

bluebird bio

Model Update Post 2Q Results

We are updating our BLUE model based on the company's 2Q results (there was no conference call). We are maintaining our OW rating and there were no changes to timelines. In our view, BLUE – with its gene therapy platform – is one of the more potentially transformative and disruptive companies we've come across in some time. Importantly, BLUE appears to be more than just a "big idea," as the company has already established promising proof-of-concept for its two lead gene therapy products, Lenti-D and LentiGlobin, and is going after orphan indications with a very high unmet medical need that could bolster the ultimate probability of success.

- **2Q results.** 2Q EPS of (\$2.13) was wider vs. cons of (\$0.34) and JPMe of (\$0.07). 2Q revs of \$6.3M were above cons of \$4.5M but in line with JPMe of \$6.3M. However, 2Q OpEx of \$10.5M was higher than JPMe of \$8.4M, with both R&D and G&A expenses coming in ~\$1M higher than we expected. That said, BLUE is not yet an earnings story.
- **Estimate revisions.** We have updated our model for 2Q results. Changes were modest, and our YE14 PT remains at \$44.
- **Balance sheet.** BLUE ended 2Q with \$229M in cash (and no debt), which includes ~\$105M raised via the IPO in June.
- **Key upcoming events.** BLUE is expected to initiate the potentially pivotal Phase 2/3 ALD-102 trial for Lenti-D in childhood cerebral adrenoleukodystrophy (CCALD) in late 2013, as well as the Phase 1/2 HGB-204 trial for LentiGlobin in beta thalassemia major in mid-2013. While 2H13 should be more about trial initiations and getting sites up and running, we could get an early read of some Phase 1/2 data for LentiGlobin in beta-thalassemia in 2014. BLUE also expects to file an IND in the US for sickle cell disease (SCD) in 2014. There could also be various clinical data publications over the next 12-18 months that focus additional attention on BLUE's products and gene therapy technology.

Overweight

BLUE, BLUE US

Price: \$30.04

Price Target: \$44.00

Biotechnology

Cory Kasimov ^{AC}

(1-212) 622-5266

cory.w.kasimov@jpmorgan.com

Bloomberg JPMA KASIMOV <GO>

Matthew J. Lowe, Ph.D.

(1-212) 622-0848

matthew.j.lowe@jpmorgan.com

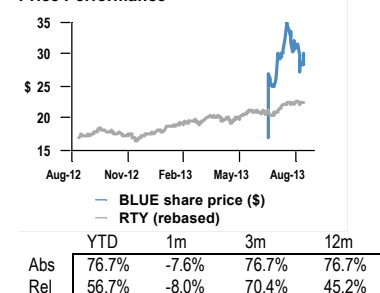
Whitney G Ijem

(1-212) 622-4668

whitney.g.ijem@jpmorgan.com

J.P. Morgan Securities LLC

Price Performance



bluebird bio, Inc. (BLUE;BLUE US)

FYE Dec	2013E (Prev)	2013E (Curr)	2014E (Prev)	2014E (Curr)
EPS reported (\$)				
Q1 (Mar)	-	-	-	-
Q2 (Jun)	(0.07)	(2.13)A	-	-
Q3 (Sep)	(0.20)	(0.24)	-	-
Q4 (Dec)	(0.26)	(0.30)	-	-
FY	(0.82)	(1.45)	(1.07)	(1.21)

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

Company Data

Price (\$)	30.04
Date Of Price	14 Aug 13
52-week Range (\$)	36.25-17.00
Market Cap (\$ mn)	64.62
Fiscal Year End	Dec
Shares O/S (mn)	2
Price Target (\$)	44.00
Price Target End Date	31-Dec-14

See page 6 for analyst certification and important disclosures.

J.P. Morgan does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

Pipeline

Figure 1: BLUE Pipeline

Program	P/C	Ph1	Ph2	Ph3	FDA	Mkt.	Partner	Comments
Lenti-D								
Childhood Cerebral ALD								Grated Orphan Drug designation by FDA and EMA in 2012
Adult Cerebral ALD								Pivotal study to begin in late 2013e
LentiGlobin								
Beta-Thalassemia								Ph 1/2 ongoing in France, to begin in mid-2013e in US
Sickle Cell Disease								SCD pts in France study; SCD IND in 2014e
CAR T-cells							CELG	
Hematologic malignancies								
Solid tumors								

Source: Company reports and J.P. Morgan estimates.

Upcoming Events

Figure 2: BLUE Upcoming Events

Program	Event	Expected Timing	Significance
Lenti-D	Initiate Ph 2/3 study (ALD-102) in CCALD in the US/EU	Late-2013	Medium
LentiGlobin	Initiate Phase 1/2 study (HGB-205) in beta-thalassemia in the US	Mid-2013	Medium
	File IND for SCD	2014	Medium
	Preliminary Phase 1/2 data for beta-thalassemia	2H14	High
CAR T-cells	Initiate Ph1 trial	2016	Low-Medium

Source: Company reports and J.P. Morgan estimates.

Investment Thesis, Valuation and Risks

bluebird bio (Overweight; Price Target: \$44.00)

Investment Thesis

We have an OW rating on BLUE. In our view, BLUE – with its gene therapy platform – is one of the more potentially transformative and disruptive companies we've come across in some time. Importantly, BLUE has already established promising proof-of-concept for its two lead products, Lenti-D and LentiGlobin, and is going after orphan indications (such as CCALD and beta-thalassemia) with a very high unmet medical need that could bolster the ultimate probability of success.

Valuation

We have a YE14 price target of \$44 for BLUE. Our valuation methodology is based on a blended average of our risk-adjusted NPV model (33%), our proprietary scenario analysis (33%), and a DCF analysis (33%) and reflects a 50% probability of success for Lenti-D (~\$250M in peak sales) and 25% for LentiGlobin (~\$1B peak). We assign each valuation method a 15% discount rate, which we believe is appropriate given the probability-adjustments made to each development program.

BLUE Valuation Summary

BlueBird Bio : Valuation Summary			
Discount rate	15%		
Main value driver	Prob of approval	Peak sales est (avg. scenario)	Avg peak yr
CCALD	50%	\$ 255	2022
B-Thalassemia	25%	\$ 1,175	2023
Sickle Cell Disease	0%	\$ -	-
Valuation methodology	Value	Weighting	Adj. value/ share
P/E 2015	\$ -	0%	\$ -
Real options scenario analysis	\$ 43.09	33%	14.4
Risk adjusted NPV analysis	\$ 33.96	33%	11.3
DCF analysis	\$ 53.76	33%	17.9
Total			\$ 43.60
Catalyst/liquidity discount			0%
YE14 Valuation			\$ 44

Source: J.P. Morgan Estimates

Risks to Rating and Price Target

Downside risks to our OW recommendation include the standard issues that apply to the entire biotechnology industry, including development, regulatory, commercial, manufacturing, financing, and IP pitfalls. Other risks specific to BLUE include clinical trial risk with ongoing studies involving Lenti-D or LentiGlobin, regulatory uncertainty surrounding gene therapy, the company's ability to deliver gene therapies on a commercially viable scale, and competition within the gene therapy field.

Figure 3: BLUE Income Statement

BlueBird Bio Income Statement

Cory Kasimov
cory.w.kasimov@jpmorgan.com
212.622.5266

Fiscal Year Ends Dec 31	2011A	2012A	1Q13A	2Q13A	3Q13E	4Q13E	2013E	2014E	2015E	2016E	2017E
Total Revenue	\$ 0.9	\$ 0.3	\$ 1.1	\$ 6.3	\$ 6.3	\$ 6.3	\$ 20.0	\$ 25.0	\$ 25.0	\$ 5.3	\$ -
COGS	-	-	-	-	-	-	-	-	-	-	-
Gross Profit		0.1	1.1	6.3	6.3	6.3	20.0	25.0	25.0	5.3	-
R&D	11.4	17.2	5.3	7.2	8.7	10.1	31.3	42.0	46.0	51.5	57.5
Sales and Marketing	-	-	-	-	-	-	-	-	-	21.0	26.3
G&A overhead	-	-	-	-	-	-	-	-	-	-	-
G&A PPE depreciation	-	-	-	-	-	-	-	-	-	-	-
G&A corporate donations	-	-	-	-	-	-	-	-	-	-	-
G&A actuals	-	-	-	-	-	-	-	-	-	-	-
General and Administrative	4.6	6.8	2.3	3.3	3.4	3.5	12.5	13.8	15.1	15.9	16.7
Total Operating Expenses	\$ 16.0	\$ 24.1	\$ 7.6	\$ 10.5	\$ 12.1	\$ 13.6	\$ 43.8	\$ 55.8	\$ 61.1	\$ 88.4	\$ 100.4
Operating income	(15.1)	(23.7)	(6.5)	(4.2)	(5.9)	(7.4)	(23.9)	(30.8)	(36.1)	(83.1)	(100.4)
Other income, net	(0.5)	0.0	(0.06)	(0.39)	0.40	0.4	0.4	2.0	2.5	3.6	3.3
Pretax Income	(15.6)	(23.7)	(6.5)	(4.6)	(5.4)	(6.9)	(23.5)	(28.8)	(33.6)	(79.5)	(97.1)
Income Tax (benefit)	-	-	-	-	-	-	-	-	-	-	-
Net Income	\$ (15.6)	\$ (23.7)	\$ (6.5)	\$ (4.6)	\$ (5.4)	\$ (6.9)	\$ (23.5)	\$ (28.8)	\$ (33.6)	\$ (79.5)	\$ (97.1)
Net Loss applicable to common stockholders	(20.6)	(3.613)	(6.5)	(4.6)	(5.4)	(6.9)	(23.5)	(28.8)	(33.6)	(79.5)	(97.1)
Average shares Outstanding				2.2	23.1	23.3	16.2	23.8	24.3	28.6	29.1
EPS, Basic and Diluted				(2.13)	(0.24)	(0.30)	(1.45)	(1.21)	(1.38)	(2.78)	(3.33)
Margin Analysis:											
Gross margin		NM	NM	NM	NM	NM	100%	100%	100%	100%	NM
Operating margin		NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Net margin		NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cost Analysis:											
COGS as % of tot. prod. sales		NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
R&D as % of tot. revenue	5061.76%	468.86%	114.41%	139.20%	161.60%	156.96%	168.00%	184.00%	980.95%		NM
S&M as % of tot. revenue	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	400.00%		NM
G&A as % of tot. revenue		NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Year-over-year growth:											
Total revenue			1225.88%	NM	NM	NM	5770.88%	25.24%	0.00%	-79.00%	NM
R&D Expense			36.96%	NM	NM	NM	82.05%	34.05%	9.52%	11.96%	11.65%
S&M Expense			70.51%	NM	NM	NM	NM	NM	NM	NM	25.00%
G&A Expense							82.66%	10.00%	10.00%	5.00%	5.00%
Total operating expenses			45.72%	NM	NM	NM	82.22%	27.19%	9.64%	44.59%	13.63%
Operating income			NM	NM	NM	NM	NM	NM	NM	NM	NM
Net income			NM	NM	NM	NM	NM	NM	NM	NM	NM
EPS			NM	NM	NM	NM	NM	NM	NM	NM	NM
Tax Rate			NM	NM	NM	NM	NM	NM	NM	NM	NM

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

bluebird bio: Summary of Financials

Income Statement - Annual	FY12A	FY13E	FY14E	FY15E	Income Statement - Quarterly	1Q13A	2Q13A	3Q13E	4Q13E
Revenues	0	20	25	25	Revenues	1A	6A	6	6
Cost of products sold	0	0	0	0	Cost of products sold	0A	0A	0	0
Gross profit	-	-	-	-	Gross profit	-	-	-	-
SG&A	(7)	(13)	(14)	(15)	SG&A	(2)A	(3)A	(3)	(4)
R&D	(17)	(31)	(42)	(46)	R&D	(5)A	(7)A	(9)	(10)
Operating income	(24)	(24)	(31)	(36)	Operating income	(6)A	(4)A	(6)	(7)
EBITDA	(24)	(24)	(31)	(36)	EBITDA	(6)A	(4)A	(6)	(7)
Net interest (income) / expense	0	1	2	3	Net interest (income) / expense	0A	0A	0	0
Other income / (expense)	0	(0)	0	0	Other income / (expense)	(0)A	(0)A	0	0
Income taxes	0	0	0	0	Income taxes	0A	0A	0	0
Net income - GAAP	(1)	(24)	(29)	(34)	Net income - GAAP	(7)A	(5)A	(5)	(7)
Net income - recurring	(4)	(24)	(29)	(34)	Net income - recurring	(7)A	(5)A	(5)	(7)
Diluted shares outstanding	0	16	24	24	Diluted shares outstanding	0A	2A	23	23
EPS - excluding non-recurring	-	(1.45)	(1.21)	(1.38)	EPS - excluding non-recurring	-	(2.13)A	(0.24)	(0.30)
EPS - recurring	-	(1.45)	(1.21)	(1.38)	EPS - recurring	-	(2.13)A	(0.24)	(0.30)
Balance Sheet and Cash Flow Data	FY12A	FY13E	FY14E	FY15E	Ratio Analysis	FY12A	FY13E	FY14E	FY15E
Cash and cash equivalents	67	235	220	199	Sales growth	(61.5%)	5770.9%	25.2%	0.0%
Accounts receivable	0	0	0	0	EBIT growth	56.6%	0.7%	28.8%	17.5%
Inventories	-	-	-	-	EPS growth - recurring	-	-	(17.0%)	14.6%
Other current assets	1	0	0	0	Gross margin	-	-	-	-
Current assets	68	235	220	199	EBIT margin	(6975.3%)	(119.6%)	(123.0%)	(144.5%)
PP&E	1	0	0	0	EBITDA margin	(6975.3%)	(119.6%)	(123.0%)	(144.5%)
Total assets	69	235	245	262	Tax rate	0.0%	0.0%	0.0%	0.0%
Total debt	0	0	0	0	Net margin	(1062.6%)	(117.8%)	(115.0%)	(134.5%)
Total liabilities	5	77	62	54	Net Debt / EBITDA	282.6%	984.5%	714.4%	551.8%
Shareholders' equity	64	158	183	207	Net Debt / Capital (book)	2296.5%	304.1%	596.6%	(2489.5%)
Net income (including charges)	(24)	(24)	(29)	(34)	Return on assets (ROA)	(7.2%)	(15.5%)	(12.0%)	(13.3%)
D&A	0	6	8	8	Return on equity (ROE)	(8.0%)	(21.2%)	(16.9%)	(17.2%)
Change in working capital	2	69	0	0	Enterprise value / sales	-	-	-	-
Other	1	3	0	0	Enterprise value / EBITDA	-	-	-	-
Cash flow from operations	(21)	60	(15)	(20)	Free cash flow yield	-	12.4%	(2.1%)	(2.8%)
Capex	(1)	0	0	0					
Free cash flow	(22)	60	(15)	(20)					
Cash flow from investing activities	3	0	0	0					
Cash flow from financing activities	60	108	0	0					
Dividends	-	-	-	-					
Dividend yield	-	-	-	-					

Source: Company reports and J.P. Morgan estimates.

Note: \$ in millions (except per-share data). Fiscal year ends Dec

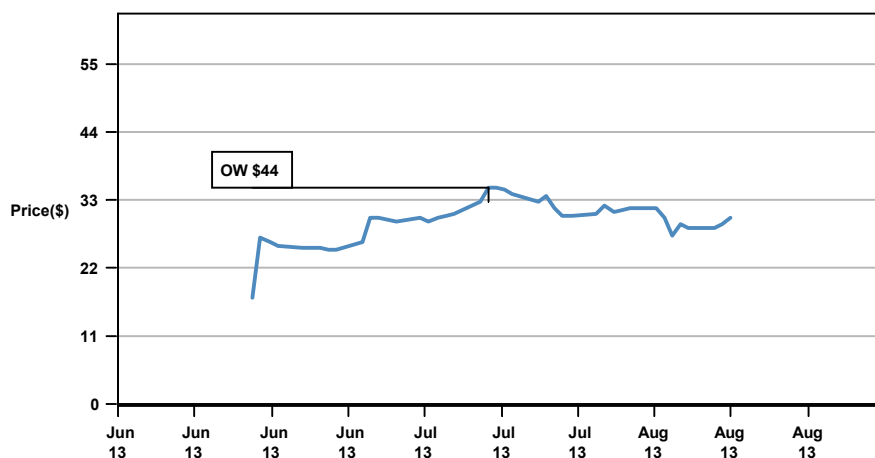
Analyst Certification: The research analyst(s) denoted by an “AC” on the cover of this report certifies (or, where multiple research analysts are primarily responsible for this report, the research analyst denoted by an “AC” on the cover or within the document individually certifies, with respect to 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.

Important Disclosures

- **Market Maker:** JPMS makes a market in the stock of bluebird bio.
- **Lead or Co-manager:** J.P. Morgan acted as lead or co-manager in a public offering of equity and/or debt securities for bluebird bio within the past 12 months.
- **Client:** J.P. Morgan currently has, or had within the past 12 months, the following company(ies) as clients: bluebird bio.
- **Client/Investment Banking:** J.P. Morgan currently has, or had within the past 12 months, the following company(ies) as investment banking clients: bluebird bio.
- **Investment Banking (past 12 months):** J.P. Morgan received in the past 12 months compensation from investment banking bluebird bio.
- **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 bluebird bio.

Company-Specific Disclosures: Important disclosures, including price charts, are available for compendium reports and all J.P. Morgan–covered companies by visiting <https://mm.jpmorgan.com/disclosures/company>, 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.

bluebird bio (BLUE, BLUE US) Price Chart



Source: Bloomberg and J.P. Morgan; price data adjusted for stock splits and dividends.
Initiated coverage Jul 15, 2013.

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: Aegerion Pharmaceuticals (AEGR), Alkermes, Inc. (ALKS), Arena Pharmaceuticals, Inc. (ARNA), Ariad Pharmaceuticals (ARIA), Array BioPharma (ARRY), BioMarin Pharmaceuticals (BMRN), Clovis Oncology (CLVS), Dendreon (DNDN), Emergent BioSolutions (EBS), Exelixis, Inc (EXEL), Geron Corp (GERN), ImmunoGen (IMGN), Incyte Corporation (INCY), Infinity Pharmaceuticals (INFI), Keryx Biopharmaceuticals (KERX), Lexicon Pharmaceuticals (LXRX), MannKind Corporation (MNKD), Nektar Therapeutics (NKTR), Onyx Pharmaceuticals (ONXX), Orexigen Therapeutics (OREX), Rigel Pharmaceuticals (RIGL), Savient Pharmaceuticals (SVNT), Seattle Genetics (SGEN), The Medicines Company (MDCO), VIVUS, Inc (VIVUS), ZIOPHARM Oncology (ZIOP), bluebird bio (BLUE)

J.P. Morgan Equity Research Ratings Distribution, as of June 28, 2013

	Overweight (buy)	Neutral (hold)	Underweight (sell)
J.P. Morgan Global Equity Research Coverage	44%	44%	12%
IB clients*	56%	50%	40%
JPMS Equity Research Coverage	42%	50%	8%
IB clients*	76%	66%	55%

*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 and is authorized and regulated in the UK by the Financial Services Authority. **U.K.:** J.P. Morgan Securities plc (JPMS plc) is a member of the London Stock Exchange and is authorized and regulated by the Financial Services 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. **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, 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. **Thailand:** JPMorgan Securities (Thailand) Limited is a member of the Stock Exchange of Thailand and is regulated by the Ministry of Finance and the Securities and Exchange Commission. **Indonesia:** PT J.P. Morgan Securities Indonesia is a member of the Indonesia Stock Exchange and is regulated by the 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 Comissão de Valores Mobiliários (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 J.P. Morgan Securities Singapore Private Limited (JPMSS) [MIC (P) 049/04/2013 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. **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. **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 May 4, 2013.

Copyright 2013 JPMorgan Chase & Co. All rights reserved. This report or any portion hereof may not be reprinted, sold or redistributed without the written consent of J.P. Morgan.