

2021 | 25TH ANNUAL EDITION

Long-Term Capital Market Assumptions

Time-tested projections to build stronger portfolios

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FOREWORD



GEORGE GATCH

A global pandemic can shift our perspective, making it more difficult to focus on the future. But, of course, this is the essential task of any long-term investor, regardless of the stresses and challenges in the moment. After all, the comment widely attributed to Britain's wartime prime minister Winston Churchill sums it up well: "If you are going through hell, keep going."

Amid today's demanding investing environment, we present the 2021 edition of J.P. Morgan Asset Management's Long-Term Capital Market Assumptions (LTCMAs). In our 25th year of producing capital market estimates, we incorporate more than 200 asset and strategy classes;¹ our return assumptions are available in 16 base currencies. Over the years, many investors and advisors have come to depend on our assumptions to inform their strategic asset allocation, build stronger portfolios and establish reasonable expectations for risks and returns over a 10- to 15-year time frame. Moreover, we seek each year to recalibrate our long-run approximations as we incorporate the new information presented by markets, policymakers and economic data alike.

We formulate our LTCMAs as part of a deeply researched proprietary process that draws on quantitative and qualitative inputs as well as insights from experts across J.P. Morgan Asset Management. Our own multi-asset investment approach relies heavily on our LTCMAs: The assumptions form a critical foundation of our framework for designing, building and analyzing solutions aligned with our clients' specific investment needs.

This edition of our assumptions explores how the policies adopted to tackle the COVID-19 crisis will affect the next cycle. The alignment of monetary and fiscal policy in the same supportive direction is perhaps the biggest single difference in the fabric of the economy between this new cycle and the last one. Over our investment horizon, we see modest global growth and somewhat constrained returns in many asset markets. And yet we are optimistic that with flexibility in portfolio strategy and precision in its execution, investors can harvest an acceptable return without an unacceptable increase in portfolio risk.

Whatever approach investors take, a considered, long-term strategic perspective is essential. So too is careful manager selection and attentiveness to the power of active asset allocation. We look forward to working with you to make the best use of our assumptions in setting your own strategic perspective and pursuing your investment goals. On behalf of J.P. Morgan Asset Management, thank you for your continued trust and confidence. As always, we welcome your feedback.



George Gatch
*Chief Executive Officer,
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¹ Key asset classes in USD, GBP and EUR presented at the back of this book; all others available via our website or from your J.P. Morgan representative.

A new portfolio for a new decade

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IN BRIEF

- The global pandemic of 2020 precipitated the sharpest recession on record and also the fastest-ever rebound. As the economy begins to move toward a new business cycle, we expect the extensive deployment of monetary and fiscal stimulus to leave a lasting imprint.
- While the closer alignment of monetary and fiscal support will distinguish the next cycle from the last, many important issues transcend business cycles. Issues such as climate change, aging populations and technology adoption continue to affect economies and asset markets, and in some cases may have been made even more acute by the upheaval of the pandemic.
- Despite the abruptness with which the last cycle ended and the depth of the economic shock, our long-term growth and inflation projections are little changed. However, around our point estimates we believe there is a fatter and flatter distribution of tail risks.
- Forecasts for public asset market returns, meanwhile, fall sharply: The low starting point for yields translates to a bleak outlook for government bonds, and elevated valuations for equity present a headwind for stocks. Credit and emerging market debt remain brighter spots, but increasingly it is to alternative assets that investors must turn to find higher returns.
- As we move further into the 2020s, we will need to adopt a new portfolio for the new decade. With expanded opportunity sets and acceptance that truly safe assets no longer offer income, investors can more fully exploit the specific trade-offs that a portfolio can tolerate in order to harvest returns.



A NEW PORTFOLIO FOR A NEW DECADE

In the immediate aftermath of an acute crisis, it can be difficult to look beyond the current news flow and think about the long term. But with the global pandemic still dominating the headlines, that task is even more challenging - and yet it is also even more essential.

In the 25th edition of our Long-Term Capital Market Assumptions (LTCMAs), we aim to do just that: to abstract from the challenges faced in the very near term and consider the lasting consequences of the COVID-19 crisis, and in particular how the policies adopted to tackle the crisis will affect the next cycle. We also consider some of the issues that transcend the pandemic and persistently shape the economic environment.

Perhaps it will come as a surprise that we expect very few lasting consequences for nominal economic activity around the world; our central forecasts for growth (**EXHIBIT 1A**) and inflation are very similar to those we published last year.

However, much like a swan, which appears to glide gracefully across the water while invisibly but furiously paddling below the water's surface, today's policymakers - central banks and governments - have been doing the hard work to maintain the economy's forward glide.

We believe that the imprint of their policy actions will linger well into the coming decade. Already, central banks such as the Federal Reserve (Fed) are adopting new frameworks¹ to manage the economy over a longer horizon.

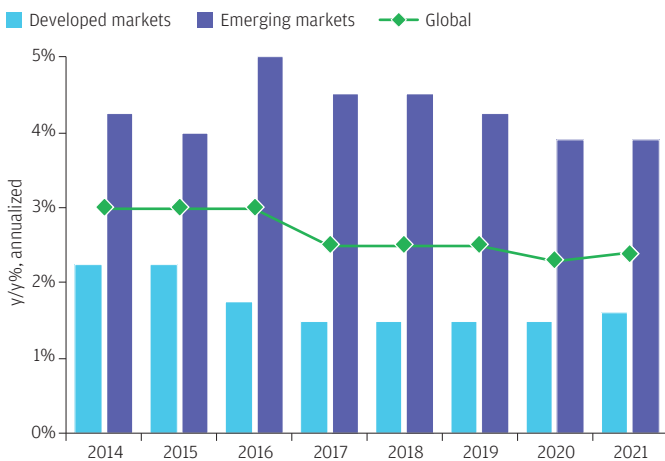
Most critically, we expect that fiscal intervention will remain a policy tool well into the next cycle. The alignment of monetary and fiscal policy in the same supportive direction is perhaps the biggest single difference in the fabric of the economy between this new cycle and the last one. Capital markets are already feeling the ripples of the more interventionist actions from policymakers (**EXHIBIT 1B**).

Unlike our macro projections, our forecasts for asset returns include more material changes. Once again, we are downgrading many of our forecasts for public market returns. The challenges for core fixed income are especially acute, which in turn prompts us to rethink how we construct balanced portfolios. The use of alternatives - to provide income and diversification - is more imperative than ever.

¹ In Q3 2020, the Federal Reserve announced an "average inflation targeting" regime that allows policymakers to balance periods where inflation falls below target by letting inflation rise above the 2% target at times.

Limited change to potential growth forecasts ...

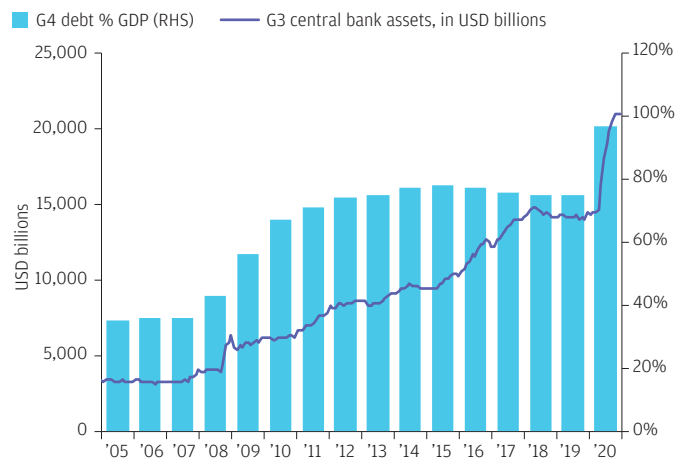
EXHIBIT 1A: PRIOR TRAJECTORY OF LTCMA 10- TO 15-YEAR GLOBAL GROWTH FORECAST (2014-21)



Source: Bloomberg, Haver, J.P. Morgan Asset Management; data as of September 30, 2020.

... but big changes to policy have huge implications for asset return forecasts

EXHIBIT 1B: CENTRAL BANK BALANCE SHEETS AND FISCAL SPEND AS A % OF GDP, 2005-20



A LOT GOING ON BELOW THE SURFACE

Every new cycle follows a recession, and each recession has its own character and policy responses, which themselves influence the contour of growth in the years that follow. The last recession was unusual in that it was triggered by a sudden seizure in the supply side of the economy, whereas most previous recessions occurred because demand dried up.

This recession was not caused by the familiar sins of corporate, consumer or financial recklessness, and thus household savings rates and financial sector balance sheets were in reasonable shape when the economic shock hit. Moreover, the global trade tension that dominated 2019 weighed on corporate sentiment such that many firms entered the recession with neither capex nor inventory levels especially extended. Therefore, unlike in previous recessions, we do not believe we are looking at a lengthy and painful period in which capital and other resources need to transition from one overextended sector to another.

Essentially, this was a recession that shouldn't have happened - at least, not yet - and one caused by a truly exogenous shock rather than an endemic issue or imbalance that pushed the economy over a cliff. We believe, therefore, that economies will bounce back over the course of the next 12 months, and our forecasts of trend growth rates continue to be governed by many of the themes we have written about extensively in recent years, not least the steady aging of the workforce.

This leaves us with real growth projections that are modestly higher this year, with our forecast for global growth 10 basis points (bps) higher, at 2.4%, over the next 10 to 15 years. This is driven by the 10bps uplift in our developed market (DM) forecast, to 1.6%, itself entirely driven by the cyclical bonus we attribute to economies as they accelerate out of recession and close their output gaps. Our emerging market (EM) forecast is unchanged, at 3.9%, with the slight dip we see in trend growth offset by a cyclical bonus (**EXHIBIT 2**).

Our 2021 assumptions anticipate slow real GDP growth globally, with little change to trend assumptions but small cyclical bonuses applied to several economies

EXHIBIT 2: MACROECONOMIC ASSUMPTIONS (%)

	Real GDP			Inflation		
	2021	2020	Change	2021	2020	Change
DEVELOPED MARKETS	1.6	1.5	0.1	1.6	1.6	0.0
United States	1.8	1.8	0.0	2.0	2.0	0.0
Euro area	1.3	1.2	0.1	1.3	1.3	0.0
Japan	1.0	0.6	0.4	0.7	0.8	-0.1
United Kingdom	1.6	1.2	0.4	2.0	2.0	0.0
Canada	1.7	1.6	0.1	1.8	1.8	0.0
Australia	2.4	2.2	0.2	2.3	2.3	0.0
Sweden	2.0	1.7	0.3	1.6	1.6	0.0
Switzerland	1.5	1.1	0.4	0.5	0.5	0.0
EMERGING MARKETS	3.9	3.9	0.0	3.3	3.3	0.0
China	4.4	4.4	0.0	2.5	2.5	0.0
India	6.9	7.0	-0.1	5.0	5.0	0.0
Brazil	2.4	2.4	0.0	4.3	4.5	-0.2
Russia	1.1	1.2	-0.1	5.3	5.5	-0.2
Korea	2.1	2.2	-0.1	1.8	2.0	-0.2
Taiwan	1.6	1.6	0.0	1.0	1.1	-0.1
Mexico	2.5	2.2	0.3	3.7	3.7	0.0
South Africa	2.5	2.2	0.3	5.3	5.3	0.0
Turkey	3.1	3.0	0.1	8.5	8.0	0.5
GLOBAL	2.4	2.3	0.1	2.2	2.2	0.0

Source: J.P. Morgan Asset Management; estimates as of September 30, 2020. Emerging markets aggregate derived from nine-country sample.

Like our growth forecasts, our inflation forecasts are little changed, and our outlook for aggregate global inflation remains intact at 2.2%. Most of our developed market inflation forecasts are unchanged. Our emerging markets inflation forecast also moves sideways, at 3.3%, despite small downward revisions for several countries. These reflect improving inflation-fighting credentials at some EM central banks. However, we note that the range of outcomes around our central case is wider and more evenly distributed than in previous years.

Fiscal policy is back

Even if the recession was not attributed to more normal causes, its depth and severity left policymakers with no choice but to step in. With many monetary tools exhausted, and as many regions entered the recession with policy rates already at emergency levels (having not risen at all during the preceding expansion), governments were forced to boost fiscal spending to unprecedented levels. Meanwhile, central banks widened their intervention into asset markets and expanded their collective balance sheets to over USD 20 trillion.

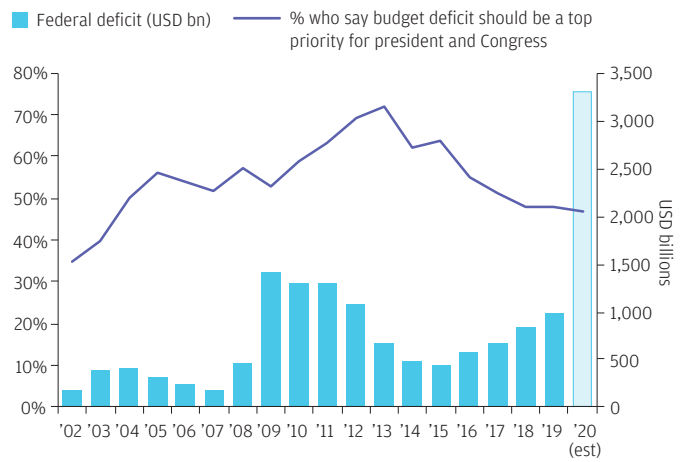
In the decade ahead, we expect more active fiscal stimulus in peacetime than at any time in modern financial history as fiscal and monetary policy pull in the same direction to achieve economic objectives. This is a marked change from the last few decades, when independent central banks were almost solely responsible for demand management. In our theme paper “The fiscal decade: The promises, problems and potential of fiscal stimulus,” we emphasize the importance of this shift.

Should we welcome or fear greater government involvement in economies? It depends: Where a country has a well-ordered economy and solid institutional robustness, market access for the funding of even quite sizable fiscal expansions is likely to remain straightforward. As a result, we see little market-induced imperative for governments to return to a period of austerity (EXHIBIT 3). This is particularly so for countries that have clear projects and investments where capital can be effectively deployed, along with strong economic stewardship. A combination of these attributes is more likely to lead to productive investment, with a greater chance of boosting long-term potential growth.

However, where these conditions are not fully met, the risk of higher inflation, higher interest rates and, at the extreme, currency crises and being shut out of capital markets grows very quickly. Overall, higher fiscal spending is an inevitability in the next cycle, and one we cautiously welcome, but with the significant caveat that poorly executed fiscal expansion can have devastating second-order effects.

U.S. voters are becoming less focused on fiscal deficits, even as they grow

EXHIBIT 3: VOTER VIEW OF BUDGET DEFICIT AND SIZE OF FISCAL DEFICIT



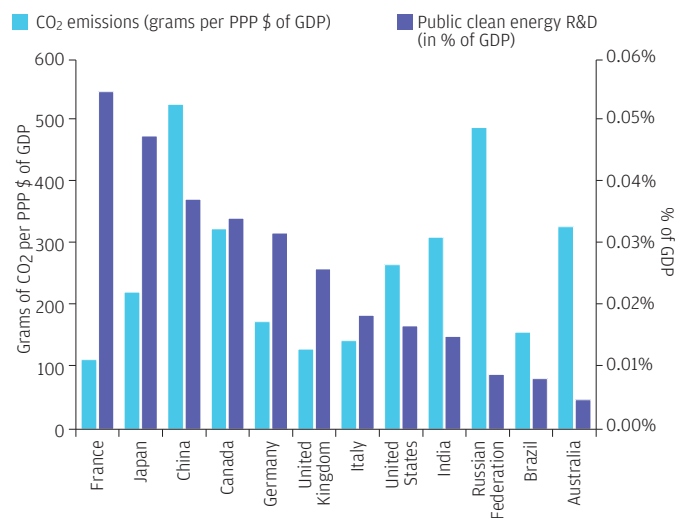
Source: Bloomberg, Haver, Pew Research Center, J.P. Morgan Asset Management; data as of September 30, 2020.

Rising to the climate challenge

Governments are not focused solely on supporting near-term activity. Many – particularly in Europe – are thinking longer term and often with particular attention to tackling climate change (EXHIBIT 4). Again, we see this as lending near-term support to demand and a longer-term enhancement to the supply side of the economy.

European countries have meaningful commitments to green investment even though they’re not at the top of the list of polluters

EXHIBIT 4: GOVERNMENT INVESTMENT IN GREENING THE ECONOMY AND LEVEL OF CO2 EMISSIONS



Source: IEA, OECD, World Bank, Mission Innovation; data as of 2019 or latest available. R&D budgets for Brazil, Russia, India and China are estimates.

Note: R&D numbers are from public sector data and may not reflect private sector or joint venture research initiatives.

This year, we include a detailed analysis of the economic implications of climate change in the LTCMAs. Despite the huge social implications of climate change, economic models have been less conclusive, in large part because simple supply-demand frameworks and national accounting conventions tend to overlook the entrenched externality issues² that dominate the economic implications, especially over the long run.

Whether climate change is tackled through less intensive usage of “brown” energy or greater investment in green energy, we see a positive economic outcome in aggregate from more sustainable investment. Indeed, for some nations and regions, investment in greening the economy could be both a politically expedient and a growth-enhancing means of deploying fiscal stimulus. Clearly, there will be winners and losers, particularly as demand for fossil fuels levels off and eventually goes into reverse. But as with other long-term challenges, we expect that the adoption of sustainable technology will both lead to new innovation and increase efficiency.

Central bank policy constrained by a more leveraged system

Amid all the uncertainties, one thing seems clear: We are likely to be in a period of elevated leverage for some time to come. As we discuss in our theme paper on the issue of leverage, “Debt, debt everywhere: The implications of a high debt world,” governments and corporates have taken on considerable additional debt to manage this period of weak revenues. This could have served to reduce future spending and investment. However, we suspect the burden of this debt will be eased thanks to a prolonged period of low interest rates courtesy of the world’s central banks.

Central banks have little choice but to focus less on managing down price inflation and more on deploying and maintaining financial stability. Simply put, this is a significant step change – arguably a dilution or even a reversal of the approach embodied by Paul Volcker as Fed chair and replicated by policymakers around the globe for the last three decades. Indeed, it might even be said that central banks’ incentives are perhaps becoming more aligned with issuers of debt than with the holders of debt.

Our debt and leverage theme paper also examines how persistently higher corporate leverage affects both firms’ financial structures and the returns from corporate financial assets. For developed market firms, low prevailing rates present an incentive for higher leverage that is likely to continue for some time. Eventually, some degree of deleveraging may occur, but only when riskless rates rise and the overall cost of debt starts to increase.

Given the terming out of corporate debt and reasonable interest cover (even for optically high levels of debt), we expect to have to adjust to a lengthy period of elevated corporate leverage. Higher leverage may well support return on equity and will likely bring a surprisingly quick return to the corporate tendency toward elevated payout ratios via both dividends and buybacks.

POLICY INTERVENTIONS CHALLENGE PUBLIC MARKET RETURNS

Our macro forecasts are largely unchanged this year – testimony to the enormous efforts of policymakers to absorb the economic shock of COVID-19 and prevent lasting economic scars. However, this intervention has significant ramifications for financial markets. Central banks’ direct manipulation of “risk-free” markets increased in the 2008–09 financial crisis. In the coronavirus crisis, their interventions have taken them deeper into the workings and pricing of risk assets. Supporting asset markets is an understandable part of the policy response, but it does now challenge expected returns, particularly in public markets.

The challenge is most acute in sovereign fixed income markets. At a headline level, extremely low starting yields translate to meager average returns across government bond markets over the next 10 to 15 years. Our estimates of equilibrium yield are unchanged for cash and 30-year bonds in most currencies, but they are modestly lower at the 10-year point to allow for higher structural demand in the belly of the curve as central bank balance sheets grow. Given the very low level of starting yields, our return forecasts are lower for all maturities in most major currencies (**EXHIBIT 5**). Indeed, with the exception of CNY, MXN and KRW, we forecast negative real returns for all sovereign bonds over the next 10 to 15 years, and in the long end of EUR, GBP and CHF curves we expect even nominal returns to be negative.

² Consumption, production and investment decisions of individuals, households and firms often affect people not directly involved in the transactions. Sometimes these indirect effects are tiny. But when they are large, they can become problematic – what economists call externalities. Externalities are among the main reasons governments intervene in the economic sphere. Source: IMF.

Given the very low level of starting yields, our return forecasts fall across maturities and currencies

EXHIBIT 5: STANDARD G4, IG, HY AND EMD FIXED INCOME RETURN PROJECTIONS

	USD		GBP		EUR		JPY	
	Equilibrium yield (%)	Return	Equilibrium yield (%)	Return	Equilibrium yield (%)	Return	Equilibrium yield (%)	Return
Inflation	2.0%		2.0%		1.3%		0.7%	
Cash	1.9%	1.1%	2.0%	1.1%	1.0%	0.2%	0.3%	0.1%
10-year bond	3.0%	1.6%	2.4%	0.9%	2.0%	0.6%	0.9%	0.4%
Long Bond Index^	3.3%	0.3%	2.6%	-1.1%	2.3%	-0.5%	0.9%	0.4%
Investment grade credit	4.5%	2.5%	4.1%	2.0%	3.0%	1.4%	1.2%	0.8%
High yield	7.6%	4.8%			5.6%	3.6%		
Emerging market debt*	6.7%	5.2%						

Source: J.P. Morgan Asset Management; estimates as of September 30, 2020.

^ EUR: 15-yr+ index; JPY: JGB Bond Index; GBP: 15-yr+ index; USD: 20r-y+ index. * EMD sovereign debt.

These are rather shocking numbers, to be sure, but they obscure two important subtleties in our return projections. First, our return expectations for EUR government bonds have actually risen slightly. Mechanically, this is because EUR yields this year are higher (i.e., less negative) than they were in the depths of the Sino-U.S. trade dispute that was still raging in autumn 2019. At a deeper level, however, the fact that EUR yields are actually higher now, after all the economic trauma of 2020, implies that Europe may have already hit its lower bound of interest rates before the pandemic swept through.

Second, given the intervention from global central banks through the pandemic and their subsequent commitments to low rates for an extended period, we have pushed out any expectation for rate normalization to at least 2024. However, once normalization starts, we think rates will rise quite swiftly - particularly if fiscal stimulus has led to some reflation, as we anticipate it will (EXHIBITS 6A and 6B).

Given that we are in a new business cycle, and following forward guidance from central banks that rates will remain low for an extended period, we significantly push out rate normalization projections

EXHIBIT 6A: CASH RATE NORMALIZATION PROJECTIONS, 2021 VS. 2020

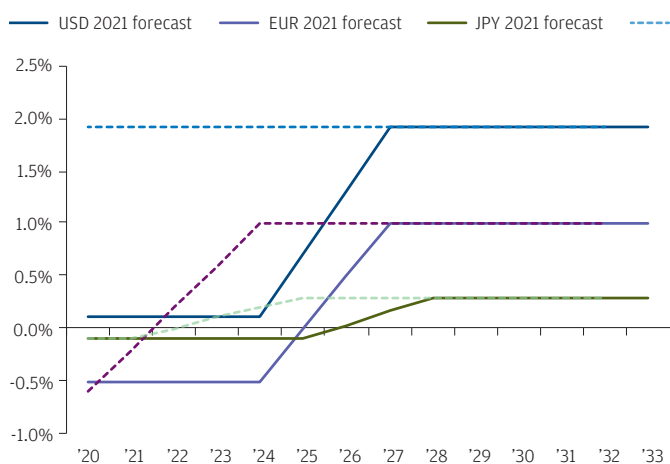
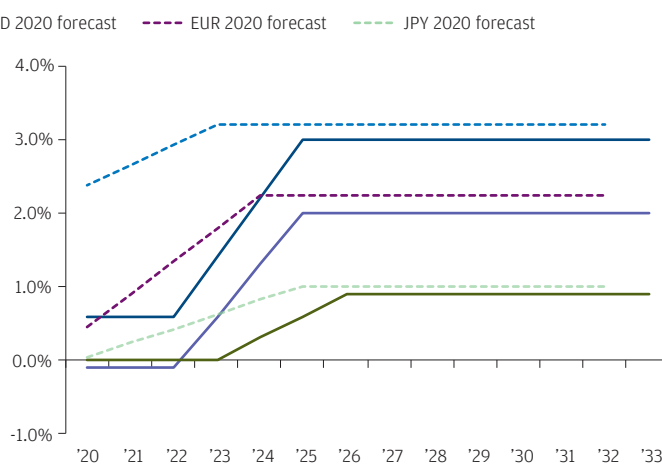


EXHIBIT 6B: 10-YEAR RATE NORMALIZATION PROJECTIONS, 2021 VS. 2020



Source: J.P. Morgan Asset Management; data as of September 30, 2020.

As a result, we see three distinct phases for sovereign returns: an initial phase of low yields and low returns - yet potentially reasonable Sharpe ratios, a middle phase of rising rates and negative returns, and a final phase in which yields have normalized and real returns are positive once again. Nevertheless, the returns in these later years will simply not be enough to offset the preceding periods of low and then negative returns as rates normalize.

Fed policy easing has also arrested the dollar's bull run. We first flagged overvaluation of the dollar in 2016, but we also noted that dollar bull (and bear) markets can run for several years (**EXHIBIT 7**) and that a stretched valuation was a necessary, but not sufficient, condition for a secular reversal.

It is possible now, however, that an extended period of U.S. "exceptionalism" - in growth, interest rates and equity market performance - may be coming to an end. As a result, we expect the dollar to weaken in most crosses over this cycle, with notable falls coming against EUR, JPY and CNY.

In the past, USD's high valuation has acted to boost our long-term forecasts of global asset returns relative to domestic returns for dollar-based investors, while increasingly weighing on forward returns available in U.S. assets for investors in other regions. However, it is only when currencies actually start to reverse their secular trends that any currency differentials begin to accrue to investors. This has served to sharply widen the dispersion of our long-term return forecasts across equities and credit markets.

Turning to credit, we believe that central banks will continue to intervene in credit markets for some time, essentially capping downside risks in the very highest quality segment of the market, at least. This should offset the impact of persistently higher leverage. As a result, our equilibrium

spread assumptions are little changed for developed market corporate credit this year: down just 5bps, to 160bps, for U.S. investment grade (IG) and unchanged at 500bps for U.S. high yield (HY) credit. This translates to lower forecast returns, down 90bps, to 2.50%, for U.S. IG - where the longer duration of the index weighs heavily. Return assumptions fall a more modest 40bps, to 4.80%, for U.S. HY; it benefits from a smaller duration drag and prevailing spread levels close to our estimate of long-term equilibrium. The pattern for European IG credit is similar, with EUR IG falling 40bps, to 1.40%, and European HY returns are unchanged at 3.60%.

For emerging market debt (EMD), central bank support for the market is less clear, and thus higher debt levels do lead us to increase our equilibrium spread assumptions. We increase our equilibrium spread assumptions for EM sovereign debt by 25bps, to 375bps, and for EM corporates by 75bps, to 400bps, translating to return forecasts of 5.20% and 4.70%, respectively.

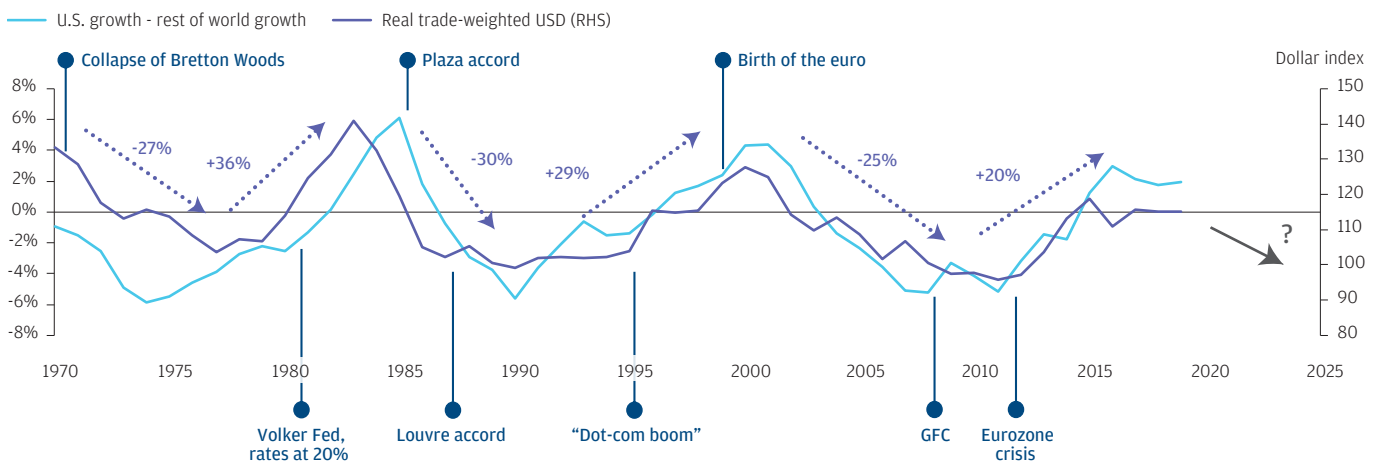
Return forecasts for credit assets in general this year are reasonably resilient - even allowing for the impact of duration in IG credit. For some time now, we have described credit as the bright spot within fixed income, but given the high starting valuations in equity markets, credit now compares very favorably with stocks, in both return and risk terms.

In equities, the main message from our forecasts this year is increased dispersion between U.S. and non-U.S. equity returns. This trend, evident in recent years, this year has become more pronounced - especially when our forecast returns for global equities are translated into USD.

In making our forecasts, the lower level of interest rates and greater use of leverage combine to lead us to modestly raise our assumption of fair valuations. As described more fully in

An extended period of U.S. "exceptionalism" may be coming to an end, leading to a weaker dollar

EXHIBIT 7: SECULAR USD BULL AND BEAR MARKETS OVER THE LAST 50 YEARS

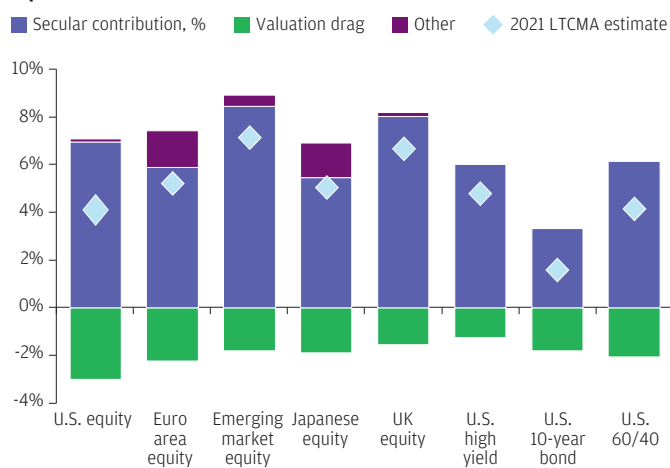


Source: Bloomberg, Haver, J.P. Morgan Asset Management; data as of September 30, 2020.

our Equity Assumptions article, we have brought our assumption of fair price/earnings (P/E) ratios more in line with the 30-year average. Even so, the starting level of valuations in this cycle is unusual, and the cheaper valuation levels that followed the rout in February and March 2020 rebounded extraordinarily quickly (**EXHIBIT 8**). Nevertheless, it is not quite correct to describe stocks as expensive. Certainly, the valuation tailwind that existed in the early part of previous business cycles is absent, but compared with valuations in bond markets, equities look attractive.

This cycle is starting at an unusual point, with equity valuations elevated and presenting a headwind for returns in many stock markets

EXHIBIT 8: CYCLICAL VS. STRUCTURAL RETURN DRIVERS FOR KEY EQUITY AND OTHER ASSETS



Source: Bloomberg, Datastream, J.P. Morgan Asset Management; data as of September 30, 2020.

The impact of elevated valuations is most stark for U.S. large cap equities, where our return forecast falls by 150bps, to 4.10%. This pulls global equity returns down by 140bps, to 5.10%, while our global equity ex-U.S. forecast is down 100bps, to 6.70%, all in U.S. dollar terms, implying better forecasts for some non-U.S. markets. UK equities lagged in 2020, contributing to a better entry level, pushing our return forecast up 60bps, to 6.70% in local currency. By contrast, Japanese equity forecasts are down 40bps, to 5.10%, and eurozone equity forecasts fall 60bps, to 5.20%, both in local currency. Our forecast for EM equity returns falls by 200bps, to 7.20%, in U.S. dollar terms. Although this represents a 230bps premium to developed market equities, the gap between DM and EM return forecasts has narrowed by 60bps this year. Valuations explain some of that shift, but it also arises because – after the U.S. equity market – EM equities showed the best performance over the last year,³ while a number of other key stock markets actually declined.

³ September 2019 to September 2020.

What's the alternative?

A trend toward lower public market asset returns, in place for some years, is increasingly prompting investors to look toward alternative and private asset markets. Our thematic paper “Alternatives: From optional to essential” explores the further mainstreaming of alternative assets and why these asset markets have grown from an esoteric backwater of the capital markets to a huge and rapidly expanding opportunity set.

In years to come, we expect access to, and liquidity in, alternative asset markets to grow robustly (**EXHIBIT 9**).

For context, the global private equity market, at the riskier end of the spectrum, is now bigger than the entire UK stock market. At the more conservative end of the spectrum, core real estate globally represents an asset pool totaling some USD 4.8 trillion.⁴ Certainly, there are trade-offs in allocating to private and alternative assets, but this is the case in any investment decision. Simply put, the trade-off between market risk and returns in many public markets offers scant reward, leading investors to consider how to monetize other risk premia, such as illiquidity.

Within financial alternatives, our forecast returns for cap-weighted private equity fall 100bps, to 7.80%. The decline reflects lower public market assumptions, even as alpha expectations are flat to up despite elevated purchase price multiples and significant dry powder. The slight upgrade in alpha expectations is based on the ability to deploy dry powder more productively in a dislocated economy and rotation into higher growth sectors. Return forecasts for most hedge fund strategies come down this year, reflecting lower returns available in public market assets. Nevertheless, we do believe that conditions for alpha generation are improving, which will heighten the importance of manager selection.

In real assets, returns have held up remarkably well. Our forecasts for core real estate rise by 10bps in the U.S. and in Asia-Pacific, to 5.90% and 6.60%, respectively, while Europe ex-UK core real estate is unchanged at 5.00%, and UK core real estate rises from 5.50% to 5.90%. There are some fears that the impact of COVID-19 will profoundly change working habits, impacting the office sector. While we acknowledge the near-term impact on absorption, we note that the optimal mix of underlying real estate assets is constantly changing, and in the long term these changes will continue to be evolutionary at the asset and sector level. Retail, for example, has been under pressure for some years, but at the same time logistics and warehousing are in high demand. The post-COVID-19 world and changing working practices may alter the mix of asset types, but in aggregate, real estate remains an important asset class with robust return prospects.

⁴ Private real estate equity, non-corporate owned, non-REITs.

In general, forecast returns for alternatives and private assets have held up better than those for public markets

EXHIBIT 9: RETURNS FOR KEY ALTERNATIVE ASSET CLASSES

	2021	2020
PRIVATE EQUITY (USD)	7.80%	8.80%
Small cap	7.30%	8.70%
Mid cap	7.40%	8.50%
Large/mega cap	8.00%	9.00%
HEDGE FUNDS (USD)		
Long bias	3.40%	4.80%
Event-driven	3.10%	4.80%
Relative value	3.60%	4.50%
Macro	2.20%	3.30%
Diversified	3.30%	4.50%
Conservative	3.10%	4.00%
REAL ESTATE-DIRECT (LOCAL CURRENCY)		
U.S. core	5.90%	5.80%
European ex-UK core	5.00%	5.00%
UK core	5.90%	5.50%
Asia-Pacific core	6.60%	6.50%
REITS (LEVERED, LOCAL CURRENCY)		
U.S.	6.50%	6.00%
European ex-UK	5.90%	5.50%
UK	6.00%	6.00%
Asia-Pacific	6.40%	6.00%
Global	6.40%	6.00%
GLOBAL INFRASTRUCTURE (USD)		
Core	6.10%	6.00%
GLOBAL TRANSPORT (USD)		
Core	7.60%	
COMMODITIES (USD)	2.30%	2.50%
Gold	2.90%	3.00%

Source: J.P. Morgan Asset Management; data as of September 30, 2020.

Infrastructure and transportation also offer standout returns to investors, with global core infrastructure returns up 10bps, to 6.10%, this year and global core transportation – a newly added asset this year – at 7.60%. Across real assets, the uplift compared with public markets is compelling.

However, it is important to recognize the trade-offs being made in alternatives broadly – notably liquidity – and the importance of manager selection in accessing these returns. In making portfolio construction choices with alternative assets, investors will increasingly need to extend traditional mean variance-based (risk-return) allocation frameworks to account for the different aspects of risk premia across alternative assets.

A NEW PORTFOLIO FOR A NEW DECADE

In last year's LTCMAs, we suggested that investors should look beyond the traditional 60/40 stock-bond portfolio. This year, the impetus is stronger still. In last year's edition, we noted that while bonds would continue to play a role in portfolios – offering protection in times of economic weakness – their other role of providing income was compromised. This year, bonds proved their worth in the first quarter, delivering handsome returns as the economy came to an abrupt halt, but looking forward, absenting a further crisis and even more negative yields, we see little prospect of a positive real return from bonds.

Investors therefore face a difficult decision: how to harvest an acceptable return without an unacceptable increase in portfolio risk. Investors may well find that the level of market risk required to generate an acceptable level of return is unpalatable unless other trade-offs – such as illiquidity risk, currency risk or increasingly dynamic asset allocation – are embraced.

Moreover, one shouldn't underestimate the scale and nature of the risks ahead. Our central scenario is essentially that policy is sensible and works to prevent lasting scars. But we think many of our forecasts have fatter tails – i.e., a wider distribution of risks around our central projection. A revival in productivity presents an even greater upside risk than in recent years, given the rapid adoption of new technologies in recent months. Persistent trade friction remains one of the key downside risks.

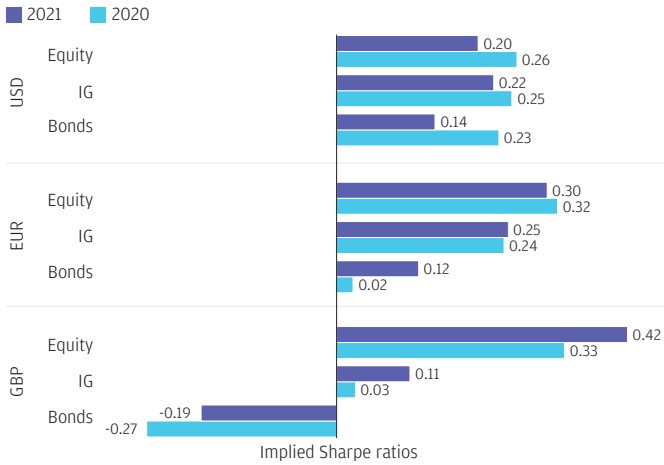
The concept of fat tails is also important in our inflation forecasts. In last year's LTCMAs, we noted that since the early 1980s inflation has consistently exhibited downside bias compared with *ex ante* expectations – something that was especially pronounced in the last cycle. With fiscal policy now pulling in the same direction as monetary policy, the upside risks to inflation are growing. To be clear, we think this plays out over the medium term, since wide output gaps will serve to contain inflation in the next few years. But for the first time in several years, we see a plausible upside risk to our inflation forecasts.

To maximize returns while acknowledging wide-ranging risks, investors should look at the widest array of assets available and consider an expanded opportunity set. In many cases, there may be regulatory hurdles to doing this, but over our 10- to 15-year forecast horizon we believe such restrictions will gradually adapt to the negative real return outlook, and unappealing Sharpe ratios, in traditionally “safe” assets (EXHIBIT 10). Most crucially, when investors design a portfolio to meet specific goals and accommodate any practical

constraints rather than starting with a market portfolio and adopting arbitrary allocation limits, it allows a clearer appreciation of optimal trade-offs in portfolios.

Sharpe ratios for U.S. dollar assets have slipped notably this year

EXHIBIT 10: 2021 AND 2020 SHARPE RATIOS FOR KEY G3 ASSETS



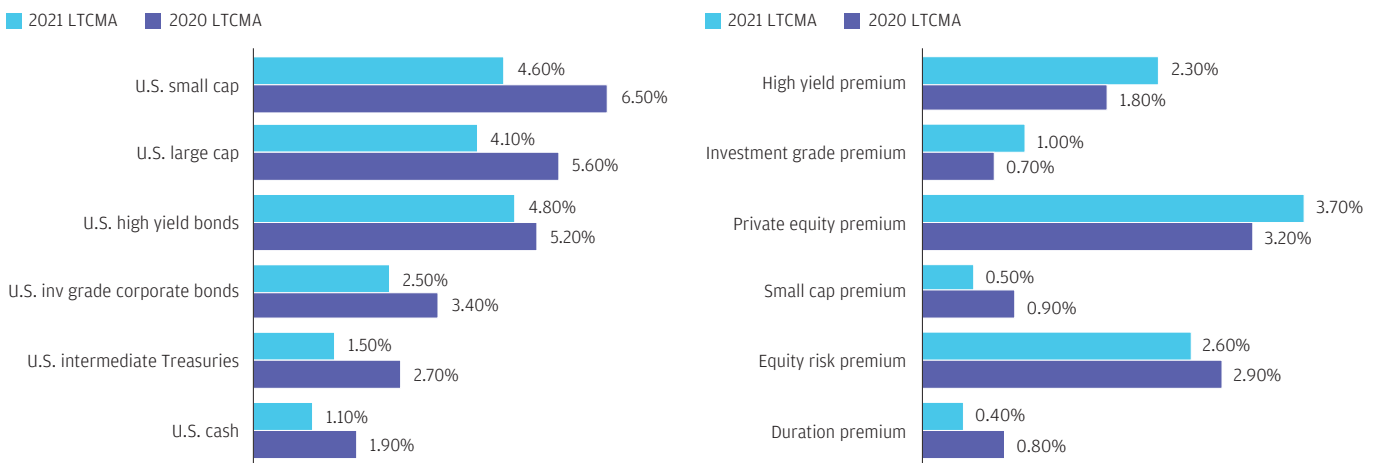
Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2020.

Greater use of scenario analysis is another important aspect of portfolio design that investors will need to adopt. Scenario analysis is widely practiced, but its adoption is often limited to testing the extremes of a given view of the world. Investors and risk managers seldom systematically consider entirely alternative states. One way to reconcile low market volatility with high uncertainty is to reflect that it is possible for tail risks to be well contained within one state of the world - through persistent central bank policy interventions, for instance. But if that state of the world were to collapse - perhaps due to a failure of central bank credibility - then investors could find themselves in an entirely different and much more uncertain environment.

Building portfolios that can be robust across different future states of the world is becoming as critical as optimizing for risks and returns around our central viewpoint. Bonds, for instance, offer limited return in our base case of stable long-term growth and balanced inflation risks, but should the combination of fiscal and monetary stimulus lead to significantly higher inflation, then bond exposures will suffer considerable losses. Real assets, by contrast, may provide a more stable store of value in a wider set of future states, but it comes at the cost of liquidity today, which is a trade-off not all investors can make (EXHIBIT 11).

Returns have fallen for most public market assets, but in risk premia terms assets such as credit, equity and private equity remain attractive

EXHIBIT 11: RETURN AND RISK PREMIA FOR KEY USD ASSETS



Source: J.P. Morgan Asset Management; data as of September 30, 2020.

Today there are no easy portfolio choices. In the past, a new economic cycle coincided with low yields and low stock market valuations. The choice for investors came down to how firmly they believed in the forthcoming recovery and economic expansion. The stock-bond frontier serves to highlight the structural challenge ahead for investors: Low yields and elevated equity valuations act in concert to push the frontier to very low levels (EXHIBITS 12A and 12B).

In prior early cycles, harvesting returns was simply a case of pushing further along the risk frontier, but in this new cycle simply assuming ever more market risk may not be the most efficient trade-off. To be clear, there are opportunities for investors - as the number of assets that sit well away from the stock-bond frontier demonstrates.

However, the absolute level of returns available in the most liquid public bond and equity markets presents a dilemma. This is not a “close your eyes and buy” world, and while we believe that the coming expansion will support risk asset markets, valuations present a challenge.

Asset markets that have seen the least policymaker intervention, such as high yield credit, EM debt and many alternative assets, still offer some promise of reasonable returns. But in asset markets where policy action has been most pronounced, future returns are impaired. The result is a number of key assets sitting meaningfully above the stock-bond frontier, implying that investors do have a path toward building a robust portfolio and accessing higher potential returns. But none of these options is risk-free - what is optically a compelling prospect from a market risk lens will inevitably involve other trade-offs.

One of the first things we are taught in Economics 101 is that there is no such thing as a free lunch. And the return forecasts in our 25th anniversary edition of the LTCMAs make this plain: The price for dealing with the pandemic today comes at the cost of tomorrow's returns in many conventional asset markets. In building a new portfolio for a new decade, we urge investors to draw on an expanded range of opportunities across public and private assets and new approaches to risk management to address the shortfall in returns across traditional asset classes. After all, lunch is not the only meal of the day.

Stock-bond frontiers are meaningfully lower than last year, showing the combined impact of ultra-easy monetary policy compressing yields and fiscal plus monetary stimulus together boosting equity valuations

EXHIBIT 12A: USD STOCK-BOND FRONTIERS

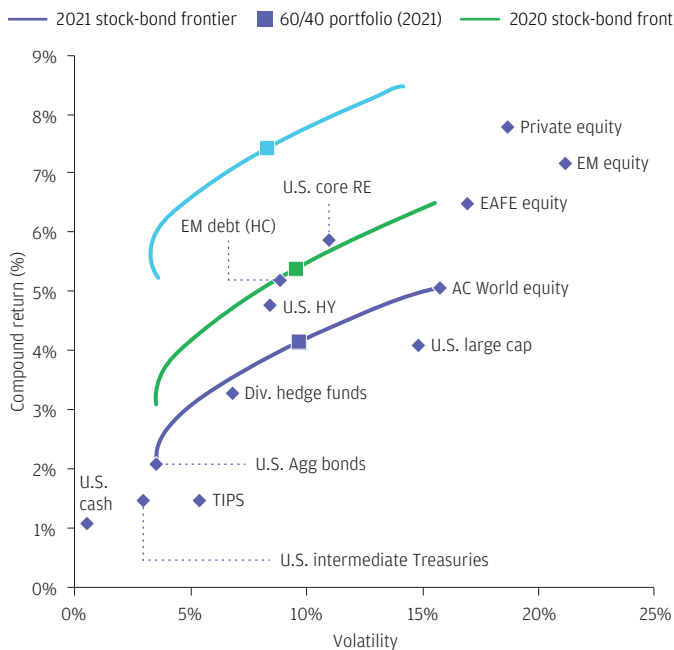
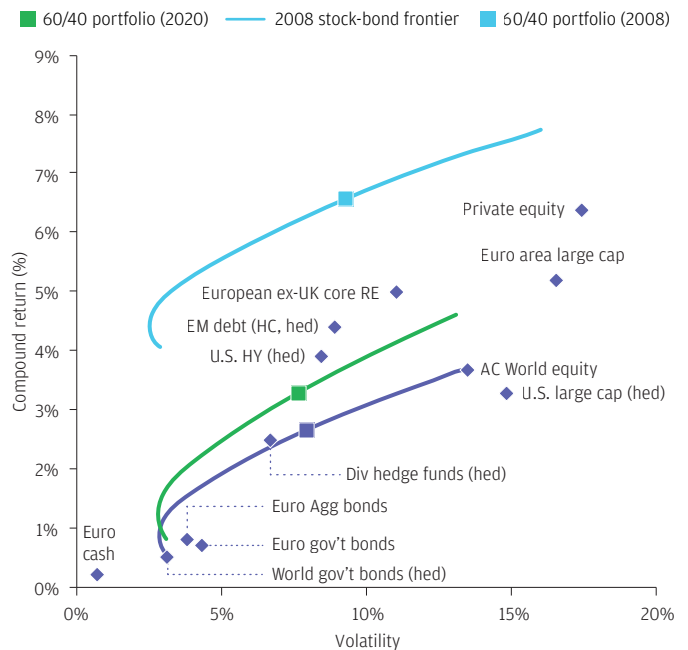


EXHIBIT 12B: EUR STOCK-BOND FRONTIERS



Source: J.P. Morgan Asset Management; data as of September 30, 2020.

A new business cycle begins: Growth prospects unshaken; range of possible long-run inflation outcomes widens

Michael Hood, *Global Strategist, Multi-Asset Solutions*

Dr. David Kelly, CFA, *Chief Global Strategist, Head of Global Market Insights*

Benjamin Mandel, Ph.D., *Global Strategist, Multi-Asset Solutions*

IN BRIEF

- The macroeconomic forecasts underlying our annual asset class assumptions grapple this year with the changes wrought by the global pandemic, the long-term impacts of which are not yet clear. Given that the coronavirus recession depressed economic starting points, we add a small cyclical bonus to most growth projections.
- Our developed market (DM) trend growth rate slips from last year's, but the overall forecast rises with the inclusion of the cyclical bonus. Relatively advantaged by demographics and technology adoption, the U.S. stands near the top of the growth list while Japan continues to trail.
- Emerging market (EM) trend growth edges downward but continues to outpace developed markets as EM productivity and human capital gradually converge with DM levels.
- Long-term inflation projections are little changed this year amid uncertainty in both directions. Significant slack and liquidity trap dynamics risk unanchoring expectations downward while, on the upside, several potential inflation drivers and the easing of decades-long structural drags could swing inflation higher longer term - a rough balance of forces.



The year 2020 will forever be remembered as the year of the virus. And just as scientists have grappled with unanswered questions about the pathogen, uncertainty about the impact of the novel coronavirus hangs over the economic forecasts embedded in our Long-Term Capital Market Assumptions (LTCMAS) this year. In many ways, it's too early to tell.

The word “recession” is normally applied to periods of declining economic activity, and by this convention the recession that engulfed the global economy in the first half of 2020 is already over. We also note that the LTCMAS normally ignore short-term, cyclical fluctuations. This time, however, the depth and nature of the coronavirus recession raise two key questions for our long-term forecasts. First, to what extent will the recession change economic agents' and governments' long-term behavior in ways that could impact growth and inflation dynamics? Second, how should we adjust our assumptions so they take account of the economic slack created by the recession?

On the first question, about economic growth, we believe it is just too early to say. While the pandemic could change both economic behavior and policy, some of the behavioral changes may be visible in day-to-day life without doing much

to alter overall growth outcomes. And other behavior changes may prove to be offsetting: While a few would likely restrain long-term expansion, others might accelerate it. By next year, we should have a firmer grasp on some of these trends.

With respect to the recession's depth, though, we are including a small boost to most economies' average growth rates to take account of their weak cyclical starting points. As a result, our growth forecasts have generally edged higher this year, mostly on account of this “cyclical bonus” (EXHIBIT 1).

Our inflation forecasts have not moved much this year, but we see notably more uncertainty than historically around the long-term outlook. On the one hand, the creation of significant slack in most economies, at a time when central banks had been persistently missing their targets, points to the risk that inflation expectations become unanchored to the low side. At the same time, some of the forces that generated that extended period of disinflation may now be diminishing – and we see new possible factors that may drive inflation upward. As a result, we find noteworthy tail risks on both sides of our projections.

Our 2021 assumptions anticipate slow real GDP growth globally, with little change to trend assumptions but small cyclical bonuses applied to several economies

EXHIBIT 1: MACROECONOMIC ASSUMPTIONS (%)

	Real GDP			Inflation		
	2021	2020	Change	2021	2020	Change
DEVELOPED MARKETS	1.6	1.5	0.1	1.6	1.6	0.0
United States	1.8	1.8	0.0	2.0	2.0	0.0
Euro area	1.3	1.2	0.1	1.3	1.3	0.0
Japan	1.0	0.6	0.4	0.7	0.8	-0.1
United Kingdom	1.6	1.2	0.4	2.0	2.0	0.0
Canada	1.7	1.6	0.1	1.8	1.8	0.0
Australia	2.4	2.2	0.2	2.3	2.3	0.0
Sweden	2.0	1.7	0.3	1.6	1.6	0.0
Switzerland	1.5	1.1	0.4	0.5	0.5	0.0
EMERGING MARKETS	3.9	3.9	0.0	3.3	3.3	0.0
China	4.4	4.4	0.0	2.5	2.5	0.0
India	6.9	7.0	-0.1	5.0	5.0	0.0
Brazil	2.4	2.4	0.0	4.3	4.5	-0.2
Russia	1.1	1.2	-0.1	5.3	5.5	-0.2
Korea	2.1	2.2	-0.1	1.8	2.0	-0.2
Taiwan	1.6	1.6	0.0	1.0	1.1	-0.1
Mexico	2.5	2.2	0.3	3.7	3.7	0.0
South Africa	2.5	2.2	0.3	5.3	5.3	0.0
Turkey	3.1	3.0	0.1	8.5	8.0	0.5
GLOBAL	2.4	2.3	0.1	2.2	2.2	0.0

Source: J.P. Morgan Asset Management; estimates as of September 30, 2020. Emerging markets aggregate derived from nine-country sample.

DM GROWTH: THE STRUCTURAL AND THE CYCLICAL

In generating this year’s forecasts for developed market (DM) growth, we started with the question, “What would have happened to the numbers if the coronavirus shock had not occurred?” We concluded that they most likely would not have moved much. The slow-moving inputs to these figures – information about the labor force, investment spending and total factor productivity (TFP) – barely budged relative to 2020. Rolling population projections by a year did not significantly alter our expectations for long-term labor force growth, in part because in recent years we have already taken on board much of the ongoing demographic transition in these aging economies. Nor have we observed major changes to business or public sector investment patterns. Finally, while the past year has brought some signs of accelerating total factor productivity growth, thus far the pickup appears small and our forecasts already anticipated improvement after an extended weak spell.

In thinking about the long-term effects of the coronavirus shock, we considered several that might affect growth trajectories. One is globalization. Already stagnant in recent years, globalization could retreat if companies choose to shorten their supply chains and if countries provide incentives to promote heavier reliance on local resources. Such a development would likely create winners and losers, but in broad terms we would think of it as a negative productivity shock, albeit one that might damage emerging market (EM) economies more than developed markets.

Another, similar productivity drag could result from renewed emphasis on redundancy at the expense of efficiency (such as holding larger inventory stockpiles or relying on multiple suppliers in different countries), although reduced volatility might accompany this trend. A third is de-densification. If many people decide to decamp from cities to suburbs or rural areas, this would also likely trim productivity growth, which is higher in urban centers. This response to the shock, however, might spur a new wave of technology adoption or accelerate an existing one, boosting productivity in a similar fashion to the 1990s.

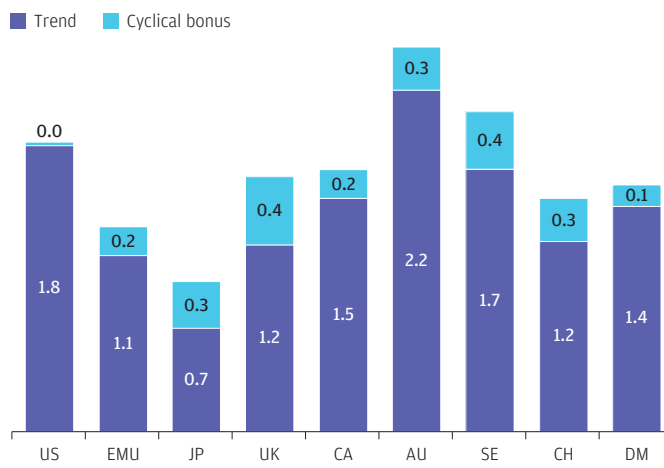
Alongside these potential influences on productivity we also considered a few possible influences on the labor force, including higher women’s participation, facilitated by work-from-home arrangements or a decline in senior participation. We concluded, though, that none of these changes to productivity and labor has conclusively manifested itself thus far. Moreover, some, such as de-densification, would likely exercise only very small effects on growth if they did materialize. Finally, we cannot yet say whether a combined technology and anti-globalization shock would be a net positive or negative for growth. We will reevaluate developments on all these fronts next year.

In estimating this year’s cyclical bonus, given the low current levels of activity relative to trend, it is important to recognize that most economies have moved from the best of times to the worst. At the start of 2020, many economies were operating above their potential levels, with low unemployment rates. We therefore do not take that starting point as the equilibrium to which economies will inevitably return.

Instead, we compare the pre-shock unemployment rate in each economy with our estimate of a long-term expected average level. From that gap, we estimate the degree to which GDP had been running above its trend. We then subtract that from the amount that GDP has fallen this year to see how much each country can reasonably be expected to outgrow its long-term potential from here, and amortize that over our forecast period to calculate the cyclical bonus. The bonuses range from zero to 0.4 percentage points (ppt), as shown in **EXHIBIT 2**. We expect most of that slack to be taken up in the next few years, especially if a vaccine is developed soon.

Given depressed post-shock starting points, we have added cyclical bonuses to our trend growth projections

EXHIBIT 2: GDP GROWTH BREAKDOWN (% PER ANNUM)



Source: J.P. Morgan Asset Management; estimates as of September 30, 2020.

AUSTRALIA, U.S. TOP DM GROWTH LIST; JAPAN CONTINUES TO TRAIL

Our aggregate DM growth rate forecast rises 10bps, to 1.6%, given the inclusion of the cyclical bonus, but the trend growth rate actually slips to 1.4%, from 1.5% last year.

The U.S. growth rate forecast stands near the top of developed markets, even as its strong initial post-shock rebound means its cyclical bonus rounds to zero. Our trend estimate for the U.S., 1.8%, is unchanged from last year. Demographics again represent a relative advantage for the U.S. among developed markets, with the labor force projected to grow 0.6ppt per year vs. the 0.3ppt DM average. We also continue to project a slightly faster pace of TFP growth in the U.S. than elsewhere, given the economy's generally rapid rate of technology adoption.

Australia leads in DM growth with a 2.2% trend rate, buoyed by highly favorable demographics. We note two downside risks to our Australian estimate: increased domestic discussion about immigration restrictions and the possibility of a turn toward household deleveraging after an extended cycle of expansionary behavior tied to a strong housing market. At the other end of the spectrum, Japan continues to trail other DM economies, reflecting its demographics. Still, we nudge its trend rate higher, to 0.7% from 0.6%, given a secular increase in senior participation in the workforce. In contrast, we lower the euro area trend rate by one-tenth, to 1.1%, largely because of less favorable population projections for Spain.

DM INFLATION LITTLE CHANGED, BUT WITH GREATER TAIL RISKS

Long-term inflation projections are in flux following a lengthy period in which multiple factors steadily pushed our forecasts downward. What has changed? For one, the global coronavirus recession that has lowered GDP starting points (for which we compensate with a cyclical bonus in real terms) has also pushed prices lower globally. As a result, our forecasting exercise takes place amid strong cyclical crosscurrents: We expect some payback for the disinflationary shock to push against slack and persistent liquidity trap dynamics.

There is also a more structural shift underway as the trends that have anchored our low inflation view (and the downside risks around it) are becoming less aligned. The influence of monetary policy efficacy, technological innovation and adoption, globalization and demographic change – which have

all dragged on inflation for the last two decades – is exerting increasingly mixed effects, and new upside risks are coming into view. As a result, while our DM inflation estimates are broadly stable, the plausible range of outcomes over the next 10 to 15 years is considerably wider.

EXHIBIT 3 illustrates the forces we expect to be exerted on inflation over our forecast horizon. In the early years, we see risks as being roughly balanced and, if anything, still tilted to the downside. For one, there is still ample slack in the system following the shutdown measures of early 2020, and with rates back at the zero lower bound, central bankers will continue to struggle to push inflation to their targets.¹ There are also many high growth, low inflation impulses that have been accelerated by the COVID-19 pandemic. Technology innovation and adoption trends, in particular, have been given a boost; e-commerce and work-from-home arrangements are the most visible of these trends.² Demographics are a near-term headwind, especially as economies approach the tail end of their baby boomers' transition to retirement, with the associated downdrafts to aggregate demand.

Over the course of our forecast horizon, aggregate inflation risk swings to the upside

EXHIBIT 3: MACRO TRENDS AND THEIR INFLUENCE ON DM INFLATION

Macro trend	Prior decade	Early years (0–5)	Late years (5–15)
Technology	-	--	-
Slack	--	-	0
Demographics	-	-	0
Globalization	-	+	0
Monetary policy efficacy	--	-	+
Fiscal policy	0	+	+
Inequality	0	+	+
Climate change	0	++	+

Source: J.P. Morgan Asset Management; assessments as of September 30, 2020.

¹ David Kelly et al., "Central banks and sluggish growth: The failure of monetary stimulus," *2020 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, November 2019.

² Benjamin Mandel et al., "The future impact of e-commerce on the economy: New economy, same old returns?" *2020 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, November 2019, and Benjamin Mandel et al., "The impact of a global work from home labor force: Market implications of skill-biased tech adoption and lower urban density," J.P. Morgan Asset Management, June 23, 2020.

These low inflation forces are counterbalanced in the near term - and possibly overwhelmed in the long term - by a number of countervailing forces:

- The transition to, or toward, neutral of what have been long-standing inflation drags: technology, slack and demographics.
- The likely outright reversal of other disinflationary forces, including globalization and monetary policy efficacy. The globalization transitions have already begun to play out, after stalling along several dimensions post-global financial crisis (GFC). Now globalization has been forced into a moderate retreat by Sino-U.S. trade tensions and more cloistered migration policies due to COVID-19, both of which have incrementally increased firms' marginal costs of intermediate inputs or labor.
- The possibilities that the tacit coordination between fiscal and monetary authorities during the COVID-19 recession proves to be persistent,³ and that the whiff of debt monetization is enough to move inflation expectations higher. Indeed, for inflation expectations to normalize to their pre-GFC levels, some level of monetary-fiscal coordination might be a necessary precursor.
- The appearance of three upside risks relatively novel in our framework: fiscal policy, operating through more persistently accommodative policy stances over the cycle; climate change - rising carbon pricing as new climate transition policies come into being or as existing ones are strengthened; and inequality, with the potential for redistributive policies (e.g., a rise in the minimum wage) to alter corporate cost structures.

GAPS BETWEEN OUR OUTLOOK AND HISTORICAL REALIZED INFLATION

In light of the near-term balance of macro forces on inflation, as well as the string of forecast downgrades in recent years that have brought our projections much closer to recent realized inflation, we make few changes to our DM inflation forecasts this year. Japan is an exception, with a large gap between realized inflation and our outlook: 90 basis points (bps) since last year's publication and 65bps over the last five years, which prompts us to make a small downward revision.

We can also use the gap between our outlook and historical realized inflation to gauge the upside inflation baked into our assumptions. Our current forecasts for DM inflation over the next 10 to 15 years are 20bps-30bps higher vs. realized inflation over the past decade, which strikes us as reasonable for the expected evolution of macro risks. Of course, the tail risks in either direction deriving from these factors could be much larger.

EM GROWTH: EDGING DOWNWARD

Our forecasting process for EM economies resulted in slightly larger changes than for DM economies. As with the DM countries, we are not yet taking on board possible long-term effects from the coronavirus shock, though one phenomenon we will be monitoring is the alteration - particularly any shortening - of supply chains. Instead, the adjustments we make to EM growth assumptions reflect fresh analysis of existing conditions, and similarly to recent years, the results are all growth downgrades. Still, our aggregate EM trend growth forecast, 3.8%,⁴ remains above the DM pace. The EM-DM gap owes only partly to demographics, which are just moderately more favorable in emerging economies. A faster pace of improvement in human capital also helps, as does an advantage in total factor productivity growth. Economic structures also play a role, particularly the orientation of major EM economies, such as Korea and Taiwan, toward high tech manufacturing, a sector characterized by rapid productivity growth. EM economies' edge also comes partly from a convergence effect: EM countries generally operate away from the global technology frontier but are converging toward it.

In the largest change to an EM trend growth forecast, we trim India to 6.5% from 7.0%.⁵ After an extensive period of very rapid growth, India has slowed in the past few years. Its structural reform process has also lost momentum, leaving the economy less open and flexible today than we expected. And the domestic banking sector is going through a deleveraging process that may inhibit efficient resource allocation in coming years. Due to a combination of these factors, the country's investment rate has fallen off fairly sharply. Yet even with our downgrade, India's growth forecast leads all emerging economies by a wide margin, reflecting its ample room for convergence, its young and growing population, and the rapidly improving education and skill level of its human capital.

³ See the analysis in this volume and John Bilton et al., "The fiscal decade: The promises, problems and potential of fiscal stimulus," *2021 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, November 2020.

⁴ While the EM trend growth rate this year is 3.8%, our long-term EM forecast is 3.9% with the inclusion of the cyclical bonus.

⁵ While India's trend growth rate this year is cut to 6.5%, our long-term forecast for India is 6.9% with the inclusion of the cyclical bonus.

We have shaved a few other EM trend forecasts. Korea edges down to 1.9%, from 2.2%, mostly on steadily weakening population projections. Also dipping slightly: commodity-oriented Russia (to 0.9%, from 1.2%). Brazil slips slightly (to 2.3%, from 2.4%), given persistently weak economic policy formation, an unfriendly global backdrop and low domestic saving rates.

Having cut China significantly last year, we keep its trend forecast unchanged, at 4.4% - the second highest in our sample after India. On the surface, China's demographics look highly unfavorable, but we think ongoing internal migration to cities will continue providing a partial offset. The economy's gradually increasing emphasis on technology manufacturing and online activity should also help. In contrast with other forecasts, the China number does not represent a "steady state" figure but rather captures a gradual decline in trend growth over time, extending the trend evident during the past decade, as local standards of living gradually move closer to developed markets'.

We have included cyclical bonuses for most EM economies that, like their DM counterparts, have only partly clawed back the significant output losses of the first half of 2020 (**EXHIBIT 4**). EM economies, though, generally show more path dependence than is the case in developed markets, and some of the decline in production will likely never be recouped. Moreover, China has bounced back extremely rapidly and does not appear to be operating with much spare capacity. This combination of factors limits the aggregate EM cyclical bonus to 0.1ppt.

EM INFLATION: DISINFLATIONARY BABY STEPS

The main challenge for our EM projections is to distinguish the signal from the noise in recent inflation outcomes. China and India's run of high inflation over the past year was predominantly driven by food and commodity inflation, which is likely to be mostly transient over our forecast horizon. Where we take more signal aboard is the broad-based slowing of inflation in most of the EM economies for which we publish estimates (with the noticeable exceptions of China and India), which has pushed recent outcomes below our LTCMA forecasts.

To be sure, part of the decline is cyclical and orients around relatively weak global goods price inflation. But equally material are the lower frequency trends toward lower inflation in Brazil and Russia, and the convergence to DM inflation levels in parts of emerging Asia. We make several 10bps-20bps cuts to our forecasts to reflect these trends. Turkey is the exception, where inflation rates remain persistently around 10%, prompting a 50bps upward revision to our forecast.

This year, our forecasts include a cyclical bonus in both DM and EM economies

EXHIBIT 4: GDP TREND GROWTH FORECASTS

	2020 GDP	Change in trend forecast	Cyclical bonus	2021 GDP
DEVELOPED MARKETS	1.5	-0.1	0.1	1.6
United States	1.8	0.0	0.0	1.8
Euro area	1.2	-0.1	0.2	1.3
Japan	0.6	0.1	0.3	1.0
United Kingdom	1.2	0.0	0.4	1.6
Canada	1.6	-0.1	0.2	1.7
Australia	2.2	0.0	0.3	2.4
Sweden	1.7	0.0	0.4	2.0
Switzerland	1.1	0.1	0.3	1.5
EMERGING MARKETS	3.9	-0.1	0.1	3.9
China	4.4	0.0	0.0	4.4
India	7.0	-0.5	0.4	6.9
Brazil	2.4	-0.1	0.2	2.4
Russia	1.2	-0.3	0.2	1.1
Korea	2.2	-0.3	0.1	2.1
Taiwan	1.6	0.0	0.0	1.6
Mexico	2.2	0.0	0.3	2.5
South Africa	2.2	0.0	0.2	2.5
Turkey	3.0	0.0	0.2	3.1

Source: J.P. Morgan Asset Management; estimates as of September 30, 2020. Emerging markets aggregate derived from nine-country sample.

I Thematic articles

Weighing the investment implications of climate change policy

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IN BRIEF

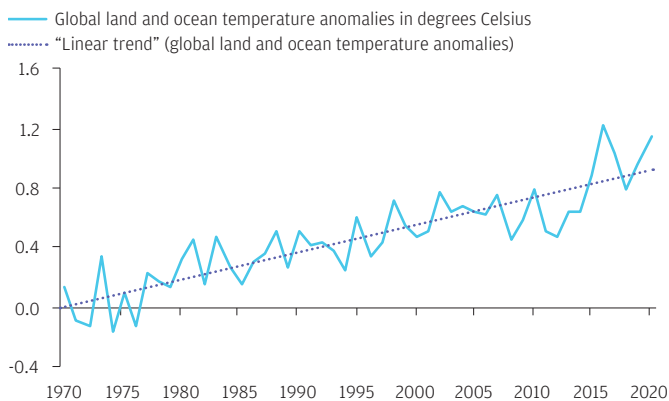
- With global temperatures on track to increase by more than three degrees by the end of the century, shifts in public climate policy could begin to accelerate within our 10- to 15-year investment horizon. By moving early, investors can benefit from climate-related opportunities before they are priced in.
- While policies that reduce the energy intensity of GDP (the “fewer fossils” approach) can help avoid an increase in emissions, we will need to shift toward producing significantly more green energy to actually reduce emissions (the “more green” approach).
- In aggregate, the impact of the transition to a low carbon economy on GDP growth, inflation and interest rates is likely to be limited. But much will depend on whether the transition to a low carbon economy is “sticks-based,” with private businesses bearing the bulk of the cost of the transition, or “carrots-based,” with governments supporting the transition through subsidies and other forms of fiscal stimulus. A significant and sustained fiscal stimulus, for example, could increase equilibrium interest rates by up to 60 basis points.
- Investors also need to take into account important geographical and sector differences in the trajectory of climate policy. Countries like Russia, South Africa and Brazil are likely to be hit hardest by a shift to a low carbon economy, lacking the fiscal headroom to cushion the significant structural changes. In contrast, most European countries seem better positioned.

The earth's atmosphere is changing in ways that have not been seen in some 800,000 years - the evidence is overwhelming. Following an unprecedented increase in atmospheric concentrations of carbon dioxide (CO₂), temperatures are already one degree above their pre-industrial average, and they are on track to increase by more than three degrees by the end of the century (**EXHIBIT 1**). Our climate is a global public good; unless policymakers provide clear incentives for companies to address climate change, we are unlikely to fully avert the physical risks that would be associated with significant warming.

Will governments move decisively to address climate change and begin a transition to a low carbon economy? Our base case scenario anticipates that they will, through some mix of meaningful carbon pricing, subsidies for green investments and tighter environmental regulation. Given the short time horizons of many politicians, strong vested interests and continued denial, it is far from certain that there will be global, coordinated action in time to stave off the most damaging long-term effects of climate change. But countries appear increasingly willing to take ambitious action even in the absence of a global consensus. This has coincided with an increasing focus on "carbon border adjustment taxes" - targeted tariffs on carbon-intensive imports that reduce the risk of putting domestic industries at a competitive disadvantage through ambitious climate policies. As a result of this growing momentum, investors need to consider the very real risks and opportunities associated with shifts in climate policy.

Global temperature anomalies have been increasing steadily over the past five decades

EXHIBIT 1: GLOBAL TEMPERATURES, 1970-2020



Source: NOAA National Centers for Environmental Information, Climate at a Glance: Global Time Series, published April 2020, <https://www.ncdc.noaa.gov/cag/>, J.P. Morgan Asset Management.

Note: The simple linear trend is likely to underestimate future increases in temperatures in a "business as usual" scenario. That is because of important non-linearities and tipping points in the climate system. Temperature anomalies are defined as deviations of temperatures from their long-term mean.

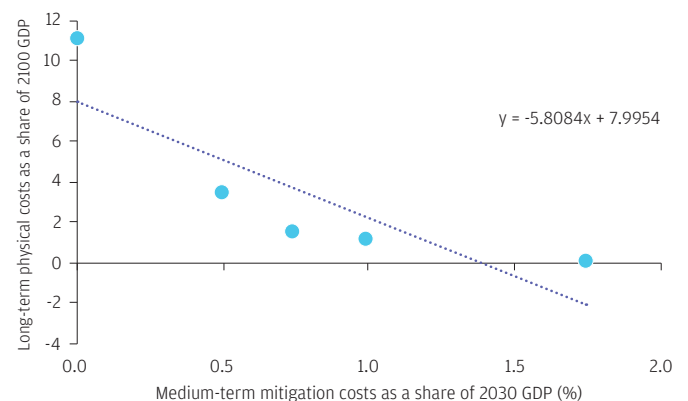
Reducing global warming by one degree would necessitate a sacrifice of slightly less than 1% of the level of global GDP by 2030, according to academic evidence reviewed by the United Nation's Intergovernmental Panel on Climate Change (IPCC). And every percentage point of GDP that we sacrifice in the medium term is expected to reduce some of the physical consequences of climate change in the long run and thus increase GDP by over 5% by 2100 (**EXHIBIT 2**). Some estimates project the beneficial effects could be substantially greater, suggesting that climate policy has additional value in terms of providing insurance against tail risks.

As we see it, the transition to a low carbon economy could be "sticks-based," with governments mandating and enforcing sustainable behavior and private businesses bearing the bulk of the cost of the transition, or it could be "carrots-based," with governments incentivizing green behavior through subsidies and other forms of fiscal stimulus. At this stage, it is unclear which path will be chosen. In contrast, the evidence is clear that reducing the energy intensity of GDP (the "fewer fossils" approach) will not be enough to avoid significant increases in temperatures. It will be essential to also generate energy in less carbon-intensive ways (the "more green" approach).

In aggregate, the impact of the transition on GDP growth, inflation and interest rates is likely to be limited, we believe. But there is considerable uncertainty about the shape and structure of the transition, so investors may well need to revise their assumptions. They will also need to understand important geographical and sector differences as they identify investment risks and opportunities. In this paper, we consider how the transition might unfold and what the investment implications might be over the 10- to 15-year horizon of our Long-Term Capital Market Assumptions (LTCMAS).

While the transition to a low carbon economy has near-term costs, it prevents much larger damages in the future

EXHIBIT 2: LONG-TERM PHYSICAL COSTS OF CLIMATE CHANGE, MEDIUM-TERM MITIGATION COSTS OF THE TRANSITION TO A LOW CARBON ECONOMY



Source: Various academic studies, J.P. Morgan Asset Management Multi-Asset Solutions.

TRANSITIONING TO A LOW CARBON ECONOMY: USING STICKS OR CARROTS?

Policymakers must first decide who will pay for the transition. Their second choice will consider the structure of the transition (**EXHIBIT 3**) - specifically, how much weight to put on policies that reduce the energy intensity of GDP (the “fewer fossils” approach) and how much weight to put on policies that generate energy in less carbon-intensive ways (the “more green” approach).

Measures to reduce the energy intensity of GDP (the “fewer fossils” approach) include more fuel-efficient cars and green retrofits of existing buildings. Historically, these measures have struggled to offset the effects of growing GDP - one reason emissions hit an all-time high in 2019. As a result, any net reduction in emissions will rely on generating energy in less carbon-intensive ways (the “more green” approach).

The path to a low carbon economy can take different forms

EXHIBIT 3: DIFFERENT APPROACHES TO CLIMATE POLICY

		Who bears the cost	
		Public sector (“carrots”)	Private sector (“sticks”)
More green energy (“more green”)	Government investment in green energy		Requiring utilities to favor green energy
	Combination of green energy investments and incentives for higher energy efficiency		Imposing carbon prices and allowing the private sector to choose how to reduce emissions
Lower energy intensity (“fewer fossils”)	Fiscal incentives for higher energy efficiency		Product-level regulation (e.g., fuel efficiency)

Source: J.P. Morgan Asset Management.

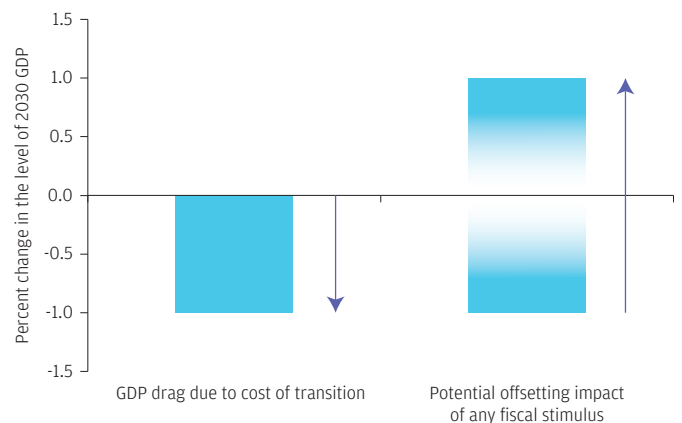
Given sharp declines in the relative cost of renewable energy over the past few years and an expectation that costs will fall further, a significant increase in the use of green energy is well within reach. The International Energy Agency (IEA) predicts that in a “sustainable development scenario,” reductions in the carbon intensity of GDP could help cut carbon emissions by 45% relative to their current levels by 2040.

Technology will largely determine how we reduce emissions. But who pays for it is, in essence, a political choice. The cost either can be borne by today’s households and businesses or it can be financed by public debt and shifted onto future generations, with much of the debt ending up on sovereign balance sheets. We could also see a hybrid approach in which some of the transition cost is borne by public-private partnerships.

In a sticks-based approach, governments shift the cost of climate change onto the private sector - e.g., by imposing significant carbon taxes or regulation. Using sticks to limit the expected rise in temperatures to 2°C could reduce 2030 GDP by around 1%, according to the academic studies summarized above. Using carrots in lieu of sticks, governments could bear the cost for the transition by providing debt-financed green stimulus. This fiscal stimulus might be used to build low carbon infrastructure, subsidize green technologies, increase public expenditure on green R&D or invest broadly in a country’s capacity to adapt to climate change. These efforts could provide fiscal tailwinds strong enough to offset any medium-term costs of the transition to a low carbon economy. We estimate that such an expansionary transition could increase the level of global GDP by 2030 by around 1% (**EXHIBIT 4**). However, the impact of fiscal tailwinds on medium-term GDP is highly uncertain and depends on the extent to which climate-related expenditure crowds out other forms of investment. While a carrots-based transition would be associated with a significant increase in public debt, by tilting public investment toward green infrastructure, low carbon R&D or cheaper and sustainable transportation, governments would be able to reduce the fiscal cost of adapting to a hotter environment in the future.

Fiscal stimulus could more than offset the (small) cost of a transition

EXHIBIT 4: THE IMPACT OF FISCAL STIMULUS ON GLOBAL GDP



Source: Various academic studies, J.P. Morgan Asset Management.

THE PAIN OF TRANSITION VARIES GREATLY BY COUNTRY

The fairly modest impact on aggregate GDP masks significant differences among countries. Countries that have a highly carbon-intensive domestic economy or are home to large carbon-intensive corporations will find the transition more painful than those with less carbon intensity. Countries that are currently large net exporters of fossil fuels or countries that are home to large energy companies will also experience a more difficult transition.

In our view, Russia, India, South Africa, Canada, Australia and Brazil will likely be the hardest hit by the transition to a low carbon economy (**EXHIBIT 5**). While Australia and Canada have the fiscal headroom to alleviate the short-term pain by taking on more debt, Brazil, Russia and South Africa do not (**EXHIBIT 6**). India is likely to find the transition difficult too. As a result of these challenges, Russia could see the transition reduce its level of GDP by more than 6.5% over roughly the next 30-40 years – a significant drag on growth.

This gives a sense of the potential impact of climate policy on the most heavily exposed countries. However, the precise impact on a given country is highly uncertain and depends on the exact shape of the transition. As a result, we have not reflected this in our 10- to 15-year central outlook.¹

Conversely, Switzerland, the European Union and Japan look much more transition-ready. They are less reliant on fossil fuels, have the willingness to embrace the transition to a low carbon economy and are in many cases already leaders in green technologies. In addition, these countries have strong geopolitical incentives to reduce their reliance on fossil fuels, given their dependence on a handful of oil- and gas-exporting countries.

¹ See, for example, BCG, “The economic case for combating climate change,” September 2018, for a detailed bottom-up assessment of the transition costs that some countries may face.

There are significant regional differences in how difficult the adjustment will be

EXHIBIT 5: CARBON INTENSITY ACROSS GLOBAL MARKETS AND ECONOMIES

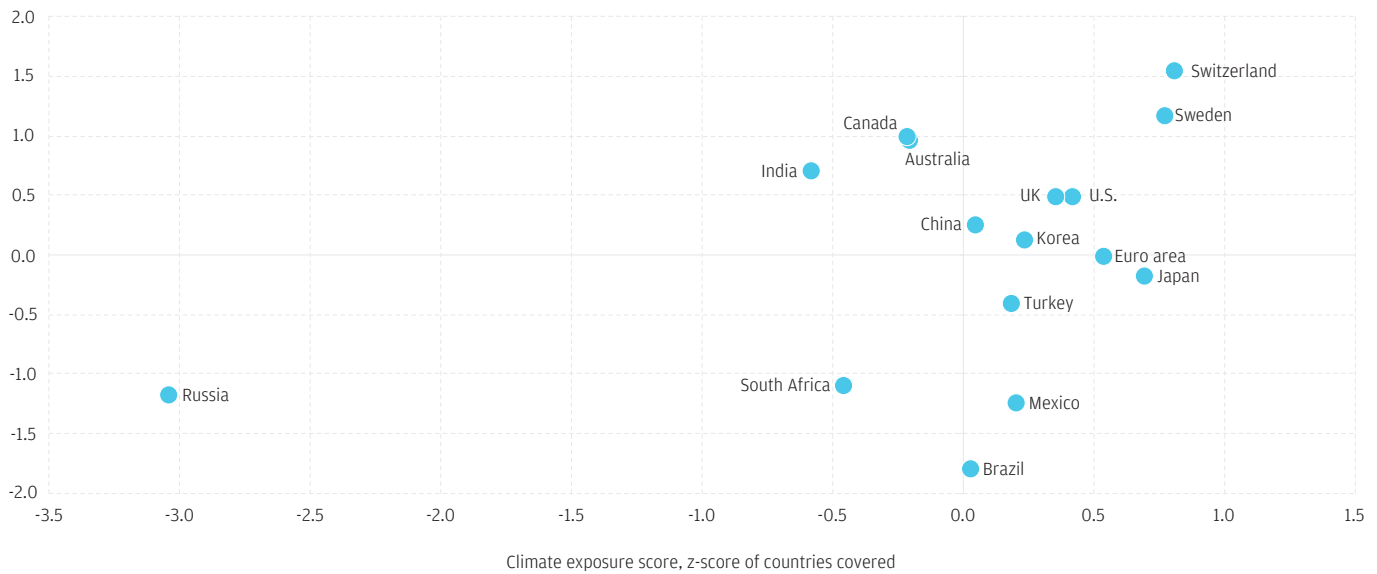
Market	Domestic economy (z-scores)		Domestic equity market (z-scores)		Total rank
	Fuel exports as a % of merchandise exports	Carbon intensity as a % of GDP	Exposure to energy and materials	Carbon intensity of domestic equity market	
United States	-0.2	0.4	0.8	0.6	0.4
Euro area	0.8	0.7	0.5	0.1	0.5
United Kingdom	0.2	0.8	-0.1	0.4	0.3
Japan	0.8	0.7	0.8	0.4	0.7
Australia	-1.0	0.4	-0.3	0.2	-0.2
Canada	-1.0	0.4	-0.6	0.4	-0.2
Sweden	0.4	1.0	0.9	0.7	0.7
Switzerland	0.9	1.0	0.7	0.5	0.8
Brazil	-0.1	0.6	-0.7	0.3	0.0
Russia	-3.1	-1.6	-3.2	-3.6	-2.9
India	-0.1	-1.4	-0.4	-0.2	-0.5
China	0.8	-1.6	0.8	0.2	0.0
South Africa	0.1	-1.8	-0.3	0.3	-0.4
Korea	0.3	0.0	0.6	0.0	0.2
Mexico	0.5	0.1	0.1	0.0	0.2
Turkey	0.6	0.3	0.3	-0.4	0.2

Source: Bloomberg, Haver, MSCI, World Bank, J.P. Morgan Asset Management; data as of September 9, 2020.

Russia, South Africa and Brazil look to be heavily impacted by the transition, and they have the least fiscal space to deal with it

EXHIBIT 6: CLIMATE EXPOSURE COMPARED WITH A COUNTRY'S ABILITY TO PROVIDE FISCAL STIMULUS

Fiscal space measure, z-score



Source: J.P. Morgan Asset Management; data as of September 9, 2020.

Note: The details of our measure of climate exposure can be found in Exhibit 5. Our measure of fiscal space is a composite of an “institutional robustness” score and a “state of public finances” score. Institutional robustness is measured by taking the z-score of an average of each country’s rank in Corruption Perception (Transparency International), Economic Freedom (Fraser Institute) and Worldwide Governance (World Bank). Public finances are captured by our estimates of R-G, the difference between the interest rates on government debt (R) and economic growth (G); the public debt load as a % of GDP; and an external measure from Moody’s of space before reaching public debt limits.

CLIMATE POLICY AND INFLATION PRESSURES

The inflationary effects of climate policy depend on whether policy interventions follow a sticks-based or carrots-based approach.

Sticks

Carbon pricing is one of the clearest examples of a sticks-based approach. It can be implemented through explicit taxes on carbon emissions or by requiring companies to purchase emission permits. The goal in both cases: to make it costlier for companies to emit greenhouse gases and for households to buy carbon-intensive goods and services.

Although a number of countries have already introduced carbon pricing schemes, the average price on emissions is still only USD 2/ton of CO₂, far below the USD 40–USD 80/ton pricing seen as necessary to limit global warming to less than two degrees.

A sudden introduction of much higher carbon prices could have a dramatic effect on inflation. In the most extreme case, we could see a one-off inflationary shock of up to 3.3% on CPI inflation if a USD 80 price were implemented suddenly and simultaneously across the world and quickly passed through supply chains to final consumers. (We believe the inflationary effects would disappear quickly once the price level adjusted.)

But we do not anticipate such sudden moves and instead expect carbon prices to be phased in gradually, with a more modest impact on inflation. **EXHIBIT 7** assumes that this phase-in of carbon prices starts within the next five years, although timelines could easily slip.

Policymakers could rely on a different stick, environmental regulation – on the energy efficacy of new homes, for example – instead of, or in addition to, carbon pricing. This could lead to price increases that could affect the aggregate price level – e.g., a passive house costs 5%–10% more than a traditional house.² However, higher upfront costs of green products are typically mitigated by lower operating costs. As a result, we would expect inflationary pressures from such regulations to also diminish over time.

² Passive House Institute U.S.

Choosing a sticks- or carrots-based approach will likely lead to different inflation outcomes

EXHIBIT 7: OVERVIEW OF INFLATION IMPLICATIONS OF DIFFERENT CLIMATE POLICY OPTIONS

Policy	Time horizon	Short-term impact on inflation (0-5 years)	Mid-term impact on inflation (5-10 years)	Long-term impact on inflation (10+ years)
STICKS (Carbon pricing or detailed regulation)		++	+	=
CARROTS (Fiscal stimulus)		+?	+?	+?

Source: J.P. Morgan Asset Management.

Carrots

If governments take a carrots-based approach, using subsidies and other forms of fiscal support to bear the bulk of the cost of the transition to a low carbon economy, this should reduce the cost passed on to households via higher consumer prices.

At the same time, large-scale fiscal stimulus could itself create inflationary pressures. Substantial fiscal expenditure – potentially as much as 1.5% of annual GDP – would likely be needed to cover the cost of transition. Some of this fiscal expenditure could serve to close the existing gap in infrastructure investment or contribute to other sustainability goals, such as access to clean water.

The International Monetary Fund (IMF) estimates that such fiscal expenditure on climate policies could add around 0.3% to annual inflation rates over the next 10 years. However, given persistently low inflation across the world, and the flattening of the relationship between the output gap and inflation, that projection looks high to us. For example, despite plans in the European Union for a “green deal” that involves significant fiscal spending, we think inflation in the euro area is likely to continue to undershoot the 2% inflation target of the European Central Bank (ECB).

Looking beyond our 10- to 15-year forecast horizon, the transition to a low carbon economy may reduce both inflation volatility and inflation: Lower reliance on oil imports will reduce volatility in the cost of energy. And more widespread use of efficient green technologies may reduce average inflation, both by providing a scalable alternative to fossil fuels and by helping us avoid some of the inflationary effects that climate change would present.

CLIMATE POLICY AND EQUILIBRIUM INTEREST RATES: MODEST MOVES UP OR DOWN

The structure of the transition to a low carbon economy could affect equilibrium interest rates, but we think the impact will be modest. Our base case assumes that changes in long-term real rates will reflect changes in expected growth rates. If the private sector bore the bulk of the cost of the transition, this would result in a small drag on medium-term economic growth and a correspondingly modest reduction in equilibrium real interest rates. On the other hand, if governments launched substantial green stimulus, taking on the cost of transition, it would provide a tailwind to growth that would boost rates at the margin. In either scenario, absent other forces affecting interest rates, we would expect to see equilibrium rate moves of just around 10 basis points (bps) up or down.

A significant increase in government expenditure (and debt) that would be associated with a carrots-based approach could also absorb some of the savings that over the past years have pushed equilibrium interest rates below growth rates. This might reduce the amount of capital available for other productive investments and would tend to push up equilibrium rates for those investments (**EXHIBIT 8**). Research by economists Lukasz Rachel and Lawrence Summers³ suggests that if governments issued more debt to fund the transition, this could increase equilibrium interest rates by a further 50bps. But this effect is very uncertain and depends in part on whether green stimulus is “special” – or if it simply crowds out other forms of government expenditure.

Finally, central bank actions in the context of climate change could prove to be another important determinant of future interest rates. Central banks including the ECB and the Bank of England have stated plainly that they consider climate change to be relevant to their mandates. They have also provided not-too-subtle hints that they might reorient their quantitative easing (QE) programs toward greener assets. This could include purchasing corporate debt issued by companies that are deemed more sustainable and/or buying designated green bonds, a fast-growing market currently estimated at around USD 850 billion.⁴ More than 80% of green bonds are rated investment grade, which is likely to be a necessary condition for their inclusion in central bank programs.⁵

While we would not expect green QE programs to affect the aggregate level of interest rates, they could introduce a wedge between the yields of green assets and their nongreen counterparts. At the moment, green bonds do not seem to offer a significant advantage in terms of financing costs for their issuers when compared with conventional bonds, but that could change if central banks intervene in the still fairly small market and thus increase demand (and reduce the yields) for green bonds relative to other assets.

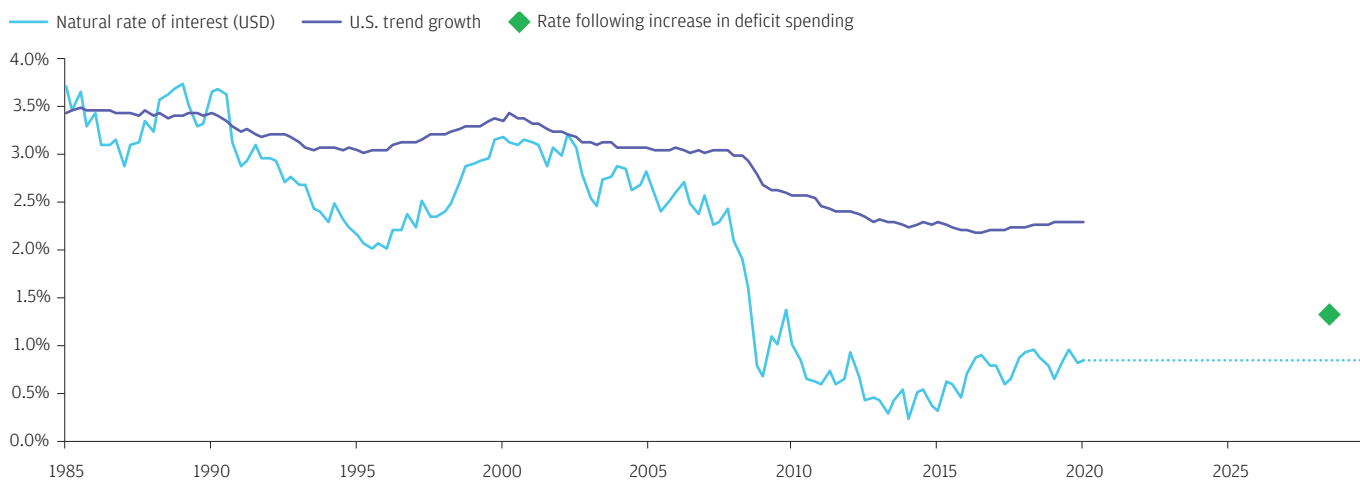
³ Lukasz Rachel and Lawrence Summers, “On secular stagnation in the industrialized world,” *Brookings Papers on Economic Activity*, Spring 2019.

⁴ Climate Bonds Initiative; data as of August 2020.

⁵ IMF, August 2019.

Large-scale investments in green technologies could help narrow the gap between growth rates and long-term equilibrium interest rates

EXHIBIT 8: GROWTH RATES AND LONG-TERM INTEREST RATES SINCE 1985



Source: Thomas Laubach and John C. Williams, “Measuring the natural rate of interest,” *Review of Economics and Statistics* 85, no. 4 (November 2003): 1063-70, Rachel and Summers (2019) and J.P. Morgan Asset Management.

COUNTERVAILING FORCES AT PLAY IN EQUITY MARKETS

How might the transition to a low carbon economy impact equity markets? Here we see various countervailing forces at play. Assuming governments take some action to address climate change (our base case scenario), dividend discount models using current discount rates suggest that the drag on corporate profitability may lead to a modest fall in average equity values of around 3%.⁶ However, this is likely to vary significantly across countries. There are also a number of plausible counterbalances. Insulating economies from exogenous oil price volatility may feed through to lower macroeconomic volatility and thus reduce equity risk premia (supporting equity valuations). Similarly, the level of interest rates and the types of fiscal policy enacted will affect equity valuations over our 10- to 15-year investment horizon.

The impact of the climate transition across and within individual sectors is likely to vary significantly. Sectors that stand to gain include renewable energy and green infrastructure. The sectors likely to be hit the hardest: energy, consumer cyclicals (especially autos), materials and some utilities. Companies in these sectors will suffer from demand destruction as the goods they sell become less sought-after and carbon costs become an ongoing burden. A company's emissions intensity and its capacity to pass on carbon costs to consumers will determine how difficult the climate transition will be for an individual company, though.

To take the best-known example, we consider the impact on oil companies.

Oil and gas: Beyond the sector's valuation discount, different shades of green

Most oil companies will likely suffer in any transition to a low carbon economy for the simple reason that fossil fuel extraction, along with oil consumption, is a significant cause of CO₂ emissions. These risks are not entirely new to the market, and the underperformance of the energy sector over recent years might suggest that these risks are starting to be priced in (although there have been other forces at play too).

Within the energy sector, though, we expect quite meaningful dispersion, for three basic reasons. First, some types of oil extraction are more polluting than others, and particular offenders will likely face tougher curbs on their activity. Second, reduced access to capital is already curtailing oil supply growth and is likely to disproportionately hit producers that are more reliant on external capital.⁷ Third, some "big oil"

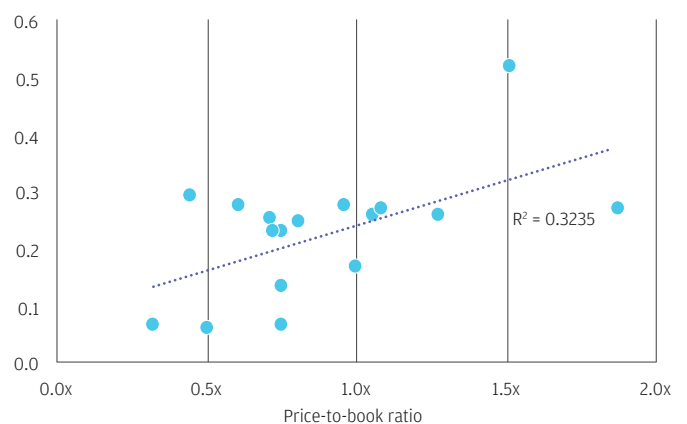
companies are in the process of using their infrastructure, better access to capital, long-term investment approach and technological expertise to essentially rebrand themselves as "big energy" companies. For example, oil giant BP has recently set out an ambitious decarbonization strategy, including a 40% decline in oil and gas production and a tenfold increase in green energy investment. Already, Denmark's leading energy company, Ørsted, has transformed itself from an oil and gas producer into a company fully focused on renewables. It is now the largest offshore wind farm company in the world.

In general, markets have been slow to distinguish between energy companies that embrace the transition to a low carbon economy and those that do not. However, more recently, investors have started to welcome announcements by oil companies to shift toward new markets. BP's recent announcements were viewed positively, for example. As illustrated in **EXHIBIT 9**, we find a positive correlation between integrated oil companies' price-to-book ratios and our proprietary measure of their exposure to technologies underpinning the carbon transition.

Integrated oil companies that are more exposed to transition technologies have higher price-to-book ratios

EXHIBIT 9: OIL COMPANY VALUATIONS RELATIVE TO EXPOSURE TO TRANSITION TECHNOLOGIES

Emission transition score, ThemeBot



Source: Bloomberg, J.P. Morgan Asset Management.

Note: Based on companies' relative exposure to the theme of emission transition, as measured by J.P. Morgan Asset Management's proprietary ThemeBot, an artificial intelligence tool.

In sum, the nuanced impact of the transition to a low carbon economy underscores the value of an active approach to security selection. We believe that investors should construct their equity portfolios to be "transition ready." This can help insulate them from the risks of climate change while seizing the investment opportunities made possible by the transition.

⁶ See, for example, the United Nations Principles for Responsible Investment's Inevitable Policy Response.

⁷ We discuss this issue in the commodities section of the 2021 LTCMA Alternative Assets Assumptions.

INFRASTRUCTURE: OPPORTUNITIES IN ALTERNATIVE ASSETS

Private markets too will offer a growing range of opportunities. The need for infrastructure investments is likely to continue to grow as countries renew their energy infrastructure to mitigate climate change, and make additional investments to grapple with the consequences of increasing temperatures (broadly defined as climate adaptation). According to a 2019 report from the Global Commission on Adaptation, climate adaptation globally will require a cumulative investment of roughly USD 1.8 trillion over 2020-30, the equivalent of 0.2% of global GDP per year. Much of this investment will be needed in regulated industries where returns on equity are in part shaped by access price⁸ regulation. To attract new private capital, policymakers may need to offer sufficiently high returns on equity in the future – benefiting those who invest in green infrastructure today.

CONCLUSION

Simply put, an orderly transition to a low carbon economy is nothing for investors to fear. We do not yet know how the transition will ensue – whether governments will tend to take a sticks-based or carrots-based approach. Significant geographical and sector differences will emerge, we believe. And it is quite clear that some countries are already taking action to achieve a successful transition, while others may follow soon. Investors need to identify those companies that are most transition-ready – including by assessing information on companies' current and future carbon footprints, their low carbon technologies and sector-specific trends. By moving early, investors can avoid or mitigate climate policy risks and capture opportunities across asset classes and markets – well before they are priced in.

⁸ An access price is the price that other companies are charged to use downstream infrastructure such as rail tracks, electricity grids or telecommunication networks.

The fiscal decade: The promises, problems and potential of fiscal stimulus

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IN BRIEF

In the decade ahead, we expect greater use of fiscal stimulus than at any other time in modern history. We also believe that fiscal and monetary policy will be operating in the same direction, in contrast to much of the expansion of the last decade.

- The pandemic recession has triggered the adoption of fiscal stimulus, which has also become more attractive over time due to the failure of monetary stimulus in the last expansion, the pervasiveness of low inflation and the rise of political populism.
- Different countries have different amounts of “fiscal space,” roughly defined as room to expand deficits without causing surging government bond yields or undermining currencies. This can be evaluated by looking at both traditional fiscal ratios and institutional robustness.
- The likely effectiveness of fiscal stimulus also varies, due to country factors that limit fiscal multipliers and structural issues affecting productivity growth.
- Fiscal stimulus is a powerful tool that needs to be handled with care. Done right, it can offer a quicker exit from recessions and broad social benefits. Done wrong, it can divert resources to areas with little potential to improve welfare today or productivity tomorrow. Done too timidly, as we recover from the pandemic recession, it could yield a recovery as frustratingly slow as the last one. However, if done too aggressively, it could boost inflation and interest rates and, by undermining trust in currencies and government debt, severely curtail long-term economic growth.

A NEW ECONOMIC CYCLE WITH NEW POLICY LEVERS

The COVID-19-induced recession of 2020 will be remembered as an economic shock like few others. Unlike the bursting of the dot-com bubble in the early 2000s, the global financial crisis (GFC) 12 years ago or the eurozone crisis of 2011-12, this recession was not the result of corporate, financial sector or government miscalculations. Instead, it followed a genuinely exogenous shock and a near-universal decision by governments globally to prioritize public health over economic health.

Once this choice was made, its consequences set the tone for the next economic cycle and possibly beyond. Of all the actions taken as the world economy was in triage in early 2020, it was the unleashing of massive fiscal stimulus that will create the most lasting economic impact. In the past decade, as governments adopted fiscal austerity, monetary stimulus became the dominant policy lever; as a result, fiscal and monetary measures often pulled in opposing directions. But the next decade is likely to follow a different trajectory, with monetary and fiscal policy generally complementing each other.

The effects of this new dynamic and, in particular, how different countries and regions deploy and pay for fiscal stimulus, will profoundly shape the new economic cycle that began earlier this year after the outbreak of the coronavirus pandemic.

Over time, we expect financial markets to become more discerning in how they receive announcements of incremental fiscal spending. In the next sections, we consider how much fiscal capacity different regions have and how effective different governments might be in deploying additional spending or tax

cuts. Finally, we consider what might go wrong, and what could go right, as we navigate a period of more active fiscal stimulus than at any time in modern financial history.

The pandemic as catalyst in move to fiscal stimulus

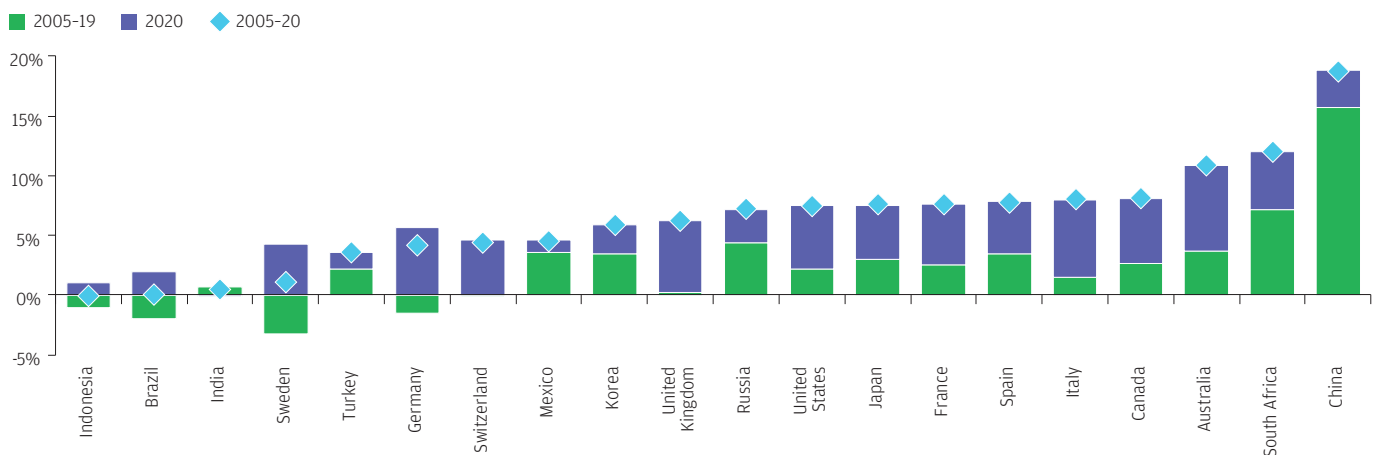
While even fiscal hawks broadly acknowledge the need in this crisis for governments to step in to support the labor force and the wider economy, the sharp reversal of many countries' fiscal policy from their austerity drive of the 2010s has elicited some nervousness (**EXHIBIT 1**). History is littered with examples of how financial markets and investors punish the fiscally profligate - in the worst cases, precipitating a collapse in the currency, hyperinflation and locking governments out of the bond markets.

At the same time, countercyclical fiscal stimulus is widely - if sometimes cautiously - accepted as a key economic policy tool. Arguments between fiscal hawks and fiscal doves tend to center on assessments of fiscal multipliers. Put another way, each incremental dollar that a government spends - whether directly or via targeted tax cuts - should boost GDP by at least that dollar over the long run. Fiscal hawks point out that governments generally do a fairly poor job of generating meaningful multipliers. Meanwhile, fiscal doves argue that the fiscal multiplier is too crude a measure to use on its own and fails to account for the wider role governments play in society.

From either perspective, it's clear that the recent surge in fiscal stimulus - for many countries, the largest peacetime increase in government spending on record - will swell the ratio of government debt to GDP (**EXHIBIT 2**). Some believe

Fiscal policy has accelerated sharply in 2020 in most countries, and in several cases has reversed sharply from the austerity drive of the 2010s

EXHIBIT 1: CHANGE IN GOVERNMENT SPENDING SHARE OF GDP, 2005-19 AND 2020 (% OF GDP)

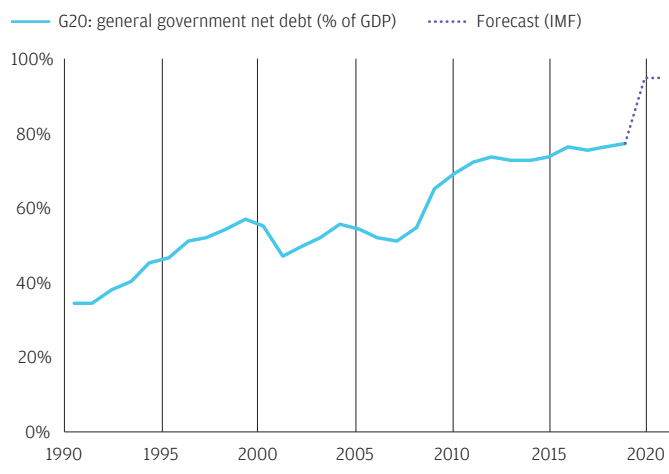


Source: Fiscal Monitor, International Monetary Fund, April 2020.

that debt ratios are already at dangerously elevated levels. But in a world of negative real interest rates, it may also seem financially imprudent for governments not to invest, particularly in the immediate aftermath of the worst economic shock since the Great Depression.

A surge in fiscal stimulus will swell the ratio of government debt to GDP

EXHIBIT 2: G20 GENERAL GOVERNMENT DEBT-TO-GDP RATIO, 1990-2021



Source: Fiscal Monitor, International Monetary Fund, April 2020.

Higher debt-to-GDP ratios and greater fiscal stimulus also point to a bigger role for government in the economy and markets. Again, this could prove controversial, given the risk that a larger government sector could crowd out a generally more efficient private sector. But “big government” does not equate to inefficiency in all countries and all situations. Indeed, in regions where fiscal stimulus is channeled toward supranational initiatives, such as green energy, or large-scale infrastructure programs, governments may deploy capital more successfully than the private sector.

Determining how to deploy fiscal stimulus and how to pay for it – including the controversial question of debt monetization – will vary widely from country to country. In this paper, we don’t seek to argue for a right or wrong way to approach these questions, but instead look at which countries have more or less fiscal flexibility and which approaches to deploying fiscal stimulus may be most successful. In short, we consider whether financial markets and investors should welcome or fear bigger fiscal deficits and a larger role for government in the economy.

IF NOT NOW, WHEN?: GOVERNMENT CHOICES AND POLICY ACTIONS

While the coronavirus pandemic has catalyzed a tectonic shift toward fiscal stimulus around the globe, political pressure to move away from overt austerity and tight fiscal policy has been growing for some time.

However, popular disgruntlement with fiscal conservatism is, of course, not the only reason fiscal stimulus was adopted so widely and enthusiastically in the wake of COVID-19. In the last cycle, only the U.S. succeeded in entering a rate hiking cycle, and even then weakness elsewhere quickly forced the Federal Reserve (Fed) into retreat. For the rest of the developed world, a decade of zero and even negative rates failed to stimulate either inflation or growth, despite generating an ample amount of liquidity and capital. At best, a lot of excess capital found its way into savings – possibly acting as a brake on the velocity of money and in turn contributing to disinflation. At worst, excess capital may have widened the gap between the capital and labor shares of the economy. Either way, monetary stimulus in isolation notably failed to boost inflation expectations in the last cycle and may have reached a natural limit to its efficacy.¹ This prompted our contention in last year’s Long-Term Capital Market Assumptions (LTCMAS) that navigating any future recession would require fiscal as well as monetary support.

A further and compelling reason previously recalcitrant governments underwent an almost 180 degree conversion to fiscal stimulus has been the nature of the coronavirus recession. The 2020 recession was not organic but entirely driven by government choices. Few observers would conclude that governments were completely wrong in shuttering economies to protect public well-being, but at the same time, many would agree that it is government’s obligation to fix the economic mess that ensued. Without an errant corporate or financial sector to blame, governments have felt more pressure to begin rebuilding confidence and to protect as much as possible of the economy’s productive capacity. With voters already tired of austerity and real interest rates negative in most major currencies, even the most vocal fiscal conservatives have lined up in support of greater spending and lower taxes.

Damned if you don’t?

One factor that limited fiscal profligacy in past decades was the prospect that bond investors would eventually punish excessive spending and government leverage. In the 1980s

¹ See David Kelly et al., “The failure of monetary stimulus,” *2020 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, November 2019.

and 1990s, the threat of high inflation, a run on the currency and bond vigilantism loomed large for finance ministries. More recently, however, economies around the world have seen a steady trend down in inflation due to labor-saving technology, increased globalization, greater income inequality and an aging population. This receding threat of inflation has in turn spurred easier monetary policy, expressed through both lower short-term interest rates and a sharp increase in central bank balance sheets. We expect the calming influence of central bank buying on bond markets to swamp the impact of any would-be bond vigilantes for some time to come. Moreover, with long-term interest rates at historically low levels, governments find themselves able to finance far larger deficits and accumulated debt than would have been the case in earlier decades (**EXHIBIT 3**).

Disinflationary trends in recent decades and, in particular, during the last, long economic expansion suggest relatively limited risk of high inflation or interest rates in the next few years. And with previous rules of thumb² concerning debt-to-GDP limits now breached without apparent consequence, governments will be challenged for unnecessary fiscal conservatism far more than for excessive spending. Over the longer run, we do expect easy monetary policy plus expansionary fiscal policy to increase the upside risks to inflation, but until the output gap narrows sufficiently in the coming cycle, concerns about inflation are unlikely to quell the calls for higher fiscal spending.

In the near term, at least, financial markets may welcome higher government spending and lower taxes as much as

voters do. Investors will be primarily concerned with minimizing economic disruption in the short run and preventing the loss of productive potential in the long run. As a result, fiscal stimulus - even with substantial increases to the debt-to-GDP ratio - has been welcomed by equity markets and generally shrugged off by bond markets.

Eventually, however, market attention will likely turn toward the sustainability of fiscal support. When it occurs, that analysis will focus not only on metrics such as national leverage but also on the scope and opportunity different nations and regions have to deploy fiscal dollars in a way that boosts productive capacity - ideally, generating a positive fiscal multiplier. To be clear, there is no one way that this might be done, and what suits one region may not work well in another. A country like the U.S., with an innovative private sector and dynamic capital markets, may favor deploying fiscal stimulus through the tax system. A region like Europe, with significant popular support for greening the economy, may favor a program of government investment in decarbonization and energy efficiency.

THE CAPACITY FOR FISCAL STIMULUS

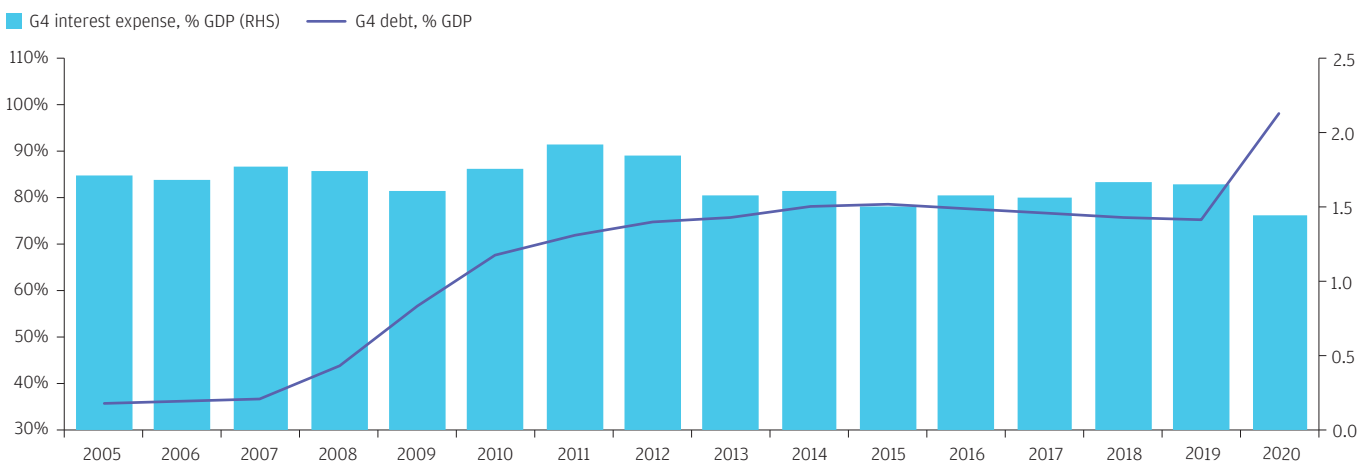
Our analysis focuses first on which nations and governments have the greatest ability to increase spending or cut taxes.

It is, of course, mechanically possible to calculate how large a primary budget deficit a government could run while still allowing the debt-to-GDP ratio to stabilize below a specified level. This estimate depends on assumptions regarding interest rates and economic growth, and countries with fast growth, low interest rates and low initial debt will always tend to look better in this kind of analysis. However, this does not

² See Carmen M. Reinhart and Kenneth S. Rogoff, "Growth in a time of debt," NBER Working Paper No. 15639, January 2010.

With long-term interest rates at historically low levels, governments can finance larger deficits than in earlier decades

EXHIBIT 3: G4 GOVERNMENT DEBT AND INTEREST COSTS, % OF GDP



Source: Fiscal Monitor, International Monetary Fund, April 2020.

Note: 2020 figures are forecasts.

provide any guidance on what a maximum sustainable debt-to-GDP ratio might be. Additionally, the denomination of any increase in government debt seems a relevant factor, especially for emerging market governments, which often borrow in hard currencies.

A more nuanced approach, such as that of Moody's, does attempt to estimate this maximum sustainable borrowing capacity, expressed as a share of GDP, before a country would run into severe fiscal troubles. In the Moody's approach, reaching a country's calculated limit does not mean that a default is a certain outcome, but it implies that a drastic correction in public finances would be needed to avoid such an outcome. The measure also uses the budget deficit, debt load as a share of GDP, and market interest rates. In our framework, we feature the Moody's score as well as our forward-looking estimates for R-G (real interest rates minus the real GDP growth rate) and public debt as a percentage of GDP. While there is some overlap between the Moody's score and these stand-alone measures, we favor some granularity to get a sense of the specific strengths and weaknesses for each country in this numerical assessment.

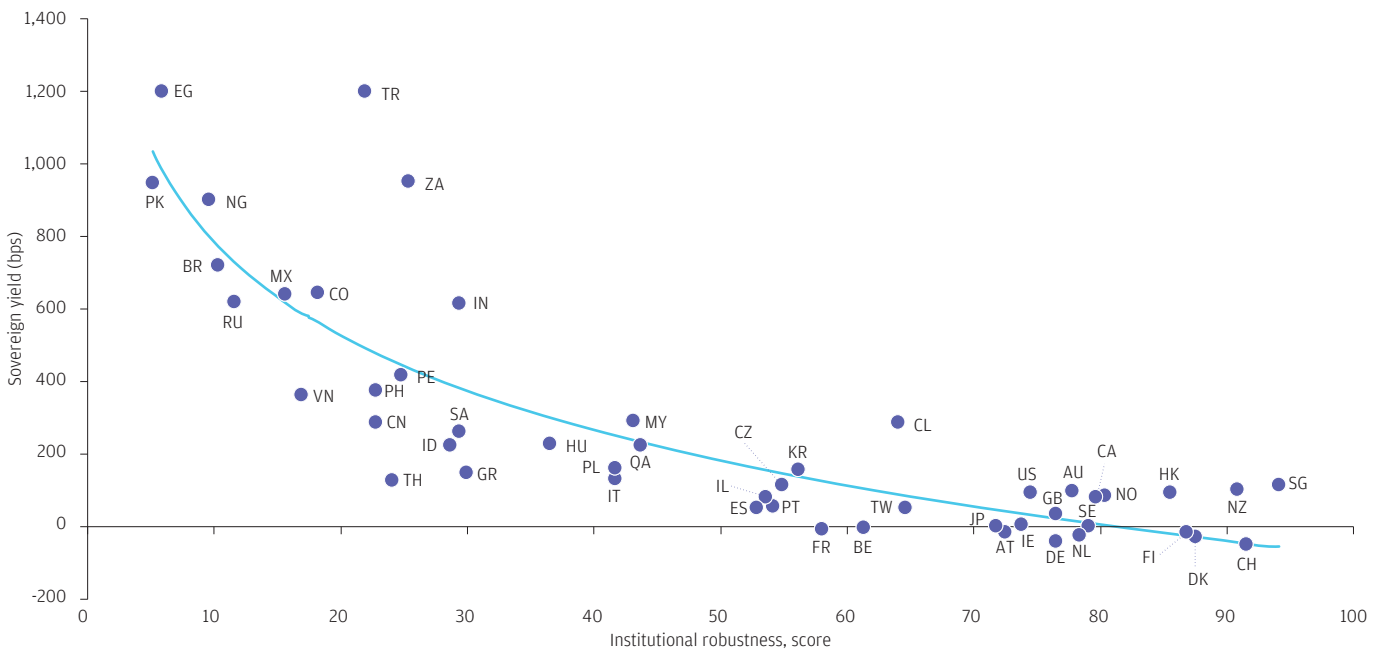
We believe, additionally, that a full assessment of fiscal capacity should go beyond these purely numerical calculations to include the concept of institutional robustness as a determinant of whether markets might welcome or question a government's incremental borrowing for the purposes of fiscal stimulus.

Simply put, more robust institutions appear to foster greater tolerance of increased government debt. We have ranked countries in terms of institutional robustness by combining three indicators: Corruption Perceptions, Economic Freedom and Governance.³ Within a group of 50 countries, each indicator is percentile-ranked and then combined into an average per year per country. Generally, the rank order does not change drastically over the 25 years we examined, and the broad ordering is unsurprising - Singapore, New Zealand, Switzerland and Denmark consistently scoring highest and countries like Nigeria, Ecuador and Egypt typically scoring poorly.

While it isn't necessarily of the greatest value to compare one country's score with another's, an assessment of institutional robustness is useful in spotting patterns or misalignments. First, we note that there appears to be significant nonlinearity in market pricing with respect to the perception of institutional robustness. Comparing sovereign bond yields with institutional robustness, the highest scoring third of countries have near-zero bond yields while those in the lowest third have much higher sovereign yields, with much greater variance (EXHIBIT 4). In our view, countries with medium-to-higher institutional robustness operate in a different space from countries with lower institutional robustness. Countries with a poor score might find efforts to finance even reasonable and necessary fiscal stimulus severely hampered by very high yields.

³ Corruption Perceptions (Transparency International), Economic Freedom (Fraser Institute) and Worldwide Governance (World Bank).

Countries with medium-to-higher institutional robustness operate in a different space from countries with lower institutional robustness
EXHIBIT 4: THE NONLINEAR RELATIONSHIP BETWEEN INSTITUTIONAL ROBUSTNESS AND SOVEREIGN YIELDS



Source: Bloomberg, Fraser Institute, Transparency International, World Bank.

Note: Sovereign yield is average 10-year bond yield from January 1, 2020, to September 30, 2020. Institutional robustness score is an average of each country's percentile rank in Corruption Perceptions (Transparency International), Economic Freedom (Fraser Institute) and Worldwide Governance (World Bank).

Next, we overlay institutional robustness with an assessment of fiscal space, which adds a useful corollary. Combining these measures shows that some countries that are in the middle of the pack in measures of fiscal space – e.g., the UK, Switzerland and Germany – actually have reasonable capacity to raise and service debt to support fiscal spending (EXHIBIT 5).

To be clear, our framework and the resulting ranking do not constitute an empirical study of fiscal capacity. However, we would expect countries with a high combined score to have disproportionately greater latitude to pursue fiscal stimulus than those with even a middling ranking, while countries toward the lower end might not even be able to deploy reasonable fiscal tools before the market started to punish them via bond yields or FX moves.

THE EFFECTIVENESS OF FISCAL STIMULUS

Having the capacity to deploy fiscal stimulus does not necessarily imply it will be used effectively. Historically, many wealthy and successful nations have misallocated capital on a grand scale – which alone could justify the skepticism of many observers about the efficacy of fiscal stimulus. We take a more nuanced view. If spending is disciplined and capable of either stimulating near-term demand to minimize the lasting impact of a recession or boosting long-term potential growth, it can be seen as an effective policy tool. In this section, we consider which governments and nations have more opportunity to deploy fiscal spending in a productive manner.

That fiscal spending can counter the effects of a recession over the short run is relatively uncontroversial, and the power of such fiscal stimulus in boosting economic growth boils down to a question of multipliers. The idea of a fiscal

Some countries have reasonable capacity to raise and service debt to support fiscal spending

EXHIBIT 5: COMBINED RANKING OF FISCAL RATIO SPACE SCORES

Country name	In z-score terms, a positive number is “good” for fiscal space				State of public finances	Total fiscal capacity
	R-G	Public debt % GDP	Moody’s fiscal space	Institutional robustness		
Switzerland	0.2	0.6	0.1	2.3	0.3	1.5
Sweden	0.5	0.9	1.1	1.1	0.8	1.2
Canada	-0.1	0.3	1.2	1.2	0.5	1.0
Australia	0.0	0.4	1.4	1.0	0.6	1.0
India	3.0	1.3	0.9	-0.6	1.7	0.7
Germany	0.1	0.1	0.1	0.9	0.1	0.5
United Kingdom	0.2	-0.6	0.1	0.9	-0.1	0.5
United States	0.2	-1.0	0.9	0.8	0.0	0.5
China	1.2	1.3	1.7	-1.0	1.4	0.2
Korea	-0.1	0.8	-0.2	0.1	0.2	0.1
France	0.3	-1.0	0.1	0.1	-0.2	0.0
Indonesia	0.0	0.6	0.6	-0.6	0.4	-0.1
Japan	0.0	-2.3	-0.5	0.6	-0.9	-0.2
Spain	-0.4	-0.8	-0.7	0.0	-0.6	-0.3
Turkey	-0.5	0.5	-1.3	-1.1	-0.5	-0.4
Italy	-1.1	-1.7	-1.3	-0.1	-1.4	-0.7
South Africa	-1.3	-0.3	-1.3	-0.8	-1.0	-1.1
Russia	0.2	1.2	-1.2	-2.0	0.0	-1.2
Mexico	-0.3	0.0	-1.2	-1.6	-0.5	-1.3
Brazil	-2.1	-0.1	-0.4	-2.1	-0.9	-1.8

Source: International Monetary Fund, OECD, World Bank, J.P. Morgan Asset Management.

Note: Total fiscal space score = Z-Score (0.5*(Total fiscal ratios score) + 0.5*(Institutional robustness)), where Total fiscal ratios score = 1/3*(R-G) + 1/3*(Public debt % GDP) + 1/3*(Moody’s fiscal space).

multiplier is straightforward: If the government buys a dollar's worth of goods and services, then the providers of those services will end up with a dollar's worth of income.

Some of that income will be taxed, some will be saved, some will be spent on imports, and some will buy more goods and services in the economy. The providers of those goods and services will then spend a fraction of the income they received in buying further goods and services, and so on. The multiplier is simply the sum of the initial dollar spent and all the subsequent fractions of income spent as a result.

Fiscal multipliers tend to be larger in countries with low tax rates, low marginal propensities to save and low marginal propensities to import. In theory, spending multipliers are higher than tax cut multipliers because all direct government spending represents GDP, while some of the money initially provided by tax cuts is diverted to savings and imports. By and large, fiscal multipliers are strongest when there is considerable slack in the economy, as extra demand in a full employment economy would - in theory, at least - tend to push up interest rates, thereby crowding out private investment spending.

In **EXHIBIT 6**, we show average taxes, imports and savings as a share of GDP, and measure economic slack (rather crudely) as the percentage decline in real GDP from the fourth quarter of 2019 to the second quarter of 2020. The simple exercise paints a relatively clear picture suggesting that, among developed economies, the U.S., Japan and Spain should have relatively high fiscal multipliers while Sweden, Switzerland and Korea should have relatively low ones. In emerging markets, Brazil, India and Indonesia should benefit more in the short term from expansionary fiscal policy compared with Mexico, Turkey and China. It should be noted that, due to the sharp fall in GDP caused by the pandemic, fiscal multipliers for most major countries, with the exception of China, are probably higher than the average taxes, imports and savings, as a share of the economy, might suggest.

But this is not the whole story. For a start, there is no one-size-fits-all solution, as governments have varied discretionary opportunities to levy taxes or borrow to finance projects that might increase productivity over the longer term.

In many countries, the last decade was a period of declining public investment spending and increasing fiscal restraint.

Fiscal multipliers are typically strongest when there is considerable slack in the economy

EXHIBIT 6: FACTORS IMPACTING SHORT-TERM FISCAL MULTIPLIERS ACROSS COUNTRIES

Country name	2018 tax revenue (% of GDP)*	2018 imports (% of GDP)	2018 net savings (% of GNI**)	GDP H1 2020 (% change)
Australia	23.0	21.4	3.9	-7.2
Brazil	14.2	14.5	0.9	-11.9
Canada	12.9	34.0	3.2	-13.4
China*	9.4	18.3	23.2	0.4
France	24.2	32.8	4.4	-18.9
Germany	11.5	41.3	10.8	-11.5
India	12.0	23.6	19.9	-24.8
Indonesia	10.2	22.0	14.7	-7.6
Italy	24.3	29.1	3.3	-17.6
Japan	11.9	18.3	5.4	-8.5
Korea	15.6	37.0	15.9	-4.4
Mexico	13.1	41.2	6.1	-18.0
Russia	11.4	20.6	17.2	-4.1
South Africa	27.5	29.6	1.0	-16.7
Spain	14.2	32.4	6.8	-22.7
Switzerland	10.1	53.9	12.6	-10.5
Sweden	27.9	43.4	11.0	-8.1
Turkey	17.9	30.6	10.6	-11.1
United States	9.6	15.3	2.6	-10.2
United Kingdom	25.5	32.0	-1.3	-22.1

Source: International Monetary Fund, OECD, World Bank, J.P. Morgan Asset Management.

* Tax revenue ratio as of 2017. ** GNI = Gross national income.

Today, as fiscal purse strings are being loosened to counter the shock of COVID-19, expanding investment in areas like transportation and digital infrastructure may seem an obvious choice. But since the positive externalities of such projects are often not properly valued in asset markets, it falls on governments to finance such initiatives. For all the perceived inefficiencies of economies with large public sectors, such countries may be better placed to invest in large-scale projects with positive externalities and to offer more automatic stabilizers⁴ in times of crisis.

Some countries (e.g., China and Japan) already have significant public capital stock as a share of GDP. For these nations, further investment spending may have a lesser effect on growth and productivity than it would in nations with a lower capital stock, such as Brazil, Germany and the UK. For a country such as China, there may be as much to gain through reducing the red tape that can depress spending and investment as there would be in increasing the level of fiscal spending itself. In general, however, emerging economies may have more obvious investment opportunities due to generally lower levels of capital stock – provided they can afford them.

The ability to direct fiscal stimulus to discretionary opportunities is also constrained by structural spending needs – for pension obligations and health care, especially for rapidly aging economies – reflected in sharply rising old-age dependency ratios. Japan, Germany and France are likely to face the biggest limitations in this regard, while many emerging economies, with the notable exception of China and Korea, score relatively well. Military spending is another constraint, which could become an increasing headwind should geopolitical threats escalate.

Above all, good stewardship of public investments is crucial over both the short run and the long run. Putting aside opportunities for corruption and self-enrichment of government officials, which tend to be greater in emerging economies, making such decisions is difficult at best. In assessing a country's ability to deploy fiscal stimulus effectively and boost long-term potential growth, we weight stewardship equally with the combined weight of investment opportunity and fiscal constraints.

EXHIBIT 7 provides a portrait of the potential effectiveness of fiscal stimulus in promoting higher productivity in the long run. Based on the measures of discretionary opportunities, structural flexibility and stewardship, countries like the U.S., Australia, the UK and Canada appear to have more potential to deploy fiscal stimulus in a way that can boost long-term productivity than do Russia, Brazil and Mexico. What is striking is that some emerging economies score well, since reasonable stewardship allows their potential to increase capital stock to boost their ranking. However, where stewardship is in question, even a very high score for opportunities is overtaken by the risk of capital being misallocated over the long run.

It should be noted that many targeted areas of government spending or tax incentives could be worthwhile even if they have a negligible short-term impact on either aggregate demand or productivity. For example, the productivity benefits of improving primary education may not accrue for decades. Other spending decisions, such as allocations to preserve the environment or improve health care, may have huge positive impacts on society while doing little to boost economic output.

⁴ Automatic stabilizers are aspects of government welfare and tax systems that tend to operate countercyclically and thus reduce the severity of recessions. These include progressive tax schedules, which result in proportionately bigger declines in tax revenue than taxable income, and unemployment benefits, which expand as the jobless rate increases.

Our model estimates the potential effectiveness of fiscal stimulus in promoting higher productivity

EXHIBIT 7: PRODUCTIVITY-ENHANCING POTENTIAL OF FISCAL STIMULUS BY COUNTRY

Country name	Discretionary opportunities	Structural flexibility	Stewardship	Overall score
United States	88	67	69	73
Australia	60	70	77	70
United Kingdom	75	56	72	68
Canada	63	38	90	66
Switzerland	42	36	100	62
Korea	54	72	54	58
Sweden	27	41	100	57
India	93	100	33	57
South Africa	69	93	38	55
Indonesia	100	85	28	51
China	58	81	36	50
France	43	32	64	49
Spain	34	54	54	48
Germany	39	17	87	48
Turkey	88	93	20	43
Japan	58	9	79	42
Italy	37	29	44	38
Russia	66	86	13	31
Brazil	90	78	10	29
Mexico	72	80	8	24

Source: Haver, IMF, UN Department of Economic and Social Affairs, SIPRI, World Bank, J.P. Morgan Asset Management; data as of September 14, 2020.

Note: We use a geometric mean with a double weighting to stewardship to better account for outliers and to emphasize the importance of good stewardship of investment above other factors.

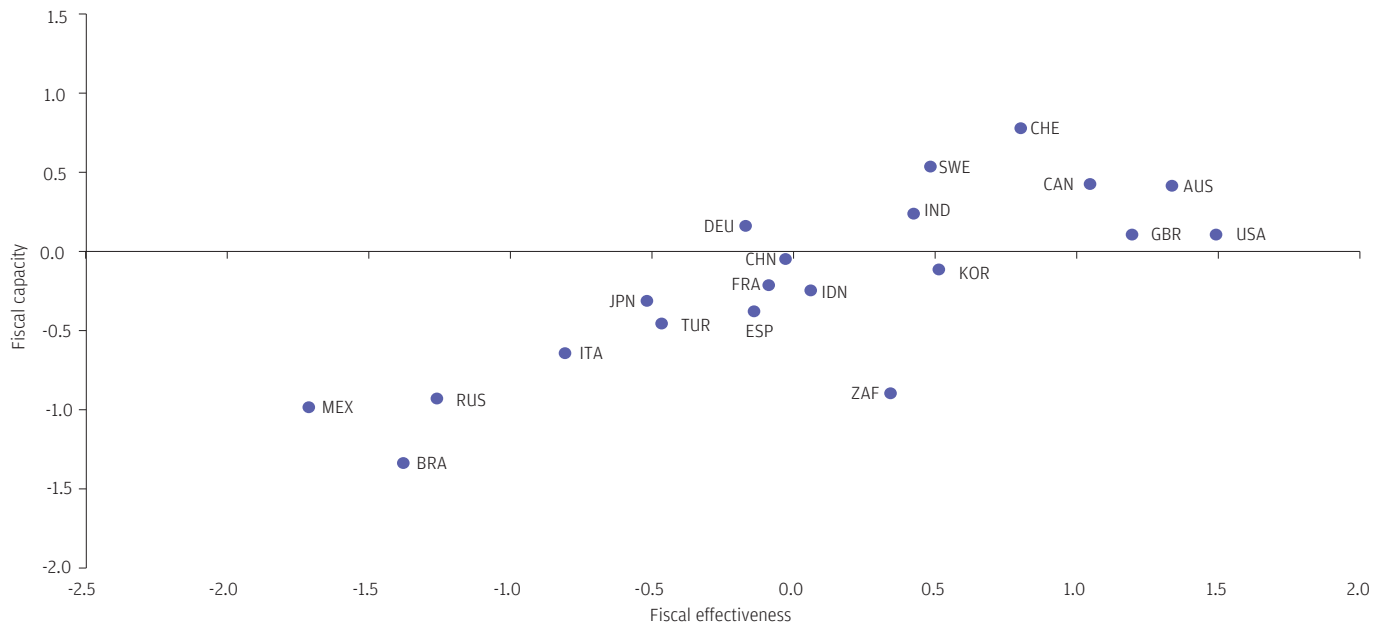
Deploying fiscal stimulus: Identifying winners and losers

Combining our assessment of which nations have the greatest ability to increase fiscal stimulus with our assessment of those nations with the greatest scope to deploy fiscal stimulus effectively is an instructive process (**EXHIBIT 8**). For simplicity, we have represented this on two axes, with those nations toward the upper right having greater ability to fund fiscal spending and more scope to spend it effectively compared with those in the lower left. Those nations at the extremes are not a huge surprise – fiscal stimulus announcements from those nations in the top right are likely to be welcomed, or at least absorbed, by markets. By contrast, investors are likely to remain skeptical of fiscal spending by nations in the bottom left – even if it is deployed in a well-intentioned attempt to address cyclical economic stresses.

Outside these clusters, the message is more nuanced. China, for instance, has ready access to capital, but it isn't clear that it has much to gain from simply throwing fiscal stimulus at its economy. Instead, for China, continued streamlining of administrative procedures or further rationalizing the banking infrastructure could be at least as impactful as a boost in raw fiscal spending. Pension funding in nations with aging demographics also affects fiscal choices. Despite the huge opportunity across Europe to invest in green energy and transportation, the challenging demographic profile in countries like Italy and Germany may limit even these advanced nations' capacity to freely deploy fiscal spending in the most productive fashion. Clearly, there are winners and losers in a period of greater fiscal spending, but there are also important subtleties driven by long-term structural economic and social factors.

Winners and losers will emerge in a period of greater fiscal spending

EXHIBIT 8: COMBINING FISCAL CAPACITY WITH THE POTENTIAL TO DEPLOY FISCAL STIMULUS EFFECTIVELY



Source: J.P. Morgan Asset Management; data and assessments as of September 30, 2020.

CONCLUSIONS

This article is titled “The fiscal decade” as a prediction rather than an endorsement of future government policy. Following the relatively unsuccessful use of monetary stimulus in the last decade and given the greater acceptance of budget deficits today by both politicians and central bankers, fiscal stimulus will likely play a significant role in shaping the investment landscape in the years ahead. Whether this will ultimately be celebrated or lamented depends on the care with which policymakers deploy their powers.

Of course, there are good reasons for adopting a policy of greater fiscal stimulus.

In many economies in recent decades, either because of macroeconomic concerns or an uneven income distribution, aggregate demand has fallen short of aggregate supply and the central governments have acted as “spenders of last resort,” helping the economy back to full employment. Indeed, for all the horrors of World War II, the government spending it necessitated finally put an end to a decadelong depression.

There are also many things a government can and should do that the private sector would never have the incentive or credibility to attempt. In the past, this list has included providing basic retirement income, building great networks for travel and utilities, and achieving impressive advances in medicine and communications. In the future, governments could lead efforts to preserve the planet, leverage human skills through better education and eradicate diseases, including the virus that has laid us low in 2020.

Government debt, if not taken to extremes, can play two very important roles in the functioning of an economy. First, the general creditworthiness of the government, given its authority to levy taxes and fees, can be used to finance investment spending today at relatively low interest rates. Second, government debt gives millions of individuals a reliable way to save for retirement, confident of repayment for decades into the future.

However, each of these good purposes is subject to abuse.

Fiscal stimulus can actually do more harm than good, if not applied countercyclically. European countries adopted austerity measures in the midst of the recession triggered by the European sovereign debt crisis. At the other extreme, in 2017, the U.S. implemented major unfunded tax cuts even as the U.S. unemployment rate continued to move toward near-record lows.

Equally troubling has been the misuse of government spending or tax cuts to promote activities that undermine, rather than enhance, the public welfare. Taxpayer money, rather than achieving worthwhile goals, has too often been diverted to ill-conceived, badly executed projects rather than hospitals and schools. However, even when governments have ostensibly set out to promote public welfare, they have often failed by backing the wrong technology or undermining incentives within the private sector economy.

Most ominously, however, taken to an extreme, undisciplined fiscal stimulus can undermine trust in government debt and, with a sufficiently compliant central bank, national currencies.

The question so many ask is, “Where is the limit?”

A decade ago, economists Kenneth Rogoff and Carmen Reinhart argued that pushing the debt-to-GDP ratio beyond a threshold of 90% would be associated with much slower economic growth.⁵ However, the experience in many nations over the course of the 2010s suggests that debt-to-GDP could rise meaningfully above that threshold with limited side effects.

In our view, the real limiting factor on governments is likely not the level of debt but the level of debt service. If interest rates and inflation remain very low, then governments can clearly increase borrowing without significant consequences. However, when higher interest rates cause interest costs to absorb a significant share of the government budget, squeezing other areas of spending, both taxpayers and investors take notice.

This potential risk of higher interest rates in turn is largely driven by the risk of higher inflation. For almost four decades, inflation has trended downward in both developed and emerging economies. Part of that decline has been a normal reaction to excess supply in recessions. However, a larger part of it has been driven by greater income inequality, which has tended to reduce the demand for goods and services relative to their supply, and greater competition, largely due to automation and information technology, which has reduced inflation pressures across the board.

Going forward, as the global economy recovers from recession there is some risk of a cyclical upswing in inflation. More significantly, if policymakers use fiscal policy to reduce income inequality, it might well increase the demand for goods and services while reducing the demand for financial assets such as bonds, increasing both inflation and interest rates.

If these forces prove sufficient to drive inflation higher, even in the face of continued competition, then long-term rates could rise, limiting the scope for further fiscal stimulus. Moreover, this could only be temporarily ameliorated by central bank purchases of government bonds, since outright debt monetization, while reducing real government bond yields, could also lead to even higher inflation, pushing nominal yields higher still.

Given a starting point of low interest rates, low inflation and considerable slack in the global economy, active fiscal policy will likely define the decade ahead. However, whether this turns into the decade of fiscal-powered economic progress or the decade of fiscal crisis will depend on the care with which governments and central banks deploy the tools they now seem ready to use.

⁵ See Carmen M. Reinhart and Kenneth S. Rogoff, “Growth in a time of debt,” NBER Working Paper No. 15639, January 2010.

Debt, debt everywhere: The implications of a high debt world

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IN BRIEF

- Our assumptions of a persistent new high debt reality – due to increased market tolerance for debt, and the depressed real short rates now enabling fiscal stimulus – have implications across asset classes. Overall, a high debt world should add to economic volatility and market volatility over the new cycle.
- Higher debt levels increase the inflation risk premia we assume over our horizon for developed and emerging sovereign bond markets. Active use of fiscal policy should lead to greater differentiation among government bond markets, especially in emerging economies.
- U.S. corporations levered up in the last cycle, and unlike in past recessions, we do not expect this to reverse, at least not in the early part of the cycle. Instead, we expect this anomalous leverage cycle to lead to tighter spreads per turn of leverage. Still, our aggregate corporate spread assumptions, while unchanged, are high relative to long-term history.
- For equities, high corporate debt loads should enable continuing high shareholder payouts (though at reduced levels vs. recent years) but drag on net margins; revenue growth, however, will likely determine whether higher leverage helps or hurts equity returns – the jury is still out. We expect debt to exert the most pronounced effects on U.S. equity markets and the least in Japan.

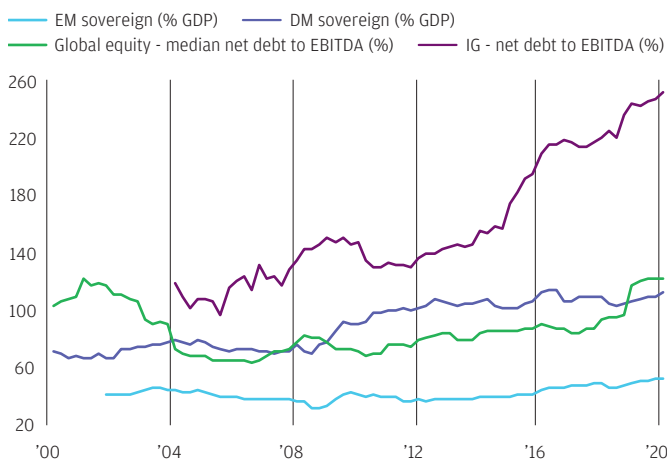


We are living in a time of high and rising debt. The phenomenon affects most asset classes across the public and private sectors and emerging and developed economies.¹ That high government debt levels persist over our forecast horizon is one of the key views in our 2021 Long-Term Capital Market Assumptions (LTCMAs). Aggressive central bank action suppressing interest rates over recent decades has been one driver of rising debt levels. Other, less obvious reasons may also explain them: changing demographics, for example, and declines in underlying economic volatility.² We are living in a time of growing debt tolerance: There is a rising willingness of investors to accept it and of policymakers to adopt it, and a greater capacity of economic systems to carry debt loads.

In the near term, debt ratios are set to rise further, and sharply, as the COVID-19-induced recession lifts debt levels while causing (likely temporary) drops in the denominator (e.g., GDP). Over our long-term forecast horizon, we expect more fiscal stimulus than at any point in modern financial history, reaching levels seen only in wartime. While we do see high corporate debt drifting back toward historical levels over time, we do not expect corporates to delever during the crisis, so credit and equity investors should also confront higher leverage, on average (**EXHIBIT 1**).

Government debt levels have risen across developed and emerging markets, and corporate debt levels in the global equity universe alongside them

EXHIBIT 1: GOVERNMENT DEBT-TO-GDP AND CORPORATE DEBT-TO-EBITDA



Source: Bank for International Settlements, Bloomberg, Datastream, J.P. Morgan Asset Management; data as of March 31, 2020.

¹ For a detailed exploration of rising government debt levels in this edition of our LTCMAs, see John Bilton et al., “The fiscal decade: The promises, problems and potential of fiscal stimulus,” *2021 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, November 2020.

² See Karen Ward and Benjamin Mandel, “Will debt be a drag? Dealing with the upward drift in government debt,” *2019 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, November 2018, and Michael Hood and Benjamin Mandel, “Fiscal therapy: Multi-asset implications,” J.P. Morgan Asset Management, September 2016.

High fiscal spending is necessary to support economic growth in the post-COVID-19 world, and low interest rates are one factor allowing more fiscal spending than in previous cycles. Said another way, our 2021 LTCMAs’ equilibrium steady state implies a bigger government presence in the economy. This paper will examine some issues arising from this new high debt reality for major asset classes, assessing the likely trade-offs and implications for returns.

DEVELOPED MARKET SOVEREIGN DEBT: EXPECT LOWER REAL RATES, HIGHER INFLATION RISK PREMIUM

What conditions facilitate prolonged government indebtedness? The key one is a conscious policy decision to depress real short rates, giving governments the ability to finance large fiscal deficits to pay for high fiscal spending. Major central banks have already signaled their intentions to keep rates low through strong forward guidance or by moving toward average inflation targeting. The LTCMAs factor in this easy monetary stance and financial repression by lengthening the periods over which short and long rates normalize, which in turn leads to lower average expected rates over the next cycle.

Persistently high government indebtedness coupled with easy monetary policy affects our view on the distribution of risks around inflation. To reflect the possibility that coordinated policy could lead to sustained higher inflation, we adjust our inflation risk premium higher for developed markets. We also lower our real yield estimates to reflect the view that central banks will likely keep rates low for a prolonged period. This change in the composition of our equilibrium 10-year bond yield assumptions is a direct result of elevated indebtedness over our forecast horizon.³

Coordinated monetary and fiscal policy regimes will create winners and losers.⁴ After the 2008-09 recession, most major developed markets used monetary policy, implementing quantitative easing (QE) with a fairly uniform impact. This led to strong co-movement, which worked to lower rates. Fiscal policy implementation, however, can differ by country, depending on the economy’s underlying structure. Moreover, countries’ available fiscal space⁵ and policy effectiveness will be central to determining market pricing of reflating inflation expectations and/or boosting productive capacity.

³ Please see the 2021 LTCMA Fixed Income Assumptions chapter for country-by-country details on changes we make to our LTCMA equilibrium assumptions.

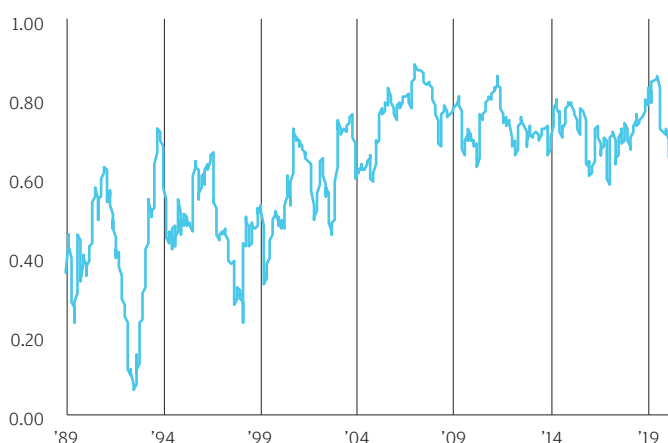
⁴ As discussed in Bilton et al.

⁵ The capacity of an economy to deploy fiscal stimulus and expand its deficit without blowing up debt-to-GDP ratios, causing government bond yields to surge or undermining the country’s currency.

While fiscal policies will differ by country, monetary and fiscal policy regimes will be coordinated within a country. We expect this phenomenon to create more differentiation globally. For example, we have more confidence that U.S. policymakers can successfully raise inflation expectations than we do in the case of Europe or Japan. For these reasons, the longtime co-movement of developed market (DM) government bonds is at risk of dissipating over time (EXHIBIT 2). As we discuss below, the lessening of co-movement should most clearly manifest in emerging markets but is a possibility for developed market sovereign debt as well.

Strong co-movement was a symptom of declining rates, but now that fiscal policies will differ by country, the longtime co-movement of DM government bonds is at risk of dissipating

EXHIBIT 2: CORRELATION AMONG DM SOVEREIGN BONDS (10-YEAR)



Source: Bloomberg, J.P. Morgan Asset Management; data as of October 9, 2020. Correlations calculated on trailing 52 weeks' 10-year government bond yield changes among the U.S., the UK, Germany, Japan, Canada and Australia.

EMERGING MARKET LOCAL DEBT

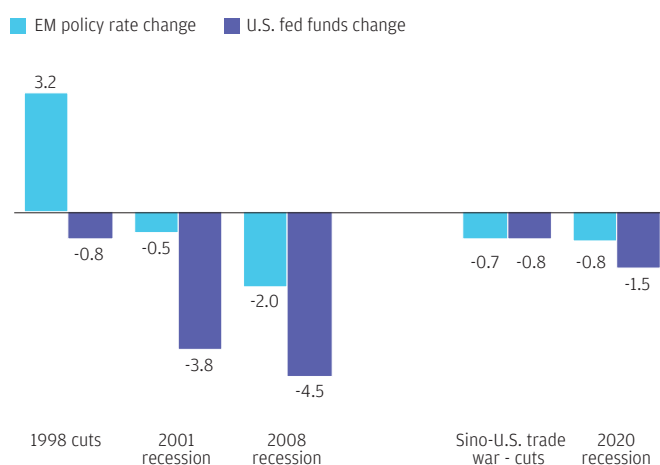
The state of emerging market (EM) sovereign issuers has evolved since past cycles. Market participants' tolerance for higher debt ratios, a low inflation landscape and a yield-starved investor base have combined to change EM fiscal authorities' and central banks' reaction functions.

The way EM policymakers responded to past crises followed a well-established pattern: seeking to restore confidence by raising interest rates, withdrawing liquidity and cutting back markedly on fiscal deficits. (China is a different case; see box, **CHINA: UNIQUE LATITUDE TO INCREASE LEVERAGE, BUT NOT WITHOUT SOME CONSEQUENCES.**)

This time has been different. In response to the COVID-19 recession, EM central banks have cut interest rates even in the face of currency weakness; injected significant amounts of liquidity; eased regulations to keep money and bond markets functioning; and even undertaken QE, to varying degrees, to keep bond yields broadly stable (EXHIBIT 3).

EM central banks were able to loosen monetary policy amid the COVID-19 outbreak

EXHIBIT 3: CHANGE IN POLICY RATES IN 2000, 2008 AND NOW FOR EM AND DM CENTRAL BANKS (% CHANGE)



Source: Bloomberg, J.P. Morgan Asset Management; data as of June 30, 2020.

What changed? (1) This recession was not due to an EM financial imbalance; (2) prevailing rates in developed markets are low to negative; and (3) EM credibility in confronting financial crises has undergone structural changes, which we now address.

After struggling with financial crises in the 1990s, EM countries have implemented a variety of policy changes that have left them more resilient to financial stresses (EXHIBIT 4). They have:

Following the crises of the 1990s, many EM countries implemented policy changes that left them more resilient to financial stress

EXHIBIT 4: CHANGES IN EM COUNTRIES' INSTITUTIONAL FRAMEWORKS, LAST 10 YEARS (% OF EM GDP)

Emerging markets with fiscal rules		Emerging markets with inflation targets		Emerging markets with flexible exchange rates		Emerging markets with central bank transparency	
1999	7.7	1999	14.0	1999	11	1999	2.6
2015	29.0	2017	44.4	2017	26	2014	5.1

Source: Dincer and Eichengreen (2014), Global Debt Wave, World Bank; data as of June 30, 2020. Central bank transparency as defined in N. Nergiz Dincer and Barry Eichengreen, "Central bank transparency and independence: Updates and new measures," *International Journal of Central Banking*, March 2014.

- Adopted independent, inflation-targeting regimes, helping anchor inflation expectations despite sizable currency devaluations.
- Implemented flexible exchange rates that dramatically lower the chances of disruptive breaks with a currency peg.
- Adopted fiscal rules bolstering the credibility of their paths to debt sustainability.
- Issued a growing share of debt denominated in local currencies, leaving them less vulnerable to external financial conditions, particularly moves in the U.S. dollar and Treasury rates (**EXHIBIT 5**).
- Built up more assets to finance these liabilities in case of emergency, evidenced by larger currency reserves.

Local currency debt has accounted for most of the increase in EM debt

EXHIBIT 5: EM GENERAL GOVERNMENT DEBT (USD BILLIONS)



Source: Global Debt Wave, World Bank, June 30, 2020.

These policy trends are evident in aggregate, although with considerable variation across countries. This heterogeneity is reflected in the market responses to recent QE policies in EM countries as, for the first time, many EM central banks are engaging in unprecedented QE in response to the COVID-19 recession to help fund burgeoning fiscal deficits. Those doing so include 11 of the 19 countries in the benchmark EM government debt index,⁶ representing two-thirds of index capitalization. EM countries that entered this recession with a proven ability to keep inflation and inflation expectations in check have been rewarded with generally flatter curves and lower yields than countries that entered it with fiscal or monetary vulnerabilities.

Our proprietary Institutional Robustness Index measures market perceptions of policy credibility and plots this vs. changes in local debt yield curves since March 2020. Tellingly,

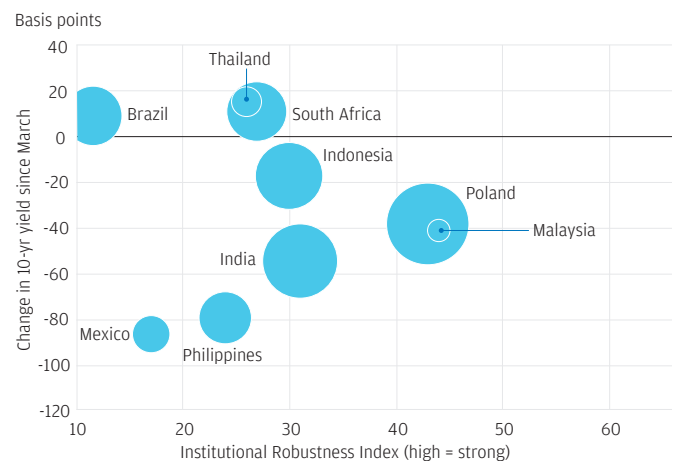
⁶ The JPMorgan Government Bond Index - Emerging Markets Global Diversified Indices (GBI-EM GD).

countries with strong institutional robustness have seen little or no steepening of yield curves or concerns that QE may introduce medium-term inflation risk (**EXHIBIT 6**). Following QE announcements, credible policymakers have been rewarded with DM-like yield curve performance while less credible central banks have struggled with market concerns that policy today will stoke rising, even runaway, inflation in the future.

Those that entered this recession with stressed fiscal balances, high inflation expectations and low prospects for reform retain steeper yield curves in our equilibrium assumptions, despite enacting QE. We expect markets will require higher risk premia over the coming years from those sovereigns to compensate for greater policy and inflation uncertainty.

EM countries with strong perceptions of institutional robustness have not seen QE announcements spur yield curve steepening

EXHIBIT 6: INSTITUTIONAL ROBUSTNESS INDEX (HIGH = STRONG) VS. CHANGE IN YIELD CURVE SINCE COVID-19



Source: J.P. Morgan Asset Management; data as of August 8, 2020. Bubble sizes represent volume of announced QE as a % of GDP.

EM hard currency debt

EM hard currency debt has also benefited from the aforementioned structural changes in EM countries. But the set of 73 EM countries issuing hard currency debt in the benchmark index, the EMBIG,⁷ is much broader than the local debt group, and we have concerns regarding its lower quality tier. The index's inclusion of several frontier countries over time has also increased the number of fiscally vulnerable countries. Even after stripping away new inclusions, the EMBIG's rating quality degraded during the last cycle (**EXHIBIT 7**). In turn, the number of defaults associated with the pandemic-induced global recession is already one of the

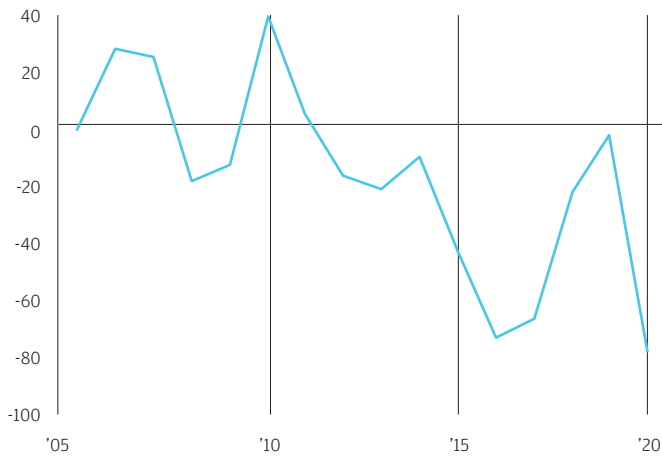
⁷ The benchmark EM hard currency index, made up of 73 sovereign debt issuers, is the Emerging Market Bond Index Global Diversified (EMBIG-DIV).

largest on record. Argentina, Ecuador and Lebanon had defaulted as of publication time, for a 2020 notional (par value) annual default rate of about 9%, the second-largest rate in the index's history.

It took years for the EMBIG countries to build up their fiscal imbalances; it will take time to improve them. Countries that default will face lengthy negotiations with private creditors and multilaterals before very likely going through structural reform, during which time, should that occur, their fiscal flexibility would be limited. For this reason, we think there will be a higher percentage of low quality bonds in the index over the next 10 to 15 years, on average, and we raise our equilibrium spread this year by 25 basis points (bps) to 3.75%.

EM hard currency debt experienced net downgrades during much of the last expansion

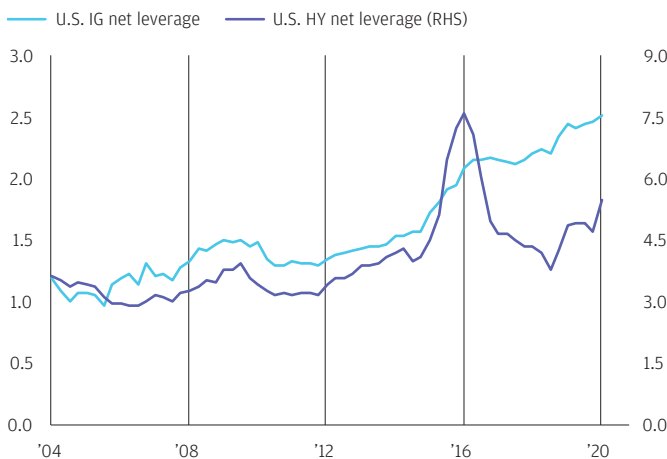
EXHIBIT 7: EMBIG-DIV NET UPGRADES BY NUMBER OF ISSUERS



Source: J.P. Morgan Securities, J.P. Morgan Asset Management; data as of August 31, 2020.

While metrics among U.S. corporates have been on a secular rise ...

EXHIBIT 8A: DM CREDIT: NET LEVERAGE (NET DEBT/EBITDA)



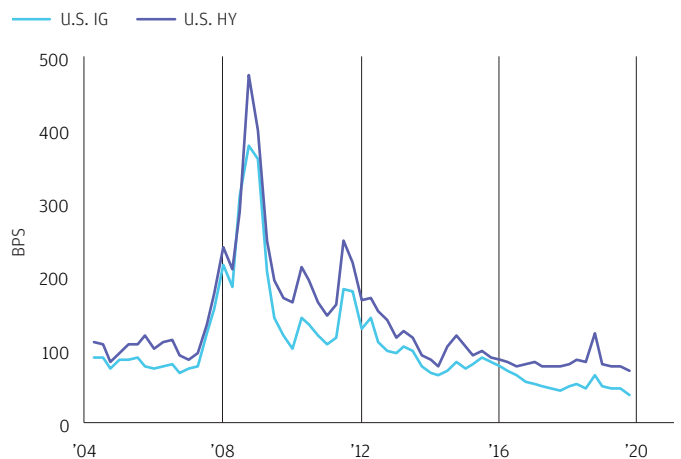
DM CREDIT: UNUSUAL LEVERAGE TRENDS DON'T MOVE OUR UNDERLYING SPREAD ASSUMPTIONS

With the cost of borrowing in secular retreat in recent years, U.S. corporates seem to have levered up their balance sheets, in turn boosting return on equity (RoE) and consequently share prices. Over the previous credit cycle, strong investor demand and increased competition among lenders loosened lending standards, worsened credit quality and increased leverage metrics and duration across the rating spectrum, for both investment grade (IG) and high yield (HY) borrowers.

Over the period from 2007 to December 31, 2019, shortly before the start of the pandemic, HY issuers' balance sheet leverage rose from around 3x net debt-to-EBITDA to 4.7x. IG leverage also increased, from 1.0x to 2.5x over the same period (EXHIBIT 8A). Low Treasury yields created a "search for yield" dynamic in which fixed income products saw demand for their carry characteristics, particularly in the late stages of the last business cycle, when equity multiples appeared stretched. Spreads generally tightened throughout the last business cycle (with the notable exception of the energy-led spread collapse of 2015-16). The result was that spread per turn of leverage trended downward in the last cycle (EXHIBIT 8B).

... investors looked through the rise in leverage, causing spreads per turn of leverage to decrease over the last expansion

EXHIBIT 8B: SPREADS PER TURN OF LEVERAGE (BASIS POINTS)



Source: J.P. Morgan Securities, BofA Securities, J.P. Morgan Asset Management; data as of March 31, 2020. Data range is March 2004-March 2020.

In the past, a recession would have reversed this downward trend in spreads per turn of leverage as investors became painfully aware of the risks of overlevered balance sheets. This recession, however, has been unique. Strong fiscal and especially monetary policy responses amid the public health crisis have provided U.S. corporates cheap bridge financing. Credit spreads quickly normalized once the Federal Reserve provided an unprecedented backstop to the corporate sector that (with all-time low Treasury yields) encouraged companies to take on more debt. As a result, U.S. corporates will move through the early part of this cycle with an unusually high degree of leverage.

What are the impacts of this high debt reality? We believe the Treasury rate will continue to drive leverage dynamics in the corporate bond market. Our projections call for a long period of low rates, with Treasury yields eventually normalizing to 3% within our LTCMA horizon. Ultimately, rising rates should incentivize DM companies to delever their balance sheets as the cost of servicing debt starts to rise again.

The projection for elevated leverage metrics (even after incorporating some decline eventually) has the greatest effect on our IG spread assumptions. Our credit spread assumption, 160bps, is higher than the historical average, reflecting both the buildup in BBB concentration and the asset class's higher duration. Our HY assumption, 500bps, remains around its historical average. This is because we anticipate that a higher proportion of companies will be caught with too much leverage and will be downgraded to a CCC rating, but that this will be offset by a similar proportion of safer BB rated companies that, absent the increase in leverage, might have been rated IG.

THE IMPACT OF HIGH DEBT LOADS ON DM EQUITY MARKET RETURNS: NOT NECESSARILY NEGATIVE

In a world in which companies have shifted away from equity to a debt-heavy financing model, we see the clearest impacts on our assumptions in two areas. In financing terms, high debt loads should enable continued elevated payouts to shareholders through dividends and buybacks. In operating terms, high debt loads should be a drag on net margins via elevated interest payments. Sustainably higher equilibrium valuation levels (P/Es) are part of the picture as well, but more due to an environment of sustained low interest rates and ample liquidity than high debt *per se*.⁸

The overall impact on returns from high debt levels is not necessarily negative, depending on the balance among these factors. The deciding factor is likely to be debt's impact on economic and hence revenue growth, which may well outweigh other factors. And here the jury is still out. Our LTCMA equity assumptions framework models returns in a structured fashion derived from a number of drivers (**EXHIBIT 9**; also, see the Equity Assumptions section).

Aggregate revenue growth: No change

Revenue growth assumptions in our equity assumptions framework are largely driven by export-weighting our regional GDP assumptions. These have risen in this year's forecasts due

⁸ This approach contrasts somewhat with widely used discounted cash flow models in which a shift toward debt financing usually is largely captured via a lowered cost of capital used to discount future flows. The cost of debt is lower than the cost of equity almost by definition, while debt usually also enjoys a tax advantage.

How do high debt levels impact equity returns? The answer depends on a balance of factors

EXHIBIT 9: EVALUATING THE IMPACT OF HIGHER DEBT USING OUR LTCMA EQUITY ASSUMPTIONS FRAMEWORK

Equity assumptions	Isolated impact of higher debt on our base case 2021 LTCMA equity assumptions*	Our base case 2021 LTCMA equity assumptions vs. last year*
Revenue growth	No change	Higher
+ margins impact	Lower	Higher
Earnings growth	Lower	Higher
Gross dilution	No change	No change
Buybacks	Higher	Lower
EPS growth	Varies	Higher
+ valuation impact	Higher	Lower
Price return	Varies	Lower
Dividend yield	Potentially higher	Lower
Total return	Varies	Lower

Source: J.P. Morgan Asset Management; assumptions as of September 30, 2020.

* Our base case assumes the MSCI AC World Equity index. Please refer to the 2021 LTCMA Equity Assumptions for more details.

to our expectations of a recovery from depressed levels, not to faster debt-fueled spending *per se*. However, this is an area of uncertainty – should high debt levels (private and public) have a large impact in either direction on GDP and revenue growth, that could well outweigh most other factors. We see upside risks mainly in the U.S., Australia, the UK and Canada, and downside risks in Brazil, Mexico and Russia.⁹

Margins: Downward pressure from rising interest costs

We expect the corporate debt outlook to be a negative for net margins and thus earnings growth. Rising bond yields (whether spread- or duration-driven) imply higher interest expenses, although the overall impact depends on the timing of rising debt costs vs. falling debt levels. Given that bond yields are expected to rise only later in our LTCMA horizon, the immediate impact should be modest. Further, this impact is overpowered in this year’s assumptions by the now-depressed starting level of earnings and margins, which should rise cyclically as the economy recovers.

A more speculative negative impact might come from politics: Limiting the tax deductibility of interest payments is a prominent part of the U.S. discussion around how corporations should be taxed. If enacted, it would raise all-in interest costs.

Net dilution: Buybacks decline vs. recent years but remain above historical averages

In our framework, higher debt levels allow companies to make higher payouts to shareholders, reducing shareholder dilution and boosting return on equity by minimizing equity capital on balance sheets. As debt levels decline over our LTCMA time

horizon, this should lead to downward pressure on payouts, reinforcing the near-term negative impact from the cyclically depressed level of earnings, making payouts less affordable. Taken together, we see lower buybacks across most countries, although they remain above long-run averages.

Politically driven changes may have an impact here as well, since governments may exert moral or legal pressure on buybacks. If payouts were consequently to shift toward dividends, that might have a negative impact on after-tax returns for some types of investors.¹⁰ However, it would have little or no impact on our return assumptions.

Valuations

In our equity returns framework, higher debt allows companies to boost RoE via larger shareholder payouts. In combination with a historically very low cost of debt, this should boost equilibrium valuations. We have long nodded to this factor in our equity assumptions by using equilibrium P/E assumptions that are modestly above long-run averages.

Regional considerations

When incorporating the above considerations into our equity assumptions, we have to take into account the varying scale of the debt issue among regions. The U.S. equity universe has clearly led the charge in raising corporate leverage (**EXHIBITS 10A and 10B**).¹¹ The only other major market to show a clear upward trajectory is the UK, albeit from a much lower

⁹ As discussed in Bilton et al., “The fiscal decade.”

¹⁰ As capital gains are commonly more lightly taxed than dividends.

¹¹ Aggregate fundamental corporate data can be substantially distorted by sector differences and anomalies. Most prominently, the cash-rich U.S. technology sector dilutes the extent of the rise in leverage in the rest of the U.S. market, while the U.S. and European auto sectors’ finance arms cause distortions in the opposite direction. Calculating median debt levels allows us to largely avoid these issues.

Debt has risen the most in the U.S. and the UK while trending downward in Japan – trends that can be obscured in aggregate (10A) by sectoral distortions but are clear in median data (10B)

EXHIBIT 10A: AGGREGATE NET DEBT TO EQUITY, NONFINANCIALS

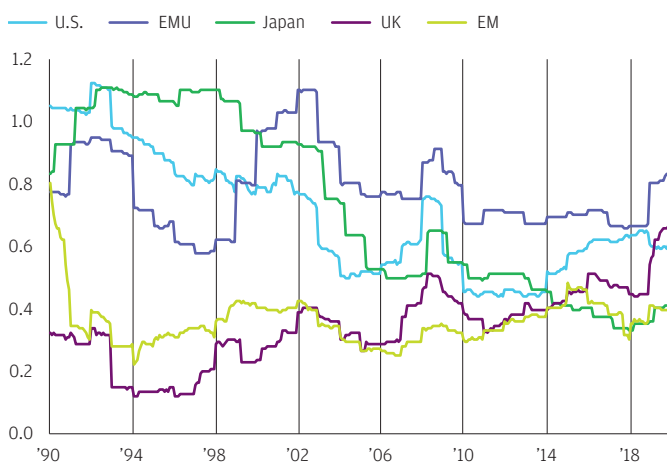
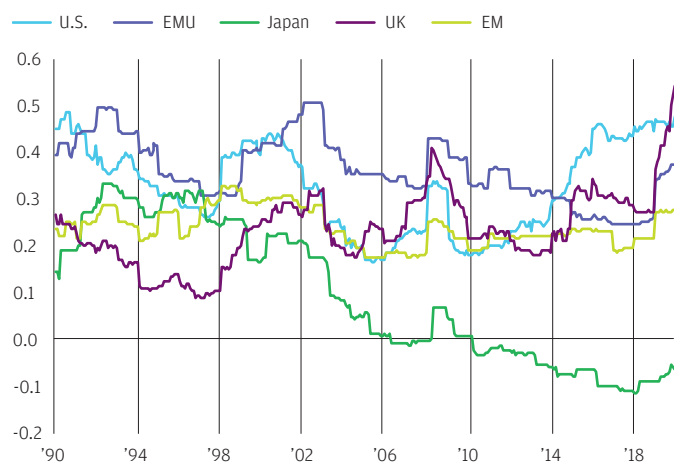


EXHIBIT 10B: MEDIAN NET DEBT TO EQUITY, NONFINANCIALS



Source: Datastream, J.P. Morgan Asset Management; data as of October 5, 2020.

starting level. In contrast, the Japanese corporate sector until recently remained in a multi-decade deleveraging mode. Trends in other regions look less interesting, although long-run average/neutral levels differ, likely owing to differences in sector composition, accounting and corporate culture.

In sum, the return implications for equity markets of the new high debt reality are clearest for the two extreme cases: The U.S. sees the clearest negative impact on margins but also benefits from a relatively large boost to RoE and valuations. At the other end of the spectrum, Japan's low level of corporate debt supports our long-standing view that there is ample scope for corporates to increase leverage and reach a higher level of payouts, which we think will be a major driver of returns. European and EM debt levels are more or less in line with history, leading us to expect only a modest drag on margins - but here too we anticipate a positive impact on P/Es and RoE.

CONCLUSION

We expect higher indebtedness to be sustained across both sovereigns and corporates due to increased market tolerance for debt. High debt loads are expected to amplify market volatility in times of recession.

In bond markets, this new cycle is shaping up to be very different from the post-financial crisis cycle. The most striking difference is the signal that monetary and fiscal policy will be used in tandem well into the recovery. That increases the risk premia we attach for inflation risk over the next 10 to 15 years across DM and EM sovereign bond markets. The active use of fiscal policy should lead to greater differentiation among bond markets, manifesting most clearly in emerging markets.

In credit, we expect this anomalous leverage cycle to lead to tighter spreads per turn of leverage, but this does not change our aggregate corporate spread assumptions. In the U.S., in particular, we expect eventual deleveraging to reduce the support for buybacks.

For equities, the most evident impacts of high debt loads will likely be enabling the continuation of high shareholder payouts while dragging on net margins. That this would occur against a low interest rate backdrop also implies equilibrium valuation levels well above history. However, the factor most likely to determine whether a high debt world has a positive or negative impact on equity returns is revenue growth. Here the jury is still out, although we do see upside risks. Given the differences in the rise of corporate debt across economies in recent years, these effects should be most pronounced in the U.S. market, with Japan relatively unaffected at the other end of the spectrum.

Overall, investors will have to become accustomed to living in a high debt world. In this environment, DM equities increasingly become a vehicle for income rather than capital appreciation. Investors may have to turn to EM equities and alternatives for return on capital. We also expect high indebtedness to exacerbate market volatility in future recessions.

CHINA: UNIQUE LATITUDE TO INCREASE LEVERAGE, BUT NOT WITHOUT SOME CONSEQUENCES

After remaining broadly stable for the past three years, China's economy will likely see a notable releveraging in 2020, mainly driven by the government's pandemic fiscal support, a package likely totaling 5%–6% of GDP in 2020. The implications are less severe than they might be for other emerging economies because of China's unique characteristics, but the consequences are still important.

Unlike other EM economies, China can meaningfully ramp up government borrowing without a significant increase in interest rates. That reflects two key factors. First, China does not rely on foreign investors to finance its government debt, almost all of which is domestic debt. As of the end of 2019, only 3.5% of government debt was held by foreign investors vs. 38.8%, on average, in emerging markets and 21.3%, on average, in emerging Asia.*

Second, China's large domestic banking sector offers a strong domestic bid for its government debt and serves as the main source of financing, holding 86% of total government debt. Fiscal stimulus in China is usually accompanied by monetary easing, which positions these banks well for when public sector borrowing needs rise. In addition, China's domestic banking sector is funded predominantly by retail deposits, making it less exposed to potential interbank liquidity shortages during an economic crisis.

The government's strong control over both the asset and the liability sides of the public debt equation also gives China a range of policy options unavailable to most other economies. So we see limited risks of any liquidity-driven debt crisis, including at the local government level, where the repayment burden is higher; any debt restructuring is likely to take place gradually.

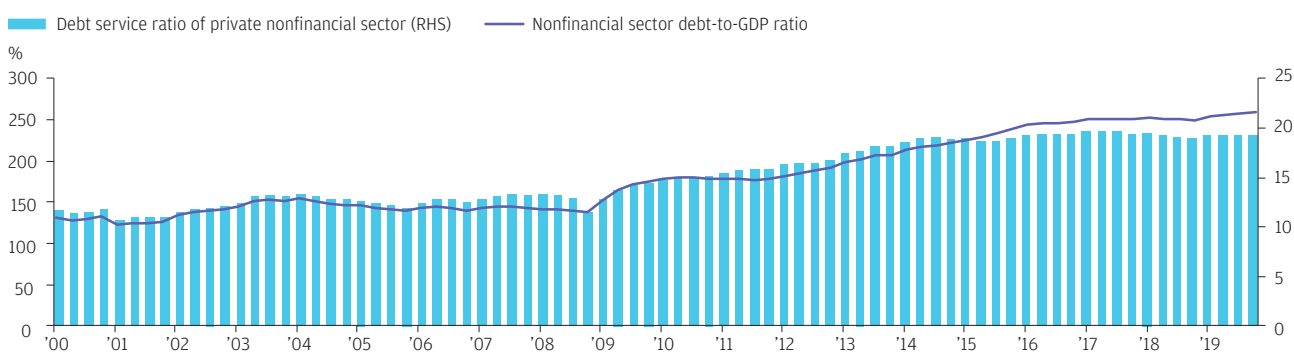
Still, even if higher government leverage is unlikely to trigger a debt crisis, it reduces Chinese policymakers' future capacity to stimulate the economy. Policy easing this time around is more measured and targeted than the aggressive stimulus package rolled out during the 2008–09 global financial crisis. Chinese policymakers are facing some constraints because government leverage has doubled since 2008. (The 2020 package does surpass the government's stimulus effort during its 2015–16 easing cycle.)

What are the implications for rates and debt service of the significant increase in leverage levels in 2020? In our view, real policy rates should remain low to keep the debt service burden manageable. This introduces a range of possible consequences for economic efficiency and even, potentially, productivity growth. China's private nonfinancial sector debt service ratio (DSR) is already relatively high at 19.2%, compared with 17.5% in Brazil, 7.5% in Russia and 7.1% in India.** We estimate, to take a hypothetical example, that if the private nonfinancial sector debt-to-GDP ratio increased by 10 percentage points (ppt), it would raise China's DSR by 1ppt. Meanwhile, a 100 basis point reduction in the average lending rate would lower the DSR by 1.2ppt (EXHIBIT A).

However, keeping policy rates low to manage debt service concerns would create financial distortions. Policy rates kept well below the natural rate of interest† would persist for longer, which would likely lead to a further deterioration in the efficiency of credit allocation to different sectors. It would also weigh on long-term productivity growth in the absence of structural reforms, especially of the state-owned enterprise sector.

China's private nonfinancial sector debt service ratio, the highest of the BRIC countries, will rise further

EXHIBIT A: CHINA'S OVERALL LEVERAGE VS. DEBT SERVICE RATIO (DSR)



Source: Bank for International Settlements, J.P. Morgan Asset Management Multi-Asset Solutions; data as of December 31, 2019.

* All data and estimates on China's government debt in this sidebar are as of December 31, 2019. According to the International Monetary Fund's International Financial Statistics database, the percentage of China's debt held by foreign investors is the lowest of all EM economies.

** The debt service ratio is defined as the ratio of interest payments plus amortization to income.

† The natural interest rate is defined as the real interest rate consistent with output at its potential level and constant inflation. For more information, see Hannah Anderson and Leon Goldfeld, "The cost of capital in China's changing markets," 2018 Long-Term Capital Market Assumptions, J.P. Morgan Asset Management, November 2017.

Alternatives: From optional to essential

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IN BRIEF

- Alternatives are evolving from an optional to an essential portfolio component. We see expanding allocations to alternatives over the next decade by institutions and individuals of all types, each with distinct investment needs and constraints.
- Investors are increasingly turning to alternatives to meet their investment objectives - whether in pursuit of alpha, income or diversification.
- A comprehensive framework for allocating to alternatives will be critical as allocations rise and alternatives are recognized as vital to achieving investors' desired outcomes. We provide a framework that starts with investor objectives and builds solutions based on the roles that different alternatives can play within an overall portfolio.
- Alternative investing has distinct challenges. Illiquidity, dispersion of returns, limited transparency, tail risk and complex fee structures are, to varying degrees, intrinsic to alternatives and have limited their uptake by some investors.
- New solutions are being developed for smaller institutions and retail investors to access the potential benefits of alternatives. Increased flows may lessen investment hurdles but could also, over the long term, constrain alpha potential for some alternatives.
- Investors appear to have reached the conclusion that the long-term benefits of these nontraditional assets are likely to outweigh the challenges.

OVERVIEW

From optional to essential: That's how we see alternatives evolving over the next 10 to 15 years. This trend is already well underway, with significantly rising alternatives allocations among larger institutions as well as high and ultrahigh net worth individuals.

Three simple reasons explain our expectations:

- Our view that interest rates will stay “lower for longer”
- Shrinking opportunities for alpha, income and diversification
- Improving means of access to alternatives, combined with less restrictive regulations

The distinguishing characteristics of alternatives (See **WHAT MAKES ALTERNATIVES ALTERNATIVE?**) and the roles they can play within a portfolio help address the shortfalls of public financial assets today and may enhance the performance of traditional portfolio allocations:

- Lower interest rates over the past decade have sent investors on an avid search for income. Core alternative strategies in the real assets and alternative credit segments can provide stable sources of income.

- The ability of bonds to provide portfolio protection by rallying in a market downturn has been diminished. Hedge funds may provide new sources of diversification, and income-producing core alternatives can offer a measure of protection.
- Passive investing can provide market beta but cannot, by definition, provide alpha. Private equity, non-core real assets and hedge funds, on the other hand, are potential portfolio return enhancers.
- Should inflation risks tick up, which we see as a possibility over the medium term, the need for an inflation cushion could increase. Real assets can help.

Of course, investment objectives and experience with alternatives vary across and within investor segments; the inherent characteristics of alternatives (illiquidity, limited transparency, tail risk, fee structures) present greater challenges for some investors than for others; and the flow of capital into alternatives will likely shape the risks and rewards of these investments over time. In this piece, we look at:

- An objectives-based framework for allocating to alternatives that starts with investors' specific needs for alpha, income and diversification and allocates to different types of

WHAT MAKES ALTERNATIVES ALTERNATIVE?

“Alternatives” is an often-used catchall phrase for all nontraditional assets (private equity, alternative credit, real assets including real estate and infrastructure, etc.) and investment strategies – hedging, short selling, leverage and others.

But that doesn't mean alternatives are a hodgepodge of assets. They are all alternative sources of one or more outcomes that investors seek from traditional stocks and bonds – alpha, income and diversification – and can, with trade-offs, potentially help investors achieve these outcomes.

Alternatives also share characteristics that distinguish them from traditional stocks and bonds. They are, to different degrees, less liquid, have longer investment horizons and operate in more inefficient (private, less regulated) markets. They have less transparency, and information is not always equally available to all market participants. For all these reasons, alternative investments generally:

- Exhibit low correlations with traditional assets – which can make them good diversifiers* of traditional portfolios
- Deliver returns that are driven by income and/or alpha, making them potentially good stabilizers and/or return enhancers
- Have higher fees than traditional stocks and bonds

Finally, non-core** alternative managers' returns exhibit significantly higher dispersion than those of traditional managers. This stresses the importance of manager selection: Skillful managers are able to exploit market inefficiencies, bring about operational improvements and deliver enhanced returns.

* Diversification does not guarantee investment returns and does not eliminate the risk of loss. Diversification among investment options and asset classes may help to reduce overall volatility.

** Non-core refers to alternative categories outside of core alternative investments. While core alternative investments are designed to deliver stable income with lower volatility, non-core alternative investments tend to have added return and/or diversifier components. See EXHIBIT 2 for more information.

alternatives based on their roles within a portfolio, not their industry nomenclature. We believe aligning alternative asset selection with investor objectives within an overall portfolio context is critical – and a focus of most successful frameworks used by experienced alternative investors.

- Challenges and trade-offs that are specific to investing in alternatives and need to be considered when allocating to these assets.
- How different types of investors are utilizing alternatives today, how their access and use is likely to evolve going forward and the potential implications for alternative investing.

ALLOCATING TO ALTERNATIVES: AN OUTCOME-ORIENTED APPROACH

A large institution and an average household may have very different investment objectives and constraints, but they both face the same challenge: how to allocate capital to achieve their desired outcomes. We argue that the most effective approach to asset allocation is to let these desired outcomes, not traditional or alternative asset class labels, guide the decision-making process.

EXHIBIT 1 illustrates such an approach: It starts with investors’ objectives and allocates capital to assets and strategies – return enhancers (Alpha), yield enhancers/safe havens

(Income) and diversifiers (Diversification) – to deliver the desired outcomes within an overall portfolio context.

We take a closer look at each of these functions, with examples of how traditional and/or alternative assets might be used to support them within a portfolio:

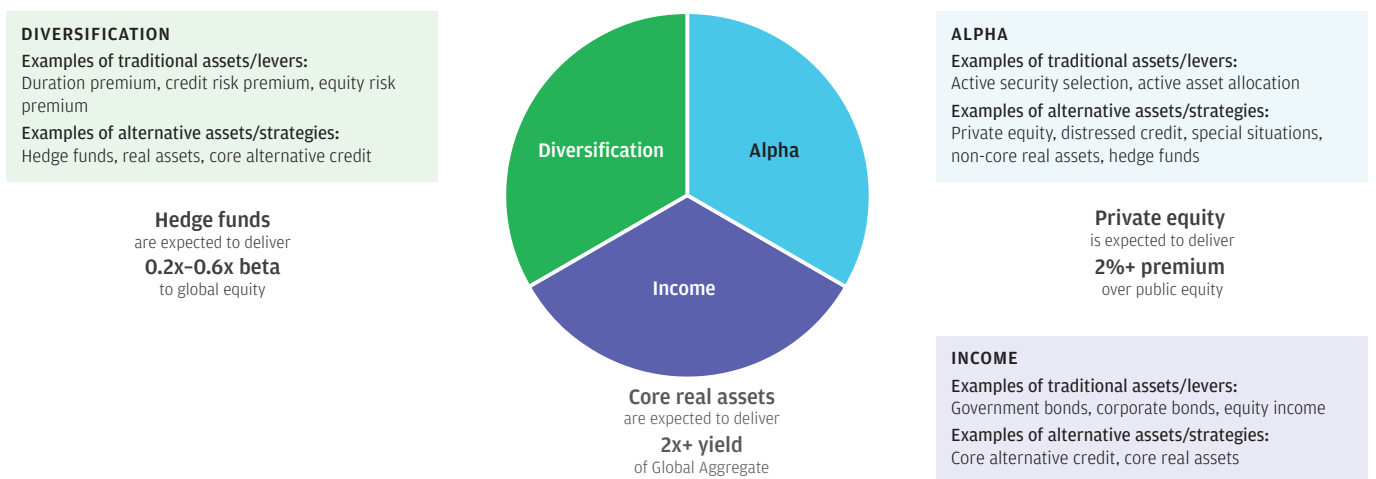
ALPHA is commonly defined as the return from skillful active management or value creation that lifts portfolio returns. Traditional active security selection and cycle-aware asset allocation, as well as private equity, opportunistic alternative credit (e.g., distressed credit and special situations) and non-core real assets, can be attractive alpha sources. Integrating environmental, social and governance (ESG) factors may enhance alpha generation across all these sources.

INCOME generation is a primary objective for many asset owners – for institutions that need to match liability cash flows or retirees who need to replace their earnings, for example. Within portfolios, income provides a source of liquidity and/or stability. High quality government and corporate bonds often fill this role. However, core alternative credit and real assets, including core real estate and infrastructure, can also provide a stable income stream in downturns. They may offer some appealing safe haven characteristics, with potentially higher yield, albeit at the cost of some liquidity.¹

¹ Thushka Maharaj et al., “Rethinking safe haven assets,” *2020 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, November 2019.

Alternative and traditional assets share the same set of functions within a portfolio

EXHIBIT 1: ALPHA, INCOME AND DIVERSIFICATION



Source: J.P. Morgan Asset Management. Estimates are based on the 2021 Long-Term Capital Market Assumptions (LTCMAS); data as of September 30, 2020. Core real assets yield is calculated based on a weighted average starting NOI (after capex and depreciation) yield on a well-diversified portfolio of core real assets. Global Aggregate yield refers to the Bloomberg Barclays Global Aggregate current yield. Hedge fund beta range is calculated based on the range of hedge fund strategies covered by the LTCMAS. Hypothetical performance results have many inherent limitations. No representation is being made that an asset class will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program. One of the limitations of hypothetical performance results is that they are generally prepared with the benefit of hindsight. In addition, hypothetical trading does not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risk in actual trading.

DIVERSIFICATION is a critical risk management tool for asset owners. Holding assets (traditional and alternative) with low or uncorrelated sources of return can reduce volatility. Hedge fund betas are often used as effective risk diversifiers, although they do come with lockups, leverage and relatively large left-tail risks. Core real assets and core alternative credit can also diversify equity risk, as their return streams are driven by higher quality income and/or local economic factors.

As alternatives are increasingly viewed as essential, not as optional, in supporting these functions, we expect a further blurring of the boundaries between traditional and alternative assets. Fees, on the other hand, are likely to become more differentiated, with the gap widening between more passive index tracking or systematic strategies and more active, top-performing, alpha-seeking managers.

A simple framework for investing in alternatives

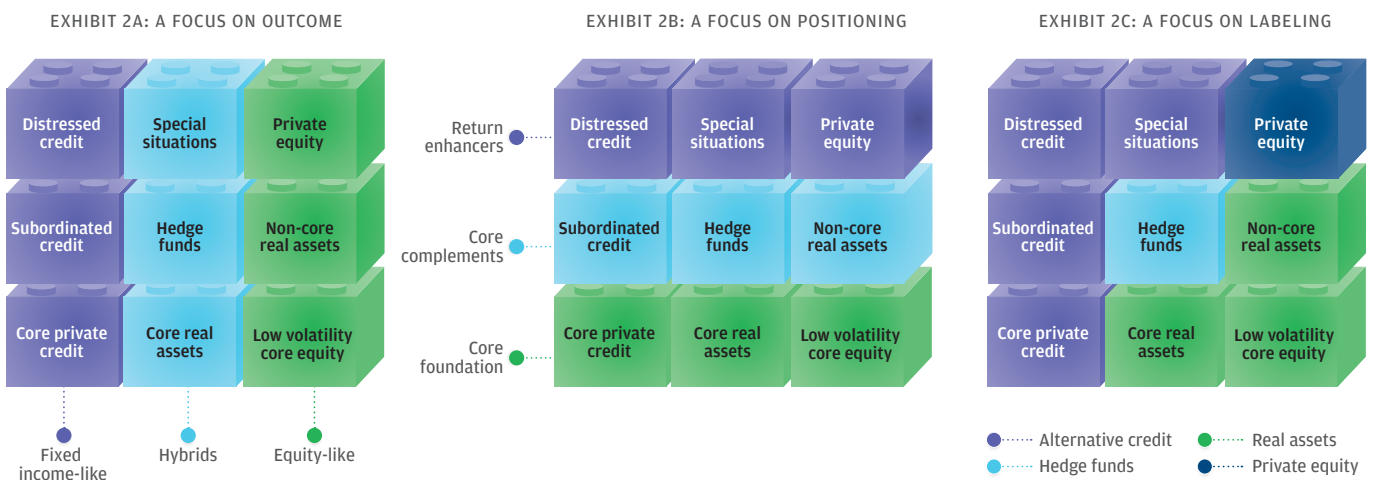
Investors taking an outcome-oriented approach can employ an alternatives investing framework to help sort alternative assets – not by their labels (alternative credit, private equity, hedge funds or real assets) but by the characteristics they share with traditional asset classes (fixed income-like, equity-like or both in the case of hybrids) and the attributes they provide to a portfolio (alpha, income and diversification).

EXHIBIT 2 illustrates a framework that categorizes the main alternative asset classes according to:

- **A FOCUS ON OUTCOME (EXHIBIT 2A):** Assets on the left are alternatives to or share characteristics with *fixed income*. In the middle are *hybrids*, with attributes of fixed income and equity. On the right are alternatives with *equity-like* attributes. From a portfolio management perspective, balancing exposures within these building blocks can be a source of alpha (i.e., tilting toward fixed income attributes in a risk-off environment and toward equity attributes in a risk-on environment) while maintaining a steady allocation to hybrid categories, which tend to be more all-weather.
- **A FOCUS ON POSITIONING (EXHIBIT 2B):** Starting at the bottom, the *core foundation* includes scalable categories that have stable cash flows as the primary driver of return and are also diversifying vs. traditional assets. In the middle row are the *core complements*, investments focusing on less transparent and relatively less scalable opportunities that provide diversification and/or enhanced returns benefiting from secular themes. The top row, *return enhancers*, can potentially produce outsize returns across a market cycle. Right-sizing the mix of these various components should reflect an investor’s specific objectives and constraints, as well as the economic environment.
- **A FOCUS ON LABELING (EXHIBIT 2C):** Color-coded groupings indicate how clusters of these building blocks are labeled in the industry today. We de-emphasize the label and encourage investors to consider the benefits and trade-offs of alternatives by focusing instead on their outcomes and roles within a portfolio.

An objectives-based alternatives framework emphasizes function over standard industry nomenclature

EXHIBIT 2: ALTERNATIVES ALLOCATION FRAMEWORK



Source: J.P. Morgan Asset Management - Alternatives Investment Strategy & Solutions. For illustrative purposes only. Hedge funds – hybrid core complements – are placed at the center of the framework, as they are flexible structures that can toggle between equity- and fixed income-like and hybrid functions. While low volatility core equity is denoted as part of real assets, it may represent a broader segment of liquid equity-like core alternatives.

Tailoring allocations to meet different risk-return objectives

The following hypothetical case study illustrates how investors with different risk-return objectives can improve their traditional multi-asset portfolio outcomes with an alternatives allocation that reflects their distinct risk-return profiles (EXHIBIT 3). The approach complements existing portfolio allocation approaches that we use in the broader portfolio construction process.

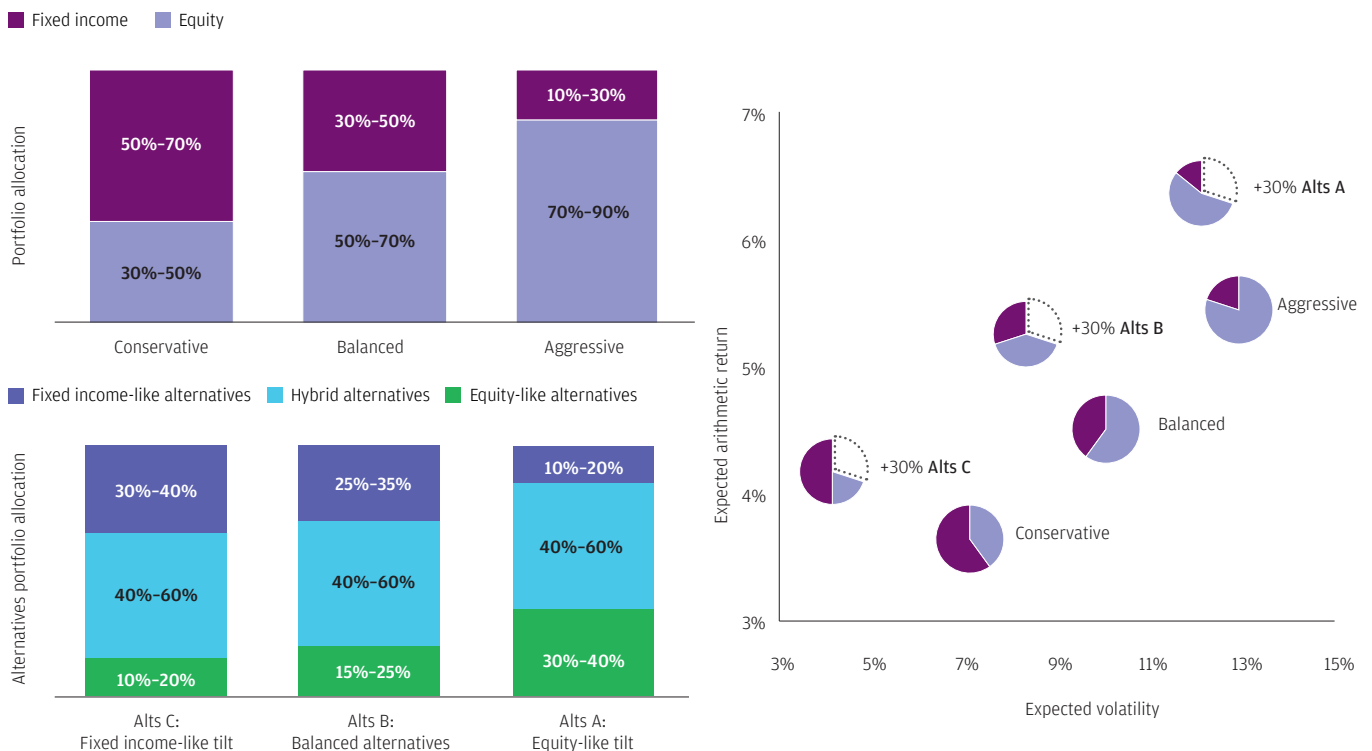
We start with three multi-asset portfolios with different equity/bond allocations: Conservative (40/60), Balanced (60/40) and Aggressive (80/20). Next, for each portfolio we reallocate 30% of capital from equities and bonds to a diversified, risk-return-appropriate alternatives set (Alts C, Alts B and Alts A, respectively) blending equity-like, fixed income-like and hybrid alternatives. In each case, incorporating an outcome-oriented alternatives allocation improves the overall expected portfolio risk and return.

ALTERNATIVES: MATERIAL OPPORTUNITIES/ INCREMENTAL RISKS

Hypothetical case study results like those captured in Exhibit 3 illustrate the potential advantages of alternative allocations, but they do not reflect the full set of risks and trade-offs inherent in alternative investing or capture those trade-offs for a specific investor. As highlighted in **WHAT MAKES ALTERNATIVES ALTERNATIVE?** and throughout our framework discussion, alternative investing comes with additional challenges not faced to the same degree in traditional investing, namely: illiquidity, manager return dispersion, tail risk and lack of transparency, along with generally higher fees. Allocating to alternatives proves the old adage “There’s no such thing as a free lunch.”

Objectives-based alternative allocations can help improve portfolio outcomes for a range of investors

EXHIBIT 3: ILLUSTRATIVE CASE STUDY – ADDING DIVERSIFIED ALTERNATIVE ALLOCATIONS BASED ON INVESTORS’ RISK-RETURN OBJECTIVES



Source: J.P. Morgan Asset Management - Global Alternatives. Portfolio expected returns and volatilities are mapped via asset classes available in 2021 Long-Term Capital Market Assumptions, USD version; data as of September 30, 2020. Mapping detail is as follows: Equity - 100% AC World Equity; fixed income - 100% US Aggregate Bonds; equity-like alternatives - 100% private equity; fixed income-like alternatives - 100% direct lending; hybrid alternatives - 70%/30% real assets/hedge funds in Alts C, 80%/20% real assets/hedge funds in Alts B and 90%/10% real assets/hedge funds in Alts A. Core real assets portfolio is diversified across global core real estate, infrastructure and transport. Hedge fund portfolio is modeled as 100% diversified hedge funds. For broader definitions of equity-like alts, hybrid alts and fixed income-like alts, please refer to Exhibit 2. The 30% alternatives allocations are funded as follows: Conservative portfolio - 30%/0% equity/fixed income; balanced portfolio - 25%/5% equity/fixed income; aggressive portfolio - 20%/10% equity/fixed income.

Illiquidity and dispersion of returns

How different investors weigh the potential for capital gains against the need for steady cash flows speaks to their risk tolerance in the traditional sense. Evaluating the opportunities and uncertainties inherent in the operation of alternative strategies and non-long only management formats comes with added dimensions of risk: illiquidity and a wide dispersion of possible return outcomes.² **EXHIBIT 4** attempts to bring these considerations together to capture the essential trade-offs inherent in alternative investing.

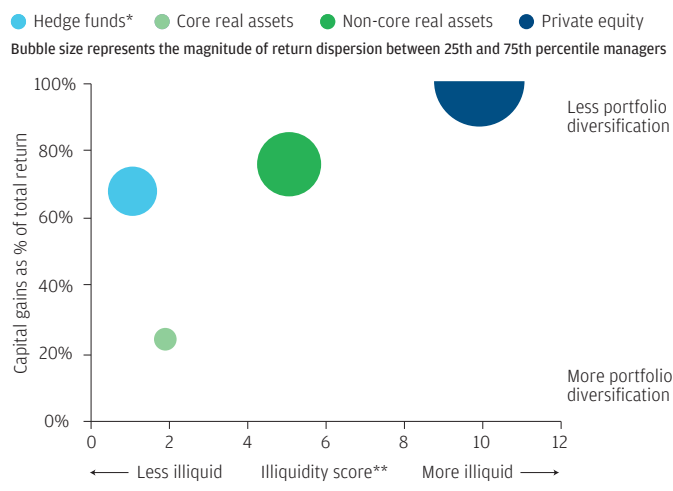
Consider the trade-offs for private equity - a highly illiquid investment that involves a long-term commitment to a strategy and, importantly, to an execution vehicle or manager, often through an entire economic or market cycle. The returns, largely in terms of capital gains, are potentially significant, likely to be highly correlated with public equity market returns (i.e., diversification is not the primary motivation for private equity investing) and can vary meaningfully across managers and vehicles. In a private equity partnership structure, illiquidity should be viewed as a positive attribute and a powerful tool for implementing operating enhancements that have the potential to drive alpha and deliver “fair” compensation for the loss of investment optionality. Historical return data confirm there has been a premium for illiquid asset investing, but this is not guaranteed. No mechanism within alternative investment strategies ensures a premium or higher return for the additional cost of illiquidity.

At the other end of the spectrum, core real assets have the potential to provide returns driven by stable cash flows. Returns are typically lower than those of private equity but come with greater liquidity and significantly lower dispersion of manager returns, and they can offer strong public equity diversification.

The added dimensions of illiquidity and wide dispersion of returns, in particular for capital appreciation-oriented categories, represent material increments to the assessment of risk and highlight the importance of due diligence in realizing anticipated outcomes. Investors need to ensure they get what they pay for.

Standard efficient frontiers do not capture two added dimensions of risk integral to alternative investing - illiquidity and manager risk

EXHIBIT 4: TRADE-OFFS IN ALTERNATIVE ASSET INVESTING



Source: Burgiss, Cambridge Associates, HFRI, NCREIF, Preqin, J.P. Morgan Asset Management; data as of Q2 2020 for hedge funds and core real assets; data as of Q1 2020 for non-core real assets and private equity.

* Hedge funds are represented by equity long-bias funds, trailing five years. Core real assets bubble is mapped using core real estate proxy. Non-core real assets bubble is mapped using non-core real estate proxy. Private equity returns are measured using 10-year internal rate of return.

**Illiquidity score is the estimated time to value realization: Hedge funds - one year; core real assets - two years; non-core real assets - five years; private equity - 10 years.

Other challenges in alternative investing

While illiquidity and dispersion of returns may dominate investors’ decision-making processes, other challenges - tail risk, a lack of transparency and more complex fee structures - should also be considered in a holistic assessment of alternative investing. While these factors may be limiting the role of alternatives in some investors’ portfolios, they could become less of a barrier.

Left-tail risk (simply put, the chance that an investment generates much lower than expected returns or greater than expected losses) is a valid concern. High profile cases like the failure of Long-Term Capital Management (LTCM) in 1998 are reminders of how devastating the resulting losses can be. Of course, it’s not difficult to find examples in the public markets of company collapses inflicting equally painful losses on investors. But with alternatives, other challenges can compound the aversion to left-tail risk: When transparency is lacking, investors cannot be sure they understand the potential downside. With illiquidity, they may not have the option to “cash out” in times of stress or to book profits. On the other hand, diversification across alternative building blocks and within alternative asset classes can help limit these portfolio risks.

² See “The evolution of market structure: Managing illiquidity risk across public and private markets,” *2019 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, for further discussion of the nature of illiquidity in both private and public assets, and how best to harvest illiquidity premia across the cycle.

Transparency, illiquidity and fees affect alternative investing today, but historically, public market segments faced similar hurdles, which declined over time. The rise of emerging market assets in the 1990s offered higher returns, but many public exchanges were in their infancy, liquidity was limited, and information-sharing was inefficient. However, over time, emerging markets became deeper and more liquid, transparency increased, and fees for international investors declined.

Could alternatives have a similar experience as they become essential portfolio components? The growing interest in alternatives has already resulted in increased capital-raising across real assets and private financial markets. Larger capital allocations could lead to lower fees; some alternatives (core real estate and hedge funds, in particular) are showing evidence of this already.

HOW DIFFERENT INVESTORS USE ALTERNATIVES: CURRENT SNAPSHOT AND ANTICIPATED TRENDS

As investors build out and restructure alternative allocations to meet their specific alpha, income and diversification objectives, a framework to help align expanding allocations with specific investment objectives is likely to become as essential as alternatives themselves.

We examine how various institutional and individual investor segments are using alternatives to address specific objectives today, anticipate where we are likely to see growth in allocations going forward and consider some potential implications for alternative investors as flows into these assets increase.

Institutional investors

EXHIBIT 5 compares and contrasts alternative allocations across endowments and foundations (E&Fs), sovereign wealth funds (SWFs), public pensions, corporate pensions and insurers, using a comprehensive dataset encompassing institutions of various sizes. When viewed at an aggregated segment level, results clearly show that differentiated investment objectives and constraints are shaping distinct alternative allocation patterns across investor types. While each institution has unique goals and constraints, these results support the rationale for an objectives-based framework and can offer a useful peer perspective as institutions expand and refine their own allocations.

ENDOWMENTS & FOUNDATIONS generally have aggressive return targets. Many allocate 10% to 50% of their portfolios to alternatives, with an emphasis on equity-like categories. Endowments, with a perpetual investment horizon, low spending rates and limited liabilities, have a greater tolerance

How are different types of institutions using alternatives to meet their objectives?

EXHIBIT 5: ALTERNATIVE ALLOCATIONS, KEY INVESTMENTS AND CONSTRAINTS BY INSTITUTIONAL INVESTOR TYPE

	Endowments & foundations	Sovereign wealth funds	Public pensions	Corporate pensions	Insurance
Typical alternatives allocation					
Range	10%-50%	0%-40%	10%-40%	0%-30%	0%-10%
Objectives					
Total portfolio focus	Asset only with spending considerations	Asset only with wealth preservation considerations	Asset only with liability considerations	Asset & liability	Asset & liability
Alternatives focus	Growth in real returns & diversified sources of alpha	Stable yield & growth	Growth, stability & cash flow management	Growth & stability	Income, diversification
Alternatives portfolio characteristics					
Risk orientation	Equity-like	Balanced	Balanced	Balanced	Fixed income-like
Return enhancement	High	Medium - high	Medium - high	Medium	Low - medium
Income	Low - medium	Medium	Medium - high	Medium - high	Medium - high
Equity diversification	Low	Low - medium	Low - medium	Medium - high	High
Downside protection	Low	Low - medium	Low - medium	Medium	Medium - high
Alternatives key constraints					
Liquidity	Low - medium	Low - medium	Low - medium	Medium	Low
Regulatory	Low	Low	Low	Low - medium	High

For illustrative purposes only. The information is based on a combination of actual data and a subjective view from J.P. Morgan Asset Management; data as of August 31, 2020.

for risk. Foundations are similar, with the added requirement of distributing a minimum percentage of their assets each year.

SOVEREIGN WEALTH FUNDS AND PUBLIC PENSIONS are also major investors in alternatives, with more of a focus on assets than on liability considerations. SWFs have concentrated on real assets and private equity, where they can invest with scale, and typically have smaller allocations to hedge funds and alternative credit. Public pension plans, given their size and long-term investment horizon, typically allocate 10% to 40% to alternatives, using an increasingly wide array of strategies.

CORPORATE PENSION PLANS, as liability-aware investors, have become increasingly reliant on alternatives for income, stability and growth. Allocations to alternatives have increased, funded primarily from existing equity and fixed income allocations. Incremental allocations to real assets, private equity and private credit have been funded almost entirely from public equity reductions and new money flows. Looking ahead, fixed income-like core alternatives may play an increasing role in liability-hedging portfolios, given a continuing low rate environment.

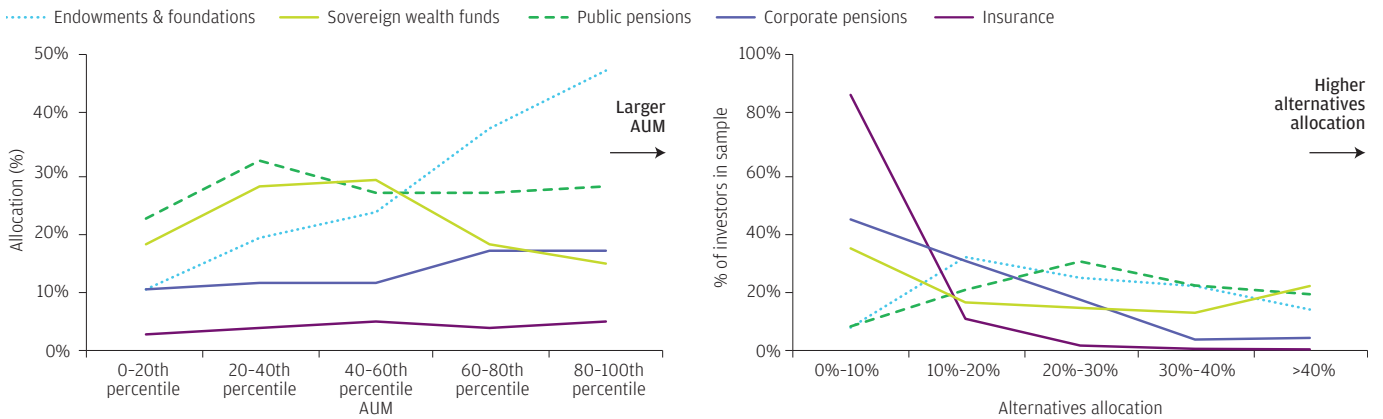
INSURANCE COMPANIES, also liability-aware investors, need stable income return, low balance sheet volatility and capital efficiency. For these investors, alternatives have the potential

to enhance return opportunities and improve diversification, especially in the current yield-constrained environment.

Looking ahead, we see expanding alternative allocations across institutions of all sizes and types. We do not see the fundamental investment needs of these segments changing significantly. What we do see is a greater reliance on alternatives, given our assumptions that interest rates will remain low and traditional markets alone will be less likely to meet investors' objectives. Against this backdrop, we anticipate relatively strong growth among corporate pension plans and insurance companies - asset liability-aware investors for which liquidity and regulatory constraints, respectively, have historically kept alternative allocations below those of their asset-only peers. Small to midsize institutions, with generally smaller alternative allocations than their larger counterparts, are also likely to see some of the greatest increases (**EXHIBIT 6**). But not all institutions will have the resources to build and manage alternative allocations at scale. Growth among these smaller investors will depend on continuing industry innovation and the development of multi-alternative asset solutions and access vehicles to address the needs of this vast investor segment.

In general, larger institutional portfolios have greater allocations to alternatives

EXHIBIT 6: ALTERNATIVE ALLOCATIONS BY AUM AND PERCENTAGE OF INVESTORS



Source: Capital IQ, Center for Retirement Research at Boston College, National Association of College and University Business Officers (NACUBO), company 10-Ks, J.P. Morgan Asset Management; data as of August 31, 2020.

Alternatives allocation is defined as allocation to assets other than equity, fixed income and cash.

Sample statistics for institutional types:

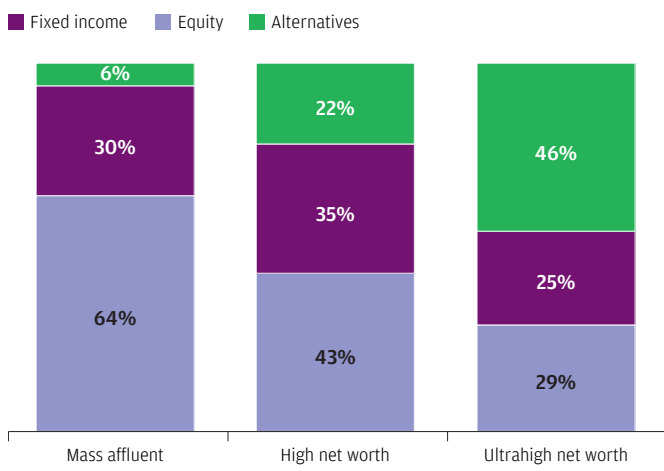
- Endowments & foundations data reflect over 750 global plans with USD 630 billion in assets. AUM percentiles: 0-20th percentile: <USD 50 million; 20-40th percentile: USD 50 million-USD 100 million; 40-60th percentile: USD 100 million-USD 250 million; 60-80th percentile: USD 250 million-USD 1 billion; 80-100th percentile: >USD 1 billion.
- Corporate pension data reflect over 180 U.S. plans with USD 1.5 trillion in assets. AUM percentiles: 0-20th percentile: <USD 2 billion; 20-40th percentile: USD 2 billion-USD 3 billion; 40-60th percentile: USD 3 billion-USD 5 billion; 60-80th percentile: USD 5 billion-USD 10 billion; 80-100th percentile: >USD 10 billion.
- Public pension data reflect over 130 U.S. plans with USD 3.5 trillion in assets. AUM percentiles: 0-20th percentile: <USD 2 billion; 20-40th percentile: USD 2 billion-USD 8 billion; 40-60th percentile: USD 8 billion-USD 15 billion; 60-80th percentile: USD 15 billion-USD 30 billion; 80-100th percentile: >USD 30 billion.
- Insurance data reflect over 300 U.S. plans with USD 5 trillion in assets. AUM percentiles: 0-20th percentile: <USD 1.5 billion; 20-40th percentile: USD 1.5 billion-USD 3 billion; 40-60th percentile: USD 3 billion-USD 6 billion; 60-80th percentile: USD 6 billion-USD 20 billion; 80-100th percentile: > USD 20 billion.
- Sovereign wealth fund data reflect over 50 global plans with USD 9.5 trillion in assets. AUM percentiles: 0-20th percentile: <USD 10 billion; 20-40th percentile: USD 10 billion-USD 50 billion; 40-60th percentile: USD 50 billion-USD 100 billion; 60-80th percentile: USD 100 billion-USD 300 billion; 80-100th percentile: > USD 300 billion.

Individual investors

Ultrahigh net worth individuals have one of the highest allocations to alternatives among investor segments, but for many individual investors alternatives are not yet a portfolio staple (**EXHIBIT 7**). However, with expected returns from public asset classes under pressure and less liquid investments becoming increasingly accessible, the retail investor may finally have an opportunity to share in some of the potential benefits of alternatives.

Many individual investors are still heavily reliant on traditional stocks and bonds vs. alternatives

EXHIBIT 7: WHERE INDIVIDUAL INVESTORS PUT THEIR MONEY



Source: *Institutional Investor*, KKR, J.P. Morgan Asset Management; data as of August 31, 2020.

Mass affluent is defined as an investor with USD 500,000-USD 1.5 million in investible assets. High net worth is defined as an investor with USD 10 million-USD 30 million in investible assets. Ultrahigh net worth is defined as an investor with USD 30 million or more in investible assets. High net worth and ultrahigh net worth data are as of 2017. Mass affluent data are as of 2018.

Ultrahigh net worth individuals, who have a relatively high tolerance for illiquidity and risk, hold over half of their total alternatives exposure in private equity, with the other half evenly split between real assets and hedge funds. Further down the wealth spectrum, investors tend to hold a greater share of their alternative assets in semiliquid investments like hedge funds, where fees, illiquidity and access may pose less of a constraint.

Alternatives are becoming more accessible to the average individual investor, as they are for small and midsize institutions. Obviously, the spectrum of strategies that are considered alternative is wide, ranging from equity long-short mutual funds to private capital vehicles with multi-year lockups, but asset managers are creative. Increasingly, semiliquid structures like interval funds³ and closed-end REITs are finding their way into the average investor's portfolio, while more creative solutions rely on lines of credit that can allow fund managers to handle redemptions without engaging in the forced liquidation of portfolio assets. In short, access and liquidity, two hurdles that have historically kept the average retail investor out of alternatives, are falling away for certain major alternatives categories.

We would expect that private equity, real assets and hedge funds will become increasingly prevalent in retail investor portfolios going forward, as they provide the alpha, income and diversification, respectively, that investors are looking for. Furthermore, with direct real estate finding its way into defined contribution retirement plan options, and the U.S. Department of Labor recently clearing a path for private equity to do the same,⁴ access looks set to become less of an issue going forward.

Broader access, increased flows – and new challenges

As alternatives are recognized as essential, accessibility for small to midsize institutions and retail investors improves and flows into the alternative investment universe swell, a new set of issues arises: Will alternative strategies and platforms be able to absorb these flows? And if they can, what are the likely implications for liquidity, transparency, fees – and alpha?

There is no obvious answer, and the transition from optional to essential will have different implications across alternative asset categories. On the positive side, increasing flows could mean deeper, more liquid markets and more pressure from investors for greater transparency. Mature and more core-like categories of alternatives (such as real assets) are generally more scalable than newer or non-core segments (such as differentiated or niche areas within alternative credit or hedge funds). Some of these less scalable core complements or return enhancers may not become mainstays of all investors' portfolios, as they are more susceptible to the crowding effect of large capital flows.

³ An interval fund is a type of closed-end fund with shares that do not trade on the secondary market. These funds periodically offer to buy back a percentage of outstanding shares at net asset value. They can provide retail investors with access to institutional grade alternative investments with relatively low minimums.

⁴ U.S. Department of Labor Information Letter 06-03-2020, Employee Benefits Security Administration, June 6, 2020.

A lesson learned from public markets is that the greater the scalability, the lower the potential for return and the lower the fees over time. However, when it comes to scalable alternatives this trend is likely to materialize only over the medium to long term, given conflicting forces. For example, within value-creation sectors like private equity, alpha generation gets harder when fundraising gets easier, but emerging market growth and technological innovation continue to provide opportunities to put funds to work. And for private core real assets, an acute investor demand for stable income sources is likely to drive increasing inflows; opportunities to earn the developed market public equity-like returns that core real assets can offer, with a preponderance of those returns from predictable income, are hard to come by in traditional fixed income markets. However, core real assets are omnipresent essential assets making up a multi-trillion dollar market, but they are still not an established component of many investor portfolios. Hence, return compression for these alternatives is likely to be a mid- to long-term phenomenon.

The bottom line is that all investors across the spectrum, from institutional to retail, will have to consider how increasing capital allocations will impact the characteristics of alternatives as we understand them today. Even with a larger opportunity set for investment than public markets have, alternatives may see enlarged flows lead to alpha and fee compression over time. However, with the premium over public markets for both income and capital appreciation currently greater than it has been for a number of years, the near-term potential for alternatives to deliver on alpha, income and diversification appears unchanged.

CONCLUDING REMARKS

Exercise. Smartphones. Online streaming services. Indoor plumbing. Once optional, now essential. For more than 50 years, institutional investors have enjoyed the option of adding alternative investments to their portfolios. Their ever-growing allocations, despite higher fees, liquidity constraints and manager performance dispersion, hinted that they were getting something in alternatives that wasn't readily available in the public markets. Whether in search of alpha, income or diversification, these investors now find themselves facing ever-fewer opportunities for these pursuits in the traditional asset classes. The optional has indeed become essential.

The rise of passive investing and stretched valuations in traditional markets, limited correlation benefits between fixed income and equities, and the likelihood of persistently low bond yields create an increasing urgency to add alternatives. Consequently, we expect rising alternative allocations over the next decade for investors of all stripes. Larger institutional investors will need to make way for small to midsize institutions and a fresh crop of retail investors as the alternative asset management industry invents new means for smaller-sized entities and more individuals to access the benefits of these asset classes - with positive potential repercussions in lower fees but perhaps negative ones in lower alpha.

The challenge for investors, then, is to ensure they are getting what they "pay" for when spending their precious fee, liquidity and risk budgets ... and not paying for what can be had elsewhere with less sacrifice. The operational intensity and complexity of many of these asset classes are substantially higher than for traditional investments, and tail risks are real. Manager skill, experience and track records, and the use of an alternatives asset allocation framework, are rarer commodities but also vital for success. In spite of the challenges, the alpha available from non-core real assets and private equity, the income from core real assets or alternative credit and the diversification from less macroeconomic-sensitive asset classes such as hedge funds have convinced investors resoundingly that the trade-offs inherent in alternative investing are worth it, particularly when the investment universe offers no alternative.

II Assumptions

U.S. dollar downtrend may be finally underway

Thushka Maharaj, D.Phil., CFA, *Global Strategist, Multi-Asset Solutions*

Michael Feser, CFA, *Portfolio Manager, Multi-Asset Solutions*

IN BRIEF

- Our long-held view that the U.S. dollar is on a secular downtrend now has a cyclical catalyst: the start of a new synchronized global business cycle. Our conviction in a USD downtrend is also driven by the dollar's expensive starting valuation and relatively higher expected inflation in the U.S. than in the eurozone and Japan.
- Should the U.S. pursue stimulative fiscal policy, and monetary policy focused on stoking inflation expectations, those actions would powerfully support reflation and growth, and an erosion in the dollar's real value.
- Developed market currencies' bilateral relationships with the USD drive our views; above others, we expect the euro to serve as a more credible counterweight to the dollar and potentially to reassert its standing as an alternative reserve currency, boosted by the region's pandemic recovery fund, which underscores the eurozone's new economic solidarity.
- We expect a wide dispersion among emerging market currencies and continue to expect the Chinese yuan to appreciate, albeit to a somewhat lesser degree than implied by its fair value.



STRONGER CONVICTION IN THE CYCLICAL AND STRUCTURAL DEPRECIATION OF THE USD

The 12 months ended September 2020 saw the erosion of U.S. exceptionalism – in terms of its growth rate, its Treasury bonds’ yield advantage and the magnitude of the economic fallout from the restrictions required to contain the spread of the COVID-19 pandemic. In sum, from a cyclical perspective, the starting point for the U.S. economy at the beginning of this new cycle is indeed unexceptional vs. other countries’.

Our long-held view that the U.S. dollar is poised to enter a secular downtrend now has a cyclical catalyst (EXHIBIT 1) – strengthening our conviction that the necessary conditions for a longer-term USD depreciation have begun to fall in place as more symmetrical fiscal and policy responses across the regions start to tilt the relative growth differential in favor of economies outside of the U.S.

Methodology

As in prior years, we have determined today’s fair value exchange rates for G10¹ currencies through a relative purchasing power parity (PPP) approach, based on the long-term average of each currency’s real exchange rate. To calculate the fair value for emerging market currency

exchange rates, we take an absolute PPP-based approach that builds on the PPP estimates for actual individual consumption, as calculated by the World Bank and the Organization for Economic Co-operation and Development (OECD) for their international price comparison program (EXHIBIT 2).²

To arrive at a given exchange rate projection over our assumption horizon, which we also refer to as future fair value, we adjust today’s fair value exchange rate using the Long-Term Capital Market Assumptions’ (LTCMAs’) underlying macroeconomic assumptions, as follows: For G10 currencies, we reflect the expected change in a country’s terms of trade over the assumptions horizon by adjusting today’s fair value for the projected inflation rate differential between the two countries. For emerging markets, we make an additional adjustment for the expected differential in GDP-per-capita growth.

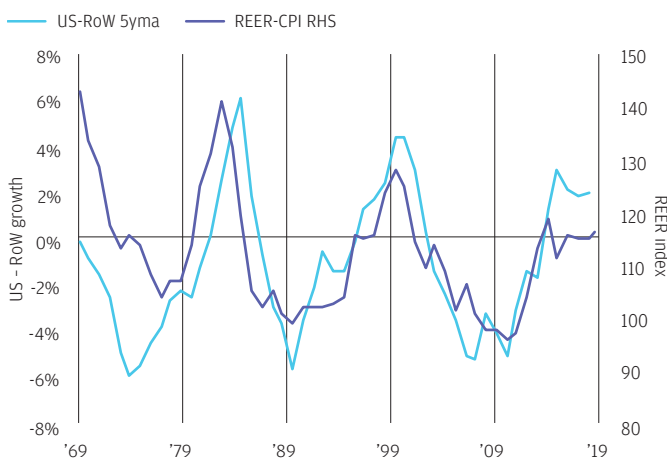
Our assumptions continue to reflect the adverse impact of deteriorating demographics on developed market (DM) economies’ growth prospects, expectations for smaller

¹ The Group of Ten in this context is Australia, Canada, the eurozone, Japan, New Zealand, Norway, Sweden, Switzerland, the UK and the U.S.

² According to the OECD, PPP for actual individual consumption covers all households’ consumption expenditure and that part of government final expenditure that covers services it supplies to individual households – for example, housing, health, education, social protection, etc. It does not include government final expenditure on those services it supplies to households collectively, such as defense, police and environmental protection.

USD performance: Closely linked to relative growth differentials between the U.S. and the rest of the world

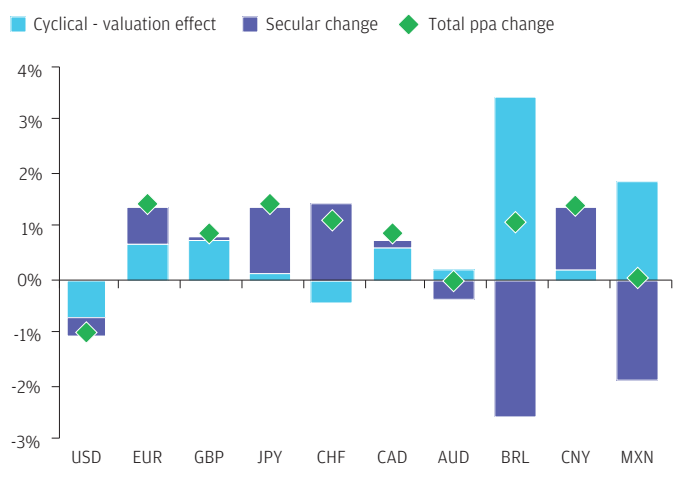
EXHIBIT 1: U.S. VS. ROW GROWTH VS. USD REER



Source: Bloomberg, World Bank; data as of March 2020. ROW: Rest of the world; REER: real effective exchange rate; 5yma: 5-year moving average.

The fall in USD is largely driven by its high starting valuation

EXHIBIT 2: CYCLICAL AND SECULAR (INFLATION DIFFERENTIAL) CONTRIBUTIONS TO OUR 2021 CURRENCY EXCHANGE RATE ASSUMPTIONS



Source: OECD, J.P. Morgan Asset Management; data as of September 30, 2020. Ppa: percent per annum.

improvements in total factor productivity³ and lower levels of human capital development over our forecast horizon (**EXHIBIT 3**). We project that emerging markets, in aggregate, will grow faster than developed markets, given the anticipated larger increases in the size and quality of their labor forces, although with an increasingly wide dispersion in their labor force growth rates. The labor forces in some emerging economies, such as Russia and Korea, are likely to begin shrinking in the coming years.

Our assumption of a USD downtrend is driven equally by a number of factors: the U.S. dollar's expensive starting valuation, improving growth outside the U.S. and higher expected U.S. inflation, in particular relative to the eurozone and Japan.⁴ We expect quantitative easing (QE) and excess USD liquidity to be dominant features of this new cycle, depressing the real rate advantage of the U.S. vs. its major trading partners.

But in order to see an actual period of a weak dollar, U.S. realized inflation and inflation expectations would have to rise above the Federal Reserve (Fed) target and stay there for a sustained period.

That may take a while. As we discuss in the Fixed Income Assumptions section, we expect the Fed to adjust its policy reaction function in this new cycle toward focusing explicitly

on average inflation targeting.⁵ So we don't expect the Fed to even think about raising rates until it sees inflation clearly on track to exceed its longer-term target, following the new mantra: Do not fire until you see the whites of their eyes. To run the economy hot and above full employment for a prolonged period of time is not only acceptable under this policy stance but a necessity for its success. Policymakers are clearly willing to tolerate a temporary inflation overshoot. As to whether they are actually able to generate higher inflation, the burden of proof will be on realized and actual inflation outcomes.

A necessary ingredient for reflation and boosting inflation expectations would be a pro-cyclical fiscal stimulus in the U.S. that remains expansionary well into the recovery. Indeed, we expect fiscal policy to be used as aggressively in this cycle as monetary policy was used in the previous one - as we highlight in two of the theme chapters in this year's edition: on fiscal policy (in "The fiscal decade: The promises, problems and potential of fiscal stimulus") and on high and rising debt loads (in "Debt, debt everywhere: The implications of a high debt world").⁶ Along with raising inflation expectations, we also see this increase in fiscal spending and expanding of federal deficits as necessary ingredients for USD depreciation. While this should suffice to weaken the dollar, it is not clear whether it will usher in a new era of a weak USD, given the currency's continued dominance in global trade and finance.

³ Total factor productivity (TFP) is a residual that in developed economies likely reflects technological change. It encompasses productivity growth not explained by capital stock accumulation or the labor force (increased hours worked) but rather captures the efficiency or intensity with which inputs are utilized.

⁴ We downgraded our inflation assumptions for Europe and Japan last year.

⁵ The Fed's policy up to now has been to target 2% inflation without regard for past periods in which inflation may have gone above or below that level. By contrast, with average inflation targeting, the Fed takes the past into account, so that if past inflation was below 2% for a period of time, it would aim to compensate with a period in which it is above 2%.

⁶ John Bilton et al., "The fiscal decade: The promises, problems and potential of fiscal stimulus," and Thushka Maharaj et al., "Debt, debt everywhere: The implications of a high debt world," *2021 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, November 2020.

Assumptions for selected changes in currency exchange rates vs. USD, nominal and real

EXHIBIT 3: OUR LONG-HELD VIEW OF A SECULAR USD DOWNTREND HAS A CYCLICAL CATALYST IN THE NEW CYCLE

	Spot September 30, 2020	2021 assumptions LTCMA forecast	2021 vs. 2020 assumptions % change p.a.				2020 assumptions 2020 nominal p.a.	Change
			2021 nominal p.a.	Inflation differential	Real	Growth differential		
EUR	1.17	1.39	1.40%	0.70%	0.70%	1.90%	-0.50%	
GBP	1.29	1.43	0.80%	0.00%	0.80%	1.50%	-0.70%	
JPY	105.45	88.62	1.40%	1.30%	0.10%	1.70%	-0.30%	
CHF	0.92	0.80	1.10%	1.50%	-0.40%	1.50%	-0.40%	
CAD	1.31	1.21	0.80%	0.20%	0.60%	1.20%	-0.40%	
AUD	0.72	0.71	-0.10%	-0.30%	0.20%	0.50%	-0.60%	
BRL	5.61	4.97	1.00%	-2.30%	2.70%	0.60%	0.40%	
CNY	6.79	5.71	1.20%	-0.50%	-0.90%	2.00%	-0.60%	
MXN	22.11	22.04	0.00%	-1.70%	1.00%	0.70%	-0.80%	

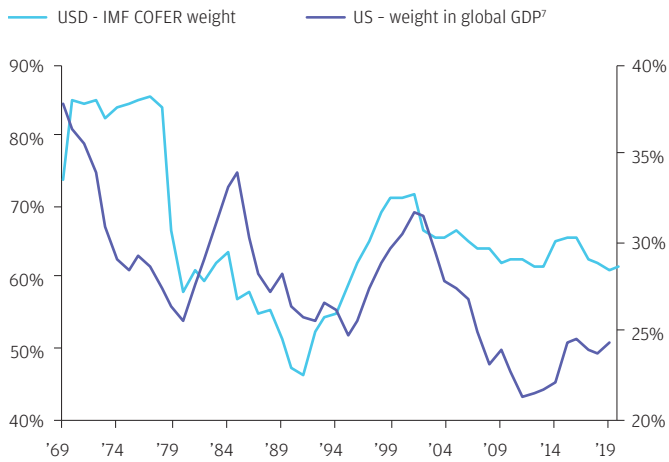
Source: Bloomberg spot FX, J.P. Morgan Asset Management; estimates as of September 30, 2020. P.a.: per annum.

Spot FX rates are quoted using market convention; % changes p.a. are quoted uniformly vs. USD such that a positive number reflects appreciation vs. USD, and vice versa.

While our core macro scenario calls for a weaker USD, we do also realize that the U.S. dollar continues to play a unique role in global trade and finance. As **EXHIBIT 4** illustrates, even though the weight of U.S. GDP in global GDP fell from 32% to below 25%, the USD was still a large weight in international FX reserves, according to International Monetary Fund (IMF) data.⁷ We see this largely as a reflection of the noneconomic benefits and usage of the U.S. dollar in trade and finance. This unique position in the global economy and financial architecture is likely to act as a partial offset and limit the USD secular decline to less than what other fundamental data may imply.

While U.S. GDP has fallen as a percentage of global GDP, USD still made up a large proportion of international foreign exchange reserves

EXHIBIT 4: USD IN FX RESERVES VS. U.S. GDP IN GLOBAL GDP (% WEIGHT)



Source: IMF, J.P. Morgan Asset Management; data as of December 31, 2019.

Across DM currencies, it is the bilateral relationships with the dollar that drive our FX views. As was the case last year, the trade-weighted indices for EUR, GBP, CNY and JPY are not significantly misaligned vis-à-vis one another. Our assumptions therefore do not imply a significant loss in the relative competitiveness of any one region vs. another (**EXHIBIT 5**).

Trade-weighted indices (TWI) for the euro, pound sterling, yen and yuan are not misaligned with one another; we focus on each currency’s relationship with USD

EXHIBIT 5: TRADE-WEIGHTED INDEX, PER ANNUM CHANGE

	2021	2020
USD	-1.04%	-1.32%
EUR	0.57%	0.76%
GBP	-0.29%	0.02%
JPY	0.35%	0.31%
CNY	0.51%	0.86%
USD DXY	-1.27%	-1.77%

Source: J.P. Morgan Asset Management; data as of September 30, 2020.

MAJOR CURRENCY PAIRS

The euro

We expect the euro will be a key counterweight to USD. In the last cycle, the euro was dogged with sovereign debt default risk, a central bank reluctant to engage in QE, fiscal austerity and the glaring lack of a centralized fiscal authority that could facilitate a transfer from the rich northern countries to those in the south and east. We see the announcement of the Next Generation European Union (EU) recovery instrument and the coronavirus response recovery plan as crucial components for establishing a more credible fiscal authority at the euro area level. Recovery funds, which will be used to support countries according to their level of structural unemployment and loss of growth due to the COVID-19 shock, ensure that fiscal spending continues well after the recovery from the COVID-19 recession. The linking of the recovery fund to the EU’s seven-year budget is a bold innovation underscoring the solidarity with which the EU is providing help for countries facing the harshest challenges.

Policymakers were well aware that this recession could be the defining moment for the EU and that divergent recoveries afterward could spell the end of the euro project. Crucially, the establishment of this recovery fund aims to restart economic convergence and catalyze increased prosperity for all EU members, not just a choice few.

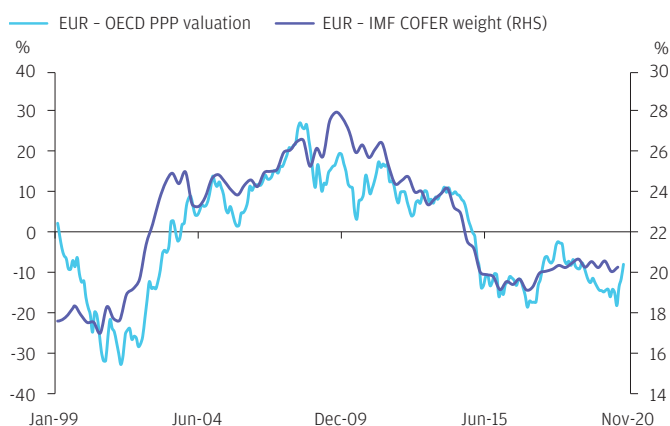
The recovery fund’s spending plan and the institutional framework laid out to fund it set important precedents for how the EU may deal with future recessions, and form a blueprint for a truer and closer fiscal union – the closest we have seen since the 1999 inception of the euro. The plan also adds an alternative, euro-denominated safe haven asset to the market.

⁷ As measured by Currency Composition of Official Foreign Exchange Reserves (COFER), an official database managed by the International Monetary Fund.

Essentially, this new framework removes the redenomination risk premium⁸ built into the euro, introducing the conditions for an era of EU exceptionalism in terms of sustained growth and transformation toward a more sustainable economic model. A depreciating dollar is crucial if the EUR is to behave in a less cyclical manner and reassert its standing as a credible alternative reserve currency to the USD (EXHIBIT 6).

We see conditions for EU area exceptionalism bolstering the euro’s ability to become an alternative reserve currency

EXHIBIT 6: EUR WEIGHT IN IMF FX RESERVES VS. EUR PPP VALUATION



Source: Bloomberg, IMF COFER; data as of June 30, 2020.

Pound sterling

In the UK, sterling is driven in the near term by Brexit uncertainty. We expect a trade deal by the end of 2020 but expect it to be narrow, leaving a high degree of uncertainty. An agreement on a trade deal is only the first of many steps in the journey to establishing a new trading arrangement with the EU. Our forecasts for a higher pound largely emanate from our secular view on USD depreciation. This year, we reflect the narrowness of a trading agreement and heightened uncertainty even after an agreement is reached, with a higher haircut adjustment to the fair value for GBPUSD.

Emerging market currencies

Our outlook for emerging markets moderates our assumption about the magnitude of the USD fall: Emerging economies would need to heal and recover strongly for a uniformly large dollar decline. What we expect instead is more likely a wide dispersion of outcomes. Our assumptions anticipate inflation remaining persistently high for certain Latin American countries and South Africa while falling further in Asian economies, including Korea and Taiwan. Emerging market central banks have started to engage in QE for the first time and are less concerned about the inflationary consequences.

⁸ Redenomination risk premium refers to the risk that a euro asset will be redenominated into a devalued legacy currency.

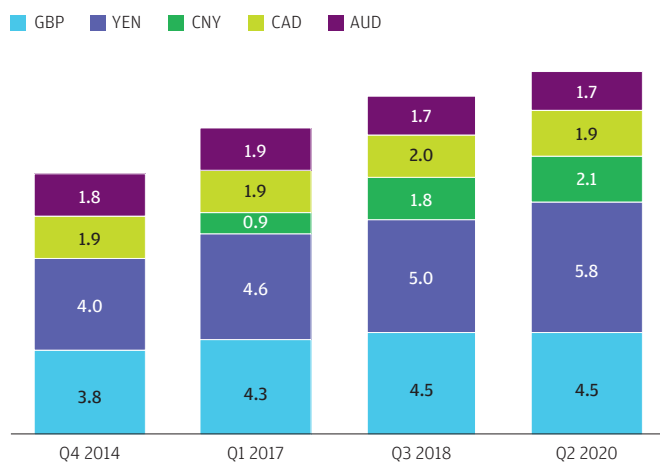
For a select number of countries, this concurrent fiscal and monetary largesse is likely unsustainable, and economic reforms may well stall. In those cases, we expect currency depreciation to be the main release valve to reequilibrate relative competitiveness. Hence, our forecasts are for the Mexican peso to remain above 22 in equilibrium and the South African rand to depreciate 1.2% annually vs. the USD. The Brazilian real, by contrast, appreciates by 1% per year.

The Chinese yuan

The Chinese yuan remains in its infancy as a reserve currency (reserve managers hold 1%-2% of reserves in CNY), and it is hard to envisage its widespread adoption as an alternative to USD without further liberalization of capital and trade markets. Geopolitical tensions now appear to be less focused on currency manipulation or tariffs, but an ongoing headwind from Sino-U.S. strategic rivalry remains a long-term theme. The area of most acute tension has shifted toward tech dominance and strategic control of resource-rich regions, which impact currency exchange rates less directly, but their persistence over time is a key reason we expect the CNY to appreciate less than its fundamental fair value would imply (EXHIBIT 7).

While still in its infancy as a reserve currency, the Chinese yuan’s weight in IMF FX reserves is higher than Australia’s and Canada’s

EXHIBIT 7: CNY WEIGHT IN FX RESERVES (%)



Source: Bloomberg, IMF COFER; data as of June 30, 2020.

A long road back to normal

Thushka Maharaj, D.Phil., CFA, *Global Strategist, Multi-Asset Solutions*

Michael Feser, CFA, *Portfolio Manager, Multi-Asset Solutions*

Sean Daly, CFA, *Portfolio Manager, Global Fixed Income, Currency & Commodities*

Jason Davis, CFA, *Portfolio Manager, Global Fixed Income, Currency & Commodities*

IN BRIEF

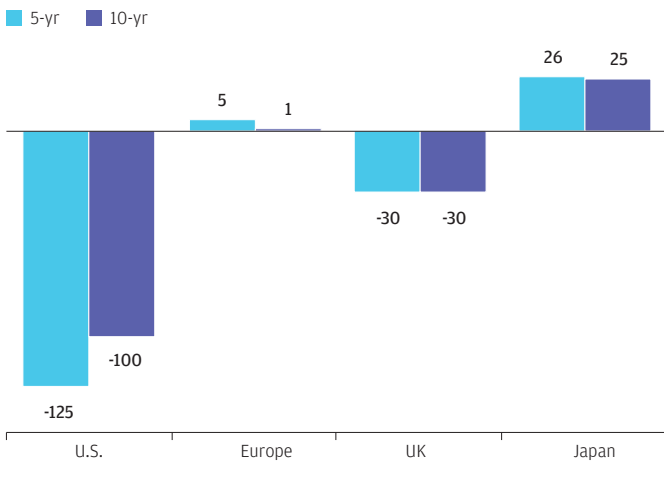
- We expect double-barreled stimulus - fiscal and monetary - to continue well into the recovery. To enable the stimulus to be effective and help heal fragile economies, monetary policy will depress real rates. This new normal for policy increases the risk premium we attach to higher inflation outcomes before central banks hike rates.
- We foresee three phases for major economy government bonds: In the first phase, we expect stable risk-adjusted returns for government bonds. In the second phase, we see capital depreciation as yields rise; in the third phase, as equilibrium yields are reached, we expect core fixed income returns to improve and return to a positive level.
- In credit, our U.S. investment grade total returns decline. High yield spread assumptions are unchanged, and returns are robust and comparable to equity. We expect corporate balance sheets to eventually delever as economies recover and policy rates normalize.
- We increase our equilibrium spread assumptions for both emerging market (EM) hard sovereign and corporate debt to reflect our view of higher indebtedness over the next 10 to 15 years. We expect more dispersion across EM country returns as fiscal policy stimulus creates distinct winners and losers.

AFTER POWERFUL STIMULUS, A MULTI-PHASED NORMALIZATION

During the coronavirus recession, global bond markets converged toward zero. For example, in the U.S. the recession precipitated a sharp drop in U.S. Treasury yields, with the 10-year falling to nearly 0.3%. In the depths of the recession, 30-year Treasury bond yields reached a low of 70 basis points (bps) (EXHIBIT 1).

A short, severe recession led to a sharp fall in yields

EXHIBIT 1: CHANGE IN YIELDS (SEPT-SEPT)



Source: Bloomberg; data as of July 30, 2020.

This business cycle is different in many ways. In the Great Recession of 2008 and 2009, monetary policy largely carried the burden of spurring an economic recovery. In this cycle, policymakers unleashed powerful fiscal stimulus at a faster pace and in greater volume than at any time in the post-World War II period to mitigate the devastating economic effects of COVID-19-induced lockdowns. Moreover, we expect that central banks and governments will use fiscal and monetary policy pro-cyclically well into the recovery. (There’s little political appetite for fiscal austerity, and monetary policy has already moved well beyond the global financial crisis toolkit.)

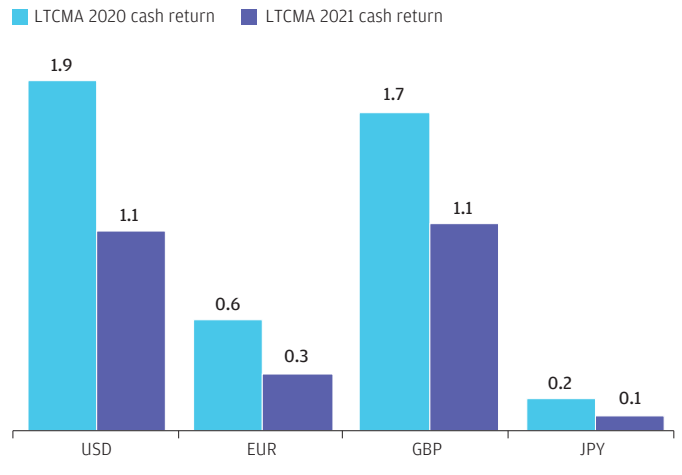
This double-barreled stimulus will depress real rates, we believe, as low and negative real yields will be necessary to heal still-fragile economies. We also see central banks changing their reaction function, adopting average inflation targeting or yield curve control as a form of enhanced forward guidance. Simply put, we expect inflation will have to overshoot targets before central bankers even “think about thinking about” policy rate hikes.

We leave unchanged our equilibrium cash interest rate assumptions across major G4 markets relative to last year’s Long-Term Capital Market Assumptions (LTCMAs). However, we do extend the time horizon over which we anticipate

interest rates will normalize, which means that average interest rates are expected to be lower than previously. This in turn implies that the expected returns on cash fall sharply (EXHIBIT 2).

Average cash interest rates are expected to stay low over an extended normalization

EXHIBIT 2: DEVELOPED MARKET CASH RETURNS (%)



Source: Bloomberg; data as of September 30, 2020.

This year, for the first time, we frame the coming fixed income return environment in the major economies in three distinct phases. In the first phase, we anticipate no major change in yields. In the second phase, we see the beginning of a slow and prolonged normalization in which yields rise from current depressed levels to approach equilibrium. (Last year’s LTCMAs only showed an extended normalization period outside the U.S.) During this second phase, central banks raise policy rates, but not by enough to push the average real cash rate into positive territory. We apply this lengthening fairly uniformly across the G4 countries, as we do not expect the U.S. economy to decouple from the rest of the developed world in this cycle. (However, Japan, in our assumptions, continues to lag.) Finally, in the third phase, yields reach equilibrium levels.

In the first phase, we expect low returns from core government bonds, but because volatility is also low, risk-adjusted returns are stable; in the second phase, we see capital losses as yields rise; and in the third phase, as equilibrium yields are reached, we expect government bond returns to improve and return to a positive level.

Markets will build inflation uncertainty premia into the long end of the yield curve

EXHIBIT 3A: U.S. CURVE VS. TERM PREMIUM

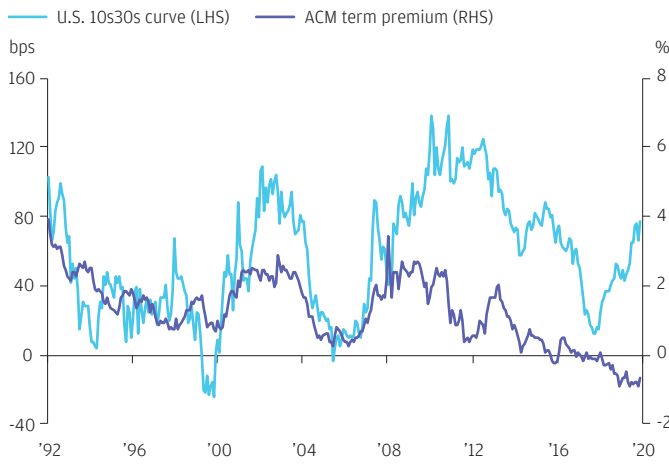
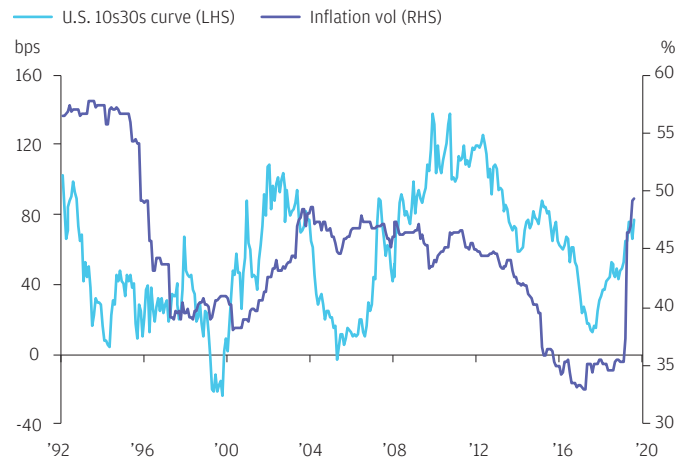


EXHIBIT 3B: 10S30S VS. INFLATION VOLATILITY



Source: Bloomberg; data as of August 30, 2020.

Note: ACM term premium is the Adrian, Crump, Moench measure of term premium (FRBNY).

Across the board, we reduce 10-year equilibrium yields modestly, acknowledging the significant impact of continued financial repression and easy monetary policy, and the modest impact of a rise in net government bond issuance. This also impacts the U.S. Treasury (UST) 10s30s curve slope, where the reduction in 10-year yields leads us to increase the slope to 50bps (**EXHIBIT 3A**). This reflects our view that fiscal policy stimulus significantly increases UST supply and that ultimately over our 10- to 15-year horizon markets will build inflation uncertainty premia into the long end of the yield curve (**EXHIBIT 3B**).

One final note: Although our macroeconomic forecasts incorporate a cyclical boost to countries' GDP growth outlook to reflect our assumptions' low starting point (just after the brief but severe 2020 recession), we do not include this cyclical boost in our fixed income assumptions. That is because, as we have discussed, we assume that central banks will look well past any temporary cyclical recovery and keep rates on hold for a very long time.

U.S. RATES

Our equilibrium cash rate assumption is unchanged at 1.9%, but we extend the normalization pathway to reaching it. This reduces the average expected cash rate over our 15-year horizon from 1.9% last year to 1.1%. As mentioned, as the global economy begins a new business cycle, we are extending the time frame over which rates normalize to reflect our expectation that central banks are likely to wait until their economies realize above-target inflation before raising rates.

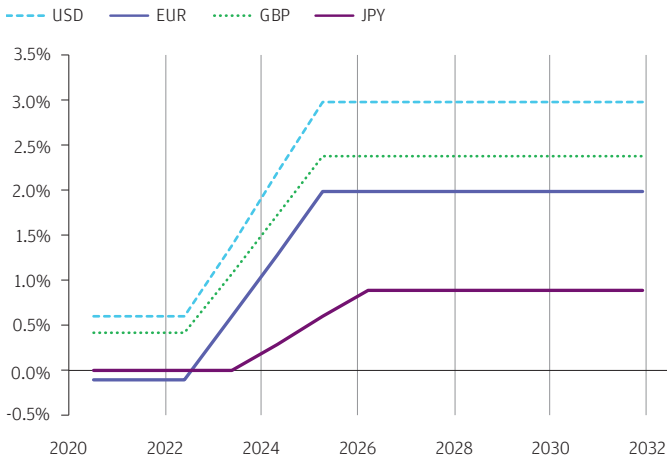
We lower our 10-year yield assumption by 20bps, to 3%, and extend the normalization period materially, believing that financial repression will keep real long-term rates low relative to GDP growth and that the changed central bank reaction function will lead to lower real interest rates in equilibrium. We expect 10-year yields to be unchanged for two years, to rise for three years and to reach equilibrium in five years, thus reducing the average 10-year yield over the 15-year horizon (**EXHIBIT 4**). The 10s30s curve is steeper, at 50bps. This reflects central bank policy anchoring rates out to the intermediate-term sector, while the long end reflects increased uncertainty on inflationary and fiscal budget outcomes.

EUROZONE RATES

As with our U.S. rate assumptions, we do not change the equilibrium assumption for eurozone cash, but we lengthen the normalization period. In effect, the average cash rate return falls 40bps, to 0.2%.

We extend the normalization period materially, as financial repression will keep 10-year rates low relative to GDP growth

EXHIBIT 4: RATE NORMALIZATION PATHWAY: DEVELOPED MARKET 10-YEAR YIELDS (%)



Source: J.P. Morgan Asset Management; data as of September 30, 2020.

The COVID-19 recession has catalyzed significant policy change in Europe – most notably, the creation of the EUR 750 billion European Recovery Fund, a pan-European fiscal instrument funded by the European Union (EU) budget. Its establishment marks a watershed moment in EU history as member countries take a meaningful step toward instituting a common joint-issuance framework, offering the

prospect of greater fiscal integration in the coming years. We think this new facility could potentially reduce and even remove the risk premium previously embedded into EUR-denominated assets for the potential of a eurozone breakup. For this reason, we have stronger conviction in our long-term equilibrium assumptions for European government bonds.

Especially as the European Central Bank (ECB) has shown a willingness to conduct pro-cyclical asset purchases (and was also quite aggressive in its purchases during the recession), we expect policy rates to remain on hold for four years before cash rates rise very gradually in a low inflation environment. Our 10-year yield equilibrium assumption (using the French 10-year bond) falls modestly, from 2.2% to 2.0%. This reflects an expected low growth and inflation environment over the next decade as well as our view that policymakers will engage in financial repression to facilitate high budget deficits. In keeping with our global view that yield curves will steepen at the long end, we push the EUR 10s30s slope up to 50bps. Sweden and Denmark broadly follow the path mapped out for the eurozone yield curve.

BUILDING BLOCKS: ANATOMY OF BREAKEVEN AND REAL YIELDS

CYCLE-NEUTRAL FORECASTS

10-YR BREAKEVEN =

Average inflation expectations

We assume inflation expectations are backward looking and determined by historical realized inflation. Given our long horizon, expectations are set equal to our inflation forecasts.

+ Inflation risk premium

The additional yield on top of inflation expectations to reflect the distribution of inflation risks around the base case

+ CPI vs. RPI wedge (UK only)

10-yr implied real yield = 10-yr nominal yield - 10-yr breakeven

INFLATION-LINKED BOND RETURNS

TOTAL RETURN =

INFLATION CARRY

Average expected inflation

+ Real yield carry

Average real yields

+/- Duration normalization

Annualized impact of normalization from current real yields to forecasted real yields

+ Roll-down

Annualized roll-down return

JAPANESE RATES

The equilibrium real cash rate in Japan remains the lowest of the major developed markets in our assumption set. Due to the lengthening of the normalization period from current levels to equilibrium, Japan's average cash rate assumptions in both nominal and real terms are also lower than last year.

We assume that the Bank of Japan will continue yield curve control for a prolonged period in this cycle and thus lengthen the normalization period for the 10-year yield. Among G4 economies, Japan sees the slowest rise over our forecast horizon in both policy and 10-year yields. We expect Japanese 10-year yields of 0.9% at equilibrium, a 10bps decline from last year. We steepen the Japanese 10s30s curve to 60bps, expecting that yield curve control will anchor rates out to 10 years and that the risk premium for the government's high level of debt will persist.

UK RATES

Brexit and uncertainty about the contours of the UK's future trading relationship with the EU make the outlook for UK-related assets difficult to forecast. As they are in other major developed markets, UK cash equilibrium assumptions are unchanged, but the period to reach that equilibrium is lengthened. Similarly, we lower the 10-year yield assumption to reflect the longer cash rate normalization period. The 10s30s yield curve steepens modestly, from flat to 30bps, given increased inflation uncertainty and prospects for higher government deficits in equilibrium.

OTHER DEVELOPED MARKETS

Changes to our Australia, Canada and Switzerland assumptions are in keeping with those for other major developed markets. Equilibrium cash rates are unchanged, but the pathway to normalization is extended. The long ends of yield curves (10s30s) are steepened modestly to reflect higher fiscal deficits in equilibrium and, to varying degrees, a rise in inflation risk premia over the forecast horizon.

INFLATION-LINKED BONDS

Until inflation targets are realized, monetary policy is likely to remain on hold or become easier. At the same time, we expect fiscal policy to remain structurally stimulative, with little desire for deficit reductions via austerity. This should boost inflation expectations and is reflected in our across-the-board increase to inflation risk premia by 10bps, on average. Given our forecast for lower nominal yields, this means the biggest mover this year is the fall in real yields. In the U.S., our implied 10-year real yield is 0.6%, down 0.3% from last year's forecast.

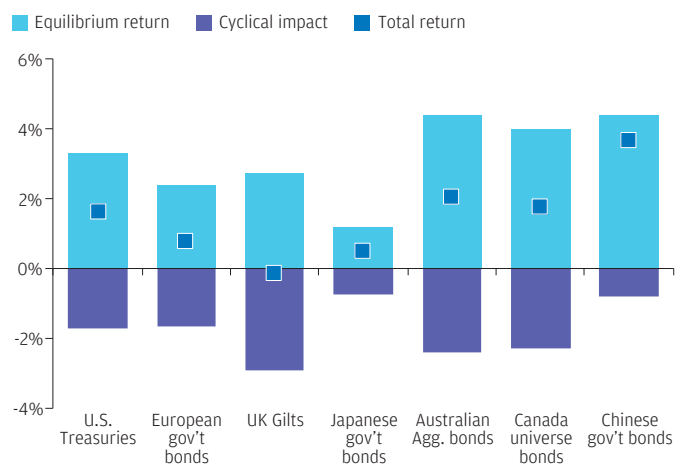
The UK's upcoming Retail Price Index (RPI) reform makes Gilt breakevens unique. At some point, the UK will replace RPI with the Consumer Prices Index, which includes owner-occupied housing costs (CPIH) and is thus considerably lower than RPI. However, the exact date of the RPI reform, as well as what compensation will be made available to Gilt holders, is still uncertain. Due to uncertainty on the implementation of this reform, we have not included this issue in our assumptions this year.

SUMMARY OF CORE GOVERNMENT BOND RETURNS

In **EXHIBIT 5**, we present a summary of core government bond returns. We identify both the equilibrium contribution to returns and the cyclical drag on returns from normalizing yields from today's low levels.

The cyclical drag from today's low yields diminishes over time

EXHIBIT 5: SUMMARY OF CORE GOVERNMENT BOND RETURNS



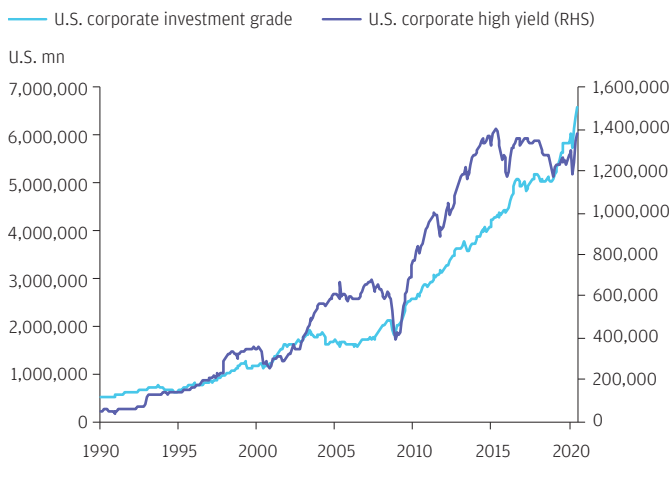
Source: J.P. Morgan Asset Management; data as of September 2020.

CREDIT

We have seen the end of a business cycle that structurally transformed credit markets. Credit markets grew in size and duration throughout the last cycle, thanks to unprecedented quantitative easing and the low yields that ensued (EXHIBIT 6). Companies and countries have been incentivized to issue more debt and with longer maturities. We believe these trends will persist over our assumptions horizon.

Growth of credit markets accelerated over the last cycle

EXHIBIT 6: U.S. CREDIT MARKET VOLUME OUTSTANDING



Source: Bloomberg, J.P. Morgan Asset Management; data as of September 2020.

This past year has also introduced new, credit-specific developments that force us to reconsider our long-term assumptions. In response to the disruption in market activity brought about by COVID-19 lockdowns, the Federal Reserve (Fed) intervened to purchase corporate credit - something it had never done before. This is likely a structural change; the Fed tends to reutilize the tools it creates in times of trouble.

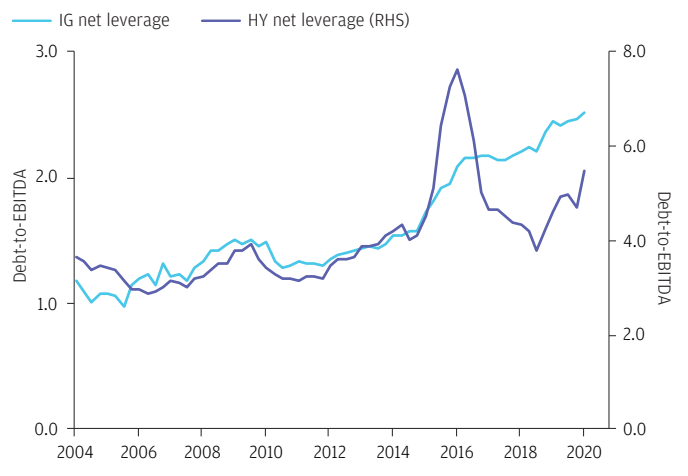
Will the Fed intervene as forcefully in future recessions as it has in the COVID-19 crisis? It's unclear. There is always a moral hazard when central banks purchase corporate bonds. But the unusual nature of the coronavirus recession - most notably the sudden lockdowns - allowed policymakers to provide increased support to counteract a negative shock businesses could not reasonably have foreseen. In a more traditional recession, the Fed may have been more hesitant to support corporate credit markets, out of fear of propping up otherwise insolvent companies.

Moreover, we had already assumed that credit spreads would not widen out to the same level, or for as long, as they did in prior recessions. While the 2008 recession involved questions about the solvency of the banking sector, which caused a severe and prolonged disruption in the flow of credit, we expect the banking sector will remain healthy and well capitalized over our forecast horizon, and believe the current cycle is unlikely to produce a credit-disruptive crisis, particularly with the existing Fed support. As a result, we have not changed our equilibrium credit spreads, which assume slightly lower spreads for a given rating and maturity bucket than were observed over the previous cycle.

In formulating our assumptions about credit, we also take into account the likely inevitable pickup in corporate leverage in the early years of our investment horizon (EXHIBIT 7). We're inclined to view this as a cyclical phenomenon. As the economy rebounds and, eventually, as interest rates rise back toward our assumed equilibrium yields, we believe that corporate balance sheets will delever, moving back toward the levels of late 2019. We don't believe the structural outlook for the U.S. Treasury equilibrium yield has shifted lower this year, and as a result our long-term outlook for the cost of debt and leverage has not changed meaningfully. We note that levels of corporate leverage were beginning to stabilize in 2019, notwithstanding some continued net borrowing among the highest quality issuers. This suggests that leverage was reaching equilibrium levels prior to the COVID-19 crisis.

Net leverage will likely continue its upward trend in the near future before leveling off

EXHIBIT 7: U.S. CORPORATE NET LEVERAGE METRICS



Source: BofA Securities, J.P. Morgan Securities, J.P. Morgan Asset Management; data as of September 2020. Data range is March 2004-March 2020.

This leaves our assumptions for the composition of the indices largely unchanged from last year. Most prominently, we assume that the U.S. investment grade (IG) corporate index will maintain its large BBB concentration, accumulated over the last cycle. We make a small adjustment in our spread assumption, from 165bps to 160bps, which is slightly higher than its historical average (EXHIBIT 8). Our total return assumption declines by 90bps, to 2.5%.

We assume U.S. high yield spreads will be close to their historical average, at 500bps, unchanged year-over-year. The concentration of BB names in the index has increased meaningfully over the last year, with a surge in fallen angels exiting the IG space following the coronavirus outbreak (EXHIBIT 9). This is a temporary phenomenon, we believe. We expect that recently downgraded companies will reclaim their IG rating at some point during the current recovery and thus do not change our equilibrium yield assumption. We also leave our default and recovery rate assumptions near their historical averages. Altogether, our high yield total return assumption decreases 40bps, to 4.8%.

EMERGING MARKET DEBT

We increase our emerging market (EM) hard currency debt spread assumption, from 350bps to 375bps. Broadly speaking, many of the countries included in the index had been working toward stabilizing and/or lowering the elevated debt levels that prevailed before the pandemic. This was consistent with our narrative of improving credit quality. Unfortunately, the public health disaster has hit emerging economies hard and,

for many countries, shattered their fragile path toward fiscal consolidation. While U.S. corporations can default, taking a hit to their credit rating but receiving the benefit of a much-improved balance sheet, EM countries that default on their sovereign debt tend to be subject to drawn-out default negotiations, limiting their fiscal benefit. In this more difficult environment, we anticipate a higher proportion of lower rated countries to be represented in the index than we envisioned last year. The factors that push our equilibrium spread assumption wider also help our expected returns. We assume EMD hard currency debt will return 5.2%, on average, over our forecast horizon.

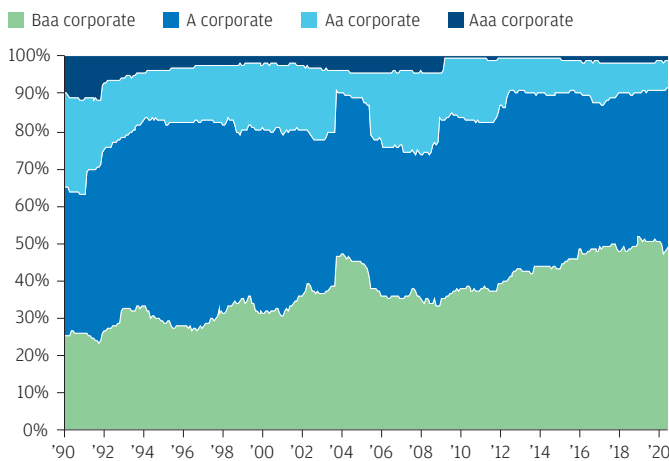
In emerging market corporates, we increase spread levels, to 400bps. This is both an appreciation of the increased high yield portion of the index today, which over recent years has made up 45% of the index compared with the average of around 20% pre-2008, and a reflection of the impact of deteriorating sovereign ratings on this market.

EM LOCAL BONDS

Our overall assumption for EM local bond yields is unchanged at 6.75%, but we do make changes at a country level. We lowered our Brazil cash and 10-year yield assumptions by 50bps, to 7.5% and 9.5%, respectively. For Chinese bonds, we lowered the cash rate assumption by 30bps, to 2.7%, to reflect our views of extremely easy monetary policy in the new cycle and depressed real short rates.

The U.S. IG rating distribution has deteriorated over time

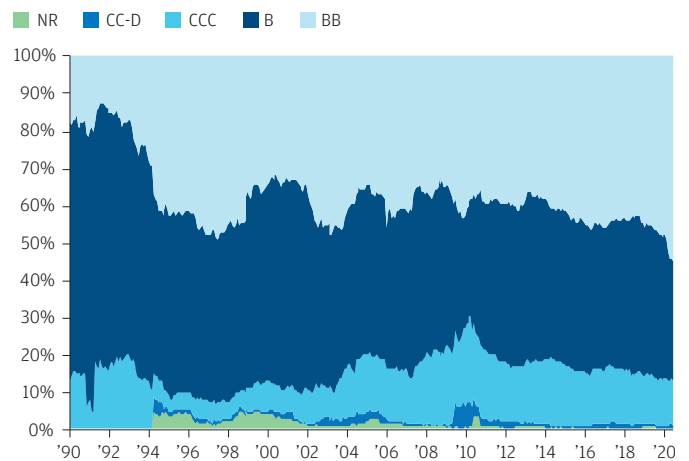
EXHIBIT 8: U.S. INVESTMENT GRADE CORPORATE RATINGS BREAKDOWN



Source: Bloomberg, J.P. Morgan Asset Management; data as of September 2020.

The recent increase in the BB weight in the U.S. HY index is expected to reverse over the coming cycle

EXHIBIT 9: U.S. HIGH YIELD CORPORATE RATINGS BREAKDOWN



Tougher starting point, lower returns

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IN BRIEF

- We lower our long-term (10- to 15-year) equity return assumptions across most regions, with developed markets and emerging markets both down year-over-year. The projected gap in returns between emerging and developed equities compresses to 2.30% in U.S. dollar terms.
- This year, we revisit both the equilibrium margin and valuation assumptions, specifically looking to take into account changes in the underlying sector composition of developed markets.
- Our U.S. expected return posts the steepest decline among developed markets, from 5.60% to 4.10% in U.S. dollar terms. Our euro area assumption falls from 5.80% to 5.20%, while our Japanese assumption falls from 5.50% to 5.10%, both in local currency returns. The reductions largely reflect the impact of valuation normalization.
- Our UK equity return assumption increases to 6.70% from 6.10% in local currency terms as stronger earnings growth expectations more than offset higher starting valuations.
- Our emerging market (EM) equity return expectation drops to 6.80% from 8.70% in local currency terms and to 7.20% from 9.20% in USD terms. The declines reflect headwinds from sharply higher starting valuations and moderately lower GDP growth assumptions. If the U.S. dollar weakens, as we expect it will, it should prove supportive of EM assets.

BROAD DECLINE

Our expected equity returns are broadly lower across most markets this year. In U.S. dollar terms, our long-term developed market (DM) equity return assumption drops 140 basis points (bps), with U.S. assumptions posting the steepest decline, from 5.60% to 4.10%. Our expected emerging market (EM) equity return declines to 7.20% from 9.20% in U.S. dollar terms. The projected gap in returns between emerging and developed equities compresses to 2.30% in U.S. dollar terms.

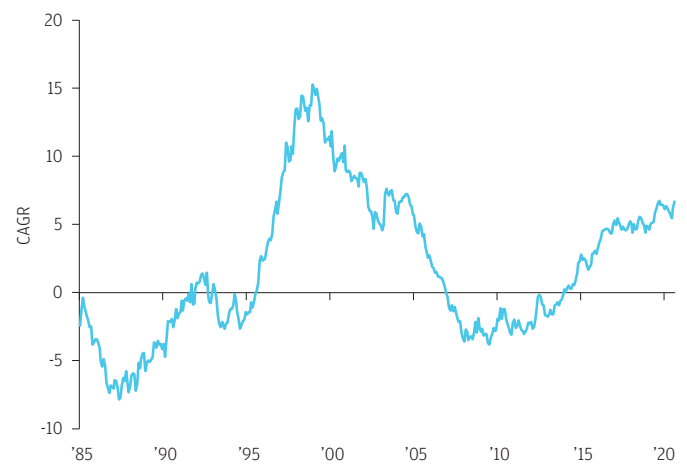
Our assumptions generally reflect expectations of normalizing global growth and valuation. In a world of mid-single digit equity market returns, currency will likely have a significant impact. We expect USD to weaken relative to key developed market currencies, providing a tailwind for the attractiveness of markets outside the U.S. to U.S. dollar-based investors.

Developed market return assumptions this year generally benefit from an expectation of higher GDP growth, driven by a post-pandemic economic recovery. The impact, which varies among countries, delivers a modest boost to revenue and earnings growth of up to 50bps. Given a lower starting point for earnings, we assume a lower level of DM payouts (mostly reduced buybacks and also lower dividends) over our assumption horizon. However, we note that the level of payouts remains high in a historical context, helped by an assumption of a generally supportive leverage environment.

Once again, our equity assumptions imply that non-U.S. equities will outperform their U.S. counterparts. The expected performance gap is 2.40%, largely driven by the U.S. market's increasingly heady valuations - a substantial headwind even relative to our raised equilibrium valuation assumption. We acknowledge that the recent history of U.S. outperformance makes this a challenging notion for many investors. However, long cycles of U.S. outperformance followed by long cycles of underperformance are not unprecedented. The current cycle, more than 10 years of U.S. outperformance - though it has not yet reached the scale of the late 1990s - may well be due for a reversal (**EXHIBIT 1**).

The long cycle of U.S. outperformance may be due for a reversal

EXHIBIT 1: 10-YEAR ROLLING TOTAL RETURNS, U.S. VS. DM EX-U.S.



Source: Datastream; data as of August 2, 2020.
CAGR = Compound annual growth rate.

Our equity assumptions methodology decomposes equity returns into easy-to-forecast return drivers

BUILDING BLOCKS OF EQUITY RETURN ASSUMPTIONS

Component	Subcomponents	Outputs			LTCMA
Revenue growth	Domestic growth assumption	Earnings growth	Earnings per share growth	Price return	= Total return
	International contribution of revenues				
	Sales % GDP				
Margins	Change from margin today to target margin				
Net dilution	Buybacks*				
	Gross dilution*				
Valuations	Change from P/E today to target P/E				
Dividend yield	Dividend yield forecast				

Source: J.P. Morgan Asset Management; data as of October 2020.

* Our buybacks and gross dilution assumptions are cross-checked vs. our estimations of return on equity.

REVIEWING OUR EQUILIBRIUM ASSUMPTIONS

This year, we revisit both the equilibrium margin and valuation assumptions to which we expect markets to revert over time. Specifically, we look to take into account changes in the underlying sector composition of developed markets. In the U.S., equilibrium profit margin assumptions are unchanged, with current readings near historical averages. The resilience of U.S. margins at a cyclical trough in the economy reflects the changing complexion of the market. Specifically, sectors with expanding margins - e.g., technology - have an increasing revenue weight in the overall index, whereas those with shrinking margins - e.g., energy - have a lower revenue weight.

In Europe, equilibrium margin assumptions remain in line with historical averages. The overall impact of margin changes was muted, as sector composition changes have been modest and margin increases in some sectors were almost completely offset by margin decreases in others. For the UK, a margin lower than the historical average reflects the market's overweight to "old economy" companies that have faced ongoing profit pressure, as well as uncertainty about the Brexit outcome; these factors have offset any cyclical tailwinds. In Japan, margin assumptions remain unchanged. Japanese margins are currently running below our equilibrium assumption, although they have expanded for industrials that benefit from global secular trends in automation. We continue to believe that governance-led reforms will ultimately strengthen profitability for Japanese corporations.

Based on our review of equilibrium valuation assumptions across markets, we made modest increases in our P/E assumptions for the U.S., UK, euro area and Japan. Acknowledging the trend of rising P/E ratios over recent decades, we looked again at the 30-year average of P/E ratios. A 30-year time frame, extensive enough to ensure a more robust dataset, reflects well the trend of rising P/E ratios. We expect this trend to persist over our investment horizon, likely owing to several factors: ever-lower interest rates, and corporate decisions to use higher levels of payouts (buybacks and dividends) and balance sheet debt to support return on equity (RoE) in the face of a lower macroeconomic growth environment.

U.S. equity

Our expected return for U.S. equities decreases to 4.10% from 5.60% in U.S. dollar terms, one of the largest reductions among stock markets and the lowest return expectation among major developed markets. Earnings growth looks likely to remain strong relative to developed market peers, and we expect that buybacks and dividends will provide a significant

component of expected return. But we assume that the positive impact of those forces will be considerably muted by valuation normalization over our investment horizon.

After the shortest bear market in history, in 2020 U.S. equity markets made new highs on the back of coordinated monetary and fiscal stimulus, and investors looked through deteriorating corporate fundamentals to push valuations to levels surpassed only in the dot-com bubble of the late 1990s. As we have discussed, we modestly increased our equilibrium valuation estimates, and this partially reduces the negative impact of valuation normalization.

In prior years, we incorporated the increased impact of the higher margin technology sector by upgrading our equilibrium margin estimates, and during the recent market turbulence the tech sector has indeed proved remarkably resilient. We do acknowledge that increasing uncertainty about regulation of the technology and communications sectors, from both the European Union and the U.S., presents a risk to our profitability forecasts. Current margins for the market overall have deteriorated significantly and are now near our equilibrium estimates; this has reduced the material drag on expected returns that characterized prior-year return expectations.

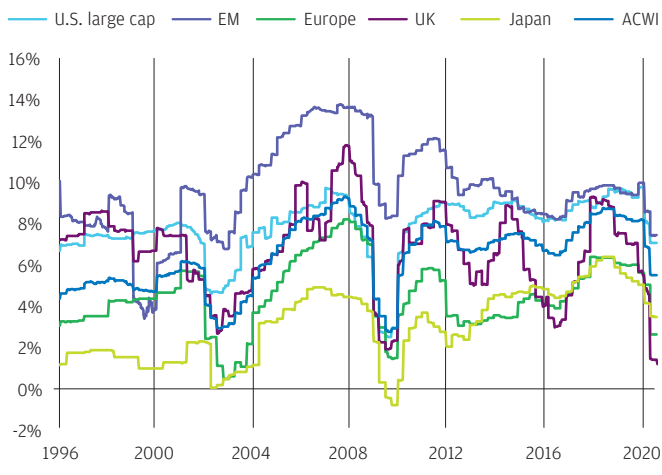
UK, Europe and Japan equity

Our UK equity return assumption moves significantly higher this year, to 6.70% in local currency terms, up from 6.10% last year and a full 2.10% above the developed market average.

UK equities look generally attractive in our framework because they are relatively cheap when compared with other markets while offering a sizable dividend yield. However, year-on-year, the biggest driver of the pickup in our return expectations comes from margins. We see a 5.75% equilibrium margin for the UK market, down from 6.25% in the face of looming Brexit headwinds. Last year, UK margins came in above that level, but they are now below it. The UK equity market, with its heavy weighting to the commodities and financial sectors, has seen its margins collapse by more than other developed markets during the COVID-19 crisis (**EXHIBIT 2**). Additionally, after taking a closer look at the UK market's sector composition, we have lowered our equilibrium P/E ratio from 15.5x to 14.5x. In absolute terms, we see UK equities as expensive, but in relative terms the negative drag expected from valuations for UK equities is smaller than in other markets. This makes sense, given the significant underperformance of UK equities since our 2020 LTCMAs.

UK margins have collapsed by more than other developed market margins during the COVID-19 crisis

EXHIBIT 2: NET PROFIT MARGINS ACROSS KEY REGIONS



Source: Datastream, J.P. Morgan Asset Management; data as of October 15, 2020.

We marginally downgrade our eurozone equity assumptions from 5.80% in local currency last year to 5.20%. As is the case in many other markets, the positive impact of our higher equilibrium valuation assumption is overwhelmed by the negative impact of the past year's significant rise in P/E ratios. Another major negative detractor is a 50bps decline in dividend yield.

Looking back over a decade of disappointing returns from eurozone markets, it's clear that Europe's political crises were exacerbated by a double-dip recession, which we would not expect to repeat over our forecast horizon. Over the past year, too, Europe has taken a significant step toward collective fiscal policy, which could pave the way toward a deeper and more integrated capital market. Finally, we note that while U.S. companies have certainly dominated the tech boom of the 2010s, Europe may be better positioned to capitalize on growth in environmental technology over the 2020s.

Our return assumption for Japanese equities falls from 5.50% to 5.10% in local currency terms. With the local index level not much changed from last year's starting point in our Long-Term Capital Market Assumptions (LTCMAs), the hit to earnings sustained from the COVID-19 recession has left the market looking somewhat expensive, despite a small hike in our equilibrium P/E assumption. Stronger assumed earnings growth, driven by a recovery in margins back to our (unchanged) equilibrium assumption and modestly higher GDP growth than last year, is not quite enough to offset the higher valuation starting point.

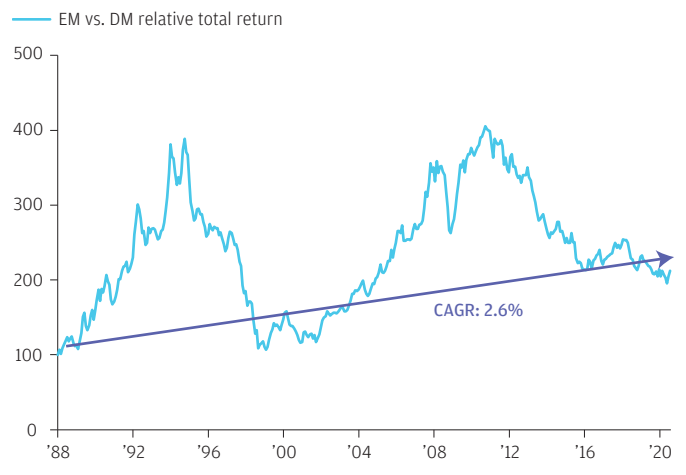
EM equity

Our EM equity return expectation drops significantly, to 6.80% from 8.70% in local currency terms. In USD terms, it falls to 7.20% from 9.20%. The return premium we expect from emerging markets relative to developed markets compresses further, to 230bps in USD vs. last year's 290bps.

In 2020, EM equity markets outperformed their DM counterparts during the COVID-19 bear market, lagged in the rapid global rebound and received a boost in the second half of the year when a furious bull market in China lifted the whole EM complex. This followed several years of challenged performance for the asset class, which has eroded its long-run performance advantage over developed markets to just 2.6% annualized (since 1987). Historically, the performance of emerging markets relative to developed markets has gone through long cycles, and we are now 10 years into this underperformance cycle (EXHIBIT 3).

For the past decade, EM markets have underperformed relative to DM markets

EXHIBIT 3: EMERGING VS. DEVELOPED MARKETS RELATIVE TOTAL RETURN



Source: Datastream; data as of August 2, 2020.

CAGR = Compound annual growth rate.

Valuations have risen substantially across the EM universe, although in aggregate only modestly more than in developed markets. At the same time, earnings and margins have fallen, offsetting some of the headwinds from valuations and modestly lower GDP growth assumptions.

From a structural perspective, our views remain mostly stable, although we acknowledge increased uncertainty. In particular, the changing U.S.-China relationship could potentially alter the EM landscape over the long term; however, we have not yet adjusted our expectations to anticipate any significant change. We incrementally lower our overall economic growth forecasts for emerging markets, mostly in Asia, where the effects of China's secular growth slowdown are most keenly felt. However, relative to developed economies, EM growth potential remains substantially higher, due mostly to still-high potential for productivity catch-up and - outside of parts of East Asia - more favorable demographics. If the U.S. dollar weakens, as we expect it will, it should prove supportive, as it gives EM central banks policy space and alleviates pressure on EM borrowers.

Translating economic growth into equity returns is an especially nuanced process in emerging markets that investors need to consider as they determine their allocations. We continue to note the dispersion among returns in individual emerging markets within the broader complex. Variations in market structure, sectoral composition, corporate governance and external exposure all contribute to the spread among individual EM market returns.

As highlighted in prior editions of our LTCMAs, earnings per share are more complicated to forecast for emerging markets. As the market capitalization of a relatively nascent stock market grows through new issuance, the number of listed shares increases, diluting the portion of the pie owned by existing shareholders. Thus, faster economic growth does not necessarily result in faster earnings per share growth. Within our assumptions framework, this tends to lead to a higher net dilution for emerging markets than for developed ones. While this factor has admittedly diminished substantially over the last decade, we still see it as being a roughly 2.5% drag for EM equity returns relative to DM equity returns.

We derive our aggregate EM equity assumption by applying the same methodology we use for DM equity assumptions to nine large emerging markets and aggregating by market capitalization weight. The countries we include account for more than 80% of the market capitalization of the MSCI Emerging Markets Index. We once again caution that data history in emerging economies is generally shorter and data quality less robust, so our confidence in the resulting assumptions is by nature somewhat lower than for developed markets. Despite this reservation and the variety of cyclical and structural crosscurrents moving through the emerging market universe, we identify a few common themes.

The divergence in the performance of different EM regions this year has been the widest in more than a decade, as the commodity-sensitive Latin America and EMEA regions were hit harder by the COVID-19 crisis than EM Asia. Following poor performance by Latin American equity, we raise the return assumption for the region by 70bps, to 8.00% in local currency terms. This mainly reflects an expectation of improving profit margins; in both Brazil and Mexico, for example, amid weaker commodity prices the current margin levels are well below our equilibrium margin assumptions.

Meanwhile, our overall EMEA return assumption declines by 100bps, to 8.60% in local currency terms. The decline was mainly driven by a 290bps cut in the return assumption for Russia, to 6.50%, dragged down by a higher starting valuation and weak earnings. The return assumption for South Africa is raised by 60bps, to 10.50%, helped by the positive impact of low current margins and upgraded dividend assumptions.

Changes in Asia are more significant, with the overall EM Asia return assumption falling to 6.50% from 8.80% in local currency terms amid significantly higher starting valuations across the complex. The valuation drag is most notable for Chinese equities. The return assumption for MSCI China and China's domestic A-share market drops by 250bps and 180bps, respectively, to 6.60% and 6.30%. That compares with a decline of 200bps for the Taiwan market and a decline of 230bps for the Korea market. The Taiwan market is notably weighed down by higher margin levels amid strong tech demand. The downward adjustment in India's return assumption is more modest at only 140bps, to 8.90%.

CONVERTIBLE BONDS

Convertible bonds - corporate debt securities that provide the holder with an option to convert into the issuer's stock at a predetermined price - have historically offered investors equity-like returns with lower volatility and downside protection through a bond floor. Convertibles generally provide a more attractive income component than stocks alone while still allowing participation in the stock's price movement. They can improve the risk-adjusted returns of balanced stock-bond portfolios due to their asymmetric return profile and diversification benefits (**EXHIBIT 4**).

Convertibles can be used by equity investors as a more defensive alternative, as well as by fixed income investors.

As an equity alternative, convertibles allow investors to participate in the equity upside while lowering the risk of large drawdowns. Moreover, convertible valuations benefit from increased volatility, as they are implicitly long volatility via the optionality embedded within them.

As a credit alternative, convertible bonds offer an income component and are structurally lower in duration than credit broadly. Convertibles will generally be more positively affected by rising stock values than negatively affected by rising interest rates due to their low duration.

Credit-sensitive convertibles behave more like debt than equity

EXHIBIT 4: CONVERTIBLE BOND RETURNS, IN LOCAL CURRENCY AND HEDGED TO USD

Convertible asset	Local currency	2021		2020		Year-over-year change	
		Local return	Return hedged to USD	Local return	Return hedged to USD	Local return	Return hedged to USD
Global	USD	4.2	4.6	4.3	4.8	-0.1	-0.2
Global investment grade hedged	USD	2.7	3.2	3.0	3.6	-0.3	-0.4
Global credit sensitive hedged	USD	3.8	4.2	3.9	4.4	-0.1	-0.2
U.S. hedged	USD	5.0	5.0	4.6	4.6	0.4	0.4
U.S. investment grade hedged	USD	3.2	3.2	3.8	3.8	-0.6	-0.6
U.S. high yield	USD	5.4	5.4	5.4	5.4	0.0	0.0
Europe hedged	EUR	3.2	4.1	2.6	3.9	0.6	0.2
Japan hedged	JPY	2.3	3.3	2.2	3.2	0.1	0.1

Source: J.P. Morgan Asset Management; data as of September 30, 2020.

We incorporate into our convertible bond assumptions our existing LTCMA numbers for equity and fixed income, along with convertibles' equity sensitivity, credit quality, option premium and the underlying stocks' unique characteristics. While the geographic composition of the global convertible bonds universe is similar to that of the MSCI World Index, it has historically been biased toward smaller companies and cyclical sectors. Thus, our convertible bond assumptions estimate regional betas based on a historical regression and apply that to our regional weight and delta assumptions and the existing regional equity return LTCMA numbers.

We believe that the current trend of more issuance coming out of the Americas and APAC ex-Japan will continue. Similarly, we believe that the weight in Europe and Japan will continue to decline. For the fixed income component of convertible bonds, we make an assumption of future investment grade vs. high yield issuance and use our LTCMA regional return assumptions. This year, our global convertible bond and global credit-sensitive convertible bond assumptions (hedged into USD) are 4.6% and 4.2%, respectively. Credit-sensitive convertibles are securities whose underlying stock trades significantly below the conversion price, causing them to behave more like debt than equity.

This year, our equity return assumptions decline across most regions

EXHIBIT 5A: SELECTED DEVELOPED MARKET EQUITY LONG-TERM RETURN ASSUMPTIONS AND BUILDING BLOCKS

Equity assumptions	U.S. large cap	Eurozone	Japan	UK
Revenue growth	5.2	4.4	3.4	5.3
+ Margins impact	0.1	1.5	1.5	0.2
Earnings growth	5.3	5.9	5.0	5.5
+ Gross dilution	-2.0	-2.0	-2.0	-2.0
+ Buybacks	2.1	1.1	1.5	1.2
EPS growth	5.4	4.9	4.4	4.7
+ Valuation impact	-3.0	-2.2	-1.9	-1.5
Price return	2.4	2.7	2.6	3.1
+ Dividend yield (DY)	1.8	2.5	2.5	3.5
Total return, local currency	4.1	5.2	5.1	6.7
Change vs. 2020 LTCMAs	-1.5	-0.6	-0.4	0.6

Source: J.P. Morgan Asset Management; estimates as of September 30, 2019, and September 30, 2020. Components may not add up to totals due to rounding.

EXHIBIT 5B: SELECTED EMERGING MARKET EQUITY LONG-TERM RETURN ASSUMPTIONS AND BUILDING BLOCKS

Equity assumptions	China*	Korea	Taiwan	India	South Africa	Brazil
Revenue growth	9.4	4.7	3.8	12.2	9.1	8.1
+ Margins impact	-0.4	2.6	0.1	0.9	-0.2	2.9
Earnings growth	8.9	7.5	4.0	13.2	8.9	11.3
+ Gross dilution	-3.4	-1.5	-0.7	-2.7	-2.3	-4.0
+ Buybacks	0.3	1.0	0.3	0.5	0.5	0.8
EPS growth	5.5	6.9	3.5	10.7	6.9	7.7
+ Valuation impact	-1.0	-3.2	-1.8	-3.1	-0.2	-4.0
Price return	4.5	3.7	1.7	7.6	6.7	3.7
+ Dividend yield (DY)	2.5	2.0	3.8	1.5	3.5	3.5
Total return, local currency	6.6	5.6	5.5	8.9	10.5	7.1
Change vs. 2020 LTCMAs	-2.5	-2.3	-2.0	-1.4	0.5	0.5

Source: J.P. Morgan Asset Management; estimates as of September 30, 2019, and September 30, 2020. Components may not add up to totals due to rounding.

* China refers to MSCI China Index.

EQUITY FACTOR ASSUMPTIONS

Authors

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Garrett Norman, *Investment Specialist, Beta Strategies*

Our long-term assumptions include return estimates for factor exposures. We cover individual factor and multi-factor approaches across five geographies, with U.S. assumptions included in this report.

METHODOLOGY

We determine our long-term assumptions by examining the properties of two index suites, designed by J.P. Morgan Asset Management and calculated by FTSE Russell. The J.P. Morgan Diversified Factor Suite describes the performance of stocks chosen for their diversified factor characteristics; the J.P. Morgan U.S. Single Factor Suite describes the performance of large U.S. companies chosen to target a single characteristic. While there is no unambiguous, natural choice of representative index, we hope that these long-term assumptions will help inform how investors think about asset allocation with respect to factors.

To reach a factor return assumption, we first make assumptions about the relative performance of the best and worst stocks according to a factor. We calculate the historical return difference between the best and worst quartile of stocks for each factor; significantly, we measure stocks relative to their sector and geographical region peers. Relative returns are adjusted to remove the impact of market beta, allowing for an isolated view of factor performance. The quartile portfolios are rebalanced monthly and incorporate conservative estimates for the cost of trading. We then apply a haircut to these returns to account for potential selection bias effects and market adaptation. These steps form a baseline for our long-term factor return assumptions.

Next, we adjust for the richness/cheapness of factors under the assumption that factor returns are persistent but cyclical. Mechanically, we assume that the forward earnings yield differential between top quartile stocks and bottom quartile stocks will revert to its long-term average over time, and adjust the factor return assumption accordingly. This year, the value and quality factors receive meaningful upward adjustments, as both factors cheapened over the past year, particularly in the stimulus-driven equity market rally in Q2 2020. With the exception of the dot-com bubble, value and quality have never been cheaper.*

Finally, we estimate the exposure of each index in the diversified and single-factor suites to a range of factors, including the market risk premium, using regression analysis. Multiplying each exposure by the appropriate return assumption gives us our final return assumptions. These are down across the board due to the year-over-year decrease in market risk premia assumptions, though many are higher in excess return terms; our multi-factor estimate is now 140bps higher than the assumption for U.S. equities, up from 70bps a year ago. We base expectations for volatility and correlation on their historical values for the J.P. Morgan Asset Management Index series.

We cover individual factors and multi-factor approaches across five geographies

RETURN ESTIMATES

Factor	2021 return assumption USD	2020 return assumption USD	Change
U.S. diversified	5.8%	6.3%	-0.7%
U.S. value	6.2%	7.2%	-1.0%
U.S. momentum	4.1%	5.4%	-1.3%
U.S. quality	4.3%	5.6%	-1.3%
U.S. dividend	5.5%	6.9%	-1.4%
U.S. min vol	4.8%	5.8%	-1.0%
U.S. large cap	4.1%	5.6%	-1.5%

Source: J.P. Morgan Asset Management; assessments as of September 30, 2020.

* Note: This impact is partially countered by the decrease in historical returns for value and quality when incorporating this year's data into the sample period beginning in 1999.

A welcome source of alpha, income and diversification

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IN BRIEF

Relative to 2020 estimates, return assumptions for financial strategies are down, driven by expected declines in underlying public markets, but with an improving alpha outlook. Assumptions for real assets (ex-commodities) are flat to up, reflecting the stable income component of core assets and an expected widening of value-added spreads. Our return assumptions are for the median manager; due diligence is key to successful investment.

- **Private equity:** PE return assumptions are lowered, reflecting declining public equity market return expectations. Alpha projections are stable to slightly higher. The disruption and digitalization of the economy, along with changing consumer preferences, should create significant opportunities to put dry powder to productive use.
- **Direct lending:** Direct lending return estimates are trimmed slightly, given expected credit loss increases and challenges from lower cash rates.
- **Hedge funds:** Hedge fund return projections decrease, given a declining public market outlook. Alpha generation should gradually improve as volatility and the dispersion of returns increase while fundamentals gain importance vs. macro factors.
- **Real estate:** Core real estate assumptions rise for the UK, are close to flat for the U.S. and APAC, and are unchanged for Europe ex-UK. Value-added risk premia vs. core increase moving into the new cycle. REITs return projections improve for most regions.
- **Global infrastructure:** Core infrastructure estimates are essentially flat. We expect stable returns, with a high proportion of those returns coming from operating assets with long-dated contractual cash flows.
- **Global transport (NEW):** We see attractive returns for core transport, underpinned, as for other core real assets, by long-term contractual cash flows backed by strong counterparties.
- **Commodities:** Commodity returns are reduced marginally, given lower collateral return expectations and less support from a falling U.S. dollar. **Gold** is expected to maintain its premium vs. overall commodity returns, given anticipated demand from central banks, investors and emerging markets consumers.

OVERVIEW

Our expectations for an improving alpha environment and stable income from real assets, along with our risk and correlation assumptions, explain the expanding role we see for alternatives in a diversified multi-asset portfolio, amid a general decline in traditional asset returns.¹ As always, thoughtful allocation and prudent selection of top-tier managers remain critical in realizing the potential for alpha, income and diversification that alternative investing can provide.

EXHIBIT 1: SELECTED ALTERNATIVE ASSETS RETURN ASSUMPTIONS (LEVERED,* NET OF FEES, %)

FINANCIAL ALTERNATIVES	2021	2020
PRIVATE EQUITY (USD)**	7.80	8.80
U.S. private equity - small cap	7.30	8.70
U.S. private equity - mid cap	7.40	8.50
U.S. private equity - large/mega cap	8.00	9.00
PRIVATE DEBT (USD)		
Direct lending	6.80	7.00
HEDGE FUNDS (USD)		
Equity long bias	3.40	4.80
Event-driven	3.10	4.80
Relative value	3.60	4.50
Macro	2.20	3.30
Diversified†	3.30	4.50
Conservative††	3.10	4.00
REAL ASSETS	2021	2020
REAL ESTATE - DIRECT (LOCAL CURRENCY)		
U.S. core	5.90	5.80
U.S. value-added	8.10	7.70
European ex-UK core	5.00	5.00
European ex-UK value-added	7.70	7.50
UK core	5.90	5.50
UK value-added	8.40	7.70
Asia-Pacific core	6.60	6.50
REITS (LEVERED, LOCAL CURRENCY)		
U.S. REITs	6.50	6.00
European ex-UK REITs	5.90	5.50
UK REITs	6.00	6.00
Asia-Pacific REITs	6.40	6.00
Global REITs	6.40	6.00
GLOBAL INFRASTRUCTURE (USD)		
Core	6.10	6.00
GLOBAL TRANSPORT (USD)		
Core	7.60	N/A
COMMODITIES (USD)		
Gold	2.90	3.00

Source: J.P. Morgan Asset Management; estimates as of September 30, 2019, and September 30, 2020.

* All return assumptions incorporate leverage, except for Commodities, where it does not apply.

** The private equity composite is AUM-weighted: 65% large cap and mega cap, 25% mid cap and 10% small cap. Capitalization size categories refer to the size of the asset pool, which has a direct correlation to the size of companies acquired, except in the case of mega cap.

† The diversified assumption represents the projected return for multi-strategy hedge funds.

†† The conservative assumption represents the projected return for multi-strategy hedge funds that seek to achieve consistent returns and low overall portfolio volatility by primarily investing in lower volatility strategies such as equity market neutral and fixed income arbitrage.

¹ See Pulkit Sharma et al., "Alternatives: From optional to essential," *2021 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, September 2020.

FINANCIAL ALTERNATIVES: AN IMPROVING ENVIRONMENT FOR ALPHA GENERATION AMID A DECLINING OUTLOOK FOR PUBLIC MARKETS - THE UNDERLYING CORE DRIVERS OF RETURN

In the case of private equity, the outlook for alpha is stable to slightly higher, despite the store of dry powder to be deployed. The opportunity set has clearly expanded, with significant dislocations occasioned by digital transformation; the pandemic's impact on the service economy; changing consumer preferences; growing investor interest in corporate environmental, social and governance (ESG) mandates; and the increasing non-U.S. reach for investment returns.

For hedge fund strategies, we see alpha improving toward its long-term historical mean. Our view assumes an investment environment less dominated by macro factors and the significant outperformance of a handful of technology, communication services and e-commerce names. Increased volatility of markets and dispersion of investment returns within and among sectors should increasingly validate the long-short investment models. Macro investing is the exception to the more positive alpha outlook.

The direct lending strategies outlook is anchored more directly to the pandemic and its immediate market impact on starting securities yields and weighted average spreads in a market that remains "starved for yield."

No financial strategies outlook is complete without highlighting the wide dispersion in manager returns around our industry return projections, especially within the private equity space.

PRIVATE EQUITY - DRY POWDER INCREASINGLY FINDING A PROFITABLE HOME

Our private equity (PE) assumptions are lowered relative to last year's. The reduction across the range of fund size and capitalization reflects the decrease in underlying public market return expectations. While we acknowledge the continuing challenge of increasing stores of dry powder and elevated purchase price multiples, our positive alpha expectations are rooted in opportunities created by the disruption and digitalization of the economy, along with changing consumer preferences (EXHIBIT 2).

Geographic diversification contributes to the base case return outlook

Private equity assets are increasingly being allocated to non-U.S. markets. We project approximately 50% of the assets of large and mega cap funds will be focused on European and Asian companies (EXHIBIT 2). Importantly, while our public market return expectations are generally lowered, the base (market) returns for Europe and Asia ex-Japan are expected to exceed those in the U.S. mid and small cap markets. This is

Private equity assumptions decline, driven by expectations for lower public market returns, but the alpha component is stable

EXHIBIT 2: PRIVATE EQUITY ASSUMPTIONS AND RETURN FRAMEWORK

	Small PE (< USD 1bn)	Mid PE (USD 1bn–USD 5bn)	Large/mega PE (>USD 5bn)	Cap-weighted ^{*,**}
PUBLIC MARKET EXPOSURES				
U.S. small cap	100%	40%		
U.S. mid cap		50%	50%	
Europe		10%	20%	
Japan			5%	
Asia ex-Japan			25%	
ASSUMPTIONS (USD, %)				
Public market exposure [†]	4.60	4.70	5.60	5.30
Alpha trend	2.70	2.70	2.40	2.50
2021 LTCMA	7.30	7.40	8.00	7.80
2020 LTCMA	8.70	8.50	9.00	8.80

Source: J.P. Morgan Asset Management; estimates as of September 30, 2019, and September 30, 2020.

* The private equity composite is AUM-weighted: 65% large cap and mega cap, 25% mid cap and 10% small cap. Capitalization size categories refer to the size of the asset pool, which has a direct correlation to the size of companies acquired, except in the case of mega cap.

** The regional weights for the capitalization-weighted PE composite are: U.S.: 60%; Europe: 20%; Japan: 5%; Asia ex-Japan: 15%.

† Includes impact of translation into USD.

especially relevant for USD-based investors. And regardless of a portfolio company's domicile, global product expansion remains part of the operational value-added mandate for private equity managers.

Disruption creates opportunity

As we have highlighted in the past few years, private markets may offer a better environment than public markets for accessing disruptive innovation. Often, a focus on short-term operating metrics and targets deters public corporations from investing in long-term value creation. The U.S. and economies globally are experiencing a transformation, with old, asset-heavy industries giving way to new, digitally enabled business models. Together with demographic shifts and changing consumer preferences, this points to an expanding opportunity set for financial sponsors. Additionally, the pandemic has created the need to realign many parts of the service economy - particularly travel, entertainment and food services - but the chaos has served to accelerate the necessity of business model change overall.

A positive alpha outlook - just below the long-term trend

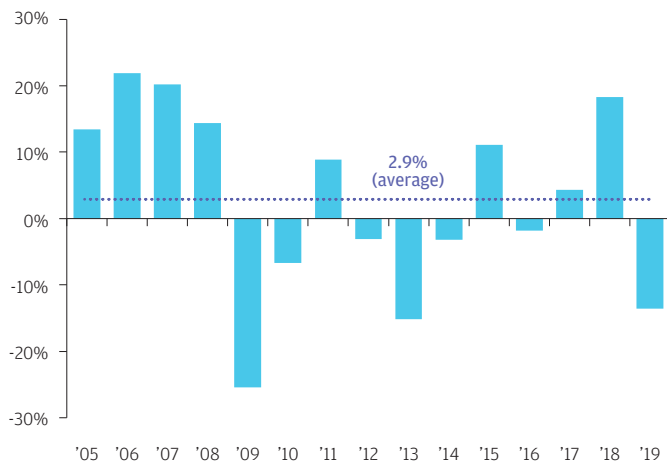
In the context of economic and business model disruption, as well as changing consumer demand, we project dry powder will be more profitably deployed than in the past several years and in rough proximity to the 15-year alpha trend line. In short, our outlook for manager alpha remains positive and largely unchanged from last year, despite the growth in dry powder and elevated purchase price multiples. Our expectation for managers to benefit from disruption and access to higher growth end markets, often more difficult for public market investors to access directly, is the basis for our optimism (EXHIBITS 3A and 3B).

Environmental, social and governance preferences

Of the many trends that have gained momentum over the past financial cycle, one of the strongest - among investors and asset managers alike - is an increasing focus on the management of capital in adherence with ESG principles. The share of the financial sponsor community that has signed the United Nations Principles for Responsible Investment (UNPRI) is on the rise, and the potential to add value is also significant. The ongoing and long-term opportunity of aligning

An expanding opportunity set leaves our long-term alpha assumptions largely unchanged and just slightly below the 15-year alpha trend, despite the growth in dry powder

EXHIBIT 3A: HISTORICAL PREMIUM OF PE TO U.S. MID CAP EQUITY (2005-19)**

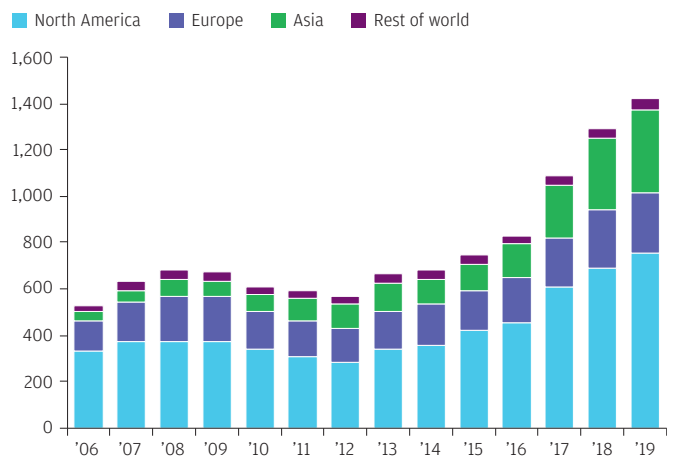


Source: Bloomberg, Burgiss Private iQ, J.P. Morgan Asset Management; data as of June 30, 2020.

* Includes buyout and expansion capital funds.

** The historical premium to U.S. mid cap returns (shown here) is not directly comparable to the forward-looking PE cap-weighted composite alpha trend assumption. Our alpha trend assumption reflects a range of public market exposures (across regions and size categories) in addition to U.S. mid cap, the dominant market exposure.

EXHIBIT 3B: DRY POWDER BY PRIMARY GEOGRAPHIC FOCUS (USD BILLIONS)

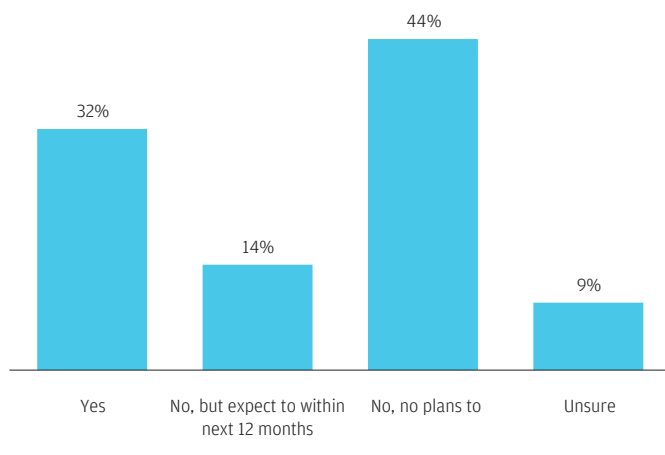


Source: Preqin 2020 Global Private Equity & Venture Capital Report; data as of December 31, 2019.

corporate operations with sustainability and governance principles, paired with operational improvements (which remain at the core of the private equity model), will likely add significant value to an enterprise over time.² Currently, ESG and impact investing mandates are a modest but growing part of the total PE asset picture (**EXHIBIT 4**).

ESG principles are of increasing importance to investors

EXHIBIT 4: PRIVATE EQUITY INVESTORS WITH AN ACTIVE ESG POLICY



Source: Preqin Investor Outlook: Alternative Assets H1 2020; data as of November 2019.

Direct or co-investment as an expansion of the private equity experience

While outside the standard limited partner (LP) return calculation, direct or co-investment options may offer an additional increment to investor returns. Given that many co-investments are offered on a no fee, no carry basis, and others have more attractive investor economics than pooled LP fees, there is the potential for a meaningful return enhancement through fee reduction, assuming all gross investment returns are similar. At this point, return data are scant and manager and investment selection appear to be very important in realizing the potential for this expansion of the private equity experience. Our 2021 projections do not include any increment to return from the projected growth of direct or co-investments.

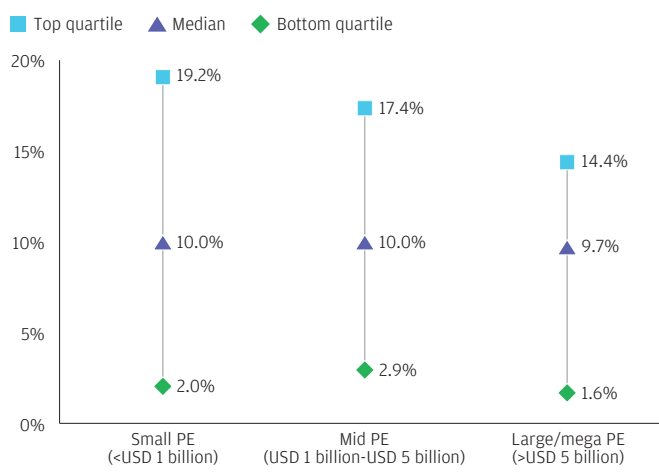
² For discussion of the potential benefits of incorporating environmental considerations into investment decisions, see Jennifer Wu et al., “Weighing the investment implications of climate change policy,” *2021 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, November 2020.

Manager selection is critical to meeting expected returns

Our positive private equity outlook is premised upon the incremental return opportunities arising from digitalization, changing consumer preferences, business model disruption emanating from the pandemic and the implementation of ESG principles. To capitalize on all these opportunities, operational expertise across markets and industries is critical. That broad range of capabilities is best captured in the dispersion of returns. Manager selection remains essential to achieving the average return outlook or better; the dispersion in performance outcomes continues to be wide (**EXHIBIT 5**) and may potentially expand as the headwinds noted above meet the opportunities best captured by skillful operators.

Manager selection remains critical to realizing the desired benefits of private equity investing

EXHIBIT 5: HISTORICAL RETURNS BY MANAGER PERCENTILE RANKING (IRR, USD)*



Source: Burgiss Private IQ, J.P. Morgan Asset Management; data as of June 30, 2020. * Includes buyout and expansion capital funds for vintages 2006-19.

DIRECT LENDING – THE DEFAULT CYCLE AND LOWER CASH RATES DIMINISH THE OUTLOOK

Our 2021 estimated levered return for direct lending is 6.80%, a reduction from 2020's assumption of 7.00%, reflecting the headwinds of lower cash rates (as most loans are floating rate) as well as higher overall credit losses as defaults continue to wash through the system. We expect these factors to be partially, though not completely, offset by higher initial spreads and lower financing costs (**EXHIBIT 6**).

How current conditions play out is likely to be a major determinant of future returns for direct lending. Ascertaining the long-term influence of the COVID-19 crisis on the direct lending market is a complex task, given the far-reaching impact of the virus itself and also the diverse nature of private debt borrowers potentially at risk. The effect of central bank purchases is not directly felt here as it is in the larger, liquid debt markets. It is also more difficult to quantify the direct feed-through into loss mitigation from potentially beneficial steps such as the Paycheck Protection Program (established by the CARES Act to support small businesses in meeting their expenses). As elsewhere in the credit market, exposure to sectors positively vs. negatively affected by the virus is a key determinant of portfolio prospects.

Ultimately, as was anticipated in the exuberant days toward the end of the previous cycle, the best factors for minimizing investor losses are likely to be credit selection, careful document structuring and a prudent level of portfolio diversification. While nonaccruals³ have been on the increase, in general the picture is one of cautious optimism; the gradual reopening of the economy should allow portfolio companies' revenue streams to recover to levels sufficient to service and pay down debt. In addition, private equity sponsors (in many cases, the equity holder subordinated by senior secured direct lenders) are generally supportive of portfolio companies and prepared to inject capital where required. In the immediate term, direct lending deal flow is likely to remain curtailed owing to a decline in middle market mergers and acquisitions. Thereafter, investors may be able to capitalize on a broad increase in available spreads post-crisis.

³ Nonaccruals are typically defined as unsecured loans with payments 90 days or more overdue.

Return assumptions are reduced, reflecting lower cash rates and higher credit cost estimates

EXHIBIT 6: DIRECT LENDING RETURN ASSUMPTIONS AND BUILDING BLOCKS (USD, %)

	Rate/spread (%)		
	2021	2020	
Cash	1.10	1.90	LTCMA for cash
Weighted average spread	5.50	4.90	Based on anticipated leveraged loan spreads, weighted for issuance quality and seniority
Illiquidity	1.00	0.90	Represents "day one" excess returns for direct lenders at origination over and above liquid loans of equivalent credit quality, comprising a mix of upfront fees (amortized over the life of the loan) and excess spread
Starting yield	7.60	7.70	Sum of cash rate + spread + illiquidity
Credit cost	-1.40	-1.25	Assumed defaults, net of assumed recoveries in restructuring scenarios
Unlevered yield	6.20	6.45	Sum of starting yield + credit costs
Leverage	6.20	6.45	Reflects 1x turn of leverage added
Cost of financing	-3.80	-4.05	Based on manager discussions and yield spreads on publicly traded debt backed by mid-market loan portfolios
Fees	-1.80	-1.85	Based on manager discussions of management and performance fees on levered assets
Levered assumption	6.80	7.00	Sum of unlevered yield + leverage + cost of financing + fees

Source: J.P. Morgan Asset Management; estimates as of September 30, 2019, and September 30, 2020.

HEDGE FUNDS – IMPROVING INVESTMENT ENVIRONMENT AND INDUSTRY CHANGE STRENGTHEN THE OUTLOOK VS. PUBLIC MARKETS

Our hedge fund (HF) assumptions are marked lower for 2021 vs. 2020 primarily to reflect the reduced underlying public market assumptions that remain key drivers of our outlook for all hedge fund strategy returns (**EXHIBIT 7**). For perspective, our beta assumptions are reduced by over 0.50 percentage points in the case of diversified hedge funds. We project improved operating conditions for most HF strategy classes in terms of alpha generation. Helped by modest industry changes still evolving below the surface, our hedge fund return outlook – together with the potential for enhanced returns inherent in the return dispersion of the strategy class – indicates there is a role for hedge funds in a diversified multi-asset portfolio.

Revamping the methodology to better capture industry investment dynamics

We have, for the past 16 years, employed a long-only beta approach to summarize the key risks and return generators for the hedge fund industry. For 2021, we employ a more nuanced technique to better capture both sides (long and short) of a typical hedge fund strategy. For example, in modeling the core return drivers for the equity long bias strategy we use the return differential between large cap and small cap equity instead of simply using both absolute

numbers. We find that this enhancement provides further insight into the pattern of risk-taking and return generation in hedge funds. In addition, it improves the explanatory power of the core return drivers, strengthening our conviction in the core driver approach (see **METHODOLOGY HIGHLIGHTS**).

Lower beta returns for all strategies, but rising alpha expectations

EXHIBIT 7: HEDGE FUND RETURN ASSUMPTIONS (USD, %)

Strategy	2021	2020
Equity long bias	3.40	4.80
Event-driven	3.10	4.80
Relative value	3.60	4.50
Macro	2.20	3.30
Diversified*	3.30	4.50
Conservative**	3.10	4.00

Source: J.P. Morgan Asset Management; estimates as of September 30, 2019, and September 30, 2020.

* The diversified assumption represents the projected return for multi-strategy hedge funds.

** The conservative assumption represents the projected return for multi-strategy hedge funds that seek to achieve consistent returns and low overall portfolio volatility by primarily investing in lower volatility strategies such as equity market neutral and fixed income arbitrage.

METHODOLOGY HIGHLIGHTS

- Each hedge fund strategy has a pre-selected set of factors (both long-only beta factors and spread factors). All factors are mapped to our Long-Term Capital Market Assumptions.
- Rolling seven-year multi-factor regressions are run on monthly hedge fund strategy index returns.
- An elastic net algorithm (a combination of Lasso and Ridge regressions) is used to estimate factor loadings.*
- Medium- to longer-term average factor loadings, including betas and alphas, are studied to guide forecasts.
- Each hedge fund strategy's forecast is the sum of beta and alpha components.

HEDGE FUND BUILDING BLOCKS (% , USD)

	Equity long bias	Event-driven	Relative value	Macro	Diversified	Conservative
Beta return	2.10	1.80	1.10	1.00	1.90	1.25
Alpha trend line	1.30	1.30	2.50	1.20	1.40	1.85
Return expectation	3.40	3.10	3.60	2.20	3.30	3.10

Source: Bloomberg, HFR, J.P. Morgan Asset Management; data as of September 30, 2020. Components may not add up to totals due to rounding.

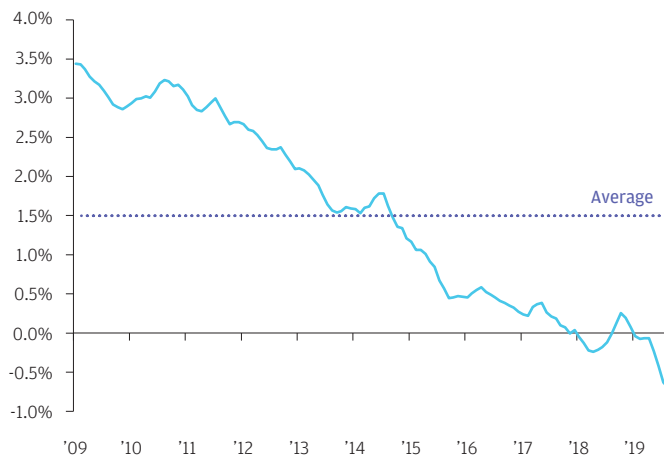
* Lasso and Ridge regression algorithms are in the category of regularized regression, which aims to reduce the numbers of nonzero factor loadings and shrinks the coefficient magnitudes. The benefits include better variable selection and more intuitive results. An elastic net algorithm uses linear combinations of Lasso and Ridge regressions. The methods have been widely used in econometrics and machine learning.

Trend line alpha as seen through a decadelong, post-global financial crisis (GFC) lens

Undeniably, conditions since the GFC have been difficult for most long-short investment strategies to navigate: low sector and individual stock dispersion, low volatility, markets driven in large part by a small cohort of stocks (e.g., FAANGM⁴), and fundamental drivers overridden by macro factors. But in evaluating long-term alpha potential, it is important not to allow the experience of the most recent five years to completely outweigh that of the previous five. In fact, across the entire post-GFC period to date, the average for the long-term alpha trend is positive (**EXHIBIT 8**). While most of the onerous conditions noted are currently still in place, we believe they should normalize over our Long-Term Capital Market Assumptions (LTCMAS) forecast period (10 to 15 years), allowing alpha potential to improve. Examining the historical alpha trend over both halves of the post-GFC period creates a different picture of the alpha potential of the industry - one consistent with our more positive expectations for a modest reversion to the mean long-term alpha estimate.

With a gradual return to operating conditions present in the earlier half of the post-GFC period, the alpha trend could see a modest reversion to its long-term mean

EXHIBIT 8: TREND IN MODEL-ESTIMATED, ANNUALIZED ALPHA FOR DIVERSIFIED HEDGE FUNDS*



Source: J.P. Morgan Asset Management; data as of June 30, 2020.

* The annualized alpha is based on the unexplained residual from a monthly multi-factor regression model (see **METHODOLOGY HIGHLIGHTS**).

Current industry dynamics and the outlook for alpha

We have, over the past two years, highlighted a number of tailwinds to hedge fund returns. Our assumptions continue to reflect these factors as the nature of risk-taking gradually changes to take advantage of ongoing opportunities in the marketplace, which include:

- A tilt toward non-U.S. allocations, especially Asian equity and fixed income markets, given their higher return and inefficiency profiles vs. those of developed markets.
- The ongoing reduction in the industry's standard fees - which continues and, in our opinion, should reach a trough at approximately a 1% management fee. Additionally, a number of management fee-only and performance fee-only standards are developing that could directly contribute to the net return.
- An eventual rise in base policy interest rates, which have historically been a return contributor - a rise that, however, appears unlikely to occur any time soon.
- An increased, albeit still modest (mid-single digit), allocation to hybrid or private investments with potentially private equity-like return profiles.

Two more recently emerging dynamics, as seen by our hedge fund assumptions team, are also likely to have some positive impact on alpha trends: increased sector specialization at one end of the spectrum and the increased resources, capabilities and multi-expertise that come with the mega-size multi-strategy funds at the other end.

In total, while the industry alpha trend line is slanted downward over the last 10-plus years, its average value over this period is still positive and, in the case of relative value strategies, high and fairly consistent. With basic market dynamics likely to improve modestly, shifting toward previous regime conditions, and given the evolving industry forces cited above, the use of trend line alpha with adjustments seems to us a solid base for extrapolating the return outlook for a changing industry. Macro strategies prove the sole exception to our rising alpha expectations. The outlook is not all negative, however, as the makeup of the composite increasingly weights toward discretionary vs. systematic managers and our outlook for interest rates - an important driver of systematic returns - improves (rises) toward the back end of the assumption time frame.

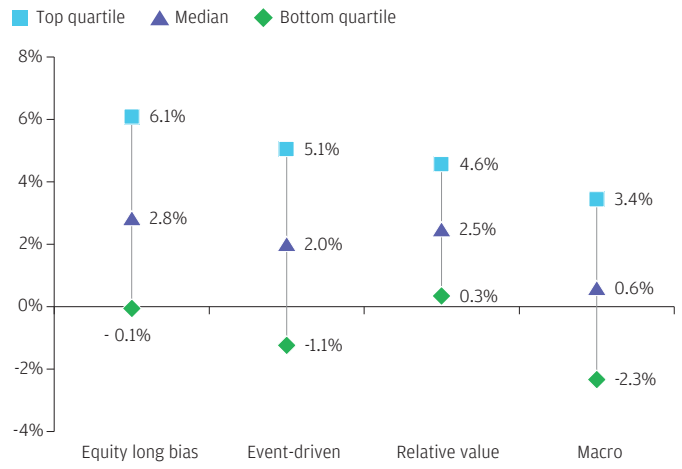
⁴ FAANGM refers to Facebook, Amazon, Apple, Netflix, Google's Alphabet and Microsoft.

The industry is changing – the importance of manager selection is not

Whether hedge fund operating conditions resemble those in the earlier or later post-GFC years, the diversity of manager skills and resources across the industry holds, ensuring that due diligence in strategy selection will remain a key element in an investor’s ability to fully capture the value of hedge funds in a multi-asset class portfolio (EXHIBIT 9).

Manager selection is key to realizing the potential portfolio benefits of a hedge fund allocation

EXHIBIT 9: DISPERSION OF ANNUALIZED MANAGER RETURNS (%), JULY 2015 TO JUNE 2020*



Source: HFR, J.P. Morgan Asset Management; data as of June 30, 2020.

* Returns adjusted for survivorship bias.

REAL ASSETS – STABLE INCOME AND DIVERSIFICATION IN A WORLD OF LOWER YIELDS

The long-term outlook for real assets is attractive, particularly when considered on a risk-adjusted return basis, relative to most traditional assets and financial alternatives. We expect core real assets to continue to gain traction in portfolios, given the stable and diversifying nature of their return streams, driven by income generated from long-term contractual cash flows backed by strong counterparties. We also expect value-added spreads to core, compressed late in the last cycle, to expand in the new cycle and return to a more normal historical relationship over our assumptions time frame.

The pandemic's impact on the real assets space has been limited, overall. The movement of goods, water, energy and data has been only marginally affected. Utilities, logistics, renewables and residential segments have also demonstrated resilience. Sectors experiencing the greatest impact are those that rely on the movement of people, including hospitality, retail and airlines. Within real estate, one result has been a further acceleration of the e-commerce-driven growth of the industrial/logistics sector at the expense of the retail sector.

We see increasing institutional asset flows fueling growth and expanding investment opportunities in a number of areas, including core infrastructure and transport, which are becoming scalable institutional core real asset categories alongside core real estate, and extended asset class sectors – for example, data centers, health care facilities, single-family rentals and storage. Institutions' expanding appetite for investments in real asset markets beyond their own borders should continue to drive growth and diversification of the global real asset opportunity set.

GLOBAL REAL ESTATE – LONG ESTABLISHED ... AND CONTINUOUSLY EVOLVING

Our 2021 assumptions for core real estate rise for the UK, are close to flat for the U.S. and APAC, and are unchanged for Europe ex-UK (**EXHIBIT 10A**). Value-added real estate returns

receive an incremental boost vs. 2020 assumptions due to an improved cyclical adjustment (**EXHIBIT 10B**).

Core real estate return assumptions are flat to modestly up

EXHIBIT 10A: CORE REAL ESTATE ASSUMPTIONS AND BUILDING BLOCKS (LOCAL CURRENCY, %)

Core real estate	U.S.	Europe ex-UK	UK	APAC
Starting NOI (before capex) yield	4.70	4.10	5.05	4.05
Maintenance capex	(0.70)	(0.25)	(0.25)	(0.25)
Net cash flow growth	2.60	1.50	1.20	2.80
Exit yield adjustment	(0.50)	(0.45)	(0.10)	(0.75)
Standard industry fees	(0.70)	(0.70)	(0.70)	(0.75)
Unlevered return, net of fees	5.40	4.20	5.20	5.10
Leverage impact	0.50	0.80	0.70	1.50
2021 levered return, net of fees	5.90	5.00	5.90	6.60
2020 levered return, net of fees	5.80	5.00	5.50	6.50

Improved cyclical dynamics expected to widen value-added spreads to core

EXHIBIT 10B: VALUE-ADDED REAL ESTATE ASSUMPTIONS AND BUILDING BLOCKS (LOCAL CURRENCY, %)

Value-added real estate	U.S.	Europe ex-UK	UK
Core real estate unlevered return, gross of fees	6.10	4.90	5.90
Risk premium	3.00	3.00	3.00
Cyclical adjustment	(0.80)	(0.20)	(0.35)
Standard industry fees	(2.50)	(2.50)	(2.50)
Unlevered return, net of fees	5.80	5.20	6.05
Leverage impact	2.30	2.50	2.35
2021 levered return, net of fees	8.10	7.70	8.40
2020 levered return, net of fees	7.70	7.50	7.70

Source: J.P. Morgan Asset Management; estimates as of September 30, 2019, and September 30, 2020.

U.S. real estate

Our assumption for **U.S. core real estate** rises slightly from last year's. Starting net operating income (NOI) yield is virtually unchanged. In Q4 2019, the U.S. real estate market was trading wider vs. fixed income, had lower vacancy than before the GFC and had modest net investment flows (**EXHIBIT 11**). This year, we estimate that prices have declined less than 10% from their 2019 peak while decreases in net cash flows tied to rent drops, vacancy increases and some rent payment deferrals are depressing income by a roughly equal percentage. While we expect a higher growth rate for net cash flow, given its lower starting point, this impact is likely to be offset by headwinds to rental income in a period of below-potential GDP growth. A lower-for-longer interest rate environment improves the outlook by lowering exit yields and boosting the benefits of modest leverage.

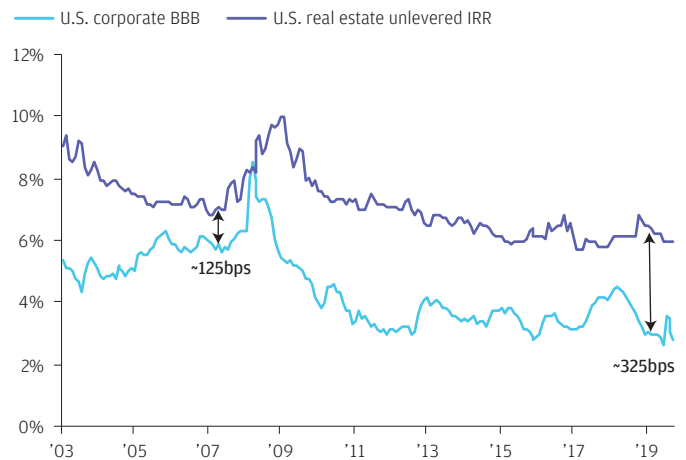
Underlying our core real estate assumption are several sectoral trends. The growth of e-commerce, accelerated by the pandemic, is serving to shrink the retail share of the commercial real estate industry. At the same time, e-commerce is helping to expand the industrial share with opportunities for "last-mile" properties, data centers and warehouses.

In our view, the practice of working from home, accelerated by COVID-19, could have a more modest impact on the office sector than some may believe. While this trend is likely to be disruptive for coworking/flex leasing firms, properties dependent on larger businesses with traditional long-term rental agreements may experience a more evolutionary impact. Additionally, office occupancy growth should benefit as faster-growing infotech tenants replace slower-growing traditional firms. The shift from urban core living to suburban apartments and single-family rentals is another trend we see continuing.

This year, our **U.S. value-added real estate** assumption builds in an increased increment to core returns, based on two factors. Prices for both value-added assets with substantial leasing risk and raw land have been weaker than for core assets, suggesting an opportunity to capture relative value. Additionally, while the spreads on development loans are moderately wide, short-term rates are so low that leverage is highly accretive for value-added executions.

U.S. real estate is better positioned than it was just prior to the GFC

EXHIBIT 11: U.S. CORE UNLEVERED REAL ESTATE PREMIUM OVER BBB: DECEMBER 2007 VS. DECEMBER 2019



Source: Moody's Analytics, NCREIF, J.P. Morgan Asset Management; data as of June 2020.

European real estate

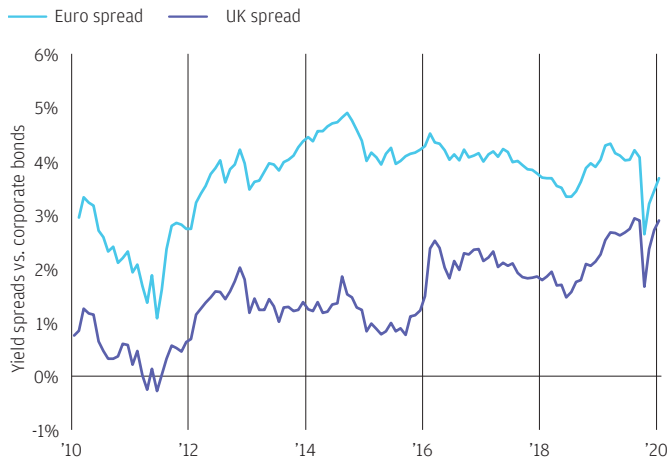
European core real estate return assumptions remain attractive. Premia placed on assets that provide long-term sources of income backed by high quality credit leases have remained close to, and in some cases above, their pre-COVID-19 peak. Although assets with less stable sources of income are expected to suffer some pricing weakness, so far the impact has been limited. The combination of generous spreads over corporate bond yields and substantial fiscal support has protected both capitalization rates and income levels (**EXHIBIT 12**). In addition, relatively limited transaction volumes combined with substantial pent-up investor demand have provided further pricing support.

Looking ahead, key questions center around the robustness of rental values. We expect the pricing of core assets to remain strong, reflecting a lower-for-longer fixed income outlook as well as the attractiveness of contractual income streams offered by long-duration leases. Although our long-term projections reflect net income growth rates that keep pace with inflation, a short-term decline in rental income is likely. Over the forecast period, rents are expected to remain in line with prices, with weakness in the retail sector being offset by a stronger logistics sector. While corporate and government bond yields are expected to rise, real estate pricing at the end of the forecast period should be protected by enhanced rental growth expectations and risk premium mean reversion.

As in the U.S. market, spreads between European value-added and core real estate are likely to increase, suggesting an enhanced case for investing in value-added assets over time.

Real estate spreads over corporate bond rates remain generous

EXHIBIT 12: EURO AND UK REAL ESTATE YIELD SPREADS VS. CORPORATE AGGREGATE BONDS



Source: Bloomberg, Green Street Advisors, J.P. Morgan Asset Management; data as of June 30, 2020.

Asia-Pacific real estate

Our APAC core real estate return assumption is raised slightly from last year and continues to exceed those of the U.S. and Europe. This modest improvement is driven by a slight increase in our estimated starting NOI, which, along with our expectations for a marginally higher exit yield adjustment and a greater impact from leverage, more than offsets our somewhat lower assumption for net cash flow growth.

While transactions have been limited, we do see pricing weakness in the retail and office sectors, primarily reflecting a slowdown in income collections. In contrast, pricing in the industrial sector has been stable, benefiting from greater e-commerce activity and positive demand growth across the region. Although our net cash flow growth assumption is lower than last year's, given the tremendous rental pressures within the retail sector and ongoing rental adjustments in most office markets, it remains at an attractive level. We expect rents to stabilize in 2021 and rental income growth to improve over the longer term, supported by healthy medium- to longer-term economic growth and prevailing structural land shortages in many markets. Those expectations are reflected in our exit yield assumption. In addition, given the low financing costs available, leverage is expected to be accretive to both yields and total return.

We view the COVID-19 crisis as a temporary disruption to the APAC region's otherwise strong economic growth trend. By 2030, APAC is expected to constitute close to 40% of the global economy. We expect its growing economic presence to draw increased allocations to the region's real estate market - a market that should be supported by favorable demographics and increased urbanization as it scales and matures. However, with further institutionalization of the APAC real estate market, increased competition from buyers is likely to reduce risk premia.

REAL ESTATE INVESTMENT TRUSTS (REITS) - FAIRLY PRICED, GLOBALLY

Our global REITs return projection is increased this year, reflecting improved outlooks for U.S., Europe ex-UK and APAC REITs.

Our regional forecasts (**EXHIBIT 13**) are based on unlevered core real estate returns as a starting point, given that REITs are ultimately subject to the same fundamentals as the underlying real estate held within these publicly traded vehicles. The regional core returns are then adjusted for sector composition, REIT leverage by region and pricing relative to underlying real estate valuation.

Across markets, REITs are seeing a more pronounced benefit from leverage this year. Pricing looks roughly fair to slightly cheap relative to the underlying real estate, though these figures are subject to considerable uncertainty amid the COVID-19 pandemic. In the U.S., the relatively fair pricing is an improvement from last year, when REITs valuations were trading at a premium. The U.S. projection also accounts for the higher cash flow growth of extended sectors (e.g., data centers), which is not captured in our core real estate return figures. APAC REITs, also at a premium last year, are now priced at a discount. The significant discount for Europe ex-UK REITs continues from last year. The unchanged UK projection reflects the counteracting effects of an improved private real estate outlook and less discounted underlying starting valuations.

Global REITs return assumptions have increased, but with variations across regions

EXHIBIT 13: REITs RETURN ASSUMPTIONS AND BUILDING BLOCKS (LEVERED, LOCAL CURRENCY, %)

REITs	U.S.	Europe ex-UK	UK	APAC	Global*
Core real estate unlevered return, net of fees	5.40	4.20	5.20	5.10	5.20
Tilt toward higher growth sectors	0.30	0.00	0.00	0.00	0.20
Net leverage benefit	0.70	1.20	0.80	0.90	0.80
Amortization to NAV discount	0.10	0.50	0.00	0.40	0.20
2021 expected return	6.50	5.90	6.00	6.40	6.40
2020 expected return	6.00	5.50	6.00	6.00	6.00

Source: J.P. Morgan Asset Management; estimates as of September 30, 2019, and September 30, 2020.

* The global composite is built assuming the following weights: roughly 60% U.S., 10% Europe ex-UK, 5% UK and 25% Asia-Pacific.

GLOBAL CORE INFRASTRUCTURE – STABLE RETURNS OVER THE NEXT DECADE

Our 2021 infrastructure long-term return projection is 6.1%, essentially flat vs. 6.0% last year. We expect continued stable returns over the next decade, with a high proportion coming from operating yield.

Return building block considerations

This year, we continue to refine our building block approach to provide a more granular breakdown of the components of our infrastructure return expectations. The fundamental building block of our core infrastructure return assumption is starting operating yield, estimated at 5.00%. Core infrastructure assets typically have long-term contracts, which insulate their income-driven returns from short-term fluctuations in asset values. Given our long-term outlook for normalizing global growth, our cash flow growth assumption rises. We assume maintenance expenses of approximately 65bps per annum. In addition, our return assumption builds in a positive adjustment for a higher valuation impact, reflecting our expectations of increasing investor demand for higher yielding asset classes in a continuing historically low yield environment. Leverage results in a positive 1.2% return impact, reflecting a reduction in the cost of debt rather than a marked increase in loan-to-value ratios (**EXHIBIT 14**).

Core infrastructure returns are up marginally, given slightly higher expected cash flow growth and exit multiples

EXHIBIT 14: GLOBAL CORE INFRASTRUCTURE – RETURN ASSUMPTIONS AND BUILDING BLOCKS (USD, %)

Core infrastructure	2021
Starting yield	5.00
Cash flow growth	1.00
Maintenance	(0.65)
Valuation impact	0.80
Fees and other expenses	(1.25)
Unlevered return, net of fees	4.90
Leverage impact	1.20
2021 levered return, net of fees	6.10
2020 levered return, net of fees	6.00

Source: J.P. Morgan Asset Management; estimates as of September 30, 2019, and September 30, 2020.

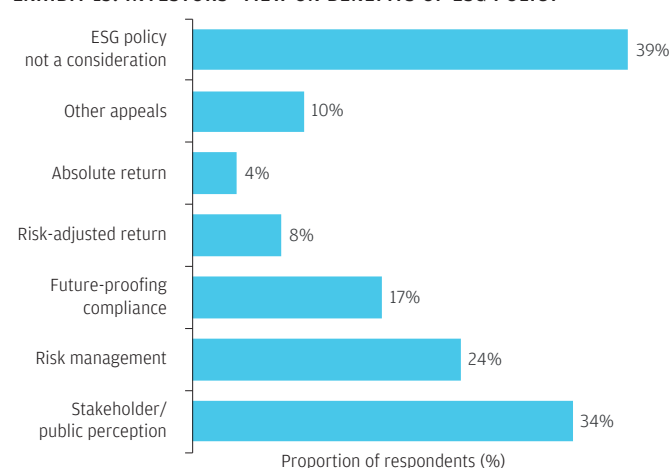
Long-term drivers

We expect a growing need for new capital to fund the development of infrastructure assets. According to estimates from the OECD, between USD 3 trillion and USD 6 trillion in new infrastructure investments will be required annually through 2030 to meet the U.N.'s Sustainable Development Goals.⁵ Similarly, investor demand is expected to remain robust, particularly for stable operating assets with long-dated contractual cash flows that can offer portfolio diversification and a less cyclical return profile.

In addition to sustained investor demand, we expect heightened attention to environmental, social and governance standards from asset managers and investors alike. As the social license to operate is a key component of most infrastructure assets, addressing societal impact is an integral part of infrastructure asset management, particularly when viewed over a long-term investment horizon. Infrastructure asset managers have established themselves as leaders in ESG integration, with 40% of managers being signatories to ESG or impact frameworks and many others taking active approaches to incorporating ESG policies.⁶ Investors are generally supportive as well, with many viewing ESG policies favorably (**EXHIBIT 15**).

Investors appear to value the potential benefits of adhering to ESG policies

EXHIBIT 15: INVESTORS' VIEW ON BENEFITS OF ESG POLICY



Source: 2020 Prequin Global Infrastructure Report, February 2020.

⁵ Technical note on estimates of infrastructure investment needs, OECD, July 2020.

⁶ 2020 Prequin Global Infrastructure Report, February 2020.

GLOBAL CORE TRANSPORT - A DIFFERENTIATED SET OF POTENTIAL YIELD ENHANCERS

This year, we add core transport to our real assets assumptions - the third leg of the real assets stool - completing the real estate, infrastructure and transport triad. We project a long-term core transport return of 7.6% (see **EXHIBIT 16** and **BUILDING BLOCKS OF CORE TRANSPORT RETURNS**).

Transportation is an essential asset class closely linked to the global economy and includes several subsectors: maritime vessels, energy logistics assets, aircraft, rail cars and intermodal containers, as well as equipment and vehicle leasing. Each of these subsectors has differentiated return drivers, allowing for the construction of a well-diversified allocation. The role of these assets in the global economy cannot be understated: Maritime vessels transport roughly 95% of global trade,⁷ while the aircraft industry carried over 4.3 billion passengers globally in 2018.⁸ Furthermore, most of the transportation subsectors experienced a 3%-7% compound annual growth rate in demand over the last 10 years, a trend expected to continue as population and consumption grow (**EXHIBITS 17A** and **17B**). COVID-19 headwinds have increased market participant return requirements for the aircraft and container sectors, but yields are expected to revert to historical levels over the long term.

Most transportation assets have a finite useful life ranging from 25 to 35 years, hence the need for continued capital investment to renew and expand the fleet. Over the next 10 years, the replacement and growth capital needed for the sector is expected to be in excess of USD 4 trillion, with an annual required capital amount of between USD 300 billion and USD 600 billion.⁹

Core transport can be a potential source of enhanced yields

EXHIBIT 16: GLOBAL CORE TRANSPORT - RETURN ASSUMPTIONS (USD, %)

Core transport	2021
Starting yield	9.50
Cash flow growth	0.00
Maintenance	(0.35)
Depreciation	(2.30)
Fees and other expenses	(1.25)
Unlevered return, net of fees	5.60
Leverage impact	2.00
Levered return, net of fees	7.60

Source: J.P. Morgan Asset Management; estimates as of September 30, 2020.

⁷ International Chamber of Shipping, United Nations, as of 2019.

⁸ Aviation benefit report, Industry High Level Group, as of 2019.

⁹ Clarksons Research, Morten Beyer & Agnew, J.P. Morgan Asset Management Global Real Assets Research; data as of September 30, 2020.

Demand within major transportation sectors should continue to expand as population and consumption grow

EXHIBIT 17A: TOTAL SEABORNE MARITIME AND ENERGY LOGISTICS TRADE

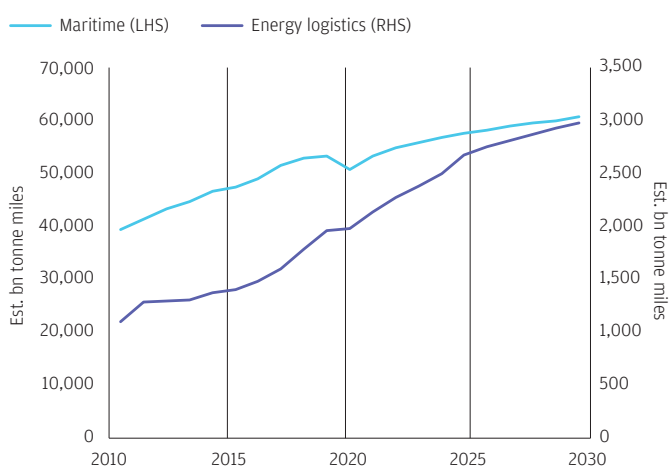
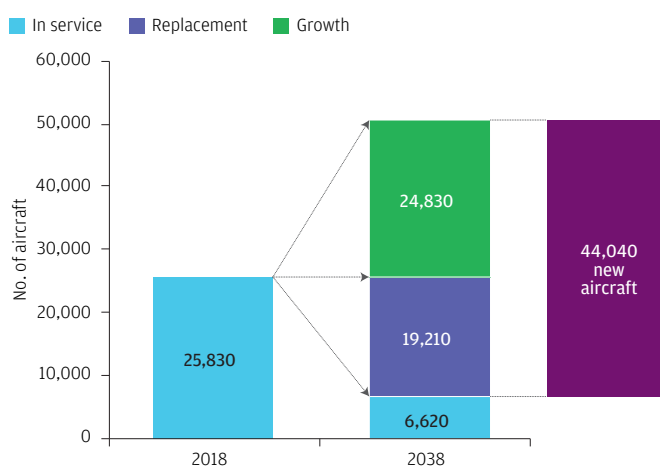


EXHIBIT 17B: TOTAL AIRCRAFT FLEET GROWTH OUTLOOK



Source: Clarksons Research, Morten Beyer & Agnew, J.P. Morgan Asset Management Global Real Assets Research; data as of September 30, 2020.

BUILDING BLOCKS OF CORE TRANSPORT RETURNS

Our long-term return estimates begin with starting yield. Downward adjustments are applied for maintenance and depreciation, and standard fees are deducted. Resulting returns are then adjusted upward for the impact of leverage. More specifically:

- Starting yield is derived from a market-weighted investible portfolio of core transportation assets* and is in line with industry experience over the last 10 years.
- We assume zero cash flow growth, reflecting our expectation of a consistent cost of capital and stable revenue.
- Maintenance of transport assets is lower than for other real assets. Our assumptions reflect maintenance costs of roughly 4% of net operating income.
- Our depreciation assumptions are based on a finite useful life of 25 to 35 years. Value depreciation is expected over the holding period, excluding scrap value.
- Leverage impact is a function of loan-to-value ratios and the cost of debt. We assume a higher debt amortization vs. other real asset segments. Transportation debt spreads have increased, but base rates have fallen, also benefiting the overall cost of debt.

* The market-weighted investible portfolio of core transportation assets consists of approximately two-thirds maritime/energy logistics and one-third aircraft.

COMMODITIES – A FALLING U.S. DOLLAR AND EARLY-CYCLE SUPPLY CONSTRAINTS DRIVE THE OUTLOOK

Our long-term broad-basket commodity assumption is reduced marginally vs. last year's, primarily due to our expectations for lower collateral returns (down 80bps year-over-year) and a reduction in the positive impact on returns from a falling U.S. dollar. Helping to offset this downward pressure is a tighter supply dynamic, consistent with early-cycle conditions and supportive of overall commodity returns (**EXHIBIT 18**).

Our Commodity Event Index (**EXHIBIT 19**) is showing levels of supply constraint indicative of the potential for a moderate cyclical uptick, driven primarily by capex restraint in the oil sector and, more recently, COVID-19-induced production constraints across much of the commodity space. Adding to tighter supply conditions, gold producers are exhibiting greater financial discipline, likely the fallout from companies struggling between 2012 and 2015 as gold prices fell dramatically.

The emerging market (EM) consumption adjustment is slightly reduced to reflect lower per capita commodity consumption for China as it transitions from a more manufacturing-driven to a more domestic consumption-led economy. We also adjust our fee expectations downward, in line with the general industry trend of declining management fees.

Over the last few years, companies and consumers have dramatically shifted their attitude toward nonrenewable energy. A number of leading companies have announced plans to significantly reduce their carbon footprints, while we

are seeing global energy producers planning to shift their businesses toward the renewable future. We believe these factors will have a marginal impact over the next 10- to 15-year time frame, which is the projection period for our LTCMAs. When starting from a low base, even double-digit growth in alternative power will not materially change the trajectory of carbon demand for a number of years. Additionally, emerging market economies with higher growth profiles are not likely to limit themselves to green energy sources in meeting their expanding energy needs. Global accords and national energy policies will likely serve to accelerate renewable energy adoption and are potential risks to our expectations.

Gold

Gold returns are modeled by beginning with our base broad commodity return assumption – of which gold is approximately 17% of the overall index – and adding an incremental 60bps premium. This reflects our increasingly positive view on a number of underlying gold price drivers: the continuation of central bank reserve additions, growing demand from China and India (the two largest gold-consuming countries) and negative real interest rates over the short term, as well as interest from institutional investors seeking downside protection outside of fixed income markets, given the risks attributed to a number of economic, monetary and geopolitical issues.

Our commodity assumption, net of fees, remains marginally positive vs. our U.S. inflation expectations (at 2.0%)

EXHIBIT 18: COMMODITIES – RETURN ASSUMPTIONS AND BUILDING BLOCKS (USD, %)

	2021	2020
Collateral return*	1.10	1.90
Position in current cycle (+premium/-discount)	0.60	-0.25
EM per capita consumption adjustment	0.15	0.25
Trade-weighted USD decline impact (projected incremental annual decline vs. historical base period)	1.00	1.35
Total return, gross of fees	2.85	3.25
Fees	-0.55	-0.75
Total return, net of fees**	2.30	2.50
Gold return, net of fees	2.90	3.00

Source: J.P. Morgan Asset Management; estimates as of September 30, 2019, and September 30, 2020.

* The Long-Term Capital Market Assumption for U.S. cash in the specified year.

** Assumes the impact of roll yield will net to zero over the life of the assumptions.

Our Commodity Event Index attempts to capture producers' supply constraints and sentiment

EXHIBIT 19: THE COMMODITY EVENT INDEX*



Source: Baker Hughes, Bloomberg, FactSet, U.S. Bureau of Economic Analysis, J.P. Morgan Asset Management; data as of June 30, 2020.

* Index components include credit ratings (11.1%); age of capital stock (11.1%); financial leverage (11.1%); volume of bankruptcies, takeovers, debt-for-equity swaps (11.1%); capital expenditure to sales (18.5%); oil rig count (18.5%); and CEO turnover (18.5%). Components may not sum to 100% due to rounding.

After near-term choppiness, long-run forecast remains stable

Grace Koo, Ph.D., *Quantitative Analyst and Portfolio Manager, Multi-Asset Solutions*

Xiao Xiao, CFA, *Quantitative Analyst, Multi-Asset Solutions*

John C. Manley, *Global Market Strategist, Global Market Insights Strategy*

IN BRIEF

- Despite a roller-coaster ride for markets and economies in 2020, our volatility and correlation forecasts are stable year-over-year because previous years' assumptions already factored in short-term disruptions.
- Unprecedented Federal Reserve actions and enormous fiscal support will likely keep U.S. fixed income and credit market volatility depressed in the next few years before rising to our long-run forecasts.
- In equities, we expect volatilities to return toward long-run historical levels after the uncertainties around the new U.S. administration and the pandemic recovery have receded over the coming months and quarters.
- In *ex ante* Sharpe ratio terms, U.S. government bonds and equities deteriorate again this year over our forecast horizon. Bonds' near-term Sharpe ratio, however, is likely better as they benefit from dampened volatility over the next few years. Our preference, in risk-adjusted terms, for extended credit and alternatives - especially real assets - continues to strengthen.
- Our case study explores a framework for adding liquidity considerations to portfolio construction. We find that it helps create a more balanced and diversified portfolio with improved liquidity profiles while minimally affecting the expected risk and return.
- A structured way of incorporating liquidity metrics offers investors an additional lens when allocating to less liquid assets such as extended credit and alternative assets - a likely direction of travel, given the need to expand investment opportunity sets to achieve an acceptable return.

OUR LONG-TERM FORECASTS REMAIN STABLE DESPITE 2020'S ROLLER COASTER

The year 2020 will be difficult to forget. Although we highlighted in last year's edition of our Long-Term Capital Market Assumptions (LTCMAs) the late-cycle dynamics that made us focus on limiting downside risk and providing a ballast to risk-taking, the timing and speed of 2020's pandemic-led recession were surprising. U.S. large cap equities experienced a 3 standard deviation negative shock in one month (**EXHIBIT 1**). The commonly referenced fear gauge - the Volatility Index (VIX), measuring the implied option volatility of the S&P 500 - hit a new all-time high in March.

But as fast as the pandemic hit global markets, the rebound velocity has been equally exceptional. Central banks and policymakers, keen to stop the free fall, rolled out an unprecedented amount of fiscal and monetary policy support beginning March 2020. As a result, financial markets recovered rapidly, well ahead of macroeconomic data, as investors looked forward to an eventual economic recovery in the coming years.

Despite the pandemic's enormous disruption to economic fundamentals and drastic effect on asset prices, our volatility and correlation assumptions are remarkably stable year-over-year. Past LTCMAs had already factored in stress periods over the forecast horizon, and by virtue of our methodology, the forward-looking forecasts are relatively unchanged year-over-year. The continuation of central bank intervention that we had anticipated also provides stability, keeping our forecasts well anchored with a relatively low level of volatility, despite high levels of uncertainty.

One thing that remains unclear is the price that economies and markets may pay for unconventional central bank actions. This heightened uncertainty is not directly observable in our core forecasts. That is because our core expectation embeds stability due to expected central bank intervention. We do, however, see a wider than normal range of potential alternative outcomes. We acknowledge that near-term uncertainty surrounding the economic recovery and policies may keep markets choppy into year-end 2020. While not impacting our long-term forecasts in the 2021 LTCMAs, this volatility may affect short-term asset pricing.

MAKING OUR ESTIMATES MORE RELEVANT

For this year's LTCMA forecasts, we continue to expand the data window, or lookback period, an important anchor for our forecasting process. Compared with a simple rolling-window estimate,¹ our methodology emphasizes making the data we use more representative and relevant for our forecasts.²

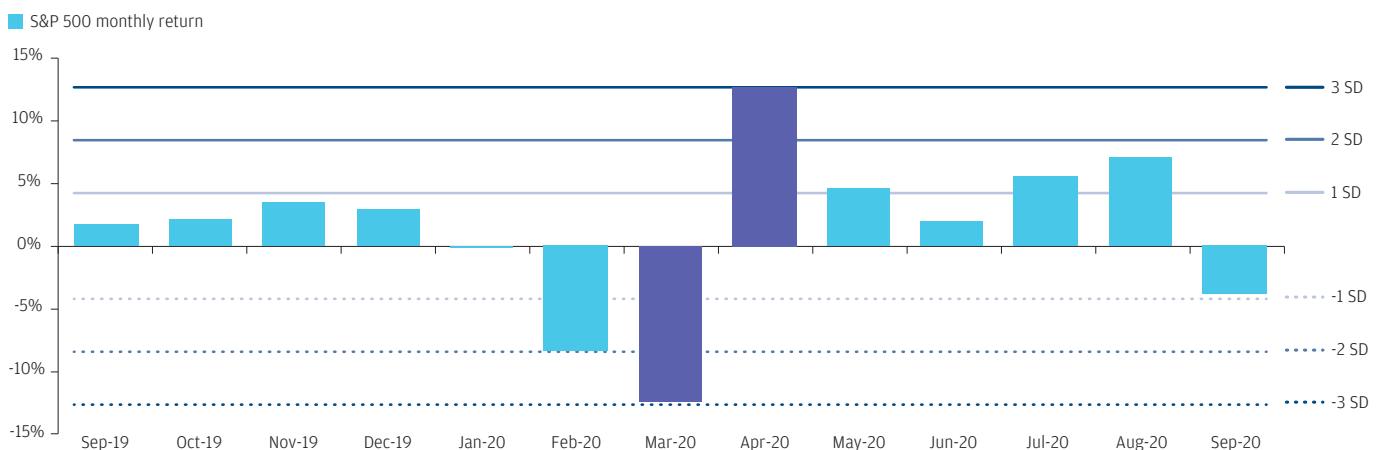
To incorporate a more typical economic downturn - in addition to the atypical one of 2020 - we continue to include the 2007-09 period in our analysis. This lengthens our data window by one year, from 13 years (2006-19 in last year's LTCMAs) to 14 years (2006-20 this year). We continue to incorporate forward-looking expectations over the forecast horizon, including the probability of stressed and high

¹ A rolling-window volatility estimate uses a fixed time period, or window, of data while varying the data input as time passes.

² For more on how we incorporate relevance into our estimation process, please see Grace Koo, Xiao Xiao and Ivan Chan, "Volatility and correlation methodology," 2020 Long-Term Capital Market Assumptions, J.P. Morgan Asset Management, November 2019.

Extreme moves: Monthly S&P 500 returns posted a 3 standard deviation loss, then dramatically rebounded the following month

EXHIBIT 1: YEAR-TO-DATE EXPERIENCE VS. HISTORICAL DISTRIBUTION OF U.S. LARGE CAP STOCK RETURNS



Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2020. For illustrative purposes only.

volatility periods, which remains unchanged at 15%,³ typical for the modern economy since the 1980s.

EXHIBIT 2 shows our 2021 LTCMA volatility forecasts for major asset classes relative to history: vs. last year, over the past 10 years and over our 14-year sample period. The chart highlights the need to continue expanding the data window, as 10-year lookback periods may underestimate the forward-looking risk (volatility) over a full cycle. This year's dramatic financial market events provided another instance of an economic downturn within our analysis period, leading to a similar output from the 14-year estimation window and our forecast. Since our forward-looking adjustments (in place for a number of years) already reflected and incorporated the

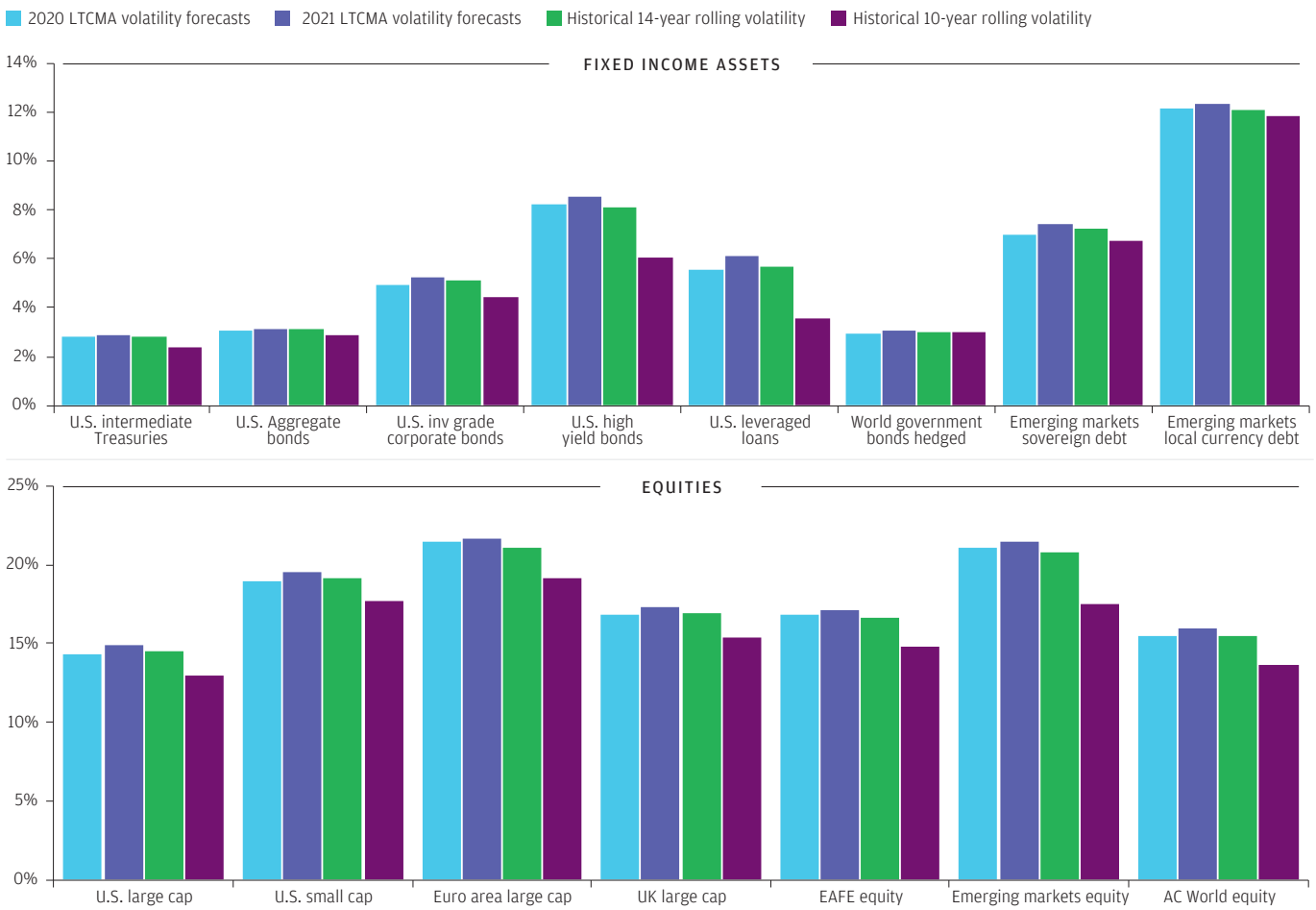
likelihood of another recession in last year's forecasts, the year-over-year change in risk estimates is minimal.

We continue to incorporate into our estimates expected structural changes to volatility relative to history. A few years back, we noted a downward bias in short-duration government bond volatility compared with long-run behavior. We attributed it to global central bank intervention. At the time, quantitative easing was expected to be unwound gradually, within the LTCMA's 10- to 15-year time frame, so we expected short-duration government bond volatility to revert to its long-term mean. However, the pandemic-driven fiscal and monetary policy support now leads us to expect short-term rates' dampened volatility may persist, and therefore we removed an adjustment made last year, given the current backdrop. We anticipate policy rates to be on hold for several years, followed by slow, steady normalization before reaching our equilibrium yields.

³ In the estimation process, a 15% weight is the total weight applied to the data points associated with stressed periods. These weights are evenly spread across all months during recessions (as determined by NBER in the data sample period), which are December 2007-June 2009 and February-April 2020 (the latter based on our expectation of NBER's likely classification).

Forecasts demonstrate stability, as prior years incorporated recession expectations

EXHIBIT 2: YEAR-OVER-YEAR COMPARISON, LTCMA VOLATILITY FORECASTS



Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2020. For illustrative purposes only.

In U.S. credit markets, unprecedented Federal Reserve activity alongside enormous fiscal support will likely keep volatility depressed over the next few years, close to the levels observed today. Over the long run, however, lowered credit quality in the U.S. corporate bond market should generate higher volatility compared with the past 15 years. We are not anticipating further deterioration of average corporate bond credit quality but rather adjusting to the existing low quality: The majority of U.S. investment grade bond market issuance is now BBB rated, increasing risk relative to past years, when credit quality was generally higher. A similar decline in average credit quality, with similar implications, can be observed in Europe.

In equities, we expect volatility to stay in line with long-run historical levels. Our volatility forecasts for alternative assets are also little changed, with our leverage assumptions staying relatively stable. We retain the view that leverage in real estate and REITs is likely to stay below the last cycle's peaks. This results in lower forecasted volatility vs. recent history.

In *ex ante* Sharpe ratio terms, we see another year of deterioration for both U.S. government bonds and equities over the forecast horizon. As highlighted in the 2021 LTCMA Executive Summary, the traditional stock-bond frontier, built by varying allocation between stocks and bonds, is unlikely to generate the level of return required by many investors. To harvest higher return, investors will no longer simply be able to allocate to equities to obtain the equity risk premium. They will also need to allocate to an expanded opportunity set.

Among the assets for which we produce forecasts, the best risk-adjusted returns lie within extended credit, especially emerging market debt and leveraged loans, and within alternative assets, especially real assets. We continue to caution investors to consider asset class characteristics beyond the return and volatility dimensions. Many of these assets have fat-tail risk, along with liquidity risk. To help investors better understand the portfolio implications of this edition of LTCMAs, see Grace Koo, Sorca Kelly-Scholte et al., "Portfolio implications: Actionable insights for diversifying portfolios amid extended valuations."

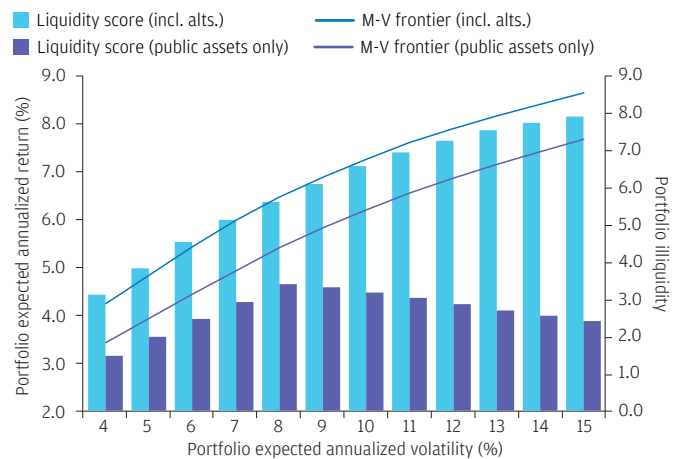
SPECIAL TOPIC: INCORPORATING LIQUIDITY CONSIDERATIONS INTO PORTFOLIO DESIGN

To achieve an acceptable return in the low return world of this year's LTCMAs, investors will likely move further away from a simple mix of equities and government bonds toward credit (for publicly traded assets) and/or alternatives (when possible),⁴ especially for investors with moderate to high risk tolerance. While potentially improving performance, this direction of travel will inherently increase portfolio illiquidity (**EXHIBIT 3**).

Investors lacking an appropriate framework for investing in alternative assets might limit their allocation to less liquid assets. Others might opt for a subjectively designed mixture of alternative and publicly traded assets, accompanied by mean-variance optimizations weighing risk against expected returns, to meet their risk-return profiles. For more insights on alternative assets and their growing role in portfolios, see the alternatives thematic section and the Alternative Assets Assumptions section of this year's LTCMAs.⁵

Including alternative assets in portfolios should improve performance, yet liquidity is a concern

EXHIBIT 3: MEAN-VARIANCE EFFICIENT FRONTIER



Source: J.P. Morgan Asset Management; data as of September 30, 2020. For illustrative purposes only.

⁴ For more on our alternatives framework, see Anthony Werley et al., "Alternative Assets Assumptions: A welcome source of alpha, income and diversification," *2021 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, November 2020.

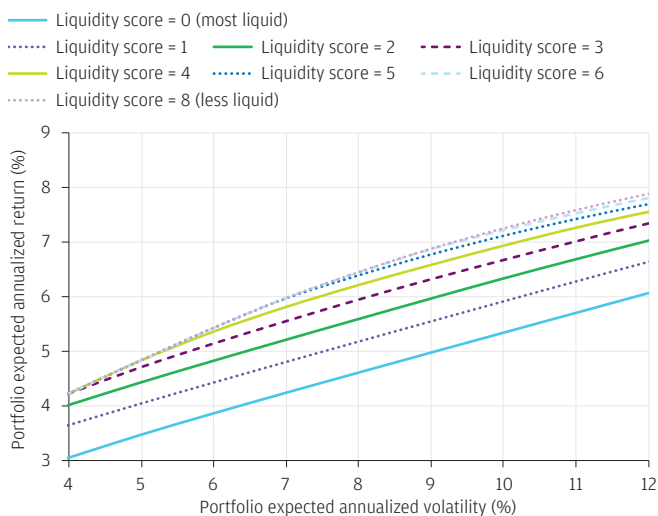
⁵ Anthony Werley et al., "Alternatives: From optional to essential," and Werley et al., "Alternative Assets Assumptions," *2021 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, November 2020.

A FRAMEWORK FOR INCORPORATING ASSET LIQUIDITY INTO PORTFOLIO CONSTRUCTION

We propose here a framework to help determine the trade-off between higher risk-adjusted returns and a portfolio's liquidity profile. This framework is helpful in directly incorporating liquidity considerations into portfolio construction - moving beyond the commonly used mean-variance frontier to create a mean-variance-liquidity frontier (**EXHIBIT 4**).

Higher expected returns are required to compensate for increased risk as well as illiquidity

EXHIBIT 4: MEAN-VARIANCE-LIQUIDITY FRONTIER



Source: J.P. Morgan Asset Management; data as of September 30, 2020. For illustrative purposes only.

To do this, we need a way to score or rank assets in terms of their relative liquidity. We considered the ease of executing large trades in a short time period, the price impact, any settlement delay, investment lockup periods, redemption notice periods and the availability of a secondary market, among other things. The main criterion was ease in liquidating the holding and having the capital returned. At the current stage, our scoring - from zero for the most liquid assets (such as U.S. large cap equities and major developed market government bonds) to 9 for the most illiquid (such as private equity) - is subjective.⁶ Within publicly traded assets, we see a range of liquidity scores, from zero to 4 (e.g., extended credit markets such as high yield bonds and emerging market sovereign debt have a liquidity score around 3-4). Alternative assets tend to score 5 or higher (**EXHIBIT 5**). We acknowledge the challenges of capturing a complex topic in an overly simplified setup but consider it a step in the right direction.

⁶ At this stage, the magnitude of each liquidity score does not have a direct economic meaning. It may be useful, as a reference, to associate scores with commonly owned assets. The scores are most useful when investors are comparing different portfolios. As we continue to refine this methodology, we will look to make these liquidity scores more objective and quantifiable.

There are multiple ways to incorporate these liquidity scores into the portfolio optimization process. We explore two of them in this section:

- Applying liquidity as a constraint:** Optimizing the standard mean-variance objective function by adding a portfolio liquidity constraint that imposes a limit on the level of illiquidity the portfolio is allowed.⁷
- Applying a penalty function:** Adding an individual asset's liquidity score directly into the mean-variance objective function as a penalty. We set up a quadratic penalty function, as liquidity is nonlinear in nature and better captured, in our opinion, in a nonlinear way.

APPROACH (a) is to impose an additional constraint in the mean-variance optimization problem:

$$\max w' \mu - \frac{1}{2} w' \Sigma w \quad (1a)$$

$$s.t. \sqrt{w' \Sigma w} = \hat{\sigma}_p \quad (1b)$$

$$0 \leq w \leq 1 \quad (1c)$$

$$A w \leq b \quad (1d)$$

$$A_{eq} \cdot w = b_{eq} \quad (1e)$$

$$w' l \leq \hat{l}_p \quad (1f)$$

Here, w is the vector of asset weights to be optimized, μ is the vector of expected returns, Σ is the covariance matrix from our LTCMAs, $\hat{\sigma}_p$ is the target portfolio risk, l is the vector of liquidity scores, and \hat{l}_p is the minimum liquidity threshold. The objective function (1a) is the standard mean-variance optimization objective, which maximizes portfolio return while penalizing portfolio risks. (1f) is the additional liquidity constraint imposed on traditional mean-variance optimization. Exhibit 5 displays the detailed optimization setup.⁸

⁷ The portfolio liquidity score is the weighted sum of individual asset liquidity scores.

⁸ Other constraints not listed: Sum of all positions equals 100%.

Selected assets, their constraints and liquidity scores in both optimization approaches we explored

EXHIBIT 5: OPTIMIZATION WITH LIQUIDITY CONSIDERATIONS SETUP

Group	Asset	Group constraint	Asset-to-group ratio constraint	Liquidity score
Cash	U.S. cash	0-100%		0
Fixed income	U.S. intermediate Treasuries			0
	U.S. long Treasuries			0
	U.S. inv grade corporate bonds	0-100%		1
	U.S. high yield bonds		U.S. high yield bonds + emerging	3
	Emerging markets sovereign debt		markets debt <= 50% total fixed income	4
Equities	U.S. large cap		25%-100% total equity	0
	EAFE equity	25-100%	12.5%-100% total equity	0
	Emerging markets equity		5%-100% total equity	2
Alternatives	Diversified hedge funds			4
	U.S. core real estate			5
	European ex-UK core real estate			5
	Asia-Pacific core real estate	0-100%		5
	Global core infrastructure			6
	Direct lending			8
	Private equity			9

Source: J.P. Morgan Asset Management; as of September 30, 2020. For illustrative purposes only.

APPROACH (b) is another method of incorporating liquidity into the mean-variance portfolio optimization process, using the liquidity metric in the objective function:

$$\max w' \mu - \frac{1}{2} w' \Sigma w - \gamma w' \text{diag}(l) w \quad (2a)$$

$$\text{s.t. } \sqrt{w' \Sigma w} = \hat{\sigma}_p \quad (2b)$$

$$0 \leq w \leq 1 \quad (2c)$$

$$Aw \leq b \quad (2d)$$

$$Aeq \cdot w = beq \quad (2e)$$

Here, γ is the illiquidity tolerance parameter and $\text{diag}(l)$ is the square matrix, with the diagonal being the liquidity score vector. The objective function (2a) has an additional penalty on portfolio illiquidity compared with traditional mean-variance optimization.

Our portfolio construction framework has the flexibility to handle different liquidity inputs by users and incorporate varying constraints (on an individual asset level or as group constraints by asset type or liquidity profile). In the discussions below, we intentionally keep the setup relatively unconstrained to highlight these dynamics.

The optimization results and portfolio analytics can be found in **EXHIBIT 6**. We set the portfolio risk target (annualized) to be 7%⁹ for both optimizations to represent a typical moderate

risk portfolio. We also construct a reference portfolio for comparison. Within the reference portfolio, we fixed the relative weights among the alternative assets to ensure a diversified basket of alternatives based on qualitative considerations.¹⁰ When compared with the reference portfolio, we find that utilizing liquidity scores provides comparable expected portfolio risk and return but with improved liquidity profiles. There are pros and cons for each of the optimizations.

For approach (a):

- Applying portfolio-level liquidity constraints helps control the total weighting of alternatives and portfolio liquidity. However, the optimized portfolio often hits so-called corner solutions - where the “best” solution is achieved based on brute-force boundary conditions due to a reduced feasible region.¹¹
- The asset inclusion or exclusion in the optimized portfolio usually follows a preference order based on the risk-return profile, diversification benefits and liquidity score of individual assets.

¹⁰ The alternative asset mix and weights are constructed by J.P. Morgan Asset Management internal teams for a balanced alternative allocation, using a variety of lenses, such as mean-variance efficiency, risk parity, market size of the assets, manager view, etc., in both a qualitative and a quantitative manner.

¹¹ A feasible region, in an optimization, is a set of candidate solutions to the optimization problem that satisfy the constraints. A feasible region tends to be reduced with an increased number of constraints.

⁹ The 7% figure is based on a 50/50 stock-bond mix, utilizing the 2021 LTCMAS.

- Calibration of the liquidity threshold is arbitrary, and results are sensitive to the choice of this threshold: If the threshold is too relaxed, the optimized portfolio will overload with the inclusion of alternatives; if too tight, the optimized portfolio will overload with the inclusion of credit.
- Sharpe ratio might be compromised slightly.

For approach (b):

- Applying a liquidity penalty in the objective function (2a) helps to control total alternatives weights and portfolio liquidity.
- Penalties on illiquidity are applied across all assets at the same time in the optimization objective; therefore, there is no reduced feasible region problem. As a result, optimized results are more diverse and intuitive.
- Optimization is not overly sensitive to the illiquidity tolerance parameter value.
- Sharpe ratio is comparable to the reference portfolio's.

Many aspects of our analysis can be extended and would benefit from further research. In particular, a more precise and economical measure would improve the usability of the framework and lead to better risk-return-liquidity efficient portfolios.

Despite its simplicity, the framework demonstrates the importance of incorporating key risk aspects into portfolio designs over and beyond the two dimensions of return and volatility. Liquidity is one of the key characteristics on which we believe investors should maintain a keen focus when expanding their investment opportunity set. Our attempt to provide a generalized framework that systematically takes extended liquidity characteristics into account helps preserve portfolio efficiency. Like any quantitative framework, the proposed mean-variance-liquidity approach does not substitute for expertise in asset allocation and the need to adapt to wider characteristics than return, volatility and liquidity. This will likely be of increasing importance as the world recovers from the pandemic and moves beyond the disruption that has ensued, and as investors embrace new opportunities outside of traditional markets.

Portfolio optimizations incorporating liquidity considerations provide risk-return profiles comparable to a reference portfolio's, but with better-controlled liquidity profiles

EXHIBIT 6: PORTFOLIO COMPARISON: REFERENCE, LIQUIDITY CONSTRAINED AND LIQUIDITY PENALTY

Group		Reference portfolio	Liquidity constraint	Liquidity penalty
Portfolio statistics	Portfolio risk target	7.0%	7.0%	7.0%
	Portfolio expected return	5.1%	4.9%	5.1%
	Portfolio Sharpe ratio	0.57	0.54	0.57
	Portfolio liquidity score	2.57	1.55	2.14
Asset allocation (%)	U.S. intermediate Treasuries	18.1%	26.1%	23.8%
	U.S. long Treasuries	14.2%	10.7%	10.9%
	U.S. inv grade corporate bonds	0.0%	0.0%	0.0%
	U.S. high yield bonds	0.0%	0.0%	4.0%
	Emerging markets sovereign debt	12.7%	0.0%	4.5%
	U.S. large cap	6.3%	8.3%	6.8%
	EAFE equity	17.5%	23.3%	18.6%
	Emerging markets equity	1.3%	1.7%	1.7%
	Private equity	6.0%	0.0%	3.2%
	U.S. core real estate	3.0%	19.2%	6.1%
	European ex-UK core real estate	1.8%	8.4%	5.3%
	Asia-Pacific core real estate	1.2%	0.0%	5.0%
	Global core infrastructure	6.0%	2.2%	5.1%
Diversified hedge funds	3.0%	0.0%	0.0%	
Direct lending	9.0%	0.0%	4.9%	
Total allocation (%)	Total fixed income	45.0%	36.8%	43.2%
	Total equities	25.0%	33.3%	27.2%
	Total alternatives	30.0%	29.9%	29.7%

Source: J.P. Morgan Asset Management; data as of September 30, 2020. For illustrative purposes only.

Actionable insights for diversifying portfolios amid extended valuations

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IN BRIEF

- Today's market conditions risk driving investors to extremes in portfolio allocation. Duration appears to have little place in long-term strategy; extended credit is squeezing out high quality credit; the U.S. equity market struggles to earn its place in portfolios; and alternatives are moving from optional to essential roles.
- Diversification - thoughtfully conceived, carefully modulated - is especially important in an environment of extended market valuations. Our portfolio optimization framework highlights the long-term value of assets facing near-term valuation challenges.
- In time, we expect duration to return to its core protection role in portfolios. Extended credit brings greater event and tail risks. Underweighting U.S. equities has been problematic during periods of U.S. exceptionalism and strong U.S. equity performance. And alternatives present risks not encountered in traditional assets.
- Our analytic framework for optimizing portfolios supports using high quality credit in place of sovereign bonds and diversifying portfolios by adding extended credit and real assets. Within equity, emerging markets and private equity are preferred. Managing currency dynamics is key.
- Rapid market moves present a particular challenge, as investors experienced the fastest-ever stock market sell-off and rebound in 2020. Separating short-term price impact from long-term investment strategy will be critical for investment success.
- Governance structures need to evolve in this changing world. Investors can build deeper relationships with their partners and providers to ensure a fully integrated approach to managing risk, capturing market opportunities and accessing manager capacity and skill.



How can investors connect big investment themes to specific portfolio moves?

In this paper, we examine how the key themes of this year’s Long-Term Capital Market Assumptions (LTCMAs) – notably, the power of aligned fiscal and monetary stimulus, the effects of elevated debt, the changing role of alternatives – might play out in investor portfolios. We look across different investor types and risk tolerances to highlight assets and strategies that could benefit from these themes. From various angles, we address the basic question that underlies all of our LTCMA work: How can an investor harvest an acceptable return without an unacceptable increase in portfolio risk? Among the particular challenges we explore:

- Achieving long-term return goals despite today’s high valuations
- Diversifying effectively in markets where policy intervention may have served to systematically raise correlations
- Finding alternative safe haven assets to provide portfolio ballast in an ultra-low yield environment
- Building long-term inflation protection into portfolios

These challenges will continue to push investors away from traditional safe havens (in particular, sovereign bonds and the U.S. dollar) and toward assets that increase exposure to risks that are not easily measurable by volatility alone. For example, most investors identify private market assets and extended credit as attractive even as real assets bring liquidity risk and extended credit brings higher tail risks.

Investors must also grapple with the sheer speed at which markets can change, as demonstrated by this year’s swift market sell-off and rebound. More than ever, portfolio strategies must distinguish between short-term, rapid price action and long-term, slower-moving fundamentals and structural drivers.

In the following pages, we present our first findings on the portfolio implications of this year’s LTCMAs, starting with a traditional mean-variance (MV) framework.¹ An overview of key asset allocation themes from this year’s assumptions leads us to a strong preference for non-U.S. equities, extended credit and alternative assets. At the end of the day, our analysis supports using high quality credit in place of sovereign bonds and diversifying portfolios by adding extended credit and real assets (**EXHIBIT 1**).

INGREDIENTS OF AN EFFICIENT PORTFOLIO

When we look to define an efficient, optimized portfolio, we start by using standard MV optimization tools to illustrate trade-offs among various key asset classes. We first consider public market assets only (**EXHIBIT 2**), before incorporating alternatives and liability-relative perspectives.

Across the risk spectrum and across regions, our MV framework displays a core preference for:

- Shorter-duration government bonds within fixed income for low to medium risk portfolios
- Extended credit assets, in particular emerging market debt (EMD)
- Non-U.S. equity markets as compared with the U.S. equity market

To ensure sufficient diversification, a key ingredient of robust outcomes, we impose minimal exposures within major asset classes such as fixed income and equities. We believe that core government bond duration can still play a role in

¹ Mean-variance is used as a first step in our analysis, providing an early read on the implications of our assumptions. Mean-variance optimization is useful in calculating initial trade-offs and incorporating a range of portfolio constraints, but it is not sufficient on its own as a tool for portfolio construction. Further analysis is required for risks not captured by mean-variance, or indeed by any quantitative metric.

In considering our LTCMA themes, we find a reduced role for core duration and U.S. equities, and a more prominent role for extended credit and alternatives

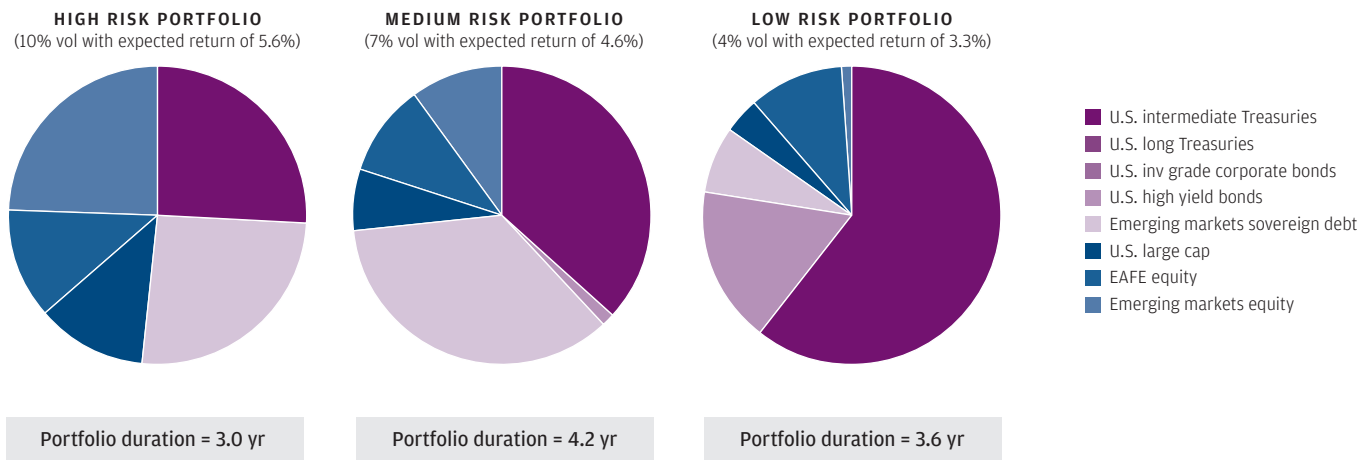
EXHIBIT 1: MAIN ASSET GROUPS BY INVESTMENT OPPORTUNITY SETS AND INVESTOR BASE

	Public assets-only portfolios	Portfolios with alternatives	Liability-relative portfolios
Core fixed income	Little duration – preference for shorter-duration assets with minimal allocation to core rates	Duration requirements sourced from core duration assets as broader fixed income is replaced with alternatives	Duration has an amplified role; it is largely sourced from high quality credit alongside or in preference to sovereign debt
Credit	Strong preference for extended credit such as high yield and emerging market debt	Weakened preference for extended credit, with preference for risk-taking moving to alternatives	Weakened preference for core and extended credit, with preference for risk-taking moving to alternatives
Equity	Strong preference for non-U.S. equity Emerging market equity is attractive	No change	No change

Source: J.P. Morgan Asset Management; data as of September 30, 2020. For illustrative purposes only.

Portfolio optimization highlights today’s extended valuations, which push allocations toward short-duration bonds, credit and international equities

EXHIBIT 2: ASSET ALLOCATION OF HIGH, MEDIUM AND LOW RISK PORTFOLIOS USING TRADITIONAL MEAN-VARIANCE FRAMEWORK FOR PUBLIC MARKET ASSETS



Source: J.P. Morgan Asset Management; data as of September 30, 2020. For illustrative purposes only.

Note: We define a high risk portfolio as a risk equivalent of a blended portfolio mix of 70% equity and 30% bond; a medium risk portfolio as a risk equivalent of 50% equity and 50% bond; a more conservative low risk portfolio as a risk equivalent of 30% equity and 70% bond. Portfolio duration is the weighted average duration of the total portfolio, including non-fixed income assets, where we assigned zero duration. The contribution breakdown of the total portfolio duration between core government bonds and credit is as follows: High risk portfolio: 1.0/2.0 years; medium risk portfolio: 1.4/2.8 years; low risk portfolio: 2.4/1.2 years. We see a decline in core bond duration as the risk profile increases, while credit, especially emerging market debt, pushes up the total portfolio duration.

protecting portfolios during periods of turbulence. The effectiveness of duration in hedging against risk assets is likely to evolve over our LTCMA horizon. In the near term, yields that are close to the effective lower bound greatly diminish the ability of bonds to provide ballast in diversified portfolios. But should yields rise, as we expect they will in several years’ time, the hedging benefit of holding duration in diversified portfolios will be restored at the same time as bond valuations improve. We also include a minimum relative allocation to U.S. equities, given the size and quality of this market.²

Because the depreciation of the dollar presents a headwind for non-U.S. investors, our optimizer exhibits a preference to hedge U.S. equities.

Adding alternatives

Selective alternative assets are some of the most attractive assets in our LTCMA assumption set. Global core real assets are among the highest risk-adjusted return assets. Private equity is one of only a handful of assets with close to an 8% expected return. Further dispersion in manager performance among most alternative assets is the widest of any asset class, which implies financial and value-added alpha potential.

To address the increasingly essential role of alternative assets in portfolios,³ a key theme in this year’s LTCMAs, we bolster the standard MV optimization tools. We use new techniques to incorporate some of the specific risks associated with alternatives - in particular, illiquidity, which we address with a liquidity penalty function.⁴ The application of the liquidity penalty helps balance the overall portfolio, with less concentrated positions in any single asset class across both public and private markets.

² We impose constraints requiring minimum regional exposures in equities (e.g., the minimum U.S. equities weight is 25% of the total equity weight) and minimum relative allocation in government bonds within total fixed income exposure (e.g., the minimum core government bonds allocation is 50% of total fixed income). For further details on the constraints applied, see Grace Koo et al., “After near-term choppiness, long-run forecast remains stable,” *2021 Long-Term Capital Market Assumptions*, Exhibit 5.

³ See Pulkit Sharma et al., “Alternatives: From optional to essential,” *2021 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, November 2020.

⁴ Our liquidity penalty function formalizes liquidity considerations in strategic asset allocation design and mitigates the issue of corner solutions to provide a more diversified portfolio. See Grace Koo et al.

Our framework favors alternative assets as a source of high quality risk-adjusted returns and diversification to traditional assets. Our analysis shows a preference for holding a broad basket of alternative assets, including core real assets, along with direct lending and private equity (EXHIBIT 3).

How might the presence of alternatives reshape the public market portfolio? In our analysis, the strong preference for non-U.S. equities persists, along with the currency dynamics described earlier. However, in contrast to public asset-only portfolios, allocations to alternatives are funded heavily from fixed income and bring equity allocations to their lower bound. In general, extended credit positions are reduced in favor of core real assets, or in some cases direct lending, within alternatives. Within the remaining core bond allocations, duration preference continues to favor short duration for low to medium risk portfolios. For higher risk portfolios, long duration provides a capital-efficient ballast to a sizable diversified basket of alternative assets along with equities.

Investors must recognize the term nature of some of these alternative assets. For example, direct lending has a holding period between three and five years, and the return delivered is subject to roll risk. Private equity investors need to hold through the entire investment cycle (10 years-plus) to capture the forecasted return. The distribution of return and illiquidity metrics can be extensive in alternatives, leading to a wide range of outcomes around our median alternative forecasts. Investors allocating to alternative need to address illiquidity, identify asset manager skill and handle fee budgets.

Asset-liability analysis

Repeating this analysis from an asset-liability perspective leads to similar results. The mark-to-market of the liabilities amplifies the risk management role of core duration assets, with a preference to source duration from high quality credit alongside or in place of sovereign debt. However, when we adjust for the inherently higher volatility when measured relative to long-duration liabilities rather than on an asset-only basis, we observe similar results across both asset-only and liability-relative portfolios.

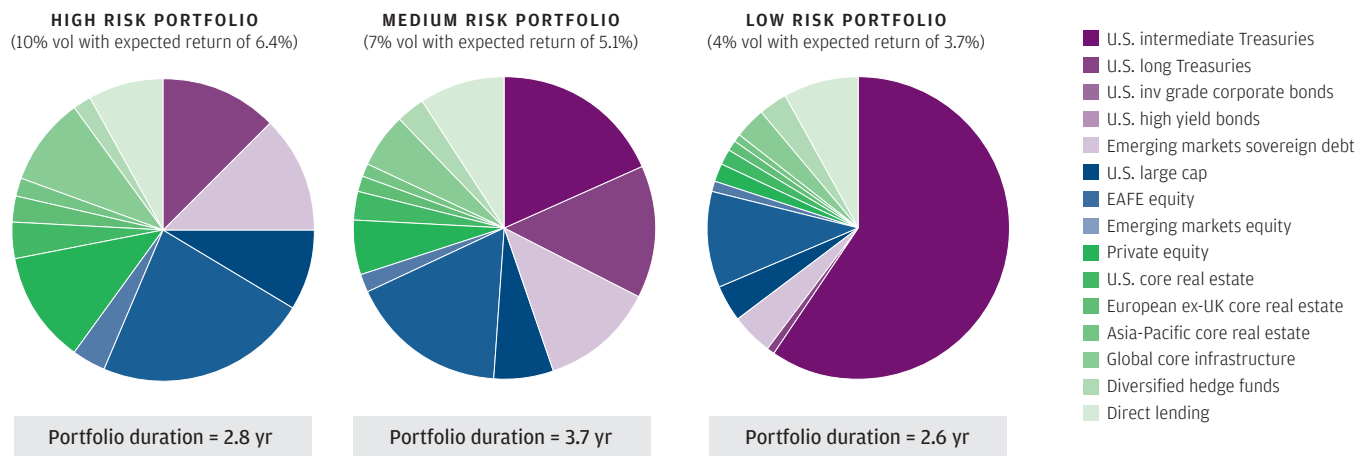
There are also some nuances in the currency hedging. In low to medium risk portfolios, unhedged U.S. equity is preferred despite the lower expected return. This is because the safe haven characteristics provided by dollar exposure are more highly valued in the asset-liability space, given the correlation structure when the liabilities are taken into account.

INVESTING WHEN MARKETS ARE IN EXTREMES: THE IMPACT OF THE STARTING CONDITION

Our framework, from both an asset-only and an asset-liability perspective, takes into account the significant effect of today's extreme valuations, which could drive investors to extremes in asset allocation. The impact of extreme valuations became clear when we ran a separate set of optimizations using equilibrium assumptions. This erases the impact of initial conditions such as valuations normalization for equities and the path of rates normalization for fixed income - all to help eliminate the cyclical component of returns.

Adding alternatives helps improve expected returns, with allocations funded heavily from fixed income

EXHIBIT 3: ASSET ALLOCATION OF HIGH, MEDIUM AND LOW RISK PORTFOLIOS USING A MEAN-VARIANCE-LIQUIDITY FRAMEWORK FOR ALL ASSETS, INCLUDING ALTERNATIVES



Source: J.P. Morgan Asset Management; data as of September 30, 2020. For illustrative purposes only.

Note: We define a high risk portfolio as a risk equivalent of a blended portfolio mix of 70% equity and 30% bond; a medium risk portfolio as a risk equivalent of 50% equity and 50% bond; a more conservative low risk portfolio as a risk equivalent of 30% equity and 70% bond. Portfolio duration is the weighted average duration of the total portfolio, including non-fixed income assets, where we assigned zero duration. The contribution breakdown of the total portfolio duration between core government bonds and credit is as follows: High risk portfolio: 2.1/0.7 years; medium risk portfolio: 3.1/0.6 years; low risk portfolio: 2.4/0.2 years.

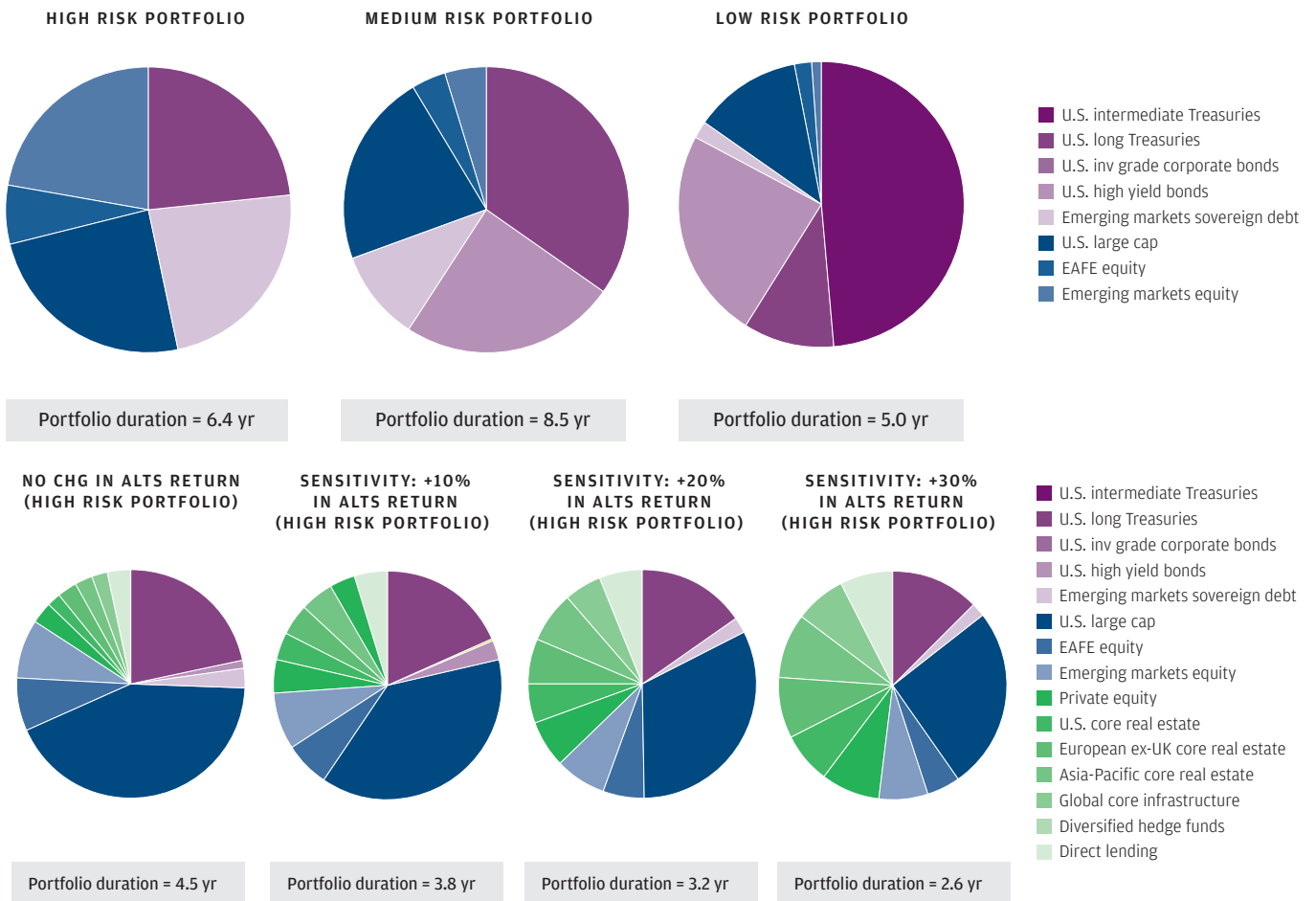
Using these equilibrium assumptions and sensitivity analysis, efficient portfolios generally become more balanced and diversified, as shown in **EXHIBIT 4**. We highlight these elements:

- **RATES:** Duration and investment grade credit risk come back into portfolios. The duration of the portfolio increases as a result of extending core government holdings from the intermediate part of the curve to include longer-maturity government bonds; this is particularly apparent in our U.S. portfolios. Investment grade credit becomes a core allocation in non-U.S. portfolios in particular.
- **EQUITIES:** The preference for non-U.S. equities over U.S. equities disappears as valuation headwinds within U.S. equity abate.

- **CURRENCIES:** Currency dynamics further promote greater balance across regional equity exposures as currency impacts normalize following USD depreciation. For EUR- and GBP-based investors, currency hedging is no longer preferred: No further return leakage from USD depreciation is expected, and the safe haven characteristics of retaining exposure to the dollar dominate.
- **ALTERNATIVES:** When the expected return for real assets is set at the low end of our sensitivity range, we see generally much lower allocations to alternatives, with core real assets replaced largely by bonds. When the return is set at the high end of our sensitivity range, alternative allocations are retained or increased at the expense of fixed income - with core real assets generally the preferred allocation, followed by private equity. Investors with

Starting conditions matter: Our equilibrium analysis points to a more diversified portfolio when extreme valuations are eliminated

EXHIBIT 4: PORTFOLIO OPTIMIZATION RESULTS BASED ON EQUILIBRIUM ASSUMPTIONS



Source: J.P. Morgan Asset Management; data as of September 30, 2020. For illustrative purposes only.

Note: We define a high risk portfolio as a risk equivalent of a blended portfolio mix of 70% equity and 30% bond; a medium risk portfolio as a risk equivalent of 50% equity and 50% bond; and a more conservative low risk portfolio as a risk equivalent of 30% equity and 70% bond. The breakdown between core duration/credit duration is as follows for public assets-only portfolios: High risk portfolio: 4.6/1.8 years; medium risk portfolio: 6.8/1.7 years; low risk portfolio: 3.9/1.1 years. The breakdown between core duration/credit duration is as follows for the bottom panel: No change 4.2/0.3 years; +10% sensitivity 3.6/0.2 years; +20% sensitivity 3.0/0.2 years; +30% sensitivity 2.5/0.1 years.

distribution needs will find the risk profile of a real asset strategy particularly attractive, given that a very high percentage of the strategy’s returns are stable income.⁵

STARTING FROM CURRENT PORTFOLIOS: A HEAT MAP OF ASSET PREFERENCE

To take into account investor constraints and the incremental nature of how portfolios evolve, we conduct a substitution analysis on a range of sample investor portfolios with different objectives and constraints, and across different regions. This allows us to determine the marginal benefit of adding individual asset classes (**EXHIBIT 5**).

⁵ For core real estate and global core infrastructure, up to 80% of the return comes from contractual coupons, lease payments and cash flows.

For each sample investor, we take a 5% “slice” of the total portfolio and invest that 5% in a single asset class. We then compare the portfolio statistics for the new portfolio with those of the original portfolio to test whether and how the portfolio efficiency has been improved.

What do we find? Adding extended credit and real assets improves portfolio efficiency across most investor bases.

Again, we highlight these elements:

RATES: Overall, adding government bonds reduces the efficiency of most portfolios, as the return penalty is disproportionate to the reduction in risk. The exception: Pension plans that mark liabilities to market and investors with very little duration in their portfolios may still see some benefit from adding longer-dated bonds, despite the return headwinds.

To illustrate the marginal change in portfolio efficiency, we substitute a 5% “slice” of a typical portfolio with an allocation to a single asset class

EXHIBIT 5: ASSET PREFERENCE BY INVESTOR BASE. RED REPRESENTS A DETRIMENT TO PORTFOLIO EFFICIENCY, AND GREEN REPRESENTS AN IMPROVEMENT TO PORTFOLIO EFFICIENCY

■ Detriment to portfolio efficiency ■ Improvement to portfolio efficiency

		USD				GBP			EUR*		
		Corporate pension plan	Public pension plan	Endowment > USD 1 billion	Individual	Corporate pension plan	Public pension plan	Individual	Industry-wide pension plan	Corporate pension plan	Individual
Bonds	Domestic sovereign	Red	Red	Red	Red	Red	Red	Red	Green	Green	Red
	Domestic long sovereign	Green	Green	Green	Green	Red	Red	Red	Green	Green	Red
	World government bonds	Red	Red	Red	Red	Red	Red	Red	Green	Green	Red
	Domestic IG credit	Green	Green	Green	Green	Red	Red	Red	Green	Green	Red
	Global IG credit	Green	Green	Green	Green	Red	Red	Red	Green	Green	Red
	Global high yield	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Leveraged loans	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Emerging markets sovereign debt	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Direct lending	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Equity	Domestic large cap	Green	Red	Red	Red	Green	Green	Green	Green	Red	Green
	Developed / EAFE	Green	Green	Red	Green	Red	Red	Red	Red	Red	Green
	Developed / EAFE hedged	Green	Green	Green	Green	Red	Red	Red	Red	Red	Green
	Emerging markets	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Private equity	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Real assets	U.S. core real estate	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	European ex-UK core real estate	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Asia-Pacific core real estate	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Global core infrastructure	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Hedge funds	Diversified	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
	Macro hedge	Red	Red	Red	Red	Red	Red	Red	Green	Green	Red

Source: J.P. Morgan Asset Management; data as of September 30, 2020. For illustrative purposes only. Exhibit includes selected asset classes that are in common use. The list is meant to be representative and not exhaustive.

* For this illustration, we used a Dutch industry-wide pension plan and a Dutch corporate pension plan as the representative portfolio.

CORE CREDIT is often a more efficient vehicle to capture duration. Compared with government bonds, core credit offers less reduction in portfolio volatility, but its return penalty is more than commensurately lower.

EXTENDED CREDIT is generally attractive in particular leveraged loans and emerging market debt. Higher quality EMD sovereign bonds, hedged back to the appropriate currency, are another source of duration.

In **EQUITIES**, adding developed market equities is attractive for U.S. investors. However, for non-U.S. investors currency effects compound valuation effects to make additions to equity allocations unattractive. Hedging currency exposure can mitigate some of this effect but, as discussed, it is associated with higher volatility. In adding emerging markets and private equity, the additional risk relative to existing portfolios is expected to be appropriately rewarded.

REAL ASSETS improve portfolio efficiency overall. Core real assets globally, and infrastructure in particular, offer a strong diversification benefit with little detriment to return. Even for corporate marked-to-market pension plans, the diversification benefit is enough to offset the reduction in liability-hedging. Adding real assets with income streams that tend to rise with inflation is also a key source of inflation protection.

HEDGE FUNDS in general look marginal in terms of improving efficiency - but, of course, this is at the median manager level. Investors confident in their manager selection skills could capture returns in the top end of the manager dispersion range, driving further gains in portfolio efficiency.

PORTFOLIO CONSTRUCTION AND GOVERNANCE STRUCTURES

In summary, our analysis supports using high quality credit in place of sovereign bonds and diversifying portfolios by adding extended credit and real assets. Within equity risk, we recommend weighting toward emerging and private equity. EAFE equities should form a larger part of a U.S. investor's portfolio, while non-U.S. investors will need to reconcile the sheer size of the U.S. equity opportunity set with current high valuations when sizing their allocation. And in all portfolios, managing currency dynamics is key.

The speed of the market response to COVID-19 underscores the need for investors to be nimble in their responses to a changed environment - whether in rebalancing, taking advantage of pricing dislocations or adopting tactical positions. But this year's unusual market moves also highlight the importance of separating short-term rapid price action from long-term strategic thinking. Our framework separates the impact of a current short-term impact (extended valuations) from long-term strategy by comparing current and equilibrium assumptions.

In the face of the investing challenges we have discussed, governance structures would need to evolve. In our view, responses to rapid market movements should be increasingly delegated to actors that can implement changes in real time. It is no longer feasible to entirely separate the tactical and strategic dimensions of asset allocation (if it ever was). Investors will need to build deeper relationships with their partners and providers to ensure a fully integrated approach to managing risk, capturing market opportunities and accessing manager capacity and skill, especially in alternatives.

III Assumptions matrices

HOW TO USE THE NUMBERS

Our assumptions can be used to:

- Develop or review a strategic asset allocation
- Understand the risk and return trade-offs across and within asset classes and regions
- Assess the risk characteristics of a strategic asset allocation
- Review relative value allocation decisions

The assumptions are not designed to inform short-term tactical allocation decisions. Our assumptions process is carefully calibrated and constructed to aid investors with strategic asset allocation or policy-level decisions over a 10- to 15-year investment horizon.

		COMPOUND RETURN 2020 (%)				ANNUALIZED VOLATILITY (%)				ARITHMETIC RETURN 2021 (%)				COMPOUND RETURN 2021 (%)							
		U.S. Inflation	U.S. Cash	U.S. Intermediate Treasuries	U.S. Long Treasuries	U.S. Inflation	U.S. Cash	U.S. Intermediate Treasuries	U.S. Long Treasuries	U.S. Inflation	U.S. Cash	U.S. Intermediate Treasuries	U.S. Long Treasuries	U.S. Inflation	U.S. Cash	U.S. Intermediate Treasuries	U.S. Long Treasuries				
FIXED INCOME	U.S. Inflation	2.00	2.01	1.40	2.00	1.00				1.00				2.00	2.01	1.40	2.00	1.00			
	U.S. Cash	1.10	1.10	0.44	1.90	0.09	1.00			1.00				1.10	1.10	0.44	1.90	0.09	1.00		
	U.S. Intermediate Treasuries	1.50	1.54	2.83	2.70	-0.19	0.22	1.00		1.00				1.50	1.54	2.83	2.70	-0.19	0.22	1.00	
	U.S. Long Treasuries	0.40	1.03	11.38	1.60	-0.16	0.07	0.81	1.00	1.00				0.40	1.03	11.38	1.60	-0.16	0.07	0.81	1.00
	TIPS	1.50	1.64	5.29	2.70	0.09	0.08	0.58	0.55	1.00				1.50	1.64	5.29	2.70	0.09	0.08	0.58	0.55
	U.S. Aggregate Bonds	2.10	2.16	3.43	3.10	-0.16	0.10	0.79	0.80	0.74	1.00			2.10	2.16	3.43	3.10	-0.16	0.10	0.79	0.80
	U.S. Securitized	2.40	2.43	2.37	3.30	-0.11	0.15	0.74	0.68	0.67	0.89	1.00		2.40	2.43	2.37	3.30	-0.11	0.15	0.74	0.68
	U.S. Short Duration Government/Credit	1.70	1.71	1.50	2.80	-0.18	0.36	0.77	0.48	0.60	0.76	0.68	1.00	1.70	1.71	1.50	2.80	-0.18	0.36	0.77	0.48
	U.S. Long Duration Government/Credit	1.60	2.02	9.24	2.50	-0.17	0.01	0.66	0.87	0.64	0.92	0.72	0.55	1.60	2.02	9.24	2.50	-0.17	0.01	0.66	0.87
	U.S. Inv Grade Corporate Bonds	2.50	2.69	6.22	3.40	-0.09	-0.02	0.36	0.46	0.65	0.80	0.63	0.56	2.50	2.69	6.22	3.40	-0.09	-0.02	0.36	0.46
	U.S. Long Corporate Bonds	2.10	2.60	10.21	3.00	-0.15	-0.04	0.35	0.55	0.59	0.81	0.59	0.48	2.10	2.60	10.21	3.00	-0.15	-0.04	0.35	0.55
	U.S. High Yield Bonds	4.80	5.13	8.33	5.20	0.11	-0.11	-0.29	-0.25	0.33	0.18	0.15	0.11	4.80	5.13	8.33	5.20	0.11	-0.11	-0.29	-0.25
	U.S. Leveraged Loans	5.10	5.40	7.91	5.00	0.28	-0.14	-0.52	-0.42	0.11	-0.06	-0.09	-0.13	5.10	5.40	7.91	5.00	0.28	-0.14	-0.52	-0.42
	World Government Bonds hedged	1.40	1.45	3.03	2.10	-0.24	0.11	0.82	0.85	0.52	0.82	0.69	0.61	1.40	1.45	3.03	2.10	-0.24	0.11	0.82	0.85
	World Government Bonds	1.80	1.99	6.16	2.50	-0.09	0.10	0.64	0.49	0.59	0.69	0.60	0.67	1.80	1.99	6.16	2.50	-0.09	0.10	0.64	0.49
	World ex-U.S. Government Bonds hedged	1.30	1.35	3.05	1.80	-0.26	0.06	0.65	0.69	0.42	0.73	0.57	0.51	1.30	1.35	3.05	1.80	-0.26	0.06	0.65	0.69
	World ex-U.S. Government Bonds	1.80	2.09	7.77	2.40	-0.08	0.07	0.50	0.35	0.52	0.60	0.50	0.51	1.80	2.09	7.77	2.40	-0.08	0.07	0.50	0.35
	Emerging Markets Sovereign Debt	5.20	5.57	8.82	5.10	0.05	-0.03	0.12	0.14	0.56	0.53	0.47	0.36	5.20	5.57	8.82	5.10	0.05	-0.03	0.12	0.14
	Emerging Markets Local Currency Debt	5.20	5.90	12.27	5.90	0.04	0.08	0.06	-0.03	0.38	0.35	0.29	0.33	5.20	5.90	12.27	5.90	0.04	0.08	0.06	-0.03
	Emerging Markets Corporate Bonds	4.70	5.04	8.52	4.90	0.13	-0.05	0.01	0.03	0.52	0.44	0.38	0.33	4.70	5.04	8.52	4.90	0.13	-0.05	0.01	0.03
U.S. Muni 1-15 Yr Blend	1.90	1.95	3.28	2.50	-0.08	0.01	0.40	0.40	0.47	0.62	0.57	0.42	1.90	1.95	3.28	2.50	-0.08	0.01	0.40	0.40	
U.S. Muni High Yield	4.60	4.88	7.68	4.00	0.34	-0.06	-0.04	0.10	0.36	0.24	0.22	0.00	4.60	4.88	7.68	4.00	0.34	-0.06	-0.04	0.10	
EQUITIES	U.S. Large Cap	4.10	5.13	14.80	5.60	0.02	-0.07	-0.35	-0.33	0.09	0.00	-0.03	-0.07	4.10	5.13	14.80	5.60	0.02	-0.07	-0.35	-0.33
	U.S. Mid Cap	4.40	5.73	16.93	5.90	0.05	-0.08	-0.37	-0.33	0.12	0.01	-0.02	-0.07	4.40	5.73	16.93	5.90	0.05	-0.08	-0.37	-0.33
	U.S. Small Cap	4.60	6.33	19.44	6.50	0.02	-0.09	-0.39	-0.37	0.03	-0.07	-0.09	-0.12	4.60	6.33	19.44	6.50	0.02	-0.09	-0.39	-0.37
	Euro Area Large Cap	6.60	8.65	21.42	7.70	0.03	0.00	-0.27	-0.30	0.14	0.07	0.05	0.06	6.60	8.65	21.42	7.70	0.03	0.00	-0.27	-0.30
	Japanese Equity	6.50	7.50	14.76	7.20	-0.01	-0.10	-0.30	-0.24	0.09	0.04	-0.01	-0.01	6.50	7.50	14.76	7.20	-0.01	-0.10	-0.30	-0.24
	Hong Kong Equity	7.60	9.44	20.30	6.30	0.00	0.01	-0.22	-0.22	0.20	0.14	0.10	0.12	7.60	9.44	20.30	6.30	0.00	0.01	-0.22	-0.22
	UK Large Cap	7.50	8.83	17.20	7.60	0.08	-0.03	-0.36	-0.36	0.13	0.01	0.00	-0.02	7.50	8.83	17.20	7.60	0.08	-0.03	-0.36	-0.36
	EAFE Equity	6.50	7.80	16.92	7.20	0.04	-0.03	-0.30	-0.31	0.16	0.07	0.04	0.04	6.50	7.80	16.92	7.20	0.04	-0.03	-0.30	-0.31
	Chinese Domestic Equity	7.50	11.43	30.39	10.10	-0.03	0.17	-0.20	-0.19	0.04	0.01	0.01	0.02	7.50	11.43	30.39	10.10	-0.03	0.17	-0.20	-0.19
	Emerging Markets Equity	7.20	9.19	21.14	9.20	0.06	0.04	-0.25	-0.25	0.25	0.12	0.08	0.11	7.20	9.19	21.14	9.20	0.06	0.04	-0.25	-0.25
	AC Asia ex-Japan Equity	7.10	9.00	20.62	9.20	0.01	0.03	-0.22	-0.21	0.24	0.14	0.10	0.12	7.10	9.00	20.62	9.20	0.01	0.03	-0.22	-0.21
	AC World Equity	5.10	6.25	15.76	6.50	0.03	-0.03	-0.33	-0.33	0.15	0.05	0.01	0.01	5.10	6.25	15.76	6.50	0.03	-0.03	-0.33	-0.33
	U.S. Equity Value Factor	6.20	7.42	16.36	7.20	0.00	-0.09	-0.37	-0.36	0.06	-0.03	-0.04	-0.09	6.20	7.42	16.36	7.20	0.00	-0.09	-0.37	-0.36
	U.S. Equity Momentum Factor	4.10	5.16	15.03	5.40	0.06	-0.07	-0.35	-0.31	0.14	0.02	-0.02	-0.07	4.10	5.16	15.03	5.40	0.06	-0.07	-0.35	-0.31
	U.S. Equity Quality Factor	4.30	5.15	13.48	5.60	0.02	-0.07	-0.33	-0.31	0.11	0.02	-0.01	-0.06	4.30	5.15	13.48	5.60	0.02	-0.07	-0.33	-0.31
	U.S. Equity Minimum Volatility Factor	4.80	5.47	11.95	5.80	0.00	-0.07	-0.26	-0.20	0.14	0.10	0.07	-0.03	4.80	5.47	11.95	5.80	0.00	-0.07	-0.26	-0.20
	U.S. Equity Dividend Yield Factor	5.50	6.53	14.90	6.90	0.01	-0.08	-0.30	-0.26	0.14	0.08	0.05	-0.03	5.50	6.53	14.90	6.90	0.01	-0.08	-0.30	-0.26
	U.S. Equity Diversified Factor	5.60	6.48	13.76	6.30	0.04	-0.08	-0.34	-0.30	0.12	0.02	0.00	-0.07	5.60	6.48	13.76	6.30	0.04	-0.08	-0.34	-0.30
	U.S. Convertible Bond	5.00	5.60	11.28	4.60	0.06	-0.09	-0.32	-0.29	0.21	0.10	0.06	0.03	5.00	5.60	11.28	4.60	0.06	-0.09	-0.32	-0.29
	Global Convertible Bond hedged	4.60	5.06	9.91	4.80	0.02	-0.06	-0.34	-0.30	0.19	0.11	0.06	0.05	4.60	5.06	9.91	4.80	0.02	-0.06	-0.34	-0.30
Global Credit Sensitive Convertible hedged	4.20	4.47	7.52	4.40	0.13	-0.04	-0.17	-0.21	0.05	0.03	-0.10	-0.02	4.20	4.47	7.52	4.40	0.13	-0.04	-0.17	-0.21	
ALTERNATIVES	Private Equity	7.80	9.36	18.67	8.80	0.20	0.07	-0.48	-0.54	0.05	-0.22	-0.16	-0.13	7.80	9.36	18.67	8.80	0.20	0.07	-0.48	-0.54
	U.S. Core Real Estate	5.90	6.46	10.94	5.80	0.33	-0.08	-0.39	-0.32	0.02	-0.20	-0.14	-0.27	5.90	6.46	10.94	5.80	0.33	-0.08	-0.39	-0.32
	U.S. Value-Added Real Estate	8.10	9.48	17.54	7.70	0.33	-0.08	-0.39	-0.32	0.02	-0.20	-0.14	-0.27	8.10	9.48	17.54	7.70	0.33	-0.08	-0.39	-0.32
	European ex-UK Core Real Estate	6.40	7.19	13.10	6.90	0.29	0.02	-0.52	-0.53	0.04	-0.30	-0.25	-0.19	6.40	7.19	13.10	6.90	0.29	0.02	-0.52	-0.53
	Asia Pacific Core Real Estate	6.60	7.40	13.16	6.50	0.30	-0.02	-0.32	-0.26	0.20	-0.01	0.00	-0.12	6.60	7.40	13.16	6.50	0.30	-0.02	-0.32	-0.26
	U.S. REITs	6.50	7.58	15.34	6.00	-0.02	-0.05	-0.05	0.02	0.25	0.28	0.25	0.08	6.50	7.58	15.34	6.00	-0.02	-0.05	-0.05	0.02
	Global Core Infrastructure	6.10	6.64	10.80	6.00	0.21	-0.01	-0.27	-0.31	0.19	-0.03	-0.01	0.00	6.10	6.64	10.80	6.00	0.21	-0.01	-0.27	-0.31
	Global Core Transport	7.60	8.48	13.87	-	0.30	0.05	-0.13	-0.15	0.04	-0.12	-0.09	-0.11	7.60	8.48	13.87	-	0.30	0.05	-0.13	-0.15
	Diversified Hedge Funds	3.30	3.52	6.74	4.50	0.18	0.05	-0.42	-0.33	0.15	-0.05	-0.10	-0.09	3.30	3.52	6.74	4.50	0.18	0.05	-0.42	-0.33
	Event Driven Hedge Funds	3.10	3.45	8.55	4.80	0.19	-0.04	-0.47	-0.46	0.11	-0.07	-0.12	-0.07	3.10	3.45	8.55	4.80	0.19	-0.04	-0.47	-0.46
	Long Bias Hedge Funds	3.40	3.92	10.48	4.80	0.09	-0.04	-0.42	-0.42	0.13	-0.03	-0.08	-0.03	3.40	3.92	10.48	4.80	0.09	-0.04	-0.42	-0.42
	Relative Value Hedge Funds	3.60	3.79	6.22	4.50	0.24	-0.05	-0.42	-0.38	0.21	0.03	0.00	-0.01	3.60	3.79	6.22	4.50	0.24	-0.05	-0.42	-0.38
	Macro Hedge Funds	2.20	2.49	7.72	3.30	-0.10	0.14	0.11	0.11	0.26	0.21	0.11	0.24	2.20	2.49	7.72	3.30	-0.10	0.14	0.11	0.11
	Direct Lending	6.80	7.67	13.74	7.00	0.36	-0.12	-0.51	-0.48	0.15	-0.22	-0.13	-0.25	6.80	7.67	13.74	7.00	0.36	-0.12	-0.51	-0.48
	Commodities	2.30	3.53	16.10	2.50	0.27	0.06	-0.20	-0.28	0.26	0.00	-0.03	0.07	2.30	3.53	16.10	2.50	0.27	0.06	-0.20	-0.28
	Gold	2.90	4.28	17.15	3.00	0.01	0.08	0.36	0.27	0.48	0.41	0.37	0.40	2.90	4.28	17.15	3.00	0.01	0.08	0.36	0.27

		COMPOUND RETURN 2020 (%)				ANNUALIZED VOLATILITY (%)				ARITHMETIC RETURN 2021 (%)				COMPOUND RETURN 2021 (%)			
FIXED INCOME																	
	Euro Inflation	1.30	1.32	1.80	1.30	1.00				Euro Inflation							
	Euro Cash	0.20	0.20	0.62	0.60	-0.14	1.00			Euro Cash							
	U.S. Aggregate Bonds hedged	1.30	1.36	3.49	1.80	-0.22	0.20	1.00		U.S. Aggregate Bonds hedged							
	Euro Aggregate Bonds	0.80	0.87	3.76	0.90	-0.27	0.17	0.66	1.00	Euro Aggregate Bonds							
	U.S. Inv Grade Corporate Bonds hedged	1.70	1.90	6.42	2.10	-0.24	0.11	0.81	0.61	1.00							
	Euro Inv Grade Corp Bonds	1.40	1.52	4.88	1.70	-0.21	0.06	0.53	0.72	0.80	1.00						
	U.S. High Yield Bonds hedged	3.90	4.24	8.40	3.90	-0.02	-0.06	0.17	0.09	0.54	0.55	1.00					
	Euro High Yield Bonds	3.60	3.98	8.95	3.60	-0.06	-0.09	0.09	0.18	0.50	0.67	0.87	1.00				
	U.S. Leveraged Loans hedged	4.30	4.60	7.91	3.70	0.01	-0.12	-0.04	-0.04	0.35	0.45	0.83	0.88	1.00			
	Euro Government Bonds	0.70	0.79	4.26	0.70	-0.24	0.16	0.62	0.97	0.49	0.56	-0.04	0.03	-0.17	1.00		
	Euro Govt Inflation-Linked Bonds	0.30	0.42	5.00	0.80	-0.13	0.15	0.55	0.78	0.60	0.68	0.34	0.34	0.15	0.75	1.00	
	World Government Bonds hedged	0.50	0.55	3.06	0.80	-0.20	0.18	0.82	0.81	0.52	0.38	-0.18	-0.21	-0.36	0.84	0.56	1.00
	World Government Bonds	0.40	0.66	7.19	0.60	-0.22	0.14	0.39	0.49	0.20	0.17	-0.32	-0.24	-0.26	0.50	0.18	0.59
	World ex-Euro Government Bonds hedged	0.40	0.45	3.02	0.80	-0.13	0.18	0.83	0.58	0.46	0.20	-0.25	-0.34	-0.43	0.61	0.35	0.94
	World ex-Euro Government Bonds	0.20	0.65	9.59	0.50	-0.20	0.13	0.30	0.33	0.10	0.06	-0.35	-0.27	-0.26	0.34	0.05	0.48
	Global Multiverse Bonds hedged	1.10	1.15	3.03	1.30	-0.25	0.22	0.94	0.85	0.82	0.68	0.23	0.20	0.03	0.80	0.71	0.87
	Emerging Markets Sovereign Debt hedged	4.40	4.77	8.87	3.80	0.00	0.00	0.51	0.37	0.71	0.61	0.71	0.57	0.46	0.28	0.53	0.22
	Emerging Markets Local Currency Debt	3.80	4.22	9.41	4.00	-0.09	0.11	0.29	0.36	0.44	0.50	0.44	0.42	0.36	0.29	0.42	0.19
	Emerging Markets Corporate Bonds hedged	3.80	4.14	8.41	3.60	-0.02	-0.07	0.42	0.30	0.71	0.65	0.75	0.68	0.58	0.17	0.45	0.09
	European Large Cap	5.00	5.97	14.44	5.40	0.04	-0.19	-0.03	0.08	0.33	0.48	0.71	0.75	0.66	-0.02	0.30	-0.25
	European Small Cap	6.50	7.80	16.87	6.30	0.02	-0.18	-0.05	0.04	0.34	0.49	0.72	0.78	0.70	-0.07	0.26	-0.30
	U.S. Large Cap	2.70	3.65	14.12	3.70	0.02	-0.20	-0.10	0.07	0.18	0.38	0.53	0.56	0.57	0.00	0.19	-0.22
	U.S. Large Cap hedged	3.30	4.34	14.83	4.30	0.10	-0.19	-0.02	0.01	0.30	0.42	0.70	0.63	0.59	-0.07	0.25	-0.25
	Euro Area Large Cap	5.20	6.47	16.58	5.80	0.05	-0.16	-0.02	0.08	0.32	0.46	0.69	0.72	0.61	0.00	0.33	-0.23
	Euro Area Small Cap	6.40	7.80	17.54	6.00	0.00	-0.15	-0.01	0.08	0.36	0.48	0.71	0.76	0.65	-0.02	0.31	-0.25
	UK Large Cap	6.10	7.09	14.66	5.70	0.04	-0.20	-0.08	0.04	0.29	0.46	0.65	0.72	0.67	-0.07	0.21	-0.30
	UK Large Cap hedged	5.80	6.64	13.47	4.90	0.03	-0.07	0.08	0.12	0.39	0.47	0.65	0.61	0.53	0.03	0.33	-0.14
	Japanese Equity	5.10	6.03	14.13	5.30	-0.08	-0.15	-0.06	0.09	0.24	0.37	0.42	0.47	0.46	0.01	0.20	-0.19
	Japanese Equity hedged	5.20	6.65	17.74	6.00	0.09	-0.02	-0.19	-0.08	0.13	0.26	0.51	0.51	0.48	-0.13	0.18	-0.37
	Chinese Domestic Equity	6.10	9.91	29.70	8.20	-0.02	0.02	-0.05	0.06	0.12	0.21	0.26	0.31	0.26	0.02	0.07	-0.12
	Emerging Markets Equity	5.80	7.16	17.26	7.30	0.05	-0.09	0.05	0.08	0.39	0.48	0.69	0.69	0.62	-0.02	0.30	-0.20
	AC Asia ex-Japan Equity	5.70	7.09	17.43	7.30	0.01	-0.09	0.08	0.12	0.41	0.50	0.65	0.66	0.58	0.02	0.30	-0.15
	AC World Equity	3.70	4.56	13.51	4.60	0.01	-0.19	-0.05	0.09	0.31	0.48	0.66	0.70	0.66	-0.01	0.27	-0.24
	AC World ex-EMU Equity	3.60	4.46	13.47	4.50	0.01	-0.19	-0.05	0.09	0.30	0.47	0.64	0.68	0.66	-0.01	0.25	-0.24
	Developed World Equity	3.50	4.36	13.51	4.40	0.01	-0.20	-0.06	0.09	0.29	0.47	0.64	0.68	0.65	-0.01	0.25	-0.24
	Global Convertible Bond hedged	3.80	4.27	9.93	3.40	-0.04	-0.09	0.10	0.12	0.50	0.56	0.81	0.77	0.69	0.01	0.35	-0.20
	Global Credit Sensitive Convertible hedged	3.40	3.67	7.43	3.10	-0.04	-0.16	0.04	0.18	0.27	0.41	0.35	0.46	0.38	0.09	0.17	-0.07
	Private Equity	6.40	7.78	17.43	6.90	0.20	-0.24	-0.27	-0.25	0.06	0.18	0.55	0.53	0.58	-0.33	-0.05	-0.45
	U.S. Core Real Estate	4.50	5.31	13.13	3.90	0.17	-0.36	-0.14	-0.15	0.05	0.14	0.40	0.40	0.52	-0.21	-0.03	-0.26
	European ex-UK Core Real Estate	5.00	5.57	11.04	5.00	0.16	-0.35	-0.38	-0.36	-0.05	0.02	0.49	0.47	0.60	-0.41	-0.14	-0.55
	European ex-UK Value-Added Real Estate	7.70	9.24	18.51	7.50	0.16	-0.35	-0.38	-0.36	-0.05	0.02	0.49	0.47	0.60	-0.41	-0.14	-0.55
	U.S. REITs	5.10	6.12	14.83	4.10	0.00	-0.16	0.22	0.25	0.36	0.41	0.49	0.44	0.40	0.21	0.35	0.13
	Global ex-U.S. REITs	5.70	6.70	14.73	5.10	-0.04	-0.21	0.21	0.26	0.47	0.55	0.63	0.67	0.58	0.17	0.35	0.04
	Global Core Infrastructure	4.70	5.15	9.76	4.10	0.12	-0.23	-0.06	-0.03	0.06	0.10	0.27	0.29	0.39	-0.06	0.06	-0.13
	Global Core Transport	6.20	7.04	13.49	-	0.10	-0.23	-0.10	-0.08	-0.18	-0.17	-0.01	0.00	0.14	-0.04	-0.03	-0.04
	Diversified Hedge Funds hedged	2.50	2.71	6.64	3.20	0.04	-0.13	-0.05	-0.03	0.31	0.39	0.66	0.69	0.68	-0.13	0.20	-0.32
	Event Driven Hedge Funds hedged	2.30	2.65	8.53	3.50	0.09	-0.14	-0.08	-0.05	0.31	0.44	0.80	0.79	0.78	-0.17	0.21	-0.38
	Long Bias Hedge Funds hedged	2.60	3.13	10.48	3.50	0.05	-0.09	-0.04	-0.04	0.36	0.44	0.76	0.73	0.69	-0.15	0.24	-0.34
	Relative Value Hedge Funds hedged	2.80	2.99	6.23	3.20	0.02	-0.05	0.03	0.02	0.41	0.50	0.86	0.85	0.87	-0.11	0.27	-0.31
	Macro Hedge Funds hedged	1.40	1.70	7.78	2.00	-0.11	0.20	0.22	0.26	0.33	0.29	0.17	0.18	0.07	0.22	0.32	0.20
	Direct Lending	5.40	6.51	15.51	5.10	0.01	-0.10	-0.10	-0.03	-0.09	-0.02	0.11	0.11	0.24	-0.04	-0.07	-0.08
	Commodities	0.90	1.81	13.69	0.60	0.07	-0.07	-0.09	-0.13	0.12	0.15	0.38	0.33	0.42	-0.19	0.08	-0.28
	Gold	1.50	2.82	16.67	1.10	-0.16	0.07	0.32	0.18	0.23	0.12	-0.06	-0.09	-0.10	0.16	0.08	0.29

		COMPOUND RETURN 2020 (%)				ANNUALIZED VOLATILITY (%)				ARITHMETIC RETURN 2021 (%)				COMPOUND RETURN 2021 (%)												
						UK Inflation	UK Cash	U.S. Aggregate Bonds hedged	Euro Aggregate Bonds hedged	U.S. Inv Grade Corporate Bonds hedged	Euro Inv Grade Corp Bonds hedged	UK Inv Grade Corporate Bonds	U.S. High Yield Bonds hedged	Euro High Yield Bonds hedged	Global Credit hedged	U.S. Leveraged Loans hedged	Euro Government Bonds hedged	UK Gilts	UK Inflation-Linked Bonds	World Government Bonds hedged	World Government Bonds	World ex-UK Government Bonds hedged	World ex-UK Government Bonds	Emerging Markets Sovereign Debt hedged	Emerging Markets Local Currency Debt	Emerging Markets Corporate Bonds hedged
FIXED INCOME	UK Inflation	2.00	2.02	1.76	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	UK Cash	1.10	1.10	0.64	1.80	-0.16	0.17	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	U.S. Aggregate Bonds hedged	2.10	2.16	3.45	3.00	-0.16	0.17	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Euro Aggregate Bonds hedged	1.70	1.77	3.67	2.20	-0.19	0.09	0.66	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	U.S. Inv Grade Corporate Bonds hedged	2.50	2.69	6.30	3.30	-0.14	0.05	0.81	0.58	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Euro Inv Grade Corp Bonds hedged	2.20	2.31	4.66	3.00	-0.08	-0.06	0.51	0.70	0.79	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	UK Inv Grade Corporate Bonds	1.90	2.18	7.58	2.00	0.04	-0.15	0.55	0.55	0.75	0.79	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	U.S. High Yield Bonds hedged	4.80	5.13	8.38	5.20	-0.01	-0.07	0.17	0.09	0.56	0.58	0.46	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Euro High Yield Bonds hedged	4.40	4.75	8.64	4.80	0.01	-0.14	0.10	0.16	0.52	0.67	0.52	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Global Credit hedged	2.40	2.52	4.92	3.10	-0.11	0.03	0.81	0.68	0.97	0.86	0.83	0.56	0.53	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	U.S. Leveraged Loans hedged	5.10	5.39	7.90	4.90	0.12	-0.17	-0.06	-0.06	0.35	0.46	0.39	0.81	0.86	0.34	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Euro Government Bonds hedged	1.50	1.59	4.23	1.90	-0.21	0.11	0.61	0.97	0.46	0.54	0.42	-0.04	0.02	0.55	-0.19	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	UK Gilts	-0.20	0.02	6.69	0.00	-0.14	0.09	0.69	0.58	0.42	0.26	0.53	-0.17	-0.21	0.48	-0.31	0.59	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	UK Inflation-Linked Bonds	-1.40	-0.98	9.12	-1.50	-0.01	-0.04	0.55	0.39	0.46	0.31	0.55	0.20	0.11	0.51	0.10	0.35	0.69	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	World Government Bonds hedged	1.40	1.45	3.06	2.00	-0.17	0.17	0.82	0.81	0.50	0.36	0.41	-0.18	-0.21	0.57	-0.39	0.84	0.82	0.52	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	World Government Bonds	1.00	1.40	9.05	1.00	-0.13	0.20	0.49	0.42	0.18	0.00	0.11	-0.33	-0.40	0.21	-0.49	0.47	0.63	0.41	0.69	1.00	1.00	1.00	1.00	1.00	1.00
	World ex-UK Government Bonds hedged	1.60	1.64	2.92	2.20	-0.15	0.17	0.82	0.82	0.51	0.38	0.39	-0.17	-0.20	0.57	-0.38	0.85	0.77	0.49	1.00	0.67	1.00	1.00	1.00	1.00	1.00
	World ex-UK Government Bonds	1.10	1.54	9.45	1.10	-0.14	0.20	0.47	0.40	0.18	-0.01	0.09	-0.33	-0.40	0.20	-0.49	0.46	0.60	0.40	0.67	0.99	0.65	1.00	1.00	1.00	1.00
	Emerging Markets Sovereign Debt hedged	5.20	5.58	8.95	5.00	-0.03	0.01	0.52	0.39	0.73	0.65	0.58	0.72	0.60	0.76	0.44	0.28	0.15	0.35	0.23	0.02	0.25	0.01	1.00	1.00	1.00
	Emerging Markets Local Currency Debt	4.40	5.01	11.40	4.40	-0.17	0.23	0.42	0.38	0.43	0.37	0.33	0.34	0.25	0.47	0.12	0.35	0.29	0.35	0.33	0.42	0.33	0.42	0.58	1.00	1.00
Emerging Markets Corporate Bonds hedged	4.70	5.04	8.49	4.80	0.02	-0.06	0.43	0.32	0.73	0.70	0.60	0.74	0.69	0.75	0.56	0.18	0.05	0.29	0.10	-0.11	0.12	-0.12	0.90	0.46	1.00	
EQUITIES	UK All Cap	6.80	7.61	13.30	6.30	0.09	-0.12	0.05	0.08	0.38	0.48	0.46	0.69	0.67	0.40	0.56	-0.01	-0.10	0.16	-0.18	-0.18	-0.18	-0.18	0.59	0.46	0.59
	UK Large Cap	6.70	7.53	13.44	6.10	0.08	-0.11	0.06	0.10	0.38	0.47	0.45	0.67	0.65	0.40	0.54	0.01	-0.08	0.17	-0.16	-0.15	-0.16	-0.14	0.59	0.48	0.58
	UK Small Cap	7.10	8.29	16.18	7.10	0.07	-0.16	-0.01	0.03	0.34	0.47	0.41	0.69	0.69	0.36	0.60	-0.08	-0.15	0.07	-0.25	-0.30	-0.25	-0.32	0.51	0.29	0.56
	U.S. Large Cap	3.30	4.22	13.97	4.10	0.03	-0.13	0.06	0.13	0.27	0.36	0.35	0.52	0.45	0.31	0.40	0.07	0.04	0.25	-0.05	0.08	-0.06	0.08	0.41	0.52	0.41
	U.S. Large Cap hedged	4.10	5.13	14.80	5.50	0.05	-0.17	-0.02	0.02	0.32	0.44	0.36	0.71	0.66	0.34	0.59	-0.07	-0.21	0.04	-0.26	-0.36	-0.25	-0.36	0.52	0.31	0.55
	Euro Area Large Cap	5.80	7.33	18.32	6.20	-0.02	-0.05	0.11	0.11	0.37	0.41	0.40	0.64	0.61	0.40	0.44	0.05	-0.07	0.18	-0.10	-0.06	-0.09	-0.05	0.60	0.54	0.56
	Euro Area Large Cap hedged	6.00	7.26	16.60	7.10	0.01	-0.15	-0.02	0.08	0.32	0.47	0.41	0.69	0.72	0.35	0.61	-0.01	-0.20	0.05	-0.25	-0.39	-0.24	-0.38	0.52	0.30	0.55
	Euro Area Small Cap	7.00	8.70	19.43	6.40	0.01	-0.09	0.10	0.09	0.39	0.42	0.41	0.67	0.64	0.41	0.49	0.01	-0.10	0.16	-0.12	-0.06	-0.12	-0.06	0.59	0.49	0.59
	Euro Area Small Cap hedged	7.20	8.60	17.60	7.30	0.02	-0.18	-0.03	0.05	0.35	0.48	0.42	0.72	0.76	0.37	0.65	-0.05	-0.22	0.03	-0.27	-0.38	-0.26	-0.38	0.51	0.27	0.56
	Japanese Equity	5.70	6.50	13.12	5.70	-0.07	-0.08	0.08	0.13	0.30	0.33	0.31	0.42	0.35	0.32	0.30	0.07	0.01	0.20	-0.04	0.07	-0.05	0.08	0.35	0.46	0.35
	Japanese Equity hedged	6.10	7.58	18.01	7.20	0.04	-0.17	-0.22	-0.07	0.13	0.29	0.22	0.52	0.52	0.14	0.50	-0.14	-0.34	-0.07	-0.39	-0.56	-0.38	-0.55	0.31	0.13	0.38
	AC Asia ex-Japan Equity	6.30	7.78	18.03	7.70	-0.01	-0.01	0.19	0.15	0.45	0.46	0.38	0.62	0.56	0.46	0.42	0.06	0.00	0.18	-0.02	-0.02	-0.02	-0.01	0.61	0.58	0.60
	Chinese Domestic Equity	6.70	10.36	29.13	8.60	-0.04	0.08	0.03	0.09	0.16	0.20	0.09	0.24	0.24	0.16	0.17	0.06	-0.07	0.00	-0.04	-0.09	-0.03	-0.08	0.24	0.19	0.27
	Emerging Markets Equity	6.40	7.94	18.40	7.70	0.04	-0.02	0.16	0.11	0.43	0.45	0.38	0.66	0.58	0.45	0.46	0.02	-0.04	0.21	-0.07	-0.03	-0.06	-0.03	0.66	0.63	0.64
	AC World Equity	4.30	5.17	13.65	5.00	0.03	-0.10	0.11	0.14	0.38	0.45	0.42	0.65	0.58	0.41	0.47	0.06	0.00	0.25	-0.07	0.02	-0.07	0.02	0.57	0.60	0.56
	AC World ex-UK Equity	4.20	5.10	13.82	5.00	0.02	-0.10	0.11	0.14	0.38	0.44	0.41	0.64	0.56	0.41	0.46	0.06	0.01	0.25	-0.07	0.04	-0.07	0.03	0.56	0.60	0.55
	Developed World Equity	4.10	4.96	13.52	4.80	0.02	-0.11	0.10	0.14	0.36	0.43	0.42	0.63	0.56	0.40	0.46	0.06	0.01	0.25	-0.07	0.03	-0.07	0.03	0.54	0.57	0.53
	Global Convertible Bond hedged	4.60	5.07	9.93	4.70	-0.07	-0.10	0.09	0.10	0.50	0.57	0.44	0.82	0.78	0.50	0.69	-0.02	-0.19	0.07	-0.22	-0.36	-0.21	-0.36	0.64	0.32	0.70
	Global Credit Sensitive Convertible hedged	4.20	4.49	7.77	4.30	0.12	-0.23	0.00	0.15	0.21	0.38	0.39	0.30	0.42	0.26	0.35	0.07	-0.14	-0.02	-0.09	-0.22	-0.08	-0.22	0.22	0.10	0.32
	ALTERNATIVES	Private Equity	7.00	8.24	16.52	7.30	0.15	-0.17	-0.20	-0.16	0.05	0.19	0.20	0.41	0.38	0.08	0.36	-0.23	-0.21	0.11	-0.30	-0.18	-0.31	-0.19	0.26	0.18
U.S. Core Real Estate		5.10	5.61	10.45	4.30	0.40	-0.41	-0.18	-0.14	-0.02	0.14	0.24	0.38	0.35	0.04	0.50	-0.20	-0.19	0.15	-0.26	-0.41	-0.26	-0.42	0.18	-0.09	0.27
European ex-UK Core Real Estate		5.60	6.24	11.68	5.40	0.23	-0.29	-0.35	-0.26	-0.10	-0.02	0.00	0.31	0.27	-0.12	0.33	-0.29	-0.37	0.02	-0.40	-0.24	-0.40	-0.25	0.09	-0.04	0.21
UK Core Real Estate		5.90	6.62	12.46	5.50	0.18	-0.31	-0.23	-0.15	0.01	0.08	0.08	0.27	0.27	-0.01	0.26	-0.19	-0.29	-0.07	-0.27	-0.23	-0.26	-0.23	0.10	-0.06	0.20
U.S. REITs		5.70	6.88	16.04	4.50	0.06	-0.12	0.29	0.27	0.39	0.38	0.47	0.50	0.38	0.43	0.31	0.22	0.25	0.41	0.21	0.20	0.20	0.20	0.45	0.51	0.38
European REITs		6.40	7.91	18.27	5.90	0.00	-0.13	0.21	0.25	0.40	0.47	0.50	0.58	0.54	0.45	0.35	0.18	0.08	0.23	0.07	-0.04	0.08	-0.04	0.55	0.43	0.47
Global Core Infrastructure		5.30	5.75	9.83	4.50	0.08	-0.10	0.13	0.18	0.06	0.06	0.19	-0.07	-0.09	0.11	-0.06	0.19	0.31	0.41	0.21	0.33	0.19	0.31	0.08	0.24	0.00
Global Core Transport		6.80	7.61	13.29	-	0.24	-0.13	-0.01	0.03	-0.19	-0.18	-0.05	-0.19	-0.19	-0.15	-0.09	0.08	0.07	0.15	0.13	0.22	0.13				

STERLING ASSUMPTIONS

Note: All estimates on this page are in sterling terms. Given the complex risk-reward trade-offs involved, we advise clients to rely on judgment as well as quantitative optimization approaches in setting strategic allocations to all of these asset classes and strategies. Please note that all information shown is based on qualitative analysis. Exclusive reliance on this information is not advised. This information is not intended as a recommendation to invest in any particular asset class or strategy or as a promise of future performance. Note that these asset class and strategy assumptions are passive only—they do not consider the impact of active management. References to future returns are not promises or even estimates of actual returns a client portfolio may achieve. Assumptions, opinions and estimates are provided for illustrative purposes only. They should not be relied upon as recommendations to buy or sell securities. Forecasts of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. We believe the information provided here is reliable, but do not warrant its accuracy or completeness. This material has been prepared for information purposes only and is not intended to provide, and should not be relied on for, accounting, legal or tax advice.

Source: J.P. Morgan Asset Management; as of September 30, 2020. Alternative asset classes (including hedge funds, private equity, real estate, direct lending, global core infrastructure and global core transport) are unlike other asset categories shown above in that there is no underlying investible index. The return estimates for these alternative asset classes and strategies are estimates of the industry average, net of manager fees. The dispersion of return among managers of these asset classes and strategies is typically significantly wider than that of traditional asset classes. Correlations of value-added and core real estate in their local currencies are identical since value-added local returns are scaled versions of their corresponding core real estate local returns. All returns are nominal. For the full opportunity set, please contact your J.P. Morgan representative.

1.00	UK All Cap
0.99	UK Large Cap
0.86	UK Small Cap
0.78	U.S. Large Cap
0.83	U.S. Large Cap hedged
0.88	Euro Area Large Cap
0.87	Euro Area Large Cap hedged
0.86	Euro Area Small Cap
0.84	Euro Area Small Cap hedged
0.61	Japanese Equity
0.63	Japanese Equity hedged
0.73	AC Asia ex-Japan Equity
0.30	Chinese Domestic Equity
0.77	Emerging Markets Equity
0.89	AC World Equity
0.87	AC World ex-UK Equity
0.88	Developed World Equity
0.82	Global Convertible Bond hedged
0.40	Global Credit Sensitive Convertible hedged
0.66	Private Equity
0.28	U.S. Core Real Estate
0.44	European ex-UK Core Real Estate
0.58	UK Core Real Estate
0.72	U.S. REITs
0.06	European REITs
-0.11	Global Core Infrastructure
0.68	Global Core Transport
0.76	Diversified Hedge Funds hedged
0.79	Event Driven Hedge Funds hedged
0.71	Long Bias Hedge Funds hedged
0.31	Relative Value Hedge Funds hedged
-0.03	Macro Hedge Funds hedged
0.43	Direct Lending
-0.06	Commodities
	Gold

IV Appendix

GLOSSARY

ALTERNATIVES Nontraditional assets including private equity, alternative credit, hedge funds, real assets (real estate, infrastructure, transport), commodities and strategies such as hedging, short selling, leverage.

AVERAGE INFLATION TARGETING A central bank framework taking into account past inflation levels in setting interest rates. The Federal Reserve, for example, in targeting 2% inflation would aim to compensate for a period of past inflation below 2% with a period of inflation above 2%.

CARBON INTENSITY In investing, a metric that divides the portfolio's total carbon emissions by portfolio total sales, adjusting for company size. More accurate in measuring efficiency of output than a portfolio's absolute carbon footprint. More generally, carbon dioxide per unit of energy consumed.

DEBT MONETIZATION The permanent creation of new money by a central bank to purchase government debt. Long considered anathema except during an emergency. (Informal: printing money.)

DYNAMIC ASSET ALLOCATION A portfolio management strategy in which the asset class mix is adjusted frequently, in accordance with market conditions.

EUROPEAN NEXT GENERATION FUND (NEXT GENERATION EU) Central to a European Union agreement to support weaker economies hurt by the COVID-19 crisis, the fund, to be established, will be financed by a new euro-denominated EU debt instrument.

EX ANTE EXPECTATIONS Latin for "before the event," estimative expectations based on assumption and prediction.

EXTERNALITIES Consumption, production and investment decisions of individuals, households and firms often affect people not directly involved in the transactions. Sometimes these indirect effects are small. But when they are large, they can exert an impact, whether positive or problematic - what economists call externalities. Externalities are among the main reasons governments intervene in the economic sphere.

FAT TAIL A tail is the tapering at the far ends of a distribution curve representing least likely outcomes; left- (or right-) tail risk is the low probability risk that the value of an asset (or portfolio) moves more than 3 standard deviations lower (or higher). A fat tail in our forecasting refers to wider distribution of risks around a central projection.

FISCAL HEADROOM (FISCAL SPACE) A country's ability to provide fiscal stimulus, based on the state of its public finances, including public debt load as a percentage of GDP.

INTEREST RATE NORMALIZATION The idea that interest rates return to their historically higher levels after the current period, during which benchmark short rates set by major central banks have been near zero and long-term rates have been suppressed by bond-buying programs (quantitative easing).

INTERVAL FUNDS A type of closed-end fund with shares that do not trade on a secondary market, which may give retail investors access to institutional grade alternative investments.

LIQUIDITY TRAP In Keynesian economics, the concept that when yields are very low, almost all people will prefer liquidity, or holding cash, to interest-bearing securities.

MEAN VARIANCE-BASED ALLOCATION In portfolio theory, mean-variance (MV) optimization is a mathematical tool for constructing portfolios with the maximum expected return (mean) for a given variance (or standard deviation of returns), or the minimum variance of return for a given mean (expected return). MV-based allocation considers the trade-off between risk and expected returns to achieve the optimal combination.

PATH DEPENDENCE In economic history, a dynamic process that generates a causally related sequence of events. A path-dependent outcome is a function of its own history, irreversibly influenced by its past state.

REDENOMINATION RISK In this volume, the risk that a euro asset will be redenominated into a devalued legacy currency.

TOTAL FACTOR PRODUCTIVITY (TFP) Productivity growth that is not explained by capital stock accumulation or the labor force (increased hours worked) but rather captures the efficiency or intensity with which inputs are utilized. A residual that likely reflects technological change.

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