STRONGER PORTFOLIOS BUILT FOR A CHANGING WORLD

Capital-efficient alternatives for Asian insurers

Alternatives may enhance returns opportunities, improve diversification, and help insulate insurers' balance sheets from public market fluctuations*

* Investment involves risks. Not all investments are suitable for all investors.
Diversification does not guarantee investment return and does not eliminate the risk of loss.

J.P.Morgan
Asset Management

IN BRIEF

- In the current market environment, insurers investing in traditional markets are facing the unappealing choice between the near-zero yields on government bonds and the exceedingly high volatility in both corporate bond and equity markets.
- We believe that Asian insurers could benefit from considering the broad spectrum of opportunities across core alternative assets, which could enhance investment returns, improve portfolio diversification, and help insulate insurers' balance sheets. We advocate focusing on income generation, risk diversification, and regulatory capital efficiency.
- Regulatory complexity and capital efficiency of non-traditional assets are among the main hurdles on the way to better diversified, more resilient investment portfolios. This primer re-iterates the case for insurers' investment in alternatives and looks into the treatment of key alternative asset classes under several risk-based capital adequacy regimes emerging across Asia.

SUMMARY

Insurers across the world are bracing for an extended period of near-zero rates and volatile credit spreads.[1] Absent meaningful changes in investment and underwriting strategy, lackluster returns and ballooning technical provisions will eventually eat into insurers' earnings and erode their capital.[2] In this environment, alternative and real assets can enhance investment returns, improve portfolio diversification, and help insulate insurers' balance sheets from day-to-day fluctuations in bond and equity markets.

By 2023, new or revised risk-based capital adequacy regulations will be in force in China, Hong Kong, Singapore, South Korea, and Thailand. From 2025, large, internationally active insurance groups worldwide will also be required to report their capital position under the global risk-based Insurance Capital Standard (ICS). Risk-based capital regimes will put further pressure on insurers' solvency, raising the bar for capital efficiency of new and existing investments (**Exhibit 1**).[3]

Against this backdrop, the investment experience of European insurers operating under the risk-based Solvency II capital regime is becoming increasingly relevant for their Asian peers. In both Asia and Europe, life insurers typically allocate 60% to 80% of their general account assets to fixed income.[4] While the average general account allocation to listed equities varies widely across Asia (from well under 10% in Japan and Hong Kong to nearly 30% in Singapore),[5] alternatives allocations typically remain in the low single digits. In contrast, the alternative and illiquid asset allocation of European life insurers has grown from 9% to 15% over the last decade, while the equities allocation has remained virtually unchanged (8% in 2010FY and 9% in 2019HY).[6]

Capital efficiency and regulatory complexity of non-traditional assets are among the main hurdles on the way to better diversified, more resilient investment portfolios. This primer re-iterates the case for insurers' investment in alternatives and looks into the treatment of key alternative asset classes under several risk-based capital adequacy regimes emerging across Asia.

[1] J.P. Morgan Perspectives "What if US yields go to zero?" (23 January 2020)

[2] European Insurance and Occupational Pensions Authority 2018 Insurance Stress Test Report (14 December 2018)

[3] Milliman "Hong Kong RBC - Second Quantitative Impact Study results and observations" (5 March 2019); AM Best "South Korea Insurers Prepare to Face New Accounting and Solvency Rules" (21 August 2019); Japan Financial Services Authority "Field Tests of Economic Value-Based Evaluation and Supervisory Method: 2018 Results and 2019 Direction" (June 2019)

[4] Society of Actuaries (2018) Letting Insurance Asset Data Speak for Itself: Asset Allocations of Life Insurers in Asia; J.P. Morgan Asset Management interpretation

[5] Japan Life Insurance Association 2019 Life Insurance Fact Book, Monetary Authority of Singapore Annual Statistics; J.P. Morgan Asset Management analysis

[6] J.P. Morgan Cazenove Europe Equity Research, "European Insurance – Asset Allocation Series Part 1: The Unintended Consequences of Low Interest Rates" (29 October 2019)

Risk-based capital regimes will raise the bar for capital efficiency of new and existing investments

EXHIBIT 1: KEY ELEMENTS OF A RISK-BASED CAPITAL (RBC) REGIME

	Standard formula					Internal model		
CALCULATION APPROACH	By default, capital requirement is based on a standard formula prescribed by the national insurance industry regulator					Under most regimes, insurers can opt to develop their own internal models for some or all elements of the regulatory capital requirement Internal models are reviewed and approved by the local regulator		
RISK MODULES	Market risk					Underwriting risk[2]	Default risk[3]	Operational risk
	Investment risks[1]			Mismatch risks[1]				
	Credit Spread	Equity	Property	Interest Rate	Currency			
OVERALL CAPITAL REQUIREMENT	Aggregation: Charges for individual market risks are additive: overall capital requirement for an individual risk is the sum of requirements across assets and liabilities					Diversification: Risk diversification is captured by aggregating charges for individual risks using a correlation matrix		

Source: J.P. Morgan Asset Management analysis. While implementation specifics differ between individual APAC jurisdictions, risk-based capital regimes across APAC and European Solvency II regimes share a number of similarities that facilitate cross-country comparison.

Notes

[1] The distinction between 'investment' and 'mismatch' risks is not always stipulated in the regulations; however, there is a meaningful difference between the two from an investment strategy perspective:

- Investment risks arise mostly on the asset side of the balance sheet and are compensated by risk premiums; a passive exposure to these risks is expected to generate a positive long-term return.
- Mismatch risks arise from the mismatch between assets and liabilities and do not generally carry a risk premium; a passive exposure to these risks would not necessarily generate a positive long-term return.

In a strategic asset allocation context, hedging or actively managing mismatch risks and diversifying across investment risks would improve capital efficiency.

[2] Underwriting risk would typically include a number of submodules covering various life, non-life and health insurance risks.

[3] Under some RBC regimes, default risk only applies to assets outside the scope of the spread risk sub-module of market risk; in others, it applies to all defaultable exposures.

MARKET PRESSURES

As of the time of writing, government bond yields across the US, the European Union (EU), and much of the Asia-Pacific region (APAC) are at historic lows. Investment-grade spreads have jumped to their highest level in the decade, driven by growing concerns about liquidity and credit risk.[7] For insurers, this means a sharp increase in the fair value of liabilities and a concerning growth in credit risk exposure.

For European life insurers, relatively close duration matching between assets and liabilities – and in some instances, historical cost accounting for fixed income investments – have helped contain the immediate balance sheet damage. Lacking an adequate supply of long-dated domestic government debt, many Asian insurers run significantly wider duration gaps than their European peers.[8] Asian insurers are also increasingly required to mark-to-market both assets and liabilities, leaving their earnings exposed to the immediate impact of falling rates.

One possible response to the pressure of declining yields and compressing spreads is to increase the allocation to equities and brace for the resulting balance sheet turbulence. However, we believe that Asian insurers could benefit from investigating the broad spectrum of opportunities across core alternative assets, focusing on income generation, risk diversification and regulatory capital efficiency.

THE CASE FOR ALTERNATIVES

Income and diversification

Income generation is one of the main objectives of life insurers' investments. Matching investment income cashflows to projected insurance liabilities helps reduce balance sheet risk and income volatility, frees up capital, and thus boosts shareholder returns. Given the relatively stable, long-dated nature of insurance liabilities, life insurers are well positioned to harvest the illiquidity premium on private-market assets with long-dated, contractually-fixed or highly predictable income cashflows, such as core real estate, infrastructure and transportation assets.

In addition to being a source of income, alternative assets are a source of risk diversification, especially for portfolios dominated by exposures to equities and home-market bonds. Alternatives have a low equity beta under normal conditions;[9] they also demonstrate resilience in adversity, such as during the 2008 global financial crisis. The benefit of diversification becomes even more pronounced in an allocation across multiple alternative and real assets that has the explicit objective of risk diversification customized to the insurer's balance sheet and liability profile.

[7] ICE BofA 10Y government spot yields: US, Euro, UK, Japan, Australia, Taiwan, S. Korea, Singapore, Hong Kong; ICE BofAML corporate indices OAS: US, Euro, Australian, Asian Dollar Investment Grade; DJ CDX NA IG main on-the-run 3Y CDS spread mid. Data as of 24 March 2020.

[8] Average insurer's duration gap (liabilities minus assets) varies from under two years in South Korea to over six years in Taiwan and China. Source: Figure 3.1 (Panel 6), International Monetary Fund "Global Financial Stability Report: Lower for Longer" (October 2019).

[9] Mark Snyder, J.P. Morgan Asset Management, "Core, What Is It Good For? Definitely Something!" *Insurance AUM Journal* (12 December 2019).

Private debt assets emerge as the main beneficiaries of risk-based capital regimes

EXHIBIT 2: EXPECTED RETURN, ECONOMIC RISK AND REGULATORY CAPITAL REQUIREMENTS FOR CORE AND ALTERNATIVE INVESTMENTS

Asset Class		RBC risk module	Expected return (USD), %	Volatility (USD), %	Avg credit rating	Avg time to maturity	Avg spread duration	Risk-based capital requirement				Return on RBC			
								EU SII %	HK RBC %	SG RBC2 %	KR K-ICS &	EU %	HK %	SG %	KR %
Bonds	US Treasuries	Spread/ Credit	1.1	3.9	AAA	8.8	8.8	0	0	0	0				
	USD IG Corporates		2.5	6.0	A	11.3	7.8	12.5	12.4	12.9	4.5	20	20	19	55
	USD Asian Corporates		3.8	8.2	NR	5.8	4.6	13.3	11.7	11.3	5.9	28	32	33	64
Private Debt	Infra Debt	Spread/ Credit	3.5	6.5	NR	15.0	7.6	11.0	19.3	21.8	5.2	32	18	16	67
	RE Mezzanine Debt		6.4	10.3	NR	4.0	3.0	9.0	10.5	9.8	12.5	71	61	65	51
	Direct Lending		7.9	13.9	NR	4.0	3.0	9.0	10.5	9.8	12.5	88	75	81	63
Core Real Estate	US	Property	5.7	9.5	-	-	-	25.0	25.0	30.0	25.0	23	23	19	23
	APAC		5.8	10.2	-	-	-	25.0	25.0	30.0	25.0	23	23	19	23
	Europe		6.4	10.9	-	-	-	25.0	25.0	30.0	25.0	26	26	21	26
Equities	Developed Markets	Equity	7.3	15.1	-	-	-	39.0	40.0	35.0	35.0	19	18	21	21
	Emerging Markets		11.2	21.1	-	-	-	49.0	50.0	50.0	49.0	23	22	22	23
Real Assets	Infra Equity	Equity	6.5	10.5	-	-	-	36.0	50.0	50.0	20.0	18	13	13	33
	Transport		8.1	12.8	-	-	-	49.0	50.0	50.0	49.0	17	16	16	17
HF & PE	Hedge Funds	Equity	4.8	7.4	-	-	-	49.0	50.0	50.0	49.0	10	10	10	10
	Private Equity		10.6	20.2	-	-	-	49.0	50.0	50.0	49.0	22	21	21	22
Global Core Alts		All	6.4	5.2	-	-	-	24.2	25.6	28.9	17.2	26	25	22	37

For illustrative purposes only based on current market conditions and is not indicative of current or future results, subject to change from time to time. Not to be construed as investment recommendation or advice.

Source: Expected returns for bonds are based on ICE BofAML index yields as of 28 February 2020. Expected returns for other assets and volatilities for all assets are based on J.P. Morgan Asset Management 2020 Long-Term Capital Market Assumptions and J.P. Morgan Asset Management analysis. Average rating, time to maturity, spread duration and risk-based capital requirements are J.P. Morgan Asset Management estimates. Core Real Estate assumptions are for unlevered investments in real estate.

Global Core Alts is an equal-weighted composite of Private Debt, Core Real Estate and Real Assets, with each sub-allocation divided equally across the constituent asset classes.

Risk-based capital requirement is the post-diversification requirement for spread, equity and property risk; it excludes mismatch risk (currency and interest rate) capital requirements calculated at the overall balance sheet level. Solvency II equity risk calculations assume 0% symmetric adjustment. US Treasuries and home-country government bonds carry no spread-risk charge. Assumes no look-through on investments in Hedge Funds.

EU SII - European Solvency II; HK RBC - Hong Kong RBC (draft); SG RBC 2 - Singapore RBC 2 (draft); KR K-ICS - South Korea K-ICS (draft). Regulatory capital estimates are based on J.P. Morgan Asset Management interpretation of the corresponding regulations, as well as assumptions about representative-weighted average life, spread duration and credit quality of the asset classes; these are estimates and are not guaranteed.

IG - investment grade; RE - real estate; Tsy - treasury; Corp - corporate bond; Infra - infrastructure; RE - real estate; HF - hedge fund; PE - private equity

Expected returns for bonds and equites are stated gross of fees; expected returns on other assets are stated net of fees. Real estate and infrastructure returns are reported on an un-levered basis. These are estimates and are not guaranteed.

Capital efficiency

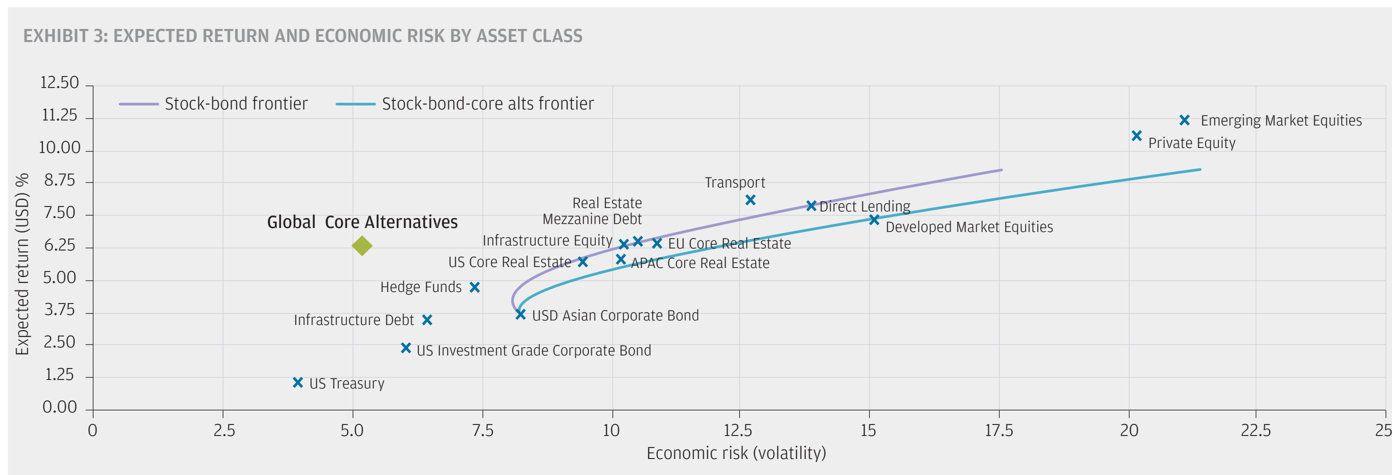
For most investors, asset allocation decisions reflect views on return and risk of asset classes comprising the investable universe. For insurance investors, regulatory capital requirements create an additional layer of complexity: an insurer's asset allocation needs to balance expected portfolio return against regulatory capital requirements as well as portfolio risk (with 'portfolio' often comprising insurance liabilities as well as investment assets) – while being mindful of additional considerations, such as liquidity, income or asset-liability management.

In the next section, we take a closer look at alternative investments' return on regulatory capital. Alongside generating an attractive return on capital, a capital-efficient investment strategy should seek to contribute to a stable solvency ratio, which is defined as the ratio of eligible capital resources to regulatory capital requirement. This is a key indicator of insurer solvency that is closely watched by regulators and stock analysts: an insurer with a stable solvency ratio is better positioned to deliver a stable stream of shareholder dividends, which, in turn, should help the insurer's stock valuation. Volatility of the solvency ratio is mainly driven by volatility of capital resources (i.e. assets in excess of liabilities) and volatility of the capital requirement.

Shifting from listed equities to alternative and real assets could help reduce asset volatility, thus stabilizing the solvency ratio. Unlike bond and equity investments, illiquid and real assets are typically valued based on the present value of expected future cashflows. This present value reacts to changes in projected cashflows and discount rate assumptions, but is less susceptible to day-to-day oscillations in market sentiment. Predictable, contractually-fixed cashflows on core alternative and real assets mean that these assets contribute less to balance sheet volatility than their public market counterparts.

Allocating to assets sitting at or above the stock-bond frontier would improve expected risk-adjusted portfolio performance relative to a stock-bond allocation

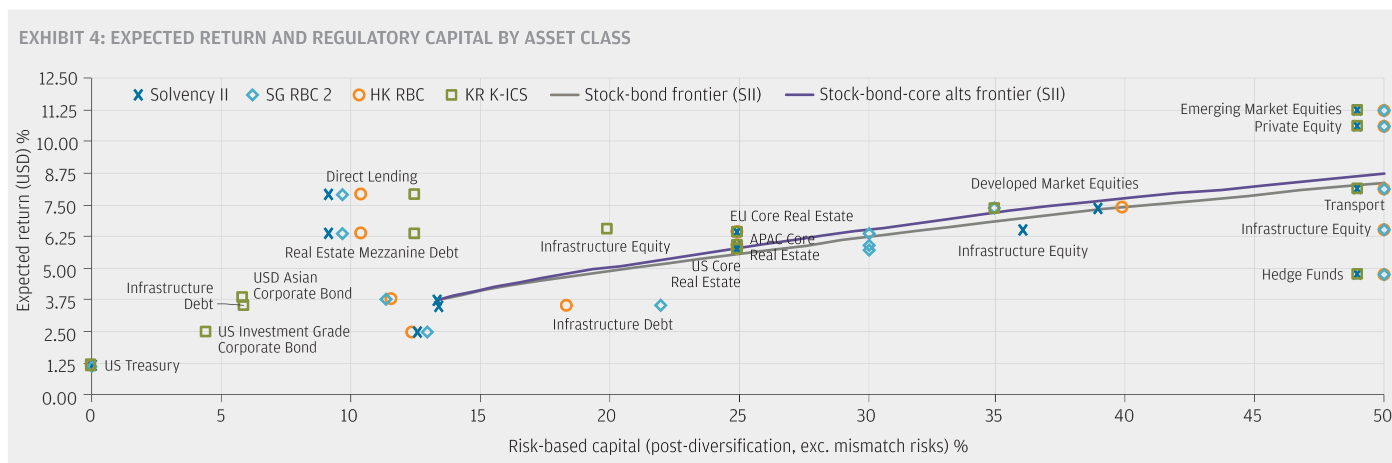
EXHIBIT 3: EXPECTED RETURN AND ECONOMIC RISK BY ASSET CLASS



Source: J.P. Morgan Asset Management, data as at 25 March 2020

Direct lending and real estate mezzanine debt are highly capital-efficient across all RBC regimes

EXHIBIT 4: EXPECTED RETURN AND REGULATORY CAPITAL BY ASSET CLASS



Source: J.P. Morgan Asset Management, data as at 25 March 2020

CAPITAL-EFFICIENT ALTERNATIVES

Exhibit 2 summarizes our expectations about the performance of key traditional and alternative asset classes. Alongside expected return and risk, we estimate risk-based capital charges for spread, equity and property risk under the (draft) RBC regimes that are due to be enacted in Hong Kong, Singapore and South Korea, as well as under the Solvency II (SII) regime in force in the European Union and the UK.

Private debt strategies

Private debt assets emerge as the main beneficiaries of risk-based capital regimes. As insurers are not required to hold additional capital against the illiquidity risk of private debt investments, they can collect an illiquidity premium on a loan or private-placement bond without incurring the (opportunity) cost of holding more capital relative to a comparable investment in an actively traded bond. Spread risk charges on unrated bonds and loans are typically lower than those on high yield debt, making unrated private debt an efficient alternative to lower-rated corporate bonds.[10]

Under Korean ICS, insurers will further benefit from reduced capital requirements on unrated qualifying infrastructure, real estate and real asset debt (such as ship or aircraft financing). Singapore RBC 2 and the current iteration of the draft Hong Kong RBC regulations make no special provisions for these debt instruments.

Real assets

For the purpose of capital calculations, real assets can be treated as property or as equity. Property assets (whether self-occupied or investment) benefit from lower capital charges than investments classified as equity. Private equity, infrastructure and transportation equity investments typically get treated as ‘other equity’, carrying higher capital requirements than equities listed in developed markets.

Hong Kong RBC and Singapore RBC 2 regimes make no concessions for investments in infrastructure. This is at odds with the European experience: reduced capital requirements for qualifying infrastructure

[10] E.g. halfway between BBB and BB-rated debt under Singapore RBC 2, Hong Kong RBC, and Korean ICS.

debt and equity under Solvency II have contributed to a significant inflow of European insurance money into infrastructure financing. Korean ICS is more in alignment with Solvency II, with a 20% capital charge making qualifying infrastructure equity one of the most compelling alternatives for Korean insurers.

Lack of differentiation in capital charges across the broad spectrum of private equity and real asset risks distorting investors' incentives: given the same capital requirement across all investment opportunities, a capital-optimizing strategy would seek maximum allocation to the riskiest option targeting the highest return.[11] When developing an investment strategy, regulatory capital efficiency should be considered against other performance dimensions, such as income level and predictability, liquidity, economic risk and diversification potential.

Portfolio implications

Exhibit 3 plots expected returns and economic risk (volatility) for our asset universe against a stock-bond portfolio frontier, comprised of varying allocations to USD-denominated Asian Corporate bonds and developed market equities. Most alternative and real assets sit above the stock-bond frontier. This reflects the premiums paid for risks not captured by the mean-variance framework, such as the illiquidity or complexity of infrastructure and transportation assets, as well as structural distortions introduced by regulation, such as high capital requirements for commercial banks extending asset and real estate financing.

Allocating to assets sitting at or above the bond-stock portfolio line would improve expected risk-adjusted portfolio performance relative to a bond-stock allocation. Further benefits can be reaped from allocating to a diversified mix of global core alternatives; this is illustrated by the stock-bond-core alts portfolio frontier. The higher the target level of return, the greater the expected impact of incorporating alternatives in the asset allocation.

Alongside economic risk, insurers need to be mindful of the regulatory capital implications of changes to their asset allocation. **Exhibit 4** plots the expected asset class returns against regulatory capital requirements for investment risk, such as the post-diversification capital requirement for equity, spread and property risk.

Private credit strategies, such as direct lending and real estate mezzanine debt, emerge as highly capital-efficient across all RBC regimes. Infrastructure debt carries a higher capital charge because its long-dated cashflows are more sensitive to regulatory spread stresses, but it can still be a more compelling opportunity for backing long-dated insurance liabilities than similar-duration corporate bonds.

CONCLUDING REMARKS

Core alternatives are a compelling investment for insurers, given the attraction of stable long-term income and diversification potential. The introduction of risk-based capital (RBC) regimes across major Asian markets adds to the complexity of insurers' decision-making: the economic risk of investments needs to be balanced against their risk-based capital consumption, alongside other performance considerations.

To help navigate this emerging complexity, we summarize the expected RBC treatment of key traditional and alternative asset classes. One common theme across forthcoming RBC regimes is the high capital efficiency of private credit strategies, including non-rated debt. Regional differences in RBC requirements and insurers' balance sheets mean that there is no one-size-fits-all portfolio that would work across the entire market; customization and detailed regulatory analysis are key for efficient and actionable solutions.

Our analysis has focused on three dimensions of investment performance: expected return, economic risk (volatility) and the regulatory capital requirement on investment assets. An insurer's investment strategy should go beyond these initial considerations to reflect the entirety of each specific insurer's balance sheet, risk appetite, liquidity requirements and regulatory regime – taken together, this sets a high bar for asset managers aiming to provide alternatives solutions to Asian insurers.

AUTHOR

Vladimir Zdorovenin
Executive Director, Insurance Strategy & Analytics
J.P. Morgan Asset Management

[11] In Europe, this limitation is being partly addressed with the introduction of 'long-term equity' investment category under Solvency II – cf. J.P. Morgan Asset Management Global Insurance Solutions – Inside Insurance, February 2020

J.P. MORGAN GLOBAL INSURANCE SOLUTIONS

The Global Insurance Solutions team focuses on the unique investment objectives and constraints of insurance companies. We have a comprehensive understanding of insurers' challenges, including asset-liability management, regulatory and accounting issues. Through strategic advice and global market expertise, the team is able to bring clarity to world events and their short- and long-term impact on insurers' investment portfolios.

With USD 174.5 billion in insurance general account assets under management and USD 47.3 billion in insurance subadvisory assets globally,[1] we provide innovative strategies from across our multi-asset investment platform to help insurers maximize risk-adjusted returns.

[1]As at 31 December 2019.

NEXT STEPS

For more information, please contact your J.P. Morgan Asset Management client advisor or email Insurance_Strategy_and_Analytics@jpmorgan.com

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.

This is a promotional document and is intended to report solely on investment strategies and opportunities identified by J.P. Morgan Asset Management and as such the views contained herein are not to be taken as advice or a recommendation to buy or sell any investment or interest thereto. This document is confidential and intended only for the person or entity to which it has been provided. Reliance upon information in this material is at the sole discretion of the reader. The material was prepared without regard to specific objectives, financial situation or needs of any particular receiver. Any research in this document has been obtained and may have been acted upon by J.P. Morgan Asset Management for its own purpose. The results of such research are being made available as additional information and do not necessarily reflect the views of J.P. Morgan Asset Management. Any forecasts, figures, opinions, statements of financial market trends or investment techniques and strategies expressed are those of J.P. Morgan Asset Management, unless otherwise stated, as of the date of issuance. They are considered to be reliable at the time of production, but no warranty as to the accuracy and reliability or completeness in respect of any error or omission is accepted, and may be subject to change without reference or notification to you.

Investment involves risks. Any investment decision should be based solely on the basis of any relevant offering documents such as the prospectus, annual report, semi-annual report, private placement or offering memorandum. For further information, any questions and for copies of the offering material you can contact your usual J.P. Morgan Asset Management representative. Both past performance and yields are not reliable indicators of current and future results. There is no guarantee that any forecast will come to pass. Any reproduction, retransmission, dissemination or other unauthorized use of this document or the information contained herein by any person or entity without the express prior written consent of J.P. Morgan Asset Management is strictly prohibited.

J.P. Morgan Asset Management or any of its affiliates and employees may hold positions or act as a market maker in the financial instruments of any issuer discussed herein or act as the underwriter, placement agent or lender to such issuer. The investments and strategies discussed herein may not be suitable for all investors and may not be authorized or its offering may be restricted in your jurisdiction, it is the responsibility of every reader to satisfy himself as to the full observance of the laws and regulations of the relevant jurisdictions. Prior to any application investors are advised to take all necessary legal, regulatory and tax advice on the consequences of an investment in the products.

Securities products, if presented in the U.S., are offered by J.P. Morgan Institutional Investments, Inc., member of FINRA.

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 privacy policies at https://am.jpmorgan.com/global/privacy.

This communication is issued by the following entities:

In the United States, by J.P. Morgan Investment Management Inc. or J.P. Morgan Alternative Asset Management, Inc., both regulated by the Securities and Exchange Commission; in Latin America, for intended recipients' use only, by local J.P. Morgan entities, as the case may be.; in Canada, for institutional clients' use only, by JPMorgan Asset Management (Canada) Inc., which is a registered Portfolio Manager and Exempt Market Dealer in all Canadian provinces and territories except the Yukon and is also registered as an Investment Fund Manager in British Columbia, Ontario, Quebec and Newfoundland and Labrador. 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 Asia Pacific ("APAC"), by the following issuing entities and in the respective jurisdictions in which they are primarily regulated: JPMorgan Asset Management (Asia Pacific) Limited, or JPMorgan Funds (Asia) Limited, or JPMorgan Asset Management Real Assets (Asia) Limited, each of which is regulated by the Securities and Futures Commission of Hong Kong; JPMorgan Asset Management (Singapore) Limited (Co. Reg. No. 197601586K), which this advertisement or publication has not been reviewed by the Monetary Authority of Singapore; JPMorgan Asset Management (Taiwan) Limited; 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 (Commonwealth), by JPMorgan Asset Management (Australia) Limited (ABN 55143832080) (AFSL 376919).

Malaysia, Philippines, Brunei, Thailand, Indonesia, India, Vietnam and Korea: This document is provided in response to your request. This document is for informational purposes only and does not constitute an invitation or offer to the public. This document including any other documents in connection are for intended recipients only and should not be distributed, caused to be distributed or circulated to the public. This document should not be treated as a prospectus or offering document and it has not be reviewed or approved by regulatory authorities in these jurisdictions. It is recipient's responsibility to obtain any regulatory approvals and complying with requirements applicable to them.

People's Republic of China: This document is private and confidential and is issued to you upon your specific request and is provided for your internal use and informational purposes only. It may not be photocopied, reproduced, circulated or otherwise distributed or redistributed to others. This document does not constitute an offer, whether by sale or subscription, in the People's Republic of China (the "PRC"). Any interests stated is not being offered or sold directly or indirectly in the PRC to or for the benefit of, legal or natural persons of the PRC. Further, no legal or natural persons of the PRC may directly or indirectly purchase any beneficial interest therein without obtaining all prior PRC's governmental approvals that are required, whether statutorily or otherwise. Persons who come into possession of this document are required by the issuer and its representatives to observe these restrictions.

For materials distributed to wholesale clients in Australia, please note the following: Pursuant to ASIC Class Order 03/1102 and ASIC Class Order 03/1103 applicable to JPMorgan Asset Management (Singapore) Limited ("JPMAMSL") and JPMorgan Funds (Asia) Limited ("JPMFAL") respectively, JPMAMSL and JPMFAL are exempt from the requirement to hold an Australian financial services licence under the Corporations Act 2001 (Commonwealth)) in respect of the financial services provided by JPMAMSL or JPMFAL in Australia to wholesale clients. A copy of which may be obtained at the website of the Australian Securities and Investments Commission www.asic.gov.au. The class order exempts JPMAMSL and JPMFAL respectively from the need to hold an AFSL for financial services provided to Australian wholesale clients on certain conditions. Please note that JPMAMS is regulated by the Monetary Authority of Singapore (MAS) under the laws of Singapore, which differ from Australian laws. Similarly, JPMFAL is regulated by the Securities and Futures Commission (SFC) of Hong Kong under the laws of Hong Kong, which also differ from Australian laws.

Copyright 2020 JPMorgan Chase & Co. All rights reserved.

LV-JPM52674 | 0320 | 0903c02a8285af8f