ZS Pharma

No Longer in Stealth Mode...Latest Thoughts and Feedback on ZSPH; PT to $75

Overweight

ZSPH, ZSPH US
Price: $56.50

▲ **Price Target: $75.00**
Previous: $57.00

With shares of ZSPH up 45% this month alone, it looks like our favorite "off the radar" name has finally been detected. Given the increased investor dialogue, imminent NDA filing, and recent publications, we thought this would be a good time to address the questions we get on the relative competitive positioning of ZS-9 for the treatment of hyperkalemia (high blood potassium). *First and foremost, we believe HK* – with roughly 4M potential patients – *represents a multi-billion-dollar opportunity in the US alone, and thus could easily support more than one successful product.* That said, ZS-9 has potentially important advantages over RLYP's patiromer that may eventually set it apart in the commercial marketplace (see full note for comp table), incl onset of action, tolerability, and dosing among other things. On the flip side, we believe ZS has been hurt by relatively low (but improving) market liquidity and a perception of a lack of catalysts (though regulatory progress and a potential LT safety update this yr are important). The bottom line is that we view ZS-9 as a differentiated treatment option in a large market with significant unmet need and continue to think ZSPH's current valuation is highly compelling. Key assumptions/scenarios in our model still remain quite conservative, but we are increasing our target to $75 based on slightly higher average peak sales. Reiterate OW.

- **ZS-9's faster onset of action and more convenient dosing could potentially lead to a commercial advantage.** ZS-9 demonstrated a stat sig reduction in serum potassium after 1 hour, with an average time to K+ normalization of 2.2 hrs. This compares favorably to patiromer's 7 hrs post first dose to reach a stat sig reduction in serum K+ and could prove to be a key advantage in both the acute and chronic settings. Additionally, ZS-9 is administered once daily vs. twice daily for patiromer, which may be particularly important in the chronic setting where compliance is critical.
- **Both ZS-9 and patiromer are clearly efficacious agents in treating hyperkalemia.** In ZS-9's Phase 3 trial (ZS004), the proportion of patients with mean K <5.1 mEq/L during days 8-29 was 46% with placebo, 80% with ZS-9 5g, 90% with ZS-9 10g, and 94% with ZS-9 15g. In comparison, 76% of patients on patiromer had normal serum K at week 4, with pts able to maintain serum K in the normal range with continued treatment during the 8 week withdrawal phase.
- **ZS-9 looks to have better GI tolerability vs. patiromer.** With ZS-9, the rates of GI AEs were 7%, 2%, 9% with ZS-9 5g, 10g, 15g, respectively, vs. 14% with placebo. This compares favorably to the Ph3 patiromer trial wherein mild to moderate GI AEs were the most frequent with a rate of 13% on patiromer vs. 6% on placebo.

Biotechnology

Cory Kasimov AC
(1-212) 622-5266
cory.w.kasimov@jpmorgan.com
Bloomberg JPMA KASIMOV <GO>

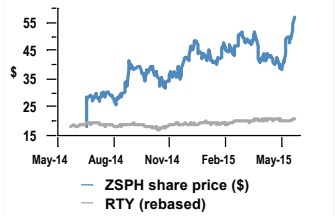
Brittany Terner
(1-212) 622-8527
brittany.terner@jpmorgan.com

Whitney G Ijem
(1-212) 622-4668
whitney.g.ijem@jpmorgan.com

Morgan T Haller
(1-212) 622-9486
morgan.t.haller@jpmorgan.com

J.P. Morgan Securities LLC

Price Performance



	YTD	1m	3m	12m
Abs	35.9%	36.4%	11.9%	213.9 %
Rel	31.1%	37.0%	9.9%	200.0 %

ZS Pharma, Inc (ZSPH;ZSPH US)

FYE Dec	2013A	2014A	2015E	2016E
EPS Reported ($)				
Q1 (Mar)	(1.35)	(2.57)	(1.05)A	-
Q2 (Jun)	-	(4.72)	(0.85)	-
Q3 (Sep)	-	(0.81)	(0.87)	-
Q4 (Dec)	-	(0.98)	(0.90)	-
FY	(8.52)	(5.47)	(3.64)	(5.10)

Source: Company data, Bloomberg, J.P. Morgan estimates.

Company Data	
Price ($)	56.50
Date Of Price	21 May 15
52-week Range ($)	56.74-25.51
Market Cap ($ mn)	1,412.10
Fiscal Year End	Dec
Shares O/S (mn)	25
Price Target ($)	75.00
Price Target End Date	31-Dec-15

See page 7 for analyst certification and important disclosures.

Cory Kasimov
(1-212) 622-5266
cory.w.kasimov@jpmorgan.com

J.P.Morgan

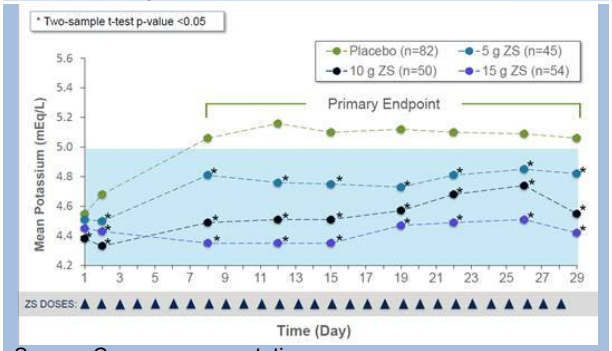
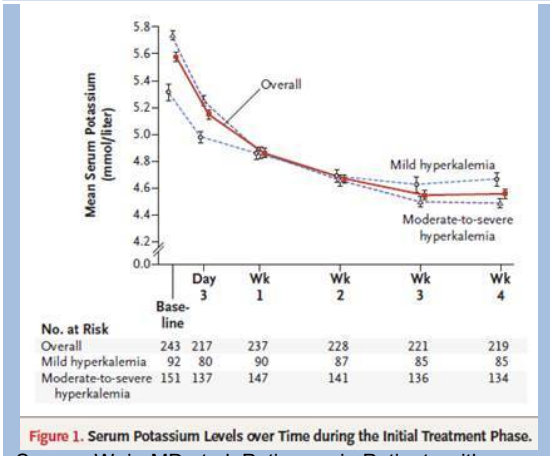
- **We're not overly concerned about edema or zirconium.** We note that although edema was a point of focus for ZS-9 (edema rate in ZS004 of 14% with ZS-9 15g and 6% with ZS-9 10g vs. 2% with placebo and ZS-9 5g), the rate of edema in the ZS004e & ZS005 trials is reportedly lower than the pbo rate in the ZS004 trial. Lastly, while some may still question the zirconium in ZS-9, we believe this issue has already been thoroughly addressed, and more importantly, the FDA's initial view that an AdCom isn't necessary appears to further diminish this risk.

- **Model update; PT to $75 with a lot of potential dry powder to go.** We still think our assumptions are conservative, including overall percentage of HK pts being treated with either ZS-9 or patiromer, price, compliance, duration of use, and ultimate market share. The key changes we made to our model are 1) accelerating the time it takes for ZS-9 to catch patiromer in total share by 1 year, to 2018 from 2019 (still conservative in our view), 2) increasing peak market split for ZS-9 to 60/40 from 55/45 starting in 2021, and 3) increasing average duration per patient to 5 mos from 4 mos starting in 2020 (still net out a 75% compliance adjustment from that number). The net effect is our peak US sales estimate goes to almost $1.5B from just over $1B. Despite this, our two valuation models (multiple based SOTP scenario analysis and rNPV) still assume just a 75% probability of success in the US and only 50% in EU, sales scenarios that are skewed to more disappointing assumptions, and a 12% discount rate despite probability adjustments.

Cory Kasimov
(1-212) 622-5266
cory.w.kasimov@jpmorgan.com

Table 1: ZS-9 vs. Patiromer

	ZS-9	Patiromer
Description	ZS-9 (zirconium silicate) is an insoluble, non-absorbed compound with a three-dimensional crystalline lattice structure that was specifically designed to trap potassium ions	Patiromer is a non-absorbed ion exchange polymer
Dosing	Oral, once daily	Oral, twice daily
Phase 3 Description	ZS004: Randomized, double-blind, placebo-controlled withdrawal study Induction phase: pts received 10g of ZS-9 3x/day for 48 hrs, and pts whose serum K normalized were eligible to enter the randomized withdrawal portion, where pts received 5g, 10g, or 15g of ZS-9 or placebo once daily for 28 days	Two part, single-blind, randomized, placebo-controlled Phase 3 study Part A: 4-week single-group, single-blind initial treatment phase where pts received patiromer 4.2g or 8.4g 2x daily and Part B:8-week, placebo-controlled, single-blind, randomized withdrawal study (eligible pts had a baseline potassium level of 5.5 to <6.5 mmol per liter in whom the level decreased to 3.8 to <5.1 mmol per liter)
Patient population	N=230; Hyperkalemia regardless of etiology, serum K >5 mEq/L	N=243; Pts with stage 3 or 4 CKD on RAAS inhibitors, serum potassium levels of 5.1 to <6.5 mmol per liter
Duration	4 weeks	12 weeks
Primary endpoint	Compare the mean serum K levels between placebo and each of the dosing groups during days 8-29 of the randomized phase	Initial phase: mean change in the serum potassium level from baseline to week 4 Withdrawal phase: between-group difference in the median change in the serum potassium level over the first 4 weeks of that phase
Secondary endpoints	Open label phase: change from baseline in serum K levels at all time intervals, proportion of pts achieving normokalemia by 24 and 48 hrs, time to K normalization Randomized phase: proportion of pts with mean K<5.1 mEq/L during days 8-29	Initial phase: proportion of patients who had a serum potassium level of 3.8 to less than 5.1 mmol per liter at week 4 Withdrawal phase: proportion of patients with a recurrence of hyperkalemia according to two definitions: a serum potassium level of 5.1 mmol per liter or higher and a serum potassium level of 5.5 mmol per liter or higher
Efficacy data	Open label phase: 0.2, 0.4, and 0.5 mEq/L K decline at 1, 2, and 4 hrs, respectively (p<0.001); mean time to K+ normalization was 2.2 hrs; 84% of pts normalized by 24 hrs, 98% of pts normalized by 48 hrs; stat sig achieved for primary endpoint of mean K+ maintenance on days 8-29 for all doses (p<0.001) – mean K of 5.06 mEq/L, 4.75 mEq/L, 4.51 mEq/L, and 4.37 mEq/L for placebo, ZS-9 5g, 10g, and 15g, respectively Randomized phase: proportion of pts with mean K <5.1 mEq/L during days 8-29 was 46% with placebo, 80% with ZS-9 5g, 90% with ZS-9 10g, and 94% with ZS-9 15g	Initial phase: showed a stat sig mean reduction in potassium of -1.01 mmol/L (P<0.001), with 76% of patients having normal serum K at week 4. Withdrawal phase: showed that continued treatment with patiromer was able to maintain serum K in the normal range. The median increase in K in patients randomized to placebo in part B was 0.72 mmol/L vs. no increase observed in the patiromer group (p<0.001) Recurrence of hyperkalemia (potassium level, ≥5.5 mmol/L) occurred in 60% of the pts on placebo vs. 15% in the patiromer group through week 8 (P<0.001)
Time to onset	1 hour post first dose	7 hours post first dose

Safety data	Tolerability comparable to placebo with no treatment-related SAEs Lower rates of GI AEs with ZS-9 vs. placebo (14% placebo vs. 7%, 2%, 9% with ZS-9 5g, 10g, 15g, respectively) Edema rate higher in ZS-9 15g dose (14% vs. 2% with placebo and ZS-9 5g and 6% with ZS-9 10g), however, we note the rate of edema in the ZS004e and ZS005 studies is lower than the placebo rate in the ZS004 trial Hypokalemia rate was higher in the ZS-9 10g and 15g groups (10% and 11% vs. 0% in both the placebo and ZS-9 5g arms) but all case were mild and resolved with dose adjustment	Mild to moderate GI AEs were the most frequent (patiromer 13% vs. placebo 6%); no severe GI AEs in the patiromer arm. Other common AES were similar to, or lower than, the placebo group
Mean K levels over time	 Source: Company presentation.	 Figure 1. Serum Potassium Levels over Time during the Initial Treatment Phase. Source: Weir, MD et al. Patiromer in Patients with Kidney Disease and Hyperkalemia Receiving RAAS Inhibitors. NEJM. 2014.

Source: Company reports.

Investment Thesis, Valuation and Risks

ZS Pharma *(Overweight; Price Target: $75.00)*

Investment Thesis

We have an OW rating on ZSPH based on the potential of ZS-9 for the treatment of hyperkalemia – a relatively common and potentially lethal condition in CKD and CHF patients. We see ZS-9 as a differentiated treatment option in a large market with significant unmet need, which we think could lead to a majority market share over time vs. competitor RLYP's patiromer. Even assuming equal share, we believe ZSPH's valuation is highly compelling on both a comp and absolute basis. Maintain Overweight.

Valuation

Our probability-weighted Dec-15 PT of $75 is based on a blended average of our proprietary probability-adjusted sum-of-the-parts scenario analysis (50% weighting) and risk-adjusted NPV model (50% weighting).

Cory Kasimov
(1-212) 622-5266
cory.w.kasimov@jpmorgan.com

ZSPH Valuation Summary

ZSPH Valuation Summary

Discount rate	12%		
4Q15 Fully Diluted Shares (mm)	28.8		
		Peak WW sales est	
Main value drivers	Prob of approval	(avg. scenario)	Avg peak yr
ZS-9 US	75%	$ 1,489	2020
ZS-9 EU/Japan	50%	$ 768	2022
Valuation methodology	Value / share	Weighting	Adj. value/ share
DCF			
P/E 2016			
Real options scenario analysis	$ 76.37	50%	38.19
Risk adjusted NPV analysis	$ 73.92	50%	36.96
Total			$ 75.15
Catalyst/liquidity discount			0%
YE15 Price Target			**$ 75**

Source: J.P. Morgan estimates.

Risks to Rating and Price Target

ZSPH is susceptible to the standard risks that apply to the entire biotech industry, including development, regulatory, commercial, manufacturing, financing, and IP pitfalls. More specific risks to the downside include clinical setbacks for ZS-9, regulatory hurdles, commercial setbacks, and personnel risk.

Cory Kasimov
(1-212) 622-5266
cory.w.kasimov@jpmorgan.com

J.P.Morgan

ZS Pharma: Summary of Financials

Income Statement - Annual	FY14A	FY15E	FY16E	FY17E
Revenues	0	0	52	-
Cost of products sold	0	0	(16)	-
Gross profit	-	-	-	-
SG&A	(20)	(26)	(114)	-
R&D	(41)	(60)	(64)	-
Operating income	(61)	(87)	(142)	-
EBITDA	(61)	(87)	(142)	-
Net interest (income) / expense	(4)	(1)	(1)	-
Other income / (expense)	-	-	-	-
Income taxes	0	0	0	-
Net income - GAAP	(64)	(87)	(143)	-
Net income - recurring	(64)	(87)	(143)	-
Diluted shares outstanding	12	24	28	-
EPS - excluding non-recurring	(5.47)	(3.64)	(5.10)	-
EPS - recurring	(5.47)	(3.64)	(5.10)	-

Balance Sheet and Cash Flow Data	FY14A	FY15E	FY16E	FY17E
Cash and cash equivalents	87	1	12	-
Accounts receivable	-	-	-	-
Inventories	-	-	-	-
Other current assets	0	0	0	-
Current assets	87	1	12	-
PP&E	10	12	12	-
Total assets	97	13	24	-
Total debt	-	-	-	-
Total liabilities	8	8	8	-
Shareholders' equity	89	4	16	-
Net income (including charges)	(64)	(87)	(143)	-
D&A	3	6	7	-
Change in working capital	0	0	0	-
Other	2	3	4	-
Cash flow from operations	(59)	(79)	(132)	-
Capex	(8)	(8)	(8)	-
Free cash flow	(63)	(85)	(138)	-
Cash flow from investing activities	(8)	(8)	(8)	-
Cash flow from financing activities	145	0	150	-
Dividends	-	-	-	-
Dividend yield	-	-	-	-

Income Statement - Quarterly	1Q15A	2Q15E	3Q15E	4Q15E
Revenues	0A	0	0	0
Cost of products sold	0A	0	0	0
Gross profit	-	-	-	-
SG&A	(6)A	(6)	(7)	(7)
R&D	(15)A	(15)	(15)	(15)
Operating income	(22)A	(21)	(22)	(22)
EBITDA	(22)A	(21)	(22)	(22)
Net interest (income) / expense	(0)A	(0)	(0)	(0)
Other income / (expense)	-	-	-	-
Income taxes	0A	0	0	0
Net income - GAAP	(22)A	(21)	(22)	(23)
Net income - recurring	(22)A	(21)	(22)	(23)
Diluted shares outstanding	21A	25	25	25
EPS - excluding non-recurring	(1.05)A	(0.85)	(0.87)	(0.90)
EPS - recurring	(1.05)A	(0.85)	(0.87)	(0.90)

Ratio Analysis	FY14A	FY15E	FY16E	FY17E
Sales growth	-	-	-	-
EBIT growth	88.0%	43.2%	63.9%	-
EPS growth - recurring	(35.8%)	(33.4%)	40.2%	-
Gross margin	-	-	-	-
EBIT margin	-	-	(274.7%)	-
EBITDA margin	-	-	(274.7%)	-
Tax rate	0.0%	0.0%	0.0%	-
Net margin	-	-	(276.3%)	-
Net Debt / EBITDA	-	-	-	-
Net Debt / Capital (book)	-	-	-	-
Return on assets (ROA)	(116.1%)	(160.0%)	(775.4%)	-
Return on equity (ROE)	(134.9%)	(187.4%)	(1405.6%)	-
Enterprise value / sales	-	-	27.1	-
Enterprise value / EBITDA	NM	NM	NM	-
Free cash flow yield	(9.5%)	(6.3%)	(8.7%)	-

Source: Company reports and J.P. Morgan estimates.
Note: $ in millions (except per-share data).Fiscal year ends Dec

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

Important Disclosures

- **Market Maker:** JPMS makes a market in the stock of ZS Pharma.
- **Lead or Co-manager:** J.P. Morgan acted as lead or co-manager in a public offering of equity and/or debt securities for ZS Pharma within the past 12 months.
- **Client:** J.P. Morgan currently has, or had within the past 12 months, the following company(ies) as clients: ZS Pharma.
- **Client/Investment Banking:** J.P. Morgan currently has, or had within the past 12 months, the following company(ies) as investment banking clients: ZS Pharma.
- **Client/Non-Investment Banking, Securities-Related:** J.P. Morgan currently has, or had within the past 12 months, the following company(ies) as clients, and the services provided were non-investment-banking, securities-related: ZS Pharma.
- **Investment Banking (past 12 months):** J.P. Morgan received in the past 12 months compensation from investment banking ZS Pharma.
- **Investment Banking (next 3 months):** J.P. Morgan expects to receive, or intends to seek, compensation for investment banking services in the next three months from ZS Pharma.
- **Non-Investment Banking Compensation:** J.P. Morgan has received compensation in the past 12 months for products or services other than investment banking from ZS Pharma.

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

ZS Pharma (ZSPH, ZSPH US) Price Chart

Date	Rating	Share Price ($)	Price Target ($)
14-Jul-14	OW	29.49	43.00
16-Dec-14	OW	47.02	57.00

Source: Bloomberg and J.P. Morgan; price data adjusted for stock splits and dividends.
Initiated coverage Jul 14, 2014.

The chart(s) show J.P. Morgan's continuing coverage of the stocks; the current analysts may or may not have covered it over the entire period.
J.P. Morgan ratings or designations: OW = Overweight, N= Neutral, UW = Underweight, NR = Not Rated

Explanation of Equity Research Ratings, Designations and Analyst(s) Coverage Universe:
J.P. Morgan uses the following rating system: Overweight [Over the next six to twelve months, we expect this stock will outperform the average total return of the stocks in the analyst's (or the analyst's team's) coverage universe.] Neutral [Over the next six to twelve months, we expect this stock will perform in line with the average total return of the stocks in the analyst's (or the analyst's team's) coverage universe.] Underweight [Over the next six to twelve months, we expect this stock will underperform the average total return of the stocks in the analyst's (or the analyst's team's) coverage universe.] Not Rated (NR): J.P. Morgan has removed the rating and, if applicable, the price target, for this stock because of either a lack of a sufficient fundamental basis or for legal, regulatory or policy reasons. The previous rating and, if applicable, the price target, no longer should be relied upon. An NR designation is not a recommendation or a rating. In our Asia (ex-Australia) and U.K. small- and mid-cap equity research, each stock's expected total return is compared to the expected total return of a benchmark country market index, not to those analysts' coverage universe. If it does not appear in the Important Disclosures section of this report, the certifying analyst's coverage universe can be found on J.P. Morgan's research website, www.jpmorganmarkets.com.

Coverage Universe: Kasimov, Cory W: ACADIA Pharmaceuticals (ACAD), Acorda Therapeutics Inc. (ACOR), Aegerion Pharmaceuticals (AEGR), Alkermes, Inc. (ALKS), Amgen Inc (AMGN), Ariad Pharmaceuticals (ARIA), BioMarin Pharmaceuticals (BMRN), Biogen (BIIB), Celgene (CELG), Clovis Oncology (CLVS), Gilead Sciences (GILD), Incyte Corporation (INCY), Juno Therapeutics (JUNO), Keryx Biopharmaceuticals (KERX), MannKind Corporation (MNKD), Novavax (NVAX), Otonomy (OTIC), Pharmacyclics, Inc. (PCYC), Regeneron Pharmaceuticals (REGN), Sage Therapeutics (SAGE), Sangamo BioSciences (SGMO), Seattle Genetics (SGEN), Spark Therapeutics (ONCE), Ultragenyx (RARE), Vertex Pharmaceuticals (VRTX), ZIOPHARM Oncology (ZIOP), ZS Pharma (ZSPH), bluebird bio (BLUE)

J.P. Morgan Equity Research Ratings Distribution, as of March 31, 2015

	Overweight (buy)	Neutral (hold)	Underweight (sell)
J.P. Morgan Global Equity Research Coverage	43%	44%	13%
IB clients*	55%	49%	37%
JPMS Equity Research Coverage	44%	48%	9%
IB clients*	75%	68%	54%

*Percentage of investment banking clients in each rating category.
For purposes only of FINRA/NYSE ratings distribution rules, our Overweight rating falls into a buy rating category; our Neutral rating falls into a hold rating category; and our Underweight rating falls into a sell rating category. Please note that stocks with an NR designation are not included in the table above.

Equity Valuation and Risks: For valuation methodology and risks associated with covered companies or price targets for covered companies, please see the most recent company-specific research report at http://www.jpmorganmarkets.com, contact the primary analyst or your J.P. Morgan representative, or email research.disclosure.inquiries@jpmorgan.com.

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

Other Disclosures

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

All research reports made available to clients are simultaneously available on our client website, J.P. Morgan Markets. Not all research content is redistributed, e-mailed or made available to third-party aggregators. For all research reports available on a particular stock, please contact your sales representative.

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

Legal Entities Disclosures
U.S.: JPMS is a member of NYSE, FINRA, SIPC and the NFA. JPMorgan Chase Bank, N.A. is a member of FDIC. **U.K.**: JPMorgan Chase N.A., London Branch, is authorised by the Prudential Regulation Authority and is subject to regulation by the Financial Conduct Authority and to limited regulation by the Prudential Regulation Authority. Details about the extent of our regulation by the Prudential Regulation Authority are available from J.P. Morgan on request. J.P. Morgan Securities plc (JPMS plc) is a member of the London Stock Exchange and is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. Registered in England & Wales No. 2711006. Registered Office 25

Bank Street, London, E14 5JP. **South Africa**: J.P. Morgan Equities South Africa Proprietary Limited is a member of the Johannesburg Securities Exchange and is regulated by the Financial Services Board. **Hong Kong**: J.P. Morgan Securities (Asia Pacific) Limited (CE number AAJ321) is regulated by the Hong Kong Monetary Authority and the Securities and Futures Commission in Hong Kong and/or J.P. Morgan Broking (Hong Kong) Limited (CE number AAB027) is regulated by the Securities and Futures Commission in Hong Kong. **Korea**: J.P. Morgan Securities (Far East) Ltd, Seoul Branch, is regulated by the Korea Financial Supervisory Service. **Australia**: J.P. Morgan Australia Limited (JPMAL) (ABN 52 002 888 011/AFS Licence No: 238188) is regulated by ASIC and J.P. Morgan Securities Australia Limited (JPMSAL) (ABN 61 003 245 234/AFS Licence No: 238066) is regulated by ASIC and is a Market, Clearing and Settlement Participant of ASX Limited and CHI-X. **Taiwan**: J.P.Morgan Securities (Taiwan) Limited is a participant of the Taiwan Stock Exchange (company-type) and regulated by the Taiwan Securities and Futures Bureau. **India:** J.P. Morgan India Private Limited (Corporate Identity Number - U67120MH1992FTC068724), having its registered office at J.P. Morgan Tower, Off. C.S.T. Road, Kalina, Santacruz - East, Mumbai – 400098, is a member of the National Stock Exchange of India Limited (SEBI Registration Number - INB 230675231/INF 230675231/INE 230675231) and Bombay Stock Exchange Limited (SEBI Registration Number - INB 010675237/INF 010675237) and is regulated by Securities and Exchange Board of India. Telephone: 91-22-6157 3000, Facsimile: 91-22-6157 3990 and Website: www.jpmipl.com. For non local research reports, this material is not distributed in India by J.P. Morgan India Private Limited. **Thailand**: This material is issued and distributed in Thailand by JPMorgan Securities (Thailand) Ltd., which is a member of the Stock Exchange of Thailand and is regulated by the Ministry of Finance and the Securities and Exchange Commission and its registered address is 3rd Floor, 20 North Sathorn Road, Silom, Bangrak, Bangkok 10500. **Indonesia**: PT J.P. Morgan Securities Indonesia is a member of the Indonesia Stock Exchange and is regulated by the OJK a.k.a. BAPEPAM LK. **Philippines**: J.P. Morgan Securities Philippines Inc. is a Trading Participant of the Philippine Stock Exchange and a member of the Securities Clearing Corporation of the Philippines and the Securities Investor Protection Fund. It is regulated by the Securities and Exchange Commission. **Brazil**: Banco J.P. Morgan S.A. is regulated by the Comissao de Valores Mobiliarios (CVM) and by the Central Bank of Brazil. **Mexico**: J.P. Morgan Casa de Bolsa, S.A. de C.V., J.P. Morgan Grupo Financiero is a member of the Mexican Stock Exchange and authorized to act as a broker dealer by the National Banking and Securities Exchange Commission. **Singapore**: This material is issued and distributed in Singapore by or through J.P. Morgan Securities Singapore Private Limited (JPMSS) [MCI (P) 100/03/2015 and Co. Reg. No.: 199405335R] which is a member of the Singapore Exchange Securities Trading Limited and is regulated by the Monetary Authority of Singapore (MAS) and/or JPMorgan Chase Bank, N.A., Singapore branch (JPMCB Singapore) which is regulated by the MAS. This material is provided in Singapore only to accredited investors, expert investors and institutional investors, as defined in Section 4A of the Securities and Futures Act, Cap. 289. Recipients of this document are to contact JPMSS or JPMCB Singapore in respect of any matters arising from, or in connection with, the document. **Japan**: JPMorgan Securities Japan Co., Ltd. is regulated by the Financial Services Agency in Japan. **Malaysia**: This material is issued and distributed in Malaysia by JPMorgan Securities (Malaysia) Sdn Bhd (18146-X) which is a Participating Organization of Bursa Malaysia Berhad and a holder of Capital Markets Services License issued by the Securities Commission in Malaysia. **Pakistan**: J. P. Morgan Pakistan Broking (Pvt.) Ltd is a member of the Karachi Stock Exchange and regulated by the Securities and Exchange Commission of Pakistan. **Saudi Arabia**: J.P. Morgan Saudi Arabia Ltd. is authorized by the Capital Market Authority of the Kingdom of Saudi Arabia (CMA) to carry out dealing as an agent, arranging, advising and custody, with respect to securities business under licence number 35-07079 and its registered address is at 8th Floor, Al-Faisaliyah Tower, King Fahad Road, P.O. Box 51907, Riyadh 11553, Kingdom of Saudi Arabia. **Dubai**: JPMorgan Chase Bank, N.A., Dubai Branch is regulated by the Dubai Financial Services Authority (DFSA) and its registered address is Dubai International Financial Centre - Building 3, Level 7, PO Box 506551, Dubai, UAE.

Country and Region Specific Disclosures

U.K. and European Economic Area (EEA): Unless specified to the contrary, issued and approved for distribution in the U.K. and the EEA by JPMS plc. Investment research issued by JPMS plc has been prepared in accordance with JPMS plc's policies for managing conflicts of interest arising as a result of publication and distribution of investment research. Many European regulators require a firm to establish, implement and maintain such a policy. This report has been issued in the U.K. only to persons of a kind described in Article 19 (5), 38, 47 and 49 of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (all such persons being referred to as "relevant persons"). This document must not be acted on or relied on by persons who are not relevant persons. Any investment or investment activity to which this document relates is only available to relevant persons and will be engaged in only with relevant persons. In other EEA countries, the report has been issued to persons regarded as professional investors (or equivalent) in their home jurisdiction. **Australia:** This material is issued and distributed by JPMSAL in Australia to "wholesale clients" only. This material does not take into account the specific investment objectives, financial situation or particular needs of the recipient. The recipient of this material must not distribute it to any third party or outside Australia without the prior written consent of JPMSAL. For the purposes of this paragraph the term "wholesale client" has the meaning given in section 761G of the Corporations Act 2001. **Germany:** This material is distributed in Germany by J.P. Morgan Securities plc, Frankfurt Branch and J.P.Morgan Chase Bank, N.A., Frankfurt Branch which are regulated by the Bundesanstalt für Finanzdienstleistungsaufsicht. **Hong Kong:** The 1% ownership disclosure as of the previous month end satisfies the requirements under Paragraph 16.5(a) of the Hong Kong Code of Conduct for Persons Licensed by or Registered with the Securities and Futures Commission. (For research published within the first ten days of the month, the disclosure may be based on the month end data from two months prior.) J.P. Morgan Broking (Hong Kong) Limited is the liquidity provider/market maker for derivative warrants, callable bull bear contracts and stock options listed on the Stock Exchange of Hong Kong Limited. An updated list can be found on HKEx website: http://www.hkex.com.hk. **Japan:** There is a risk that a loss may occur due to a change in the price of the shares in the case of share trading, and that a loss may occur due to the exchange rate in the case of foreign share trading. In the case of share trading, JPMorgan Securities Japan Co., Ltd., will be receiving a brokerage fee and consumption tax (shouhizei) calculated by multiplying the executed price by the commission rate which was individually agreed between JPMorgan Securities Japan Co., Ltd., and the customer in advance. Financial Instruments Firms: JPMorgan Securities Japan Co., Ltd., Kanto Local Finance Bureau (kinsho) No. 82 Participating Association / Japan Securities Dealers Association, The Financial Futures Association of Japan, Type II Financial Instruments Firms Association and Japan Investment Advisers Association. **Korea:** This report may have been edited or contributed to from time to time by affiliates of J.P. Morgan Securities (Far East) Ltd, Seoul Branch. **Singapore:** JPMSS and/or its affiliates may have a holding in any of the securities discussed in this report; for securities where the holding is 1% or greater, the specific holding is disclosed in the Important Disclosures section above. **Taiwan**: This material is issued and distributed in Taiwan by J.P. Morgan Securities (Taiwan) Limited. **India:** For private circulation only, not for sale. **Pakistan:** For private circulation only, not for sale. **New Zealand:** This material is issued and distributed by JPMSAL in New Zealand only to persons whose principal business is the investment of money or who, in the course of and for the purposes of their business, habitually invest money. JPMSAL does not issue or distribute this material to members of "the public" as determined in accordance with section 3 of the Securities Act 1978. The recipient of this material must not distribute it to any third party or outside New Zealand without the prior written consent of JPMSAL. **Canada:** The information contained herein is not, and under no circumstances is to be construed as, a prospectus, an advertisement, a public offering, an offer to sell securities described herein, or solicitation of an offer to buy securities described herein, in Canada or any province or territory thereof. Any offer or sale of the securities described herein in Canada will be made only under an exemption from the requirements to file a prospectus with the relevant Canadian securities regulators and only by a dealer properly registered under applicable securities laws or, alternatively, pursuant to an exemption from the dealer

registration requirement in the relevant province or territory of Canada in which such offer or sale is made. The information contained herein is under no circumstances to be construed as investment advice in any province or territory of Canada and is not tailored to the needs of the recipient. To the extent that the information contained herein references securities of an issuer incorporated, formed or created under the laws of Canada or a province or territory of Canada, any trades in such securities must be conducted through a dealer registered in Canada. No securities commission or similar regulatory authority in Canada has reviewed or in any way passed judgment upon these materials, the information contained herein or the merits of the securities described herein, and any representation to the contrary is an offence. **Dubai:** This report has been issued to persons regarded as professional clients as defined under the DFSA rules. **Brazil**: Ombudsman J.P. Morgan: 0800-7700847 / ouvidoria.jp.morgan@jpmorgan.com.

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

"Other Disclosures" last revised March 28, 2015.