J.P.Morgan

Nevro

Quarterly Results In-line with Preannouncement; Hiring in Focus for 2H18

Nevro reported 2Q results and 2018 guidance in-line with preannounced results. Thursday after the close. To recap, the company previously reported better than expected 2Q18 results as sales of \$96.1M came in \$1M above the Street off a stronger US performance. This was coupled with a largely in-line performance down the P&L, with gross margins in-line, SG&A 110bps above, and R&D 50bps below. Management also reiterated 2018 guidance of \$385-390M (+18-19%), a step down from the prior range of \$400-410M (+25-29%) and below Street expectations for \$402M before the preannounce. With the quarter behind it, we expect Nevro to put a significant management focus on (1) finding the right VP of Sales, which could take time, and (2) accelerate rep hiring. With expectations reset after (a) Nevro successfully defended its method of use patents (here) and (b) Boston publically stating they currently don't have any intentions of entering the HF market (here), we continue to see upside and reiterate our OW rating.

- To recap, sales of \$96.1M (+23%) came in ~\$1M above consensus before the preannouncement. Outperformance largely came from the domestic business, where sales of \$79.9M (+27%) were \$1.7M above the Street. On the other hand, the OUS business came in at \$16.2M (+8%), a number that disappointed by \$0.7M after expectations for a recovery to more of a high-single-digit/low-double-digit cc range didn't materialize in the quarter.
- The quarter itself was fine, but lowered guidance for the year points towards growth of 12-15% in the back half of the year. This marks a significant deceleration from the 25% growth posted by the company in 1H18 due to: (1) a disruption in sales rep hiring as attrition outstripped new rep hires, which is expected to take at least one more quarter to address; (2) continued headwinds to the OUS business as capitation and increasing share drove down growth; and (3) headwinds from competitor trialing of new products.
- The hiring issue is likely the most important, with Nevro unable to adequately address attrition. Management highlighted attrition of 15-20% on the preannouncement, a degree of annual attrition that is already a step above sales rep turnover in our MedTech universe. While Nevro called out 10-15% as a normal level of attrition for companies in the SCS space, the company's ongoing efforts to improve retention and improve hiring will take time. In the meantime, a flat to down sales headcount leads us to model US growth of 15% in 2H18 and 20% in 3Q18, the company's first 2Q to 3Q sequential decrease.

Overweight

NVRO, NVRO US Price: \$59.55

Price Target: \$77.00

Medical Supplies & Devices

Robbie Marcus, CFA AC

(1-212) 622-6657

robert.j.marcus@jpmorgan.com

Allen Gong

(1-212) 622-9520 allen.gong@jpmorgan.com

Christian Moore

(1-212) 622-7458

christian.d.moore@jpmorgan.com

J.P. Morgan Securities LLC

Price Performance



	TID	1111	JIII	IZIII
Abs	-14.3%	-18.7%	-34.5%	-27.4%
Rel	-22.8%	-20.3%	-42.7%	-46.5%

Nevro Corp. (NVRO;NVRO US)

FYE Dec	2017A	2018E (Prev)	2018E (Curr)	2019E (Prev)	2019E (Curr)	2020E (Prev)	2020E (Curr)
EPS - Recurring (\$)							
Q1 (Mar)	(0.50)	(0.59)A	(0.59)A		_		-
Q2 (Jun)	(0.40)	(0.39)	(0.35)A		-	-	-
Q3 (Sep)	(0.21)	(0.31)	(0.51)	-	-	-	
Q4 (Dec)	(0.15)	(0.14)	(0.25)	-	=		-
FY	(1.24)	(1.43)	(1.71)	(0.83)	(1.05)	(0.43)	(0.63)
Revenue FY (\$ mn)	327	387	387	435	437	488	491

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

Company Data 59.55 Price (\$) Date Of Price 02-Aug-18 52-week Range (\$) 94 34-35 41 Market Cap (\$ mn) 1.788.23 Fiscal Year End Dec Shares O/S (mn) 30 Price Target (\$) 77.00 Price Target End Date

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.

This document is being provided for the exclusive use of lynn@gilmartinir.com.

J.P.Morgan

- Management maintained its stance on the competitive environment. On a more direct front, we expect continued aggressive sales and marketing efforts from largecap competitors are also playing a role in the company's commercial troubles as new products and increased trialing impact sales. We continue to see Senza and Senza II as the highest quality products on the market today, but the breadth and scale of Nevro's competitors help even the playing field. For 2018 we model US SCS market growth of 15%, with Nevro share increasing 90bps y/y as 1H share gains of 140bps moderates to just 40bps in 2H. Part of this is due to the sales rep hiring disruption, while the other is most likely increased competitive pressure from Medtronic and Boston Scientific on new product launches following several years of share losses.
- On the other hand, the recent outcome in the company's legal dispute with Boston has been a clear positive for Nevro. A direct statement from Boston around its intent to avoid the U.S. HF market, for now, holds weight and is largely in-line with our expectations following the final summary judgment earlier in July. As a reminder, even though it looks like Boston came out ahead in summary judgment by (a) avoiding infringement of Nevro's HF patents and (b) nullifying four of Nevro's patents, (1) Boston only had low frequency tonic stim devices, so it makes sense it didn't infringe the HF patents, and (2) Nevro's remaining three method of use patents likely remain more than enough to block a competitive HF launch.
- To close out the quarter, results down the P&L were largely in-line. Gross margins of 70.7% were in-line with Street expectations while R&D came in 50bps better than expected (11.9% vs. 12.4%), offset by SG&A which came in 110bps higher (67.3% vs. 66.2%) off of higher legal expenses (\$5.8M vs. \$4.0M) and a \$6.4M increase in personnel costs. All told, this led to a net loss of \$10.6M in the quarter, of \$0.35 per share, a step below Street expectations for \$0.28.
- We continue to view the \$385-390M 2018 sales guidance range as a more appropriate target. For the full year, we now model sales of \$387M (+19%), with US sales of \$320M (+22%) and OUS sales of \$67M (+6%). We also expect the company will hire 3 reps in the back half of the year, which would put the company at 294 reps exiting 2018 and represents just 6% y/y rep growth. With hiring looking to pick up in 2019, we model sales growing to \$437M (+13%) with 30 net adds, while in 2020 we model sales growing to \$491M (+12%) with 15 net hires.

Highly Confidential - AEO

Investment Thesis, Valuation and Risks

Nevro (Overweight; Price Target: \$77.00)

Investment Thesis

Following the 2Q pre-announcement, the bar for performance has been significantly lowered, which had been a growing investor concern of late. To be clear, we do believe Nevro's near-term outlook will be challenged as it works to overcome internal rep hiring headwinds, continued disruption in the OUS market, and increasing competitive pressures. However, with the bar reset and the stock now trading at a severe discount to peers, we see significant room for upside.

Support for Senza remains strong, with feedback to date showing that (1) uptake and utilization in the US are robust; (2) Senza is driving SCS market acceleration and expansion into the underserved back pain segment; (3) there is a growing preference for paresthesia-free therapy with strong, clinically proven patient outcomes; and (4) real-world results are reflective of the outstanding results seen in the US pivotal SENZA-RCT trial, which now has two years of durable outcomes.

We believe Senza is a platform technology; over the next 12+ months, we expect Nevro to initiate a number of larger trials to support the second wave of growth. Nevro's broad label today already allows for the treatment of Virgin Back and Upper Limb; however, the issue is reimbursement, which will require larger trials to secure. A Neck pain indication falls outside the scope of Senza's label and will therefore require a pivotal trial for both label expansion and reimbursement. We expect Nevro to initiate several trials over the next year or so, with the first of these a randomized clinical trial in diabetic neuropathy in the process of enrolling centers. Looking further, we see the potential for Senza in (1) Virgin Back, especially now that the paddle lead is approved, as this trial will need to be championed by the neurosurgeon community, (2) Upper Limb, and (3) Neck pain.

Valuation

With our updated numbers Nevro currently trades at 3.7x NTM EV/sales, a discount to 5x EV/Sales that other mid-teens growth companies are valued at. It will take time for management to right the ship, but we do not think the Nevro growth story is broken beyond repair. Our December 2019 price target is \$77 per share, or 5.0x 2020E revenues, which we view as an appropriate valuation for a company growing mid teens.

Risks to Rating and Price Target

Risks to our Overweight rating include: (1) the SCS market is highly concentrated with entrenched competitors that are larger than Nevro; (2) competitors are developing novel systems—both high and intermittent frequency at lower amplitudes—to respond to the Nevro challenge; and (3) Nevro's intellectual property is likely to face legal challenges as competitors attempt to follow Nevro's path.

Nevro: Summary of Financials

Income Statement - Annual	FY16A	FY17A	FY18E	FY19E	FY20E	Income Statement - Quarterly		1Q18A	2Q18A	3Q18E	4Q18E
Revenue	229	327	387	437	491	Revenue		88A	96A	96	108
COGS	(75)	(99)	(113)	(121)	(131)	COGS		(26)A	(28)A	(28)	(31)
Gross profit	153	228	274	315	360	Gross profit		62A	68A	68	77
SG&A	(142)	(220)	(273)	(290)	(311)	SG&A		(67)A	(65)A	(70)	(71)
Adj. EBITDA	(8)	0	(9)	5	23	Adj. EBITDA		(15)A	(7)A	(13)	(5)
D&A	(2)	(3)	(3)	(4)	(5)	D&A		(1)A	(1)A	(1)	(1)
Adj. EBIT	(10)	(2)	(12)	1	18	Adj. EBIT		(16)A	(8)A	(14)	(6)
Net Interest	(5)	(7)	(6)	(3)	(1)	Net Interest		(2)A	(1)A	(1)	(1)
Adj. PBT	(17)	(8)	(19)	(2)	16	Adj. PBT		(17)A	(10)A	(15)	(7)
Tax	(2)	(1)	(1)	(3)	(3)	Tax		(0)A	(0)A	(0)	(0)
Minority Interest			-	-	-	Minority Interest			-		
Adj. Net Income	(32)	(37)	(51)	(35)	(21)	Adj. Net Income		(18)A	(11)A	(15)	(8)
Reported EPS	(1.12)	(1.24)	(1.71)	(1.05)	(0.63)	Reported EPS		(0.59)A	(0.35)A	(0.51)	(0.25)
Adj. EPS	(1.12)	(1.24)	(1.71)	(1.05)	(0.63)	Adj. EPS		(0.59)A	(0.35)A	(0.51)	(0.25)
DPS	-	8	=	8	=	DPS		-	=		
Payout ratio	-	-	_	-	<u> </u>	Payout ratio		-	-	-	
Shares outstanding	28	29	30	33	34	Shares outstanding		30A	30A	30	30
Balance Sheet & Cash Flow Statement	FY16A	FY17A	FY18E	FY19E	FY20E	Ratio Analysis	FY16A	FY17A	FY18E	FY19E	FY20E
Cash and cash equivalents	41	43	140	194	225	Gross margin	67.0%	69.7%	70.8%	72.2%	73.3%
Accounts receivable	53	69	85	96	108	EBITDA margin	(3.5%)	0.0%	(2.4%)	1.1%	4.6%
Inventories	85	98	84	72	71	EBIT margin	(4.2%)	(0.7%)	(3.1%)	0.2%	3.6%
Other current assets	241	232	120	64	36	Net profit margin	(13.9%)	(11.2%)	(13.3%)	(8.0%)	(4.3%)
Current assets	420	442	429	426	441		000.000	70 0 2200	020 122 13		10 000
PP&E	7	9	11	15	19	ROE	(13.1%)	(14.7%)	(21.3%)	(15.2%)	(9.0%)
LT investments	-	-	-	-	-	ROA	(8.8%)	(8.3%)	(11.4%)	(7.8%)	(4.6%)
Other non current assets	3	4	5	5	5	ROCE	(3.3%)	(0.7%)	(3.4%)	0.6%	3.8%
Total assets	431	455	445	446	465	SG&A/Sales	62.3%	67.3%	70.4%	66.4%	63.3%
						Net debt/equity	38.8%	40.8%	2.2%	(21.6%)	(33.3%)
Short term borrowings	0	0	0	0	0	DIE (E)	NIN		NINA	NINE	NIN
Payables	16	18	21	23	24	P/E (x)	NM	NM	NM	NM	NM
Other short term liabilities Current liabilities	26 42	40 58	45 66	48 71	52 77	P/BV (x) EV/EBITDA (x)	6.8	7.0 13,698.6	7.7 NM	8.7 361.4	8.4 75.0
	138	145	145	145	145	Dividend Yield	INIVI	13,090.0	INIVI	301.4	75.0
Long-term debt Other long term liabilities	1	2	2	2	2	Dividend field	-	-		-	
Total liabilities	182	205	213	218	224	Sales/Assets (x)	0.6	0.7	0.9	1.0	1.1
Shareholders' equity	249	250	232	228	241	Interest cover (x)	NM	0.0	NM	1.8	15.4
Minority interests	240	200	202	220	241	Operating leverage		(175.8%)			15665.5%
Total liabilities & equity	431	455	445	446	465	Operating leverage	(00.170)	(170.010)	2201.170	(007.070)	10000.070
BVPS	8.74	8.49	7.70	6.82	7.13	Revenue y/y Growth	228.3%	43.0%	18.6%	12.8%	12.4%
y/y Growth	(1.0%)	(2.9%)		(11.4%)	4.5%	EBITDA y/y Growth			(6719.9%)		373.4%
Net debt/(cash)	97	102	(9.4%)	(49)	(80)	Tax rate	(9.7%)	(17.5%)	20	(138.1%)	18.5%
iver debit(casil)	01	102		(43)	(00)	Adj. Net Income y/y Growth	(52.9%)	15.4%	40.3%	(32.2%)	(39.3%)
						A series control control of the control of the	,			(38.7%)	(40.1%)
Cash flow from operating activities	(50)	(1.1)	(10)	5	12		(56 1%)	116%			
Cash flow from operating activities	(59)	(1 4)	(10) 3	5 ⊿	12	EPS y/y Growth	(56.1%)	11.6%	37.1%	(30.770)	(10.170)
o/w Depreciation & amortization	2	3	3	4	5	DPS y/y Growth	(56.1%)	11.6%	37.1%	(30.7 70)	(10.170
o/w Depreciation & amortization o/w Changes in working capital	(54)	3 (17)	3 5	4 6	5 (6)		(56.1%)	11.6%	57.1%	(30.770)	(10.170
o/w Depreciation & amortization o/w Changes in working capital Cash flow from investing activities	(54) (132)	3 (17) 4	3 5 108	4 6 49	5 (6) 19		(56.1%)	11.6%	57.1%	-	(10.170,
o/w Depreciation & amortization o/w Changes in working capital Cash flow from investing activities o/w Capital expenditure	(54) (132) (3)	3 (17) 4 (4)	3 5 108 (6)	4 6 49 (7)	5 (6)		(56.1%)	11.6%	37.1%	(30.7 70)	(10.170
o/w Depreciation & amortization o/w Changes in working capital Cash flow from investing activities o/w Capital expenditure as % of sales	(54) (132)	3 (17) 4	3 5 108	4 6 49	5 (6) 19 (10)		(56.1%)	11.6%	57.1%	-	(10.176
o/w Depreciation & amortization o/w Changes in working capital Cash flow from investing activities o/w Capital expenditure	(54) (132) (3) 1.5%	3 (17) 4 (4) 1.3%	3 5 108 (6) 1.5%	4 6 49 (7) 1.7%	5 (6) 19 (10) 1.9%		(56.1%)	11.6% -	37.176	-	(10.170)
o/w Depreciation & amortization o/w Changes in working capital Cash flow from investing activities o/w Capital expenditure as % of sales Cash flow from financing activities o/w Dividends paid	(54) (132) (3) 1.5%	3 (17) 4 (4) 1.3%	3 5 108 (6) 1.5% 0	4 6 49 (7) 1.7%	5 (6) 19 (10) 1.9%		(56.1%)	11.6% -	37,1%	-	(10.170
o/w Depreciation & amortization o/w Changes in working capital Cash flow from investing activities o/w Capital expenditure as % of sales Cash flow from financing activities	2 (54) (132) (3) 1.5% 145	3 (17) 4 (4) 1.3% 11	3 5 108 (6) 1.5% 0	4 6 49 (7) 1.7% 0	5 (6) 19 (10) 1.9% 0		(56.1%)	11.6%	37.1%	-	(10.174)
o/w Depreciation & amortization o/w Changes in working capital Cash flow from investing activities o/w Capital expenditure as % of sales Cash flow from financing activities o/w Dividends paid o/w Net debt issued/(repaid)	2 (54) (132) (3) 1.5% 145	3 (17) 4 (4) 1.3% 11	3 5 108 (6) 1.5% 0	4 6 49 (7) 1.7% 0	5 (6) 19 (10) 1.9% 0		(56.1%)	11.6%	37,170	-	(10.174)

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

Note: \$ in millions (except per-share data). Fiscal year ends Dec. o/w - out of which

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/ Liquidity Provider: J.P. Morgan Securities plc and/or an affiliate is a market maker and/or liquidity provider in securities issued by Nevro.
- Client: J.P. Morgan currently has, or had within the past 12 months, the following entity(ies) as clients: Nevro.
- Other Significant Financial Interests: J.P. Morgan owns a position of 1 million USD or more in the debt securities of Nevro.

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://www.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.

Nevro (NVRO, NVRO US) Price Chart



Date	Rating	Share Price (\$)	Price Target (\$)
14-Dec-15	OW	64.16	80.00
10-May-16	OW	68.36	84.00
09-Aug-16	OW	94.56	100.00
24-Oct-16	OW	100.14	112.00
07-Nov-16	OW	89.12	106.00
23-Feb-17	OW	98.97	112.00
08-May-17	OW	86.30	102.00
07-May-18	OW	77.59	98.00
16-Jul-18	ow	58.71	77.00

Source: Bloomberg and J.P. Morgan; price data adjusted for stock splits and dividends

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 ex-India) 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

5

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: Marcus, Robert J: Abbott Laboratories (ABT), Baxter Intl (BAX), Becton, Dickinson & Co (BDX), Boston Scientific Corporation (BSX), Conformis (CFMS), Dexcom (DXCM), Edwards Lifesciences (EW), Endologix (ELGX), Glaukos (GKOS), Inogen Inc (INGN), Insulet Corp (PODD), Integra LifeSciences (IART), Intersect ENT (XENT), Medtronic PLC (MDT), Nevro (NVRO), NuVasive, Inc. (NUVA), Penumbra (PEN), Stryker Corp (SYK), The Cooper Companies, Inc. (COO), Wright Medical Group NV (WMGI), Zimmer Biomet Holdings Inc (ZBH), iRhythm (IRTC)

J.P. Morgan Equity Research Ratings Distribution, as of July 02, 2018

	Overweight	Neutral	Underweight	
	(buy)	(hold)	(sell)	
J.P. Morgan Global Equity Research Coverage	47%	41%	13%	
IB clients*	54%	48%	40%	
JPMS Equity Research Coverage	45%	42%	13%	
IB clients*	74%	66%	58%	

^{*}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. For material information about the proprietary models used, please see the Summary of Financials in company-specific research reports and the Company Tearsheets, which are available to download on the company pages of our client website, http://www.jpmorganmarkets.com. This report also sets out within it the material underlying assumptions used.

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 https://www.theocc.com/components/docs/riskstoc.pdf

Private Bank Clients: Where you are a client of the private banking businesses offered by JPMorgan Chase & Co. and its subsidiaries ("J.P. Morgan Private Bank"), research is issued to you by J.P. Morgan Private Bank and not by any other division of J.P. Morgan, including but not limited to the J.P. Morgan corporate and investment bank and its research division.

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: This material is issued and distributed in Korea by or through J.P. Morgan Securities (Far East) Limited, Seoul Branch, which is a member of the Korea Exchange(KRX) and is regulated by the Financial Services Commission (FSC) and the Financial Supervisory Service (FSS). 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 Privat

6

North America Equity Research 02 August 2018

Robbie Marcus, CFA (1-212) 622-6657 robert.j.marcus@jpmorgan.com J.P.Morgan

INH000001873. J.P. Morgan India Private Limited is also registered with SEBI as a member of the National Stock Exchange of India Limited (SEBI Registration Number - INB 230675231/INF 230675231/INE 230675231), the Bombay Stock Exchange Limited (SEBI Registration Number - INB 010675237/INF 010675237) and as a Merchant Banker (SEBI Registration Number - MB/INM000002970). 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) 099/04/2018 and Co. Reg. No.: 199405335R], which is a member of the Singapore Exchange Securities Trading Limited and/or JPMorgan Chase Bank, N.A., Singapore branch (JPMCB Singapore) [MCI (P) 059/09/2017], both of which are regulated by the Monetary Authority of Singapore. This material is issued and distributed in Singapore only to accredited investors, expert investors and institutional investors, as defined in Section 4A of the Securities and Futures Act, Cap. 289 (SFA). This material is not intended to be issued or distributed to any retail investors or any other investors that do not fall into the classes of "accredited investors," "expert investors" or "institutional investors," as defined under Section 4A of the SFA. 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. and JPMorgan Chase Bank, N.A., Tokyo Branch are 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. Further information about J.P. Morgan's conflict of interest policy and a description of the effective internal organisations and administrative arrangements set up for the prevention and avoidance of conflicts of interest is set out at the following link https://www.jpmorgan.com/jpmpdf/1320742677360.pdf. 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. J.P. Morgan's research coverage universe spans listed securities across the ASX All Ordinaries index, securities listed on offshore markets, unlisted issuers and investment products which Research management deem to be relevant to the investor base from time to time. J.P. Morgan seeks to cover companies of relevance to the domestic and international investor base across all GIC sectors as well as across a range of market capitalisation sizes. Germany: This material is distributed in Germany by J.P. Morgan Securities plc, Frankfurt Branch which is 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. Korea: This report may have been edited or contributed to from time to time by affiliates of J.P. Morgan Securities (Far East) Limited, Seoul Branch. Singapore: As at the date of this report, JPMSS is a designated market maker for certain structured warrants listed on the Singapore Exchange where the underlying securities may be the securities discussed in this report. Arising from its role as designated market maker for such structured warrants, JPMSS may conduct hedging activities in respect of such underlying securities and hold or have an interest in such underlying securities as a result. The updated list of structured warrants for which JPMSS acts as designated market maker may be found on the website of the Singapore Exchange Limited: http://www.sgx.com. In addition, JPMSS and/or its affiliates may also have an interest or holding in any of the securities discussed in this report – please see the Important Disclosures section above. For securities where the holding is 1% or greater, the holding may be found in the Important Disclosures section above. For all other securities mentioned in this report, JPMSS and/or its affiliates may have a holding of less than 1% in such securities and may trade them in ways different from those discussed in this report. Employees of JPMSS and/or its affiliates not involved in the preparation of this report may have investments in the securities (or derivatives of such securities) mentioned in this report and may trade them in ways different from those discussed in this report. Taiwan: Research relating to equity securities is issued and distributed in Taiwan by J.P. Morgan Securities (Taiwan) Limited, subject to the license scope and the applicable laws and the regulations in Taiwan. According to Paragraph 2, Article 7-1 of Operational Regulations Governing Securities Firms Recommending Trades in Securities to Customers (as amended or supplemented) and/or other applicable laws or regulations, please note that the recipient of this material is not permitted to engage in any activities in connection with the material which may give rise to conflicts of interests, unless otherwise disclosed in the "Important Disclosures" in this material. 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

7

North America Equity Research 02 August 2018

Robbie Marcus, CFA (1-212) 622-6657 robert.j.marcus@jpmorgan.com J.P.Morgan

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, 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 indicative 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 June 30, 2018.

Copyright 2018 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.