

## Biotech trading meaningfully below historical averages

The Nasdaq Biotechnology Index (NBI) has underperformed the broader market, down 17% vs the S&P 500 up 3% year-to-date. Since the peak in July 2015 (4165.87), the NBI is down 30%. With investors jittery on the outlook for biotechs and questioning current valuations, we took a closer look at the NPVs of the nine larger cap companies in our coverage universe.

## Most value coming from base businesses

Given the significant decline across the board, we found that current valuations largely reflect minimal contributions from the pipeline with the exception of those with large clinical trials underway that could offer high rewards if successful. Our analysis indicates the base businesses for ALXN, AMGN, GILD, INCY, REGN, and VRTX reflect about 75%-100% of current valuations with very little premium from the pipeline, whereas R&D heavy weights BIIB, BMRN, and CELG screen lower with their base businesses representing about 55%-65% of current valuations. On a multiple basis, most are trading at or below historical averages on forward P/E and EV/EBITDA. We highlight ALXN and REGN as two stocks with above-peer growth and pipeline premium lower than prior levels.

## Large caps screen well in historical context

We also reviewed historical forward P/E multiples for the last 10 years for the four large caps AMGN, BIIB, CELG, and GILD (see Chart 19-22). With the exception of AMGN which is trading slightly above, the other three are trading considerably below historical averages (4x-10x below). AMGN, BIIB, and CELG trade above historical lows (5x-6x above). GILD, however, is currently trading at its lowest forward P/E multiple as investors are concerned about the sustainability of the Hepatitis C (HCV) franchise. We expect the sector to recover after political rhetoric on drug pricing dies down after election.

## Top-down view: growth at a reasonable price

From a generalist perspective, Biotech is the definition of GARP. The industry trades at significant a discount to history on [most valuation metrics](#), but has one of the highest projected long-term growth rates in the S&P 500. In fact, S&P 500 Biotech sports the best combination of low P/E versus high long-term growth expectations relative to all other groups (Chart 9). Risks of continued multiple compression include political uncertainty around Health Care (particularly in an election year) and a more hawkish Fed.

## Risks: Crowded & correlated

According to our comprehensive [fund holdings analysis](#), Biotech is the third most overweight industry within S&P 500. Within Health Care, active managers are 40% overweight relative to the benchmark. But the buy-side has been systematically reducing this overweight, which now sits at its lowest levels since mid-2011, and well below its average exposure since '08. The group could still be used as a source of funds for active managers if they want to close underweights in other areas of the market – in particular, cyclicals and commodity plays if the macro data continues to improve. But relative to the last several years, positioning risks are lesser. Also of note to stock-pickers: Biotech is now dominated by passive flows, and stocks have become increasingly correlated within the industry.

BofA Merrill Lynch does and seeks to do business with issuers 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.

Refer to important disclosures on page 19 to 21. Analyst Certification on page 17. Price Objective Basis/Risk on page 16.

United States  
Biotechnology

Ying Huang  
Research Analyst  
MLPF&S

Savita Subramanian  
Equity & Quant Strategist  
MLPF&S

Jill Carey Hall, CFA  
Equity & Quant Strategist  
MLPF&S

Qian Wang  
Research Analyst  
MLPF&S

Aspen Mori  
Research Analyst  
MLPF&S

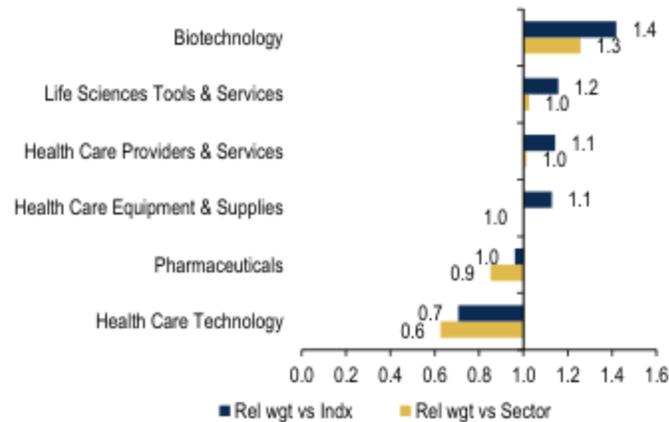
# Biotech

## Large-cap Biotech: crowded, but less so than historically

Biotech is the most crowded industry within the S&P 500 Health Care sector: large cap active managers are 40% overweight Biotech relative to the benchmark (Chart 1). In fact, the two most overweight Health Care stocks in the S&P 500 by active funds are ALXN (2.7x the benchmark weight) and BIIB (1.9x the benchmark weight).

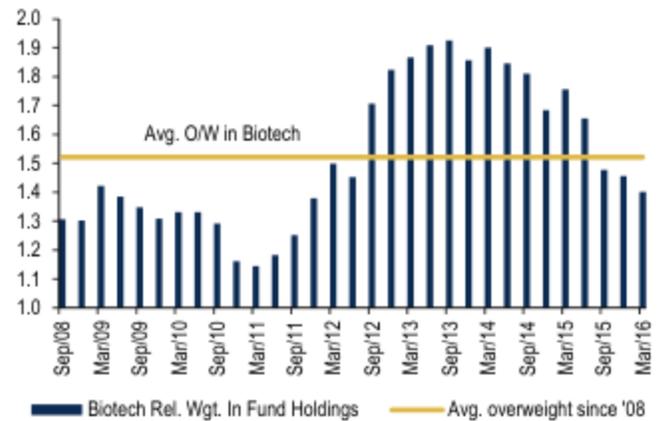
But managers' overweight in the industry has been narrowing since mid-2013, when managers were more than 90% overweight Biotech relative to benchmark, and today the overweight is its narrowest since mid-2011, and about 10% below the average overweight since 2008 (Chart 2).

**Chart 1: Large cap managers: Health Care industry exposure (all styles)**



Source: FactSet/Lionshares, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 2: Large cap managers' relative weight in Biotech, 9/08-present**



Source: FactSet/Lionshares, BofA Merrill Lynch US Equity & US Quant Strategy

**Table 1: Large cap active managers' positioning in S&P 500 Biotech stocks (as of March 2016)**

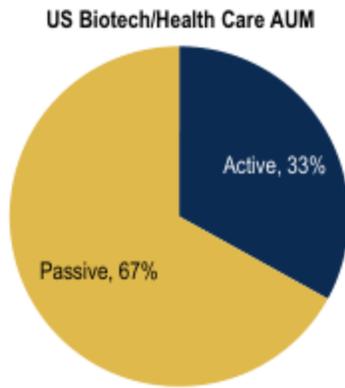
Ticker	Company	Mkt Cap (\$mn)	Relative Weight (vs. S&P 500)	% Funds Owning
ALXN	Alexion Pharmaceuticals, Inc.	33,324	2.70	23.2%
BIIB	Biogen Inc.	59,555	1.87	29.8%
REGN	Regeneron Pharmaceuticals, Inc.	43,347	1.68	15.9%
AMGN	Amgen Inc.	118,509	1.64	34.6%
CELG	Celgene Corporation	84,174	1.57	35.8%
VRTX	Vertex Pharmaceuticals Inc.	21,543	1.49	18.0%
GILD	Gilead Sciences, Inc.	138,105	0.98	45.8%
ABBV	AbbVie, Inc.	94,758	0.94	23.4%
BXLT	Baxalta, Inc.	27,250	0.71	11.0%

Source: FactSet/Lionshares, BofA Merrill Lynch US Equity & US Quant Strategy

### Biotech now dominated by passive flows

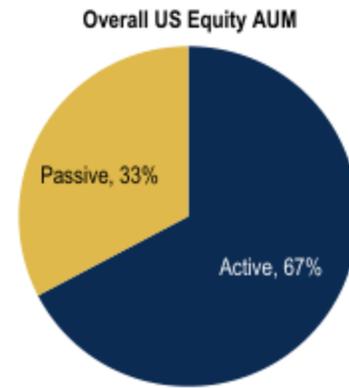
According to data from EPFR Global, while total US Biotech/Health Care assets under management in ETFs and mutual funds had closely tracked on another until 2013, since then, assets in ETFs have greatly surpassed assets in mutual funds. In tandem, Biotech stocks have become increasingly correlated—see Chart 6. Today, US Biotech/Health Care is only one-third active, two-thirds passive—the opposite of the overall US AUM landscape, which is still two-thirds active (Chart 3 and Chart 5). Year-to-date, both mutual funds and ETFs in this sector have seen outflows, but with larger outflows from ETFs following the elevated inflows over the past few years (Chart 4).

**Chart 3: Current assets in US Biotech/Health Care mutual funds vs. ETFs**



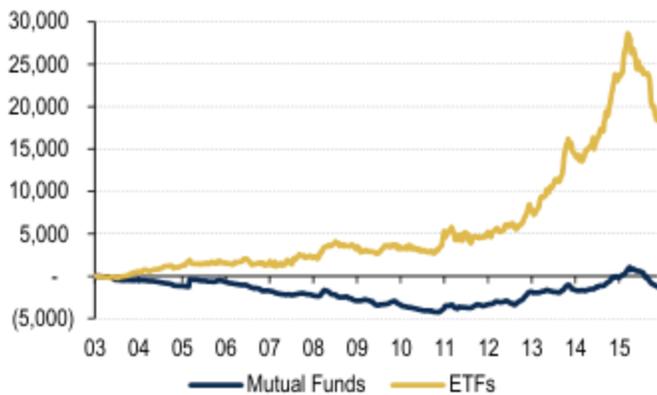
Source: EPFR Global, BofA Merrill Lynch Global Research

**Chart 5: Current assets in overall US equity mutual funds vs. ETFs**



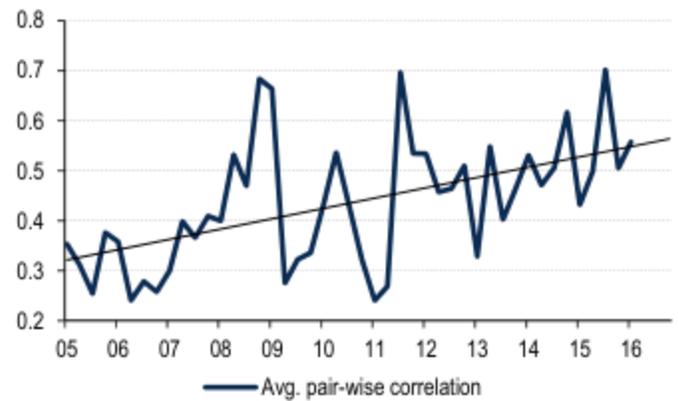
Source: SimFund, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 4: Cumulative flows (\$mn) into US Biotech/Health Care mutual funds and ETFs, 5/03-present**



Source: EPFR Global, BofA Merrill Lynch Global Research

**Chart 6: Avg. pair-wise correlation: S&P 500 Biotech stocks, 1Q05-1Q16**

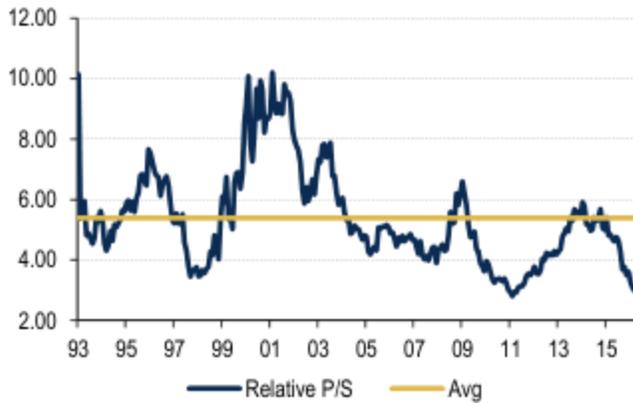


Source: BofA Merrill Lynch US Equity & US Quant Strategy

### Growth at a reasonable price

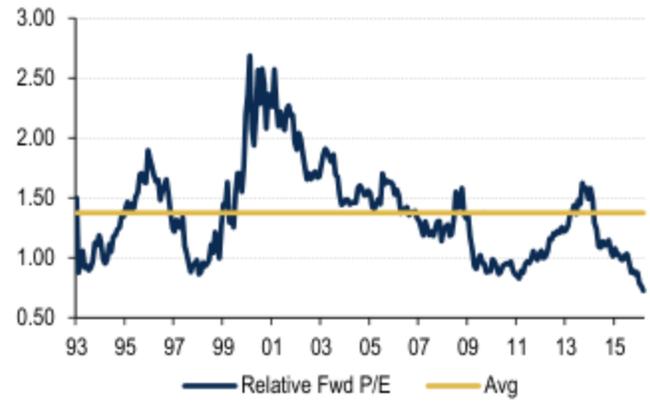
Large cap Biotech stocks currently look cheap vs. history on most metrics, with the exception of relative Price to Book (see tables). Political uncertainty, expectations of Fed tightening and the positioning unwind have all helped to compress multiples to five-year lows on relative Price to Sales and to historical lows on relative forward P/E. Comparing S&P 500 sectors' and other Health Care industries' valuations to projected long-term growth rates, Biotech represents growth-at-a-reasonable-price: it has the lowest forward P/E, but among the highest expected long-term growth (Chart 9).

**Chart 7: S&P 500 Biotech industry: relative Price/Sales (1993-3/2016)**



Source: FactSet, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 8: S&P 500 Biotech industry: relative fwd. P/E (1993-3/2016)**



Source: FactSet, BofA Merrill Lynch US Equity & US Quant Strategy

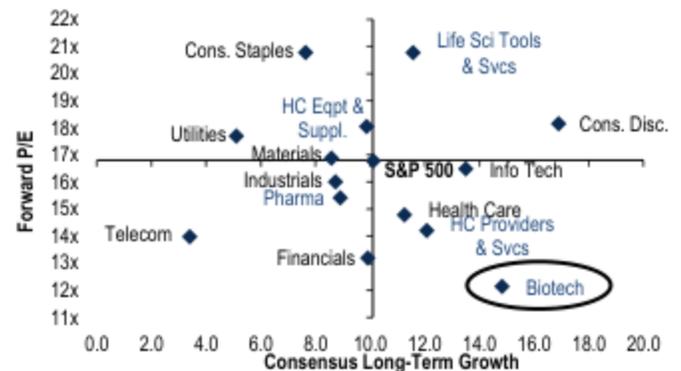
**Table 2: S&P 500 Biotech – relative valuations vs. history (1992-3/2016)**

Metric	Current	Avg.	Implied upside (downside) to get back to L/T avg.
Relative P/B	2.6	2.0	-21%
Relative P/S	3.0	5.1	71%
Relative Fwd P/E	0.7	1.3	78%
Relative P/OCF	1.1	1.9	74%

Note: based on aggregate valuation multiple relative to S&P 500 multiple  
Source: FactSet, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 9: Biotech: growth at a reasonable price**

S&P 500 sectors and Health Care industries: Fwd. P/E vs. Consensus LTG (as of 3/31/16)



Source: FactSet, BofA Merrill Lynch US Equity & US Quant Strategy

## Valuations reflect mainly base businesses for most

We reviewed the net present values (NPVs) for ALXN, AMGN, BIIB, BMRN, CELG, GILD, INCY, REGN, and VRTX – taking apart the base business (BB) vs pipeline contributions. Based on our analysis, the BBs for ALXN, AMGN, GILD, INCY, REGN, and VRTX reflect about 75%-100% of the current valuation with little premium from the pipeline. This should be viewed favorably in a nervous market and could protect against significant downside in a market downturn and offer upside if pipeline assets report favorable clinical data. Of these, AMGN, REGN, and VRTX will report later-stage clinical data in 2016 that could meaningfully drive shares higher, including Repatha outcomes data for AMGN, interim Praluent outcomes data for REGN, and VX661/Kalydeco and early triple combo data for VRTX. In addition to clinical read-outs on new indications for Soliris, ALXN also has two product launches (Strensiq and Kanuma) that began late last year; we believe the long-term market opportunities for these are not reflected in the price.

Not surprisingly, heavy weights BIIB, BMRN, and CELG screen lower with their BBs representing only 55%-65% of current valuations. We believe these are justified given the number of late-stage large trials each have underway that could significantly accelerate growth in the next few years. BIIB has Phase 3 aducanumab in Alzheimer's and Phase 3 anti-LINGO in multiple sclerosis data. BMRN has multiple catalysts over the next 12 months, including updates for BMN190 for Batten's disease, 30mcg data for BMN111 for achondroplasia, and preliminary data for BMN270 for Hemophilia A. CELG has the PDUFA date for Revlimid for patients with non-del-5q myelodysplastic syndromes (MDS) on April 16 and Ozanimod data in 1H17.

Table 3: Company NPVs by drug

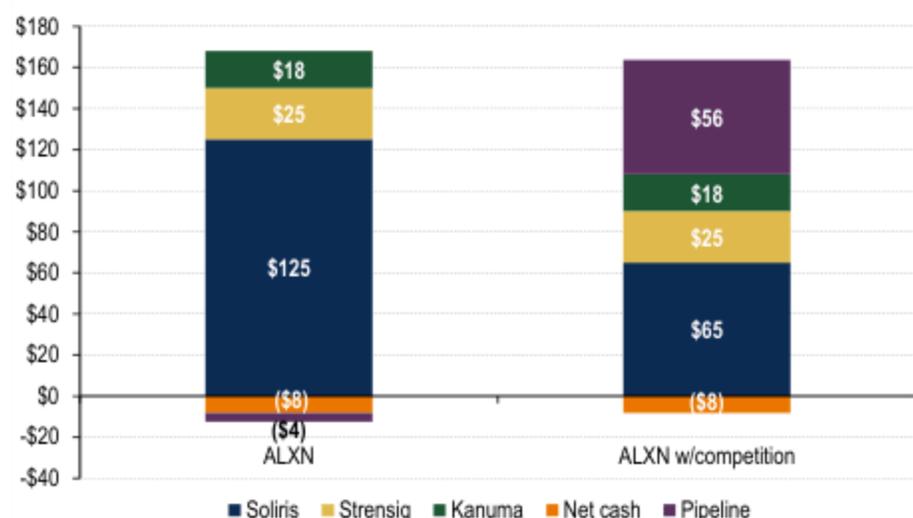
	ESA	Neupo	Enbrel	Repatha	Others	Net cash	Pipeline	Total	Price	% base biz
AMGN	\$11	\$21	\$24	\$15	\$49	\$0	\$42	\$120	\$162	74%
	Tecfidera	Interferon	Tysabri	Others		Net cash	Pipeline	Total	Price	% base biz
BIIB	\$78	\$40	\$23	\$38		(\$2)	\$94	\$177	\$271	65%
	Revlimid	Thal/Vidaza	Pomalyst	Abraxane	Otezla	Net cash	Pipeline	Total	Price	% base biz
CELG	\$49	\$1	\$9	\$5	\$8	(\$9)	\$44	\$63	\$107	59%
	HCV	HIV	Others			Net cash	Pipeline	Total	Price	% base biz
GILD	\$43	\$40	\$5			\$4	\$8	\$92	\$99	92%
	Eylea	Praluent	Dupilumab	Sarilumab		Net cash	Pipeline	Total	Price	% base biz
REGN	\$244	\$39				\$14	\$117	\$297	\$414	72%
w/dup and sari	\$244	\$39	\$22	\$7		\$14	\$88	\$326	\$414	79%
	Soliris	Strensiq	Kanuma			Net cash	Pipeline	Total	Price	% base biz
ALXN	\$125	\$25	\$18			(\$8)	(\$4)	\$160	\$155	103%
ALXN w/competition	\$65	\$25	\$18			(\$8)	\$56	\$100	\$155	64%
	Aldurazyme	Naglazyme	Kuvan	Vimizim		Net cash	Pipeline	Total	Price	% base biz
BMRN	\$5	\$13	\$3	\$29		\$2	\$34	\$52	\$86	60%
	Kalydeco	Orkambi				Net cash	Pipeline	Total	Price	% base biz
VRTX	\$15	\$58				\$3	\$7	\$76	\$83	91%
	Jakafi	Baricitinib				Net cash	Pipeline	Total	Price	% base biz
INCY	\$37	\$20				\$1	\$19	\$58	\$77	75%

Source: BofA Merrill Lynch Global Research

# Alexion (ALXN) | Buy | C-1-9 | \$204

ALXN specializes in the research and development of rare and ultra-rare orphan diseases. Its flagship product is Soliris (eculizumab) for the treatment of paroxysmal nocturnal hemoglobinuria (PNH) and atypical hemolytic-uremic syndrome (aHUS). The company also recently launched two new drugs for metabolic indications in late-2015: Strensiq for hypophosphatasia (HPP) and Kanuma for lysosomal acid lipase deficiency (LAL-D). ALXN also has a robust clinical pipeline that could bring as much as six product launches to market by 2018-2019. We view ALXN's product portfolio and pipeline as undervalued, and think there is room for significant upside if data for ALXN1210, SBC-103, and additional Soliris indications continue to read out positive and the Strensiq and Kanuma launches track well. With most of ALXN's value still coming from its BB, it should remain somewhat shielded from significant downside in the event of continued market downturn. We note, however, that as the most overweight biotech in our coverage, we may see more outflows if repositioning continues.

**Chart 10: ALXN product and pipeline portfolio NPV**



Source: BofA Merrill Lynch Global Research estimates

## NPV assumptions for marketed products

Each valuation scenario assumes (\$8)/sh net cash NPV. The scenarios above also account for Strensiq sales through 2024 gradually ramping up to about \$1.4B in sales as well as Kanuma sales through 2025 gradually ramping up to about \$1.0B. We use a WACC of 9.3%.

### No Soliris competition scenario

Our first ALXN valuation scenario is based on Soliris revenues through 2025 unimpeded by biosimilar competition, with modest growth, translating to a Soliris NPV of \$125/sh. Soliris, Strensiq, and Kanuma in this scenario account for over 100% of ALXN's value.

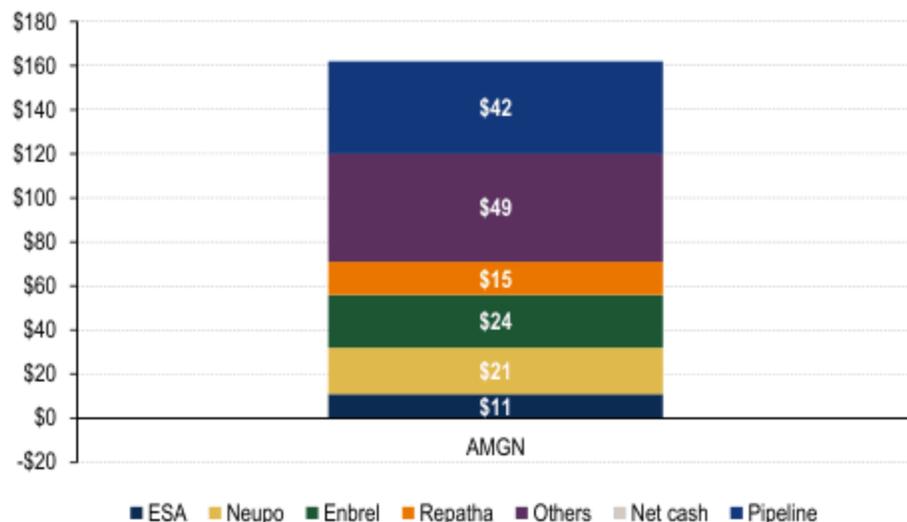
### Biosimilar competition to Soliris

This scenario assumes Soliris revenues quickly grow to peak sales of \$4.3B in 2020 and then face biosimilar competition in 2021 and a decline in sales through 2025. This case provides for a pipeline NPV of \$56/sh and the BB accounting for 64% of the company's overall value.

# Amgen (AMGN) | Neutral | C-2-7 | \$181

AMGN has one of the larger product portfolios of our coverage. Led by Enbrel and Neupogen/Neulasta, AMGN's products bring in over \$20B in revenue per year. AMGN's products are currently under the threat of biosimilar competition, with the first biosimilar to Neupogen (Zarxio) launching at a 15% discount in September 2015. AMGN however, continues to convert its own pipeline assets into products (i.e. Repatha) to fill these holes. With most of the company's value coming from its base business, we view AMGN as a secure short term story, with potential for upside coming from Repatha cardiovascular outcomes data in 2H16.

**Chart 11: AMGN product and pipeline portfolio NPV**



Source: BofA Merrill Lynch Global Research estimates

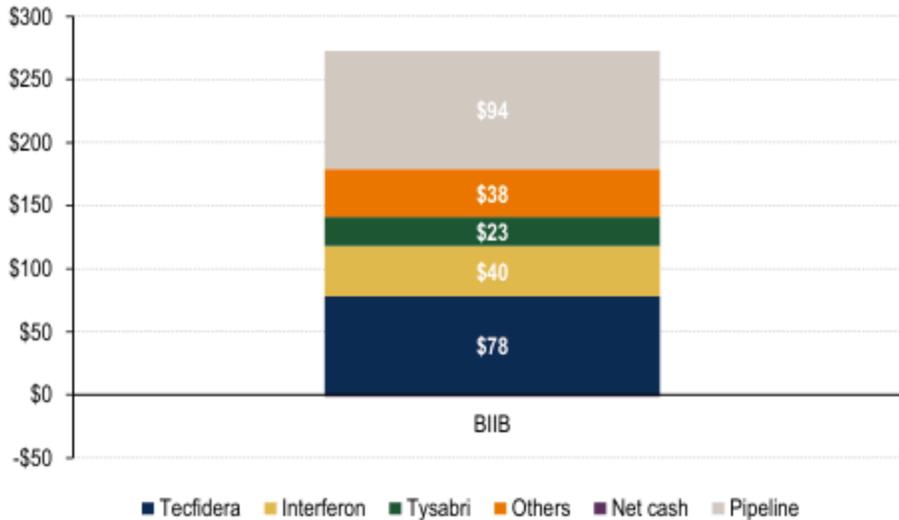
## NPV assumptions for marketed products

Our AMGN product NPV valuation assumes product sales through 2025, a WACC of 9.4%, and \$0/sh net cash. We grouped AMGN's erythropoiesis stimulating agents (ESAs), Epogen and Aranesp, together and assumed gradually declining sales through 2025 due to introduction of biosimilars and applied a similar analysis for Neupogen/Neulasta and Enbrel sales. This provided NPVs of \$11/sh for ESAs, \$21/sh for Neupogen, and \$24/sh for Enbrel. AMGN's recently launched cholesterol lowering drug, Repatha, came out to \$15/sh, assuming a rapid launch over the next few years and peak sales of \$4.2B. Grouping AMGN's other marketed products together, we arrived at a \$49/sh NPV. These products account for 74% of AMGN's price, leaving \$42/sh for the pipeline.

# Biogen (BIIB) | Buy | B-1-9 | \$370

BIIB specializes in developing drugs for treating multiple sclerosis (MS). Lead by Tecfidera, BIIB's products bring in around \$9B per year. However, with slowing growth in the MS franchise BIIB's pipeline is all the more important. Important data readouts in BIIB's Alzheimer's and MS pipeline will drive growth for the time being. We are confident in the results of these studies being positive, given the previously demonstrated efficacy and think the relative cheapness of the stock offers an attractive buying opportunity ahead of these binary data points. Despite a relatively high pipeline valuation, BIIB still has a significant revenue base that should be somewhat protective against downside. Of note, BIIB is the second most overweight company in our coverage relative to the S&P, and so remains at risk downside from repositioning.

Chart 12: BIIB product and pipeline portfolio NPV



Source: BofA Merrill Lynch Global Research estimates

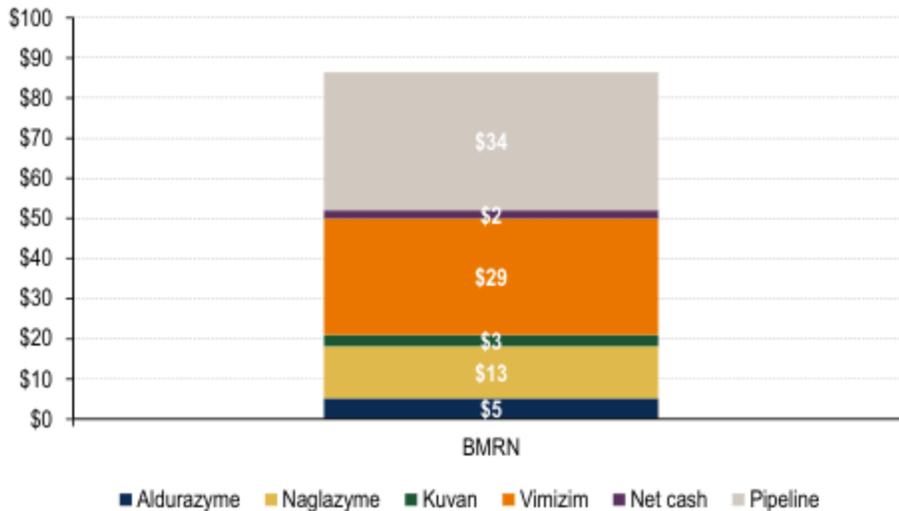
## NPV assumptions for marketed products

Our BIIB product NPV valuation assumes Tecfidera sales through 2028 and Avonex/Plegridy (Interferon Franchise), Tysabri and other product sales through 2025. We use a WACC of 8.8% and assume \$(2)/sh net cash. The Interferon Franchise is currently at \$40/sh, assuming a gradual decline in sales from now through 2025. Tysabri (\$23/sh) sales should behave similarly. We model Tecfidera sales increasing through 2022 then gradually decreasing, translating to a \$78/sh NPV. All other revenues gradually increase from now until 2025 and make up \$38/sh NPV, leaving \$94 for BIIB's pipeline. In this scenario, the BB accounts for 65% of BIIB's value.

## BioMarin (BMRN) | Buy | C-1-9 | \$109

BMRN is the second largest orphan drug developer, after ALXN. Its product portfolio currently consists of Naglazyme for Mucopolysaccharidosis type VI (MPS VI), Aldurazyme (sold by Genzyme) for MPS I, Kuvan for Phenylketonuria (PKU) and Vimizim for MPS IVA. Current growth is driven by Vimizim sales, which should bring the company to break-even by 2017. With much less of its valuation coming from its BB and strong clinical science backing up its pipeline drugs, we view BMRN as a strong growth opportunity.

Chart 13: BMRN product and pipeline portfolio NPV



Source: BofA Merrill Lynch Global Research estimates

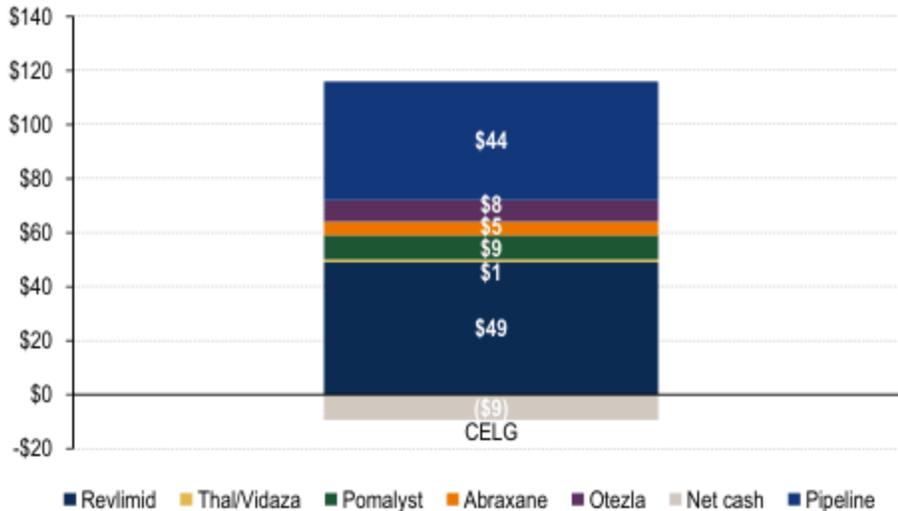
### NPV assumptions for marketed products

Our BMRN product NPV valuation assumes revenues through 2025, a 9.1% WACC and \$2/sh in net cash. Aldurazyme and Naglazyme are currently valued at \$5/sh and \$13/sh, assuming very moderate revenue growth through 2025. Kuvan is only valued at \$3/sh, with sales growth until 2020, when it loses exclusivity and generics enter the market. Vimizim (\$29/sh) shows a much more rapid revenue growth, with peak sales of just under \$1B in 2025. These represent 60% of BMRN's value and leave \$34/sh for BMRN's pipeline.

# Celgene (CELG) | Buy | B-1-9 | \$125

CELG's clinical specialty is multiple myeloma (MM), primarily headed by its lead product, Revlimid, however Otezla for plaque psoriasis is in the midst of a strong launch that should also help boost revenue growth. Other products include Thalomid for MM and Erythema Nodosum Leprosum, Vidaza for treatment of refractory anemia and chronic myelomonocytic leukemia, Pomalyst for MM, and Abraxane for metastatic pancreatic cancer, non-small cell lung cancer, and breast cancer. CELG's BB plays a smaller role in CELG's overall valuation in relation to the other large caps and so an approval for Revlimid for non-del-5q myelodysplastic syndromes (PDUFA April 16<sup>th</sup>) and positive data readouts for Ozanimod for MS and ulcerative colitis (2017) could mean greater upside, but the company is less protected in the event of a poor market environment.

**Chart 14: CELG product and pipeline NPV**



Source: BofA Merrill Lynch Global Research estimates

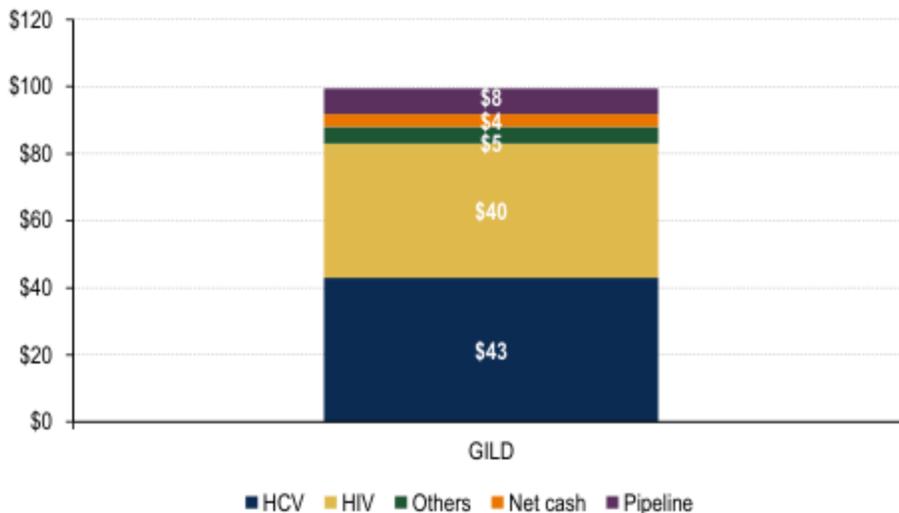
## NPV assumptions for marketed products

Our CELG product NPV valuation assumes revenues through 2020 for Vidaza, 2023 for Thalomid, 2024 for Otezla and Pomalyst, 2025 for Revlimid, and 2026 for Otezla. We use a WACC of 10.3% and assume (\$9) in net cash. The biggest chunk of CELG's value comes from Revlimid, which accounts for \$49/sh NPV. Revlimid revenues should continue rapid growth as it remains a staple for MM treatment and expands indications, until 2022 when Natco is able to produce limited amounts of generic drug. Vidaza and Thalomid (\$1/sh NPV) sales should continue to decrease as generics enter the market. Pomalyst sales should ramp up to a peak of \$2.3B in 2023 when it loses patent protection in EU and US (2024); Pomalyst accounts for \$9/sh NPV. Abraxane (\$5/sh NPV) sales should gradually grow until it faces patent exposure in 2026. Finally, Otezla, CELG's most recently launched product accounts for \$8/sh NPV and should see rapid growth to peak sales of \$4.0B in 2024, when it loses patent protection. These products represent 59% of CELG's NPV, leaving \$44 attributable to its pipeline.

# Gilead (GILD) | Neutral | B-2-7 | \$104

GILD's specialty is in antiviral indications. Its two largest product portfolios are in hepatitis c virus (HCV) and human immunodeficiency virus (HIV). These two segments brought in over \$30B in revenue for GILD in 2015. Its primary source of growth has come from its HCV franchise (Harvoni and Sovaldi) however, as sales slow down due to competition, it is on GILD to find a new source of revenue growth. With the vast majority of GILD's value coming from these two businesses, the company remains relatively protected against downside, but we wait to see what kind of pipeline GILD is able to build through in-licensing and acquisition to determine potential upside.

Chart 15: GILD product and pipeline portfolio NPV



Source: BofA Merrill Lynch Global Research estimates

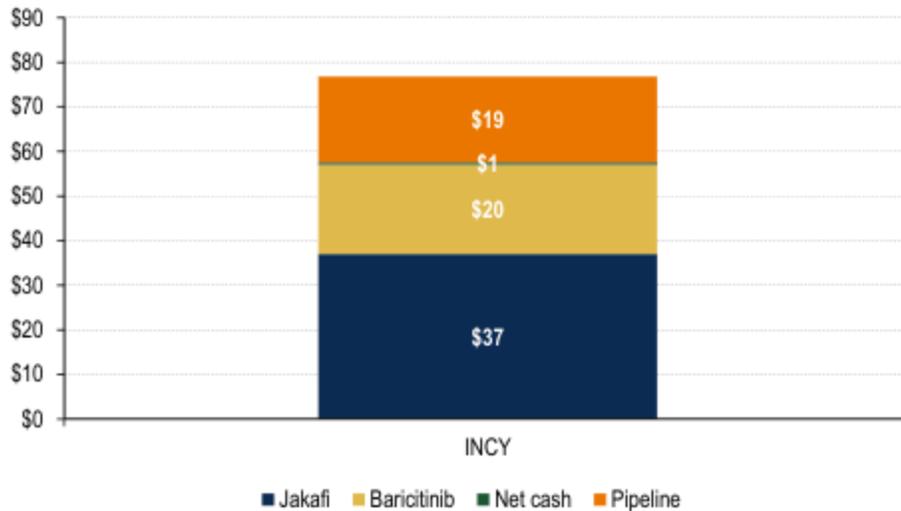
## NPV assumptions for marketed products

Our GILD product NPV valuation assumes product revenues through 2030 for HCV and other products, through 2029 for HIV, a WACC of 7.9%, and \$4/sh NPV net cash. GILD's most valuable asset is their HCV portfolio at \$43/sh NPV. This assumes an approximate 9% decline in revenues per year through 2023 due to an increase in marketed competition. GILD's second biggest money maker is its HIV franchise, valued at \$40/sh. HIV sales overall should grow for the next couple years, as Genvoya sales gear up, but loss of patent protection for Atripla, Truvada and Viread in 2018 initiates a decline in HIV sales through 2029. Other products, including Ambisome, Letairis, Ranexa, Zydelig, and Cayston should contribute very mild growth and account for \$5/sh NPV. The BB represents 92% of GILD's NPV with only \$8/sh from its pipeline.

# Incyte (INCY) | Buy | C-1-9 | \$90

INCY's only currently marketed product is Jakafi (ruxolitinib) an oral Janus-kinase (JAK) inhibitor indicated for the treatment of Myelofibrosis (MF) and Polycythemia Vera (PV), two bone marrow disorders. With only one marketed product, INCY's valuation is very pipeline heavy. This gives it a lot of potential for growth if epacadostat and other early pipeline drugs have positive data readouts, which we expect to be the case, given the differentiating safety profile and strong efficacy epacadostat has demonstrated thus far. However, this also puts INCY in the hands of the market as it ramps up Jakafi sales.

Chart 16: INCY product and pipeline NPV



Source: BofA Merrill Lynch Global Research estimates

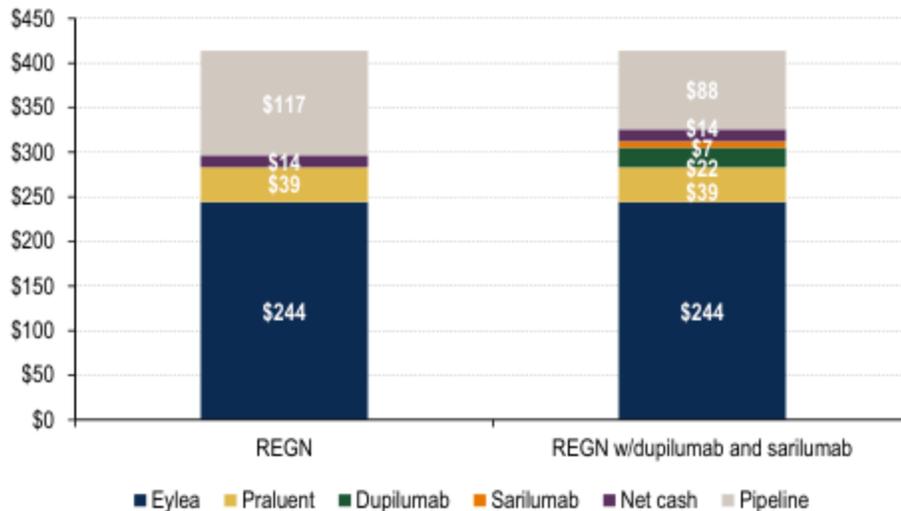
## NPV assumptions for marketed products

Our INCY product NPV valuation assumes revenues through 2030 for Jakafi and baricitinib for rheumatoid arthritis, a WACC of 9.3%, and \$1/sh net cash. Note that while baricitinib (RA) is still technically in the pipeline, we treat it like a marketed product in this analysis because of its high probability for FDA approval. Our analysis currently values Jakafi at \$37/sh, with sales gradually increasing to a \$1.7B peak in 2026, followed by steep drop off when its patents expire. Baricitinib should see a similarly moderate sales growth to a \$1.1B peak in 2029, when its patents expire. Baricitinib represents \$20/sh NPV. The BB comprising these two products makes up 75% of INCY's NPV with \$19/sh coming from the pipeline.

# Regeneron (REGN) | Buy | B-1-9 | \$525

REGN, a perennial powerhouse, currently only markets Eylea for wet macular degeneration and Arcalyst for cryopyrin-associated periodic syndroms (CAPS). However, it also books revenues for Praluent (alirocumab) from its collaboration with Sanofi and ex-US revenues for Eylea from its collaboration with Bayer. With only one marketed product, it would seem that REGN's NPV would be very pipeline heavy, but with a strong base of Eylea sales, REGN's value mainly comes from its products. We view this as a very attractive opportunity, given the protection it would have against a market downturn from its BB and the growth opportunity from its late stage pipeline. In addition, REGN is screening cheap, compared to historical valuations. Note however, that as the third most overweight biotech relative to the S&P 500, repositioning remains a risk.

**Chart 17: REGN product and pipeline portfolio NPV**



Source: BofA Merrill Lynch Global Research estimates

## NPV assumptions for marketed products

Each valuation scenario above assumes Eylea and Praluent revenues through 2020, \$14/sh net cash NPV and a 10.3% WACC. Eylea's \$244/sh NPV assumes revenue growth to \$4.0B peak sales in 2019. Praluent's \$39/sh NPV assumes growth to 2020 sales of \$1.0B. In this scenario, the BB accounts for 72% of REGN's total NPV, with the pipeline representing \$117/sh.

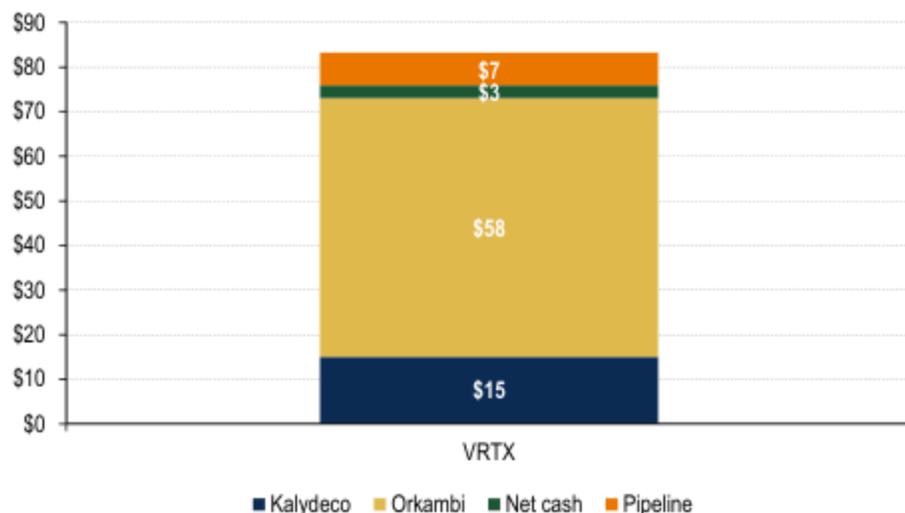
## Valuation with dupilumab and sarilumab factored in

We incorporate dupilumab and sarilumab into our second scenario because of the clinical success they have shown in the late stages of development. In this case, our analysis gives dupilumab for atopic dermatitis and asthma an NPV of \$22/sh, assuming sales quickly grow to \$1.8B in 2025. Our analysis also gives sarilumab for RA \$7/sh NPV from the collaboration with Sanofi. Accounting for the potential approvals of dupilumab and sarilumab, REGN's BB represents 79% of its total NPV, with the pipeline offering \$88/sh.

## Vertex (VRTX) | Neutral | C-2-9 | \$108

VRTX is the current market leader in the cystic fibrosis (CF) space, however, competition is currently intensifying. Its two leading CF products currently generate \$1.0B in revenue and despite only just becoming profitable, almost all of the company's NPV comes from its product portfolio. While protective against downturn, we think most of its product revenue growth is already baked into its price. Cash generation from its growing product portfolio should allow the company more flexibility to continue diversification of its internal pipeline candidates and development collaborations. For now, we look to the expansion of Orkambi and VX661 combination indications and development of early stage CRISPR, cancer and pain management assets. We should see data from these toward the second half of the year.

Chart 18: VRTX product and pipeline portfolio NPV



Source: BofA Merrill Lynch Global Research estimates

### NPV assumptions for marketed products

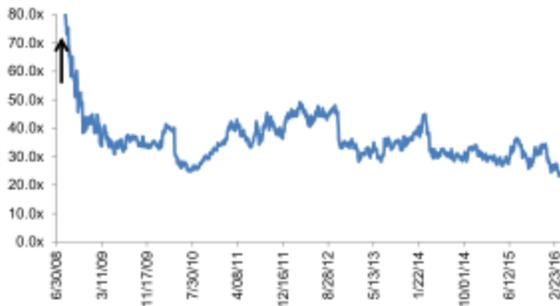
Our VRTX product NPV valuation assumes revenues through 2027, an 11% WACC, and \$3/sh net cash. Our analysis values Kalydeco at \$15/sh NPV, assuming revenue growth until 2025-2027, when EU and US patents expire. Orkambi (\$58/sh) is VRTX's largest growth opportunity and expected to generate \$2.2B of revenue in 2025, before it loses patent protection the next year. The BB of these two products represents 91% of VRTX's total NPV, with \$7 attributable to the company's pipeline.

**Chart 19: Historical Price-to-Earnings Ratios for AMGN, BIIB, CELG, and GILD**



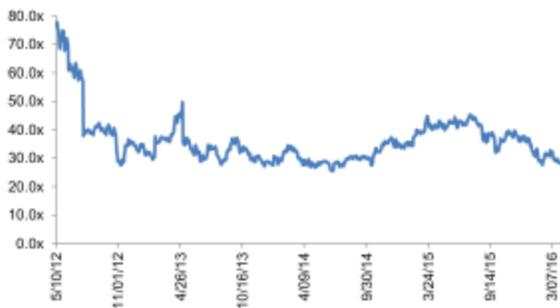
Source: FactSet

**Chart 20: Historical Price-to-Earnings Ratios for ALXN**



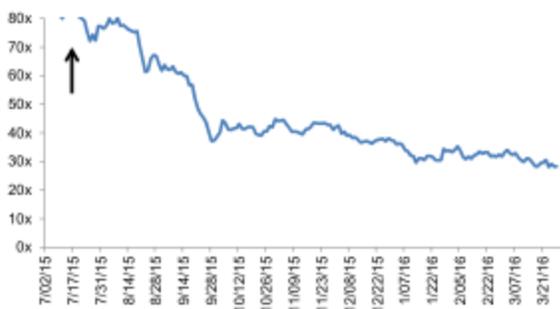
Source: FactSet

**Chart 21: Historical Price-to-Earnings Ratios for INCY**



Source: FactSet

**Chart 22: Historical Price-to-Earnings Ratios for VRTX**



Source: FactSet

## Price objective basis & risk

### Alexion Pharmaceuticals Inc. (ALXN)

Our \$204 price objective for ALXN is based on a discounted cash flow analysis using a WACC of 9.5% and a terminal growth rate of 2.25%.

Risks: (1) failure to meet expectations for Soliris sales and/or launch of Strensiq (asfotase alfa) for HPP and Kanuma for LAL-D, (2) government drug pricing focus on ultra-orphan products, (3) failure to advance key pipeline products, including Soliris in new indications.

### Amgen Inc. (AMGN)

Our price objective of \$181 is based on a 17x multiple on our 2016 EPS estimate. Our non-GAAP EPS excludes stock option expense, amortization of intangible assets, restructuring charges, and other non-cash expenses. The 17x multiple is supported by AMGN's strong cash flow generation and dividend payouts. The choice of our multiple is in line with the 17x where other large biotechs are currently trading.

Downside risks to our PO are: 1) greater-than-forecast decline in ESA, NEUPO and Enbrel revenues, 2) greater-than-expected price pressure in Europe, 3) potential drug pricing system restructuring in the US, 4) failure to bring out new pipeline products. Upside risks to our PO are: 1) a less-than-forecast decline in key product revenues from competition, 2) better-than-expected new product uptakes, 3) potential new pipeline products.

### Biogen Inc. (BIIB)

We assign BIIB a PO of \$370, based on a 20x multiple on our 2016E non GAAP EPS. This is in-line to a slight discount compared to its large-cap peers, which we believe is warranted given slower growth.

Downside risks to our PO: 1) MS market headwinds beyond what we model, 2) pipeline setbacks, 3) Tecfidera potential competition advancing.

### BioMarin (BMRN)

Our \$109 PO is based on a probability-adjusted NPV analysis that includes \$59 for marketed products Aldurazyme, Naglazyme, Kuvan, Firdapase, and Vimizim, and \$48 for pipeline candidates (\$11 for BMN-190, \$12 for Peg-Pal, \$4 for BMN-701, \$20 for BMN-111), as well as \$2 in cash. We use a WACC of 9.5% and a 2.5% terminal growth rate. We assign varying probabilities of success for the different pipeline assets based on development stage and available clinical data to date.

Downside risks to our PO are: 1) disappointing Vimizim launch, 2) delays in product approvals, 3) delays in pipeline development, 4) unexpected safety findings, and 5) greater than expected competition.

### Celgene Corp. (CELG)

Our \$125 price objective for CELG is based on a 22x multiple on our 2016 adjusted non-GAAP EPS estimate. We assume a multiple expansion and a premium to its peers given the consistent high growth and depth of pipeline.

Risks to our price objective are 1) slower-than-expected growth from product sales, particularly Revlimid, 2) slower-than-expected launches of Otezla, and 3) pipeline setbacks.

### Gilead Sciences Inc. (GILD)

Our price objective of \$104 is based on an 8.5x multiple on our estimate of 2016 non-GAAP EPS. We believe GILD should trade at a significant discount to its large-cap peers

given concerns on the long-term sustainability of its HIV and HCV franchises and lack of late-stage pipeline assets.

The upside risks to our price objective are 1) faster-than-expected growth from product sales, particularly Harvoni/Sovaldi, 2) less-than-anticipated pressures on pricing, 3) weaker-than-expected competition, and 4) greater and faster progress with pipeline. The downside risks to our price objective are 1) slower-than-expected growth from product sales, particularly Harvoni/Sovaldi 2) greater-than-anticipated pressures on pricing, and 3) slower progress with pipeline.

#### **Incyte Corporation (INCY)**

Our PO of \$90 is derived from a probability-adjusted NPV analysis including \$36/share for Jakafi in MF and PV, \$25/share for epacadostat (IDO inhibitor), \$19/share for baricitinib and \$9/share for the early pipeline. We also include approx. \$1/share for net cash. We use a 9.3% WACC and no terminal value.

Downside risks to our price objective are: 1) weaker-than-expected sales for Jakafi in MF and PV, 2) unfavorable efficacy and/or safety data for epacadostat, JAK1, PI3K in clinical trials, and 3) earlier-than-expected or more-than-expected competition for Jakafi in approved indications.

#### **Regeneron Pharmaceuticals Inc. (REGN)**

Our \$525 price objective is based on a probability-adjusted net present value (NPV) analysis of marketed products Eylea (\$356/share) and pipeline assets Praluent (\$62/share), sarilumab (\$11/share), dupilumab (\$50/share), early pipeline assets (\$31/share), as well as \$14/share in net cash. We use a WACC of 9% and a terminal growth rate of 3%.

The risks to our price objective are 1) slower-than-expected growth from product sales, particularly Eylea and Praluent, 2) failure to obtain approval for sarilumab and dupilumab, and 3) pipeline setbacks, particularly dupilumab.

#### **Vertex Pharmaceuticals Inc. (VRTX)**

Our VRTX price objective of \$108 is based on a probability-adjusted NPV analysis of cash flows from 2016-2027E using a WACC of 8.5%. We derive the following values: Kalydeco (\$21/share), VX-809 (\$66/share), VX661 (\$16/share), and inclusive of \$4/share of net cash. We believe an NPV valuation is appropriate given the patent expirations in 2025-2027.

Downside risks to our price objective are: 1) slower than expected launch of Orkambi, 2) lower pricing or incremental pricing pressures, 3) failure of VX661/Kalydeco and triple combinations, and 4) additional pipeline setbacks. Upside risks are: 1) quicker than expected uptake of Orkambi, 2) better than expected pricing/compliance of Orkambi, and 3) quicker development of the triple combo for heterozygous F508del patients.

## **Analyst Certification**

I, Ying Huang, hereby certify that the views expressed in this research report accurately reflect my personal views about the subject securities and issuers. I also certify that no part of my compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

US - Biotechnology Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
<b>BUY</b>				
	Acadia Pharmaceuticals	ACAD	ACAD US	Tazeen Ahmad
	Aimmune Therapeutics	AIMT	AIMT US	Ying Huang
	Alexion Pharmaceuticals Inc.	ALXN	ALXN US	Ying Huang
	Ascendis Pharma	ASND	ASND US	Tazeen Ahmad
	Biogen Inc.	BIIB	BIIB US	Ying Huang
	BioMarin	BMRN	BMRN US	Ying Huang
	Celgene Corp.	CELG	CELG US	Ying Huang
	Chi-med	HCM	HCM US	Ying Huang
	Cytomx Therapeutics Inc.	CTMX	CTMX US	Ying Huang
	DBV Technologies	DBVT	DBVT US	Tazeen Ahmad
	Esperion	ESPR	ESPR US	Colin Bristow
	GW Pharmaceuticals Plc	GWPH	GWPH US	Tazeen Ahmad
	Heron Therapeutics	HRTX	HRTX US	Tazeen Ahmad
	Incyte Corporation	INCY	INCY US	Ying Huang
	Ironwood Pharmaceuticals	IRWD	IRWD US	Ying Huang
	Medivation	MDVN	MDVN US	Tazeen Ahmad
	Pacira Pharmaceuticals	PCRX	PCRX US	Tazeen Ahmad
	Prothena Corporation	PRTA	PRTA US	Tazeen Ahmad
	Puma Biotechnology	PBYI	PBYI US	Ying Huang
	Radius Health, Inc.	RDUS	RDUS US	Ying Huang
	Regeneron Pharmaceuticals Inc.	REGN	REGN US	Ying Huang
	REGENXBIO Inc.	RGNX	RGNX US	Ying Huang
	Relypsa, Inc.	RLYP	RLYP US	Ying Huang
	Seres Therapeutics	MCRB	MCRB US	Tazeen Ahmad
	The Medicines Company	MDCO	MDCO US	Tazeen Ahmad
	Theravance Biopharma	TBPH	TBPH US	Tazeen Ahmad
	Tokai	TKAI	TKAI US	Sara Blum
<b>NEUTRAL</b>				
	Adaptimmune	ADAP	ADAP US	Ying Huang
	Amgen Inc.	AMGN	AMGN US	Ying Huang
	bluebird bio	BLUE	BLUE US	Ying Huang
	Gilead Sciences Inc.	GILD	GILD US	Ying Huang
	PTC Therapeutics	PTCT	PTCT US	Tazeen Ahmad
	Rockwell Medical	RMTI	RMTI US	Tazeen Ahmad
	Seattle Genetics	SGEN	SGEN US	Tazeen Ahmad
	Vertex Pharmaceuticals Inc.	VRTX	VRTX US	Ying Huang
<b>UNDERPERFORM</b>				
	Aduro Biotech, Inc.	ADRO	ADRO US	Ying Huang
	Aegerion Pharmaceuticals	AEGR	AEGR US	Tazeen Ahmad
	Biocryst Pharmaceuticals Inc	BCRX	BCRX US	Tazeen Ahmad
	Corcept Therapeutics	CORT	CORT US	Tazeen Ahmad
	Innoviva	INVA	INVA US	Tazeen Ahmad
	Intercept Pharmaceuticals	ICPT	ICPT US	Ying Huang
	Karyopharm Therapeutics	KPTI	KPTI US	Ying Huang
	Vital Therapies, Inc.	VTL	VTL US	Tazeen Ahmad

# Disclosures

## Important Disclosures

### Equity Investment Rating Distribution: Health Care Group (as of 31 Mar 2016)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	137	58.05%	Buy	106	77.37%
Hold	50	21.19%	Hold	36	72.00%
Sell	49	20.76%	Sell	31	63.27%

### Equity Investment Rating Distribution: Global Group (as of 31 Mar 2016)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	1602	49.61%	Buy	1195	74.59%
Hold	754	23.35%	Hold	563	74.67%
Sell	873	27.04%	Sell	552	63.23%

\* Issuers that were investment banking clients of BofA Merrill Lynch or one of its affiliates within the past 12 months. For purposes of this Investment Rating Distribution, the coverage universe includes only stocks. A stock rated Neutral is included as a Hold, and a stock rated Underperform is included as a Sell.

**FUNDAMENTAL EQUITY OPINION KEY:** Opinions include a Volatility Risk Rating, an Investment Rating and an Income Rating. **VOLATILITY RISK RATINGS**, indicators of potential price fluctuation, are: **A - Low, B - Medium and C - High.** **INVESTMENT RATINGS** reflect the analyst's assessment of a stock's: (i) absolute total return potential and (ii) attractiveness for investment relative to other stocks within its Coverage Cluster (defined below). There are three investment ratings: **1 - Buy** stocks are expected to have a total return of at least 10% and are the most attractive stocks in the coverage cluster; **2 - Neutral** stocks are expected to remain flat or increase in value and are less attractive than Buy rated stocks and **3 - Underperform** stocks are the least attractive stocks in a coverage cluster. Analysts assign investment ratings considering, among other things, the 0-12 month total return expectation for a stock and the firm's guidelines for ratings dispersions (shown in the table below). The current price objective for a stock should be referenced to better understand the total return expectation at any given time. The price objective reflects the analyst's view of the potential price appreciation (depreciation).

Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster*
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

\* Ratings dispersions may vary from time to time where BofA Merrill Lynch Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

**INCOME RATINGS**, indicators of potential cash dividends, are: **7 - same/higher (dividend considered to be secure), 8 - same/lower (dividend not considered to be secure) and 9 - pays no cash dividend.** Coverage Cluster is comprised of stocks covered by a single analyst or two or more analysts sharing a common industry, sector, region or other classification(s). A stock's coverage cluster is included in the most recent BofA Merrill Lynch report referencing the stock.

Price charts for the securities referenced in this research report are available at <http://pricecharts.baml.com>, or call 1-800-MERRILL to have them mailed.

MLPF&S or one of its affiliates acts as a market maker for the equity securities recommended in the report: Alexion Pharmaceutical, Amgen Inc., Biogen Inc., BioMarin, Celgene Corp., Gilead Sciences Inc., Incyte, Regeneron Pharmaceut, Vertex Pharmaceutica.

MLPF&S or an affiliate was a manager of a public offering of securities of this issuer within the last 12 months: Amgen Inc., Biogen Inc., Celgene Corp., Gilead Sciences Inc.

The issuer is or was, within the last 12 months, an investment banking client of MLPF&S and/or one or more of its affiliates: Alexion Pharmaceutical, Amgen Inc., Biogen Inc., BioMarin, Celgene Corp., Gilead Sciences Inc., Incyte, Regeneron Pharmaceut, Vertex Pharmaceutica.

MLPF&S or an affiliate has received compensation from the issuer for non-investment banking services or products within the past 12 months: Alexion Pharmaceutical, Amgen Inc., Biogen Inc., BioMarin, Celgene Corp., Gilead Sciences Inc., Incyte, Regeneron Pharmaceut, Vertex Pharmaceutica.

The issuer is or was, within the last 12 months, a non-securities business client of MLPF&S and/or one or more of its affiliates: Alexion Pharmaceutical, Amgen Inc., Biogen Inc., BioMarin, Celgene Corp., Gilead Sciences Inc., Incyte, Regeneron Pharmaceut, Vertex Pharmaceutica.

MLPF&S or an affiliate has received compensation for investment banking services from this issuer within the past 12 months: Alexion Pharmaceutical, Amgen Inc., Biogen Inc., BioMarin, Celgene Corp., Gilead Sciences Inc., Incyte, Regeneron Pharmaceut, Vertex Pharmaceutica.

MLPF&S or an affiliate expects to receive or intends to seek compensation for investment banking services from this issuer or an affiliate of the issuer within the next three months: Alexion Pharmaceutical, Amgen Inc., Biogen Inc., BioMarin, Celgene Corp., Gilead Sciences Inc., Incyte, Regeneron Pharmaceut, Vertex Pharmaceutica.

MLPF&S together with its affiliates beneficially owns one percent or more of the common stock of this issuer. If this report was issued on or after the 9th day of the month, it reflects the ownership position on the last day of the previous month. Reports issued before the 9th day of a month reflect the ownership position at the end of the second month preceding the date of the report: Alexion Pharmaceutical, Celgene Corp.

MLPF&S or one of its affiliates is willing to sell to, or buy from, clients the common equity of the issuer on a principal basis: Alexion Pharmaceutical, Amgen Inc., Biogen Inc., BioMarin, Celgene Corp., Gilead Sciences Inc., Incyte, Regeneron Pharmaceut, Vertex Pharmaceutica.

The issuer is or was, within the last 12 months, a securities business client (non-investment banking) of MLPF&S and/or one or more of its affiliates: Alexion Pharmaceutical, Amgen Inc., Biogen Inc., BioMarin, Celgene Corp., Gilead Sciences Inc., Incyte, Regeneron Pharmaceut, Vertex Pharmaceutica.

BofA Merrill Lynch Research Personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible.

## Other Important Disclosures

Officers of MLPF&S or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.

From time to time research analysts conduct site visits of covered issuers. BofA Merrill Lynch policies prohibit research analysts from accepting payment or reimbursement for travel expenses from the issuer for such visits.

BofA Merrill Lynch Global Research policies relating to conflicts of interest are described at <http://go.bofa.com/coi>.

"BofA Merrill Lynch" includes Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") and its affiliates. Investors should contact their BofA Merrill Lynch representative or Merrill Lynch Global Wealth Management financial advisor if they have questions concerning this report. "BofA Merrill Lynch" and "Merrill Lynch" are each global brands for BofA Merrill Lynch Global Research.

#### Information relating to Non-US affiliates of BofA Merrill Lynch and Distribution of Affiliate Research Reports:

MLPF&S distributes, or may in the future distribute, research reports of the following non-US affiliates in the US (short name: legal name): BAMLI Paris: Bank of America Merrill Lynch International Limited, Paris Branch; BAMLI Frankfurt: Bank of America Merrill Lynch International Limited, Frankfurt Branch; Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd.; Merrill Lynch (Milan): Merrill Lynch International Bank Limited; MLI (UK): Merrill Lynch International; Merrill Lynch (Australia): Merrill Lynch Equities (Australia) Limited; Merrill Lynch (Hong Kong): Merrill Lynch (Asia Pacific) Limited; Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd.; Merrill Lynch (Canada): Merrill Lynch Canada Inc; Merrill Lynch (Mexico): Merrill Lynch Mexico, SA de CV, Casa de Bolsa, Merrill Lynch (Argentina): Merrill Lynch Argentina SA; Merrill Lynch (Japan): Merrill Lynch Japan Securities Co., Ltd.; Merrill Lynch (Seoul): Merrill Lynch International Incorporated (Seoul Branch); Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd.; DSP Merrill Lynch (India): DSP Merrill Lynch Limited; PT Merrill Lynch (Indonesia): PT Merrill Lynch Indonesia, Merrill Lynch (Israel): Merrill Lynch Israel Limited; Merrill Lynch (Russia): OOO Merrill Lynch Securities, Moscow; Merrill Lynch (Turkey I.B.): Merrill Lynch Yatirim Bank A.S.; Merrill Lynch (Turkey Broker): Merrill Lynch Menkul Değerler A.Ş.; Merrill Lynch (DIFC): Merrill Lynch International (DIFC Branch); MLPF&S (Zurich rep. office): MLPF&S Incorporated Zurich representative office; Merrill Lynch (Spain): Merrill Lynch Capital Markets Espana, S.A.S.V.; Merrill Lynch (Brazil): Bank of America Merrill Lynch Banco Multiplo S.A.; Merrill Lynch KSA Company, Merrill Lynch Kingdom of Saudi Arabia Company.

This research report has been approved for publication and is distributed in the United Kingdom to professional clients and eligible counterparties (as each is defined in the rules of the Financial Conduct Authority and the Prudential Regulation Authority) by Merrill Lynch International and Bank of America Merrill Lynch International Limited, which are authorized by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority, and is distributed in the United Kingdom to retail clients (as defined in the rules of the Financial Conduct Authority and the Prudential Regulation Authority) by Merrill Lynch International Bank Limited, London Branch, which is authorised by the Central Bank of Ireland and subject to limited regulation by the Financial Conduct Authority and Prudential Regulation Authority - details about the extent of our regulation by the Financial Conduct Authority and Prudential Regulation Authority are available from us on request; has been considered and distributed in Japan by Merrill Lynch Japan Securities Co., Ltd., a registered securities dealer under the Financial Instruments and Exchange Act in Japan; is distributed in Hong Kong by Merrill Lynch (Asia Pacific) Limited, which is regulated by the Hong Kong SFC and the Hong Kong Monetary Authority is issued and distributed in Taiwan by Merrill Lynch Securities (Taiwan) Ltd.; is issued and distributed in India by DSP Merrill Lynch Limited, and is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch International Bank Limited (Merchant Bank) and Merrill Lynch (Singapore) Pte Ltd. (Company Registration No.'s F 06872E and 198602883D respectively). Merrill Lynch International Bank Limited (Merchant Bank) and Merrill Lynch (Singapore) Pte Ltd. are regulated by the Monetary Authority of Singapore. Bank of America N.A., Australian Branch (ARBN 064 874 531), AFS License 412901 (BANA Australia) and Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distributes this report in Australia only to 'Wholesale' clients as defined by s.761G of the Corporations Act 2001. With the exception of BANA Australia, neither MLEA nor any of its affiliates involved in preparing this research report is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this report in Brazil and its local distribution is made by Bank of America Merrill Lynch Banco Multiplo S.A. in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the Dubai Financial Services Authority (DFSA). Research reports prepared and issued by Merrill Lynch (DIFC) are prepared and issued in accordance with the requirements of the DFSA conduct of business rules.

BAMLI Frankfurt distributes this report in Germany. BAMLI Frankfurt is regulated by BaFin.

This research report has been prepared and issued by MLPF&S and/or one or more of its non-US affiliates. MLPF&S is the distributor of this research report in the US and accepts full responsibility for research reports of its non-US affiliates distributed to MLPF&S clients in the US. Any US person receiving this research report and wishing to effect any transaction in any security discussed in the report should do so through MLPF&S and not such foreign affiliates. Hong Kong recipients of this research report should contact Merrill Lynch (Asia Pacific) Limited in respect of any matters relating to dealing in securities or provision of specific advice on securities. Singapore recipients of this research report should contact Merrill Lynch International Bank Limited (Merchant Bank) and/or Merrill Lynch (Singapore) Pte Ltd in respect of any matters arising from, or in connection with, this research report.

#### General Investment Related Disclosures:

Taiwan Readers: Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Merrill Lynch.

This research report provides general information only. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This report is not intended to provide personal investment advice and it does not take into account the specific investment objectives, financial situation and the particular needs of any specific person. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this report and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this report.

Securities and other financial instruments discussed in this report, or recommended, offered or sold by Merrill Lynch, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

This report may contain a short-term trading idea or recommendation, which highlights a specific near-term catalyst or event impacting the issuer or the market that is anticipated to have a short-term price impact on the equity securities of the issuer. Short-term trading ideas and recommendations are different from and do not affect a stock's fundamental equity rating, which reflects both a longer term total return expectation and attractiveness for investment relative to other stocks within its Coverage Cluster. Short-term trading ideas and recommendations may be more or less positive than a stock's fundamental equity rating.

BofA Merrill Lynch is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned in this report. Investors in such securities and instruments, including ADRs, effectively assume currency risk.

UK Readers: The protections provided by the U.K. regulatory regime, including the Financial Services Scheme, do not apply in general to business coordinated by BofA Merrill Lynch entities located outside of the United Kingdom. BofA Merrill Lynch Global Research policies relating to conflicts of interest are described at <http://go.bofa.com/coi>.

Officers of MLPF&S or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.

MLPF&S or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. MLPF&S or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Merrill Lynch, through business units other than BofA Merrill Lynch Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented in this report. Such ideas or recommendations reflect the different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Merrill Lynch is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this report.

In the event that the recipient received this report pursuant to a contract between the recipient and MLPF&S for the provision of research services for a separate fee, and in connection therewith MLPF&S may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom MLPF&S has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by MLPF&S). MLPF&S is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including transactions in any securities mentioned in this report.

#### Copyright and General Information regarding Research Reports:

Copyright 2016 Merrill Lynch, Pierce, Fenner & Smith Incorporated. All rights reserved. iQmethod, iQmethod 2.0, iQprofile, iQtoolkit, iQworks are service marks of Bank of America Corporation. iQanalytics®, iQcustom®, iQdatabase® are registered service marks of Bank of America Corporation. This research report is prepared for the use of BofA Merrill Lynch clients and may not be redistributed, retransmitted or disclosed, in whole or in part, or in any form or manner, without the express written consent of BofA Merrill Lynch. BofA Merrill Lynch Global Research reports are distributed simultaneously to internal and client websites and other portals by BofA Merrill Lynch and are not publicly-available materials. Any unauthorized use or disclosure is prohibited. Receipt and review of this research report constitutes your agreement not to redistribute, retransmit, or disclose to others the contents, opinions, conclusion, or information contained in this report (including any investment recommendations, estimates or price targets) without first obtaining expressed permission from an authorized officer of BofA Merrill Lynch.

Materials prepared by BofA Merrill Lynch Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Merrill Lynch, including investment banking personnel. BofA Merrill Lynch has established information barriers between BofA Merrill Lynch Global Research and certain business groups. As a result, BofA Merrill Lynch does not disclose certain client relationships with, or compensation received from, such issuers in research reports. To the extent this report discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this report. BofA Merrill Lynch Global Research personnel's knowledge of legal proceedings in which any BofA Merrill Lynch entity and/or its directors, officers and employees may be plaintiffs, defendants, co-defendants or co-plaintiffs with or involving issuers mentioned in this report is based on public information. Facts and views presented in this material that relate to any such proceedings have not been reviewed by, discussed with, and may not reflect information known to, professionals in other business areas of BofA Merrill Lynch in connection with the legal proceedings or matters relevant to such proceedings.

This report has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of MLPF&S, any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Merrill Lynch Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing such rating, recommendation or investment thesis.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Merrill Lynch and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This report may contain links to third-party websites. BofA Merrill Lynch is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content contained on such third-party websites is not part of this report and is not incorporated by reference into this report. The inclusion of a link in this report does not imply any endorsement by or any affiliation with BofA Merrill Lynch. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Merrill Lynch is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

Subject to the quiet period applicable under laws of the various jurisdictions in which we distribute research reports and other legal and BofA Merrill Lynch policy-related restrictions on the publication of research reports, fundamental equity reports are produced on a regular basis as necessary to keep the investment recommendation current.

Certain outstanding reports may contain discussions and/or investment opinions relating to securities, financial instruments and/or issuers that are no longer current. Always refer to the most recent research report relating to an issuer prior to making an investment decision.

In some cases, an issuer may be classified as Restricted or may be Under Review or Extended Review. In each case, investors should consider any investment opinion relating to such issuer (or its security and/or financial instruments) to be suspended or withdrawn and should not rely on the analyses and investment opinion(s) pertaining to such issuer (or its securities and/or financial instruments) nor should the analyses or opinion(s) be considered a solicitation of any kind. Sales persons and financial advisors affiliated with MLPF&S or any of its affiliates may not solicit purchases of securities or financial instruments that are Restricted or Under Review and may only solicit securities under Extended Review in accordance with firm policies.

Neither BofA Merrill Lynch nor any officer or employee of BofA Merrill Lynch accepts any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this report or its contents.