After The Pullback

In early September we pointed to several reasons for near term caution. The S&P 500 was then at the top of its trend channel in place since early 2016; the window was open for a typical pullback of 3-5% that has historically occurred every 2-3 months; the buyback blackout period was beginning; and potential for noise from US mid-term elections was rising (Cautious Near Term, Constructive To Year End, Sep 4 2018). In the event, the pullback occurred a little later and has been a bit larger than we anticipated. But it does not change our read on the drivers or that it’s just a pullback.

Pullback not about rising yields but rather a continuation of the defensive rotation on growth and end-cycle fears
Bond yields rose over 40bps starting late August while the S&P 500 continued to move up in its trend channel until the recent pullback. During the pullback the defensive bond-like sectors outperformed, while the cyclical sectors and beneficiaries of higher bond yields sold off sharply. The coincidence of the pullback with some corporate profit warnings, points to growth and end-cycle concerns being the primary driver and has been a continuation of the defensive rotation in place since late May when trade war concerns rose. At current levels, US and global equities have already priced in a significant growth slowdown.

The equity pullback mostly reflected a significant positioning unwind …
The initial pullback on growth concerns was somewhat amplified by selling from systematic strategies which we estimate sold -$50bn on October 11th-12th. Our models suggest that vol control funds were responsible for most of this selling, as these strategies were fully allocated to equities when volatility spiked above triggers for most strategies. We attribute some marginal selling of US equities to CTA strategies, although these funds came into the October sell-off with far lighter allocations to S&P 500 than at the end of January. Additionally, we saw drawdowns in long-short factors - Momentum, Excess Volatility, Growth - suggesting Hedge Funds and other active managers de-risked. From a thematic standpoint, rates-sensitivity and inflation pairs were significant underperformers consistent with concerns about a growth slowdown.

… not end investor outflows which looked to have followed the pullback
Flows out of US equity mutual funds and ETFs were muted during the initial steep decline last Wednesday, but picked up later and continued through the market bounce on Tuesday (-$23bn). The last 2 days have seen inflows return (+$8bn) despite the renewed market pullback. The largest outflows across regions last week were from the US (-$15bn) and Europe (-$5bn), while Japan (+$6bn) and
EM (+$2.3bn) saw inflows, surprisingly their largest since April. Across sectors, defensive bond-like funds in Utilities, Telecom and Healthcare saw modest inflows while most cyclicals saw outflows with the Financials (-$2bn) seeing by far the largest.

Looking forward, we see

- **The buyback blackout period starting to ease next week.** With next week seeing a peak number of companies reporting, and half way through the earnings season, blackout periods which have been the subject of intense focus should start easing and we estimate buybacks will slowly revert to the normal pace of $15bn a week on net ($19bn gross).

- **If volatility normalizes, we expect vol control funds to gradually buy equities over 2-3 weeks.** Volatility metrics - eg. VIX, realized vol, put implied volatility - are still above 10%, 12%, 15% vol targets. These metrics will need to normalize below vol targets for equity buying to start.

- **Pattern in previous pullbacks points to pace of equity outflows moderating from here.** The large outflows in this episode have been similar in magnitude to those seen in previous 5%+ pullbacks. Importantly, the historical pattern points to the pace of outflows moderating from next week. Further, modestly positive data surprises, the spike in rates and seasonality are all supportive of equity inflows. Rising rates have led to flows out of bond funds, which with a lag should rotate into equities, as has historically been the case. Flows have also historically exhibited seasonality with the last 2 months of the year seeing a pickup after a slowing from June to October.

- **Positioning across most risk asset classes relatively muted, unlike before the February selloff.** The selloff in February was characterized by several asset classes seeing strongly correlated momentum and stretched consensus positioning, 1.5 to 3sd away from historical averages (Stretched Consensus Positioning, Jan 2018). By contrast, positioning across most risk asset classes was much more muted (<1sd) this time.

Largest bond fund outflows since the 2016 US election join extreme bond futures shorts

Net shorts in bond futures have been climbing steadily to new all-time extremes over the last year. Bond funds had however continued to largely enjoy inflows until late September (+$275bn last 12 months). That changed over the last 4 weeks as rates rose sharply, with outflows (-$27bn) at the fastest pace since the 2016 US Presidential election. Bond outflows notably continued over the last week through the equity pullback.

Oil futures positioning still long in contrast to shorts in gold

Commodity futures positions (and prices) have inversely tracked dollar positioning historically. Over the last 2 months however even as dollar longs rose to near 2 year highs, oil longs continued to remain range bound at elevated levels. Oil longs are now being cut back. Positions in gold on the other hand were extremely short and are now being pared back; copper positions are near neutral.
In early September we pointed to several reasons for near term caution.

Figure 1: S&P 500 fell below its 2.5 year channel

Figure 2: Adjusted for trend the pullback is worse than in February

Pullback not about rising yields but rather a continuation of the defensive rotation on growth and end-cycle fears.

Figure 3: Defensive bond-like sectors outperformed through the pullback

Figure 4: S&P 500 already pricing in a sharp slowdown in growth

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, Haver Analytics, Data as of 18-Oct-18.
Pullback does not reflect equity outflows which followed later

Figure 5: Outflows started after the bulk of the pullback was done

![Graph of US daily equity flows and S&P 500](source)

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, EPFR, Haver Analytics, Data as of 18-Oct-18

Figure 6: Equity outflows similar to prior pullback episodes

![Graph of US Equity Flows 4w ma and S&P 500](source)

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, EPFR, Haver Analytics, Data as of 17-Oct-18

The buyback blackout period starting to ease next week

Figure 7: Blackout period starts to ease next week

![Graph of S&P 500 companies in blackout period](source)

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, Factset, Data as of 18-Oct-18

Figure 8: The S&P 500 and earnings seasons

![Graph of S&P 500 and earnings season](source)

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, Factset, Haver Analytics, Data as of 18-Oct-18
Pattern in previous pullbacks points to pace of equity outflows moderating from here

Figure 9: Pattern in prior pullbacks points to outflows easing from here

Figure 10: Positive seasonality for equity inflows in the last 2 months

Positioning across most risk asset classes relatively muted, unlike before the February selloff

Figure 11: Positioning across most risk asset classes muted compared to the February selloff

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, EPFR, Haver Analytics, Data as of 17-Oct-18

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, ICI, Haver Analytics, Data as of 17-Oct-18

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, CFTC, Bloomberg Finance LP, Haver Analytics, Data as of 16-Oct-18
Largest bond fund outflows since the 2016 US election join extreme bond futures shorts

Figure 12: Bond futures near extremes

Figure 13: Largest outflows from bond funds since Nov 2016 elections

Oil futures positioning still long in contrast to large shorts in gold

Figure 14: Oil and USD positioning have diverged over last 2 months

Figure 15: Shorts in gold pared back from extremes

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, CFTC, Haver Analytics, Data as of 16-Oct-18

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, EPFR, FRB, Haver Analytics, Data as of 17-Oct-18
Systematic strategies - mostly vol control - likely sold $50bn in equity beta, and long-short strategies also de-risked

Figure 16: Vol control funds sold ~$40bn on recent sell-off and would re-allocate over 2-3 weeks if volatility is low

Figure 17: CTAs had much lower S&P 500 exposure at the end of September versus end of January

Figure 18: Banks, Infrastructure, Inflation, Rates Sensitivity underperformed over past 1W

Figure 19: Excess Volatility and Momentum drew down in the October sell-off
Cross-Asset Futures Positioning and Flows

Figure 20: Cross asset futures positioning

Net long positions* (as % of Open interest) (z score, since 2010)

*Non commercial positions in FX and bonds; (Asset managers + Lev funds) in equities; Managed Money in commodities

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, CFTC, Bloomberg Finance LP, Data as of 16-Oct-18
Figure 21: Investors cut equity risk and added FX positions WoW

Weekly change in net positions* (as % of Open interest)

*Non commercial positions in FX and bonds; (Asset managers + Lev funds) in equities; Managed Money in commodities

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, CFTC, Bloomberg Finance LP. Data as of 16-Oct-18
vFLARE: Volatility-Sensitive Systematic Strategies

Figure 22: Vol control funds sold ~$40bn on recent sell-off and would re-allocate over 2-3 weeks if volatility is low

[Graph showing DB Vol Control Composite: Estimated Equity Allocation]

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, SEC filings, Bloomberg Finance LP, Data as of 10-Oct-18

Figure 23: Risk-parity funds most likely have not cut equity exposure

[Graph showing Risk Parity Funds Beta to Global Equities]

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, SEC filings, Bloomberg Finance LP, Data as of 10-Oct-18

Figure 24: CTAs cut some S&P 500 beta and still are long oil and short EM beta

[Graph showing Regression Betas of CTAs to Different Assets Classes (Daily Returns, 3M)]

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, SEC filings, Bloomberg Finance LP, Data as of 10-Oct-18

Figure 25: CTA exposure to S&P 500 is much lower than in January 2018

[Graph showing CTAs Beta to SPX (LHS) and CTAs Beta to US Treasure Bonds (RHS)]

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, SEC filings, Bloomberg Finance LP, Data as of 10-Oct-18
Futures Positioning: US Equities, USD, WTI Oil, & 10Y Treasuries

Figure 26: Investor positioning in US equity futures is -55% lower versus end of January

Figure 27: Dollar futures positioning

Figure 28: Oil futures positions

Figure 29: Investors are heavily short Treasuries on rising 10Y yields

Futures Positioning: US Equities

Figure 30: Leveraged Funds have been cutting S&P 500 futures exposure, while Asset Managers added

Figure 31: Aggregate futures positions and shorts in single stocks and ETFs

Figure 32: Leveraged Funds have lighter US equity exposure than AMs - 1Y Percentile Ranks

Figure 33: Asset Managers cut long equity exposures - 1Y Z-score of WoW Change

ETFs: Volumes and Flows

Figure 34: Despite realized vol moving higher, volumes normalized this week

Figure 35: ETF volumes are still somewhat elevated averaging 32% of total cash volumes this week

Figure 36: After 4 consecutive days of outflows totaling -$17bn, equity ETFs saw +$10bn inflows on Wednesday and Thursday

Figure 37: Inflows to equity ETFs on Wednesday and Thursday were to trading liquidity and asset allocation products

Equity Premia: Fast Factors, Hedge Funds, Themes

Figure 38: US Fast Factors: Leverage & Growth rallied this week despite the prospect of rising rates

Figure 39: Europe Fast Factors: Residual Volatility continues to slide suggesting risk aversion

Figure 40: Hedge Funds: Favorite longs bounced early in the week then slid with the market

Figure 41: Thematic Baskets: Banks, Infrastructure, Inflation, Rates Sensitivity underperformed over past 1W while Leverage and Healthcare outperformed

Source: Deutsche Bank Quantitative & Delta-1 Strategy, Axioma, Factset, Bloomberg Finance LP, Data as of 17-Oct-18

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, Axioma, Factset, Bloomberg Finance LP, Data as of 18-Oct-18
S&P 500 Options: Open Interest, Vol, Skew, Correlation

Figure 42: SPY open interest is concentrated at 90-110% spot with some in-the-money puts having been monetized since last week.

Figure 43: Put-call ratio is relatively low versus 2017 and early 2018.

Source: Deutsche Bank Quant & Delta-1 Strategy, OptionMetrics, Bloomberg Finance LP. Data as of 17-Oct-18.

Figure 44: Realized volatility spiked but not to February extremes.

Figure 45: Implied volatility and skew rose to levels last seen in April.

Cross-asset flows

Figure 46: Flows across asset classes cumulative since 2017

Cumulative flows since Jan 2017 ($bn)

- Equity
- Bonds
- MM funds

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, EPFR, Haver Analytics, Data as of 17-Oct-18

Figure 47: Cross asset flows last 4 weeks

Cross asset flows as a % of assets (last 4 weeks)

- Safer
- Riskier

MM Govt Bonds Corp HG EM Bonds Corp HY Bal Funds Div Funds DM Equity EM Equity

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, EPFR, Haver Analytics, Data as of 17-Oct-18

Figure 48: Equity flows across by region

Cumulative equity flows since Jan 2017 (monthly, $bn)

- US
- Europe
- Japan
- EM
- International*

*Funds with a global mandate, overwhelmingly tend to be focused on DM ex-US

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, EPFR, Haver Analytics, Data as of 17-Oct-18

Figure 49: Bond flows by category

Cumulative bond flows since 2017 ($bn)

- Corp HY
- EM
- Corp HG
- Govt Bonds
- Munis
- MBS
- TIPS
- Banks Loans

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, EPFR, Haver Analytics, Data as of 17-Oct-18
Equity Flows

Figure 50: Regional equity fund flows last 4 weeks

Regional equity flows (last 4 weeks, % of assets)

-0.7
-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
0.0
0.1
0.2
0.3

26-Sep
3-Oct
10-Oct
17-Oct

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, EPFR, Haver Analytics, Data as of 17-Oct-18

Figure 51: Sector fund flows

Cumulative sector flows since 2017 (monthly, $bn)

Growth
Value
Blend

Dec-16
Mar-17
Jun-17
Sep-17
Dec-17
Mar-18
Jun-18
Sep-18

Large cap
Mid cap
Small cap

Dec-16
Mar-17
Jun-17
Sep-17
Dec-17
Mar-18
Jun-18
Sep-18

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, EPFR, Haver Analytics, Data as of 17-Oct-18
Bond fund flows

Figure 54: Bond fund flows by category last 4 weeks

Figure 55: Bond fund flows by maturity

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, EPFR, Haver Analytics, Data as of 17-Oct-18
Bond futures positioning

Figure 56: Aggregate bond futures positioning

Figure 57: Bond futures positioning by maturity

Figure 58: Eurodollar futures positioning

Figure 59: Bond futures positioning by maturity
FX futures positioning

Figure 60: Trade weighted dollar positioning

Figure 61: Euro futures positioning

Figure 62: Yen futures positioning

Figure 63: Futures positioning across currencies

Trade weighted positions in JPY, EUR, GBP, AUD, CHF and CAD are used for calculating

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, CFTC, FRB, Haver Analytics, Data as of 9-Oct-18

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, CFTC, FRB, Haver Analytics, Data as of 9-Oct-18

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, CFTC, FRB, Haver Analytics, Data as of 9-Oct-18
Commodity futures positioning

Figure 64: Oil futures positioning

![Net long crude oil futures positions (Managed Money, million barrels)](chart)

Note: Net positions of combined WTI and Brent crude oil positions

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, CFTC, Bloomberg Finance LP, Haver Analytics, Data as of 9-Oct-18

Figure 65: Oil futures gross longs vs shorts

![Managed Money combined crude oil futures positions](chart)

Gross longs
Gross shorts

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, CFTC, Bloomberg Finance LP, Haver Analytics, Data as of 9-Oct-18

Figure 66: Copper futures positioning

![Managed Money Copper futures positions](chart)

Net long contracts (thous, lhs)
Copper ($/lb, rhs)

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, CFTC, Bloomberg Finance LP, Haver Analytics, Data as of 9-Oct-18

Figure 67: Gold futures positioning

![Managed Money Gold futures positions](chart)

Net long contracts (thous, lhs)
Gold ($/troy oz, rhs)

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, CFTC, Bloomberg Finance LP, Haver Analytics, Data as of 9-Oct-18

Note: Net positions of combined WTI and Brent crude oil positions

Source: Deutsche Bank Asset Allocation & Delta-1 Strategy, CFTC, Bloomberg Finance LP, Haver Analytics, Data as of 9-Oct-18
Appendix 1

Important Disclosures

*Other information available upon request

*Prices are current as of the end of the previous trading session unless otherwise indicated and are sourced from local exchanges via Reuters, Bloomberg and other vendors. Other information is sourced from Deutsche Bank, subject companies, and other sources. For disclosures pertaining to recommendations or estimates made on securities other than the primary subject of this research, please see the most recently published company report or visit our global disclosure look-up page on our website at https://research.db.com/Research/Disclosures/CompanySearch. Aside from within this report, important risk and conflict disclosures can also be found at https://research.db.com/Research/Topics/Equities?topicId=RB0002. Investors are strongly encouraged to review this information before investing.

Analyst Certification

The views expressed in this report accurately reflect the personal views of the undersigned lead analyst(s). In addition, the undersigned lead analyst(s) has not and will not receive any compensation for providing a specific recommendation or view in this report. Parag Thatte, Srinel Jalagani, Hallie Martin, Binky Chadha

<table>
<thead>
<tr>
<th>Equity Rating Key</th>
<th>Equity rating dispersion and banking relationships</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy: Based on a current 12- month view of total share-holder return (TSR = percentage change in share price from current price to projected target price plus projected dividend yield), we recommend that investors buy the stock.</td>
<td></td>
</tr>
<tr>
<td>Sell: Based on a current 12-month view of total share-holder return, we recommend that investors sell the stock.</td>
<td></td>
</tr>
<tr>
<td>Hold: We take a neutral view on the stock 12-months out and, based on this time horizon, do not recommend either a Buy or Sell.</td>
<td></td>
</tr>
<tr>
<td>Newly issued research recommendations and target prices supersede previously published research.</td>
<td></td>
</tr>
</tbody>
</table>

Additional ETF Information

Information on ETFs is provided strictly for illustrative purposes and should not be deemed an offer to sell or a solicitation of an offer to buy shares of any fund that is described in this document. Consider carefully any fund's investment objectives, risk factors, and charges and expenses before investing. This and other information can be found in the fund’s prospectus. Prospectuses about db X-trackers funds and Powershares DB funds can be obtained by calling 1-877-369-4617 or by visiting www.DBXUS.com. Read prospectuses carefully before investing. Past performance is not necessarily indicative of future results. Investing involves risk, including possible loss of principal. To better understand the similarities and differences between investments, including investment objectives, risks, fees and expenses, it is important to read the products’ prospectuses. Shares of ETFs may be sold throughout the day on an exchange through any brokerage account. However, shares may only be redeemed directly from an ETF by authorized participants, in very large creation/redemption units. Transactions in shares of ETFs will result in brokerage commissions and will generate tax consequences. ETFs are obliged to distribute portfolio gains to shareholders. Deutsche Bank may be an issuer, advisor, manager, distributor or administrator of, or provide other services to, an ETF included in this report, for which it receives compensation. db X-trackers and Powershares DB funds are distributed by ALPS Distributors, Inc. The opinions expressed are those of the authors and do not necessarily reflect the views of DB, ALPS or their affiliates.
Aside from within this report, important conflict disclosures can also be found at https://gm.db.com/equities under the “Disclosures Lookup” and "Legal" tabs. Investors are strongly encouraged to review this information before investing.
Additional Information

The information and opinions in this report were prepared by Deutsche Bank AG or one of its affiliates (collectively “Deutsche Bank”). Though the information herein is believed to be reliable and has been obtained from public sources believed to be reliable, Deutsche Bank makes no representation as to its accuracy or completeness. Hyperlinks to third-party websites in this report are provided for reader convenience only. Deutsche Bank neither endorses the content nor is responsible for the accuracy or security controls of those websites.

If you use the services of Deutsche Bank in connection with a purchase or sale of a security that is discussed in this report, or is included or discussed in another communication (oral or written) from a Deutsche Bank analyst, Deutsche Bank may act as principal for its own account or as agent for another person.

Deutsche Bank may consider this report in deciding to trade as principal. It may also engage in transactions, for its own account or with customers, in a manner inconsistent with the views taken in this research report. Others within Deutsche Bank, including strategists, sales staff and other analysts, may take views that are inconsistent with those taken in this research report. Deutsche Bank issues a variety of research products, including fundamental analysis, equity-linked analysis, quantitative analysis and trade ideas. Recommendations contained in one type of communication may differ from recommendations contained in others, whether as a result of differing time horizons, methodologies, perspectives or otherwise. Deutsche Bank and/or its affiliates may also be holding debt or equity securities of the issuers it writes on. Analysts are paid in part based on the profitability of Deutsche Bank AG and its affiliates, which includes investment banking, trading and principal trading revenues.

Opinions, estimates and projections constitute the current judgment of the author as of the date of this report. They do not necessarily reflect the opinions of Deutsche Bank and are subject to change without notice. Deutsche Bank provides liquidity for buyers and sellers of securities issued by the companies it covers. Deutsche Bank research analysts sometimes have shorter-term trade ideas that may be inconsistent with Deutsche Bank’s existing longer-term ratings. Some trade ideas for equities are listed as Catalyst Calls on the Research Website (https://research.db.com/Research/), and can be found on the general coverage list and also on the covered company’s page. A Catalyst Call represents a high-conviction belief by an analyst that a stock will outperform or underperform the market and/or a specified sector over a time frame of no less than two weeks and no more than three months. In addition to Catalyst Calls, analysts may occasionally discuss with our clients, and with Deutsche Bank salespersons and traders, trading strategies or ideas that reference catalysts or events that may have a near-term or medium-term impact on the market price of the securities discussed in this report, which impact may be directionally counter to the analysts’ current 12-month view of total return or investment return as described herein. Deutsche Bank has no obligation to update, modify or amend this report or to otherwise notify a recipient thereof if an opinion, forecast or estimate changes or becomes inaccurate. Coverage and the frequency of changes in market conditions and in both general and company-specific economic prospects make it difficult to update research at defined intervals. Updates are at the sole discretion of the coverage analyst or of the Research Department Management, and the majority of reports are published at irregular intervals. This report is provided for informational purposes only and does not take into account the particular investment objectives, financial situations, or needs of individual clients. It is not an offer or a solicitation of an offer to buy or sell any financial instruments or to participate in any particular trading strategy. Target prices are inherently imprecise and a product of the analyst’s judgment. The financial instruments discussed in this report may not be suitable for all investors, and investors must make their own informed investment decisions. Prices and availability of financial instruments are subject to change without notice, and investment transactions can lead to losses as a result of price fluctuations and other factors. If a financial instrument is denominated in a currency other than an investor’s currency, a change in exchange rates may adversely affect the investment. Past performance is not necessarily indicative of future results. Performance calculations exclude transaction costs, unless otherwise indicated. Unless otherwise indicated, prices are current as of the end of the previous trading session and are sourced from local exchanges via Reuters, Bloomberg and other vendors. Data is also sourced from Deutsche Bank, subject companies, and other parties.

The Deutsche Bank Research Department is independent of other business divisions of the Bank. Details regarding our organizational arrangements and information barriers we have to prevent and avoid conflicts of interest with respect to our research are available on our website (https://research.db.com/Research/) under Disclaimer.
Macroeconomic fluctuations often account for most of the risks associated with exposures to instruments that promise to pay fixed or variable interest rates. For an investor who is long fixed-rate instruments (thus receiving these cash flows), increases in interest rates naturally lift the discount factors applied to the expected cash flows and thus cause a loss. The longer the maturity of a certain cash flow and the higher the move in the discount factor, the higher will be the loss. Upside surprises in inflation, fiscal funding needs, and FX depreciation rates are among the most common adverse macroeconomic shocks to receivers. But counterparty exposure, issuer creditworthiness, client segmentation, regulation (including changes in assets holding limits for different types of investors), changes in tax policies, currency convertibility (which may constrain currency conversion, repatriation of profits and/or liquidation of positions), and settlement issues related to local clearing houses are also important risk factors. The sensitivity of fixed-income instruments to macroeconomic shocks may be mitigated by indexing the contracted cash flows to inflation, to FX depreciation, or to specified interest rates – these are common in emerging markets. The index fixings may – by construction – lag or mis-measure the actual move in the underlying variables they are intended to track. The choice of the proper fixing (or metric) is particularly important in swaps markets, where floating coupon rates (i.e., coupons indexed to a typically short-dated interest rate reference index) are exchanged for fixed coupons. Funding in a currency that differs from the currency in which coupons are denominated carries FX risk. Options on swaps (swaptions) the risks typical to options in addition to the risks related to rates movements.

Derivative transactions involve numerous risks including market, counterparty default and illiquidity risk. The appropriateness of these products for use by investors depends on the investors’ own circumstances, including their tax position, their regulatory environment and the nature of their other assets and liabilities; as such, investors should take expert legal and financial advice before entering into any transaction similar to or inspired by the contents of this publication. The risk of loss in futures trading and options, foreign or domestic, can be substantial. As a result of the high degree of leverage obtainable in futures and options trading, losses may be incurred that are greater than the amount of funds initially deposited – up to theoretically unlimited losses. Trading in options involves risk and is not suitable for all investors. Prior to buying or selling an option, investors must review the “Characteristics and Risks of Standardized Options”, at http://www.optionsclearing.com/about/publications/character-risks.jsp. If you are unable to access the website, please contact your Deutsche Bank representative for a copy of this important document.

Participants in foreign exchange transactions may incur risks arising from several factors, including the following: (i) exchange rates can be volatile and are subject to large fluctuations; (ii) the value of currencies may be affected by numerous market factors, including world and national economic, political and regulatory events, events in equity and debt markets and changes in interest rates; and (iii) currencies may be subject to devaluation or government-imposed exchange controls, which could affect the value of the currency. Investors in securities such as ADRs, whose values are affected by the currency of an underlying security, effectively assume currency risk.

Unless governing law provides otherwise, all transactions should be executed through the Deutsche Bank entity in the investor’s home jurisdiction. Aside from within this report, important conflict disclosures can also be found at https://research.db.com/Research/ on each company’s research page. Investors are strongly encouraged to review this information before investing.

Deutsche Bank (which includes Deutsche Bank AG, its branches and affiliated companies) is not acting as a financial adviser, consultant or fiduciary to you or any of your agents (collectively, “You” or “Your”) with respect to any information provided in this report. Deutsche Bank does not provide investment, legal, tax or accounting advice, Deutsche Bank is not acting as your impartial adviser, and does not express any opinion or recommendation whatsoever as to any strategies, products or any other information presented in the materials. Information contained herein is being provided solely on the basis that the recipient will make an independent assessment of the merits of any investment decision, and it does not constitute a recommendation of, or express an opinion on, any product or service or any trading strategy.

The information presented is general in nature and is not directed to retirement accounts or any specific person or account type, and is therefore provided to You on the express basis that it is not advice, and You may not rely upon it in making Your decision. The information we provide is being directed only to persons we believe to be financially sophisticated, who are capable of evaluating investment risks independently, both in general and with regard to particular transactions and investment strategies, and who understand that Deutsche Bank has financial interests in the offering of its products.
In July 2018, Deutsche Bank revised its rating system for short term ideas whereby the branding has been changed to Catalyst Calls ("CC") from SOLAR ideas; the rating categories for Catalyst Calls originated in the Americas region have been made consistent with the categories used by Analysts globally; and the effective time period for CCs has been reduced from a maximum of 180 days to 90 days.

**United States:** Approved and/or distributed by Deutsche Bank Securities Incorporated, a member of FINRA, NFA and SIPC. Analysts located outside of the United States are employed by non-US affiliates that are not subject to FINRA regulations.

**Germany:** Approved and/or distributed by Deutsche Bank AG, a joint stock corporation with limited liability incorporated in the Federal Republic of Germany with its principal office in Frankfurt am Main. Deutsche Bank AG is authorized under German Banking Law and is subject to supervision by the European Central Bank and by BaFin, Germany’s Federal Financial Supervisory Authority.

**United Kingdom:** Approved and/or distributed by Deutsche Bank AG acting through its London Branch at Winchester House, 1 Great Winchester Street, London EC2N 2DB. Deutsche Bank AG in the United Kingdom is authorised by the Prudential Regulation Authority and is subject to limited regulation by the Prudential Regulation Authority and Financial Conduct Authority. Details about the extent of our authorisation and regulation are available on request.

**Hong Kong:** Distributed by Deutsche Bank AG, Hong Kong Branch or Deutsche Securities Asia Limited (save that any research relating to futures contracts within the meaning of the Hong Kong Securities and Futures Ordinance Cap. 571 shall be distributed solely by Deutsche Securities Asia Limited). The provisions set out above in the “Additional Information” section shall apply to the fullest extent permissible by local laws and regulations, including without limitation the Code of Conduct for Persons Licensed or Registered with the Securities and Futures Commission.

**India:** Prepared by Deutsche Equities India Private Limited (DEIPL) having CIN: U65990MH2002PTC137431 and registered office at 14th Floor, The Capital, C-70, G Block, Bandra Kurla Complex Mumbai (India) 400051. Tel: + 91 22 7180 4444. It is registered by the Securities and Exchange Board of India (SEBI) as a Stock broker bearing registration nos.: NSE (Capital Market Segment) - INB231196834, NSE (F&O Segment) INF231196834, NSE (Currency Derivatives Segment) INE231196834, BSE (Capital Market Segment) INB011196830; Merchant Banker bearing SEBI Registration no.: INM000010833 and Research Analyst bearing SEBI Registration no.: INH000001741. DEIPL may have received administrative warnings from the SEBI for breaches of Indian regulations. The transmission of research through DEIPL is Deutsche Bank’s determination and will not make a recipient a client of DEIPL. Deutsche Bank and/or its affiliate(s) may have debt holdings or positions in the subject company. With regard to information on associates, please refer to the “Shareholdings” section in the Annual Report at: [https://www.db.com/ir/en/annual-reports.htm](https://www.db.com/ir/en/annual-reports.htm).

**Japan:** Approved and/or distributed by Deutsche Securities Inc.(DSI). Registration number - Registered as a financial instruments dealer by the Head of the Kanto Local Finance Bureau (Kinsho) No. 117. Member of associations: JSDA, Type II Financial Instruments Firms Association and The Financial Futures Association of Japan. Commissions and risks involved in stock transactions - for stock transactions, we charge stock commissions and consumption tax by multiplying the transaction amount by the commission rate agreed with each customer. Stock transactions can lead to losses as a result of share price fluctuations and other factors. Transactions in foreign stocks can lead to additional losses stemming from foreign exchange fluctuations. We may also charge commissions and fees for certain categories of investment advice, products and services. Recommended investment strategies, products and services carry the risk of losses to principal and other losses as a result of changes in market and/or economic trends, and/or fluctuations in market value. Before deciding on the purchase of financial products and/or services, customers should carefully read the relevant disclosures, prospectuses and other documentation. “Moody’s”, “Standard & Poor’s”, and “Fitch” mentioned in this report are not registered credit rating agencies in Japan unless Japan or “Nippon” is specifically designated in the name of the entity. Reports on Japanese listed companies not written by analysts of DSI are written by Deutsche Bank Group’s analysts with the coverage companies specified by DSI. Some of the foreign securities stated on this report are not disclosed according to the Financial Instruments and Exchange Law of Japan. Target prices set by Deutsche Bank’s equity analysts are based on a 12-month forecast period.
Korea: Distributed by Deutsche Securities Korea Co.


Singapore: This report is issued by Deutsche Bank AG, Singapore Branch or Deutsche Securities Asia Limited, Singapore Branch (One Raffles Quay #18-00 South Tower Singapore 048583, +65 6423 8001), which may be contacted in respect of any matters arising from, or in connection with, this report. Where this report is issued or promulgated by Deutsche Bank in Singapore to a person who is not an accredited investor, expert investor or institutional investor (as defined in the applicable Singapore laws and regulations), they accept legal responsibility to such person for its contents.

Taiwan: Information on securities/investments that trade in Taiwan is for your reference only. Readers should independently evaluate investment risks and are solely responsible for their investment decisions. Deutsche Bank research may not be distributed to the Taiwan public media or quoted or used by the Taiwan public media without written consent. Information on securities/instruments that do not trade in Taiwan is for informational purposes only and is not to be construed as a recommendation to trade in such securities/instruments. Deutsche Securities Asia Limited, Taipei Branch may not execute transactions for clients in these securities/instruments.

Qatar: Deutsche Bank AG in the Qatar Financial Centre (registered no. 00032) is regulated by the Qatar Financial Centre Regulatory Authority. Deutsche Bank AG - QFC Branch may undertake only the financial services activities that fall within the scope of its existing QFCRA license. Its principal place of business in the QFC: Qatar Financial Centre, Tower, West Bay, Level 5, PO Box 14928, Doha, Qatar. This information has been distributed by Deutsche Bank AG. Related financial products or services are only available only to Business Customers, as defined by the Qatar Financial Centre Regulatory Authority.

Russia: The information, interpretation and opinions submitted herein are not in the context of, and do not constitute, any appraisal or evaluation activity requiring a license in the Russian Federation.

Kingdom of Saudi Arabia: Deutsche Securities Saudi Arabia LLC Company (registered no. 07073-37) is regulated by the Capital Market Authority. Deutsche Securities Saudi Arabia may undertake only the financial services activities that fall within the scope of its existing CMA license. Its principal place of business in Saudi Arabia: King Fahad Road, Al Olaya District, P.O. Box 301809, Faisaliah Tower - 17th Floor, 11372 Riyadh, Saudi Arabia.

United Arab Emirates: Deutsche Bank AG in the Dubai International Financial Centre (registered no. 00045) is regulated by the Dubai Financial Services Authority. Deutsche Bank AG - DIFC Branch may only undertake the financial services activities that fall within the scope of its existing DFSA license. Principal place of business in the DIFC: Dubai International Financial Centre, The Gate Village, Building 5, PO Box 504902, Dubai, U.A.E. This information has been distributed by Deutsche Bank AG. Related financial products or services are available only to Professional Clients, as defined by the Dubai Financial Services Authority.

Australia and New Zealand: This research is intended only for “wholesale clients” within the meaning of the Australian Corporations Act and New Zealand Financial Advisors Act, respectively. Please refer to Australia-specific research disclosures and related information at https://australia.db.com/australia/content/research-information.html. Where research refers to any particular financial product recipients of the research should consider any product disclosure statement, prospectus or other applicable disclosure document before making any decision about whether to acquire the product. In preparing this report, the primary analyst or an individual who assisted in the preparation of this report has likely been in contact with the company that is the subject of this research for confirmation/clarification of data, facts, statements, permission to use company-sourced material in the report, and/or site-visit attendance. Without prior approval from Research Management, analysts may not accept from current or potential Banking clients the costs of travel, accommodations, or other expenses incurred by analysts attending site visits, conferences, social events, and the like. Similarly, without prior approval from Research Management and Anti-Bribery and Corruption (“ABC”) team, analysts may not accept perks or other items of value for their personal use from issuers they cover.