of the investments are still highly illiquid with lockup periods of three to five years or limited windows of time when they can be sold. Finally, at present, most of the platforms are focused on US assets.

Tokenizing these assets instead could have significant advantages. As the tokens would be easily tradeable in the secondary market, they would be much more liquid. Moreover, they would offer much greater and easier customization, down to an individual property level. And by automating many of the currently cumbersome administrative tasks and removing intermediaries, they have potential for much lower fees.

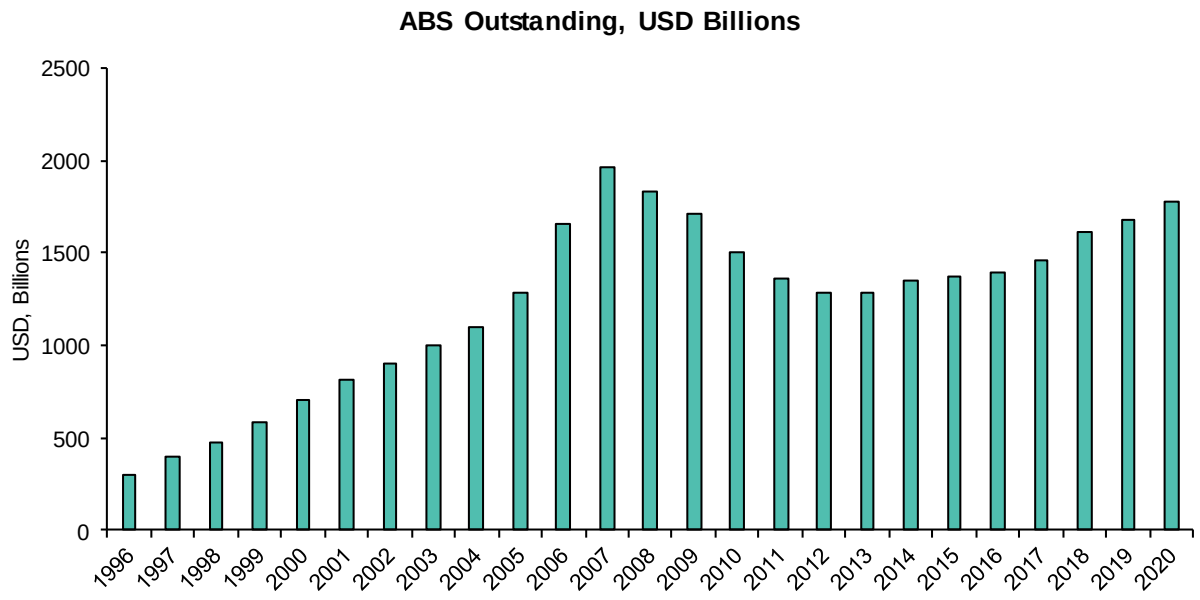
Another big drawback of real estate crowdfunding platforms as noted by Julie Smith, et al.[36] is adverse selection. Project managers who are unable to raise funds via traditional means due to limited track record or low asset quality turn to the crowdfunding platforms instead. Over time, this can build up significant exposure to inferior assets on these platforms. As we noted earlier in this chapter, we believe that in early stages adverse selection will be an important problem to overcome for tokenized security offerings as well.

Asset Backed Securities (ABS) market vs. tokenization

Tokenization of real assets can be compared to the ABS market. We think the evolution of the ABS market could be a relevant blueprint to how the tokenization of real assets can evolve. Thus, in this section we briefly recap the key milestones in the history of the ABS market and compare and contrast the processes of creating ABS vs. tokenization.

While ABS markets have been around since the 1970s, the growth really took off from 1996 when over the next 10 years outstanding ABS assets grew from less than $300Bn to nearly $2Tn just before the GFC in 2007 (see Exhibit 156). After a fall in the outstanding value of ABS post the GFC, the ABS market has been recovering in recent years and the assets currently stand at more than $1.7Tn.

EXHIBIT 156: **Outstanding ABS assets**



Source: Securities Industry and Financial Markets Association (SIFMA) and Bernstein analysis

As the ABS market developed, it expanded the investor base from banks and institutional investors to hedge funds and structured investment vehicles. It also created access for

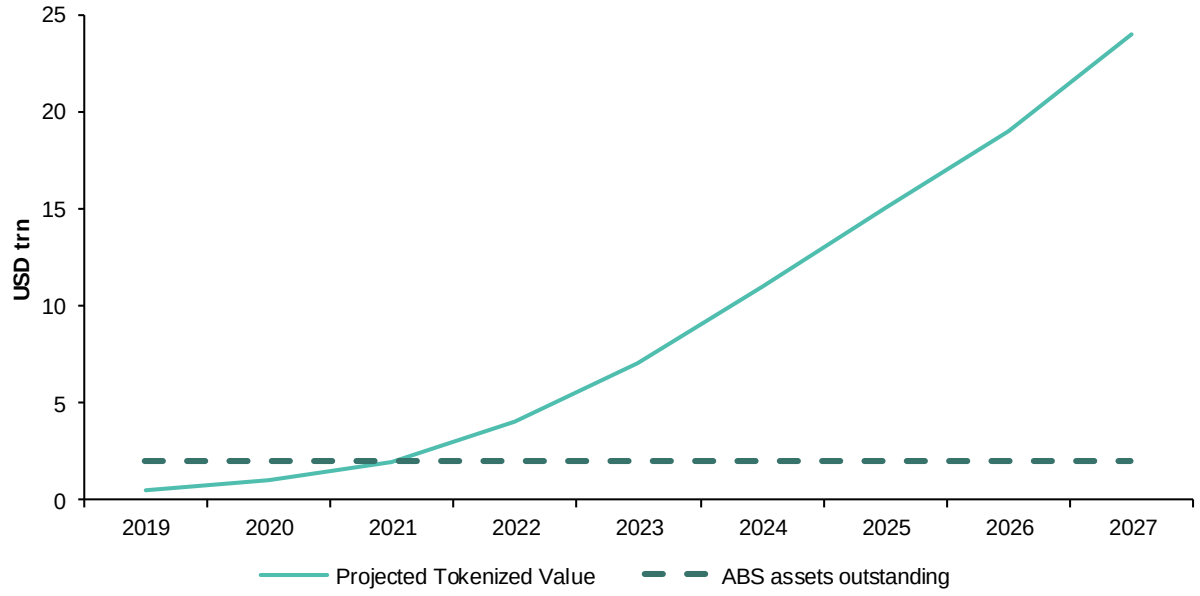
[36] Smith, Julie and Vora, Manasi and Benedetti, Hugo E and Yoshida, Kenta and Vogel, Zev, Tokenized Securities and Commercial Real Estate (May 14, 2019). Available at https://ssrn.com/abstract=3438286.

investors to new asset classes — e.g., investors that were previously restricted by credit rating on single bonds could invest in higher-rated ABS securities.

We expect tokenization to also expand access to new asset classes and new investors. In particular, we expect that with fractional ownership, retail investors and smaller institutional investors will be able to invest in previously inaccessible real assets, such as private real estate, large-scale infrastructure projects, renewable energy projects, and others that currently require significant amounts of capital or are overseen by private equity firms that command extremely high fees.

There are a whole host of possible projections for the size of the tokenized market. Projections from the World Economic Forum (see Exhibit 157) suggest the market could reach $24Tn by 2017. This compares to the current size of the ABS market of nearly $2Tn.

EXHIBIT 157: **Projected tokenized asset value**

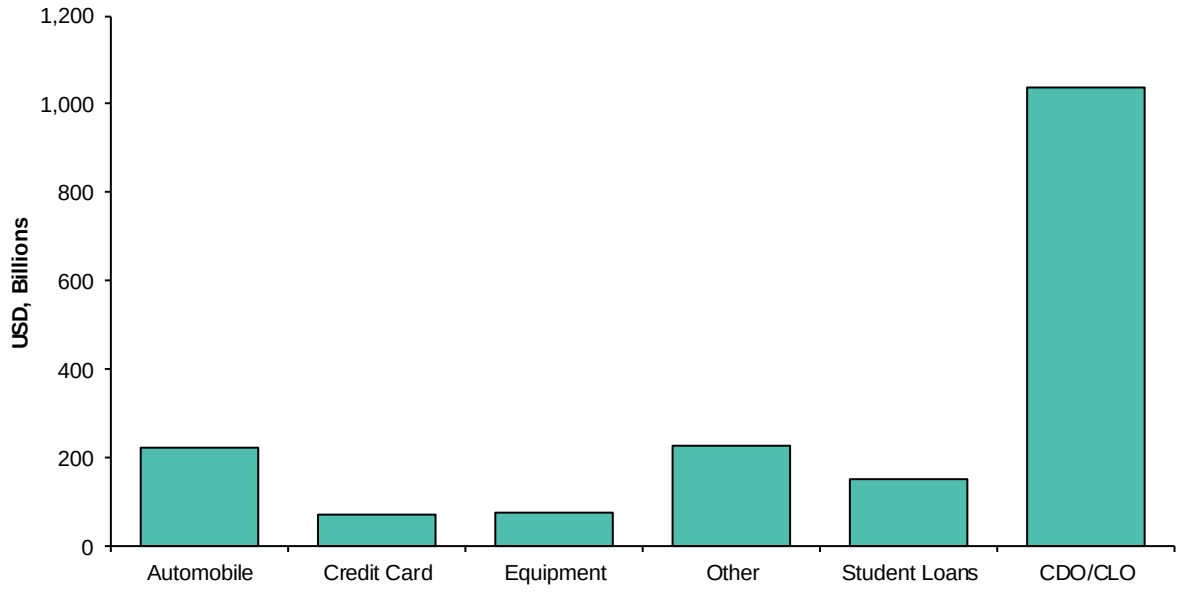


Source: World Economic Forum, https://hackernoon.com/market-outlook-on-tokenized-assets-a-usd24trn-opportunity-9bac0c4dfefb, and Bernstein analysis

In theory, ABS can be backed by any type of asset with an associated cash flow. But in practice, it is dominated by certain types of consumer and business loans, as well as mortgage and commercial real estate exposure. Currently, it is not really providing sizeable exposure to real assets, such as infrastructure and farmland.

Similarly, in theory, any asset can be tokenized. The proposed tokenization cases have been very diverse, including collectibles, art, intellectual property rights, and fractional investment in real estate (see Exhibit 158). There is a plausible case to be made that there be a greater ability for tokenization to cover more real hard assets, real estate, and infrastructure.

EXHIBIT 158: **Distribution of ABS assets**

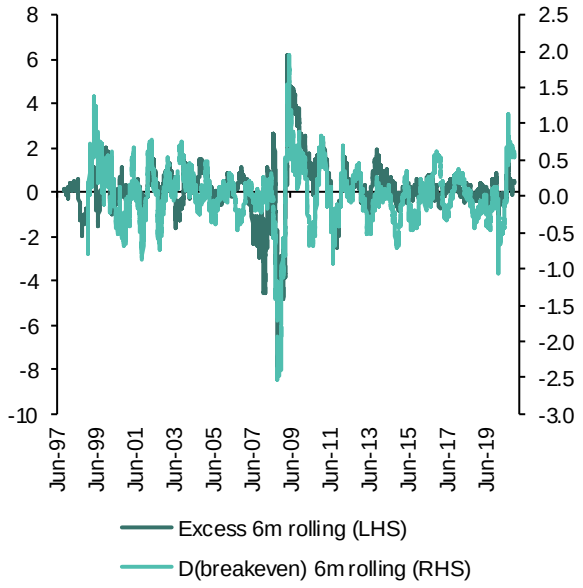


Source: SIFMA and Bernstein analysis

ABS as an inflation hedge?

The other reason the ABS market is an interesting comparison is that we can use it as an example of an inflation hedge. In Exhibit 159, we show the excess returns of US ABS over rolling six-month periods overlaid with contemporaneous changes in inflation breakevens. We show the same data in Exhibit 160 in scatter chart form. This suggests there is evidence that ABS can play a role in portfolios as part of an inflation hedge.

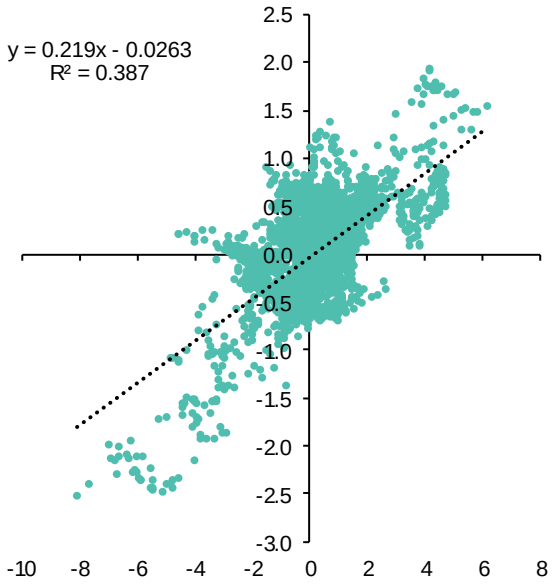
EXHIBIT 159: **US ABS excess returns and inflation breakevens**



Note: Six-month rolling excess returns of US ABS and contemporaneous changes in 10-year inflation breakevens.

Source: Bloomberg and Bernstein analysis

EXHIBIT 160: **US ABS excess returns and inflation breakevens**

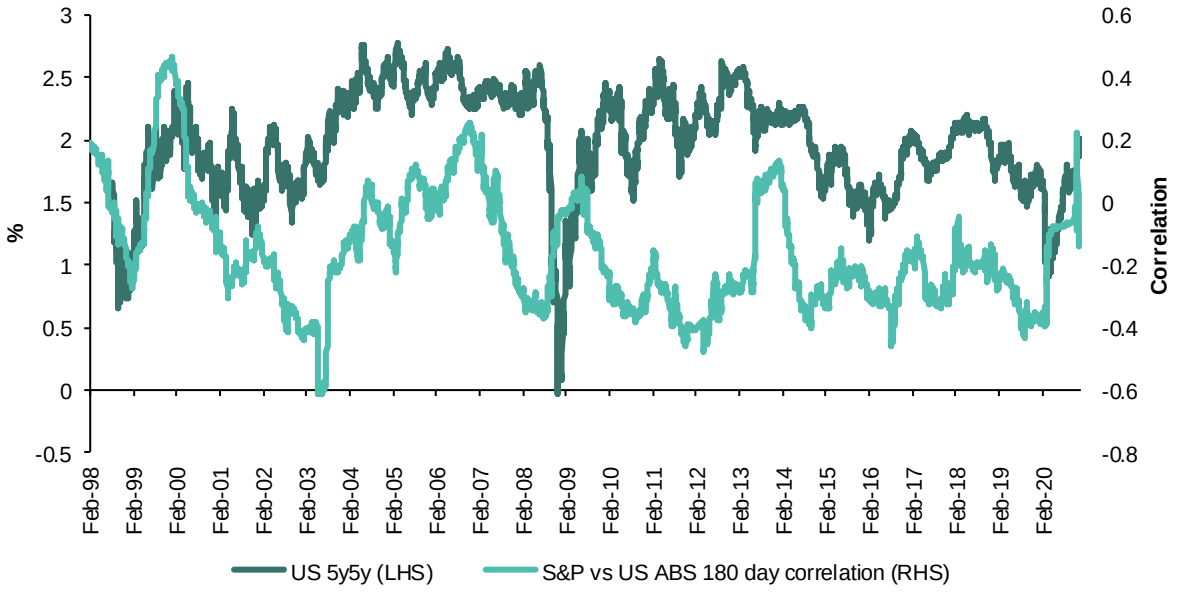


Note: Six-month rolling excess returns of US ABS and contemporaneous changes in 10-year inflation breakevens.

Source: Bloomberg and Bernstein analysis

As noted earlier, we believe that in the current environment it is important to have an allocation to assets that not only can outperform as inflation rises but can also act as equity diversifiers. While it's hard to get enough data to test the efficacy of ABS as a diversifier to equities back to higher inflation periods in the 1970s, at least over the last 10 years there has been relatively little evidence of correlation to equities being positively linked to rising inflation expectations (see Exhibit 161). This lack of a link is encouraging; we think it further strengthens the case for including ABS in portfolio asset allocation.

EXHIBIT 161: **US inflation expectations and ABS correlation with equities**



Source: Bloomberg and Bernstein analysis

Conclusion: What does this mean for portfolios?

Asset owners have reasons to want to increase holdings of real assets as they need to up their allocations to return streams that can deliver positive real returns as inflation rises and also act as diversifiers. Asset tokenization via blockchain looks like it could well be a technology that is arriving at just the right time. It is the changing needs of asset owners that can act as a catalyst to promote adoption.

A key challenge will be dealing with the inevitable information asymmetry inherent in a new technology. There is a whole ecosystem of new entrants here. We think established asset managers could, therefore, have an advantage in being trusted counterparts to allow investor access, especially in the context of the real asset exposure of a broader portfolio, as we have described here.

APPENDIX: TOKENIZATION USE CASE EXAMPLES

Real estate is perhaps the most obvious "real" asset for tokenization

According to Julie Smith et al.[37] more than 80 million Americans are exposed to REITs via retirement savings, mutual funds, and other investment funds. However, despite the growth of REITs as a means by which the investing public can gain exposure to real estate, much of the overall real estate market remains private.

In North America, listed property as a percentage of the overall underlying real estate market was only 11.5%. Moreover, the total Commercial Real Estate (CRE) market dollar value as estimated by the National Association of Real Estate Investment Trusts (NAREIT)

[37] Smith, Julie and Vora, Manasi and Benedetti, Hugo E and Yoshida, Kenta and Vogel, Zev, Tokenized Securities and Commercial Real Estate (May 14, 2019). Available at https://ssrn.com/abstract=3438286.

is between $15Tn and $17Tn. Meanwhile, public REITs' total market capitalization is only around $1.2Tn. Tokenizing private deals and providing access to a broader set of investors would be one way to bridge this gap.

Infrastructure

https://www.pontoro.com/

According to its website, Pontoro is building a digital asset securitization and liquidity platform to address the $20Tn shortfall in infrastructure debt finance by enabling broader investor participation in these private assets. Pontoro has sourced an initial $500Mn infrastructure loan pipeline from some of its large originating bank relationships and is also speaking with several large financial institutions about opportunities to distribute its digital assets.

Agricultural commodities in the Philippines

https://alphapoint.com/case-study-first-bullion/

First Bullion completed the Flourish City Development Limited (FCD) STO within three months, the first asset-backed token offering approved by the Cagayan Economic Zone Authority (CEZA). FCD is a leading plantation owner, developer, and producer of agarwood, oud oil, and related products. Agarwood is a fragrant dark resinous wood used in incense, perfume, Chinese medicine, and small carvings. First-grade agarwood is one of the most expensive natural raw materials in the world. The offering was aimed at experienced mid/high net worth investors.

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