UBS

Merck & Co.

United States of America/Pharmaceuticals
14 February 2017

UBS Research
Marc Goodman, IB Analyst
Ami Fadia, IB Analyst

12-month rating	**Buy**
12-month price target	**$70.00**
Price	**$65.66**

Contributing authors: Zidong Zhang

BACE failed for Mid-to-Moderate Alzheimer's

- What's new? The EPOCH Phase 2/3 BACE study in Alzheimer's stopped
- Our takeaway: Prodromal may work but we have low expectation
- Thoughts on stock: We don't expect much of an impact
- Valuation: We maintain our Buy rating and PT of $70 based on DCF

Following a recent interim assessment, an external Data Monitoring Committee (eDMC) recommended that Merck ceases the Phase 2/3 study of its BACE inhibitor, verubecestat, for treating mild-to-moderate Alzheimer's disease. The eDMC determined that there was "virtually no chance of finding a positive clinical effect." On safety, it appears that the eDMC didn't observe anything that would warrant stopping the EPOCH trial; and so the recommendation was specifically on efficacy, suggesting that there may not even be a positive trend. However, the eDMC recommends that the APECS Phase 3 trial in prodromal patients, with data expected in Feb 2019, continues.

Our takeaway: Prodromal may work but we have low expectation
Following the failures of a number of registrational amyloid beta studies (including the recent failure of LLY's Sola), we had low expectations that the EPOCH study would work, particularly as the evidence and past studies suggest that the mild-to-moderate AD patients may not be the appropriate patient population. Additionally, the EPOCH study did not screen for patients with amyloid beta, and so the study may have enrolled patients who may not have had Alzheimer's. We have very limited risk-adjusted sales (more like a small place holder) for verubecestat for this population in our model (~$100M), and we're removing this now which does not impact our EPS estimates. We note that the current belief is that amyloid beta therapy may still work in the early/prodromal patients, so there is a chance that APECS may work. However, we have low expectations.

Thoughts on stock: We don't expect much of an impact
The failure of EPOCH is disappointing, but expectations in the investment community for a successful trial were very low in our view. The next key catalysts for MRK are the potential approval of Keytruda + chemo in 1L NSCLC (May 10 PDUFA), CVOT from anacetrapib Phase 3 (mid-2017) – for which we have low expectations, and topline data from Keytruda + chemo Phase 3 KeyNote-189 in 1L NSCLC in 2H17.

Valuation: We maintain our Buy rating and PT of $70 based on DCF
Our DCF analysis uses a terminal growth rate of 0% for the base business and 5% for the pipeline, and a WACC of 8%.

Trading data and key metrics

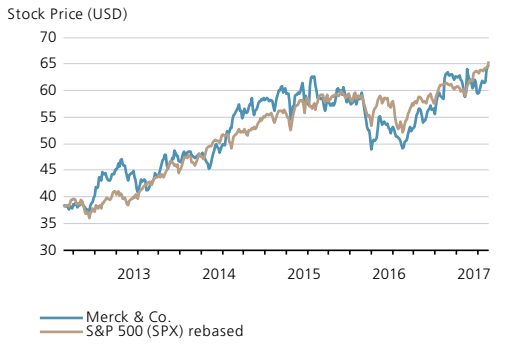
52-wk range	US$65.66-49.78
Market cap.	US$182bn
Shares o/s	2,776m (COM)
Free float	100%
Avg. daily volume ('000)	3,274
Avg. daily value (m)	US$201.9
Common s/h equity (12/17E)	US$34.0bn
P/BV (12/17E)	5.3x
Net debt / EBITDA (12/17E)	1.4x
RIC	MRK.N
BBG	MRK US

Sources: UBS, Bloomberg

EPS (UBS, diluted) (US$)

	12/17E	
	UBS	Cons.
Q1E	0.80	0.84
Q2E	0.80	0.87
Q3E	1.10	1.07
Q4E	1.10	1.01
12/17E	3.80	3.81
12/18E	4.30	4.22
12/19E	4.80	4.56

Performance



Sources: Bloomberg, UBS

Definitions of terms and abbreviations are available in the appendix section of this report, and more extensively on internet at www.ubs.com/glossary

Company Profile: Merck & Co.
Merck discovers, develops, and markets human and animal health products. It is a major vaccine provider, with Gardasil for preventing HPV, as well as a player in the diabetes space, and it is becoming a key player in immuno-oncology, with Keytruda, which could ramp >$4bn by 2020. In addition, we think its pipeline remains underappreciated, particularly in HCV.

Statement of Risk
Our price target is based on a DCF analysis. The pharmaceutical industry is subject to many business risks. These include, but are not limited to, political risks, government oversight of the approval and ongoing manufacturing process, discovery bottleneck and pipeline attrition, competitive developments, patent challenges, and product liability. Merck-specific risks include failure of pipeline products in the near future.

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.

Highlights (US$m)	12/14	12/15	12/16	12/17E	12/18E	12/19E	12/20E	12/21E
Revenues	42,237	39,498	39,807	39,562	40,801	42,659	43,577	44,475
EBIT (UBS)	13,694	13,382	13,713	13,281	14,260	15,319	15,859	16,123
Net earnings (UBS)	10,215	10,194	10,538	10,495	11,470	12,444	13,023	13,328
EPS (UBS, diluted) (US$)	3.49	3.59	3.78	3.80	4.30	4.80	5.20	5.50
DPS (US$)	1.80	1.80	1.76	1.76	1.85	1.85	1.85	1.94
Net (debt) / cash	(13,125.00)	(21,611.00)	(21,611.00)	(21,611.00)	(21,611.00)	(21,611.00)	(21,611.00)	(21,611.00)

Profitability/valuation	12/14	12/15	12/16	12/17E	12/18E	12/19E	12/20E	12/21E
EBIT margin %	32.4	33.9	34.4	33.6	35.0	35.9	36.4	36.3
ROIC (EBIT) %	24.0	26.3	27.1	29.4	35.0	40.8	46.1	52.3
EV/EBITDA (core) x	8.0	10.7	10.3	12.0	11.2	10.5	10.3	10.1
P/E (UBS, diluted) x	16.4	15.8	15.2	17.3	15.3	13.7	12.6	11.9
Equity FCF (UBS) yield %	3.7	7.3	7.7	6.5	7.3	7.8	8.0	8.4
Net dividend yield %	3.1	3.2	3.1	2.7	2.8	2.8	2.8	3.0

Source: Company accounts, Thomson Reuters, UBS estimates. Metrics marked as (UBS) have had analyst adjustments applied.
Valuations: based on an average share price that year, (E): based on a share price of US$65.66 on 14 Feb 2017 18:43 EST

For questions related to this report, please contact the global UBS Research Equity info center under ubs-cio-wm@ubs.com. Please note that e-mail communication is unsecured. For access to more research publications, please visit the UBS Quotes online portal or contact your client advisor for assistance.

Appendix

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. This recommendation was finalized on: February 15, 2017 01:58 AM GMT

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 12-Month Rating	Rating Category	Coverage [1]	IB Services [2]
Buy	**Buy**	45%	28%
Neutral	**Hold/Neutral**	39%	25%
Sell	**Sell**	15%	17%

1:Percentage of companies under coverage globally within the 12-month rating category.

2:Percentage of companies within the 12-month rating category for which investment banking (IB) services were provided within the past 12 months.

Source: UBS. Rating allocations are as of 31 December 2016.

UBS 12-Month Rating	Definition
Buy	FSR is > 6% above the MRA.
Neutral	FSR is between -6% and 6% of the MRA.
Sell	FSR is > 6% below the MRA.

UBS Investment Research: Global Equity Ratings Definitions

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.

Global Equity 12-Month Rating Definitions

Buy: FSR is > 6% above the MRA. **Neutral:** FSR is between -6% and 6% of the MRA. **Sell:** FSR is > 6% below the MRA.

Key Definitions

Forecast Stock Return (FSR) is defined as expected percentage price appreciation plus gross dividend yield over the next 12 months.

Market Return Assumption (MRA) is defined as the one-year local market interest rate plus 5% (a proxy for, and not a forecast of, the equity risk premium).

Under Review (UR) Stocks may be flagged as UR by the analyst, indicating that the stock's price target and/or rating are subject to possible change in the near term, usually in response to an event that may affect the investment case or valuation.

Exceptions and Special Cases

Core Banding Exceptions (CBE): Exceptions to the standard +/-6% bands may be granted by the Investment Review Committee (IRC). Factors considered by the IRC include the stock's volatility and the credit spread of the respective company's debt. As a result, stocks deemed to be very high or low risk may be subject to higher or lower bands as they relate to the rating. When such exceptions apply, they will be identified the Companies Mentioned or Company Disclosure table in the relevant research piece.

Disclaimer

This report is prepared by UBS AG or an affiliate thereof and published by Wealth Management and Personal & Corporate Banking, a Business Division of UBS AG (UBS) or an affiliate thereof. In certain countries UBS AG is referred to as UBS SA.
This publication is for your information only and is not intended as an offer, or a solicitation of an offer, to buy or sell any investment or other specific product. Certain services and products are subject to legal restrictions and cannot be offered worldwide on an unrestricted basis and/or may not be eligible for sale to all investors. All information and opinions expressed in this document were obtained from sources believed to be reliable and in good faith, but no representation or warranty, express or implied, is made as to its accuracy or completeness (other than disclosures relating to UBS AG, its subsidiaries and affiliates). All information and opinions as well as any prices indicated are current as of the date of this report, and are subject to change without notice. Research will initiate, update and cease coverage solely at the discretion of UBS Research Management. Any prices stated in this report are for information purposes only and do not represent valuations for individual securities or other 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. The analysis contained herein is based on numerous assumptions. Different assumptions could result in materially different results. The analyst(s) responsible for the preparation of this report may interact with trading desk personnel, sales personnel and other constituencies for the purpose of gathering, synthesizing and interpreting market information. UBS is under no obligation to update or keep current the information contained herein. Opinions expressed herein may differ or be contrary to those expressed by other business areas or divisions of UBS, its subsidiaries and affiliates, as a result of using different assumptions and/or criteria. UBS does not undertake that investors will obtain profits, nor will it share with investors any investment profits nor accept any liability for any investment losses. Investments involve risks and investors should exercise prudence in making their investment decisions. The report should not be regarded by recipients as a substitute for the exercise of their own judgment. At any time UBS and other companies in the UBS group (or its employees) may have a long or short position, or deal as principal or agent, in relevant securities or provide advisory or other services to the issuer of relevant securities or to a company connected with an issuer. Some investments may not be readily realizable since the market in the securities is illiquid and therefore valuing the investment and identifying the risk to which you are exposed may be difficult to quantify. UBS relies on information barriers to control the flow of information contained in one or more areas within UBS, into other areas, units, divisions or affiliates of UBS. 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 and other market conditions. Past performance of an investment is no guarantee for its future performance. Neither UBS nor any of its affiliates, nor any of UBS' or any of its affiliates, directors, employees or agents accepts any liability for any loss or damage arising out of the use of all or any part of this report. For financial instruments admitted to trading on an EU regulated market: UBS AG, its affiliates or subsidiaries (excluding UBS Securities LLC and/or UBS Capital Markets LP) 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 research report. Additional information will be made available upon request. Some investments may be subject to sudden and large falls in value and on realization you may receive back less than you invested or may be required to pay more. Changes in foreign exchange rates may have an adverse effect on the price, value or income of an investment. The compensation of the analyst(s) who prepared this report 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 Wealth Management & Swiss Bank as a whole, which includes investment banking, sales and trading services. We are of necessity unable to take into account the particular investment objectives, financial situation and needs of our individual client and we would recommend that you take financial and/or tax advice as to the implications (including tax) of investing in any of the products mentioned herein. For structured financial instruments and funds the sales prospectus is legally binding. If you are interested you may attain a copy via UBS or a subsidiary of UBS. This document may not be reproduced or copies circulated without prior authority of UBS or a subsidiary of UBS. UBS expressly prohibits the distribution and transfer of this document to third parties for any reason. UBS will not be liable for any claims or lawsuits from any third parties arising from the use or distribution of this document. This report is for distribution only under such circumstances as may be permitted by applicable law. For information on the ways in which UBS CIO Wealth Management manages conflicts and maintains independence of its investment views and publication offering, and research and rating methodologies, please visit www.ubs.com/research. Additional information on the relevant authors of this publication and other CIO publication(s) referenced in this report; and copies of any past reports on this topic; are available upon request from your client advisor.
Australia: This notice is issued by UBS AG ABN 47 088 129 613 (Holder of Australian Financial Services Licence No 231087): This Document is issued and distributed by UBS AG. This is the case despite anything to the contrary in the Document. The Document is intended for use only by "Wholesale Clients" as defined in section 761G ("Wholesale Clients") of the Corporations Act 2001 (Cth) ("Corporations Act"). In no circumstances may the Document be made available by UBS AG to a "Retail Client" as defined in section 761G of the Corporations Act. UBS AG's research services are only available to Wholesale Clients. The Document is general information only and does not take into account any person's investment objectives, financial and taxation situation or particular needs. **Bahamas:** This publication is distributed to private clients of UBS (Bahamas) Ltd and is not intended for distribution to persons designated as a Bahamian citizen or resident under the Bahamas Exchange Control Regulations. **Austria:** This publication is not intended to constitute a public offer under Austrian law, but might be made available for information purposes to clients of UBS Europe SE, Niederlassung Österreich, with place of business at Wächtergasse 1, A-1010 Wien. UBS Europe SE, Niederlassung Österreich is a branch of UBS Europe SE, a credit institution constituted under German Law in the form of a Societas Europaea, duly authorized by the German Federal Financial Services Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin), and is subject to the joint supervision of BaFin, the central bank of Germany (Deutsche Bundesbank), as well as of the Austrian supervisory authority (Finanzmarktaufsicht, FMA), to which this publication has not been submitted for approval. **Bahrain:** UBS is a Swiss bank not licensed, supervised or regulated in Bahrain by the Central Bank of Bahrain and does not undertake banking or investment business activities in Bahrain. Therefore, Clients have no protection under local banking and investment services laws and regulations. **Brazil:** Prepared by UBS Brasil Administradora de Valores Mobiliários Ltda, entity regulated by Comissão de Valores Mobiliários ("CVM"). The views and opinions expressed in this report accurately reflect analyst's personal views about the subject securities and issuers. This report is only intended for Brazilian residents if such residents are directly purchasing or selling securities in the Brazil capital market through a local authorized institution. For investors residing in Brazil, Eligible Investors 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 and that confirm the status of qualified investors in written, (v) investment funds, (vi) securities portfolio managers and securities consultants duly authorized by CVM, regarding their own investments, and (vii) social security systems created by the Federal Government, States, and Municipalities. **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, 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. Under no circumstances is the information contained herein 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 or, alternatively, pursuant to a dealer registration exemption. No securities commission or similar regulatory authority in Canada has reviewed or in any way passed upon these materials, the information contained herein or the merits of the securities described herein and any representation to the contrary is an offence. In Canada, this publication is distributed by UBS Investment Management Canada Inc. **China:** This research report is neither intended to be distributed to PRC investors nor to provide securities investment consultancy services within the territory of PRC. **Czech Republic:** UBS is not a licensed bank in Czech Republic and thus is not allowed to provide regulated banking or investment services in Czech Republic. This material is distributed for marketing purposes. **Denmark:** This publication is not intended to constitute a public offer under Danish law, but might be distributed by UBS Europe SE, Denmark Branch, filial af UBS Europe SE, with place of business at Sankt Annae Plads 13, 1250 Copenhagen, Denmark, registered with the Danish Commerce and Companies Agency, under the No. 38 17 24 33. UBS Europe SE, Denmark Branch, filial af UBS Europe SE is a branch of UBS Europe SE, a credit institution constituted under German Law in the form of a Societas Europaea, duly authorized by the German Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin). UBS Europe SE, Denmark Branch, filial af UBS Europe SE is subject to the joint supervision of the BaFin, the central bank of Germany (Deutsche Bundesbank) and the Danish Financial Supervisory Authority (DFSA) (Finanstilsynet), to which this document has not been submitted for approval. **France:** This publication is distributed by UBS (France) S.A., French "société anonyme" with share capital of € 125.726.944, 69, boulevard Haussmann F-75008 Paris, R.C.S. Paris B 421 255 670, to its clients and prospects. UBS (France) S.A. is a provider of investment services duly authorized according to the terms of the "Code Monétaire et Financier", regulated by French banking and financial authorities as the "Autorité de Contrôle Prudentiel et de Résolution." **Egypt:** Securities or other investment products are not being offered or sold by UBS to the public in Egypt and they have not been and will not be registered with the Egyptian Financial Supervisory Authority (EFSA). Germany: The issuer under German Law is UBS Europe SE, Bockenheimer Landstrasse 2-4, 60306 Frankfurt am Main. UBS Europe SE is authorized

Disclaimer

and regulated by the "Bundesanstalt für Finanzdienstleistungsaufsicht". **Hong Kong:** This publication is distributed to clients of UBS AG Hong Kong Branch by UBS AG Hong Kong Branch, a licensed bank under the Hong Kong Banking Ordinance and a registered institution under the Securities and Futures Ordinance. **India:** Distributed by UBS Securities India Private Ltd. 2/F, 2 North Avenue, Maker Maxity, Bandra Kurla Complex, Bandra (East), Mumbai (India) 400051. Phone: +912261556000. SEBI Registration Numbers: NSE (Capital Market Segment): INB230951431 , NSE (F&O Segment) INF230951431, BSE (Capital Market Segment) INB010951437. **Indonesia:** This research or publication is not intended and not prepared for purposes of public offering of securities under the Indonesian Capital Market Law and its implementing regulations. Securities mentioned in this material have not been, and will not be, registered under the Indonesian Capital Market Law and regulations. **Israel:** UBS Switzerland AG is registered as a Foreign Dealer in cooperation with UBS Wealth Management Israel Ltd, a wholly owned UBS subsidiary. UBS Wealth Management Israel Ltd is a licensed Portfolio Manager which engages also in Investment Marketing and is regulated by the Israel Securities Authority. This publication shall not replace any investment advice and/or investment marketing provided by a relevant licensee which is adjusted to your personal needs. For the avoidance of doubt, any use of the word "advice" and any of its derivatives in this publication shall be construed as "Investment Marketing" as defined in the Israeli Advisory Law.) UBS AG and its affiliates incorporated outside Israel are not licensed under the Israeli Advisory Law. UBS AG 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 AG and its affiliates may prefer various Financial Assets to which they have or may have an affiliation (as such term is defined under the Israeli Advisory Law. **Italy:** This publication is distributed to the clients of UBS Europe SE, Succursale Italia, Via del Vecchio Politecnico, 3 - 20121 Milano, the branch of a German bank duly authorized by the "Bundesanstalt für Finanzdienstleistungsaufsicht" to the provision of financial services and supervised by "Consob". Jersey: UBS AG, Jersey Branch, is regulated and authorized by the Jersey Financial Services Commission for the conduct of banking, funds and investment business. Where services are provided from outside Jersey, they will not be covered by the Jersey regulatory regime. UBS AG, Jersey Branch is a branch of UBS AG a public company limited by shares, incorporated in Switzerland whose registered offices are at Aeschenvorstadt 1, CH-4051 Basel and Bahnhofstrasse 45, CH 8001 Zurich. UBS AG, Jersey Branch's principal place business is P.O. Box 350, 24 Union Street, St Helier, Jersey JE4 8UJ. **Luxembourg:** This publication is not intended to constitute a public offer under Luxembourg law, but might be made available for information purposes to clients of UBS Europe SE, Luxembourg Branch, with place of business at 33A, Avenue J. F. Kennedy, L-1855 Luxembourg. UBS Europe SE, Luxembourg Branch is a branch of UBS Europe SE, a credit institution constituted under German Law in the form of a Societas Europaea, duly authorized by the German Federal Financial Services Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin), and is subject to the joint supervision of BaFin, the central bank of Germany (Deutsche Bundesbank), as well as of the Luxembourg supervisory authority, the Commission de Surveillance du Secteur Financier (the "CSSF"), to which this publication has not been submitted for approval. **Mexico:** This document has been distributed by UBS Asesores México, S.A. de C.V., a company which is not part of UBS Grupo Financiero, S.A. de C.V. or of any other Mexican financial group and whose obligations are not guaranteed by any third party. UBS Asesores México, S.A. de C.V. does not guarantee any yield whatsoever. **Netherlands:** This publication is not intended to constitute a public offering or a comparable solicitation under Dutch law, but might be made available for information purposes to clients of UBS Europe SE, Netherlands branch, a branch of a German bank duly authorized by the "Bundesanstalt für Finanzdienstleistungsaufsicht" for the provision of financial services and supervised by "Autoriteit Financiële Markten" (AFM) in the Netherlands , to which this publication has not been submitted for approval. **New Zealand:** This notice is distributed to clients of UBS Wealth Management Australia Limited ABN 50 005 311 937 (Holder of Australian Financial Services Licence No. 231127), Chifley Tower, 2 Chifley Square, Sydney, New South Wales, NSW 2000, by UBS Wealth Management Australia Ltd. You are being provided with this UBS publication or material because you have indicated to UBS that you are a client certified as a wholesale investor and/or an eligible investor ("Certified Client") located in New Zealand. This publication or material is not intended for clients who are not Certified Clients ("Non-Certified Clients"), and if you are a Non-Certified Client you must not rely on this publication or material. If despite this warning you nevertheless rely on this publication or material, you hereby (i) acknowledge that you may not rely on the content of this publication or material and that any recommendations or opinions in this publication or material are not made or provided to you, and (ii) to the maximum extent permitted by law (a) indemnify UBS and its associates or related entities (and their respective directors, officers, agents and advisers (each a "Relevant Person") for any loss, damage, liability or claim any of them may incur or suffer as a result of, or in connection with, your unauthorised reliance on this publication or material and (b) waive any rights or remedies you may have against any Relevant Person for (or in respect of) any loss, damage, liability or claim you may incur or suffer as a result of, or in connection with, your unauthorised reliance on this publication or material. **Singapore:** Please contact 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 report. **Spain:** This publication is distributed to its clients by UBS Europe SE, Sucursal en España, with registered office at Calle María de Molina 4, C.P. 28006, Madrid, entity supervised by Banco de España and the Bundesanstalt für Finanzdienstleistungsaufsicht. UBS Europe SE, Sucursal en España is a branch of UBS Europe SE, a credit institution constituted in the form of a Societas Europaea authorized and regulated by the Bundesanstalt für Finanzdienstleistungsaufsich. **Sweden:** This publication is not intended to constitute a public offer under Swedish law, but might be distributed by UBS Europe SE, Sweden Bankfilial with place of business at Regeringsgatan 38, 11153 Stockholm, Sweden, registered with the Swedish Companies Registration Office under the Reg. No 516406-1011. UBS Europe SE, Sweden Bankfilial is a branch of UBS Europe SE, a credit institution constituted under German Law in the form of a Societas Europaea, duly authorized by the German Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin). UBS Europe SE, Sweden Bankfilial is subject to the joint supervision of the BaFin, the central bank of Germany (Deutsche Bundesbank) and the Swedish financial supervisory authority (Finansinspektionen), to which this document has not been submitted for approval**. Taiwan:** This material is provided by UBS AG, Taipei Branch in accordance with laws of Taiwan, in agreement with or at the request of clients/prospects. **Thailand:** At your specific request, this material has been provided to you. This document has not been approved by the Thai SEC, which has not verified the correctness or completeness of this document either on the issuing date of this document or later. This document has not passed any consideration by the Thai SEC. Investment in these securities involves risks investors should exercise due care and discretion in considering investment risk. The Investors should carefully study the investment risk and ensure that they have a good understanding of such risk. **Turkey:** 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 in the Republic of Turkey. UBS AG is not licensed by the Turkish Capital Market Board (the CMB) under the provisions of the Capital Market Law (Law No. 2499). 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 CMB. However, according to article 15 (d) (ii) of the Decree No. 32 there is no restriction on the purchase or sale of the instruments by residents of the Republic of Turkey. **UAE:** This research report is not intended to constitute an offer, sale or delivery of shares or other securities under the laws of the United Arab Emirates (UAE). The contents of this report have not been and will not be approved by any authority in the United Arab Emirates including the UAE Central Bank or Dubai Financial Authorities, the Emirates Securities and Commodities Authority, the Dubai Financial Market, the Abu Dhabi Securities market or any other UAE exchange. This material is intended for professional clients only. UBS AG Dubai Branch is regulated by the DFSA in the DIFC. UBS AG/UBS Switzerland AG is not licensed to provide banking services in the UAE by the Central Bank of the UAE nor is it licensed by the UAE Securities and Commodities Authority. The UBS AG Representative Office in Abu Dhabi is licensed by the Central Bank of the UAE to operate a representative office**. UK:** Approved by UBS AG, authorised and regulated by the Financial Market Supervisory Authority in Switzerland. In the United Kingdom, UBS AG is authorised by the Prudential Regulation Authority and subject to regulation by the Financial Conduct Authority and limited regulation by the Prudential Regulation Authority. Details about the extent of our regulation by the Prudential Regulation Authority are available from us on request. A member of the London Stock Exchange. This publication is distributed to private clients of UBS London in the UK. Where products or services are provided from outside the UK, they will not be covered by the UK regulatory regime or the Financial Services Compensation Scheme. **Ukraine:** UBS is not registered and licensed as a bank/financial institution under Ukrainian legislation and does not provide banking and other financial services in Ukraine. UBS has not made and will not make any offer of the mentioned products to the public in Ukraine. No action has been taken to authorize an offer of the mentioned products to the public in Ukraine and the distribution of this document shall not constitute financial services for the purposes of the Law of Ukraine "On Financial Services and State Regulation of Financial Services Markets" dated 12 July 2001. **USA:** This document is not intended for distribution into the US, to US persons, or by US-based UBS personnel. UBS Securities LLC is a subsidiary of UBS AG and an affiliate of UBS Financial Services Inc., UBS Financial Services Inc. is a subsidiary of UBS AG.

Version 11/2016.