FOCUS | EUROZONE
18 October 2018

Please refer to important information at the end of this report

MARKETS 360
Strategy & Economics

ECONOMICS | G10 INTEREST RATES

ECB: ON TRACK

KEY MESSAGES

We expect the European Central Bank to announce next week that it is on track to end net asset purchases in December – despite Italy worries.

This is likely to be accompanied by an announcement on reinvestments and a dovish press conference.

The ECB will, in our view, allow maximum flexibility on reinvestments within existing parameters, including the possibility of buying longer maturities.

However, the ECB is likely to view reinvestments as a predominantly technical means to ensure smooth implementation, rather than as a way to modify the policy stance.

The key decisions at the Governing Council on 25 October are likely to be whether to announce the end of net asset purchases and details of the ECB's reinvestment programme. This note discusses why we think the answer to both is 'yes'.

- Normalisation is on track.
- The ECB is unlikely to act over Italy market tensions.
- There are reasons to announce next week and reasons to wait until 13 December – and a middle course.
- Our review of reinvestment modalities considers:
  - change in the capital key;
  - flexibility around the capital key;
  - variants of Operation Twist;
  - differentiated stimulus across countries; and
  - using reinvestments to make up for potentially miscalibrating forward guidance on rates.
- We think it is too early for the ECB to modify its forward guidance to temper market expectations of rate hikes.
- We continue to expect the ECB to raise the deposit rate by 20bp in September 2019.

MARKET VIEW

With the ECB unlikely to carry out an operation twist, we think the high embedded QE premium on long-dated German ASW – especially on the 30y bucket – should fade over time. Selling the 10y20y Bund ASW is a potential way to benefit from tighter ASW at the very long end of the German curve.

Luigi Speranza, Head of European Economics | BNP Paribas London Branch |
Spyros Andreopoulos, Senior European Economist | BNP Paribas S.A. Zweigniederlassung Frankfurt |
Agne Stengeryte, Europe Strategist | BNP Paribas London Branch

Normalisation on track

The ECB has two meetings left in 2018 to make two important announcements: whether to extend asset purchases and the key parameters of its reinvestment programme.

The macro environment appears as uncertain as ever.

- Although domestic demand looks to be holding up well (as accelerating wage growth combines with persistently strong job creation), slower export demand and some wobbles in the German car sector have put strain on manufacturing.
- Clearer signs of wage growth in response to an increasingly tight labour market are good news for inflation, but core inflation remains stubbornly low.
- Downside risks persist, stemming mainly from political developments, including global trade tensions, Brexit and Italy.

Overall, however, we see little in recent developments that could substantially change the ECB's latest assessment: growth is still resilient (with some risks) and inflation is likely to keep moving towards its target (albeit very gradually).

Against this backdrop, we believe the bar for any extension of net asset purchases remains very high, making it likely that net purchases end in December. We don't think that Italian worries are likely to meaningfully influence the upcoming decisions (see text box below). Indeed, the ECB has, in the past, made "hawkish" decisions against the backdrop of Italian uncertainty.

On balance, our bias is that the ECB is more likely to announce the decision to terminate net purchases at October's meeting rather than December's – or at least 'pre-announce' through language that signals a stronger conviction.

Recent ECB communication has been on a hawkish trajectory, in our view, albeit in small increments. We think it intends to signal a slow but steady advance down a normalisation path. Communicating the end of net asset purchases in October would, we believe, be consistent with this.

From a monetary policy stance perspective, the decision to end the purchases is almost a foregone conclusion and its timing is of secondary importance. However, we think the Governing Council will be sensitive to a potentially negative market reaction. The announcement might, therefore, be accompanied by a statement on reinvestments that will promise maximum flexibility, as well as by a relatively dovish tone in the press conference.

We expect the statement on reinvestments to leave all the options open, with the capital key the only real constraint. Within the capital key, the guiding principle will probably be applied with flexibility – as is already the case – to smooth the reinvestment process in view of the lumpiness of the maturity profile. Indications that the principle of market neutrality will be adhered to only loosely could lead the market to price in Operation Twist, and ECB communication might not lean against it.

We discuss the scope for such flexibility on the following pages. Overall, we argue that whatever tweaks the ECB might make to its reinvestment process will be technical choices that aim to enable smooth implementation, rather than attempts to modify the monetary policy stance.

Changes in forward guidance on rates to encompass statements about the gradient of the exit path are likely to be on the Governing Council's radar screen for next year. At this stage, however, and with a fraught communication agenda for the remaining two meetings of the year, we think the ECB will refrain from putting focus on rates. Any explicit references to rate increases now might be perceived as more hawkish by the market than the Governing Council might consider warranted.

The Italian question: On Italy, we have no doubt that the ECB is worried about the potential implications of escalating market tensions, but the central bank's hands are tied for now.

In our view, the ECB would not hesitate to intervene if and when a further escalation raises the chances of a systemic problem that risks impairing the transmission mechanism of monetary policy. But the bar to that looks very high indeed.

As President Draghi pointed out at the last press conference, there is little evidence of spillover effects and hence a more systemic risk.

Italy's strong challenge to EU rules gives rise to a risk of moral hazard should the ECB opt to take an interventionist stance. The ECB would likely be reluctant to help a government that is in open and deliberate breach of the rules. Just as importantly, it would not want to be seen to be doing so.

Further, the ECB would not want to distort prices to the extent that it sees recent spread widening as a rational response by the market to Italian fiscal developments. That said, it may well be the case that the Italian bond market ends up benefitting indirectly from some of the flexibility the ECB could introduce to its reinvestment programme, although any such benefits are likely to be modest.

Luigi Speranza, Head of European Economics | BNP Paribas London Branch |
Spyros Andreopoulos, Senior European Economist | BNP Paribas S.A. Zweigniederlassung Frankfurt

Timing of announcement: October or December?

On balance, our bias is that the ECB is more likely to announce the decision to terminate net purchases at October's meeting rather than December's – or at least to 'pre-announce' through language that signals a stronger conviction.

Why to go already in October	Why to wait until December
In the past, the Governing Council has not left things to the last minute. This time, however, it might feel that it already communicated an inclination to terminate purchases in several successive statements: "After September 2018, the Governing Council will reduce the monthly pace of the net asset purchases to €15 billion until the end of December 2018 and anticipates that, subject to incoming data confirming the medium-term inflation outlook, net purchases will then end." An October announcement would signal the Governing Council's confidence in the inflation outlook, despite noisy data. If the Governing Council decides not to announce in October, the market could start pricing a continuation of net asset purchases beyond December; leaning against that might require very hawkish language.	There might be option value of waiting: committing already on the fate of the asset purchase programme would deprive the ECB of some degrees of freedom to respond to contingencies. The Governing Council might want to wait for the December staff projections to ascertain that "the incoming data [confirm] the medium-term inflation outlook", particularly given that core inflation has disappointed recently. That said, the ECB has in the past made important decisions outside a staff forecast round – most recently in October last year, when the Governing Council decided to extend purchases at a lower pace of EUR30bn a month until September 2018.

The issue need not be binary, however. Instead of an outright announcement in October of an end to net purchases in December, the Governing Council might **change the language in a way that expresses a higher degree of conviction in a December termination**.

For example, it could amend the introductory statement (changed wording in bold).

> "…and **strongly** anticipates that, subject to incoming data confirming the medium-term inflation outlook, net purchases will then end."

or

> "…**and, subject to incoming data confirming the medium-term inflation outlook, the Governing Council intends to end** net purchases."

The advantage for the Governing Council of such formulations are that they convey the message that net purchases are very likely to end in December without losing conditionality and hence impairing the state-contingent character of the ECB reaction function.

In addition, there are connections between the two announcements: were the Governing Council to announce details on reinvestments now, it would focus market attention on the fact that net purchases are very likely to end in December.

Making the decision on net purchases a foregone conclusion could even give the Governing Council some more time to decide on reinvestments, if needed – President Draghi has stated that the issue had not been previously discussed.

Luigi Speranza, Head of European Economics | BNP Paribas London Branch |
Spyros Andreopoulos, Senior European Economist | BNP Paribas S.A. Zweigniederlassung Frankfurt

Reinvestment modalities: capital key

While we think that the ECB's communication might not want to lean against the market pricing an Operation Twist, it is likely to view the modalities of its reinvestment programme as predominantly technical, rather than as a means to modify the monetary policy stance. Within this technical perspective, we think the ECB will want to maintain maximum flexibility, with the capital key as the only inviolable constraint.

Capital key adjustment: The ECB capital key changes every five years to reflect relative population and GDP weights. The next change is due in 2019. With the highest change in the capital key weightings being only about 1pp, we do not see any significant market implications.

Assuming a change next year, the main beneficiaries would be Germany (+1.0pp), Ireland (+0.2pp) and Austria (+0.14pp), with the main losers Italy (−0.89pp), Spain (−0.72pp) and, to a lesser extent, Portugal (though realised ECB public-sector purchase weights since 2015 have been much lower anyway, at 1.90% vs 2.55%.

Because of multiple constraints, we think the ECB would want to be as flexible as necessary, but not much more than that. Besides the capital key, constraints arise from the programme parameters (issue and issuer limits), the volatile time path of redemptions (Figure 1) and exogenous reasons – importantly, the scarcity of German paper. Therefore, the ECB would have to be as flexible as possible to allow for smooth implementation of the programme.

We think the ECB will be mindful of several other factors in its reinvestment policy. While we think that the ECB's communication may not want to lean against the market pricing an Operation Twist, we are generally sceptical about how much room there is to 'instrumentalise' reinvestments to pursue objectives beyond the narrow implementation of the programme.

Flexibility around capital key: The capital key is, for political reasons, the most important parameter of the PSPP and, therefore, all but inviolable. However – like 'pull to par' – the capital key is really binding only in the long run, as purchases must satisfy the capital key only eventually, on total purchases.

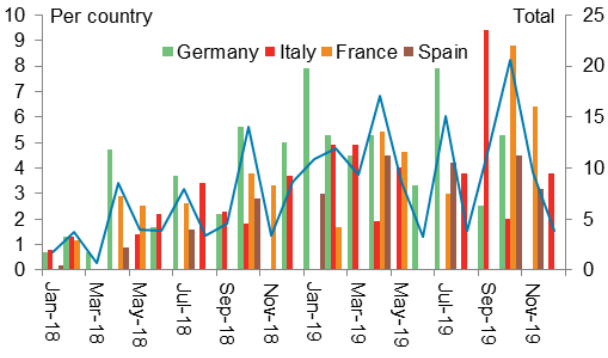
In the shorter term, therefore, we expect that the ECB will continue to opt for maximum flexibility. In fact, monthly PSPP purchases have been deviating from the capital key since the start of the programme, more significantly so since the start of 2017 (Figure 2).

However, we estimate that the ECB's holdings as at September did not deviate by more than 1% from the capital key for major economies.

In Germany, the deviation is about 0.35% above the capital key, which suggests this over-allocation could be reduced to nil over time by purchasing German bonds below the capital key on a monthly basis.

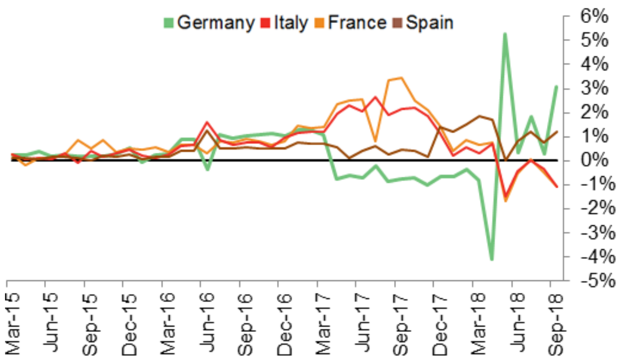
Similarly, holdings are above the capital key by 0.94% in France, 0.83% in Italy and 0.49% in Spain. Monthly PSPP purchases were below the capital key in recent months in these countries.

Fig. 1: Estimated monthly ECB PSPP redemptions of EGBs by country (EURbn)



Sources: ECB, BNP Paribas

Fig. 2: Monthly deviations from ECB capital key weighting by country (%)



Sources: ECB, BNP Paribas

Luigi Speranza, Head of European Economics | Agne Stengeryte, Europe Strategist | BNP Paribas London Branch |
Spyros Andreopoulos, Senior European Economist | BNP Paribas S.A. Zweigniederlassung Frankfurt

Other reinvestment modalities

Lumpiness and cross-jurisdiction buying: According to the current PSPP modalities, if purchases of marketable debt instruments issued by the central government and agencies need to be complemented to implement the relevant national central bank's share of purchases through the end of the APP, it can substitute purchases comprising marketable debt instruments issued by international or supranational institutions located in the euro area.

Regarding reinvestments, the ECB has given itself the freedom to reinvest redemption flows within the same month or in the following two months.

A key question is whether a national central bank that faces a large redemption but is unable to reinvest in bonds of its own jurisdiction due to constraints – including availability of paper from its own jurisdiction – could temporarily buy another country's bonds. The ECB has said in the past that "*[d]uring the period of net asset purchases*, PSPP principal redemptions will be reinvested in the jurisdiction in which the maturing bond was issued." [our italics]

In principle, this might leave room for central banks to buy in other jurisdictions once net purchases have ended. Conversely, if the Governing Council were to remove this flexibility, it could be received as a hawkish signal.

In any case, the ECB would likely be mindful of political constraints. Bundesbank purchases of Italian bonds, for example, might generate formidable communicational challenges.

Reinvestments along a given country curve: The ECB has broadly followed the principle of market neutrality when it comes to allocating purchases along a given country curve.

But we think this principle is less important than the capital key, there is likely to be more flexibility to deviate from market neutrality as needed to achieve smooth implementation, including some possible (limited) permanent deviations. Any absence of explicit commitment to market neutrality would be important information for the market, we think.

Having said that, we think the outright pursuit of 'hidden' objectives with this programme is not very likely. Through its board member Benoît Cœuré, responsible for market operations, the ECB early on established market neutrality as a principle that ensures "a high degree of transparency around its interventions".

We are, therefore, sceptical on whether the ECB would intend to

- engineer variants of Operation Twist (see p.6); or
- differentiate stimulus across countries (p.7).

Luigi Speranza, Head of European Economics | Agne Stengeryte, Europe Strategist | BNP Paribas London Branch |
Spyros Andreopoulos, Senior European Economist | BNP Paribas S.A. Zweigniederlassung Frankfurt

Variants of Operation Twist

We think a Fed-style Operation Twist – with outright sales of securities – is unlikely. Operation twist via reinvestments is not feasible in all countries; and the extent of curve twisting via reinvestments even in jurisdictions where this is possible is limited

Fed-style operation: An Operation Twist akin to that conducted by the US Federal Reserve would involve selling at the short end of the curve and buying at the long end in order to flatten the curve. The objective would be to add monetary policy accommodation while being neutral for central bank liquidity, as no reserves are injected into the system.

We think that the ECB is unlikely to embark on this. An operation twist would contradict current communication on the general direction of travel for ECB monetary policy. With increased confidence in a sustained adjustment for the path of inflation towards the ECB's aim being expressed by the Governing Council, monetary policy accommodation will be withdrawn over time, not added.

Furthermore, an operation twist could have undesirable side effects. By design, it should result in higher short-end rates and lower long-end rates – that is, it would be pushing the BTP curve towards inversion.

More generally, we think the ECB is unlikely to conduct sales of securities anytime soon.

Operation Twist via reinvestments: In principle, effects similar to the ones of an operation twist could be achieved through reinvestments. However, this is not feasible in several countries – above all Germany, for which existing holdings are likely to be close to issue limits for most of the bonds, forcing the ECB to reinvest into new issuance, of which 90% is less than 10 years.

The Netherlands and Austria are also facing significant constraints. According to our latest estimates, the respective treasuries hold 31% and 26% of the PSPP-eligible bond market (see *ECB PSPP reinvestments: Stick or twist?* dated 16 July). Barring a highly unlikely change in the issue share limit, PSPP reinvestments in these countries will rely heavily on new supply and its maturity distribution.

Only 9% of the 2017 German government bond issuance was in >10y maturity bucket, compared with 28% of 2017 French government bond supply (a new record), 20% in Spain and 15% in Italy.

Of the 'big four' eurozone countries, which represent nearly 80% of the PSPP capital key, 2017 EGB supply amounts and issuance patterns suggest it could be possible for the PSPP to reinvest strictly into the long end in France, Italy and, broadly speaking, Spain. Countries with the lowest supply at the long end, such as Germany and the Netherlands, might increase their long-end supply.

However, **the extent of curve twisting via reinvestments even in jurisdictions where this is possible is limited** by two considerations.

- **Credibility**: If the ECB is not going to acknowledge the possibility of systematic deviations from market neutrality up front, it cannot de facto do so on a large scale – particularly in jurisdictions where market neutral purchases would have been technically feasible.
- **Political constraints**: The ECB would have to tread carefully to avoid giving the impression that particular countries are being 'helped' – for example, buying longer maturities more intensively could be seen as supporting the lengthening of debt maturity profiles in certain countries.

Luigi Speranza, Head of European Economics | Agne Stengeryte, Europe Strategist | BNP Paribas London Branch |
Spyros Andreopoulos, Senior European Economist | BNP Paribas S.A. Zweigniederlassung Frankfurt

Differentiated stimulus and forward guidance regrets

We think the ECB is unlikely to relinquish the principle of single monetary policy; nor is it likely to use reinvestments to tighten the stance to make up for possible regrets about its "through the summer" guidance on rates.

Differential stimulus across countries: Another objective might be to tailor stimulus to different country needs. Again, we have some doubts.

- The single monetary policy – applying and implementing monetary policy on an (average) eurozone-wide basis – is the single most important principle of how the ECB implements monetary policy. The Governing Council would be unlikely to water it down, we think, least of all to help Italy.

  In any case, whatever beneficial technical adjustments the ECB could make to its programme in Italy would be likely to be dwarfed by the challenges faced by the Italian bond market due to the prevailing uncertainties.
- It would clash with the very narrow objective of the reinvestment programme, which is to maintain whatever stimulus has been applied through net purchases.
- The ECB has not applied differential stimulus from the beginning of the PSPP, so why now?
- The volume of overall reinvestment flows would be likely to be insufficient to achieve a meaningful differentiation in stimulus.

Forward guidance regrets and 'inverse Operation Twist': Some in the market have talked about the ECB having regrets declaring that it will leave the deposit rate unchanged "through the summer of 2019". Might the ECB want to effect an early tightening by accelerating the decline in the duration of its bond portfolio? We think this is unlikely.

- It would go against the stated rationale of reinvestment, which is to maintain the level of accommodation coming from the balance sheet constant.
- It would risk harming the credibility of its forward guidance and clouding the waters of its communication.
- The ECB could make up for starting "too late" with lift-off by other means: it could hike rates faster or it could allow the curve to steepen by not guiding on the path (gradient) of interest rates after lift-off. This could have broadly the same effect without damaging the credibility of its forward guidance, which is likely to remain its crucial tool.

Luigi Speranza, Head of European Economics | BNP Paribas London Branch |
Spyros Andreopoulos, Senior European Economist | BNP Paribas S.A. Zweigniederlassung Frankfurt

Policy rates and forward guidance

In our view, the ECB will eventually modify its forward guidance to curb any potential for aggressive market pricing of a rate-hiking cycle by changing its language rather than introducing formal conditionality. However, we think it is probably too early for such a change, as the market might perceive any explicit references to rate increases at this stage as more hawkish than the Governing Council considers warranted.

Timing of lift-off: We remain of the view that the ECB is going to raise the deposit rate by 20bp to −0.20% in September 2019. In our base case, the economy will continue to evolve in a way that will increase inflation sufficiently towards the ECB's aim – the Governing Council's confidence in this is strengthened by recent data on wages.

Forward guidance on interest rate path: Following forward guidance thus far on the timing of lift-off, we think the next step could be to give guidance on the gradient of the interest rate path. This would give the Governing Council some control over the steepness of the risk-free curve in addition to the tenor at which it goes higher. Mr Cœuré suggested in a recent speech that this may be useful (see *Forward guidance and policy normalisation*, 17 September).

The most likely option, in our view, would be for the ECB to communicate in a state-contingent fashion on its reaction function. The Governing Council would articulate a conditional expectation of the speed of rate hikes, in line with established practice of giving state-contingent forward guidance. The wording might include references to a "moderate" or "measured" pace, "gradual" or "normalisation".

Several central banks in small open economies such as Sweden and Norway produce forecasts of policy rates conditional on the economic outlook. This would probably be unfeasible for the ECB, as it implies a degree of precision on future rates that the Governing Council would not want to commit to.

The ECB could communicate on the terminal rate, which, together with guidance on the date of lift-off, would effectively pin down the steepness of the curve; but we think this would also be likely to be unpopular in Frankfurt. Any estimate of the terminal rate would have to be based on estimates of the neutral rate, which is highly uncertain.

Timing of announcement: On balance, we think next week's meeting is too early for such language to be introduced.

In principle, if the purpose is to affect the steepness of the (money market) curve, such communication could come soon, but such communication could be risky. Early talk of rate hikes could result in an unwanted market repricing, even as the Governing Council revisiting its expectation to keep key interest rates unchanged "through the summer".

Luigi Speranza, Head of European Economics | BNP Paribas London Branch |
Spyros Andreopoulos, Senior European Economist | BNP Paribas S.A. Zweigniederlassung Frankfurt

This document has been written by our Strategist and Economist teams within the BNP Paribas group of companies (collectively "BNPP"); it does not purport to be an exhaustive analysis, and may be subject to conflicts of interest resulting from their interaction with sales and trading which could affect the objectivity of this report. This document is non-independent research for the purpose of the UK Financial Conduct Authority rules. For the purposes of the recast Markets in Financial Instruments Directive (2014/65/EU) (MiFID II), non-independent research constitutes a marketing communication. This document is not investment research for the purposes of MiFID II. It has not been prepared in accordance with legal requirements designed to provide the independence of investment research, and is not subject to any prohibition on dealing ahead of the dissemination of investment research.

The content in this document/communication may also contain "Research" as defined under the MiFID II unbundling rules. If the document/communication contains Research, it is intended for those firms who are either in scope of the MiFID II unbundling rules and have signed up to one of the BNPP Global Markets Research packages, or firms that are out of scope of the MiFID II unbundling rules and therefore not required to pay for Research under MiFID II. Please note that it is your firm's responsibility to ensure that you do not view or use the Research content in this document if your firm has not signed up to one of the BNPP Global Markets Research packages, except where your firm is out of scope of the MiFID II unbundling rules.

STEER™ is a trade mark of BNPP.

This document constitutes a marketing communication and has been prepared by BNPP for, and is directed at, (a) Professional Clients and Eligible Counterparties as defined by the recast Markets in Financial Instruments Directive (2014/65/EU) (MiFID II), and (b) where relevant, persons who have professional experience in matters relating to investments falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005, and at other persons to whom it may lawfully be communicated (together "Relevant Persons") under the regulations of any relevant jurisdiction. Any investment or investment activity to which this document relates is available only to and will be engaged in only with Relevant Persons. Any person who is not a Relevant Person should not act or rely on this document or its content.

Securities described herein may not be eligible for sale in all jurisdictions or to certain categories of investors.

The information and opinions contained in this document have been obtained from, or are based on, public sources believed to be reliable, but there is no guarantee of the accuracy, completeness or fitness for any particular purpose of such information and such information may not have been independently verified by BNPP or by any person. None of BNPP, any of its subsidiary undertakings or affiliates or its members, directors, officers, agents or employees accepts any responsibility or liability whatsoever or makes any representation or warranty, express or implied, as to the accuracy and completeness of the information or any opinions based thereon and contained in this document and it should not be relied upon as such.

This document does not constitute or form any part of any offer to sell or issue and is not a solicitation of any offer to purchase any financial instrument, nor shall it or any part of it nor the fact of its distribution form the basis of, or be relied on, in connection with any contract or investment decision. To the extent that any transaction is subsequently entered into between the recipient and BNPP, such transaction will be entered into upon such terms as may be agreed by the parties in the relevant documentation.

Information and opinions contained in this document are published for the information of recipients, but are not to be relied upon as authoritative or taken in substitution for the exercise of judgment by any recipient, are subject to change without notice and not intended to provide the sole basis of any evaluation of the instruments discussed herein. In providing this document, BNPP does not offer investment, financial, legal, tax or any other type of advice to, nor has any fiduciary duties towards, recipients. Any reference to past performance is not indicative of future performance, which may be better or worse than prior results. Any hypothetical, past performance simulations are the result of estimates made by BNPP, as of a given moment, on the basis of parameters, market conditions, and historical data selected by BNPP, and should not be used as guidance, in any way, of future performance. To the fullest extent permitted by law, no BNPP group company accepts any liability whatsoever (including in negligence) for any direct or consequential loss arising from any use of or reliance on material contained in this document even where advised of the possibility of such losses. All estimates and opinions included in this document are made as of the date of this document. Unless otherwise indicated in this document there is no intention to update this document.

BNPP may make a market in, or may, as principal or agent, buy or sell securities of any issuer or person mentioned in this document or derivatives thereon. Prices, yields and other similar information included in this document are included for information purposes however numerous factors will affect market pricing at any particular time, such information may be subject to rapid change and there is no certainty that transactions could be executed at any specified price.

BNPP may have a financial interest in any issuer or person mentioned in this document, including a long or short position in their securities and/or options, futures or other derivative instruments based thereon, or vice versa. BNPP, including its officers and employees may serve or have served as an officer, director or in an advisory capacity for any person mentioned in this document. BNPP may, from time to time, solicit, perform or have performed investment banking, underwriting or other services (including acting as adviser, manager, underwriter or lender) within the last 12 months for any person referred to in this document. BNPP may be a party to an agreement with any person relating to the production of this document. BNPP may to the extent permitted by law, have acted upon or used the information contained herein, or the analysis on which it was based, before the document was published. BNPP may receive or intend to seek compensation for investment banking services in the next three months from or in relation to any person mentioned in this document. Any person mentioned in this document may have been provided with relevant sections of this document prior to its publication in order to verify its factual accuracy.

This document is for information purposes only and there is no assurance that a transaction(s) will be entered into on such indicative terms. Any indicative price(s) contained herein have been prepared in good faith in accordance with BNPP's own internal models and calculation methods and/or are based on or use available price sources where considered relevant. Indicative price(s) based on different models or assumptions may yield different results. Numerous factors may affect the price(s), which may or may not be taken into account. Therefore, these indicative price(s) may vary significantly from indicative price(s) obtained from other sources or market participants. BNPP expressly disclaims any responsibility for the accuracy or completeness of its own internal models or calculation methods, the accuracy or reliability of any price sources used, any errors or omissions in computing or disseminating these indicative price(s), and for any use you make of the price(s) provided. The indicative price(s) do not represent (i) the actual terms on which a new transaction could be entered into, (ii) the actual terms on which any existing transactions could be unwound, (iii) the calculation or estimate of an amount that would be payable following an early termination of the transactions or (iv) the price(s) given to the transactions by BNPP in its own books of account for financial reporting, credit or risk management purposes. As an investment bank with a wide range of activities, BNPP may face conflicts of interest, which are resolved under applicable legal provisions and internal guidelines. You should be aware, however, that BNPP may engage in transactions in a manner inconsistent with the views expressed in this document, either for its own account or for the account of its clients.

This document may contain certain performance data based on back-testing, i.e. simulations of performance of a strategy, index or assets as if it had actually existed during a defined period of time. To the extent any such performance data is included, the scenarios, simulations, development expectations and forecasts contained in this document are for illustrative purposes only. All estimates and opinions included in this document constitute the judgment of BNPP and its affiliates as of the date of the document and may be subject to change without notice. This type of information has inherent limitations which recipients must consider carefully. While the information has been prepared in good faith in accordance with BNPP's own internal models and other relevant sources, an analysis based on different models or assumptions may yield different results. Unlike actual performance records, simulated performance returns or scenarios may not necessarily reflect certain market factors such as liquidity constraints, fees and transactions costs. Actual historical or back tested past performance does not constitute an indication of future results or performance.

This document is only intended to generate discussion regarding particular products and investments and is subject to change or may be discontinued. We are willing to discuss it with you on the understanding that you have sufficient knowledge, experience and professional advice to understand and make your own independent evaluation of the merits and risk of the information and any proposed structures. 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, the U.S. or any other province or territory nor shall it be deemed to provide investment, tax, accounting or other advice. Transactions involving the product(s) described in this document may involve a high degree of risk and the value of such transactions may be highly volatile. Such risks include, without limitation, risk of adverse or unanticipated market developments, risk of counterparty or issuer default, risk of adverse events involving any underlying reference obligation or entity and risk of illiquidity. In certain transactions, counterparties may lose their entire investment or incur an unlimited loss. The information relating to performance contained in this document is illustrative and no assurance is given that any indicated returns, performance or results will be achieved. Moreover, past performance is not indicative of future results. Information herein is believed reliable but BNPP and its affiliates do not warrant or guarantee its completeness or accuracy. All information, terms and pricing set forth herein reflect our judgment at the date and time hereof and are subject to change without notice. In the event that we were to enter into a transaction with you, we will do so as principal (and not as agent or in any other capacity, including, without limitation, as your fiduciary, advisor or otherwise). Only in the event of a potential transaction will an offering document be prepared, in which case, you should refer to the prospectus or offering document relating to the above potential transaction which includes important information, including risk factors that relate to an investment in the product(s) described herein.

Prior to transacting, you should ensure that you fully understand (either on your own or through the use of independent expert advisors) the terms of the transaction and any legal, tax and accounting considerations applicable to them. You should also consult with independent advisors and consultants (including, without limitation, legal counsel) to determine whether entering into any securities transactions contemplated herein would be contrary to local laws. The information contained herein is provided to you on a strictly confidential basis and you agree that it may not be copied, reproduced or otherwise distributed by you, whether in whole or in part (other than to your professional advisers), without our prior written consent.. Neither we, nor any of our affiliates, nor any of their respective directors, partners, officers, employees or representatives accepts any liability whatsoever for any direct or consequential loss arising from any use of this document or their content; and any of the foregoing may from time to time act as manager, co-manager or underwriter of a public offering or otherwise, in the capacity of principal or agent, deal in, hold or act as market makers or advisors, brokers or commercial and/or investment bankers in relation to the securities or related derivatives that are discussed herein. BNPP and its affiliates may (or may in the future) hold a position or act as a market maker in the financial instruments discussed, or act as an advisor, manager, underwriter or lender to such issuer. In no circumstances shall BNPP or its affiliates be obliged to disclose any information that it has received on a confidential basis or to disclose the existence thereof.

The information presented herein does not comprise a prospectus of securities for the purposes of EU Directive 2003/71/EC (as amended from time to time).

This document was produced by a BNPP group company. This document is for the use of intended recipients and may not be reproduced (in whole or in part) or delivered or transmitted to any other person without the prior written consent of BNPP. By accepting this document you agree to this.

United States Disclosures:

Important Option Disclosures: Options are complex instruments that are not suitable for every investor, may involve a high degree of risk, and may be appropriate investments only for sophisticated investors who are capable of understanding and assuming the risks involved. Supporting documentation for any claims, comparisons, recommendations, statistics or other technical data will be supplied upon request. Any trade information is preliminary and not intended as an official transaction confirmation. If the information contained herein regards options related content, 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 BNPP sales representative or visit the OCC's website at http://www.theocc.com/about/publications/character-risks.jsp

Important ETF Disclosures: For any ETFs discussed in this document, you should consider the investment objectives, risks, and charges and expenses of the investment company carefully before investing. The prospectus, and if available, the summary prospectus, contains this and other important information about the ETF. You may obtain a prospectus and, if available, a summary prospectus by calling +1 212 841-3099. The prospectus if available, and summary prospectus should be read carefully before investing. As with any investment, ETFs have risks. These include the general risks associated with investing in the underlying assets, potential tracking error, and the possibility that particular indices may lag other market segments or active managers. In addition, ETFs investing in international markets may include currency and geopolitical risks, while fixed income ETF risks also include credit and interest rate risk. BNPP and its affiliates may hold a position or act as a market maker in the financial instruments discussed, or act as an advisor, manager, underwriter, or lender to such issuer. As a result, BNPP may have potential conflicts of interest relating to the ETFs that are discussed in this material. In particular, BNPP may act as an Authorized Participant in the purchase or sale of shares from an ETF and participate in the creation and redemption of the securities covered in this material. In connection with these activities, BNPP may receive a fee, may be deemed to be an underwriter of the ETF shares, and may receive information about pending creations or redemptions of large blocks of ETF shares. Under no circumstances shall BNPP or its affiliates be obliged to disclose any information that it has received on a confidential basis or to disclose the existence of such information. BNPP also may act as a market maker or block positioner in the ETF shares discussed in this material, or financial instruments that are held by the ETF and/or are part of the index whose performance the ETF seeks to track. As a result, BNPP may be buying or selling ETF shares (or the instruments underlying the ETF shares) for other customers or for its own account while you are selling or buying ETF shares. BNPP may have multiple advisory, transactional, financial and other interests in the companies whose securities or other instruments may be purchased or sold by an ETF discussed in this material. BNPP may from time to time engage in business with these companies, including extending loans to, making equity investments in or providing advisory services to the companies, including merger and acquisition advisory services. In the course of those activities, certain BNPP personnel may acquire non-public information about the companies. Such information could potentially affect the prices at which the ETF shares trade. BNPP will maintain the confidentiality of such information and not disclose it to the ETF, ETF holders, or other unauthorized personnel.

Important Disclosures for Convertibles Securities or other Securities not registered under US Securities Laws: Certain securities discussed herein may not be registered under the Securities Act of 1933, as amended, and therefore are considered “restricted securities” pursuant to Rule 144(a)(3). Only Qualified Institutional Buyers (“QIBs”) as defined under Rule 144A or non-US persons (as defined in Regulation S under the Securities Act) may be eligible to purchase such instruments.

This report may be distributed (i) by BNPP Securities Corp. (“BNPPSC”) to U.S. persons who qualify as “institutional investors” under FINRA Rule 2210(a)(4), or (ii) by a subsidiary or affiliate of BNPP that is not registered as a U.S. broker-dealer only to U.S. persons who are considered “major U.S. institutional investors” (as such term is defined in Rule 15a-6 under the Securities Exchange Act of 1934, as amended). BNPPSC accepts responsibility for the content of a report prepared by another non-U.S. affiliate only when distributed to U.S. persons by BNPPSC. U.S. persons who wish to effect transactions in securities based on the information provided herein must do so through BNPPSC unless otherwise authorized by law to transact through a non-U.S. affiliate of BNPP. BNPPSC, a subsidiary of BNPP, is a broker dealer and futures commission merchant registered with the Securities and Exchange Commission (SEC), Commodity Futures Trading Commission (CFTC), Financial Industry Regulatory Authority (FINRA), and National Futures Association (NFA) and is a member of the New York Stock Exchange (NYSE), other principal exchanges, and the Securities Investor Protection Corporation (SIPC). Some of the securities mentioned in this document have not been registered under the U.S. Securities Act of 1933, as amended, and may not be offered or sold in the U.S. or to a U.S. person absent registration or an applicable exemption from the U.S. registration requirements. THIS DOCUMENT IS FOR THE GENERAL INFORMATION OF BNPP’S CLIENTS AND IS A GENERAL SOLICITATION OF DERIVATIVES BUSINESS FOR THE PURPOSES OF, AND TO THE EXTENT IT IS SUBJECT TO, §§ 1.71 AND 23.605 OF THE U.S. COMMODITY EXCHANGE ACT.

UK: In the UK, this document is being communicated by BNPP London Branch. 10 Harewood Avenue, London NW1 6AA; tel: +44 20 7595 2000; fax: +44 20 7595 2555- www.bnpparibas.com. Incorporated in France with Limited Liability. Registered Office: 16 boulevard des Italiens, 75009 Paris, France. 662 042 449 RCS Paris. BNPP London Branch is lead supervised by the European Central Bank (ECB) and the Autorité de Contrôle Prudentiel et de Résolution (ACPR). BNPP London Branch is authorised by the ECB, the ACPR and the Prudential Regulation Authority and subject to limited regulation by the Financial Conduct Authority and Prudential Regulation Authority. Details about the extent of our authorisation and regulation by the Prudential Regulation Authority, and regulation by the Financial Conduct Authority are available from us on request. BNPP London Branch is registered in England and Wales under no. FC13447.

France: This report is produced and/or is distributed in France by BNPP SA and/or BNPP Arbitrage. BNPP SA is incorporated in France with Limited Liability (Registered Office: 16 boulevard des Italiens, 75009 Paris, France, 662 042 449 RCS Paris, www.bnpparibas.com) is authorized and supervised by European Central Bank (ECB) and by Autorité de Contrôle Prudentiel et de Résolution (ACPR) in respect of supervisions for which the competence remains at national level, in terms of Council Regulation n° 1024/2013 of 15 October 2013 conferring specific tasks on the ECB concerning policies relating to the prudential supervision of credit institutions. BNPP Arbitrage is an unlimited liability company, whose registered office is 160/162 boulevard Mac Donald 75019 Paris, registered with the Paris Trade and Companies Registry under number 394 895 833. It is authorised and supervised by the Autorité de Contrôle Prudentiel et de Résolution and the Autorité des Marchés Financiers in France.

Germany: This report is being distributed in Germany by BNPP S.A. Niederlassung Deutschland, a branch of BNPP S.A. whose head office is in Paris, France. 662 042 449 RCS Paris, www.bnpparibas.com). BNPP Niederlassung Deutschland is authorized and lead supervised by the European Central Bank (ECB) and by Autorité de Contrôle Prudentiel et de Résolution (ACPR) and is subject to limited supervision and regulation by Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin) in respect of supervisions for which the competence remains at national level, in terms of Council Regulation n° 2013/1024 of 15 October 2013 conferring specific tasks on the ECB concerning policies relating to the prudential supervision of credit institutions as well as Council Directive n° 2013/36/EU of 26 June, 2013 and Section 53b German Banking Act (Kreditwesengesetz - KWG) providing for the principles of shared supervision between the national competent authorities in case of branches and applicable national rules and regulations. BNPP Niederlassung Deutschland is registered with locations at Europa Allee 12, 60327 Frankfurt (commercial register HRB Frankfurt am Main 40950) and Bahnhofstrasse 55, 90429 Nuremberg (commercial register Nuremberg HRB Nürnberg 31129).

Belgium: BNPP Fortis SA/NV is authorized and supervised by European Central Bank (ECB) and by the National Bank of Belgium, boulevard de Berlaimont 14, 1000 Brussels, and is also under the supervision on investor and consumer protection of the Financial Services and Markets Authority (FSMA), rue du congrès 12-14, 1000 Brussels and is authorized as insurance agent under FSMA number 25789 A.

Ireland: This report is being distributed in Ireland by BNPP S.A., Dublin Branch. BNPP is incorporated in France as a Société Anonyme and regulated in France by the European Central Bank and by the Autorité de Contrôle Prudentiel et de Résolution.

Italy: This report is being distributed by BNPP Italian Branch (Succursale Italia) which is authorised and lead supervised by the European Central Bank (ECB) and the Autorité de Contrôle Prudentiel et de Résolution and regulated by the Autorité des Marchés Financiers, and this authorisation has been notified to the Bank of Italy. BNPP Succursale Italia is the Italian branch of a company incorporated under the laws of France having its registered office at 16, Boulevard des Italiens, 75009, Paris, whose offices are located in Piazza Lina Bo Bardi 3, Milan, tax code and registration number at the Companies Registry of Milan No. 04449690157, is enrolled in the register of the banks held by Bank of Italy under No. 5482, duly authorised to provide in Italy banking and investment services according the principle of the mutual recognition. The branch is subject to limited regulation by the Bank of Italy and the CONSOB respectively.

Netherlands: This report is being distributed in the Netherlands by BNPP Fortis SA/NV, Netherlands Branch, a branch of BNPP SA/NV whose head office is in Brussels, Belgium. BNPP Fortis SA/NV, Netherlands Branch, Herengracht 595, 1017 CE Amsterdam, is authorised and supervised by the European Central Bank (ECB) and the National Bank of Belgium and is also supervised by the Belgian Financial Services and Markets Authority (FSMA) and it is subject to limited regulation by the Netherlands Authority for the Financial Markets (AFM) and the Dutch Central Bank (De Nederlandsche Bank).

Portugal: BNPP – Sucursal em Portugal Avenida 5 de Outubro, 206, 1050-065 Lisboa, Portugal. www.bnpparibas.com. Incorporated in France with Limited Liability. Registered Office: 16 boulevard des Italiens, 75009 Paris, France. 662 042 449 RCS Paris. BNPP – Sucursal em Portugal is lead supervised by the European Central Bank (ECB) and the Autorité de Contrôle Prudentiel et de Résolution (ACPR). BNPP - Sucursal em Portugal is authorized by the ECB, the ACPR and Resolution and it is authorized and subject to limited regulation by Banco de Portugal and Comissão do Mercado de Valores Mobiliários. BNPP - Sucursal em Portugal is registered in C.R.C. of Lisbon under no. NIPC 980000416. VAT Number PT 980 000 416.”

Spain: This report is being distributed in Spain by BNPP S.A., S.E., a branch of BNPP S.A. whose head office is in Paris, France (Registered Office: 16 boulevard des Italiens, 75009 Paris, France). BNPP S.A., S.E., C/Ribera de Loira 28, Madrid 28042 is authorised and supervised by the European Central Bank (ECB) and the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and subject to limited regulation by the Bank of Spain.

Switzerland: This report is intended solely for customers who are “Qualified Investors” as defined in article 10 paragraphs 3 and 4 of the Federal Act on Collective Investment Schemes of 23 June 2006 (CISA) and the relevant provisions of the Federal Ordinance on Collective Investment Schemes of 22 November 2006 (CISO). “Qualified Investors” includes, among others, regulated financial intermediaries such as banks, securities traders, fund management companies and asset managers of collective investment schemes, regulated insurance institutions as well as pension funds and companies with professional treasury operations. This document may not be suitable for customers who are not Qualified Investors and should only be used and passed on to Qualified Investors. For specification purposes, a “Swiss Corporate Customer” is a Client which is a corporate entity, incorporated and existing under the laws of Switzerland and which qualifies as “Qualified Investor” as defined above." BNPP (Suisse) SA is authorised as bank and as securities dealer by the Swiss Financial Market Supervisory Authority FINMA. BNPP (Suisse) SA is registered at the Geneva commercial register under No. CHE-102.922.193. BNPP (Suisse) SA is incorporated in Switzerland with limited liability. Registered Office: 2, place de Hollande, 1204 Geneva, Switzerland.

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.

Brazil: This report was prepared by Banco BNPP Brasil S.A. or by its subsidiaries, affiliates and controlled companies, together referred to as "BNPP", for information purposes only and do not represent an offer or request for investment or divestment of assets. Banco BNPP Brasil S.A. is a financial institution duly incorporated in Brazil and duly authorized by the Central Bank of Brazil and by the Brazilian Securities Commission to manage investment funds. Notwithstanding the caution to obtain and manage the information herein presented, BNPP shall not be responsible for the accidental publication of incorrect information, nor for investment decisions taken based on the information contained herein, which can be modified without prior notice. Banco BNPP Brasil S.A. shall not be responsible to update or revise any information contained herein. Banco BNPP Brasil S.A. shall not be responsible for any loss caused by the use of any information contained herein.

Turkey: This report is being distributed in Turkey by TEB Investment (TEB YATIRIM MENKUL DEĞERLER A.Ş., TEB Kampüs D Blok Saray Mahallesi, Küçüksu Cadddesi Sokullu Sokak, No:7 34768 Ümraniye, İstanbul, Turkey, trade register number: 358354, www.tebyatirim.com.tr) and TEB (TÜRK EKONOMİ BANKASI A.Ş., TEB Kampüs C ve D Blok, Saray Mahallesi Küçüksu Caddesi Sokullu Sokak No:7 34768 Ümraniye, İstanbul, Turkey, Trade register number 189356, www.teb.com.tr). Notice Published in accordance with “Communique on Principles Regarding Investment Services, Activities and Ancillary Services” No: III-37.1 issued by the Capital Markets Board of Turkey. The investment related information, commentary and recommendations contained herein do not constitute investment advisory services. Investment advisory services are provided in accordance with investment advisory agreements executed between investors and brokerage companies or portfolio management companies or non-deposit accepting banks. The commentary and recommendations contained herein are based on the personal views of the persons who have made such commentary and recommendations. These views may not conform to your financial standing or to your risk and return preferences. Therefore, investment decisions based solely on the information provided herein may fail to produce results in accordance with your expectations.

Israel: BNPP does not hold a licence under the Investment Advice and Marketing Law of Israel, to offer investment advice of any type, including, but not limited to, investment advice relating to any financial products.

Bahrain: This document is being distributed in Bahrain by BNPP Wholesale Bank Bahrain, a branch of BNPP S.A. whose head office is in Paris, France (Registered Office: 16 boulevard des Italiens, 75009 Paris, France). BNPP Wholesale Bank Bahrain is licensed and regulated as a Registered Institution by the Central Bank of Bahrain – CBB. This document does not, nor is it intended to, constitute an offer to issue, sell or acquire, or solicit an offer to sell or acquire any securities or to enter into any transaction.

South Africa: BNPP is a bank incorporated in France with a local branch registered with the South African Reserve Bank and registered as an external company in terms of the South African Companies Act, 2008 . BNPP is an authorised Financial Services Provider (FSP 44610) and subject to regulation by the Financial Services Board and South African Reserve Bank. It is also a licensed member of the Johannesburg Stock Exchange. BNPP does not expressly or by implication represent, recommend or propose that the information and/or financial products referred to in this report are appropriate to the particular investment objectives, financial situation or particular needs of the recipient. This document further does not constitute advice (whether financial, legal, tax or otherwise) as contemplated in the Financial Advisory and Intermediary Services Act, 2002.

Australia: This material, and any information in related marketing presentations (the Material), is being distributed in Australia by BNPP ABN 23 000 000 117, a branch of BNPP 662 042 449 R.C.S., a licensed bank whose head office is in Paris, France. BNPP is licensed in Australia as a Foreign Approved Deposit-taking Institution by the Australian Prudential Regulation Authority (APRA) and delivers financial services to Wholesale clients under its Australian Financial Services Licence (AFSL) No. 238043 which is regulated by the Australian Securities & Investments Commission (ASIC).The Material is directed to Wholesale clients only and is not intended for Retail clients (as both terms are defined by the Corporations Act 2001, sections 761G and 761GA). The Material is subject to change without notice and BNPP is under no obligation to update the information or correct any inaccuracy that may appear at a later date.

China: This document is being distributed in the People's Republic of China (“PRC”, excluding the Hong Kong or Macau Special Administrative Regions or Taiwan) by BNPP (China) Limited (“BNPP China”), a subsidiary of BNPP. BNPP China is a commercial bank licensed by the China Banking Regulatory Commission to carry on banking business in the PRC.

Hong Kong - Branch: This document is prepared and distributed by BNP Paribas Hong Kong Branch, a branch of BNP Paribas whose head office is in Paris, France. BNP Paribas Hong Kong Branch is registered as a Licensed Bank under the Banking Ordinance and regulated by the Hong Kong Monetary Authority. BNP Paribas Hong Kong Branch is also a Registered Institution regulated by the Securities and Futures Commission for the conduct of Regulated Activity Types 1, 4, 6 and 9 under the Securities and Futures Ordinance. This document may not be circulated, distributed, reproduced or disclosed (in whole or in part and in any manner whatsoever) to any other person without the prior written consent of BNP Paribas Hong Kong Branch.

Hong Kong - Securities: This document is intended only for the Professional Investors in Hong Kong. This document is prepared and distributed by BNPP Securities (Asia) Limited. BNPP Securities (Asia) Limited is a Licensed Corporation regulated by the Securities and Futures Commission for the conduct of Regulated Activity Types 1, 2, 4, and 6 under the Securities and Futures Ordinance. This document may not be circulated, distributed, reproduced or disclosed (in whole or in part and in any manner whatsoever) to any other person without the prior written consent of BNPP Securities (Asia) Limited. Some products or transactions described in this document may not be authorised in Hong Kong and may not be available to Hong Kong investors.

India - Branch: BNPP India branch is licensed by Reserve Bank of India to carry on banking business in India and is regulated by the Banking Regulation Act 1949, Securities & Exchange Board of India Act 1992, and other related regulations issued by Government of India and regulatory bodies such as Reserve Bank of India, Securities and Exchange Board of India etc. from time to time. For the purpose of distribution in India this document is prepared for counterparties who have fair knowledge of risk associated with foreign exchange market, Institutional Investors & Counterparties, Expert Investors and for those clients and investors whose risk management policies are in place.

India - Securities: In India, this document is being distributed by BNPP Securities India Pvt. Ltd. ("BNPPSIPL"), having its registered office at 5th floor, BNPP House, 1 North Avenue, Maker Maxity, Bandra Kurla Complex, Bandra (East), Mumbai 400 051, INDIA (Tel. no. +91 22 3370 4000 / 6196 4000, Fax no. +91 22 6196 4363). BNPPSIPL is registered with the Securities and Exchange Board of India (“SEBI”) as a research analyst (Regn. No. INH000000792) and as a stockbroker in the Equities and the Futures & Options segments of National Stock Exchange of India Ltd. (“NSE”) and BSE Ltd. and in the Currency Derivatives segment of NSE (SEBI Regn. Nos.: INB/INF/NSF/NSE231474835, INB/INF011474831; CIN: U74920MH2008FTC182807; Website: www.bnpparibas.co.in).

Indonesia: This document is being distributed by PT Bank BNPP Indonesia, whose registered office is Menara BCA - 35th Floor, Grand Indonesia, Jalan M.H Thamrin No.1,Jakarta 10310, Indonesia; Tel : +62 21 2358 6262; Fax: +62 21 2358 6098. PT Bank BNPP Indonesia is regulated by Bank of Indonesia. Details about the extent of our authorisation by Bank of Indonesia are available on request. This document is not directed at individuals or retail clients.

Japan - Branch: This document is being distributed to Japanese based firms by BNPP Tokyo Branch, or by a subsidiary or affiliate of BNPP not registered as a financial instruments firm in Japan, only to Japan-based Institutional Investors and Professional Investors as defined by the Financial Instruments and Exchange Act of Japan. BNPP Tokyo Branch is a Registered Financial Institution, Kanto Finance Bureau-Kinsho-#98, and a member of the Japanese Bankers Association (JBA), the Japan Securities Dealers Association and the Financial Futures Association of Japan. BNPP Tokyo Branch accepts responsibility for the content of a report prepared by another non-Japan affiliate only when distributed to Japan-based firms by BNPP Tokyo Branch.

Japan - Securities: This document is being distributed to Japanese based firms by BNPP Securities (Japan) Limited or by a subsidiary or affiliate of BNPP not registered as a financial instruments firm in Japan, to certain financial institutions defined by article 17-3, item 1 of the Financial Instruments and Exchange Act Enforcement Order. BNPP Securities (Japan) Limited is a financial instruments firm registered according to the Financial Instruments and Exchange Act of Japan and a member of the Japan Securities Dealers Association, Type Ⅱ Financial Instruments Firms Association and the Financial Futures Association of Japan. BNPP Securities (Japan) Limited accepts responsibility for the content of a report prepared by another non-Japan affiliate only when distributed to Japan based firms by BNPP Securities (Japan) Limited. Some foreign securities stated on this report are not disclosed according to the Financial Instruments and Exchange Act of Japan. If there is any mention of credit ratings in the document, it is a Japanese regulatory requirement to include a prescribed "explanatory note on non-registered credit rating". The full text is contained in the separate document titled "Additional Disclaimer for Japan" (for both Branch and Securities).

Malaysia - BNPP Malaysia Berhad: (Company No. 918091-T) is incorporated in Malaysia under the Companies Act of Malaysia, 1965. It is a licensed institution under the Financial Services Act 2013 and is regulated by Bank Negara Malaysia.
BNPP Capital (Malaysia) Sdn Bhd: (Company No. 247454-M) is incorporated in Malaysia under the Companies Act of Malaysia, 1965. It is a licensed institution under the Capital Markets and Services Act 2007 and is regulated by Securities Commission Malaysia.

Malaysia Labuan - Branch: BNPP, a company registered under the laws of France [with company number 662 042 449 RCS PARIS / its registered office at [Paris] etc] ("BNPP" or "the Bank"), acting through its Labuan branch at Level 9 (D), Main Office Tower, Financial Park Labuan, Jalan Merdeka, 87000 F.T. Labuan, Malaysia.

Philippines: This report is being distributed in the Philippines by BNPP Manila Branch, an Offshore Banking Unit (OBU) of BNPP whose head office is in Paris, France. BNPP Manila OBU is registered as an offshore banking unit under Presidential Decree No. 1034 (PD 1034), and regulated by the Bangko Sentral ng Pilipinas. This report is being distributed in the Philippines to qualified clients of OBUs as allowed under PD 1034, and is qualified in its entirety to the products and services allowed under PD 1034.

Singapore - Branch: BNP Paribas, Singapore Branch is a licensed bank regulated by the Monetary Authority of Singapore. This document is not intended for investors in Singapore who are not Institutional Investors or Accredited Investors within the meaning of the Securities and Futures Act. Some products or transactions described in this document may not be authorised in Singapore and may not be available to Singapore investors.

South Korea - Branch: BNPP Seoul Branch is regulated by the Financial Services Commission and Financial Supervisory Service for the conduct of its financial investment business in the Republic of Korea. This document does not constitute an offer to sell to or the solicitation of an offer to buy from any person any financial products where it is unlawful to make the offer or solicitation in South Korea.

South Korea - Securities: BNPP Securities Korea is registered as a Licensed Financial Investment Business Entity under the FINANCIAL INVESTMENT BUSINESS AND CAPITAL MARKETS ACT and regulated by the Financial Supervisory Service and Financial Services Commission. This document is distributed by BNPP Securities Korea Co., Ltd. in Korea to Professional Investors only and is not intended for investors in Korea who are not Professional Investor within the meaning of the Article 9 (5) (professional investor) of the FINANCIAL INVESTMENT BUSINESS AND CAPITAL MARKETS ACT and should not be passed on to any such persons. Some products or transactions described in this document may not be authorised in Korea and may not be available to Korea investors. Information in this document is for general circulation to the intended recipients only and is not a recommendation or investment advice to recipients hereof since it does not take into account the specific investment objectives, financial situation and the particular needs of any particular recipient ("Specific Requirements"). A recipient of this document should seek advice from its/his own financial adviser regarding the suitability of the products or transactions (taking into account the recipient's Specific Requirements) as well as the risks involved in such products or transactions before a commitment to purchase or enter into any product or transaction is made.

Taiwan - Branch: This report is being distributed in Taiwan by BNPP Taipei Branch, Taichung Branch, Kaohsiung Branch and/or Offshore Banking Unit, branches of BNPP and is regulated by the Financial Supervisory Commission, R.O.C under the Banking Act and Offshore Banking Act. This document is directed only at Taiwanese counterparties who are licensed or who have the capacities to purchase or transact in such products. Some products or transactions described in this document may not be authorised in Taiwan and may not be available to Taiwan investors. This document does not constitute an offer to sell to or the solicitation of an offer to buy from any person any financial products where it is unlawful to make the offer or solicitation in Taiwan. Information in this document is for general circulation to the intended recipients only and is not a recommendation or investment advice to recipients hereof since it does not take into account the specific investment objectives, financial situation and the particular needs of any particular recipient ("Specific Requirements"). A recipient of this document should seek advice from its/his own financial adviser regarding the suitability of the products or transactions (taking into account the recipient's Specific Requirements) as well as the risks involved in such products or transactions before a commitment to purchase or enter into any product or transaction is made. The material is subject to change without notice and BNPP is under no obligation to update the information or correct any inaccuracy that may appear at a later date (Applicable for the products distributed to non-Professional Institutional Investors).

Taiwan - Securities: This document is being distributed in Taiwan to professional investors only. Such information is for your reference only. The reader should independently evaluate the investment risks and is solely responsible for their investment decision. Information on securities that do not trade in Taiwan is for informational purposes only and is not to be construed as a recommendation or a solicitation to trade in such securities. BNPP Securities (Taiwan) Co., Ltd. may not execute transactions for clients in these securities. This publication may not be distributed to the public media or quoted or used by the public media without the express written consent of BNPP.

Thailand: BNPP Bangkok branch is regulated in Thailand by the Bank of Thailand and the Securities and Exchange Commission. This document does not constitute an offer to sell to or solicitation of an offer to buy from any person any financial products where it is unlawful to make the offer or solicitation in Thailand.

Vietnam: This document is distributed in Viet Nam by BNPP Ho Chi Minh City Branch, registered in Viet Nam under No. 05/NH-GP. This publication is prepared for investors who have legal standing and is not intended for Private Customers in the territory of Viet Nam and should not be passed on to any such persons. It is directed only at Vietnamese counterparties who have the capacity and licence authorised by SBV to purchase from or transact with offshore counterparties. By accepting this document you agree to be bound by the foregoing limitations.

Some or all of the information contained in this document may already have been published on https://globalmarkets.bnpparibas.com

IMPORTANT DISCLOSURES by producers and disseminators of investment recommendations for the purposes of the Market Abuse Regulation:

Although the disclosures provided herein have been prepared on the basis of information we believe to be accurate, we do not guarantee the accuracy, completeness or reasonableness of any such disclosures. The disclosures provided herein have been prepared in good faith and are based on internal calculations, which may include, without limitation, rounding and approximations.

BNPP and/or its affiliates may be a market maker or liquidity provider in financial instruments of the issuer mentioned in the recommendation.
BNPP and/or its affiliates may provide such services as described in Sections A and B of Annex I of MiFID II (Directive 2014/65/EU), to the Issuer to which this investment recommendation relates. However, BNPP is unable to disclose specific relationships/agreements due to client confidentiality obligations.

Section A and B services include A. Investment services and activities: (1) Reception and transmission of orders in relation to one or more financial instruments; (2) Execution of orders on behalf of clients; (3) Dealing on own account; (4) Portfolio management; (5) Investment advice; (6) Underwriting of financial instruments and/or placing of financial instruments on a firm commitment basis; (7) Placing of financial instruments without a firm commitment basis; (8) Operation of an MTF; and (9) Operation of an OTF. B. Ancillary services: (1) Safekeeping and administration of financial instruments for the account of clients, including custodianship and related services such as cash/collateral management and excluding maintaining securities accounts at the top tier level; (2) Granting credits or loans to an investor to allow him to carry out a transaction in one or more financial instruments, where the firm granting the credit or loan is involved in the transaction; (3) Advice to undertakings on capital structure, industrial strategy and related matters and advice and services relating to mergers and the purchase of undertakings; (4) Foreign exchange services where these are connected to the provision of investment services; (5) Investment research and financial analysis or other forms of general recommendation relating to transactions in financial instruments; (6) Services related to underwriting; and (7) Investment services and activities as well as ancillary services of the type included under Section A or B of Annex 1 related to the underlying of the derivatives included under points (5), (6), (7) and (10) of Section C (detailing the MiFID II Financial Instruments) where these are connected to the provision of investment or ancillary services.

BNPP and/or its affiliates do not, as a matter of policy, permit pre-arrangements with issuers to produce recommendations. BNPP and/or its affiliates as a matter of policy do not permit issuers to review or see unpublished recommendations. BNPP and/or its affiliates acknowledge the importance of conflicts of interest prevention and have established robust policies and procedures and maintain effective organisational structure to prevent and avoid conflicts of interest that could impair the objectivity of this recommendation including, but not limited to, information barriers, personal account dealing restrictions and management of inside information.

BNPP and/or its affiliates understand the importance of protecting confidential information and maintain a “need to know” approach when dealing with any confidential information. Information barriers are a key arrangement we have in place in this regard. Such arrangements, along with embedded policies and procedures, provide that information held in the course of carrying on one part of its business to be withheld from and not to be used in the course of carrying on another part of its business. It is a way of managing conflicts of interest whereby the business of the bank is separated by physical and non-physical information barriers. The Control Room manages this information flow between different areas of the bank where confidential information including inside information and proprietary information is safeguarded. There is also a conflict clearance process before getting involved in a deal or transaction.

In addition, there is a mitigation measure to manage conflicts of interest for each transaction with controls put in place to restrict the information flow, involvement of personnel and handling of client relations between each transaction in such a way that the different interests are appropriately protected. Gifts and Entertainment policy is to monitor physical gifts, benefits and invitation to events that is in line with the firm policy and Anti-Bribery regulations. BNPP maintains several policies with respect to conflicts of interest including our Personal Account Dealing and Outside Business Interests policies which sit alongside our general Conflicts of Interest Policy, along with several policies that the firm has in place to prevent and avoid conflicts of interest.

The remuneration of the individual producer of the investment recommendation may be linked to trading or any other fees in relation to their global business line received by BNPP and/or affiliates.

IMPORTANT DISCLOSURES by disseminators of investment recommendations for the purposes of the Market Abuse Regulation:

The BNPP disseminator of the investment recommendation is identified above including information regarding the relevant competent authorities which regulate the disseminator. The name of the individual producer within BNPP or an affiliate and the legal entity the individual producer is associated with is identified above in this document. The date and time of the first dissemination of this investment recommendation by BNPP or an affiliate is addressed above. Where this investment recommendation is communicated by Bloomberg chat or by email by an individual within BNPP or an affiliate, the date and time of the dissemination by the relevant individual is contained in the communication by that individual disseminator.

The disseminator and producer of the investment recommendations are part of the same group, i.e. the BNPP group. The relevant Market Abuse Regulation disclosures required to be made by producers and disseminators of investment recommendations are provided by the producer for and on behalf of the BNPP Group legal entities disseminating those recommendations and the same disclosures also apply to the disseminator.

If an investment recommendation is disseminated by an individual within BNPP or an affiliate via Bloomberg chat or email, the disseminator’s job title is available in their Bloomberg profile or bio. If an investment recommendation is disseminated by an individual within BNPP or an affiliate via email, the individual disseminator’s job title is available in their email signature.

For further details on the basis of recommendation specific disclosures available at this link (e.g. valuations or methodologies, and the underlying assumptions, used to evaluate financial instruments or issuers, interests or conflicts that could impair objectivity recommendations or to 12 month history of recommendations history) are available at https://globalmarkets.bnpparibas.com/gmportal/private/globalTradeIdea. If you are unable to access the website please contact your BNPP representative for a copy of this document.