

J.P. Morgan China Government + Policy Bank 20% Capped Under 10 Year Maturity Bond Index

Index Methodology and Profile

Highlights

The J.P. Morgan China Government + Policy Bank 20% Capped Under 10 Year Maturity Index aims to track the performance of eligible fixed-rate, bullet, CNY-denominated government and policy bank bonds maturing within the next 6 months to 10 years. Securities must be listed on the China interbank market to be eligible. The index exposure to each of the three policy bank issuers is capped at 20% with the excess market value redistributed across the index on a pro-rata basis. The index is based on the composition and established methodology of the J.P. Morgan China Aggregate Bond Index.

The returns and statistics are available since January 2015.

Index Criteria

Minimum Issue Size:	Government bonds: CNY 7billion
	Policy bank bonds: CNY 3billion
Instrument Type:	Includes: Liquid, fixed-rate coupon bonds listed on the interbank market. Only senior bonds are eligible.
	Excludes: Floating-rate bonds, amortizing bonds, capital securities, convertibles, inflation-linked, retail saving bonds and subordinated bonds.
Remaining Maturity:	Entry: securities must have minimum 2.5 years and maximum 10 years remaining to maturity at issuance to be eligible
	Exit: securities with less than 7 months remaining to maturity would be excluded from the index.
Currency Denomination:	CNY
Issuers:	Government bonds: the Ministry of Finance
	Policy bank bonds: China Development Bank, Agricultural Development Bank of China, and Export-Import Bank of China
Exchange:	Securities must be listed on the China interbank market to be eligible

Index Characteristics and Methodology

Pricing:	Mid prices are taken from a third party pricing source, PricingDirect
Aggregate Return:	Weighted average of bond returns using mid side prices
Rebalancing:	Rebalances on the last business day of the month.
Coupon Reinvestment:	Immediately reinvested back into the index
FX Rates:	All FX rates used for hedged/unhedged returns are as of 4pm London time provided by WM/Reuters

Hedging Strategy:	Assume a 1-month currency forward position that begins on rebalance day and ends on next rebalance day
Settlement Convention:	T+1 settlement convention
Price Timing:	3pm local China time for all securities
Holiday Calendar:	The index follows the China bond market holiday calendar
Policy Bank Issuer 20% Cap Methodology	The exposure of policy bank issuers in the index is capped at 20% each. Issuers that exceed 20% of the uncapped market value based index are limited to 20% with the excess market value redistributed across the board on a pro rata basis. The exposure of China government bonds in the index is not subject to any cap.

Defining the universe of China Government and Policy Bank instruments

The J.P. Morgan China Government + Policy Bank 20% Capped Under 10 Year Maturity Index is a subset of the J.P. Morgan China Aggregate Index which is a comprehensive index tracking the performance of eligible fixed-rate, CNY-denominated government and policy bank bonds listed on the China interbank market.

Eligibility for the index is determined using the following criteria:

Instrument Type

The China Aggregate index only includes liquid, fixed-rate coupon China government bonds (CGBs) issued by the Ministry of Finance, and financial policy bonds (FPBs) issued by the three policy banks. Securities must be listed on the China interbank market to be eligible for index inclusion.

Floating-rate, inflation linked, and capitalizing/amortizing bonds are not eligible for index inclusion. Additionally, retail and savings bonds issued by the Ministry of Finance are not eligible for index inclusion.

Minimum Issue Size

China government bonds must have a minimum CNY 7 billion outstanding amount to qualify for index inclusion.

China policy bank bonds must have a minimum CNY 3 billion outstanding amount to qualify for index inclusion.

Remaining Maturity

Entry: securities must have minimum 2.5 years remaining to maturity to qualify for index inclusion upon entry.

Exit: securities with less than 7 months remaining to maturity will be excluded from the index.

Seniority

Only senior securities are eligible for the index inclusion. Subordinated bonds are excluded from the index.

Index Rebalancing

Rebalancing takes place monthly on the last business of each month, according to the local China bond market calendar. On rebalance day, eligible new bonds must be settled on or before month-end to enter the index at the close-of-business, and bonds which fail to comply with the index criteria will be removed. Any additional taps or buybacks that occur during the month will also be reflected at this time.

Liquidity

The China Aggregate Index only includes securities that satisfy liquidity considerations including but not limited to:

- **Pricing:** bonds must trade with enough frequency to prevent stale price quotations. Regular pricing must be available through the primary third-party pricing source.
- **Availability:** bonds must be regularly traded in size at acceptable bid-offer spreads and readily redeemable for cash. A reasonable two-way market must exist for the instrument to be included in the index portfolio.

- *Replication costs*: investors should be able to replicate the index without incurring excessive transaction costs.

Index Profile, Characteristics and Returns

- As of February 28th, 2020, the China Government + Policy Bank 20% Capped Under 10 Year Maturity Index contains 209 bonds.
- The average index yield is 2.84% with an average modified duration of 4.14 years.

Figure 1: Summary of Issuer Weight Exposure

Issuer (Ticker)	Weight (%)
China Government Bond (CGB)	45.6
China Development Bank (SDBC)	20.0
Agricultural Development Bank of China (ADBCH)	20.0
Export- Import Bank of China (EXIMCH)	14.4

Source: J.P. Morgan, as of February 28th, 2020. Note: Numbers may not add up to 100% due to rounding.

Figure 2: Total return (% , USD Unhedged) of the China Government + Policy Bank 20% capped Under 10 Year Maturity Index, 2015- 2020:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual/ YTD
2015	0.1%	0.6%	-0.1%	1.4%	0.6%	0.3%	0.7%	-2.0%	0.9%	1.7%	-1.2%	0.2%	3.0%
2016	-1.4%	0.8%	1.8%	-1.0%	-1.1%	-0.2%	0.5%	-0.1%	0.6%	-1.3%	-2.3%	-1.9%	-5.4%
2017	0.4%	0.2%	-0.2%	-0.6%	0.5%	1.7%	1.0%	1.8%	-0.2%	-0.5%	-0.1%	1.8%	6.0%
2018	3.6%	0.3%	1.4%	0.5%	-0.6%	-2.7%	-1.9%	0.0%	-0.5%	-0.4%	1.4%	1.9%	2.9%
2019	3.3%	0.2%	-0.1%	-0.9%	-1.7%	1.1%	0.4%	-3.0%	0.2%	1.1%	1.0%	1.6%	3.0%
2020	1.2%	0.3%	1.0%	-	-	-	-	-	-	-	-	-	2.5%

Source: J.P. Morgan

Where to find the China Government + Policy Bank 20% Capped Under 10 Year Maturity Index?

Bloomberg Ticker	JPEIUCUS Index
Index Composition	J.P. Morgan Public Website

Bond calculations

Calculations are according to market convention: all calculations including accrued interest, duration, yield, etc., are done according to local market convention using parameters (ex-dividend rules, settlement conventions, etc.) relevant to each specific bond. All calculations are gross of tax and ignore transactions costs.

Bond pricing: Pricing for our underlying instruments is provided on a daily basis from Pricing Direct, a third party valuation vendor. In the event the primary source for pricing is unable to provide a quote, the Index Group reserves the right to consider the use of an appropriate alternative source for index inputs. Please see <http://www.pricing-direct.com> for further details.

Ex-dividend rules: ex-dividend rules, when applicable, are incorporated into accrued interest calculations, as appropriate, by country. Ex-dividend rules define the last day a bondholder must own a bond in order to receive that bond's next coupon payment, otherwise known as the ex-dividend date.

- During the period between the ex-dividend date and the coupon date, the bond trades "ex-dividend"
- An investor who purchases a bond for settlement between the ex-dividend date and coupon date will not receive that bond's next coupon payment
- During this period, according to market convention, accrued interest becomes negative resulting in a total price at a discount to the clean price and in effect, compensating the investor for the time the bond will be held without interest
- On coupon date, interest will start to accrue for the subsequent coupon payment

Returns and return indices: return indices on individual bonds are calculated on a daily basis and measure bond performance over time:

- Principal return index is based on changes in clean price
- Interest return index is based on changes in accrued interest
- Total return index is based on changes in both clean price and accrued interest

At the individual bond level focus is on total return. The segregation of interest and principal return becomes relevant at the portfolio level.

Reinvestment of coupons: the J.P. Morgan indices are always fully invested. All coupons received are immediately reinvested back into the local market.

Interest accruals: interest is accrued starting from the bond's dated date up to the first coupon value date. Accrued interest is calculated according to market convention, on a settlement day basis. Interest is accrued by value or settlement date. Weekly, seven days of interest are accrued, including the weekend.

In markets with ex-dividend rules, if a bond is purchased after the ex-dividend date the purchaser will not receive the bond's next coupon. In order to compensate the buyer of the bond, the price paid for the bond must be less than the clean market price, thus, accrued interest will be negative.

Coupon value date: The coupon value date is the trade date associated with settlement on coupon date (the day the coupon is paid). Thus, the coupon value date is the last trade date which an investor may purchase a bond and have that bond settle prior to payment of the subsequent coupon. On coupon value date, accrued interest resets to zero, and accruals begin towards the next coupon.

Yield: effective annual rate of return, expressed as a percentage. For the J.P. Morgan China Government + Policy Bank 20% Capped Under 10 Year Maturity Index securities, yields are all calculated as yield-to-maturity, which is the discount rate that the present value of future payments equals the price of the security.

Index Calculations

The base for the index level is: January 1, 2015 = 100.

The index rebalances on the last weekday of each month. Bonds comprising the indices are required to have more than 13 months remaining to maturity on rebalance day for inclusion in the index.

If FX rates from WM Reuters are unavailable on the last weekday of the month (i.e. Good Friday), indices are rebalanced on the previous business day.

The index is weighted by the component securities' market capitalization (dirty price times par outstanding). The weights change monthly on each rebalance day, and those weights remain active for the remainder of that month.

Daily indicative pricing for each security and FX rate is closely scrutinized and are reconciled using market movements and other pricing sources as guidance. As necessary, an established alternate source will be used to maintain the integrity of daily index calculations. On any given calculation day, if the primary source is unable to provide a quote, the Index Group reserves the right to consider the use of an appropriate alternate source for index inputs, such as pricing and FX. If a permanent switch for the primary third party pricing source is necessary, clients will be notified in advance prior to any official switch.

Appendix A: Bond Total Return Methodology

A. Standard Case

The total return for an individual bond between days (t-1) and (t) is calculated as shown below:

$$Total\ Return_t = \left(\frac{P_t + A_{v(t)}}{P_{t-1} + A_{v(t-1)}} \right) - 1$$

$Total\ Return_t$	Total return value on day t, incorporating both principal and interest
P_t	Local market closing clean pricing of a bond on day t.
$A_{v(t)}$	Accrued interest for a bond on day t; it is calculated up to, but excluding the value date v(t)
t	Current market day
$t - 1$	Previous market day determined by the market's holiday calendar

Accrued interest for a bond is based on the following formula:

$$A_{v(t)} = \left(\frac{C_{v(t)} \times d_{v(t)}}{d_y} \right)$$

$C_{v(t)}$	Next coupon to be paid on a bond after the value date v(t)
$d_{v(t)}$	Number of days of accrued interest used to calculate : it can be zero or negative
d_y	Number of days in a year according to a bond's day count convention

Total return indices for individual bonds are calculated as shown below:

$$Index_t = Index_{t-1} \times Total\ Return_t$$

$Index_t$	Index value on day t
-----------	----------------------

B. On Coupon Value Date

On coupon value date, the accrued interest for specific bond is reset to zero. On that date, the coupon value will be added into calculation of the total return and the associated index.

$$Total\ Return_t = \left(\frac{P_t + C_{v(t)}}{P_{t-1} + A_{v(t-1)}} \right) - 1 \qquad Index_t = Index_{t-1} \times \left(\frac{P_t + C_{v(t)}}{P_{t-1} + A_{v(t-1)}} \right)$$

Appendix B: Bond Yield Methodology

Calculation of yield to maturity in the GBI indices is a two-step process. First, the following equation is solved iteratively for the discount rate (r):

$$P + A = \sum_{n=1}^{i-1} \left(\frac{C_i}{b} \right) \times [1 - \sum f_k] \times r^{t_i} + \sum f_i R_i \times r^{t_i} + f_F \times (R_F + A_F) \times r^{t_F}$$

P	Clean Price
A	Accrued interest through the value date
r	Discount rate
d_t	Number of days from settlement to coupon payment i (final payment if $i = F$)
d_y	Number of days in the year
t_i	Time to the i th cash flow expressed in coupon periods
N	Number of coupon payments left
F	Indicator for final redemption if $F > N$ (else, ignore this term)
C_i	Annual coupon rate in the i th period (percentage of face value)
f_i	Fraction of current amount outstanding redeemed on the i th coupon payment date (or on the final redemption date if $i = F$)
R_i	Redemption price on the i th coupon payment date (or on the final payment date if $i = F$)
A_F	Additional accrued interest from the final coupon date N to the final redemption date F

Once the discount factor is obtained, the true yield is calculated as follows:

$$Yield = 100 + \left[\frac{1 \left(\frac{1}{b} \right)}{r} - 1 \right] \times b$$

b Basis of yield quote ($b=1$ = annual, $b=2$ = semi-annual, etc.)

Appendix C: Total Return Calculation Methodology

Total return for a portfolio of bonds between days $(t-1)$ and (t) is calculated as shown below.

$$Total\ Return_t = \sum_{n=1}^{bonds} \left[\left(\left(\frac{P_{n_t} + A_{n_{v(t)}} (if\ A_{v(t)} < A_{v(t-1)}) + C_{v(t)}}{P_{n(t-1)} + A_{n_{v(t-1)}}} \right) - 1 \right) * \frac{ParOuts_{n_t}}{ParOuts_{n_{t-1}}} \right]$$

The total return index is calculated as shown below:

$$T.R. Index_t = T.R. Index_{t-1} * Total\ Return_t$$

n	Indicates a given bond within the market portfolio. “ n ” moves from 1 to “bonds,” with “bonds” being the last bond in the portfolio.
t	Current market day
$t-1$	Previous market day determined by the market’s holiday calendar

P_{n_t}	Local market closing clean price of a bond n on day t
$A_{n_{v(t)}}$	Accrued interest for a bond n on day t; it is calculated up to, but excluding the value date $v(t)$
$C_{v(t)}$	Next coupon to be paid on a bond after the value date $v(t)$
$ParOuts_t$	Par value outstanding in local currency. This value remains constant through a given month. This value is rebalanced for new issues, retiring issues and auctions as part of the month end process.
$\langle \text{if } A_{v(t)} < A_{v(t-1)} \rangle$	Equals 1 if the boolean expression is true; otherwise, it equals zero. This boolean will be true when t is equal to coupon value date and accrued interest is reset to zero.
$Total Return_t$	Total return value on day t, incorporating both principal and interest
$Index_t$	Index value on day t

Global Index Research

www.jpmmorganmarkets.com

Disclosures

Analyst Certification: The research analyst(s) denoted by an “AC” on the cover of this report certifies (or, where multiple research analysts are primarily responsible for this report, the research analyst denoted by an “AC” on the cover or within the document individually certifies, with respect to each security or issuer that the research analyst covers in this research) that: (1) all of the views expressed in this report accurately reflect his or her personal views about any and all of the subject securities or issuers; and (2) no part of any of the research analyst's compensation was, is, or will be directly or indirectly related to the specific recommendations or views expressed by the research analyst(s) in this report. For all Korea-based research analysts listed on the front cover, they also certify, as per KOFIA requirements, that their analysis was made in good faith and that the views reflect their own opinion, without undue influence or intervention.

Company-Specific Disclosures: Important disclosures, including price charts and credit opinion history tables, are available for compendium reports and all J.P. Morgan-covered companies by visiting <https://www.jpmm.com/research/disclosures>, calling 1-800-477-0406, or e-mailing research.disclosure.inquiries@jpmorgan.com with your request. J.P. Morgan's Strategy, Technical, and Quantitative Research teams may screen companies not covered by J.P. Morgan. For important disclosures for these companies, please call 1-800-477-0406 or e-mail research.disclosure.inquiries@jpmorgan.com.

Analysts' Compensation: The research analysts responsible for the preparation of this report receive compensation based upon various factors, including the quality and accuracy of research, client feedback, competitive factors, and overall firm revenues.

Other Disclosures

J.P. Morgan ("JPM") is the global brand name for J.P. Morgan Securities LLC ("JPMS") and its affiliates worldwide. J.P. Morgan Cazenove is a marketing name for the U.K. investment banking businesses and EMEA cash equities and equity research businesses of JPMorgan Chase & Co. and its subsidiaries.

Options related research: If the information contained herein regards options related research, such information is available only to persons who have received the proper option risk disclosure documents. For a copy of the Option Clearing Corporation's Characteristics and Risks of Standardized Options, please contact your J.P. Morgan Representative or visit the OCC's website at <https://www.theocc.com/components/docs/riskstoc.pdf>

Legal Entities Disclosures

U.S.: JPMS is a member of NYSE, FINRA, SIPC and the NFA. JPMorgan Chase Bank, N.A. is a member of FDIC. **U.K.:** JPMorgan Chase N.A., London Branch, is authorised by the Prudential Regulation Authority and is subject to regulation by the Financial Conduct Authority and to limited regulation by the Prudential Regulation Authority. Details about the extent of our regulation by the Prudential Regulation Authority are available from J.P. Morgan on request. J.P. Morgan Securities plc (JPMS plc) is a member of the London Stock Exchange and is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. Registered in England & Wales No. 2711006. Registered Office 25 Bank Street, London, E14 5JP. **South Africa:** J.P. Morgan Equities South Africa Proprietary Limited is a member of the Johannesburg Securities Exchange and is regulated by the Financial Services Board. **Hong Kong:** J.P. Morgan Securities (Asia Pacific) Limited (CE number AAJ321) is regulated by the Hong Kong Monetary Authority and the Securities and Futures Commission in Hong Kong and/or J.P. Morgan Broking (Hong Kong) Limited (CE number AAB027) is regulated by the Securities and Futures Commission in Hong Kong. **Korea:** This material is issued and distributed in Korea by or through J.P. Morgan Securities (Far East) Limited, Seoul Branch, which is a member of the Korea Exchange(KRX) and is regulated by the Financial Services Commission (FSC) and the Financial Supervisory Service (FSS). **Australia:** J.P. Morgan Australia Limited (JPMAL) (ABN 52 002 888 011/AFS Licence No: 238188) is regulated by ASIC and J.P. Morgan Securities Australia Limited (JPMSAL) (ABN 61 003 245 234/AFS Licence No: 238066) is regulated by ASIC and is a Market, Clearing and Settlement Participant of ASX Limited and CHI-X. **Taiwan:** J.P. Morgan Securities (Taiwan) Limited is a participant of the Taiwan Stock Exchange (company-type) and regulated by the Taiwan Securities and Futures Bureau. **India:** J.P. Morgan India Private Limited (Corporate Identity Number - U67120MH1992FTC068724), having its registered office at J.P. Morgan Tower, Off. C.S.T. Road, Kalina, Santacruz - East, Mumbai – 400098, is registered with Securities and Exchange Board of India (SEBI) as a ‘Research Analyst’ having registration number INH000001873. J.P. Morgan India Private Limited is also registered with SEBI as a member of the National Stock Exchange of India Limited (SEBI Registration Number - INB 230675231/INF 230675231/NE 230675231), the Bombay Stock Exchange Limited (SEBI Registration Number - INB 010675237/INF 010675237) and as a Merchant Banker (SEBI Registration Number - MB/INM000002970). Telephone: 91-22-6157 3000, Facsimile: 91-22-6157 3990 and Website: www.jpimpl.com. For non local research reports, this material is not distributed in India by J.P. Morgan India Private Limited. **Thailand:** This material is issued and distributed in Thailand by JPMorgan Securities (Thailand) Ltd., which is a member of the Stock Exchange of Thailand and is regulated by the Ministry of Finance and the Securities and Exchange Commission and its registered address is 3rd Floor, 20 North Sathorn Road, Silom, Bangrak, Bangkok 10500. **Indonesia:** PT J.P. Morgan Securities Indonesia is a member of the Indonesia Stock Exchange and is regulated by the OJK a.k.a. BAPEPAM LK. **Philippines:** J.P. Morgan Securities Philippines Inc. is a Trading Participant of the Philippine Stock Exchange and a member of the Securities Clearing Corporation of the Philippines and the Securities Investor Protection Fund. It is regulated by the Securities and Exchange Commission. **Brazil:** Banco J.P. Morgan S.A. is regulated by the Comissao de Valores Mobiliarios (CVM) and by the Central Bank of Brazil. **Mexico:** J.P. Morgan Casa de Bolsa, S.A. de C.V., J.P. Morgan Grupo Financiero is a member of the Mexican Stock Exchange and authorized to act as a broker dealer by the National Banking and Securities Exchange Commission. **Singapore:** This material is issued and distributed in Singapore by or through J.P. Morgan Securities Singapore Private Limited (JPMSS) [MCI (P) 202/03/2017 and Co. Reg. No.: 199405335R], which is a member of the Singapore Exchange Securities Trading Limited and/or JPMorgan Chase Bank, N.A., Singapore branch (JPMCB Singapore) [MCI (P) 059/09/2017], both of which are regulated by the Monetary Authority of Singapore. This material is issued and distributed in Singapore only to accredited investors, expert investors and institutional investors, as defined in Section 4A of the Securities and Futures Act, Cap. 289 (SFA). This material is not intended to be issued or distributed to any retail investors or any other investors that do not fall into the classes of “accredited investors,” “expert investors” or “institutional investors,” as defined under Section 4A of the SFA. Recipients of this document are to contact JPMSS or JPMCB Singapore in respect of any matters arising from, or in connection with, the document. **Japan:** JPMorgan Securities Japan Co., Ltd. and JPMorgan Chase Bank, N.A., Tokyo Branch are regulated by the Financial Services Agency in Japan. **Malaysia:** This material is issued and distributed in Malaysia by JPMorgan Securities (Malaysia) Sdn Bhd (18146-X) which is a Participating Organization of Bursa Malaysia Berhad and a holder of Capital Markets Services License issued by the Securities Commission in Malaysia. **Pakistan:** J. P. Morgan Pakistan Broking (Pvt.) Ltd is a member of the Karachi Stock Exchange and regulated by the Securities and Exchange Commission of Pakistan. **Saudi Arabia:** J.P. Morgan Saudi Arabia Ltd. is authorized by the Capital Market Authority of the Kingdom of Saudi Arabia (CMA) to carry out dealing as an agent, arranging, advising and custody, with respect to securities business

under licence number 35-07079 and its registered address is at 8th Floor, Al-Faisaliyah Tower, King Fahad Road, P.O. Box 51907, Riyadh 11553, Kingdom of Saudi Arabia. **Dubai:** JPMorgan Chase Bank, N.A., Dubai Branch is regulated by the Dubai Financial Services Authority (DFSA) and its registered address is Dubai International Financial Centre - Building 3, Level 7, PO Box 506551, Dubai, UAE.

Country and Region Specific Disclosures

U.K. and European Economic Area (EEA): Unless specified to the contrary, issued and approved for distribution in the U.K. and the EEA by JPMS plc. Investment research issued by JPMS plc has been prepared in accordance with JPMS plc's policies for managing conflicts of interest arising as a result of publication and distribution of investment research. Many European regulators require a firm to establish, implement and maintain such a policy. Further information about J.P. Morgan's conflict of interest policy and a description of the effective internal organisations and administrative arrangements set up for the prevention and avoidance of conflicts of interest is set out at the following link <https://www.jpmorgan.com/jmpdf/1320742677360.pdf>. This report has been issued in the U.K. only to persons of a kind described in Article 19 (5), 38, 47 and 49 of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (all such persons being referred to as "relevant persons"). This document must not be acted on or relied on by persons who are not relevant persons. Any investment or investment activity to which this document relates is only available to relevant persons and will be engaged in only with relevant persons. In other EEA countries, the report has been issued to persons regarded as professional investors (or equivalent) in their home jurisdiction. **Australia:** This material is issued and distributed by JPMSAL in Australia to "wholesale clients" only. This material does not take into account the specific investment objectives, financial situation or particular needs of the recipient. The recipient of this material must not distribute it to any third party or outside Australia without the prior written consent of JPMSAL. For the purposes of this paragraph the term "wholesale client" has the meaning given in section 761G of the Corporations Act 2001. **Germany:** This material is distributed in Germany by J.P. Morgan Securities plc, Frankfurt Branch which is regulated by the Bundesanstalt für Finanzdienstleistungsaufsicht. **Hong Kong:** The 1% ownership disclosure as of the previous month end satisfies the requirements under Paragraph 16.5(a) of the Hong Kong Code of Conduct for Persons Licensed by or Registered with the Securities and Futures Commission. (For research published within the first ten days of the month, the disclosure may be based on the month end data from two months prior.) J.P. Morgan Broking (Hong Kong) Limited is the liquidity provider/market maker for derivative warrants, callable bull bear contracts and stock options listed on the Stock Exchange of Hong Kong Limited. An updated list can be found on HKEx website: <http://www.hkex.com.hk>. **Korea:** This report may have been edited or contributed to from time to time by affiliates of J.P. Morgan Securities (Far East) Limited, Seoul Branch. **Singapore:** As at the date of this report, JPMS is a designated market maker for certain structured warrants listed on the Singapore Exchange where the underlying securities may be the securities discussed in this report. Arising from its role as designated market maker for such structured warrants, JPMS may conduct hedging activities in respect of such underlying securities and hold or have an interest in such underlying securities as a result. The updated list of structured warrants for which JPMS acts as designated market maker may be found on the website of the Singapore Exchange Limited: <http://www.sgx.com>. In addition, JPMS and/or its affiliates may also have an interest or holding in any of the securities discussed in this report – please see the Important Disclosures section above. For securities where the holding is 1% or greater, the holding may be found in the Important Disclosures section above. For all other securities mentioned in this report, JPMS and/or its affiliates may have a holding of less than 1% in such securities and may trade them in ways different from those discussed in this report. Employees of JPMS and/or its affiliates not involved in the preparation of this report may have investments in the securities (or derivatives of such securities) mentioned in this report and may trade them in ways different from those discussed in this report. **Taiwan:** This material is issued and distributed in Taiwan by J.P. Morgan Securities (Taiwan) Limited. According to Paragraph 2, Article 7-1 of Operational Regulations Governing Securities Firms Recommending Trades in Securities to Customers (as amended or supplemented) and/or other applicable laws or regulations, please note that the recipient of this material is not permitted to engage in any activities in connection with the material which may give rise to conflicts of interests, unless otherwise disclosed in the "Important Disclosures" in this material. **India:** For private circulation only, not for sale. **Pakistan:** For private circulation only, not for sale. **New Zealand:** This material is issued and distributed by JPMSAL in New Zealand only to persons whose principal business is the investment of money or who, in the course of and for the purposes of their business, habitually invest money. JPMSAL does not issue or distribute this material to members of "the public" as determined in accordance with section 3 of the Securities Act 1978. The recipient of this material must not distribute it to any third party or outside New Zealand without the prior written consent of JPMSAL. **Canada:** The information contained herein is not, and under no circumstances is to be construed as, a prospectus, an advertisement, a public offering, an offer to sell securities described herein, or solicitation of an offer to buy securities described herein, in Canada or any province or territory thereof. Any offer or sale of the securities described herein in Canada will be made only under an exemption from the requirements to file a prospectus with the relevant Canadian securities regulators and only by a dealer properly registered under applicable securities laws or, alternatively, pursuant to an exemption from the dealer registration requirement in the relevant province or territory of Canada in which such offer or sale is made. The information contained herein is under no circumstances to be construed as investment advice in any province or territory of Canada and is not tailored to the needs of the recipient. To the extent that the information contained herein references securities of an issuer incorporated, formed or created under the laws of Canada or a province or territory of Canada, any trades in such securities must be conducted through a dealer registered in Canada. No securities commission or similar regulatory authority in Canada has reviewed or in any way passed judgment upon these materials, the information contained herein or the merits of the securities described herein, and any representation to the contrary is an offence. **Dubai:** This report has been issued to persons regarded as professional clients as defined under the DFSA rules. **Brazil:** Ombudsman J.P. Morgan: 0800-7700847 / ouvidoria.jp.morgan@jpmorgan.com.

General: Additional information is available upon request. Information has been obtained from sources believed to be reliable but JPMorgan Chase & Co. or its affiliates and/or subsidiaries (collectively J.P. Morgan) do not warrant its completeness or accuracy except with respect to any disclosures relative to JPMS and/or its affiliates and the analyst's involvement with the issuer that is the subject of the research. All pricing is indicative as of the close of market for the securities discussed, unless otherwise stated. Opinions and estimates constitute our judgment as of the date of this material and are subject to change without notice. Past performance is not indicative of future results. This material is not intended as an offer or solicitation for the purchase or sale of any financial instrument. The opinions and recommendations herein do not take into account individual client circumstances, objectives, or needs and are not intended as recommendations of particular securities, financial instruments or strategies to particular clients. The recipient of this report must make its own independent decisions regarding any securities or financial instruments mentioned herein. JPMS distributes in the U.S. research published by non-U.S. affiliates and accepts responsibility for its contents. Periodic updates may be provided on companies/industries based on company specific developments or announcements, market conditions or any other publicly available information. Clients should contact analysts and execute transactions through a J.P. Morgan subsidiary or affiliate in their home jurisdiction unless governing law permits otherwise.

"Other Disclosures" last revised January 01, 2018.

Copyright 2018 JPMorgan Chase & Co. All rights reserved. This report or any portion hereof may not be reprinted, sold or redistributed without the written consent of J.P. Morgan.