

Global Macro Strategy

Is there a US corporate credit bubble?

Global Macro Strategy

Global

The bullish case

Corporate fundamentals are deteriorating incrementally and from a relatively healthy position. US corporate debt to profits, assets and net worth do not appear extreme. While US corporate profit margins are elevated, they will not decline materially in the intermediate term – particularly if inflation remains sluggish and the Fed stands pat. Low government bond yields reduce the cost of interest payments, limiting refinancing risks and renewing the bid for yield.

The bearish perspective

Credit fundamentals, particularly in US speculative grade, are in a more dire state. HY issuance is down 53% in 2016, indicative of a substantial tightening in credit conditions. Commodity-related stress will increase default rates to 5.5%, and the broader universe is more leveraged than in the late 1990s. This leaves firms more vulnerable to peaking profit margins, rising interest costs, tighter capital markets and a slowdown in US growth. Market illiquidity and the zero bound create significant uncertainty around valuations in a downside scenario.

What's our view?

There is a bubble in speculative grade credit. Easy central bank policies limited credit losses in the last cycle, keeping many 'zombie' firms afloat. Further, QE triggered substantial inflows into credit funds, igniting a material reach for yield. This translated into elevated competition, easing credit standards, and massive issuance. Many investors are pegged to nominal returns, effectively forcing them to buy double and single B corporates. We believe roughly 40% of all issuers are of the lowest quality, and roughly \$1tn which will end up 'distressed debt' in this cycle. Much of the debt was bought to pick-up yield linearly, but the default risk is exponential. Simply put, clients were not being compensated for the credit risk.

What's priced in?

Given the recent rally in HY bonds and leveraged loans we believe market implied pricing is largely consistent with the bullish view. Our tactical view on US HY is neutral¹. However, we do not see further upside in capital appreciation terms. Our structural view remains bearish as we see material downside risks. Quality deterioration and market illiquidity suggests speculative grade default rates could reach a record of 14.2% and US HY spreads could reach 1,640bp in this cycle² 3. And our analysis implies this mosaic has manifested itself in various degrees across other credit assets (e.g, commercial real estate, auto loans). While this bubble and other mini-bubbles may not burst in coming months, we believe their existence justifies our structurally bearish view on corporate credit and an up-in-quality bias.

Matthew Mish, CFA

Strategist

matthew.mish@ubs.com

+1-203-719 1242

Stephen Caprio, CFA

Strategist

stephen.caprio@ubs.com

+1-203-719 6032

¹ [Does this credit rally still have legs?](#), M. Mish, March 30, 2016

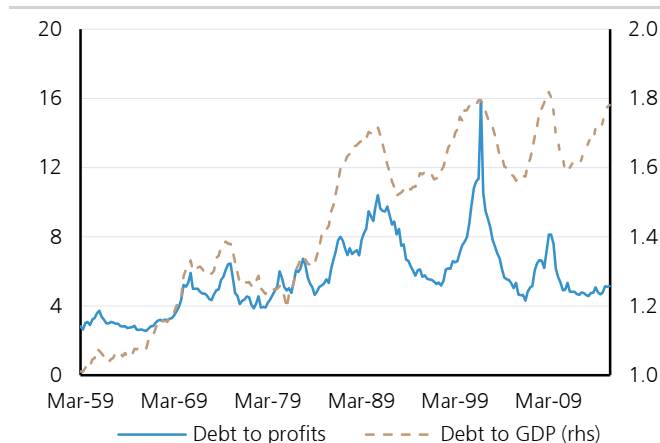
² [US high yield: quantifying the downside risk in this cycle](#), M. Mish, March 16, 2016

Is there a US corporate credit bubble?

Our meetings with London clients in late March elicited a surprising degree of divergence around views on the state and severity of the US corporate credit cycle. This lack of consensus could partly reflect improved sentiment given the recent rally in US credit markets, but the difference of opinion likely also reflects the breadth of investors represented – credit versus macro, equity, FX/ interest rate specialists – and hedge fund versus real money clients. In our view, this perspective is the increasingly relevant one as the reach for yield has thrust multi-asset investors (e.g., absolute, total return, equity and macro funds) into the credit space; i.e., everyone's view matters to some degree. So what is the bullish versus bearish client viewpoints on the prospects for the US credit cycle, and is there really a bubble brewing?

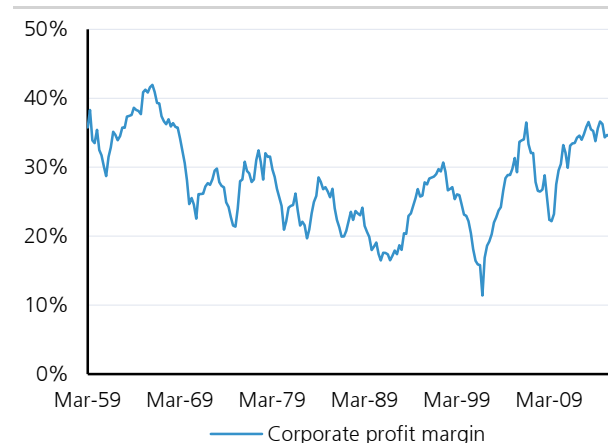
To oversimplify, our discussions suggest the bulls believe corporate fundamentals are deteriorating incrementally, and from a relatively healthy position. Several clients characterized levels of US corporate debt to profits, assets and net worth as within reasonable bounds; i.e., increases in the quantity of corporate debt have not been excessive. Further, while most agreed that corporate profit margins were near peak levels, there was little conviction that they would decline materially in the near to intermediate term – particularly if inflation remains low and limits aggressive Fed tightening. This thesis implies focusing on leverage with respect to profits is more relevant than in relation to US nominal GDP, a mosaic that is more concerning (Figures 1, 2). And a few similarly stressed that as low government bond yields reduce the cost of interest payments, refinancing risks seemed remote in the near term and limited supply could help foster a renewed bid for yield.

Figure 1: US corporate liabilities versus profits and nominal GDP



Source: UBS, Federal Reserve

Figure 2: US corporate profits as a % of nominal GDP

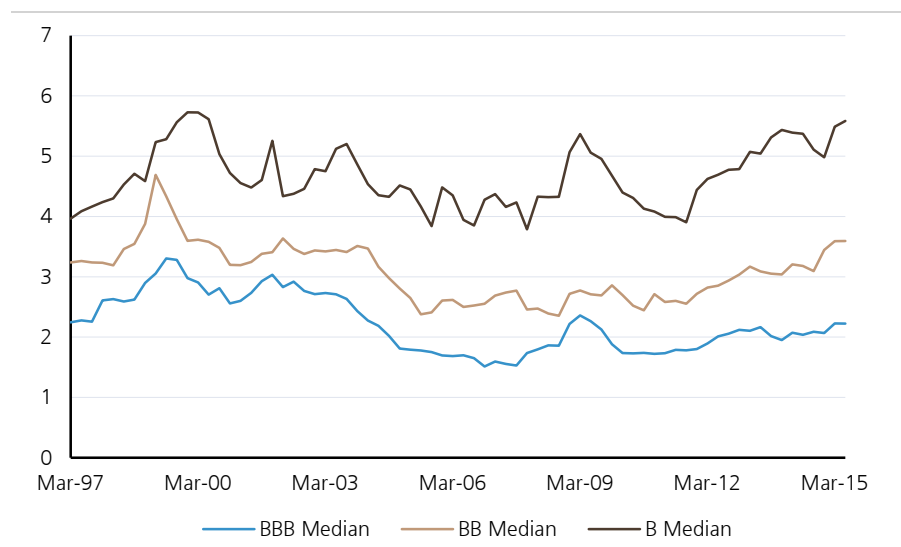


Source: UBS, Federal Reserve

In contrast, the bears contest that credit fundamentals, particularly in US high yield, are in a more dire state. Commodity-related stress will push default rates up towards 5-6%, without assuming much increase in non-commodity defaults. But the broader speculative grade universe is highly leveraged – particularly the lower quality segment (many single Bs, nearly all triple Cs), which, by definition, leaves them more exposed to peaking profit margins, rising interest costs and a slowdown in US growth (Figure 3). While US IG issuance is up 9% year-to-date, HY issuance is down 53% despite the recent rally. And this backdrop coincides with significant uncertainty in forecasting downside valuations given market

illiquidity and limited central bank policy tools remaining when the cycle turns more violently. But what many clients seem to find striking and confusing is the substantial divergence in fundamental metrics portrayed by the sell-side. Exhibit A is corporate leverage. Figure 3 clearly illustrates a leverage picture that differs substantially from that portrayed in Figure 1. Why? In our view, the divergence reflects the limitations and shortcomings of focusing on national account data, particularly in a world characterized by extreme inequality. In the S&P 500, for example, 10% of firms own 70% of all the cash on balance sheets. Similarly, Figure 1 in part reflects a narrow universe of large, high-quality (single A) mega caps with negative net debt; conversely, Figure 3 largely illustrates the greater use of debt issuance by speculative grade firms with more modest earnings streams in this cycle. Simply put, lower quality firms have been structurally increasing debt faster than earnings as interest rates have declined.

Figure 3: Median net leverage across rating categories (net debt to EBITDA)



Source: UBS, company filings

Is the focus on corporate leverage short-sighted? Rating agencies typically incorporate other operating and financial metrics, for example interest coverage and liquidity, when rating speculative grade bonds and loans. We have previously argued corporate credit ratings have been artificially inflated by monetary policy in that they have suppressed funding costs and temporarily buttressed corporate liquidity⁴. How did this happen? As discussed previously⁵ central bank policy accommodation limited credit losses in the 2007 – 08 default cycle, keeping many 'zombie' firms afloat, and triggered substantial inflows into credit funds, igniting a material 'reach for yield' and massive issuance volumes^{6,7}.

Practically speaking, many investors are constrained by nominal investment targets; e.g., many life insurers and pensions have fixed, guaranteed income streams that need to be funded. Conceptually when government bond yields plunged post-crisis, fixed income investors that generated 4 – 6% yields buying triple B corporates in the 2000s (and short dated Treasuries in the 1990s) were effectively

⁴ [US high yield outlook: What is the fate of \\$1tn in stressed credit?](#), M. Mish, 03-Dec-2015

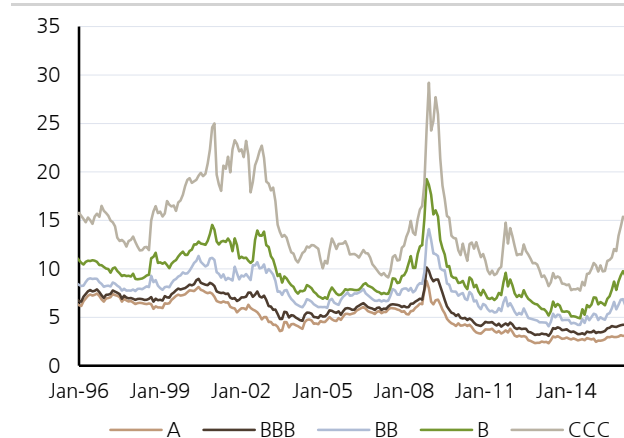
⁵ [What is the clearing level for \\$1tn in stressed credit?](#), M. Mish, 11-Feb-2016

⁶ "On Reaching for Yield and the Coexistence of Bubbles and Negative Bubbles", Acharya & Naqvi, January 2016

⁷ "Reaching for Yield or Playing It Safe? Risk Taking by Bond Mutual Funds", Choi & Kronlund, July 2015

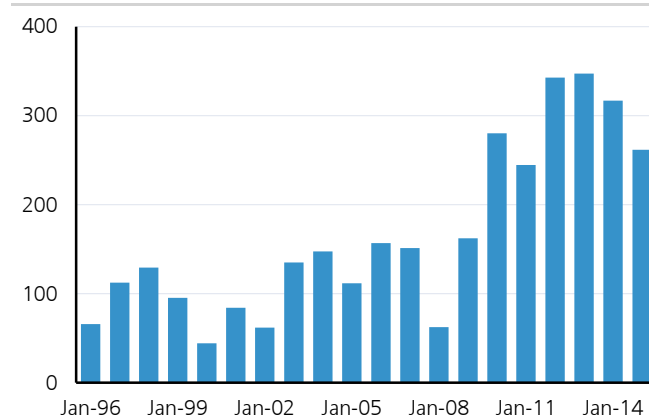
forced to buy double and single B corporates this time. This translated into competition for bond issuance, easing credit standards, massive supply at record low yields and an underestimation of risks (Figures 4 & 5). We reiterate the underpricing of risks is evident if one calculates a time series of corporate bond yields by rating adjusted for average and peak realized credit losses, which look much worse for the triple C sector. Triple C yields are quoted at 15.2% currently, but become 7.0% and -3.2%, respectively, using historical average and recessionary default environments (Figures 6 & 7). Note these yields are not estimates for total returns as they do not incorporate any price declines (i.e., negative mark-to-market). And if you don't believe us on the quality of the underlying speculative grade universe consider Moody's data (the most conservative of the three agencies overall): their latest annual default study depicts a rated universe which, incorporating fundamental (e.g., commodity related downgrades) and technical changes, shows that the proportion of triple C rated issuers in its speculative grade universe (bonds and loans) reached a new record to start 2016; 1,356 out of 3,181 issuers or about 42% of the total (Figure 8). To reiterate, the US speculative grade market is roughly \$1.5tn in bonds and \$1tn in loans, not including private, non-index eligible or revolving credit exposures. And we estimate through this cycle approximately \$1tn will become distressed debt in this cycle.

Figure 4: US corporate bond yields by credit rating



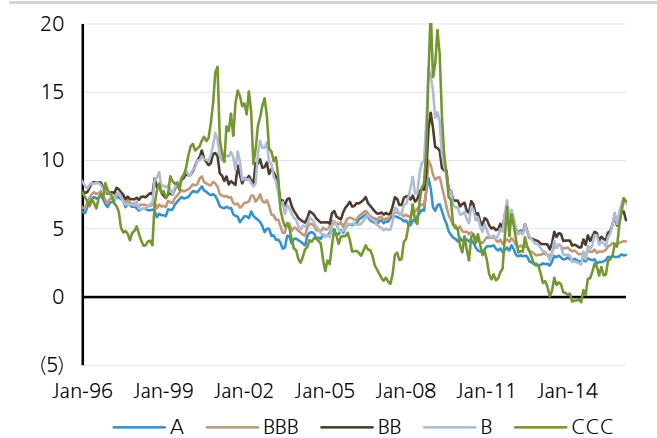
Source: UBS, Yieldbook

Figure 5: US high yield annual corporate bond issuance



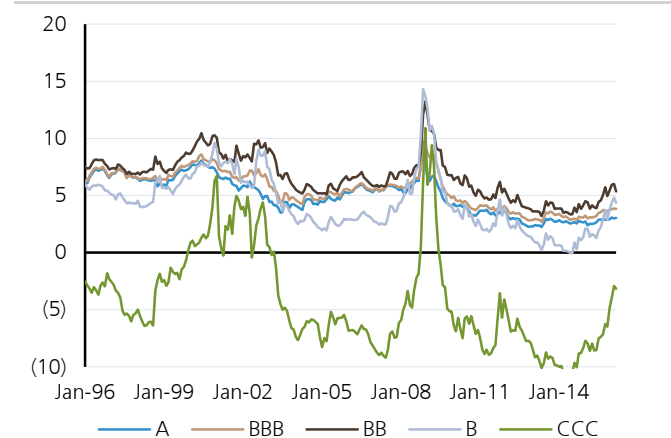
Source: UBS, Dealogic

Figure 6: US corporate bond yields by rating (loss-adjusted using average defaults)



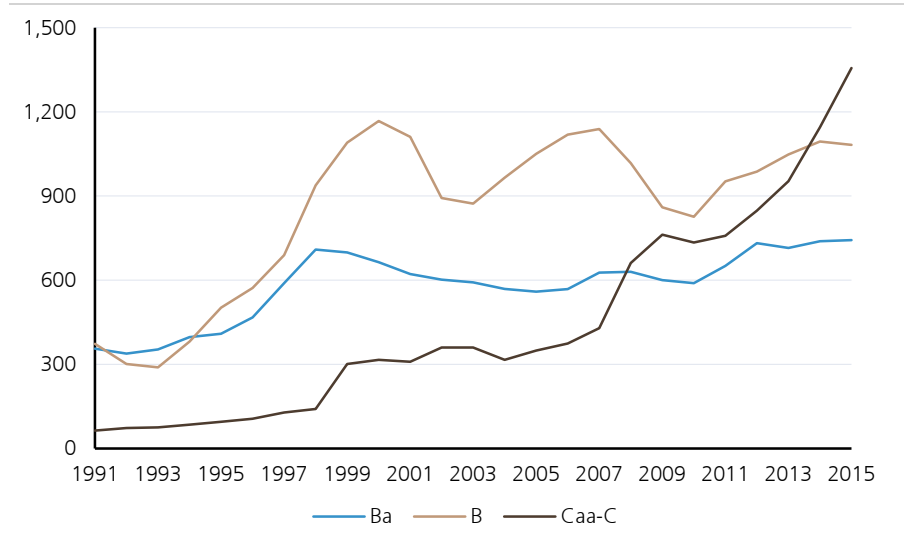
Source: UBS, Yieldbook, Moody's

Figure 7: US corporate bond yields by rating (loss-adjusted using recessionary defaults)



Source: UBS, Yieldbook, Moody's

Figure 8: Count of speculative grade issuers by credit quality

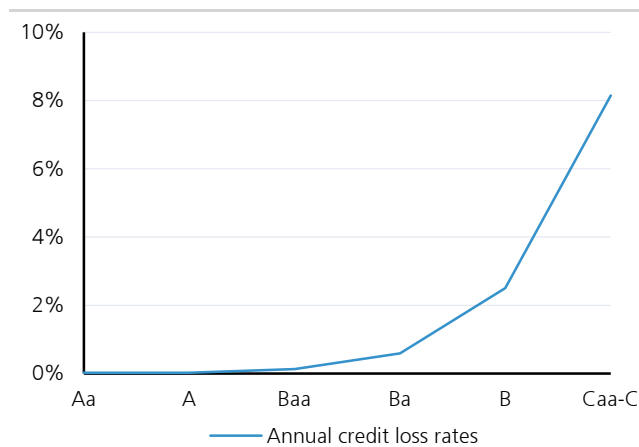


Source: UBS, Moody's

More broadly, our overarching thesis is that in the relatively compressed spread environment of prior years (late 2012 – early 2015), investors were herded into lower-quality credit risk for a yield pick-up of a couple hundred basis points. But the fundamental problem is that the default risk is exponential, not linear in these securities (Figure 9). Simply put, clients were not being compensated appropriately for the risk. Is this merely a corporate credit phenomenon? The short answer is no. First, corporate bond yields are considered a relative value or reference point for other credit asset classes, e.g., capitalization rates in commercial real estate. And investors and rating agencies compare relative value and produce ratings which attempt to calibrate similar levels of default and loss risk across categories. Second, evidence suggests that credit loss or delinquency curves across credit tiers are exponential not only for corporate credits, but also for other forms of consumer credit (Figure 10). Third, the reach for yield and deterioration in lending conditions

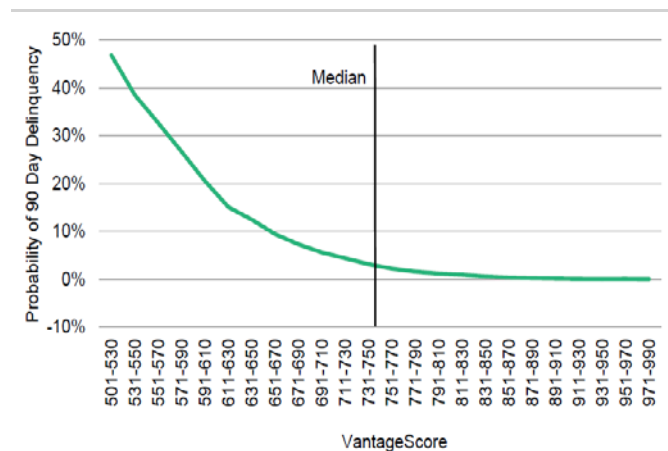
has been well documented in other credit segments, e.g., commercial real estate, consumer auto, student loans and unsecured loans^{8,9}.

Figure 9: Corporate credit loss rates by credit quality



Source: UBS, Moody's

Figure 10: Consumer delinquency rates by credit quality



Source: UBS, CFPB

Even where the aggregate data depicts a benign picture – e.g., US residential real estate – sector or underlying dynamics may be more concerning if one looks beyond national financial account data. Quantity and price terms are conventional measures of credit cycles, but not silver bullets – even when excesses should be obvious (e.g., the substantial growth in credit aggregates leading up to the financial crisis). Among others Greenwood and Hanson note non-price terms such as issuer quality characteristics is often an overlooked but critical barometer of financing conditions and signpost for credit cycles¹⁰. For example, aggregate data on US residential mortgage market may not uncover more concerning facts such as a) subprime loans have simply been relabelled FHAVA loans and annual origination is running \$3-400bn, b) non-bank lenders have grown to comprise 50-70% of non-prime origination, c) four of the ten largest mortgage lenders last year were non-banks headquartered in Southern California and run by former Countrywide Financial executives, and d) some large bank lenders have nearly one-quarter of all mortgage loans concentrated in California¹¹.

In short, we believe there is a corporate credit bubble in speculative grade credit. And the structural downside risks for high yield bonds and loans are material¹², with non-negligible downside risks to growth. But as we have researched other non-corporate credit segments it is becoming increasingly obvious that the mosaic we painted above for US speculative grade credit has manifested itself in various degrees across other asset segments (if one is inclined to look past the forest and spend time in the weeds). While this bubble and possible mini-bubbles may not pop this month, we believe their existence justifies our structurally bearish view on corporate credit and preference for higher-quality securities.

⁸ [What's the next 'energy' sector in credit markets?](#), M. Mish, 02-Feb-2016

⁹ [Non-bank lending: the tip of the iceberg?](#), M. Mish, 10-Mar-2016

¹⁰ Issuer Quality and Corporate Bond Returns, R. Greenwood and S. Hanson, October 2013

¹¹ After subprime collapse, nonbank lenders again dominate riskier mortgages, LA Times, November 30, 2015

¹² [US high yield: quantifying the downside risk in this cycle](#), M. Mish, 16-Mar-2016

Valuation Method and Risk Statement

Risks of multi-asset investing include but are not limited to market risk, credit risk, interest rate risk, and foreign exchange risk. Correlations of returns among different asset classes may deviate from historical patterns. Geopolitical events and policy shocks pose risks that can reduce asset returns. Valuations may be adversely affected during times of high market volatility, thin liquidity, and economic dislocation.

Required Disclosures

This report has been prepared by UBS Securities LLC, an affiliate of UBS AG. UBS AG, its subsidiaries, branches and affiliates are referred to herein as UBS.

For information on the ways in which UBS manages conflicts and maintains independence of its research product; historical performance information; and certain additional disclosures concerning UBS research recommendations, please visit www.ubs.com/disclosures. The figures contained in performance charts refer to the past; past performance is not a reliable indicator of future results. Additional information will be made available upon request. UBS Securities Co. Limited is licensed to conduct securities investment consultancy businesses by the China Securities Regulatory Commission. UBS acts or may act as principal in the debt securities (or in related derivatives) that may be the subject of this report.

Analyst Certification: Each research analyst primarily responsible for the content of this research report, in whole or in part, certifies that with respect to each security or issuer that the analyst covered in this report: (1) all of the views expressed accurately reflect his or her personal views about those securities or issuers and were prepared in an independent manner, including with respect to UBS, and (2) no part of his or her compensation was, is, or will be, directly or indirectly, related to the specific recommendations or views expressed by that research analyst in the research report.

Unless otherwise indicated, please refer to the Valuation and Risk sections within the body of this report. For a complete set of disclosure statements associated with the companies discussed in this report, including information on valuation and risk, please contact UBS Securities LLC, 1285 Avenue of Americas, New York, NY 10019, USA, Attention: Investment Research.

Global Disclaimer

This document has been prepared by UBS Securities LLC, an affiliate of UBS AG. UBS AG, its subsidiaries, branches and affiliates are referred to herein as UBS.

Global Research is provided to our clients through UBS Neo, the UBS Client Portal and UBS.com (each a "System"). It may also be made available through third party vendors and distributed by UBS and/or third parties via e-mail or alternative electronic means. The level and types of services provided by Global Research to a client may vary depending upon various factors such as a client's individual preferences as to the frequency and manner of receiving communications, a client's risk profile and investment focus and perspective (e.g. market wide, sector specific, long-term, short-term, etc.), the size and scope of the overall client relationship with UBS and legal and regulatory constraints.

When you receive Global Research through a System, your access and/or use of such Global Research is subject to this Global Research Disclaimer and to the terms of use governing the applicable System.

When you receive Global Research via a third party vendor, e-mail or other electronic means, your use shall be subject to this Global Research Disclaimer and to UBS's Terms of Use/Disclaimer (<http://www.ubs.com/global/en/legalinfo2/disclaimer.html>). By accessing and/or using Global Research in this manner, you are indicating that you have read and agree to be bound by our Terms of Use/Disclaimer. In addition, you consent to UBS processing your personal data and using cookies in accordance with our Privacy Statement (<http://www.ubs.com/global/en/legalinfo2/privacy.html>) and cookie notice (<http://www.ubs.com/global/en/homepage/cookies/cookie-management.html>).

If you receive Global Research, whether through a System or by any other means, you agree that you shall not copy, revise, amend, create a derivative work, transfer to any third party, or in any way commercially exploit any UBS research provided via Global Research or otherwise, and that you shall not extract data from any research or estimates provided to you via Global Research or otherwise, without the prior written consent of UBS.

For access to all available Global Research on UBS Neo and the Client Portal, please contact your UBS sales representative.

This document is for distribution only as may be permitted by law. It is not directed to, or intended for distribution to or use by, any person or entity who is a citizen or resident of or located in any locality, state, country or other jurisdiction where such distribution, publication, availability or use would be contrary to law or regulation or would subject UBS to any registration or licensing requirement within such jurisdiction. It is published solely for information purposes; it is not an advertisement nor is it a solicitation or an offer to buy or sell any financial instruments or to participate in any particular trading strategy. No representation or warranty, either expressed or implied, is provided in relation to the accuracy, completeness or reliability of the information contained in this document ('the Information'), except with respect to Information concerning UBS. The Information is not intended to be a complete statement or summary of the securities, markets or developments referred to in the document. UBS does not undertake to update or keep current the Information. Any opinions expressed in this document may change without notice and may differ or be contrary to opinions expressed by other business areas or groups of UBS. Any statements contained in this report attributed to a third party represent UBS's interpretation of the data, information and/or opinions provided by that third party either publicly or through a subscription service, and such use and interpretation have not been reviewed by the third party.

Nothing in this document constitutes a representation that any investment strategy or recommendation is suitable or appropriate to an investor's individual circumstances or otherwise constitutes a personal recommendation. Investments involve risks, and investors should exercise prudence and their own judgement in making their investment decisions. The financial instruments described in the document may not be eligible for sale in all jurisdictions or to certain categories of investors. Options, derivative products and futures are not suitable for all investors, and trading in these instruments is considered risky. Mortgage and asset-backed securities may involve a high degree of risk and may be highly volatile in response to fluctuations in interest rates or other market conditions. Foreign currency rates of exchange may adversely affect the value, price or income of any security or related instrument referred to in the document. For investment advice, trade execution or other enquiries, clients should contact their local sales representative.

The value of any investment or income may go down as well as up, and investors may not get back the full (or any) amount invested. Past performance is not necessarily a guide to future performance. Neither UBS nor any of its directors, employees or agents accepts any liability for any loss (including investment loss) or damage arising out of the use of all or any of the Information.

Any prices stated in this document are for information purposes only and do not represent valuations for individual securities or other financial instruments. There is no representation that any transaction can or could have been effected at those prices, and any prices do not necessarily reflect UBS's internal books and records or theoretical model-based valuations and may be based on certain assumptions. Different assumptions by UBS or any other source may yield substantially different results.

This document and the Information are produced by UBS as part of its research function and are provided to you solely for general background information. UBS has no regard to the specific investment objectives, financial situation or particular needs of any specific recipient. In no circumstances may this document or any of the Information be used for any of the following purposes:

- (i) valuation or accounting purposes;
- (ii) to determine the amounts due or payable, the price or the value of any financial instrument or financial contract; or
- (iii) to measure the performance of any financial instrument.

By receiving this document and the Information you will be deemed to represent and warrant to UBS that you will not use this document or any of the Information for any of the above purposes or otherwise rely upon this document or any of the Information.

Research will initiate, update and cease coverage solely at the discretion of UBS Investment Bank Research Management. The analysis contained in this document is based on numerous assumptions. Different assumptions could result in materially different results. The analyst(s) responsible for the preparation of this document may interact with trading desk personnel, sales personnel and other parties for the purpose of gathering, applying and interpreting market information. UBS relies on information barriers to control the flow of information contained in one or more areas within UBS into other areas, units, groups or affiliates of UBS. The compensation of the analyst who prepared this document is determined exclusively by research management and senior management (not including investment banking). Analyst compensation is not based on investment banking revenues; however, compensation may relate to the revenues of UBS Investment Bank as a whole, of which investment banking, sales and trading are a part.

For financial instruments admitted to trading on an EU regulated market: UBS AG, its affiliates or subsidiaries (excluding UBS Securities LLC) acts as a market maker or liquidity provider (in accordance with the interpretation of these terms in the UK) in the financial instruments of the issuer save that where the activity of liquidity provider is carried out in accordance with the definition given to it by the laws and regulations of any other EU jurisdictions, such information is separately disclosed in this document. For financial instruments admitted to trading on a non-EU regulated market: UBS may act as a market maker save that where this activity is carried out in the US in accordance with the definition given to it by the relevant laws and regulations, such activity will be specifically disclosed in this document. UBS may have issued a warrant the value of which is based on one or more of the financial instruments referred to in the document. UBS and its affiliates and employees may have long or short positions, trade as principal and buy and sell in instruments or derivatives identified herein; such transactions or positions may be inconsistent with the opinions expressed in this document.

United Kingdom and the rest of Europe: Except as otherwise specified herein, this material is distributed by UBS Limited to persons who are eligible counterparties or professional clients. UBS Limited is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. **France:** Prepared by UBS Limited and distributed by UBS Limited and UBS Securities France S.A. UBS Securities France S.A. is regulated by the ACPR (Autorité de Contrôle Prudentiel et de Résolution) and the Autorité des Marchés Financiers (AMF). Where an analyst of UBS Securities France S.A. has contributed to this document, the document is also deemed to have been prepared by UBS Securities France S.A. **Germany:** Prepared by UBS Limited and distributed by UBS Limited and UBS Deutschland AG. UBS Deutschland AG is regulated by the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin). **Spain:** Prepared by UBS Limited and distributed by UBS Limited and UBS Securities España SV, SA. UBS Securities España SV, SA is regulated by the Comisión Nacional del Mercado de Valores (CNMV). **Turkey:** Distributed by UBS Limited. No information in this document is provided for the purpose of offering, marketing and sale by any means of any capital market instruments and services in the Republic of Turkey. Therefore, this document may not be considered as an offer made or to be made to residents of the Republic of Turkey. UBS AG is not licensed by the Turkish Capital Market Board under the provisions of the Capital Market Law (Law No. 6362). Accordingly, neither this document nor any other offering material related to the instruments/services may be utilized in connection with providing any capital market services to persons within the Republic of Turkey without the prior approval of the Capital Market Board. However, according to article 15 (d) (ii) of the Decree No. 32, there is no restriction on the purchase or sale of the securities abroad by residents of the Republic of Turkey. **Poland:** Distributed by UBS Limited (spółka z ograniczoną odpowiedzialnością) Oddział w Polsce regulated by the Polish Financial Supervision Authority. Where an analyst of UBS Limited (spółka z ograniczoną odpowiedzialnością) Oddział w Polsce has contributed to this

document, the document is also deemed to have been prepared by UBS Limited (spółka z ograniczoną odpowiedzialnością) Oddział w Polsce. **Russia:** Prepared and distributed by UBS Bank (OOO). **Switzerland:** Distributed by UBS AG to persons who are institutional investors only. UBS AG is regulated by the Swiss Financial Market Supervisory Authority (FINMA). **Italy:** Prepared by UBS Limited and distributed by UBS Limited and UBS Italia Sim S.p.A. UBS Italia Sim S.p.A. is regulated by the Bank of Italy and by the Commissione Nazionale per le Società e la Borsa (CONSOB). Where an analyst of UBS Italia Sim S.p.A. has contributed to this document, the document is also deemed to have been prepared by UBS Italia Sim S.p.A. **South Africa:** Distributed by UBS South Africa (Pty) Limited (Registration No. 1995/011140/07), an authorised user of the JSE and an authorised Financial Services Provider (FSP 7328). **Israel:** This material is distributed by UBS Limited. UBS Limited is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. UBS Securities Israel Ltd is a licensed Investment Marketer that is supervised by the Israel Securities Authority (ISA). UBS Limited and its affiliates incorporated outside Israel are not licensed under the Israeli Advisory Law. UBS Limited is not covered by insurance as required from a licensee under the Israeli Advisory Law. UBS may engage among others in issuance of Financial Assets or in distribution of Financial Assets of other issuers for fees or other benefits. UBS Limited and its affiliates may prefer various Financial Assets to which they have or may have Affiliation (as such term is defined under the Israeli Advisory Law). Nothing in this Material should be considered as investment advice under the Israeli Advisory Law. This Material is being issued only to and/or is directed only at persons who are Eligible Clients within the meaning of the Israeli Advisory Law, and this material must not be relied on or acted upon by any other persons. **Saudi Arabia:** This document has been issued by UBS AG (and/or any of its subsidiaries, branches or affiliates), a public company limited by shares, incorporated in Switzerland with its registered offices at Aeschenvorstadt 1, CH-4051 Basel and Bahnhofstrasse 45, CH-8001 Zurich. This publication has been approved by UBS Saudi Arabia (a subsidiary of UBS AG), a Saudi closed joint stock company incorporated in the Kingdom of Saudi Arabia under commercial register number 1010257812 having its registered office at Tatweer Towers, P.O. Box 75724, Riyadh 11588, Kingdom of Saudi Arabia. UBS Saudi Arabia is authorized and regulated by the Capital Market Authority to conduct securities business under license number 08113-37. **Dubai:** The information distributed by UBS AG Dubai Branch is intended for Professional Clients only and is not for further distribution within the United Arab Emirates. **United States:** Distributed to US persons by either UBS Securities LLC or by UBS Financial Services Inc., subsidiaries of UBS AG; or by a group, subsidiary or affiliate of UBS AG that is not registered as a US broker-dealer (a 'non-US affiliate') to major US institutional investors only. UBS Securities LLC or UBS Financial Services Inc. accepts responsibility for the content of a document prepared by another non-US affiliate when distributed to US persons by UBS Securities LLC or UBS Financial Services Inc. All transactions by a US person in the securities mentioned in this document must be effected through UBS Securities LLC or UBS Financial Services Inc., and not through a non-US affiliate. UBS Securities LLC is not acting as a municipal advisor to any municipal entity or obligated person within the meaning of Section 15B of the Securities Exchange Act (the "Municipal Advisor Rule"), and the opinions or views contained herein are not intended to be, and do not constitute, advice within the meaning of the Municipal Advisor Rule. **Canada:** Distributed by UBS Securities Canada Inc., a registered investment dealer in Canada and a Member-Canadian Investor Protection Fund, or by another affiliate of UBS AG that is registered to conduct business in Canada or is otherwise exempt from registration. **Brazil:** Except as otherwise specified herein, this material is prepared by UBS Brasil CCTVM S.A. to persons who are eligible investors residing in Brazil, which are considered to be: (i) financial institutions, (ii) insurance firms and investment capital companies, (iii) supplementary pension entities, (iv) entities that hold financial investments higher than R\$300,000.00 and that confirm the status of qualified investors in written, (v) investment funds, (vi) securities portfolio managers and securities consultants duly authorized by Comissão de Valores Mobiliários (CVM), regarding their own investments, and (vii) social security systems created by the Federal Government, States, and Municipalities. **Hong Kong:** Distributed by UBS Securities Asia Limited and/or UBS AG, Hong Kong Branch. **Singapore:** Distributed by UBS Securities Pte. Ltd. [MCI (P) 018/09/2015 and Co. Reg. No.: 198500648C] or UBS AG, Singapore Branch. Please contact UBS Securities Pte. Ltd., an exempt financial adviser under the Singapore Financial Advisers Act (Cap. 110); or UBS AG, Singapore Branch, an exempt financial adviser under the Singapore Financial Advisers Act (Cap. 110) and a wholesale bank licensed under the Singapore Banking Act (Cap. 19) regulated by the Monetary Authority of Singapore, in respect of any matters arising from, or in connection with, the analysis or document. The recipients of this document represent and warrant that they are accredited and institutional investors as defined in the Securities and Futures Act (Cap. 289). **Japan:** Distributed by UBS Securities Japan Co., Ltd. to professional investors (except as otherwise permitted). Where this document has been prepared by UBS Securities Japan Co., Ltd., UBS Securities Japan Co., Ltd. is the author, publisher and distributor of the document. Distributed by UBS AG, Tokyo Branch to Professional Investors (except as otherwise permitted) in relation to foreign exchange and other banking businesses when relevant. **Australia:** Clients of UBS AG: Distributed by UBS AG (Holder of Australian Financial Services License No. 231087). Clients of UBS Securities Australia Ltd: Distributed by UBS Securities Australia Ltd (Holder of Australian Financial Services License No. 231098). Clients of UBS Wealth Management Australia Ltd: Distributed by UBS Wealth Management Australia Ltd (Holder of Australian Financial Services License No. 231127). This Document contains general information and/or general advice only and does not constitute personal financial product advice. As such, the Information in this document has been prepared without taking into account any investor's objectives, financial situation or needs, and investors should, before acting on the Information, consider the appropriateness of the Information, having regard to their objectives, financial situation and needs. If the Information contained in this document relates to the acquisition, or potential acquisition of a particular financial product by a 'Retail' client as defined by section 761G of the Corporations Act 2001 where a Product Disclosure Statement would be required, the retail client should obtain and consider the Product Disclosure Statement relating to the product before making any decision about whether to acquire the product. The UBS Securities Australia Limited Financial Services Guide is available at: www.ubs.com/ecs-research-fsg. **New Zealand:** Distributed by UBS New Zealand Ltd. The information and recommendations in this publication are provided for general information purposes only. To the extent that any such information or recommendations constitute financial advice, they do not take into account any person's particular financial situation or goals. We recommend that recipients seek advice specific to their circumstances from their financial advisor. **Korea:** Distributed in Korea by UBS Securities Pte. Ltd., Seoul Branch. This document may have been edited or contributed to from time to time by affiliates of UBS Securities Pte. Ltd., Seoul Branch. **Malaysia:** This material is authorized to be distributed in Malaysia by UBS Securities Malaysia Sdn. Bhd (Capital Markets Services License No.: CMSL/A0063/2007). This material is intended for professional/institutional clients only and not for distribution to any retail clients. **India:** Prepared by UBS Securities India Private Ltd. (Corporate Identity Number U67120MH1996PTC097299) 2/F, 2 North Avenue, Maker Maxity, Bandra Kurla Complex, Bandra (East), Mumbai (India) 400051. Phone: +912261556000. It provides brokerage services bearing SEBI Registration Numbers: NSE (Capital Market Segment): INB230951431, NSE (F&O Segment) INF230951431, NSE (Currency Derivatives Segment) INE230951431, BSE (Capital Market Segment) INB010951437; merchant banking services bearing SEBI Registration Number: INM000010809 and Research Analyst services bearing SEBI Registration Number: INH000001204. UBS AG, its affiliates or subsidiaries may have debt holdings or positions in the subject Indian company/companies. Within the past 12 months, UBS AG, its affiliates or subsidiaries may have received compensation for non-investment banking securities-related services and/or non-securities services from the subject Indian company/companies. The subject company/companies may have been a client/clients of UBS AG, its affiliates or subsidiaries during the 12 months preceding the date of distribution of the research report with respect to investment banking and/or non-investment banking securities-related services and/or non-securities services. With regard to information on associates, please refer to the Annual Report at: http://www.ubs.com/global/en/about_ubs/investor_relations/annualreporting.html

The disclosures contained in research documents produced by UBS Limited shall be governed by and construed in accordance with English law.

UBS specifically prohibits the redistribution of this document in whole or in part without the written permission of UBS and UBS accepts no liability whatsoever for the actions of third parties in this respect. Images may depict objects or elements that are protected by third party copyright, trademarks and other intellectual property rights. © UBS 2016. The key symbol and UBS are among the registered and unregistered trademarks of UBS. All rights reserved.

