



January 28, 2020

Correction - GILD/GLPG: Analysis Shows Disconnect Between Valuations For Shared Pipeline Creates Opportunity

[This note replaces one issued earlier with corrections in the key take and bullets 3, and 4]

Since the expansion of the two companies' partnership last July, GLPG shares are up 57% to reach a ~\$9.5B EV, while GILD shares are slightly down (4%) - despite most of GLPG's pipeline being shared with GILD and GILD having the rights to up to a ~30% share of GLPG. Our analysis suggests the disconnect in market value being placed on the same suite of shared assets across the two companies creates a relative value opportunity favoring GILD. This supports our view that GILD is undervalued with a fundamentally strong core business, little downside clinical/competitive risk, and an underappreciated pipeline and external BD capabilities that could catalyze future growth.

GILD and GLPG are closely linked - even if their valuations have not tracked closely together. Recall that in 2Q19, GILD signed an [expanded agreement](#) with GLPG, making an equity investment of \$1.1B in GLPG with warrant rights to acquire up to 29.9% of the company and they have already increased their ownership stake to over 25%. We believe lead partnered asset filgotinib may generate probability adjusted sales of \$3.5B across three indications (RA, UC, CD), while other programs such as '1690 for IPF (for which GILD has rights), '1972 for OA (ph.IIb results expected 1H20), and Toledo having considerable potential but being higher risk.

GILD shares look to be trading at/below their floor ex-pipeline. Our DCF of GILD without any pipeline contribution at all - even with conservative ests. for PrEP switching, capsid success, and CAR-T growth - would yield a fair value in the low-\$60s; in the most bearish scenario (entire business goes away after 2033 once Biktarvy and HCV agents go off patent), fair value would be around \$55. With GILD shares trading at \$63.83, this suggests they receive very little credit for any of their pipeline, particularly the GLPG-partnered programs (We expect this to change as filgotinib progresses through near-term catalysts and the mid-stage portfolio is potentially expanded through BD).

In contrast, GLPG receives substantial credit for their pipeline- the vast majority of which is shared with GILD. Accounting for the structure of the deal on filgotinib (primary value driver, in our view), in which GLPG receives 20-30% royalties on U.S. sales, splits overall future development costs and EU profits, and may receive up to \$1.36B in development, regulatory, and sales milestones, we est. GLPG effectively has a ~43% stake (helped incrementally by its more favorable tax structure) in a program we est. could generate \$3.5B in out-year probability-weighted sales and roughly \$15.5B in undiscounted overall pre-tax profits through 2030. Though GLPG's most advanced pipeline assets other than filgotinib ('1690, '1972, and the Toledo family) are being developed for large indications with multi-\$B out-year potential, we see meaningful risk with these programs - at this stage - given the [relatively small amount of ph.II data underpinning their large ph.III ISABELA program in IPF](#), and the absence of any target patient data with '1972 and Toledo. We are not necessarily endorsing GLPG's current valuation such that GILD should necessarily trade comparably -- as we believe it may be difficult to justify greater than a \$9B EV on split rights to filgotinib and the higher-risk earlier-stage pipeline even with the relatively generous economics from GILD -- but even if fair value for the partnered programs lies somewhere in between, this still suggests GILD should be getting more credit than they currently receive. *Continued next page...*



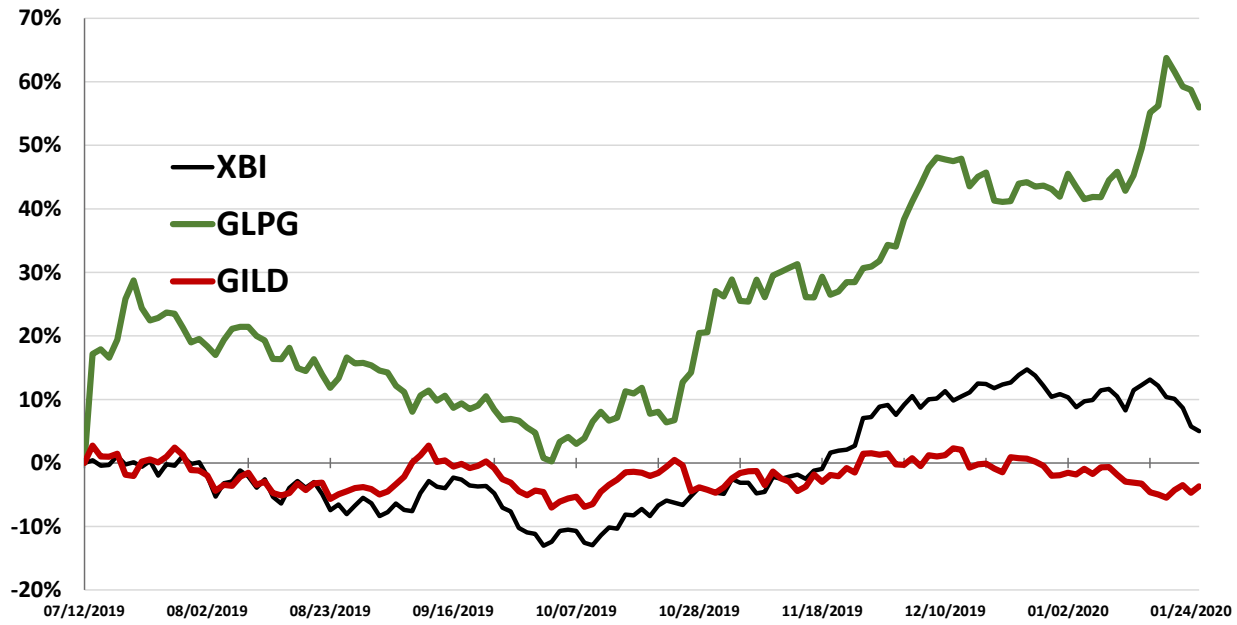
...continued from cover

Additionally, GILD owns a substantial portion of GLPG shares (est. ownership value at ~\$5B) though has not benefited from their appreciation. GILD originally acquired a 14.6% stake in GLPG in 1Q16 following their initial partnership in 4Q15 and has since brought its beneficial stake up to 29.9% of the company through open market activities and warrants. This suggests the stake in GLPG should be worth an add'l \$4.7B in GILD's market cap, something we believe is not at all reflected in GILD's valuation; the appreciation of their stake since the expanded agreement was signed should itself have added ~\$1.63, or 2.5%, though GILD shares are down 4% since then despite broader sector upside and no fundamentally negative developments.

See exhibits in backpages for further detail.



Exhibit 1: Stock performance since announcement of extended GILD/GLPG collaboration



Source: RBC Capital Markets estimates; Factset



Exhibit 2: GLPG appreciation value to GILD

07/12/2019								
	Price	Mkt Cap (\$B)	Stake (\$B)	GILD Stake in GLPG	Shares Owned*	Price per Share	EUR/USD	
GLPG	\$144.20	7.9			<i>*owned pre-expansion</i>			
GILD	\$66.26	83.0	1.0	12.3%	6,760,701	\$64.30	1.090	
GILD - GLPG	\$64.42	82.1						
08/23/2019								
	Price	Mkt Cap (\$B)	Stake (\$B)	GILD Stake in GLPG	Shares Owned	Price per Share		
GLPG	\$165.41	10.2						
					+6,828,985			
GILD	\$62.51	79.2	2.2	22.0%	13,589,686	\$156.17	1.111	
GILD - GLPG	\$60.40	77.0						
10/25/2019								
	Price	Mkt Cap (\$B)	Stake (\$B)	GILD Stake in GLPG	Shares Owned	Price per Share		
GLPG	\$164.59	11.4						
					+7,039,243			
GILD	\$63.32	80.2	3.4	29.90%	20,628,929	\$155.93	1.109	
GILD - GLPG	\$60.26	76.8						
01/27/2020								
	Price	Mkt Cap (\$B)	Stake (\$B)	GILD Stake in GLPG	Shares Owned	Price per Share		Δ
GLPG	\$226.86	15.7						57%
GILD	\$63.83	80.0	4.7	29.90%	20,628,929	\$154.82	1.101	-4%
GILD - GLPG	\$59.12	75.3						-8%

Note: GILD retains the right to exercise warrants up to 29.9% ownership in GLPG

2015 Agreement Price:	EUR 59.00
2019 Agreement Price:	EUR 140.59

GLPG shares outstanding	68,993,074
GILD shares outstanding	1,274,000,000
GILD Mkt Value for GLPG	\$4,679,826,848
GILD Cost Basis for GLPG	\$2,598,851,174
Appreciation	\$2,080,975,674
Appreciation Value	\$1.63

Source: RBC Capital Markets; Company reports; Factset

Exhibit 3: Analysis of GILD/GLPG filgotinib stake

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2028	2028
Filgotinib Sales											
Rheumatoid Arthritis											
Total U.S. filgotinib sales in RA	\$36,804,947	\$144,455,829	\$234,697,463	\$332,646,537	\$438,805,513	\$540,880,415	\$632,894,544	\$751,019,906	\$858,469,751	\$944,316,726	\$1,010,418,897
Total EU filgotinib sales in RA	\$12,106,391	\$25,160,100	\$60,912,055	\$117,626,719	\$178,681,467	\$244,326,901	\$306,638,460	\$361,861,379	\$432,957,076	\$476,252,784	\$509,590,479
Ulcerative Colitis											
Total U.S. filgotinib sales in UC	-	-	\$80,883,709	\$177,858,362	\$283,260,016	\$397,641,222	\$521,586,594	\$655,714,543	\$800,679,093	\$880,747,002	\$942,399,292
Total EU filgotinib sales in UC	-	-	-	\$48,383,343	\$105,862,832	\$167,760,173	\$234,330,774	\$305,843,074	\$382,579,164	\$420,837,080	\$450,295,676
Crohn's Disease											
Total U.S. filgotinib sales in CD	-	-	-	\$109,248,676	\$226,340,433	\$353,581,810	\$491,637,587	\$641,211,090	\$803,046,271	\$883,350,899	\$945,185,461
Total EU filgotinib sales in CD	-	-	-	-	\$65,025,755	\$134,049,665	\$208,366,474	\$288,281,855	\$374,117,068	\$411,528,775	\$440,335,789
Total US Filgotinib Sales	\$36,804,947	\$144,455,829	\$315,581,171	\$619,753,575	\$948,405,961	\$1,292,103,446	\$1,646,118,725	\$2,047,945,539	\$2,462,195,115	\$2,708,414,626	\$2,898,003,650
Total EU Filgotinib Sales	\$12,106,391	\$25,160,100	\$60,912,055	\$166,010,063	\$349,570,055	\$546,136,739	\$749,335,708	\$955,986,308	\$1,189,653,308	\$1,308,618,633	\$1,400,221,944
Expenses in EU											
GILD Expenses											
COGS	\$302,660	\$629,002	\$1,522,801	\$4,150,252	\$8,739,251	\$13,653,418	\$18,733,393	\$23,899,658	\$29,741,333	\$32,715,466	\$35,005,549
SG&A	\$15,753,309	\$24,531,097	\$39,592,836	\$43,162,616	\$45,444,107	\$49,698,443	\$52,603,367	\$55,925,199	\$61,861,972	\$68,048,169	\$72,811,541
GLPG Expenses											
COGS	\$302,660	\$629,002	\$1,522,801	\$4,150,252	\$8,739,251	\$13,653,418	\$18,733,393	\$23,899,658	\$29,741,333	\$32,715,466	\$35,005,549
SG&A	\$15,753,309	\$24,531,097	\$39,592,836	\$43,162,616	\$45,444,107	\$49,698,443	\$52,603,367	\$55,925,199	\$61,861,972	\$68,048,169	\$72,811,541
Total EU Expenses	\$32,111,937	\$50,320,199	\$82,231,275	\$94,625,736	\$108,366,717	\$126,703,724	\$142,673,519	\$159,649,713	\$183,206,609	\$201,527,270	\$215,634,179
Total EU Profit	(\$20,005,546)	(\$25,160,100)	(\$21,319,219)	\$71,384,327	\$241,203,338	\$419,433,016	\$606,662,189	\$796,336,595	\$1,006,446,699	\$1,107,091,369	\$1,184,587,765
Profit Sharing	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
EU Profit to GILD	(\$10,002,773)	(\$12,580,050)	(\$10,659,610)	\$35,692,163	\$120,601,669	\$209,716,508	\$303,331,095	\$398,168,297	\$503,223,349	\$553,545,684	\$592,293,882
EU Profit to GLPG	(\$10,002,773)	(\$12,580,050)	(\$10,659,610)	\$35,692,163	\$120,601,669	\$209,716,508	\$303,331,095	\$398,168,297	\$503,223,349	\$553,545,684	\$592,293,882
Expenses in U.S.											
GILD Expenses											
COGS	\$1,840,247	\$7,222,791	\$15,779,059	\$30,987,679	\$47,420,298	\$64,605,172	\$82,305,936	\$102,397,277	\$123,109,756	\$135,420,731	\$144,900,183
SG&A	\$47,846,431	\$75,117,031	\$123,076,657	\$161,135,929	\$184,939,162	\$201,568,138	\$213,995,434	\$239,609,628	\$256,068,292	\$281,675,121	\$301,392,380
GLPG Expenses											
COGS	\$1,840,247	\$7,222,791	\$15,779,059	\$30,987,679	\$47,420,298	\$64,605,172	\$82,305,936	\$102,397,277	\$123,109,756	\$135,420,731	\$144,900,183
SG&A	\$47,846,431	\$75,117,031	\$123,076,657	\$161,135,929	\$184,939,162	\$201,568,138	\$213,995,434	\$239,609,628	\$256,068,292	\$281,675,121	\$301,392,380
Total U.S. Expenses	\$49,686,678	\$82,339,823	\$138,855,715	\$192,123,608	\$232,359,461	\$266,173,310	\$296,301,370	\$342,006,905	\$379,178,048	\$417,095,852	\$446,292,562
Total U.S. Profit	(\$12,881,731)	\$62,116,006	\$176,725,456	\$427,629,967	\$716,046,501	\$1,025,930,136	\$1,349,817,354	\$1,705,938,634	\$2,083,017,067	\$2,291,318,774	\$2,451,711,088
Royalty Rate	20%	20%	21%	22%	23%	24%	25%	26%	27%	28%	28%
U.S. Profit to GILD	(\$20,242,721)	\$33,224,841	\$110,453,410	\$291,284,180	\$497,913,130	\$715,825,309	\$938,287,673	\$1,173,472,794	\$1,418,224,386	\$1,546,504,752	\$1,640,270,066
U.S. royalty to GLPG	\$7,360,989	\$28,891,166	\$66,272,046	\$136,345,786	\$218,133,371	\$310,104,827	\$411,529,681	\$532,465,840	\$664,792,681	\$744,814,022	\$811,441,022
Global R&D											
GILD Share	\$287,375,000	\$215,531,250	\$161,648,438	\$105,071,484	\$94,564,336	\$35,000,000	\$35,000,000	\$35,000,000	\$35,000,000	\$35,000,000	\$35,000,000
GLPG Share	\$287,375,000	\$215,531,250	\$161,648,438	\$105,071,484	\$94,564,336	\$35,000,000	\$35,000,000	\$35,000,000	\$35,000,000	\$35,000,000	\$35,000,000
Net Before Taxes and Milestones											
Global Profits to GILD	(\$317,620,494)	(\$194,886,459)	(\$61,854,637)	\$221,904,859	\$523,950,463	\$890,541,817	\$1,206,618,768	\$1,536,641,091	\$1,886,447,736	\$2,065,050,436	\$2,197,563,948
Global Profits to GLPG	(\$290,016,783)	(\$199,220,134)	(\$106,036,001)	\$66,966,466	\$244,170,704	\$484,821,335	\$679,860,776	\$895,634,138	\$1,133,016,030	\$1,263,359,707	\$1,368,734,904
Milestones and Taxes											
Milestones to GLPG	\$42,500,000	\$138,000,000	\$104,500,000	\$28,500,000	\$28,000,000	\$28,000,000	\$35,000,000	\$35,000,000	\$0	\$0	\$0
Taxes											
GILD	\$0	\$0	\$0	\$44,380,972	\$104,790,093	\$178,108,363	\$241,323,754	\$307,328,218	\$377,289,547	\$413,010,087	\$439,512,790
GLPG	\$0	\$0	\$0	\$3,348,323	\$12,208,535	\$24,241,067	\$33,993,039	\$44,781,707	\$56,650,802	\$63,167,985	\$68,436,745
Net Global Profits to GILD from Filgotinib	(\$360,120,494)	(\$332,886,459)	(\$166,354,637)	\$149,023,887	\$391,160,370	\$684,433,454	\$930,295,014	\$1,194,312,873	\$1,509,158,189	\$1,652,040,349	\$1,758,051,159
Net Global Profits to GLPG from Filgotinib	(\$247,516,783)	(\$61,220,134)	(\$1,536,001)	\$92,118,142	\$259,962,169	\$488,580,268	\$680,867,737	\$885,852,431	\$1,076,365,229	\$1,200,191,721	\$1,300,298,159
Profits from Filgotinib											
% GILD	57%										
% GLPG	43%										

Source: RBC Capital Markets estimates; Company reports

Exhibit 6: GLPG Income Statement

Galapagos (GLPG) (€ in thousands except per share items)	2016A	2017A	2018A	2019				2020													
				1Q19A	2Q19A	3Q19A	4Q19E	2019E	1Q20E	2Q20E	3Q20E	4Q20E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E
Filgotinib royalties/profit split (1)									€ 0	€ 0	€ 2,295	€ 8,001	€ 10,295	€ 35,702	€ 88,012	€ 208,432	€ 374,140	€ 563,184	€ 774,174	€ 1,017,606	€ 1,292,352
GLPG1690 sales/royalties															5,280	64,323	237,261	378,917	505,290	613,089	702,674
GLPG1972 sales/royalties															-	-	-	26,771	100,987	201,809	316,717
Other income	151,600	155,900	317,845	40,919	67,590	643,954	118,435	870,898	124,058	124,058	124,058	124,058	496,233	630,419	876,426	652,783	643,837	353,101	326,264	330,736	286,008
Total revenues, net	151,600	155,900	317,845	40,919	67,590	643,954	118,435	870,898	124,058	124,058	126,353	132,059	506,528	666,121	969,718	925,538	1,255,239	1,321,972	1,706,715	2,163,241	2,597,751
Costs of sales	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(264)	(3,216)	(11,863)	(20,284)	(30,314)	(40,745)	(50,970)
R&D expenditure	(139,600)	(218,500)	(322,876)	(83,195)	(94,372)	(120,680)	(124,500)	(422,747)	(136,500)	(141,250)	(145,750)	(151,250)	(574,750)	(609,235)	(627,512)	(646,337)	(665,728)	(679,042)	(692,623)	(699,549)	(706,545)
G&A and S&M expenses	(23,500)	(27,200)	(39,777)	(10,966)	(17,585)	(32,643)	(26,000)	(87,194)	(19,750)	(20,250)	(20,500)	(21,000)	(81,500)	(97,800)	(122,250)	(146,700)	(176,040)	(202,446)	(216,617)	(225,282)	(234,293)
Total operating expenses	(163,100)	(245,700)	(362,653)	(94,161)	(111,958)	(153,323)	(150,500)	(509,942)	(156,250)	(161,500)	(166,250)	(172,250)	(656,250)	(707,035)	(750,026)	(796,254)	(853,631)	(901,772)	(939,554)	(965,576)	(991,807)
Income from operations	(11,500)	(89,800)	(44,808)	(53,242)	(44,367)	490,631	(32,065)	360,957	(32,192)	(37,442)	(39,897)	(40,191)	(149,722)	(40,914)	219,692	129,285	401,608	420,200	767,161	1,197,665	1,605,944
Non-cash adjustment on short-term financial asset	57,500	-	-	-	-	(146,226)	-	(146,226)	-	-	-	-	-	-	-	-	-	-	-	-	-
Other financial result	8,200	(25,700)	15,599	4,655	(2,820)	-	-	1,834	475	450	475	450	1,850	1,869	1,887	1,906	1,925	1,944	1,964	1,983	2,003
Net pre-tax income	54,200	(115,500)	(29,210)	(48,588)	(47,188)	344,405	(32,065)	216,565	(31,717)	(36,992)	(39,422)	(39,741)	(147,872)	(39,046)	221,580	131,191	403,533	422,144	769,125	1,199,648	1,607,947
Income taxes	(200)	(200)	(50)	(68)	(61)	16,828	-	16,699	-	-	-	-	-	-	(6,560)	(20,177)	(21,107)	(38,456)	(59,982)	(80,397)	
Net result for the period	54,000	(115,700)	(29,259)	(48,656)	(47,249)	361,233	(32,065)	233,264	(31,717)	(36,992)	(39,422)	(39,741)	(147,872)	(39,046)	221,580	124,631	383,356	401,037	730,669	1,139,666	1,527,550
Earnings per share	€ 1.14	(€ 2.34)	(€ 0.56)	(€ 0.89)	(€ 0.86)	€ 6.03	(€ 0.52)	€ 3.67	(€ 0.51)	(€ 0.59)	(€ 0.63)	(€ 0.63)	(€ 2.35)	(€ 0.61)	€ 3.13	€ 1.73	€ 5.26	€ 5.43	€ 9.76	€ 15.02	€ 19.87
Shares Outstanding (Basic)	45,696	49,129	52,834	54,615	54,823	61,954	62,204	58,399	62,454	62,704	62,954	63,204	62,829	64,204	65,204	67,204	67,204	68,204	69,204	70,204	71,204
Shares Outstanding (Diluted, est.)	47,308	50,729	56,969	59,242	59,450	67,608	67,858	63,539	67,081	67,331	68,608	68,858	68,483	69,858	70,858	71,858	72,858	73,858	74,858	75,858	76,858

Source: RBC Capital Markets estimates; Company reports



Companies mentioned

Galapagos NV (NASDAQ: GLPG US; \$227.27; Sector Perform)

Gilead Sciences, Inc. (NASDAQ: GILD US; \$63.83; Top Pick)

Required disclosures

Conflicts disclosures

The analyst(s) responsible for preparing this research report received compensation that is based upon various factors, including total revenues of the member companies of RBC Capital Markets and its affiliates, a portion of which are or have been generated by investment banking activities of the member companies of RBC Capital Markets and its affiliates.

Please note that current conflicts disclosures may differ from those as of the publication date on, and as set forth in, this report. To access current conflicts disclosures, clients should refer to <https://www.rbccm.com/GLDisclosure/PublicWeb/DisclosureLookup.aspx?entityId=1> or send a request to RBC CM Research Publishing, P.O. Box 50, 200 Bay Street, Royal Bank Plaza, 29th Floor, South Tower, Toronto, Ontario M5J 2W7.

RBC Capital Markets, LLC makes a market in the securities of Gilead Sciences, Inc..

A member company of RBC Capital Markets or one of its affiliates received compensation for products or services other than investment banking services from Gilead Sciences, Inc. during the past 12 months. During this time, a member company of RBC Capital Markets or one of its affiliates provided non-securities services to Gilead Sciences, Inc..

RBC Capital Markets is currently providing Gilead Sciences, Inc. with non-securities services.

RBC Capital Markets, LLC makes a market in the securities of Galapagos NV.

Explanation of RBC Capital Markets Equity rating system

An analyst's 'sector' is the universe of companies for which the analyst provides research coverage. Accordingly, the rating assigned to a particular stock represents solely the analyst's view of how that stock will perform over the next 12 months relative to the analyst's sector average.

Ratings

Top Pick (TP): Represents analyst's best idea in the sector; expected to provide significant absolute total return over 12 months with a favorable risk-reward ratio.

Outperform (O): Expected to materially outperform sector average over 12 months.

Sector Perform (SP): Returns expected to be in line with sector average over 12 months.

Underperform (U): Returns expected to be materially below sector average over 12 months.

Restricted (R): RBC policy precludes certain types of communications, including an investment recommendation, when RBC is acting as an advisor in certain merger or other strategic transactions and in certain other circumstances.

Not Rated (NR): The rating, price targets and estimates have been removed due to applicable legal, regulatory or policy constraints which may include when RBC Capital Markets is acting in an advisory capacity involving the company.

Risk Rating

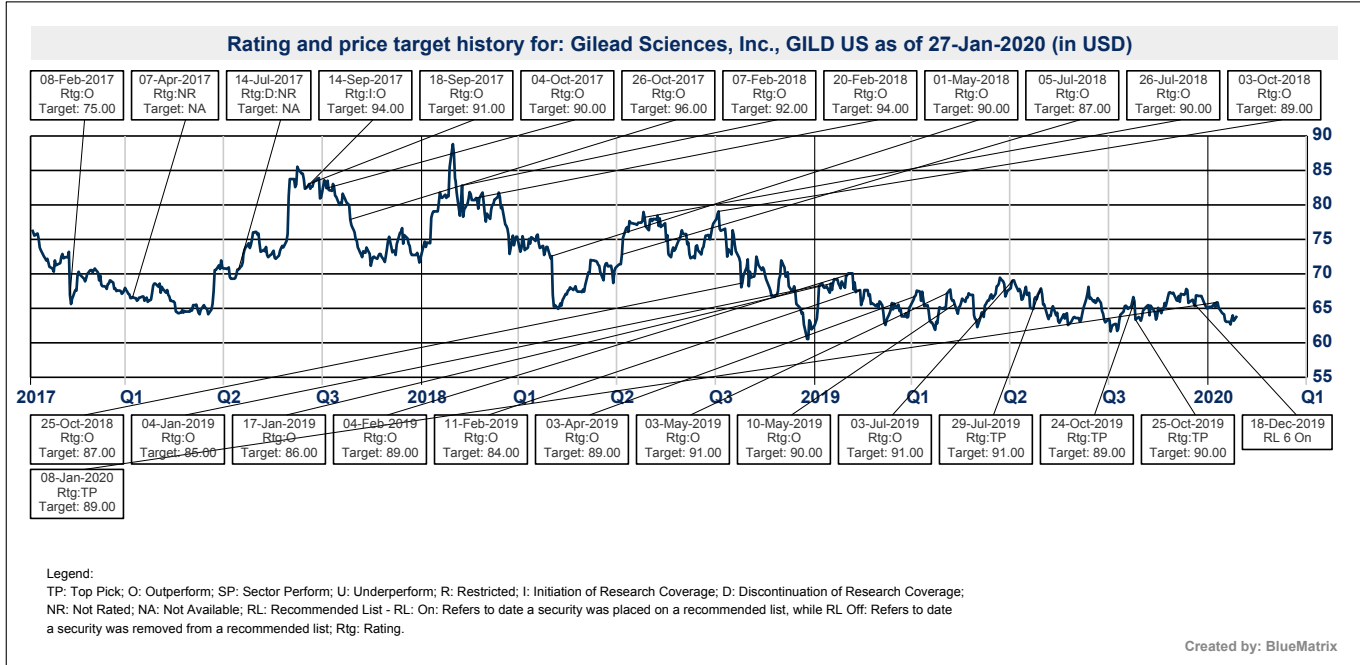
The **Speculative** risk rating reflects a security's lower level of financial or operating predictability, illiquid share trading volumes, high balance sheet leverage, or limited operating history that result in a higher expectation of financial and/or stock price volatility.

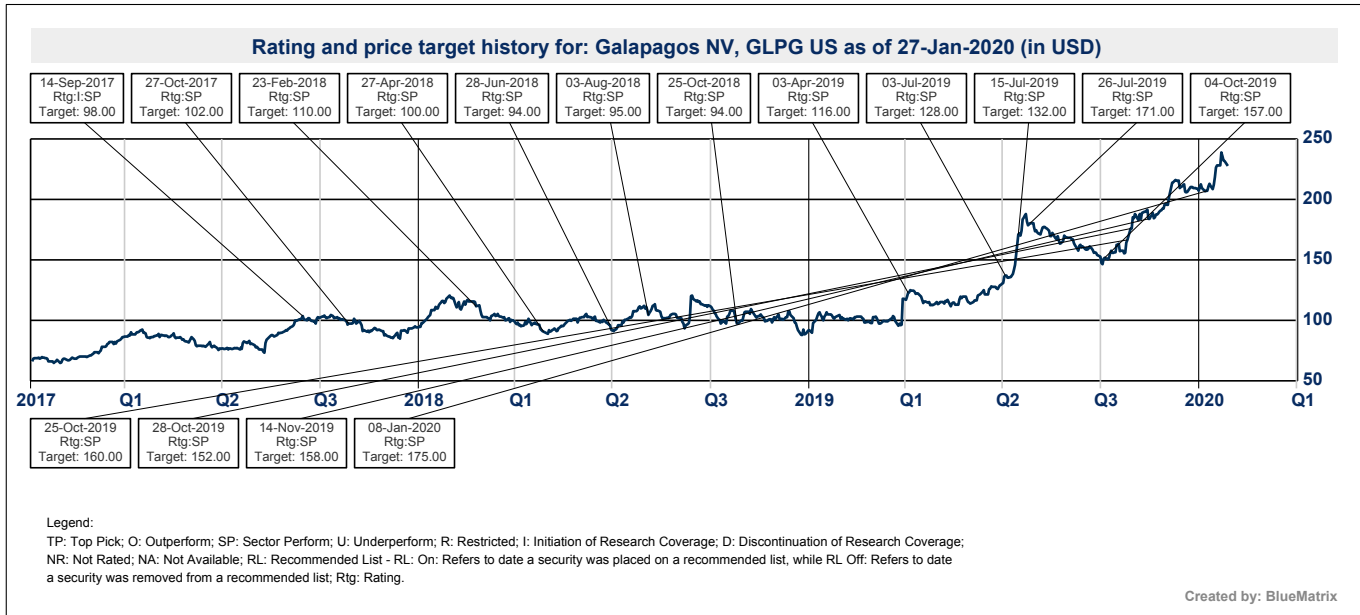


Distribution of ratings

For the purpose of ratings distributions, regulatory rules require member firms to assign ratings to one of three rating categories - Buy, Hold/Neutral, or Sell - regardless of a firm's own rating categories. Although RBC Capital Markets' ratings of Top Pick/Outperform, Sector Perform, and Underperform most closely correspond to Buy, Hold/Neutral and Sell, respectively, the meanings are not the same because our ratings are determined on a relative basis.

Distribution of ratings				
RBC Capital Markets, Equity Research				
As of 31-Dec-2019				
Rating	Count	Percent	Investment Banking	
			Serv./Past 12 Mos.	
			Count	Percent
BUY [Top Pick & Outperform]	765	51.97	225	29.41
HOLD [Sector Perform]	625	42.46	127	20.32
SELL [Underperform]	82	5.57	5	6.10





References to a Recommended List in the recommendation history chart may include one or more recommended lists or model portfolios maintained by RBC Wealth Management or one of its affiliates. RBC Wealth Management recommended lists include the Guided Portfolio: Prime Income (RL 6), the Guided Portfolio: Dividend Growth (RL 8), the Guided Portfolio: ADR (RL 10), and the Guided Portfolio: All Cap Growth (RL 12). RBC Capital Markets recommended lists include the Strategy Focus List and the Fundamental Equity Weightings (FEW) portfolios. The abbreviation 'RL On' means the date a security was placed on a Recommended List. The abbreviation 'RL Off' means the date a security was removed from a Recommended List.

Equity valuation and risks

For valuation methods used to determine, and risks that may impede achievement of, price targets for covered companies, please see the most recent company-specific research report at <https://www.rbcinsightresearch.com> or send a request to RBC Capital Markets Research Publishing, P.O. Box 50, 200 Bay Street, Royal Bank Plaza, 29th Floor, South Tower, Toronto, Ontario M5J 2W7.

Galapagos NV

Valuation

Our \$175 price target is derived from a DCF analysis of the base business with a 10% discount rate and 3.5% terminal growth rate. This valuation supports our Sector Perform rating.

Risks to rating and price target

Risks include emergence of a safety issue, high regulatory bar for RA drugs like filgotinib, and limitations to interpreting early-stage data for '1690.

Gilead Sciences, Inc.

Valuation

Our \$89 price target is derived via DCF analysis, with a 9% discount rate and a 2.5% terminal growth rate off 2028E (post-TAF generic). Our price target supports our Top Pick rating.

Risks to rating and price target

Risks include generic HIV entrants, competition in HCV, pricing pressure, commercial and scientific complexities of cellular CAR-T therapies, and efficacy and safety risk for pipeline products such as filgotinib.



Conflicts policy

RBC Capital Markets Policy for Managing Conflicts of Interest in Relation to Investment Research is available from us on request. To access our current policy, clients should refer to

<https://www.rbccm.com/global/file-414164.pdf>

or send a request to RBC Capital Markets Research Publishing, P.O. Box 50, 200 Bay Street, Royal Bank Plaza, 29th Floor, South Tower, Toronto, Ontario M5J 2W7. We reserve the right to amend or supplement this policy at any time.

Dissemination of research and short-term trade ideas

RBC Capital Markets endeavors to make all reasonable efforts to provide research simultaneously to all eligible clients, having regard to local time zones in overseas jurisdictions. RBC Capital Markets' equity research is posted to our proprietary website to ensure eligible clients receive coverage initiations and changes in ratings, targets and opinions in a timely manner. Additional distribution may be done by the sales personnel via email, fax, or other electronic means, or regular mail. Clients may also receive our research via third party vendors. RBC Capital Markets also provides eligible clients with access to SPARC on the Firms proprietary INSIGHT website, via email and via third-party vendors. SPARC contains market color and commentary regarding subject companies on which the Firm currently provides equity research coverage. Research Analysts may, from time to time, include short-term trade ideas in research reports and / or in SPARC. A short-term trade idea offers a short-term view on how a security may trade, based on market and trading events, and the resulting trading opportunity that may be available. A short-term trade idea may differ from the price targets and recommendations in our published research reports reflecting the research analyst's views of the longer-term (one year) prospects of the subject company, as a result of the differing time horizons, methodologies and/or other factors. Thus, it is possible that a subject company's common equity that is considered a long-term 'Sector Perform' or even an 'Underperform' might present a short-term buying opportunity as a result of temporary selling pressure in the market; conversely, a subject company's common equity rated a long-term 'Outperform' could be considered susceptible to a short-term downward price correction. Short-term trade ideas are not ratings, nor are they part of any ratings system, and the firm generally does not intend, nor undertakes any obligation, to maintain or update short-term trade ideas. Short-term trade ideas may not be suitable for all investors and have not been tailored to individual investor circumstances and objectives, and investors should make their own independent decisions regarding any securities or strategies discussed herein. Please contact your investment advisor or institutional salesperson for more information regarding RBC Capital Markets' research.

For a list of all recommendations on the company that were disseminated during the prior 12-month period, please click on the following link: <https://rbcnew.bluematrix.com/sellside/MAR.action>

The 12 month history of SPARCs can be viewed at <https://www.rbcinsightresearch.com>.

Analyst certification

All of the views expressed in this report accurately reflect the personal views of the responsible analyst(s) about any and all of the subject securities or issuers. No part of the compensation of the responsible analyst(s) named herein is, or will be, directly or indirectly, related to the specific recommendations or views expressed by the responsible analyst(s) in this report.

Third-party-disclaimers

The Global Industry Classification Standard ("GICS") was developed by and is the exclusive property and a service mark of MSCI Inc. ("MSCI") and Standard & Poor's Financial Services LLC ("S&P") and is licensed for use by RBC. Neither MSCI, S&P, nor any other party involved in making or compiling the GICS or any GICS classifications makes any express or implied warranties or representations with respect to such standard or classification (or the results to be obtained by the use thereof), and all such parties hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability and fitness for a particular purpose with respect to any of such standard or classification. Without limiting any of the foregoing, in no event shall MSCI, S&P, any of their affiliates or any third party involved in making or compiling the GICS or any GICS classifications have any liability for any direct, indirect, special, punitive, consequential or any other damages (including lost profits) even if notified of the possibility of such damages.

References herein to "LIBOR", "LIBO Rate", "L" or other LIBOR abbreviations means the London interbank offered rate as administered by ICE Benchmark Administration (or any other person that takes over the administration of such rate).

Disclaimer

RBC Capital Markets is the business name used by certain branches and subsidiaries of the Royal Bank of Canada, including RBC Dominion Securities Inc., RBC Capital Markets, LLC, RBC Europe Limited, Royal Bank of Canada, Hong Kong Branch and Royal Bank of Canada, Sydney Branch. The information contained in this report has been compiled by RBC Capital Markets from sources believed to be reliable, but no representation or warranty, express or implied, is made by Royal Bank of Canada, RBC Capital Markets, its affiliates or any other person as to its accuracy, completeness or correctness. All opinions and estimates contained in this report constitute RBC Capital Markets' judgement as of the date of this report, are subject to change without notice and are provided in good faith but without legal responsibility. Nothing in this report constitutes legal, accounting or tax advice or individually tailored investment advice. This material is prepared for general circulation to clients and has been prepared without regard to the individual financial circumstances and objectives of persons who receive it. The investments or



services contained in this report may not be suitable for you and it is recommended that you consult an independent investment advisor if you are in doubt about the suitability of such investments or services. This report is not an offer to sell or a solicitation of an offer to buy any securities. Past performance is not a guide to future performance, future returns are not guaranteed, and a loss of original capital may occur. RBC Capital Markets research analyst compensation is based in part on the overall profitability of RBC Capital Markets, which includes profits attributable to investment banking revenues. Every province in Canada, state in the U.S., and most countries throughout the world have their own laws regulating the types of securities and other investment products which may be offered to their residents, as well as the process for doing so. As a result, the securities discussed in this report may not be eligible for sale in some jurisdictions. RBC Capital Markets may be restricted from publishing research reports, from time to time, due to regulatory restrictions and/or internal compliance policies. If this is the case, the latest published research reports available to clients may not reflect recent material changes in the applicable industry and/or applicable subject companies. RBC Capital Markets research reports are current only as of the date set forth on the research reports. This report is not, and under no circumstances should be construed as, a solicitation to act as securities broker or dealer in any jurisdiction by any person or company that is not legally permitted to carry on the business of a securities broker or dealer in that jurisdiction. To the full extent permitted by law neither RBC Capital Markets nor any of its affiliates, nor any other person, accepts any liability whatsoever for any direct, indirect or consequential loss arising from, or in connection with, any use of this report or the information contained herein. No matter contained in this document may be reproduced or copied by any means without the prior written consent of RBC Capital Markets in each instance.

Additional information is available on request.

To U.S. Residents:

This publication has been approved by RBC Capital Markets, LLC (member FINRA, NYSE, SIPC), which is a U.S. registered broker-dealer and which accepts responsibility for this report and its dissemination in the United States. Any U.S. recipient of this report that is not a registered broker-dealer or a bank acting in a broker or dealer capacity and that wishes further information regarding, or to effect any transaction in, any of the securities discussed in this report, should contact and place orders with RBC Capital Markets, LLC.

To Canadian Residents:

This publication has been approved by RBC Dominion Securities Inc.(member IIROC). Any Canadian recipient of this report that is not a Designated Institution in Ontario, an Accredited Investor in British Columbia or Alberta or a Sophisticated Purchaser in Quebec (or similar permitted purchaser in any other province) and that wishes further information regarding, or to effect any transaction in, any of the securities discussed in this report should contact and place orders with RBC Dominion Securities Inc., which, without in any way limiting the foregoing, accepts responsibility for this report and its dissemination in Canada.

To U.K. Residents:

This publication has been approved by RBC Europe Limited ('RBCEL') which is authorized by the Prudential Regulation Authority and regulated by the Financial Conduct Authority ('FCA') and the Prudential Regulation Authority, in connection with its distribution in the United Kingdom. This material is not for general distribution in the United Kingdom to retail clients, as defined under the rules of the FCA. RBCEL accepts responsibility for this report and its dissemination in the United Kingdom.

To German Residents:

This material is distributed in Germany by RBC Europe Limited, Frankfurt Branch which is regulated by the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin).

To Persons Receiving This Advice in Australia:

This material has been distributed in Australia by Royal Bank of Canada, Sydney Branch (ABN 86 076 940 880, AFSL No. 246521). This material has been prepared for general circulation and does not take into account the objectives, financial situation or needs of any recipient. Accordingly, any recipient should, before acting on this material, consider the appropriateness of this material having regard to their objectives, financial situation and needs. If this material relates to the acquisition or possible acquisition of a particular financial product, a recipient in Australia should obtain any relevant disclosure document prepared in respect of that product and consider that document before making any decision about whether to acquire the product. This research report is not for retail investors as defined in section 761G of the Corporations Act.

To Hong Kong Residents:

This publication is distributed in Hong Kong by Royal Bank of Canada, Hong Kong Branch, which is regulated by the Hong Kong Monetary Authority and the Securities and Futures Commission (SFC) in Hong Kong, RBC Investment Services (Asia) Limited and RBC Global Asset Management (Asia) Limited, both entities are regulated by the SFC. This material is not for general distribution in Hong Kong to persons who are not professional investors (as defined in the Securities and Futures Ordinance of Hong Kong (Cap. 571) and any rules made thereunder.

To Singapore Residents:

This publication is distributed in Singapore by the Royal Bank of Canada, Singapore Branch, a registered entity licensed by the Monetary Authority of Singapore. This material has been prepared for general circulation and does not take into account the objectives, financial situation, or needs of any recipient. You are advised to seek independent advice from a financial adviser before purchasing any product. If you do not obtain independent advice, you should consider whether the product is suitable for you. Past performance is not indicative of future performance. If you have any questions related to this publication, please contact the Royal Bank of Canada, Singapore Branch. Royal Bank of Canada, Singapore Branch accepts responsibility for this report and its dissemination in Singapore.

To Japanese Residents:

Unless otherwise exempted by Japanese law, this publication is distributed in Japan by or through RBC Capital Markets (Japan) Ltd. which is a Financial Instruments Firm registered with the Kanto Local Financial Bureau (Registered number 203) and a member of the Japan Securities Dealers Association (JSDA) and the Financial Futures Association of Japan (FFAJ).

® Registered trademark of Royal Bank of Canada. RBC Capital Markets is a trademark of Royal Bank of Canada. Used under license.

Copyright © RBC Capital Markets, LLC 2020 - Member SIPC

Copyright © RBC Dominion Securities Inc. 2020 - Member Canadian Investor Protection Fund

Copyright © RBC Europe Limited 2020

Copyright © Royal Bank of Canada 2020

All rights reserved