Building investor resilience in a downturn

Sorca Kelly-Scholte, FIA, *Global Strategist, Global Pension Solutions*

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

Vincent Juvyns, *Global Market Strategist, Global Market Insights*

Tim Lintern, *Global Strategist, Multi-Asset Solutions*

IN BRIEF

- Recession experiences have varied in terms of trigger events and associated market responses. In this paper, we consider a plausible range of downturn scenarios and the degrees to which different investor types may be resilient to them.
- The maturity of corporate defined benefit pension funds and their size relative to sponsors' balance sheets have raised concern that pension funds could hamper corporate recoveries. Corporate plans have de-risked investment strategies, but other risks have become more important – notably, cash flow, liquidity and operational risks. Sponsor covenant risk remains critical.
- A "corporate caution" scenario, characterized by severe equity downturns, falling interest rates and high default rates, is the most challenging scenario for defined benefit pension funds, particularly those whose resilience has been weakened by being in a negative cash flow position.
- Other institutional investors, such as sovereign wealth funds, endowments and foundations, and public pension funds, have a greater ability to take a long-term investing view and have thus extended more aggressively into alternatives. While this may help compensate for falling expected public market returns, the spending commitments of endowments and foundations and the negative cash flow position of many public pension funds can undermine this resilience.
- The resilience of individual investors will depend on the interaction of their income growth and their strategic portfolio allocation. Evidence suggests that higher income growth is associated with greater risk-taking.
- Particularly in the U.S., where households have a relatively high allocation to risk assets, there is evidence of an increasing use of balanced funds, including target date funds, within defined contribution holdings. Skillful management of asset allocations in these vehicles can help improve outcomes, resulting in greater individual investor resilience in a downturn.

FACING INTO THE LATE CYCLE

Our Long-Term Capital Market Assumptions (LTCMAs) are structurally optimistic, but we cannot fail to acknowledge the potential short-term pain that may come with the end of the current cycle. In this paper, we consider which risks different types of investors are bearing today, their capacity for bearing them and how these risks might impact investors through the end of the expansion.

LESSONS FROM RECESSION EXPERIENCE

Our review of recessions confirms a diverse experience across different recessionary periods. A variety of triggers have catalyzed recessions, and the quality and duration of the market response have been different in each case. Recessions are generally expected to spur equity sell-offs, credit defaults and a flight to quality driving Treasury prices up. These responses have not always occurred, however (**Exhibit 1**). Markets can respond violently and then bounce back straightaway, or they can shrug recessions off altogether. Further, the ordering of market responses is not fixed.

We can consider a range of potential downturn scenarios and the resilience of different investors when exposed to each. In "The taming of the business cycle: Fewer recessions but weaker recoveries,"[1] we examine clues about what future recessions might look like and conclude that, notwithstanding the recession associated with the global financial crisis, recessions have generally become milder, less frequent and more synchronized globally. In this context, and with the U.S. economy firmly in its late-cycle phase, we have created a heuristic and non-exhaustive set of four recession scenarios that we deem most likely and contemplate the potential effects of each on markets (**Exhibit 2**).

Against these scenarios, we look at different types of investors, the risks they bear and their ability to weather a recessionary environment. The way in which investors respond to different types of recessions depends not just on the recession itself but also on investors' wider circumstances, capacity to bear risk and investment goals.

[1] "The taming of the business cycle: Fewer recessions but weaker recoveries," 2019 *Long-Term Capital Market Assumptions,* J.P. Morgan Asset Management, 2018.

History confirms that all recessions are not made equal

EXHIBIT 1: REVIEW OF DEVELOPED MARKET RECESSION EXPERIENCES

● Equity market ■ Bond market ◆ Credit

Start date*	Trigger	Duration in quarters		Market reaction*: Led	Coincided	Lagged	Uninterrupted
Nov '73	Oil shock	U.S.	5		●	■	
		EU	2				
		JP	5				
Jan '80	Oil shock	U.S.	2		■	●	
		EU	10				
		JP	12				
Jul '81	Monetary tightening	U.S.	5		●	■	
Jul '85	Plaza Accord	JP	6	■			●
Jul '90	Unknown	U.S.	2		●		■ ◆
		EU	6				
		JP	11				
Jul '97	Asian financial crisis	JP	7		■	●	
Mar '01	Equity bubble	U.S.	3	●		■	◆
		JP	5				
Dec '07	Credit crisis	U.S.	6	◆	● ■		
		EU	5				
		JP	4				
Sep '11	Sovereign debt crisis	EU	6	● ■ ◆			

Source: Bank of America Merrill Lynch, Bloomberg, Moody's, NBER, Thomson Reuters Datastream, Trading Economics, J.P. Morgan Asset Management; as of October 2018.

* Market reactions are qualitative assessments. For global recessions, market reactions and start dates refer to U.S. sources. U.S. credit data is available from 4Q 1988. For region-specific recessions, the market reaction refers to the domestic market.

We cannot predict the shape of the next recession, but we can create plausible scenarios

EXHIBIT 2: POSSIBLE DOWNTURN SCENARIOS

● Negative ○ Moderately negative ○ Moderately positive ● Positive

Cause of recession	Possible triggers	Inflation	Curve shape into downturn	U.S. large cap	U.S. 10-year Treasuries	Credit	Emerging market assets	U.S. dollar
Monetary tightening	Inflation	Higher; distribution shifts to right	Flatter; led by a higher short end	Moderately negative	Moderately positive	Moderately negative	Negative	Positive
Corporate caution	Change in tax regime	Lower; distribution shifts to left	Flatter	Negative	Positive	Negative	Moderately negative	Moderately positive
Trade war	Further tariff measures	Unclear; wider distribution	Flatter; led by long end	Moderately negative	Moderately positive	Moderately negative	Negative	Moderately positive
Consumer retreat	Labor market downturn	Lower; distribution shifts to left	Flatter	Moderately negative	Moderately positive	Moderately negative	Moderately negative	Moderately positive

Source: J.P. Morgan Asset Management. For illustrative purposes only.

CORPORATE PENSION FUNDS

Defined benefit (DB) pension provision expanded rapidly during the economic boom following World War II, but the insolvencies that followed recessions in the 1960s and 1970s exposed the weak positions of the pension funds left behind by failing companies. The response was regulatory tightening, starting with the introduction in the U.S. in 1974 of the Employee Retirement Income Security Act (Erisa), which slowed the creation of new DB plans. Eventually, the regulatory burden triggered a global trend – closing defined benefit plans and shifting to defined contribution (DC) plans, albeit at different paces in different parts of the world.

Regulatory relief

Nonetheless, by the time the global financial crisis began in 2007, DB plans had become large, both on an absolute basis and relative to the size of their sponsors, through the natural process of maturation and consolidation into larger entities. Coming on the heels of a further round of regulatory tightening, the financial crisis was disastrous for DB plans and their sponsors, with funding levels plummeting. In contrast to previous recessions, the regulatory response was more accommodative, as concerns began to emerge that pension obligations could hamper corporate recoveries or, indeed, trigger sponsor insolvencies.

Squeezing the balloon: Changing risks

While pension funds have taken substantive steps to de-risk their investment strategies by shifting from risk assets to bonds, diversifying their exposure to equities and tapping the pension risk transfer markets, new risks and a different balance of risks are present today. Many plans, particularly those that are closed or frozen, are now in negative cash flow, routinely paying out more in benefits than they are receiving in contributions.[2] Defined benefit liabilities and deficits are concentrated in "old economy" sectors, where sponsors are arguably more vulnerable to a downturn. Pension funds are not only large relative to their sponsors; they are, in general, thinly capitalized despite sizable cash injections. For example, the U.S. industrial sector continues to have an outsize share of U.S. corporate defined benefit deficits (**Exhibit 3**), despite having contributed 9.8% of its operating cash flows over the last 10 years to its pension funds, compared with the market average of just 3.7%.[3]

It is also evident that pension portfolios today are much more complex. While they may carry less investment risk, particularly in the form of equity risk, many are carrying greater:

- cash flow risk arising from their negative cash flow position
- operational risk arising from derivatives-based liability and currency hedging programs
- liquidity risk arising from increased investment in private markets, skill-based strategies and extended credit
- covenant risk, given the concentration of defined benefit liability in "old economy" sectors, and the size of DB plans relative to the size of their sponsors

Surviving the short term to thrive in the long term

Nonetheless, we believe that the long-term outlook for pension funds is relatively benign, with the expectation that the gradual normalization of interest rates and steady returns from risk assets will help to repair funding levels over the time horizon of our assumptions.[4] However, to make it to the

[2] See "Matching cash flows and managing liquidity in maturing pension funds," *2018 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, 2017.

[3] HOLT®; data as of July 8, 2018.

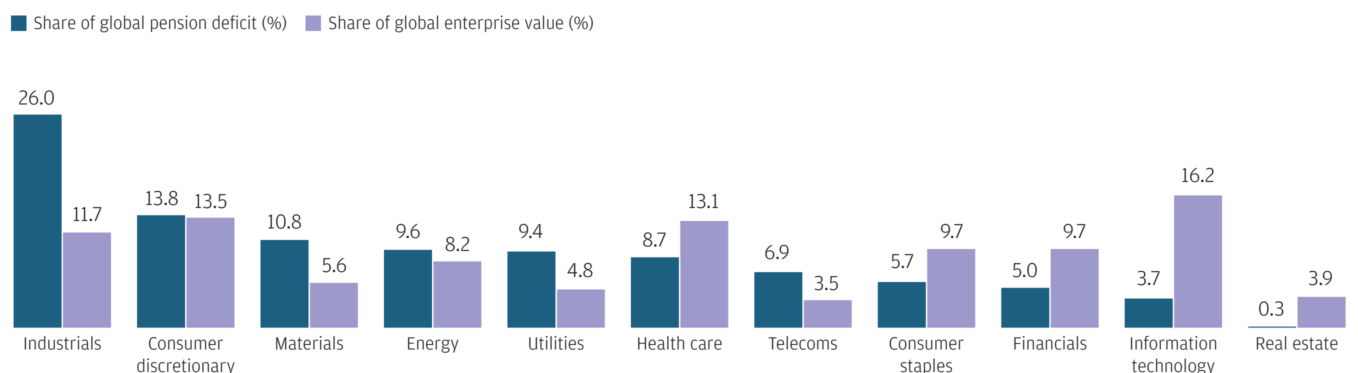
[4] "Matching cash flows and managing liquidity in maturing pension funds," *2018 Long-Term Capital Market Assumptions,* J.P. Morgan Asset Management, 2017.

long term, pension funds must survive the short term. The principal driver of the demise of pension funds following previous recessions was the demise of the sponsor, and this risk remains most pertinent today. But a key difference today is the concern that pension funds themselves may have the propensity to drag their sponsors under or, at least, materially impact their ability to recover from hard times.

A variety of risk factors can impact the resilience of pension institutions under our different scenarios. **Exhibit 4** shows the potential magnitude of the impact for an illustrative U.S. corporate DB plan, but clearly results will depend on how much an individual plan is exposed to the pension risk factors listed. For example, UK corporate plans tend to make much greater use of derivatives through leveraged liability-driven investment (LDI) and currency hedging programs, and are therefore more likely to experience large operational cash flows that can create or compound liquidity challenges. Many European pension funds have lower allocations to growth assets, so they may be less exposed to equity pullbacks than the sample U.S. plan shown.

“Old economy” sectors retain an outsize share of DB pension deficits

EXHIBIT 3: SHARE OF PENSION DEFICIT COMPARED WITH SHARE OF ENTERPRISE VALUE



Source: HOLT®, J.P. Morgan Asset Management; data as of July 8, 2018. Data refers to pension plans for the Russell 2000, MSCI Europe and FTSE 350.

Different types of downturns will have different implications for pension funds

EXHIBIT 4: IMPACT OF KEY RISK FACTORS ON RESILIENCE IN DIFFERENT RECESSION SCENARIOS — FRAMEWORK FOR ANALYTICAL THINKING

● Negative ○ Moderately negative ■ Neutral

			Potential impact on pension plan			
Pension risk factor	Description of risk factor	Illustrative U.S. pension plan	Monetary tightening	Corporate caution	Trade war	Consumer retreat
Negative cash flow drag	Negative cash flow creates a further drag on funding in low return scenarios.	-2.6% net cash flow	○	●	○	○
Public market illiquidity*	Forced selling in volatile markets amplifies funding level/balance sheet volatility.		○	●	○	○
Low hedging ratio	Flight to quality in volatile markets drives liability valuations upward.	Six years unhedged duration	○	●	○	○
Large growth allocation	Sharp sell-offs can drive funding levels below critical regulatory thresholds, requiring immediate intervention.	60% allocation to growth assets: public and private equity, REITs, hedge funds	○	●	○	○
Large credit exposure	Defaults and downgrades impair credit returns.	40% allocation to U.S. aggregate	○	●	○	○
Large illiquid allocation	Poorly planned liquidity management may result in liquidity squeezes during downturns.	5% allocation to private equity and hedge funds	■	○	■	■
Large foreign currency exposure	Strengthening of domestic currency impairs returns on non-domestic assets .	15% allocation to EAFE equities	○	■	■	■
Heavy derivatives usage	Derivatives can drive large operational cash flows during periods of volatility in rates and currencies.	Modest to little currency hedging; modest levels of interest rate leverage	■	■	■	■
Weak sponsor covenant	Extended pressure on sponsor may elevate insolvency risk.	Moderate to weak	○	●	○	○

Source: J.P. Morgan Asset Management; as of October 2018.
* “The evolution of market structure,” *2019 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, 2018.

In general, however, we expect that the corporate caution scenario, with its combination of severe equity downturns, falling interest rates and high default rates, is the most challenging scenario for DB pension funds – particularly those whose resilience has been weakened by being in a negative cash flow position – pointing to a need to be alert to the triggers of such a scenario.

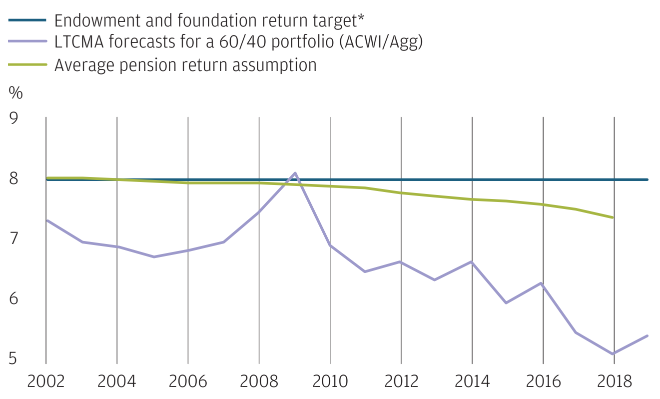
OTHER INSTITUTIONAL INVESTORS

Generally, the corporate caution scenario is also the most troublesome for insurers. Insurers rely heavily on credit in investment portfolios, and low interest rates feed through to mark-to-market liability valuations in Europe and new business book yields in the U.S.

Institutional investors that either have less concrete liabilities (such as sovereign wealth funds [SWFs] and endowments and foundations [E&Fs]), or are free of mark-to-market balance sheet accounting (public pension funds) are arguably more resilient in a downturn and able to take a long-term view. However, there is growing tension between the investment return requirements or expectations of these investors and what is likely to be attainable if our Long-Term Capital Market Assumptions are borne out. Endowments and foundations have the two-fold objective of preserving the purchasing power of their assets and meeting spending requirements, which we estimate implies a return of roughly 8% per annum, gross of fees. U.S. public pension funds have required returns of just under 8%, on average, having only marginally reduced their expectations over the last 10 years. This target looks increasingly difficult to achieve with public assets (Exhibit 5).

Investment returns from stocks and bonds are not expected to deliver the required returns of many institutional investors

EXHIBIT 5: EXPECTED RETURN ON A 60/40 PORTFOLIO (%)



Source: Public Plans Data – the Center for Retirement Research at Boston College and the Center for State and Local Government Excellence, J.P. Morgan Asset Management; data as of September 2018.

* The E&F return target is estimated at 8.00%, calculated as follows: 8.00% = spending rule (5%) + inflation (2.00%, per LTCMAs) + management fees (1%).

It is thus not surprising that E&Fs, public pension funds and SWFs have shifted substantially into alternatives, exploiting these institutions' perpetual horizons, less burdensome regulation and, for E&Fs and SWFs, non-contractual liabilities to harvest risk and illiquidity premia.

Nonetheless, the spending commitments of E&Fs and the negative cash flow positions of many public pension funds can undermine this resilience. Sovereign wealth funds, particularly those that are funded by revenues from natural resources and/or whose purpose is to smooth a nation's fiscal experience, may be faced with large and sudden divestment needs in a recessionary scenario. As outlined in our article "The evolution of market structure,"[5] it is essential for all investors to avoid becoming forced sellers in illiquid markets. Again, we find that the degree to which investors have control over the cash flows from their funds is a critical resilience factor.

INDIVIDUAL INVESTORS

We think about resilience for an individual investor in terms of the extent to which he or she will need to tap into household financial assets in a recessionary environment and in turn the declines in investment values that the individual and/or household will be able to tolerate.

Growth in income vs. growth in financial assets

Historically, the U.S. has enjoyed the greatest household net disposable income growth among OECD member nations, but we find that stronger income growth does not necessarily imply greater resilience in all types of recessions.

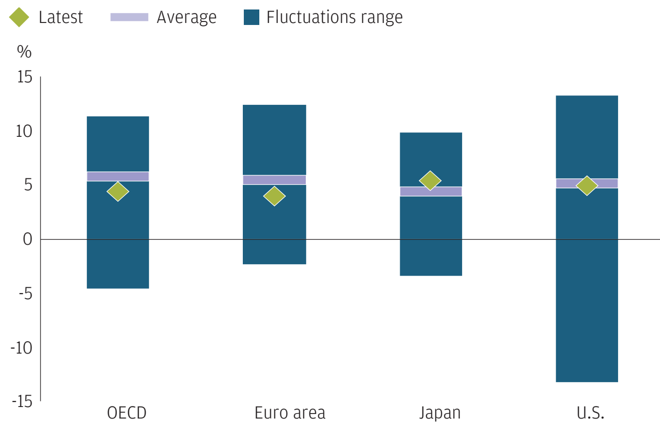
From 1995 to 2016, household wealth in the U.S. experienced greater variability than in other parts of the world (Exhibit 6) despite the fact that the U.S. faced fewer downturns than most OECD members (two in the U.S. vs. three in the euro area and four in Japan). U.S. households may have experienced the greatest growth in income during this period, but not in the value of their financial assets. In fact, we found very low correlations between household net disposable income growth and household financial asset (HFA) growth across OECD countries. This suggests to us that the strategic allocation of household financial assets may be the critical factor influencing HFA growth.

As we will see in the case of the U.S., for example, high income growth tends to be associated with more risk-taking and, over the period analyzed, with an average annual growth rate of HFAs slightly below the OECD average (5.08% for the U.S. vs. 5.71% for the OECD).

[5] "The evolution of market structure," *2019 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, 2018.

Household wealth in the U.S. has experienced much wider variation historically vs. other regions ... and an average annual growth in HFAs slightly below that of the OECD as a whole

EXHIBIT 6: CHANGE IN PER CAPITA HOUSEHOLD FINANCIAL ASSETS VALUE BY COUNTRY/REGION (%Y/Y, 1995-2016)



Source: OECD household financial assets (indicator). doi: 10.1787/7519b9dc-en; data as of July 2018.

Allocation of household wealth

An examination of the allocation of household wealth across regions (**Exhibit 7**) helps shed additional light on the relationship between strategic asset allocation and HFA growth. U.S. households have a relatively risky allocation, holding the greater part of their financial assets in pension funds (DB and DC) and equity shares. In contrast, for European households the balance shifts toward deposits and insurance-based savings, and in Japan toward cash and insurance-based savings.

This gives us a way to think about the relative resilience of households under different types of downturns. U.S. investors will be sensitive to a corporate caution scenario, for example, given that (a) they still have relatively higher direct exposure to equity shares and (b) a large proportion of their wealth is held in pension funds—either in DB plans or DC plans, which we can observe to have high equity allocations. European and Japanese investors may have a greater degree of resilience under a corporate caution scenario, given higher allocations to deposits and greater reliance on insurance-based savings.

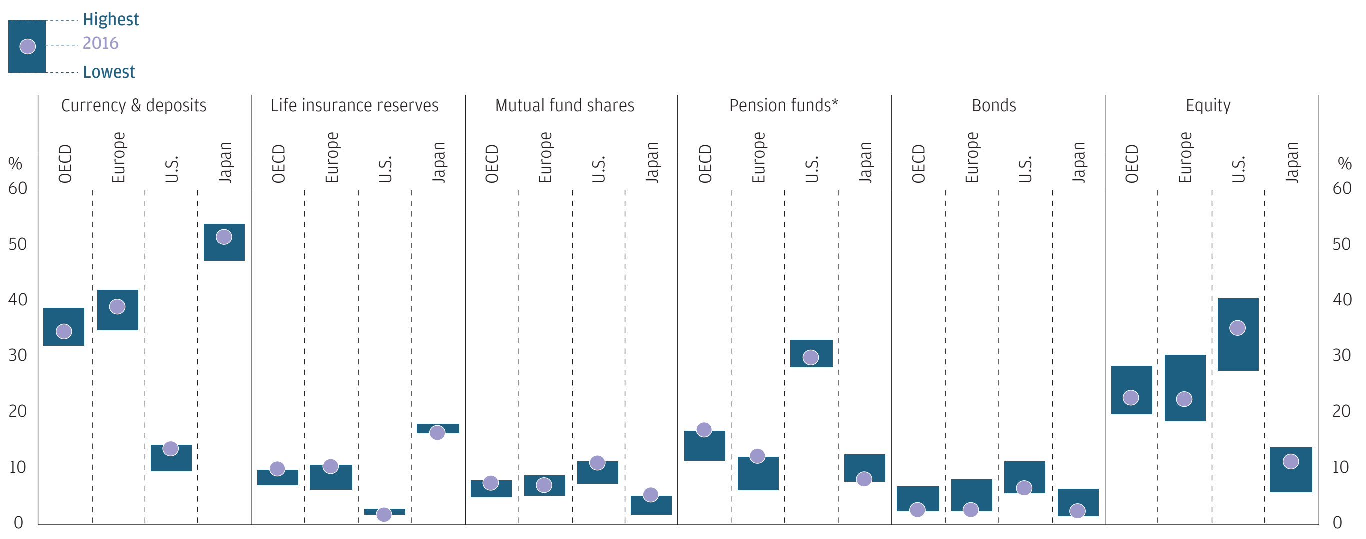
Evolving investor trends

The response of individual investors to recessionary environments is complicated by a gradual shift in market risk and investment decision-making toward the individual. This trend is being driven by insurers offering more market-based savings products with fewer guarantees and by the increasing role of DC plans in employee retirement saving. We see investors responding, in part, by increasing allocations to mutual funds and multi-asset structures, including target date funds (TDFs). This is observable across OECD countries in a move away from direct equity and bond exposure – now at the lower end of their historical ranges – in favor of mutual funds, now at the higher end, as shown in Exhibit 7. The delegation of asset allocation via balanced funds such as TDFs is another manifestation, particularly among U.S. DC plan participants.[6] These strategies can improve resilience through downturns by better aligning asset allocations with

[6] Employee Benefit Research Institute, Issue Brief No. 458, September 2018.

Household wealth allocations vary considerably across regions, with more conservative approaches in Europe and Japan vs. the U.S.

EXHIBIT 7: HOUSEHOLD FINANCIAL ASSET ALLOCATION BY COUNTRY/REGION (HIGH, LOW AND 2016 AVERAGE HFA ALLOCATIONS [%], 1995-2016)



Source: OECD household financial assets (indicator). doi: 10.1787/7519b9dc-en; data as of July 2018.

*Includes DB and DC plan assets.

investors' changing needs as they approach retirement. Further, dynamic management of these multi-asset structures can help to steer portfolios through a downturn and, where successful, reduce the degree of stress that investors experience. We see these trends as having the potential to help mitigate the strong cyclicality in household investing.

Reasons for concern

In general, though, there are still reasons for concern. Investor age and risk-taking are becoming more aligned, but there's room for improvement. Nearly one in five 401(k) participants in their 60s have equity allocations exceeding 80%, while 7% of those in their 20s have no allocation to equity.[7] J.P. Morgan's recent survey of U.S. corporate DC plan participants finds that less than 40% were highly confident in their ability to make investment decisions.[8] This knowledge gap and the large allocation of account balances to equities in the U.S., on average, (even among some participants near retirement) raise concern regarding the resilience of plan participants given a downturn. What's more, there are divergences among income groups in terms of savings participation: 87% of households with an income above $100,000 have a 401(k) or similar defined contribution plan account vs. only 37% of households with an income of less than $40,000.[9] Those households with both low income and low savings will likely be hardest hit by a recession, no matter what their portfolio allocation.

Meanwhile, outside the U.S., European and Japanese investors have fewer equities and may therefore be more immunized to equity drawdowns. However, they still have exposure to markets via insurance savings products, and hold large allocations of their household wealth in cash and deposits. A downturn that results in prolonged periods of low rates may confirm the validity of the term "reckless conservatism" as applied to these "lower risk" allocations.

In any case, there is apparently much less historic tolerance at the European and Japanese household level for variability in return than there is in the U.S., and the notion of age-appropriate investing is less well developed in these geographies. Consequently, even with lower equity exposure, the willingness to look through adverse equity market scenarios could be limited. In the context of insurers steadily switching business models to more market-based savings products with fewer guarantees, an early setback via a market downturn could inflict lasting damage to a nascent market-based savings culture.

CONCLUSION

While recessions will always be painful, the intensity and nature of that pain can vary greatly. In recessions caused by monetary tightening, emerging market assets will suffer alongside a strong U.S. dollar. Recessions characterized by corporate caution pose particular risks to stocks and credit markets. A recession following a trade war is likely to come with non-linear effects on near-term growth and inflation, with emerging market assets the likely underperformer. In the U.S., with its consumer-driven economy, a weaker demand impulse following a "consumer retreat" is likely to keep inflation contained.

For pension funds, the key risk today is that of dragging sponsors under, especially in a corporate caution scenario with severe equity downturns. Managing pension portfolios through recessionary environments will require monitoring a number of risk factors beyond just asset price performance, such as negative cash flow risks, derivatives usage and illiquid allocations.

Sovereign wealth funds and endowments and foundations are primed to weather recessionary environments well, but only if they can manage their spending commitments and avoid becoming a forced seller in illiquid markets. This is particularly important because these investors have allocated heavily to private assets, given that expected returns from stocks and bonds have moved lower over the cycle.

Individual investors with higher equity allocations, such as those in the U.S., will be hit hardest by a recession but may also have the greatest resilience, depending on their income level and age. Investment vehicles such as target date funds build on age-related resilience and may further improve resilience in the long run by actively managing investors' needs through to retirement. Additionally, multi-asset structures may be able to effectively manage portfolios through a period of market weakness.

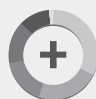
Building resilience in a downturn requires all investors to assess the quality of the recessionary environment and to understand the risks they bear and their capacity to bear them. Such an appraisal is critical in order to survive the short term and thrive in the long term.

---

[7] Ibid.

[8] *2018 Defined Contribution Plan Participant Survey, Part 1,* J.P. Morgan Asset Management, 2018.

[9] Report on the Economic Well-Being of U.S. Households in 2015, Board of Governors of the Federal Reserve System.



LET'S SOLVE IT.®

NOT FOR RETAIL DISTRIBUTION: This communication has been prepared exclusively for institutional/wholesale/professional clients and qualified investors only as defined by local laws and regulations.

JPMAM Long-Term Capital Market Assumptions: 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. Please note that all information shown is based on qualitative analysis. Exclusive reliance on the above 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. The outputs of the assumptions are provided for illustration/discussion purposes only and are subject to significant limitations. "Expected" or "alpha" return estimates are subject to uncertainty and error. For example, changes in the historical data from which it is estimated will result in different implications for asset class returns. Expected returns for each asset class are conditional on an economic scenario; actual returns in the event the scenario comes to pass could be higher or lower, as they have been in the past, so an investor should not expect to achieve returns similar to the outputs shown herein. References to future returns for either asset allocation strategies or asset classes are not promises of actual returns a client portfolio may achieve. Because of the inherent limitations of all models, potential investors should not rely exclusively on the model when making a decision. The model cannot account for the impact that economic, market, and other factors may have on the implementation and ongoing management of an actual investment portfolio. Unlike actual portfolio outcomes, the model outcomes do not reflect actual trading, liquidity constraints, fees, expenses, taxes and other factors that could impact the future returns. The model assumptions are passive only – they do not consider the impact of active management. A manager's ability to achieve similar outcomes is subject to risk factors over which the manager may have no or limited control. The views contained herein are not to be taken as advice or a recommendation to buy or sell any investment in any jurisdiction, nor is it a commitment from J.P. Morgan Asset Management or any of its subsidiaries to participate in any of the transactions mentioned herein. Any forecasts, figures, opinions or investment techniques and strategies set out are for information purposes only, based on certain assumptions and current market conditions and are subject to change without prior notice. All information presented herein is considered to be accurate at the time of production. This material does not contain sufficient information to support an investment decision and it should not be relied upon by you in evaluating the merits of investing in any securities or products. In addition, users should make an independent assessment of the legal, regulatory, tax, credit and accounting implications and determine, together with their own professional advisers, if any investment mentioned herein is believed to be suitable to their personal goals. Investors should ensure that they obtain all available relevant information before making any investment. It should be noted that investment involves risks, the value of investments and the income from them may fluctuate in accordance with market conditions and taxation agreements and investors may not get back the full amount invested. Both past performance and yield are not a reliable indicator of current and future results.

For the purposes of MiFIDII, the JPM Market Insights and Portfolio Insights programs are marketing communications and are not in scope for any MiFIDII/MiFIR requirements specifically related to investment research. Furthermore, the J.P. Morgan Asset Management Market Insights and Portfolio Insights programs, as non-independent research, have not been prepared in accordance with legal requirements designed to promote the independence of investment research, nor are they subject to any prohibition on dealing ahead of the dissemination of investment research.

J.P. Morgan Asset Management is the brand for the asset management business of JPMorgan Chase & Co. and its affiliates worldwide.

To the extent permitted by applicable law, we may record telephone calls and monitor electronic communications to comply with our legal and regulatory obligations and internal policies. Personal data will be collected, stored and processed by J.P. Morgan Asset Management in accordance with our Company's Privacy Policy. For further information regarding our regional privacy policies please refer to the EMEA Privacy Policy; for locational Asia Pacific privacy policies, please click on the respective links: Hong Kong Privacy Policy, Australia Privacy Policy, Taiwan Privacy Policy, Japan Privacy Policy and Singapore Privacy Policy.

This communication is issued by the following entities: in the United Kingdom by JPMorgan Asset Management (UK) Limited, which is authorized and regulated by the Financial Conduct Authority; in other European jurisdictions by JPMorgan Asset Management (Europe) S.à r.l.; in Hong Kong by JF Asset Management Limited, or JPMorgan Funds (Asia) Limited, or JPMorgan Asset Management Real Assets (Asia) Limited; in Singapore by JPMorgan Asset Management (Singapore) Limited (Co. Reg. No. 197601586K), or JPMorgan Asset Management Real Assets (Singapore) Pte Ltd (Co. Reg. No. 201120355E); in Taiwan by JPMorgan Asset Management (Taiwan) Limited; in Japan by JPMorgan Asset Management (Japan) Limited which is a member of the Investment Trusts Association, Japan, the Japan Investment Advisers Association, Type II Financial Instruments Firms Association and the Japan Securities Dealers Association and is regulated by the Financial Services Agency (registration number "Kanto Local Finance Bureau (Financial Instruments Firm) No. 330"); in Australia to wholesale clients only as defined in section 761A and 761G of the Corporations Act 2001 (Cth) by JPMorgan Asset Management (Australia) Limited (ABN 55143832080) (AFSL 376919); in Brazil by Banco J.P. Morgan S.A.; in Canada for institutional clients' use only by JPMorgan Asset Management (Canada) Inc., and in the United States by JPMorgan Distribution Services Inc. and J.P. Morgan Institutional Investments, Inc., both members of FINRA; and J.P. Morgan Investment Management Inc.

In APAC, distribution is for Hong Kong, Taiwan, Japan and Singapore. For all other countries in APAC, to intended recipients only.

Copyright 2018 JPMorgan Chase & Co. All rights reserved.

LV–JPM51230 | 10/18 | 0903c02a823f664a