

Galapagos NV (GLPG.AS)

We lower our filgotinib outlook and see risk with the remaining pipeline; Downgrade to Sell

SELL

GLPG.AS	12m Price Target: €87.00	Price: €111.80	Downside: 22.2%
GLPG	12m Price Target: \$103.00	Price: \$131.79	Downside: 21.8%

We lower our 12-month price target (PT) on Galapagos (GLPG) to €87, and downgrade the shares to Sell from Neutral.

With changes to our financial model, our new 12-month price target is 19% lower than our previous €108 PT, and implies 22% potential downside from current levels vs. average 25% upside to rest of coverage. In addition, with this report, we introduce a \$103 12-month price target on the US-listed ADR.

Increasing caution on filgotinib. Most notably, our model includes revised assumptions on the timing of US and ex-US launches of filgotinib (newly approved brand name in EU and Japan is Jyseleca), a JAK inhibitor (JAKi) for autoimmune/inflammatory diseases that is the company's lead asset. Our new sales estimates for filgotinib reflect (1) a meaningful delay in the timing of the US launch given receipt of the August 2020 FDA CRL ([LINK](#)) in the initial indication of RA, which in our view, now puts the asset at a considerable competitive disadvantage against AbbVie's Rinvoq (another recently launched JAKi), (2) potential sales contribution across five indications (RA, UC, CD, PsA and AS), but vs. ten indications previously modeled, and 3) weaker market penetration. The net result is that we now lower our peak risk-unadjusted sales forecast for filgotinib by approximately two-thirds, to \$2.1bn (vs. our prior >\$6bn). We note that our revised estimates for filgotinib in the three lead indications (RA, UC, and CD) are directionally aligned with those of our US large cap biotech analyst Terence Flynn, who covers Gilead (GILD).

Other model changes. Equally as important, other significant changes now reflected in our model include: (1) incorporation of GLPG's expanded global collaboration with GILD, and the various complex pushes and pulls to the P&L; (2) full 2019 and 1H20

Graig Suvannavejh, Ph.D.

+1(212)902-6393 | graig.suvannavejh@gs.com
Goldman Sachs & Co. LLC

John McNeil

+1(917)343-4058 | john.mcneil@gs.com
Goldman Sachs & Co. LLC

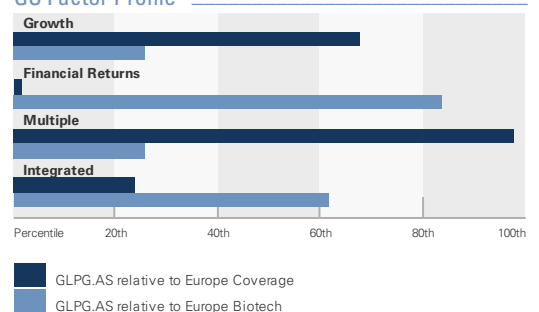
Key Data

Market cap: €7.4bn / \$8.7bn
Enterprise value: €7.6bn / \$8.9bn
3m ADTV: €62.1mn / \$73.2mn
Belgium
Europe Biotech
M&A Rank: 3
Leases incl. in net debt & EV?: Yes

GS Forecast

	12/19	12/20E	12/21E	12/22E
Revenue (€ mn) New	895.9	615.0	580.7	618.5
Revenue (€ mn) Old	215.0	232.4	272.2	463.7
EBIT (€ mn)	370.3	(211.6)	(211.1)	(96.0)
EPS (€) New	2.60	(4.54)	(3.08)	(1.36)
EPS (€) Old	(4.69)	(4.48)	(3.77)	(0.98)
P/E (X)	49.1	NM	NM	NM
Dividend yield (%)	0.0	0.0	0.0	0.0
CROCI (%)	187.0	(17.9)	(19.6)	(14.6)
N debt/EBITDA (ex lease,X)	1.9	-	-	-
	6/20	9/20E	12/20E	3/21E
EPS (€)	(1.77)	(0.04)	(1.94)	(0.24)

GS Factor Profile



Source: Company data, Goldman Sachs Research estimates. See disclosures for details.

Goldman Sachs does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision. For Reg AC certification and other important disclosures, see the Disclosure Appendix, or go to www.gs.com/research/hedge.htm. Analysts employed by non-US affiliates are not registered/qualified as research analysts with FINRA in the U.S.

Sell

Galapagos NV (GLPG.AS)

Rating since Oct 20, 2020

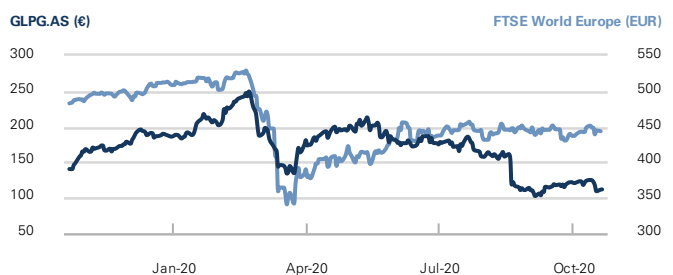
Ratios & Valuation

	12/19	12/20E	12/21E	12/22E
EV/sales (X)	9.1	12.2	13.4	12.8
EV/EBITDAR (X)	21.2	NM	NM	NM
EV/EBITDA (excl. leases) (X)	21.4	NM	NM	NM
EV/EBIT (X)	21.9	NM	NM	NM
P/E (X)	49.1	NM	NM	NM
Dividend yield (%)	0.0	0.0	0.0	0.0
EV/GCI (X)	2.3	2.7	2.7	2.7
CROCI (%)	187.0	(17.9)	(19.6)	(14.6)
ROIC (%)	22.2	(6.5)	(7.4)	(3.2)
ROA (%)	5.2	(3.9)	(3.9)	(1.9)
Days inventory outst, sales	-	0.0	0.5	1.0
Asset turnover (X)	20.1	8.7	7.3	7.4
Capex/D&A (%)	367.0	288.7	120.2	95.7
Net debt/equity (excl. leases) (%)	25.4	7.0	14.9	17.8
EBIT interest cover (X)	6.2	(2.0)	(42.2)	(19.2)
FCF cover of dividends (X)	-	-	-	-

Growth & Margins (%)

	12/19	12/20E	12/21E	12/22E
Total revenue growth	181.9	(31.4)	(5.6)	6.5
EBITDA growth	1,049.3	(153.9)	0.8	57.6
EBIT growth	926.4	(157.1)	0.2	54.5
Net inc. growth	612.2	(297.0)	31.2	55.3
EPS growth	563.3	(274.5)	32.1	55.8
DPS growth	NM	NM	NM	NM

Price Performance



	3m	6m	12m
Absolute	(39.8)%	(44.1)%	(21.1)%
Rel. to the FTSE World Europe (EUR)	(38.7)%	(48.8)%	(14.7)%

Source: FactSet. Price as of 20 Oct 2020 close.

Balance Sheet (€ mn)

	12/19	12/20E	12/21E	12/22E
Cash & cash equivalents	1,861.6	2,030.6	1,439.9	968.0
Accounts receivable	21.9	16.4	14.8	10.7
Inventory	-	0.1	1.4	2.1
Other current assets	3,982.4	3,243.1	3,240.3	3,243.4
Total current assets	5,865.9	5,290.2	4,696.5	4,224.3
Net PP&E	66.1	76.0	82.4	85.4
Net intangibles	24.9	33.4	34.7	36.1
Total investments	0.0	0.0	0.0	0.0
Other long-term assets	111.7	135.4	123.8	93.1
Total assets	6,068.6	5,535.0	4,937.4	4,438.8
Accounts payable	143.4	219.7	194.8	155.9
Short-term debt	6.2	27.3	27.3	27.3
Short-term lease liabilities	5.8	6.9	6.9	6.9
Other current liabilities	416.3	409.6	409.6	409.6
Total current liabilities	571.8	663.5	638.5	599.7
Long-term debt	2,586.3	2,189.5	1,781.2	1,372.8
Long-term lease liabilities	19.6	19.7	18.5	17.3
Other long-term liabilities	15.3	19.2	19.2	19.2
Total long-term liabilities	2,621.2	2,228.4	1,818.9	1,409.3
Total liabilities	3,193.0	2,891.9	2,457.4	2,009.0
Preferred shares	-	-	-	-
Total common equity	2,875.7	2,643.1	2,480.0	2,429.8
Minority interest	-	-	-	-
Total liabilities & equity	6,068.6	5,535.0	4,937.4	4,438.8
Capital employed	5,468.2	4,859.9	4,288.5	3,830.0
Adj for unfunded pensions & GW	-	-	-	-

Cash Flow (€ mn)

	12/19	12/20E	12/21E	12/22E
Net income	149.8	(295.2)	(203.0)	(90.8)
D&A add-back	12.4	7.4	13.3	14.0
Minority interest add-back	-	-	-	-
Net (inc)/dec working capital	12.7	73.7	(21.8)	(38.5)
Other operating cash flow	3,033.6	(351.1)	(361.7)	(341.7)
Cash flow from operations	3,208.6	(565.3)	(573.1)	(457.0)
Capital expenditures	(45.7)	(21.3)	(16.0)	(13.4)
Acquisitions	-	-	-	-
Divestitures	-	0.0	-	-
Others	(3,719.0)	739.1	4.8	4.8
Cash flow from investing	(3,764.7)	717.8	(11.3)	(8.7)
Repayment of lease liabilities	-	-	-	-
Dividends paid (common & pref)	-	-	-	-
Inc/(dec) in debt	-	-	-	-
Other financing cash flows	1,335.8	17.0	(6.2)	(6.2)
Cash flow from financing	1,335.8	17.0	(6.2)	(6.2)
Total cash flow	769.7	168.9	(590.6)	(471.9)
Reinvestment rate (%)	1.4	(3.3)	(2.9)	(3.2)

Source: Company data, Goldman Sachs Research estimates.

Income Statement (€ mn)

	12/19	12/20E	12/21E	12/22E
Total revenue	895.9	615.0	580.7	618.5
Total operating expenses	(98.3)	(216.2)	(239.6)	(264.4)
R&D	(427.3)	(610.3)	(552.2)	(450.1)
Other operating inc./exp.	-	-	-	-
EBITDA	377.1	(203.4)	(201.7)	(85.4)
Depreciation & amortisation	(6.8)	(8.2)	(9.5)	(10.5)
EBIT	370.3	(211.6)	(211.1)	(96.0)
Net interest inc./exp.	(38.6)	(61.9)	8.0	5.2
Income/(loss) from associates	-	-	-	-
Profit/(loss) on disposals	-	-	-	-
Total other net	(181.6)	(21.1)	0.0	0.0
Pre-tax profit	150.1	(294.5)	(203.1)	(90.8)
Provision for taxes	(0.2)	(0.7)	0.0	0.0
Minority interest	-	-	-	-
Preferred dividends	-	-	-	-
Net inc. (pre-exceptionals)	149.8	(295.2)	(203.0)	(90.8)
Post-tax exceptionals	-	-	-	-
Net inc. (post-exceptionals)	149.8	(295.2)	(203.0)	(90.8)
EPS (basic, pre-except) (€)	2.60	(4.54)	(3.08)	(1.36)
EPS (basic, post-except) (€)	2.60	(4.54)	(3.08)	(1.36)
Wtd avg shares out. (basic) (mn)	57.6	65.1	65.8	66.6
Tax rate (%)	0.1	(0.2)	0.0	0.0
Common dividends declared	0.0	0.0	0.0	0.0
DPS (€)	-	-	-	-

financial results, as well as recently updated 2020 financial guidance; and (3) new revenue builds and contributions from three other programs not previously factored, including Toledo (for autoimmune/inflammatory diseases), GLPG1205 (for IPF) and ziritaxestat/GLPG1690 (for SSc). Also, recall last week, GLPG reported negative Phase 2 data ([LINK](#)) for GLPG1972 (a novel ADMATS5 inhibitor); while official next steps have yet to be announced, we do not factor this asset into our model.

Our current thoughts on the stock

Looking back in time, following the news of the expanded GILD partnership in July 2019, GLPG shares reached an all-time high level of €252.90 on February 20, 2020 (+97% from the last trading day before the deal was announced). In the time since, however, and following the negative '1972 results last week, the shares have now retrenched 56%. (Of note, at current levels, the shares now trade *below* the last trading day before the GILD deal was announced).

Investor debates have primarily centered on filgotinib, and more recently, in particular, to what degree the FDA CRL could set its prospects back in terms of the timing of its US launch and ultimately, to its commercial potential. In our view, what is at stake is filgotinib's competitive positioning in what we view to be a very crowded autoimmune/inflammatory disease market, especially vis-a-vis Rinvoq, which was approved in August 2019 and had reported 1H20 WW sales of \$235mn (\$218mn US/\$17mn ex-US).

In addition, with Humira biosimilars continuing to make inroads ex-US and potentially entering the US market by 2023, we believe that with each month that the US launch of filgotinib is delayed, risk increases for optimal market share penetration for the product. Overall, in light of the CRL-related delay for filgotinib, we believe concerns around the competitive landscape for the product could continue to weigh on sentiment over the next 12 months.

Further, in light of the setback with '1972, we believe investor questions could begin to arise around GLPG's remaining pipeline, and in our view, the next key clinical readouts for GLPG (i.e., for '1205 and ziritaxestat) carry sizable risk (based on their novel MOA's). With this in mind, we now choose to take a more cautious view on the name, and hence our move to Sell.

What could make us more positive?

Admittedly, there are a number of scenarios for filgotinib where there exists the potential for upside to our current forecasts.

First, we could be too conservative with our current views around POS and also market share assumptions for filgotinib. On POS, based on the issue of the CRL, we now revise our original POS assumptions for the product, with the most important being that in lead indication rheumatoid arthritis (RA), we now lower POS from a prior 95% to a current 85%. Also, in terms of our market share assumptions, it is possible that GLPG and partner GILD could execute the initial commercial launches in the US and ex-US territories better than we currently anticipate. In either case, or perhaps even both, there

could be upside to our current filgotinib forecasts.

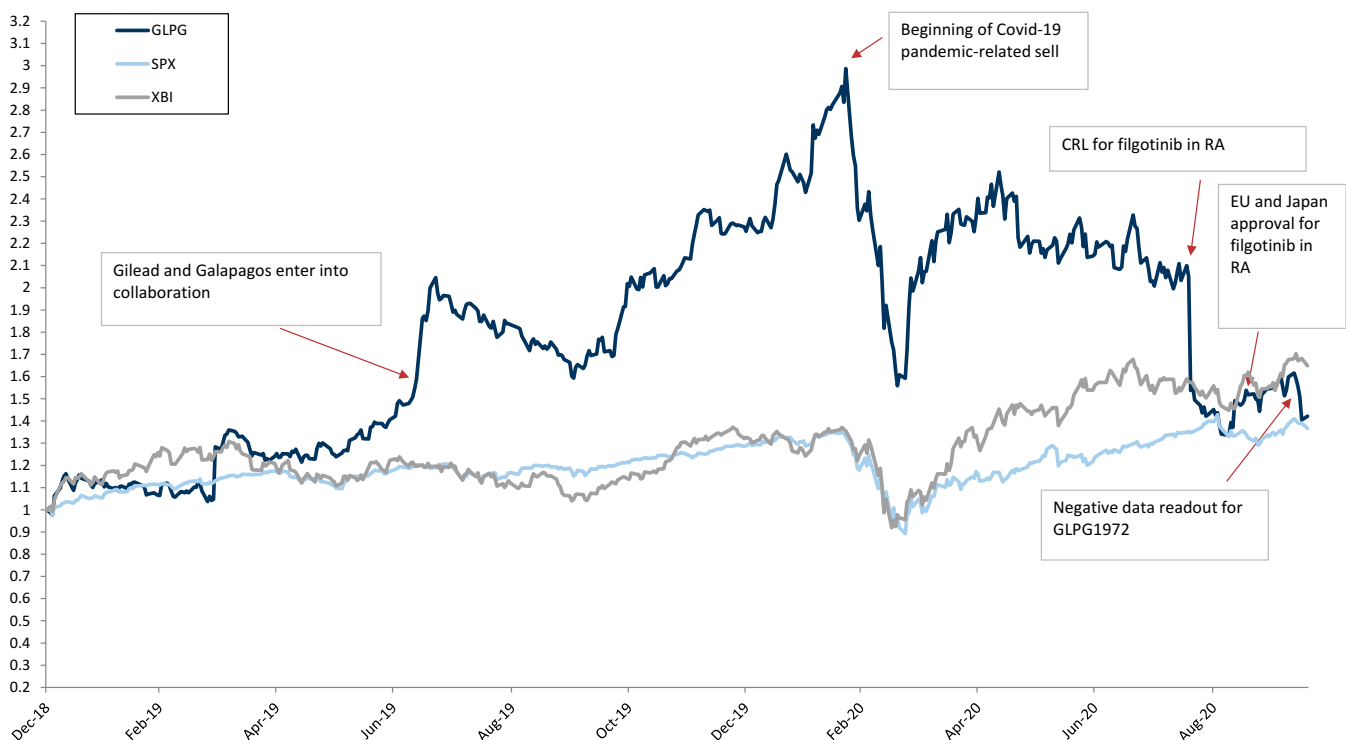
Beyond filgotinib, and more near-term, an upcoming Phase 2 clinical data readout for GLPG1205 in IPF is expected shortly (i.e., within 4Q20), and further down the line, a potentially bigger Phase 3 interim (and futility) readout for ziritaxestat/GLPG1690 (also in IPF) is expected in 1H21. These results will likely serve as important points of value inflection, as depending on the outcome, there is potential for upside to our current forecast.

While we describe each candidate in greater details in the sections below, briefly, both '1205 and ziritaxestat feature mechanisms of actions that while exciting scientifically to us, are also still very novel, and hence unproven (we currently model 25% POS for '1205 and 65% for zirataxestat).

Beyond the IPF assets, other sources of upside, in our view, include (1) better than expected data for GLPG3970, the first candidate from the Toledo program to advance into Phase 2; (2) incrementally new data that could be viewed positively at an upcoming investor event specific for the Toledo program to be held on October 27; and (3) over the next 12 months, new partnership deals that could yield either non-dilutive funding from partners, or new mid- or late-stage assets that could contribute to GLPG's top-line in the near or mid-term horizon.

GLPG in 5 charts

Exhibit 1: Stock chart



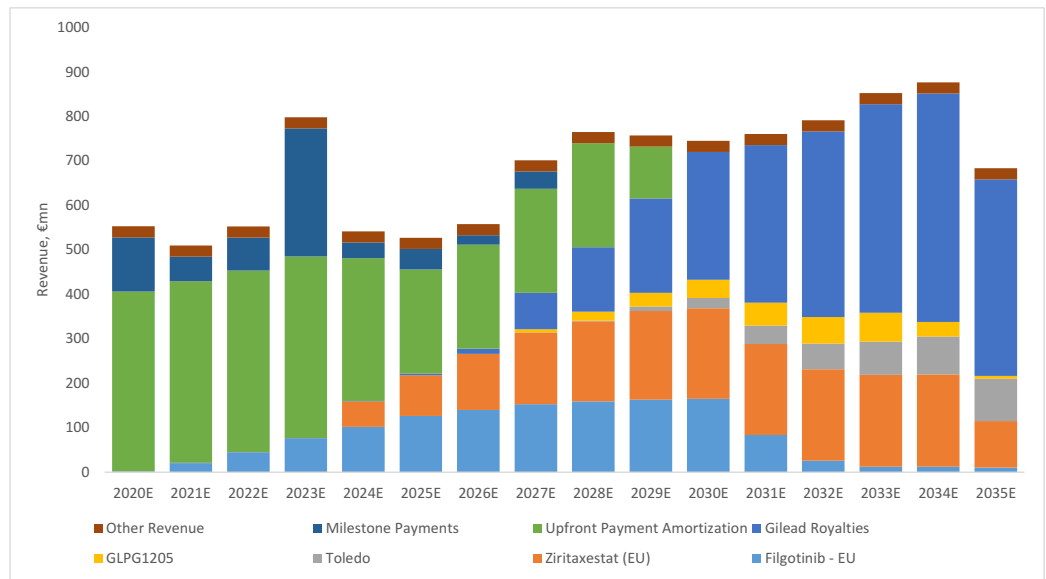
Source: FactSet, Goldman Sachs Global Investment Research

Exhibit 2: Summary of peak revenue forecasts

Program	Indication	Launch	Peak Sales unadjusted (\$ mn)	POS	Peak Sales risk-adjusted (\$ mn)	Prior POS	Prior Peak Sales unadjusted (\$mn)
Filgotinib	RA	2020	989	85%	888	95%	2624
	CD	2023	443	60%	266	70%	1068
	UC	2022	379	70%	265	60%	1082
	PsA	2024	152	50%	76	50%	802
	AS	2026	124	50%	62	50%	536
Total			2,087		1,558		6,112
GLPG1690	dcSSC	2024	459	50%	229		
	IPF	2023	2,269	65%	1,475	45%	1559
Total			2,728		1,704		1,559
Toledo		2027	2,035	25%	509		
GLPG1205	IPF	2026	1,763	25%	441		
Total			8,613		4,211		7,671

Source: Goldman Sachs Global Investment Research

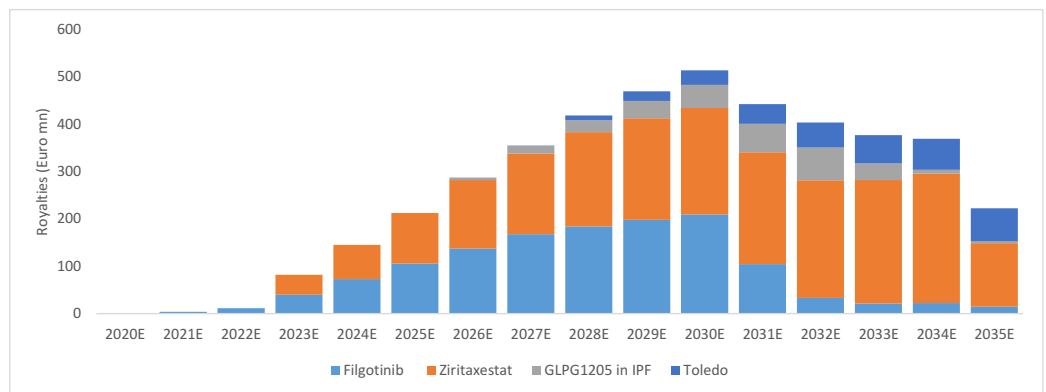
Exhibit 3: Breakdown of revenue



Other revenue includes reimbursement income and service revenues

Source: Goldman Sachs Global Investment Research

Exhibit 4: Overview of royalties from Gilend



Source: Goldman Sachs Global Investment Research

Exhibit 5: GS estimates vs. consensus

€mn except per share data

		FY20	FY21	FY22	FY23	FY24	FY25	FY30	FY35
Consensus	Revenue	556.4	593.3	690.5	789.1	898.8	1,120.0	1,815.0	1,313.0
	EBIT	(219.0)	(196.0)	(185.0)	(192.4)	(116.7)	90.0	712.0	516.0
	Net Inc.	(251.0)	(269.0)	(256.0)	(153.0)	(55.8)	122.5	930.0	531.0
	EPS	(3.69)	(4.12)	(3.60)	(2.54)	(1.53)	1.20	9.59	6.36
Gse	Revenue	615.0	580.7	618.5	939.8	728.3	779.4	1,006.3	478.1
	EBIT	(211.6)	(211.1)	(96.0)	166.6	85.7	114.7	385.9	197.7
	Net Inc.	(295.2)	(203.0)	(90.8)	169.9	87.9	116.3	360.0	191.9
	EPS	(4.54)	(3.08)	(1.36)	2.52	1.29	1.68	4.89	2.44
GS Vs Cons	Revenue	11%	-2%	-10%	19%	-19%	-30%	-45%	-64%
	EBIT	3%	-8%	48%	187%	173%	27%	-46%	-62%
	Net Inc.	-18%	25%	65%	211%	257%	-5%	-61%	-64%
	EPS	-23%	25%	62%	199%	184%	40%	-49%	-62%

Source: Company data, Goldman Sachs Global Investment Research, Bloomberg

What's changed in our model

Model revisions

We now adjust our model to reflect the following:

- **Lowering filgotinib:** We revised our assumptions on the timing of US and ex-US launches of filgotinib given the receipt of CRL from FDA, which delays potential US approval to 1Q22 versus 3Q20 prior. We now model risk-adjusted revenue contributions in five indications (RA, UC, CD, PsA and AS) versus 10 prior and have a more conservative view vs. earlier because of the lack of superior efficacy vs. Humira, the delay in US launch providing more time for ABBV to position Rinvoq and the launch of biosimilar versions of Humira in 2023 in the US market as per our AbbVie analyst's expectations. With the product now approved in Europe and Japan (approvals were announced concurrently on September 25), we make no meaningful estimate changes to filgotinib (or Jyseleca, as its being called from a brand name perspective) in these territories.
- **New product contributions:** We now include revenue from the Toledo program, GLPG1205 and ziritaxestat (for SSc) in our model. Given last week's negative results for GLPG1972, we do not include estimates for that program.
- **Expanded GILD partnership:** As a part of the collaboration with GILD, GLPG received \$1.1bn in an equity investment and \$3.95bn upfront payment (which we have recognized over the years until 2029). In addition to that, GILD also gained rights to GLPG1690 and GLPG1972 (which now has a negative Phase 2 data readout) and opt-in's for all other clinical programs after completion of Phase 2. As per the deal, GLPG and GILD will share the development cost equally for all drugs that GILD opts-in for. We assume opt-in by GILD for all the drugs (except '1972) and thus, we lower our R&D expenditure after every expected opt-in. We add milestone payments and royalties to our model as per the deal. For filgotinib, under the revised agreement, GLPG and GILD will share costs equally in lieu of 80/20 split earlier.
- Net net, the drivers of change are lower filgotinib estimates, new product revenue

contributions, incorporation of the Gilead deal, and updating the model for 2019 and 1H20 earnings.

Exhibit 6: Revisions to estimates

€mn, except EPS data		2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E	2033E	2034E	2035E
OLD	Total Revenue	232.4	272.2	463.7	865.6	1,222.5	1,330.5	1,848.8	1,843.3	1,963.0	2,052.9	2,125.0	1,219.0	1,019.7	882.9	879.9	890.6
	COGS	-	-	-	(15.1)	(20.4)	(25.9)	(31.9)	(35.2)	(35.7)	(36.2)	(36.8)	(37.3)	(37.9)	(38.5)	(39.0)	(39.6)
	R&D	(448.9)	(442.6)	(450.4)	(350.3)	(275.2)	(241.5)	(212.7)	(188.3)	(174.5)	(162.0)	(150.8)	(145.8)	(141.0)	(136.5)	(132.1)	(128.0)
	SG&A	(59.5)	(66.6)	(82.5)	(127.2)	(149.8)	(170.6)	(191.6)	(204.2)	(207.8)	(211.4)	(215.1)	(218.9)	(222.7)	(226.6)	(230.5)	(234.6)
	Opex	(508.3)	(609.2)	(532.9)	(477.5)	(425.0)	(412.1)	(404.3)	(392.5)	(382.3)	(373.5)	(365.9)	(364.7)	(363.7)	(363.0)	(362.7)	(362.6)
	EBIT	(276.0)	(236.9)	(69.2)	373.0	777.2	892.5	1,412.5	1,415.6	1,545.0	1,643.3	1,722.3	817.0	618.1	481.4	478.2	488.4
	Net Profit/Loss	(265.8)	(228.0)	(60.6)	344.2	710.5	818.5	1,292.8	1,303.6	1,428.5	1,526.1	1,606.8	797.3	616.7	488.7	479.2	480.8
	EPS	(4.48)	(3.77)	(0.98)	5.47	11.06	12.50	19.35	19.13	20.55	21.52	22.22	10.81	8.20	6.37	6.12	6.02
NEW	Total revenue	615.0	680.7	618.5	939.8	728.3	779.4	878.7	1,019.6	1,083.5	1,055.4	1,006.3	872.6	796.5	777.8	747.7	478.1
	COGS	(0.2)	(2.0)	(3.1)	(3.8)	(8.0)	(10.9)	(13.3)	(16.1)	(18.0)	(20.2)	(21.6)	(19.1)	(17.4)	(17.9)	(16.9)	(10.8)
	R&D	(610.3)	(552.2)	(450.1)	(495.1)	(346.6)	(357.0)	(367.7)	(371.3)	(375.1)	(337.6)	(286.9)	(200.8)	(160.7)	(144.6)	(130.1)	(117.1)
	SG&A	(216.0)	(237.6)	(261.3)	(274.4)	(288.1)	(296.8)	(299.7)	(302.7)	(305.8)	(308.8)	(311.9)	(187.2)	(177.8)	(168.9)	(160.5)	(152.4)
	Opex	(826.5)	(791.8)	(714.5)	(773.3)	(642.7)	(664.6)	(680.7)	(690.2)	(698.9)	(666.5)	(620.5)	(407.1)	(355.9)	(331.4)	(307.5)	(280.4)
	EBIT	(211.6)	(211.1)	(96.0)	166.6	85.7	114.7	198.0	329.4	384.6	388.8	385.9	465.6	440.6	446.4	440.2	197.7
	Net Profit /Loss	(295.2)	(203.0)	(90.8)	169.9	87.9	116.3	199.2	330.8	386.6	391.8	360.0	425.1	404.7	412.0	408.5	191.9
	EPS	(4.54)	(3.08)	(1.36)	2.52	1.29	1.68	2.85	4.67	5.39	5.39	4.89	5.71	5.36	5.39	5.27	2.44
% Change	Total revenue	165%	113%	33%	9%	-40%	-41%	-52%	-45%	-45%	-49%	-53%	-28%	-22%	-12%	-15%	-46%
	COGS				-75%	-61%	-58%	-58%	-54%	-49%	-44%	-41%	-49%	-54%	-53%	-57%	-73%
	R&D	36%	25%	0%	41%	26%	48%	73%	97%	115%	108%	90%	38%	14%	6%	-2%	-9%
	SG&A	263%	257%	217%	116%	92%	74%	56%	48%	47%	46%	45%	-14%	-20%	-25%	-30%	-35%
	Opex	63%	56%	34%	62%	51%	61%	68%	76%	83%	78%	70%	12%	-2%	-9%	-15%	-23%
	EBIT	23%	11%	-39%	-55%	-89%	-87%	-86%	-77%	-75%	-76%	-78%	-43%	-29%	-7%	-8%	-60%
	Net Profit/Loss	-11%	11%	-50%	-51%	-88%	-86%	-85%	-75%	-73%	-74%	-78%	-47%	-34%	-16%	-15%	-60%
	EPS	-1%	18%	-39%	-54%	-88%	-87%	-85%	-76%	-74%	-75%	-78%	-47%	-35%	-15%	-14%	-59%

Source: Company data, Goldman Sachs Global Investment Research

Exhibit 7: Revisions to filgotinib estimates

Filgotinib Sales(\$mn)		2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E	2033E	2034E	2035E
OLD	Non-adjusted sales	195	489	1,105	2,044	3,232	4,488	5,760	6,671	7,490	7,911	8,248	2,327	1,083	231	78	41
	Risk-adjusted sales	185	450	869	1,437	2,074	2,749	3,430	3,931	4,323	4,605	4,819	1,464	747	157	59	35
NEW	Non-adjusted sales	7	70	183	482	816	1,137	1,424	1,707	1,867	1,999	2,087	1,086	348	218	227	165
	Risk-adjusted sales	7	70	172	414	670	915	1,118	1,310	1,411	1,497	1,558	808	257	156	162	110
%change	Non-adjusted sales	-96%	-86%	-83%	-76%	-75%	-75%	-75%	-74%	-75%	-75%	-75%	-53%	-68%	-6%	190%	298%
	Risk-adjusted sales	-96%	-85%	-80%	-71%	-68%	-67%	-67%	-67%	-67%	-67%	-68%	-45%	-66%	-1%	174%	214%

Source: Goldman Sachs Global Investment Research

Pipeline review

Jyseleca (filgotinib)

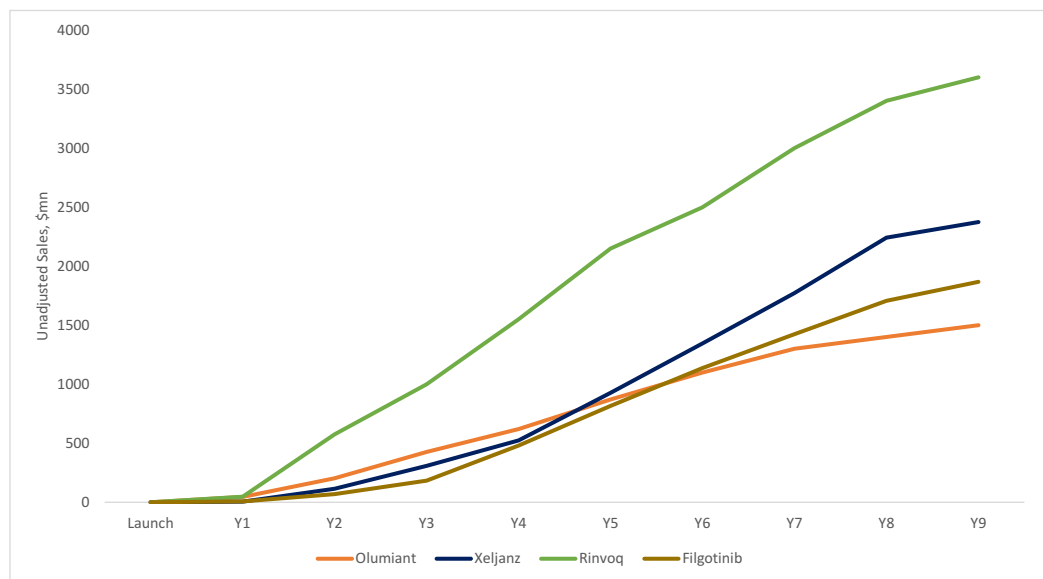
What is it and the market opportunity?

Filgotinib is a small molecule inhibitor of JAK1, a member of the JAK (Janus kinase) family of cytoplasmic tyrosine kinases. The family of receptors (JAK1, JAK2, JAK3 and TYK2) are broadly responsible for the modification of specific proteins within cells and control a diverse array of biological functions. JAKs are an important therapeutic target in a variety of diseases, particularly auto-immune diseases, as they up regulate a wide variety of cytokines (responsible for immune system signaling). Drugs that target JAK dampen the pro-inflammatory effects of cytokine signaling, thus providing therapeutic benefit in inflammatory diseases. Filgotinib is currently in development for rheumatoid arthritis (RA), ulcerative colitis (UC), psoriatic arthritis (PsA), Crohn's disease (CD) and ankylosing spondylitis (AS). According to prior GS research, we estimate that the global inflammation market will grow to ~\$65bn by 2027.

Competitive landscape: Filgotinib represents the fourth JAK inhibitor (JAKi) to come to the market (currently approved in Japan and Europe, pending approval in the US). Others include Xeljanz (approved in 2012 for RA, PSA and UC), Olumiant (approved in 2018 for RA), and Rinvoq (approved in 2019 for RA), which are marketed by Pfizer, Eli Lilly, and AbbVie, respectively (all companies covered by Terence Flynn). That said, with respect to Rinvoq, ABBV has submitted supplemental new drug applications (sNDAs) for Rinvoq in PsA, AS and more recently, atopic dermatitis (AtD). Other trials underway include those for Rinvoq in CD, UC, axial spondyloarthritis, giant cell arteritis, and Takayasu arteritis.

Although, filgotinib has shown a favorable safety profile vs. the other JAKi's, we believe there is a risk that like for the other three JAKi's, a black box warning around safety could be applied to filgotinib (this of course assumes final approval by FDA). Thus, were this to be the case, we believe any potential safety advantages previously communicated by GLPG for filgotinib may ultimately be neutralized, with all four JAKi's potentially on a similar playing field with respect to safety. In terms of commercialization, we believe that GLPG/GILD are at a relative disadvantage vs. other immunology players, which have at least two drugs in their portfolio (ABBV, JNJ and LLY) and in some cases a longer, established presence in the space. Also, the potential launch of biosimilar versions of Humira in 2023 in the US market could become another disadvantage to filgotinib, which we currently expect to launch in US in 2022.

Exhibit 8: JAK inhibitor launch trajectories



The reported sales for Olumiant, Xeljanz and Rinvoq is till Y3,Y8 and Y1 respectively, beyond which we use GS estimates

Source: Company data, Goldman Sachs Global Investment Research

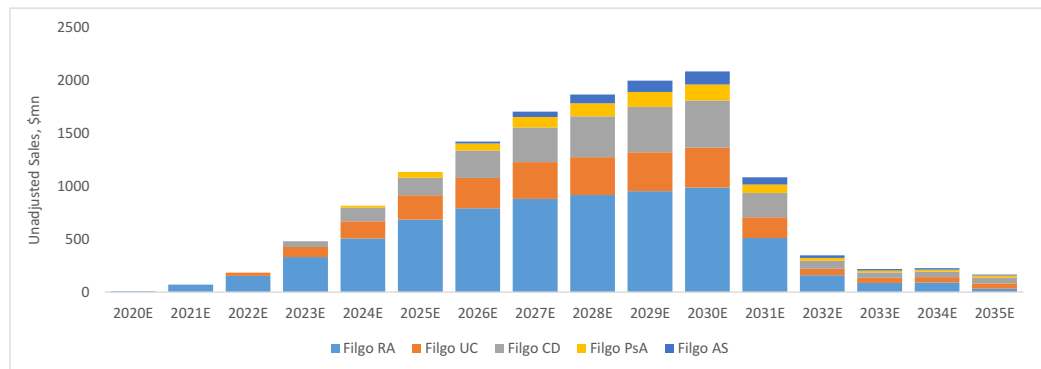
Our assumptions

- **RA** — Our model assumes US approval and subsequent launch in 2022 from 4Q20 prior (EU and Japan launch in 4Q20). We assign a PoS of 85% (US) and forecast peak risk unadjusted sales of \$990mn in 2030, after which we expect patent

expiration and thus, a decline in sales due to generic erosion. (As filgotinib is a small molecule-based drug, any patent cliff in the post-2030 LOE period for the product could be steep.) We further assume an average annual price of c.\$65k based on Rinvoq pricing, 25% GTN adjustment and 4% annual growth rate. In Europe, where filgotinib was recently approved as Jyseleca, we assume a 30% discount to the US price (c.\$45k/year) and keep the price constant (i.e., we assume no annual price increases) throughout our forecast period.

- **UC** — Our model assumes US approval and subsequent launch in 2022, given the possibility of a parallel filing for RA and UC. Recall that filing timeline for filgotinib has been made uncertain given (1) mixed Phase 3 data in UC ([LINK](#)) and (2) the FDA CRL in the lead indication of RA, with GLPG stating that filing in the US for UC is dependent on the ultimate timing of resolution for filgotinib in RA. We currently assume an EU and Japan launch in 2022. In terms of our forecasts, we assign a PoS of 70% and project peak year risk unadjusted sales of \$380mn in 2030, after which we expect patent expiration. We make the same pricing assumptions as filgotinib in RA, adjusted according to year of launch.
- **CD/PsA/AS** — Our model assumes US, EU and Japan launch in 2023/2024/2026 for CD/PsA/AS respectively. We assign a PoS of 60/50/50% and forecast peak risk unadjusted sales of ~\$440/\$150/\$120 mn in 2030 for CD/PsA/AS after which we expect patent expiration. We make the same pricing assumptions as filgotinib in RA, adjusted according to year of launch.

Exhibit 9: Filgotinib risk-unadjusted sales summary in different indications



Source: Goldman Sachs Global Investment Research

Current status: GLPG received an approval in RA on September 25, 2020 in Japan and Europe and a complete response letter from the US FDA in August 2020 ([LINK](#)) for filgotinib in RA. As stated previously, positive Phase 3 data are in hand (specifically at the higher 200mg dose, but not the lower 10mg dose) and it is in Phase 3 clinical trials in Crohn’s disease (CD) and psoriatic arthritis (PsA), with a Phase 3 in ankylosing spondylitis (AS) expected to start by YE2020. In addition, GILD is running Phase 2 trials for filgotinib in uveitis, small bowel Crohn’s disease, and fistulizing Crohn’s disease (indications we do not currently model).

IPF Franchise

Ziritaxestat (GLPG1690)

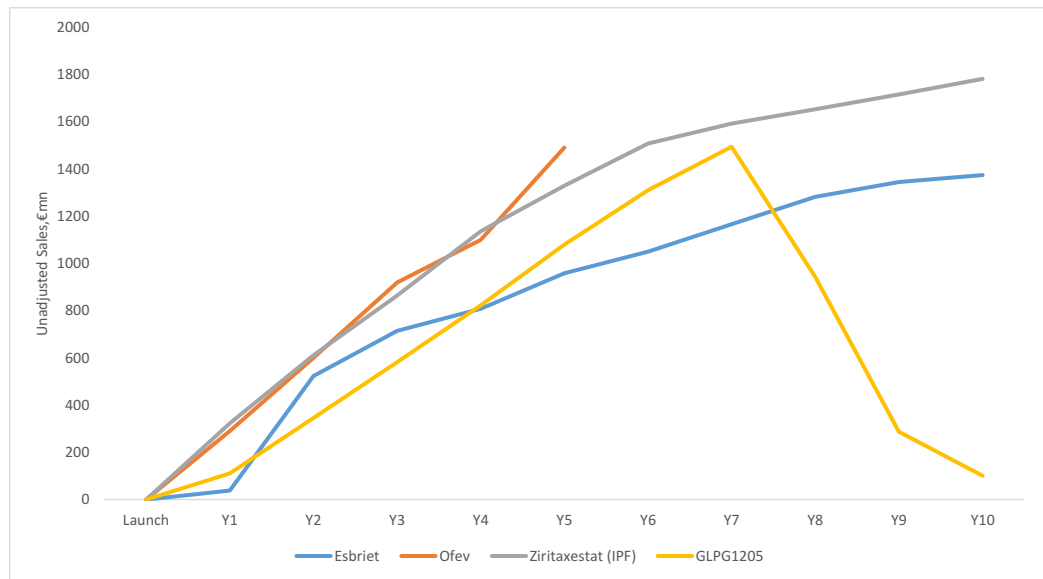
Ziritaxestat is an oral, once daily autotaxin inhibitor currently in Phase 3 studies. Autotaxin is the main enzyme responsible for lysophosphatidic acid (LPA) production. LPA is a well-known pro-fibrotic and pro-inflammatory lipid, acting through at least six G-protein coupled receptors (GPCRs). The mechanism is believed to block LPA production. The autotaxin/LPA approach has been previously validated, via a Bristol-Myers Squibb (covered by Terence Flynn) candidate (BMS-986020), but due to significant off-target toxicity, that program was discontinued. Recall that GLPG has received orphan drug designation from the US and EU in both idiopathic pulmonary fibrosis (IPF) and systemic sclerosis (SSc) for ziritaxestat.

GLPG1205

Galapagos is also advancing GLPG1205 (a GPR84 inhibitor) in IPF. GPR84 is a G protein-coupled receptor (GPCR) where based on the scientific literature, it is believed to have a role in inflammation and fibrotic conditions. Thus, its blockade may be effective in improving patients with IPF. Currently, GLPG1205 is being investigated in the Phase 2 PINTA study. Here, 60 patients on local standard of care (specifically defined as receiving Roche's Esbriet, Boehringer Ingelheim's Ofev, or neither agent) are being evaluated, with FVC at 26 weeks as the primary endpoint. The trial began in September 2018, and we are currently expecting data in 4Q20. We note that a competitor product is PBI-4050, originally developed by Prometic Life Sciences (now known Liminal BioSciences, not covered). An exploratory, Phase 2 study was completed in June 2019, showing no safety concerns and encouraging early results. That said, the program has not advanced since.

IPF and market opportunity

Idiopathic pulmonary fibrosis (IPF) is the most common type of interstitial lung disease (ILD) that results in scarring (fibrosis) of the lungs. As the scarring gets worse, it becomes hard to breathe and the lungs are unable to take in enough oxygen. Median survival of a patient diagnosed with IPF is c.2-3 years, and while there now are two currently approved drugs (Roche's Esbriet and Boehringer Ingelheim's Ofev, which were both approved in the fall of 2014 and that on a combined basis, has generated ~ €2.5bn in 2019), there is still a significant need given the limitations of the two drugs on both efficacy and tolerability (GLPG cites 25% discontinuations). Esbriet and Ofev, only slow respiratory decline and do not change the lethal outcome of IPF. Their poor tolerability profiles lead to a significant proportion of patients discontinuing therapy every year, and in addition, many patients are not even started on therapy, despite the known progression of the disease. Thus, in our view, the unmet need for disease-modifying therapies with a good efficacy and safety could translate into a sizable market opportunity.

Exhibit 10: Launch trajectories of GLPG1205 and GLPG1690(IPF) vs. competitors

For Esbriet, we use reported sales till Y6, beyond which we use GS estimates

Source: Company data, Goldman Sachs Global Investment Research

Our assumptions

- Ziritaxestat:** Our model assumes an annual incidence of IPF of around 80k/100k patients in the US/EU and peak penetration of c.30% in the US and c.8% in EU. We further assume initial launch year annual price in the US of c.\$156k for ziritaxestat based on 4% annual growth off of 2020 Ofev list pricing and a 20% GTN adjustment. In Europe, we assume a 30% discount to the US price (c.\$110k/year) and keep the price constant. We assign a PoS of 65% and forecast peak risk unadjusted sales of \$2.2bn in 2034, after which we expect patent expiration. Currently, we assume a product launch in 2023, and based on our current sales projection, we thereby model \$325mn in non-risk adjusted milestones from GILD in 2023. Of note, interim Phase 3 data (expected in 1H21) be very positive with the trial being stopped on the basis of strong efficacy, timing of a US launch could be accelerated. However, this is not our base case.
- GLPG1205:** Assuming similar epidemiology around US/EU incidence as above, our model assumes peak penetration for '1205 of c.25% in the US and c.6% in EU. We further assume initial launch year price of c.\$175k in the US, based on GLPG1690 pricing of 2026, 20% GTN adjustment and 4% annual growth rate. In Europe, we assume a 30% discount to the US price (c.\$122/year) and keep the price constant. We assign a PoS of 25% and forecast peak risk unadjusted sales of \$1.7bn in 2032, after which we expect patent expiration. Currently, we assume a US launch in 2026, and model \$150mn in non-risk adjusted milestones from GILD in 2021 after completion of Phase 2.

Current status

- GLPG1690** — It is being advanced in the Phase 3 ISABELA1 and ISABELA2 trials;

an interim (and futility) analysis is expected is 1H21.

- **GLPG1205** — It is currently in Phase 2 studies and data from Phase 2 PINTA study is expected in 4Q20.

Ziritaxestat in dcSSC

What is dcSSC and market opportunity?

Diffuse cutaneous systemic sclerosis (dcSSc) is a subtype of systemic scleroderma, whose main symptom is skin hardening (fibrosis). While exact causes of the disease are unknown, symptoms appear to originate with an autoimmune reaction that causes an overproduction of collagen. While pediatric cases are possible, most patients begin to exhibit symptoms at 40-50 years of age. While 135k adults suffer from systemic scleroderma, 75% of those cases are considered limited SSc, i.e. less widespread skin thickening and limited internal organ involvement. dcSSc (representing the other 25% patients) often involves fibrotic damage to multiple internal organs, which can lead to dysphagia (trouble eating), joint pain, and muscle weakness. Roughly 2% of cases exhibit potentially life-threatening renal involvement, and pulmonary fibrosis is seen in 60% of cases. According to GLPG, dcSSc has one of the highest mortality rates among rheumatic diseases. There are currently no FDA approved treatments for the disease.

Therapeutic options for dcSSc are methotrexate, cyclophosphamide, or mycophenolate mofetil and autologous stem cell transplantation. Methotrexate is efficient for stabilizing or reducing skin involvement but evidence of efficacy in organ involvement is lacking. Patients with lung involvement or progressive skin thickening are treated with either cyclophosphamide, or mycophenolate mofetil. Present therapies postpone disease deterioration but do not prevent serious disease complications.

Competitive landscape

There are a number of ongoing competitive programs for dcSSc, which we highlight below:

- **Lenabasum:** This is an oral medication being developed by Corbus Pharmaceuticals (not covered) as a potential treatment of scleroderma and other chronic inflammatory diseases that lead to tissue scarring (fibrosis). The Phase 2 trial results for study evaluating its safety and efficacy in patients with dcSSc showed clinically meaningful improvements and well tolerated safety profile.
- **BMS-986020:** This an LPAR1 antagonist being developed by Bristol-Myers Squibb (covered by Terence Flynn) that had advanced into a Phase 2 clinical trial in idiopathic pulmonary fibrosis (IPF) and plans to also advance into Phase 2 in SSc. However, the Phase 2 trial in SSc with withdrawn ([LINK](#)). As a result, we believe BMS-986020 has been discontinued in favor of a backup compound (potentially BMS-986278, [LINK](#)).
- **HZN-825:** This is an LPAR1 antagonist in development by Horizon Therapeutics (HZNP) for dcSSc. HZNP expects to conduct a Phase 2b trial starting in the first half of 2021, and for additional details on the asset, we refer you to our note that provides a fuller description and history of the asset ([LINK](#)).
- Of note, Boehringer Ingelheim's **Ofev** is approved in systemic scleroderma, but

primarily to manage associated declines in respiratory function.

Our assumptions: Our model assumes a US launch in 2024, and 2025 in the EU. We assign a PoS of 50% and forecast peak risk unadjusted sales of \$460mn in 2034, after which we expect patent expiration. We further assume an average annual price of c.\$162k, 20% GTN adjustment and 4% annual growth rate. In Europe, we assume a 30% discount to the US price (c.\$113/year) and keep the price constant.

Current status: On September 9, GLPG reported positive top line results from NOVESA Phase 2a trial of ziritaxestat in dsSSc. With respect to efficacy, when compared to placebo, treatment with 600 mg ziritaxestat lead to statistically significant improvements in the primary endpoint measure of modified Rodnan Skin Score (mRSS) at Week 24 (-8.3 vs -5.7 for placebo). Overall, ziritaxestat was well tolerated with only two patients experiencing serious adverse events as compared to one in the placebo group.

The Toledo program

This represents GLPG's biggest program in terms of the discovery and early development efforts. Molecules inhibiting this target family effectuate a dual mode of action on inflammation by stimulating anti-inflammatory cytokines and inhibiting pro-inflammatory cytokines. The MOA is novel but GLPG is yet to disclose any specific details about the program. However, they have disclosed the following about its Toledo compounds:

- '3970 (second generation) hits TOL2 and TOL3 (i.e., is TOL2 and TOL3 selective); a Phase 1 started in 2019, and a broad Phase 2 development program with multiple proof of concept studies in several autoimmune diseases started in 3Q20 (top line data is expected in 2021) and additionally GLPG aims to launch 2 additional Phase 2 studies, in Sjögren's and systemic lupus erythematosus in 1Q21.
- '4605, a selective TOL2/TOL3 compound, currently in preclinical phase and directed towards fibrosis
- '4399 is TOL3 selective; currently in preclinical phase and directed towards inflammation

GLPG will host an investor event on October 27 specifically on the Toledo program, at which time, we expect the company to announce the target/mechanism of action, which long has been undisclosed by the company.

Our assumptions: Contrary to our prior product revenue forecasts, where we have constructed detailed, patient-driven market models, for Toledo, we have instead chosen to take a more simplified approach. Here, we benchmark Toledo sales forecasts to that of our risk-unadjusted filgotinib forecasts. Against that backdrop, our model assumes a US launch for a Toledo program in 2027 (EU in 2028), and currently, we assign a PoS of 25% (first patient dosing occurred within the past month). In terms of peak risk-adjusted sales, we currently model \$509mn, and further, we model \$150mn in non-risk adjusted milestones at the completion of Phase 2 in 2023.

Financial projections

Revenue: To arrive at total revenue for GLPG, we model the following programs: 1) Filgotinib in RA, UC, CD, PsA and AS, 2) Zirataxestat in IPF and SSC, 3) Toledo, and GLPG1205 in IPF. For each program, we have built out individual revenue models, with key assumptions being: 1) market share penetration within the incident, 2) prevalent patient populations 3) pricing, and 4) probability of success.

Overall, we currently forecast (1) peak risk-unadjusted total sales potential across GLPG's portfolio of \$8.6bn and (2) peak company revenue of \$1.1bn in 2028 (recall GLPG does not record 100% of sales). In terms of revenue, in addition to the sales recorded by GLPG for each commercialized product in ex-US territories (where GLPG has responsibility), we also model royalty payments (from ex-EU sales — i.e., from US, Japan and other territories), and potential upfront and milestone payments from GILD.

COGS: We assume a steady state gross margin of 95% comparable to the COGS associated with small molecule manufacturing.

OpEx

- **R&D:** We forecast a decline of 10% in R&D expense in 2021 given our assumption that GLPG discontinues the development of GLPG1972. Further, we model a specific decline of ~18% and 30% in the years of 2022 and 2024 as we expect GILD to opt-in for GLPG1205 and Toledo after potential successful completion of Phase 2, and hence, share in the development costs. Post 2024, we model a gradual increase in R&D till 2028 and then a further decline as filgotinib and other programs lose patent exclusivity.
- **SG&A:** We assume SG&A growth at 10% yoy in 2021 and 2022 as GLPG launches filgotinib in Europe and Japan and a gradual increase till 2030. We model a decline of 40% yoy in 2031 assuming patent expiration for filgotinib and no new product launches, implying steady-state SG&A at ~20% of sales.
- All-in, our model implies operating profitability beginning in 2023.

Taxes

- We expect the company's net operating loss carry-forward to last until 2029, after which we assume an effective tax rate of 10%.

DCF assumptions

- We assume a discount rate of 10% (unchanged vs. our prior model), which we believe is appropriate given GLPG's late stage of development and having secured regulatory approvals for Jyseleca (again, in Europe and Japan). In addition, this is in line with the range of 10%-15% that is applied across our biotechnology coverage universe.
- We assume a terminal growth rate (TGR) of 0% which reflects the declining revenue (due to various patent expiries) offset by potential new products from GLPG's drug discovery engine (which has proven to be very productive). We note that previously,

we had modeled a -10% TGR, mainly to reflect the expected loss of US exclusivity for filgotinib several years ahead of the end of our forecast period (2035).

Upcoming news flow

Given the size of Galapagos' current R&D efforts, the balance of YE20 and 2021 is shaping up to be busy from a pipeline progress perspective. We believe the next 6-18 months will be mainly about the status and potential launch of filgotinib in RA (and UC) in the US, along with updates on the commercial launches for the product in Europe and Japan, but that said, other key data sets and events include:

- **2H20:** Phase 2 PINTA data for GLPG1205 in IPF; and updates on the Toledo program at the Toledo roundtable on October 27;
- **2021:** 26-week data from the MANTA and MANTA-Ray studies; interim Phase 3 data for ziritaxestat/GLPG1690 in IPF; Phase 2 data in fistulizing CD for filgotinib; and Phase 3 DIVERSITY data in CD for filgotinib.

Exhibit 11: Upcoming Catalysts

Timing	Product	Event Type	Details
2020			
4Q20	'1205	Clinical	Announce Phase 2 PINTA data in IPF
27-Oct-20	'3970 (2nd gen Toledo)	Clinical	Announce target class and Phase 1 data
4Q20	filgotinib	Commercial	Launch in France, Italy, Spain, and Japan for RA
4Q20	filgotinib	Clinical	Initiate Phase 3 program in AS
2021+			
1H21	filgotinib	Clinic	Announce 26 week data from MANTA studies
1H21	filgotinib	Regulatory	NDA submission in RA and UC
1H21	'3970 (2nd gen Toledo)	Clinical	Announce topline data from Phase 2 POC trials
1H21	'1690	Clinical	Announce fertility analysis for Phase 3 ISABELA1 data in IPF
1H21	filgotinib	Clinical	Announce Phase 2 data in fistulizing CD
1H21	filgotinib	Regulatory	Regulatory filing in EU and Japan for UC
2H21	filgotinib	Clinical	Announce Phase 3 DIVERSITY data in CD
2022+			
4Q21/1Q22	'1690	Clinical	Announce final Phase 3 ISABELA1 data in IPF
1Q22	filgotinib	Regulatory	EU and Japan approval in UC
1Q22	filgotinib	Regulatory	Potential FDA approval in RA and UC

Source: Company data, Goldman Sachs Global Investment Research

Valuation/Risks

As a result of the model changes, we downgrade GLPG to Sell from Neutral with a DCF-derived 12-month price target of €87 vs. prior €108 (unchanged 10% WACC and 0% terminal growth rate vs prior terminal growth rate of -10%). In addition, we introduce a \$103 12-month PT on the US ADR (using a 1:1 ADR ratio and EUR/US exchange rate of 1.18).

Upside risks include:

Clinical

- Better-than-expected data from the clinical readouts for GLPG1205 and GLPG1690.

- Revenue contributions from earlier stage assets not modeled currently
- Faster-than-anticipated clinical advancement, earlier-than-anticipated NDA submission and full FDA approval for filgotinib.

Competitive

- Better-than-expected execution of filgotinib commercial launch, potentially capturing larger-than-anticipated market share, which represents upside to our current revenue estimates.

Exhibit 12: DCF valuation

€mn	FY20E	FY21E	FY22E	FY23E	FY24E	FY25E	FY26E	FY27E	FY28E	FY29E	FY30E	FY31E	FY32E	FY33E	FY34E	FY35E
Product Sales	2	20	44	76	159	218	266	322	361	403	433	381	349	358	338	217
Royalties	0	4	12	82	145	212	287	355	418	469	513	442	403	377	369	222
Recognition of deferred revenue	404	408	408	408	321	234	234	234	234	117	0	0	0	0	0	0
Milestones	122	56	74	288	35	46	21	39	0	0	0	0	0	0	0	0
Other revenue	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Other income	62	68	55	61	43	44	45	46	46	42	35	25	20	18	16	14
Total Revenues	615	581	619	940	728	779	879	1020	1083	1055	1006	873	796	778	748	478
COGS	0	-2	-3	-4	-8	-11	-13	-16	-18	-20	-22	-19	-17	-18	-17	-11
COGS %	-10.0%	-10.0%	-7.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%
Gross profit	615	579	615	936	720	768	865	1004	1065	1035	985	854	779	760	731	467
Gross margin %	100.0%	99.7%	99.5%	99.6%	98.9%	98.6%	98.5%	98.4%	98.3%	98.1%	97.9%	97.8%	97.8%	97.7%	97.7%	97.7%
R&D	-610	-552	-450	-495	-347	-357	-368	-371	-375	-338	-287	-201	-161	-145	-130	-117
R&D %	-99.2%	-95.1%	-72.8%	-52.7%	-47.6%	-45.8%	-41.8%	-36.4%	-34.6%	-32.0%	-28.5%	-23.0%	-20.2%	-18.6%	-17.4%	-24.5%
SG&A	-216	-238	-261	-274	-288	-297	-300	-303	-306	-309	-312	-187	-178	-169	-160	-152
SG&A %	-35.1%	-40.9%	-42.3%	-29.2%	-39.6%	-38.1%	-34.1%	-29.7%	-28.2%	-29.3%	-31.0%	-21.4%	-22.3%	-21.7%	-21.5%	-31.9%
Other income/expense	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EBIT	-211.6	-211.1	-96.0	166.6	85.7	114.7	198.0	329.4	384.6	388.8	385.9	465.6	440.6	446.4	440.2	197.7
Tax rate	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.8%	10.0%	10.0%	10.0%	10.0%	10.0%
Adjusted taxes	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-30.2	-46.6	-44.1	-44.6	-44.0	-19.8
NOPLAT	-211.0	-211.1	-96.0	166.6	85.7	114.7	198.0	329.4	384.6	388.8	355.7	419.0	396.5	401.8	396.2	178.0
+ D&A	7.4	13.3	14.0	15.4	14.4	15.3	16.4	16.0	17.0	17.9	18.9	19.8	20.7	21.6	22.4	23.2
- CAPEX	21.3	16.0	13.4	14.7	10.3	11.0	11.0	11.0	11.0	11.0	11.0	10.0	9.0	8.0	8.0	8.0
+ CIWC	-338	-430	-447	-445	-346	-237	-241	-246	-239	-121	-4	-20	0	-3	0	23
Free cash flow	-562.8	-644.0	-542.3	-277.4	-256.5	-117.9	-38.2	88.3	151.3	275.0	360.0	409.0	408.4	412.8	410.3	216.3

Source: Company data, Goldman Sachs Global Investment Research

Exhibit 13: Intrinsic valuation

Intrinsic Valuation

PV of cash flows (2021-2035)	-309
WACC	10%
TV Growth rate	0%
Terminal Value	543
Enterprise Value	234
Net debt (end 1H21)	-4,916
Platform Value	600
Equity Value	5,750
# of shares (end of 1H21)	65.8
Equity Value per share	87.0
Exchange rate	1.2
Equity Value per share(\$)	103

Source: Goldman Sachs Global Investment Research

Exhibit 16: Cash flow statement

€ mn	FY20E	FY21E	FY22E	FY23E	FY24E	FY25E	FY26E	FY27E	FY28E	FY29E	FY30E	FY31E	FY32E	FY33E	FY34E	FY35E
Net income	(295.2)	(203.0)	(90.8)	169.9	87.9	116.3	199.2	330.8	386.6	391.8	360.0	425.1	404.7	412.0	408.5	191.9
Adjustments	115.5	56.8	80.3	45.6	80.6	55.1	57.2	58.9	60.1	68.2	101.3	124.0	113.3	109.4	108.2	83.9
Depreciation and amortization	7.4	13.3	14.0	15.4	14.4	15.3	16.4	16.0	17.0	17.9	18.9	19.8	20.7	21.6	22.4	23.2
Share based compensation	39.1	39.8	40.6	41.5	42.3	43.1	44.0	44.9	45.8	46.7	47.6	48.6	49.5	50.5	51.5	52.6
Exchange losses/(gains)	(4.0)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fair value remeasurements/adjustments	34.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gains/losses on asset disposals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	34.5	3.6	25.6	(11.3)	23.9	(3.3)	(3.1)	(2.0)	(2.6)	3.6	34.8	55.6	43.0	37.3	34.3	8.2
Changes in working capital (excl. deferred income)	73.7	(21.8)	(38.5)	(36.3)	(25.2)	(3.3)	(7.8)	(12.5)	(5.6)	(3.9)	(3.6)	(19.9)	0.2	(2.5)	(0.2)	23.2
Changes in deferred revenue	(411.5)	(408.3)	(408.3)	(408.3)	(321.0)	(233.7)	(233.7)	(233.7)	(233.7)	(116.8)	-	-	-	-	-	-
Interest	(97.9)	3.2	0.4	(1.4)	(2.5)	(3.3)	(3.6)	(3.4)	(2.8)	(1.8)	(0.1)	2.0	4.3	6.6	8.9	10.7
Tax	(0.7)	-	-	-	-	-	-	-	-	-	(30.6)	(47.2)	(45.0)	(45.8)	(45.4)	(21.3)
Cash flow from operating activities	(565.3)	(573.1)	(457.0)	(230.5)	(180.3)	(68.9)	11.4	140.1	204.6	337.5	427.0	484.0	477.4	479.6	479.9	288.3
Purchase of PP&E	(10.8)	(12.4)	(9.5)	(10.4)	(5.7)	(6.0)	(6.0)	(6.0)	(6.0)	(6.0)	(6.0)	(5.0)	(5.0)	(5.0)	(5.0)	(5.0)
Purchase of intangible fixed assets	(10.5)	(3.7)	(3.9)	(4.3)	(4.6)	(5.0)	(5.0)	(5.0)	(5.0)	(5.0)	(5.0)	(5.0)	(4.0)	(3.0)	(3.0)	(3.0)
Disposals	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Current financial investments, net	730.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acquisition of financial assets	(2.7)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Interest received from financial investments	4.7	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Net movement in marketable securities	6.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Change in restricted cash	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cash flow from investing activities	717.8	(11.3)	(8.7)	(9.9)	(5.6)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(5.2)	(4.2)	(3.2)	(3.2)	(3.2)
Payment of lease liabilities	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)
Shares issued for cash	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Issue costs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Proceeds from exercise of warrants	23.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Share buyback	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cash flow from financing activities	17.0	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)	(6.2)
Total cash flow in the year	169.5	(590.6)	(471.9)	(246.7)	(192.0)	(81.3)	(1.1)	127.7	192.2	325.1	414.6	472.6	467.0	470.2	470.5	278.9
Cash at beginning of period	1,861.6	2,030.6	1,439.9	968.0	721.3	529.3	448.0	446.9	574.6	766.7	1,091.8	1,506.4	1,979.0	2,446.0	2,916.1	3,386.6
Exchange rates & other unrealized gain (loss)	(0.6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cash at end of period	2,030.6	1,439.9	968.0	721.3	529.3	448.0	446.9	574.6	766.7	1,091.8	1,506.4	1,979.0	2,446.0	2,916.1	3,386.6	3,665.4

Source: Goldman Sachs Global Investment Research

Disclosure Appendix

Reg AC

We, Graig Suvannavejh, Ph.D. and John McNeil, hereby certify that all of the views expressed in this report accurately reflect our personal views about the subject company or companies and its or their securities. We also certify that no part of our compensation was, is or will be, directly or indirectly, related to the specific recommendations or views expressed in this report.

Unless otherwise stated, the individuals listed on the cover page of this report are analysts in Goldman Sachs' Global Investment Research division.

GS Factor Profile

The Goldman Sachs Factor Profile provides investment context for a stock by comparing key attributes to the market (i.e. our coverage universe) and its sector peers. The four key attributes depicted are: Growth, Financial Returns, Multiple (e.g. valuation) and Integrated (a composite of Growth, Financial Returns and Multiple). Growth, Financial Returns and Multiple are calculated by using normalized ranks for specific metrics for each stock. The normalized ranks for the metrics are then averaged and converted into percentiles for the relevant attribute. The precise calculation of each metric may vary depending on the fiscal year, industry and region, but the standard approach is as follows:

Growth is based on a stock's forward-looking sales growth, EBITDA growth and EPS growth (for financial stocks, only EPS and sales growth), with a higher percentile indicating a higher growth company. **Financial Returns** is based on a stock's forward-looking ROE, ROCE and CROCI (for financial stocks, only ROE), with a higher percentile indicating a company with higher financial returns. **Multiple** is based on a stock's forward-looking P/E, P/B, price/dividend (P/D), EV/EBITDA, EV/FCF and EV/Debt Adjusted Cash Flow (DACF) (for financial stocks, only P/E, P/B and P/D), with a higher percentile indicating a stock trading at a higher multiple. The **Integrated** percentile is calculated as the average of the Growth percentile, Financial Returns percentile and (100% - Multiple percentile).

Financial Returns and Multiple use the Goldman Sachs analyst forecasts at the fiscal year-end at least three quarters in the future. Growth uses inputs for the fiscal year at least seven quarters in the future compared with the year at least three quarters in the future (on a per-share basis for all metrics).

For a more detailed description of how we calculate the GS Factor Profile, please contact your GS representative.

M&A Rank

Across our global coverage, we examine stocks using an M&A framework, considering both qualitative factors and quantitative factors (which may vary across sectors and regions) to incorporate the potential that certain companies could be acquired. We then assign a M&A rank as a means of scoring companies under our rated coverage from 1 to 3, with 1 representing high (30%-50%) probability of the company becoming an acquisition target, 2 representing medium (15%-30%) probability and 3 representing low (0%-15%) probability. For companies ranked 1 or 2, in line with our standard departmental guidelines we incorporate an M&A component into our target price. M&A rank of 3 is considered immaterial and therefore does not factor into our price target, and may or may not be discussed in research.

Quantum

Quantum is Goldman Sachs' proprietary database providing access to detailed financial statement histories, forecasts and ratios. It can be used for in-depth analysis of a single company, or to make comparisons between companies in different sectors and markets.

Disclosures

The rating(s) for Galapagos NV is/are relative to the other companies in its/their coverage universe:

Argenx SE, Autolus Therapeutics, Bicycle Therapeutics, DBV Technologies SA, Galapagos NV, Genmab, Idorsia Pharmaceuticals, Immatics NV, Innate Pharma SA, MorphoSys AG, Orchard Therapeutics, Zealand Pharma A/S

Company-specific regulatory disclosures

The following disclosures relate to relationships between The Goldman Sachs Group, Inc. (with its affiliates, "Goldman Sachs") and companies covered by the Global Investment Research Division of Goldman Sachs and referred to in this research.

Goldman Sachs expects to receive or intends to seek compensation for investment banking services in the next 3 months: Galapagos NV (\$131.79)

Goldman Sachs had a non-securities services client relationship during the past 12 months with: Galapagos NV (\$131.79)

Goldman Sachs makes a market in the securities or derivatives thereof: Galapagos NV (\$131.79)

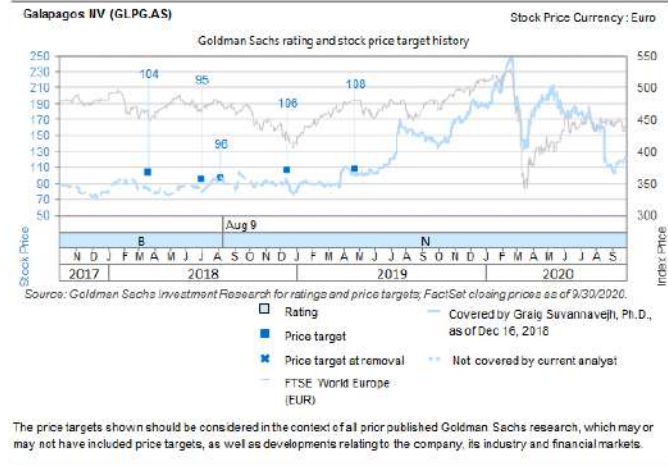
Distribution of ratings/investment banking relationships

Goldman Sachs Investment Research global Equity coverage universe

	Rating Distribution			Investment Banking Relationships		
	Buy	Hold	Sell	Buy	Hold	Sell
Global	49%	35%	16%	64%	57%	54%

As of October 1, 2020, Goldman Sachs Global Investment Research had investment ratings on 3,122 equity securities. Goldman Sachs assigns stocks as Buys and Sells on various regional Investment Lists; stocks not so assigned are deemed Neutral. Such assignments equate to Buy, Hold and Sell for the purposes of the above disclosure required by the FINRA Rules. See 'Ratings, Coverage universe and related definitions' below. The Investment Banking Relationships chart reflects the percentage of subject companies within each rating category for whom Goldman Sachs has provided investment banking services within the previous twelve months.

Price target and rating history chart(s)



Regulatory disclosures

Disclosures required by United States laws and regulations

See company-specific regulatory disclosures above for any of the following disclosures required as to companies referred to in this report: manager or co-manager in a pending transaction; 1% or other ownership; compensation for certain services; types of client relationships; managed/co-managed public offerings in prior periods; directorships; for equity securities, market making and/or specialist role. Goldman Sachs trades or may trade as a principal in debt securities (or in related derivatives) of issuers discussed in this report.

The following are additional required disclosures: **Ownership and material conflicts of interest:** Goldman Sachs policy prohibits its analysts, professionals reporting to analysts and members of their households from owning securities of any company in the analyst's area of coverage.

Analyst compensation: Analysts are paid in part based on the profitability of Goldman Sachs, which includes investment banking revenues. **Analyst as officer or director:** Goldman Sachs policy generally prohibits its analysts, persons reporting to analysts or members of their households from serving as an officer, director or advisor of any company in the analyst's area of coverage. **Non-U.S. Analysts:** Non-U.S. analysts may not be associated persons of Goldman Sachs & Co. LLC and therefore may not be subject to FINRA Rule 2241 or FINRA Rule 2242 restrictions on communications with subject company, public appearances and trading securities held by the analysts.

Distribution of ratings: See the distribution of ratings disclosure above. **Price chart:** See the price chart, with changes of ratings and price targets in prior periods, above, or, if electronic format or if with respect to multiple companies which are the subject of this report, on the Goldman Sachs website at <https://www.gs.com/research/hedge.html>.

Additional disclosures required under the laws and regulations of jurisdictions other than the United States

The following disclosures are those required by the jurisdiction indicated, except to the extent already made above pursuant to United States laws and regulations. **Australia:** Goldman Sachs Australia Pty Ltd and its affiliates are not authorised deposit-taking institutions (as that term is defined in the Banking Act 1959 (Cth)) in Australia and do not provide banking services, nor carry on a banking business, in Australia. This research, and any access to it, is intended only for "wholesale clients" within the meaning of the Australian Corporations Act, unless otherwise agreed by Goldman Sachs. In producing research reports, members of the Global Investment Research Division of Goldman Sachs Australia may attend site visits and other meetings hosted by the companies and other entities which are the subject of its research reports. In some instances the costs of such site visits or meetings may be met in part or in whole by the issuers concerned if Goldman Sachs Australia considers it is appropriate and reasonable in the specific circumstances relating to the site visit or meeting. To the extent that the contents of this document contains any financial product advice, it is general advice only and has been prepared by Goldman Sachs without taking into account a client's objectives, financial situation or needs. A client should, before acting on any such advice, consider the appropriateness of the advice having regard to the client's own objectives, financial situation and needs. A copy of certain Goldman Sachs Australia and New Zealand disclosure of interests and a copy of Goldman Sachs' Australian Sell-Side Research Independence Policy Statement are available at: <https://www.goldmansachs.com/disclosures/australia-new-zealand/index.html>. **Brazil:** Disclosure information in relation to CVM Instruction 598 is available at <https://www.gs.com/worldwide/brazil/area/gir/index.html>. Where applicable, the Brazil-registered analyst primarily responsible for the content of this research report, as defined in Article 20 of CVM Instruction 598, is the first author named at the beginning of this report, unless indicated otherwise at the end of the text. **Canada:** Goldman Sachs Canada Inc. is an affiliate of The Goldman Sachs Group Inc. and therefore is included in the company specific disclosures relating to Goldman Sachs (as defined above). Goldman Sachs Canada Inc. has approved of, and agreed to take responsibility for, this research report in Canada if and to the extent that Goldman Sachs Canada Inc. disseminates this research report to its clients. **Hong Kong:** Further information on the securities of covered companies referred to in this research may be obtained on request from Goldman Sachs (Asia) L.L.C. **India:** Further information on the subject company or companies referred to in this research may be obtained from Goldman Sachs (India) Securities Private Limited, Research Analyst - SEBI Registration Number INH000001493, 951-A, Rational House, Appasaheb Marathe Marg, Prabhadevi, Mumbai 400 025, India, Corporate Identity Number U74140MH2006FTC160634, Phone +91 22 6616 9000, Fax +91 22 6616 9001. Goldman Sachs may beneficially own 1% or more of the securities (as such term is defined in clause 2 (h) the Indian Securities Contracts (Regulation) Act, 1956) of the subject company or companies referred to in this research report. **Japan:** See below. **Korea:** This research, and any access to it, is intended only for "professional investors" within the meaning of the Financial Services and Capital Markets Act, unless otherwise agreed by Goldman Sachs. Further information on the subject company or companies referred to in this research may be obtained from Goldman Sachs (Asia) L.L.C., Seoul Branch. **New Zealand:** Goldman Sachs New Zealand Limited and its affiliates are neither "registered banks" nor "deposit takers" (as defined in the Reserve Bank of New Zealand Act 1989) in New Zealand. This research, and any access to it, is intended for "wholesale clients" (as defined in the Financial Advisers Act 2008) unless otherwise agreed by Goldman Sachs. A copy of certain Goldman Sachs Australia and New Zealand disclosure of interests is available at: <https://www.goldmansachs.com/disclosures/australia-new-zealand/index.html>. **Russia:** Research reports distributed in the Russian Federation are not advertising as defined in the Russian legislation, but are information and analysis not having product promotion as their main purpose and do not provide appraisal within the meaning of the Russian legislation on appraisal activity. Research reports do not constitute a personalized investment recommendation as defined in Russian laws and regulations, are not addressed to a specific client, and are prepared without analyzing the financial circumstances, investment profiles or risk profiles of clients. Goldman Sachs assumes no responsibility for any investment decisions that may be taken by a client or any other person based on this research report. **Singapore:** Goldman

Sachs (Singapore) Pte. (Company Number: 198602165W), which is regulated by the Monetary Authority of Singapore, accepts legal responsibility for this research, and should be contacted with respect to any matters arising from, or in connection with, this research. **Taiwan:** This material is for reference only and must not be reprinted without permission. Investors should carefully consider their own investment risk. Investment results are the responsibility of the individual investor. **United Kingdom:** Persons who would be categorized as retail clients in the United Kingdom, as such term is defined in the rules of the Financial Conduct Authority, should read this research in conjunction with prior Goldman Sachs research on the covered companies referred to herein and should refer to the risk warnings that have been sent to them by Goldman Sachs International. A copy of these risks warnings, and a glossary of certain financial terms used in this report, are available from Goldman Sachs International on request.

European Union: Disclosure information in relation to Article 6 (2) of the European Commission Delegated Regulation (EU) (2016/958) supplementing Regulation (EU) No 596/2014 of the European Parliament and of the Council with regard to regulatory technical standards for the technical arrangements for objective presentation of investment recommendations or other information recommending or suggesting an investment strategy and for disclosure of particular interests or indications of conflicts of interest is available at <https://www.gs.com/disclosures/europeanpolicy.html> which states the European Policy for Managing Conflicts of Interest in Connection with Investment Research.

Japan: Goldman Sachs Japan Co., Ltd. is a Financial Instrument Dealer registered with the Kanto Financial Bureau under registration number Kinsho 69, and a member of Japan Securities Dealers Association, Financial Futures Association of Japan and Type II Financial Instruments Firms Association. Sales and purchase of equities are subject to commission pre-determined with clients plus consumption tax. See company-specific disclosures as to any applicable disclosures required by Japanese stock exchanges, the Japanese Securities Dealers Association or the Japanese Securities Finance Company.

Ratings, coverage universe and related definitions

Buy (B), Neutral (N), Sell (S) -Analysts recommend stocks as Buys or Sells for inclusion on various regional Investment Lists. Being assigned a Buy or Sell on an Investment List is determined by a stock's total return potential relative to its coverage universe. Any stock not assigned as a Buy or a Sell on an Investment List with an active rating (i.e., a stock that is not Rating Suspended, Not Rated, Coverage Suspended or Not Covered), is deemed Neutral. Each region's Investment Review Committee manages Regional Conviction lists, which represent investment recommendations focused on the size of the total return potential and/or the likelihood of the realization of the return across their respective areas of coverage. The addition or removal of stocks from such Conviction lists do not represent a change in the analysts' investment rating for such stocks.

Total return potential represents the upside or downside differential between the current share price and the price target, including all paid or anticipated dividends, expected during the time horizon associated with the price target. Price targets are required for all covered stocks. The total return potential, price target and associated time horizon are stated in each report adding or reiterating an Investment List membership.

Coverage Universe: A list of all stocks in each coverage universe is available by primary analyst, stock and coverage universe at <https://www.gs.com/research/hedge.html>.

Not Rated (NR). The investment rating and target price have been removed pursuant to Goldman Sachs policy when Goldman Sachs is acting in an advisory capacity in a merger or strategic transaction involving this company and in certain other circumstances. **Rating Suspended (RS).** Goldman Sachs Research has suspended the investment rating and price target for this stock, because there is not a sufficient fundamental basis for determining, or there are legal, regulatory or policy constraints around publishing, an investment rating or target. The previous investment rating and price target, if any, are no longer in effect for this stock and should not be relied upon. **Coverage Suspended (CS).** Goldman Sachs has suspended coverage of this company. **Not Covered (NC).** Goldman Sachs does not cover this company. **Not Available or Not Applicable (NA).** The information is not available for display or is not applicable. **Not Meaningful (NM).** The information is not meaningful and is therefore excluded.

Global product; distributing entities

The Global Investment Research Division of Goldman Sachs produces and distributes research products for clients of Goldman Sachs on a global basis. Analysts based in Goldman Sachs offices around the world produce research on industries and companies, and research on macroeconomics, currencies, commodities and portfolio strategy. This research is disseminated in Australia by Goldman Sachs Australia Pty Ltd (ABN 21 006 797 897); in Brazil by Goldman Sachs do Brasil Corretora de Títulos e Valores Mobiliários S.A.; Ombudsman Goldman Sachs Brazil: 0800 727 5764 and / or ouvidoriagoldmansachs@gs.com. Available Weekdays (except holidays), from 9am to 6pm. Ouvidoria Goldman Sachs Brasil: 0800 727 5764 e/ou ouvidoriagoldmansachs@gs.com. Horário de funcionamento: segunda-feira à sexta-feira (exceto feriados), das 9h às 18h; in Canada by either Goldman Sachs Canada Inc. or Goldman Sachs & Co. LLC; in Hong Kong by Goldman Sachs (Asia) L.L.C.; in India by Goldman Sachs (India) Securities Private Ltd.; in Japan by Goldman Sachs Japan Co., Ltd.; in the Republic of Korea by Goldman Sachs (Asia) L.L.C., Seoul Branch; in New Zealand by Goldman Sachs New Zealand Limited; in Russia by OOO Goldman Sachs; in Singapore by Goldman Sachs (Singapore) Pte. (Company Number: 198602165W); and in the United States of America by Goldman Sachs & Co. LLC. Goldman Sachs International has approved this research in connection with its distribution in the United Kingdom and European Union.

European Union: Goldman Sachs International authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority, has approved this research in connection with its distribution in the European Union and United Kingdom.

General disclosures

This research is for our clients only. Other than disclosures relating to Goldman Sachs, this research is based on current public information that we consider reliable, but we do not represent it is accurate or complete, and it should not be relied on as such. The information, opinions, estimates and forecasts contained herein are as of the date hereof and are subject to change without prior notification. We seek to update our research as appropriate, but various regulations may prevent us from doing so. Other than certain industry reports published on a periodic basis, the large majority of reports are published at irregular intervals as appropriate in the analyst's judgment.

Goldman Sachs conducts a global full-service, integrated investment banking, investment management, and brokerage business. We have investment banking and other business relationships with a substantial percentage of the companies covered by our Global Investment Research Division. Goldman Sachs & Co. LLC, the United States broker dealer, is a member of SIPC (<https://www.sipc.org>).

Our salespeople, traders, and other professionals may provide oral or written market commentary or trading strategies to our clients and principal trading desks that reflect opinions that are contrary to the opinions expressed in this research. Our asset management area, principal trading desks and investing businesses may make investment decisions that are inconsistent with the recommendations or views expressed in this research.

The analysts named in this report may have from time to time discussed with our clients, including Goldman Sachs salespersons and traders, or may discuss in this report, trading strategies that reference catalysts or events that may have a near-term impact on the market price of the equity securities discussed in this report, which impact may be directionally counter to the analyst's published price target expectations for such stocks. Any such trading strategies are distinct from and do not affect the analyst's fundamental equity rating for such stocks, which rating reflects a stock's return potential relative to its coverage universe as described herein.

We and our affiliates, officers, directors, and employees, excluding equity and credit analysts, will from time to time have long or short positions in, act as principal in, and buy or sell, the securities or derivatives, if any, referred to in this research.

The views attributed to third party presenters at Goldman Sachs arranged conferences, including individuals from other parts of Goldman Sachs, do not necessarily reflect those of Global Investment Research and are not an official view of Goldman Sachs.

Any third party referenced herein, including any salespeople, traders and other professionals or members of their household, may have positions in the products mentioned that are inconsistent with the views expressed by analysts named in this report.

This research is not an offer to sell or the solicitation of an offer to buy any security in any jurisdiction where such an offer or solicitation would be illegal. It does not constitute a personal recommendation or take into account the particular investment objectives, financial situations, or needs of individual clients. Clients should consider whether any advice or recommendation in this research is suitable for their particular circumstances and, if appropriate, seek professional advice, including tax advice. The price and value of investments referred to in this research and the income from them may fluctuate. Past performance is not a guide to future performance, future returns are not guaranteed, and a loss of original capital may occur. Fluctuations in exchange rates could have adverse effects on the value or price of, or income derived from, certain investments.

Certain transactions, including those involving futures, options, and other derivatives, give rise to substantial risk and are not suitable for all investors. Investors should review current options and futures disclosure documents which are available from Goldman Sachs sales representatives or at <https://www.theocc.com/about/publications/character-risks.jsp> and https://www.fiadocumentation.org/fia/regulatory-disclosures_1/fia-uniform-futures-and-options-on-futures-risk-disclosures-booklet-pdf-version-2018. Transaction costs may be significant in option strategies calling for multiple purchase and sales of options such as spreads. Supporting documentation will be supplied upon request.

Differing Levels of Service provided by Global Investment Research: The level and types of services provided to you by the Global Investment Research division of GS may vary as compared to that provided to internal and other external clients of GS, depending on various factors including your individual preferences as to the frequency and manner of receiving communication, your risk profile and investment focus and perspective (e.g., marketwide, sector specific, long term, short term), the size and scope of your overall client relationship with GS, and legal and regulatory constraints. As an example, certain clients may request to receive notifications when research on specific securities is published, and certain clients may request that specific data underlying analysts' fundamental analysis available on our internal client websites be delivered to them electronically through data feeds or otherwise. No change to an analyst's fundamental research views (e.g., ratings, price targets, or material changes to earnings estimates for equity securities), will be communicated to any client prior to inclusion of such information in a research report broadly disseminated through electronic publication to our internal client websites or through other means, as necessary, to all clients who are entitled to receive such reports.

All research reports are disseminated and available to all clients simultaneously through electronic publication to our internal client websites. Not all research content is redistributed to our clients or available to third-party aggregators, nor is Goldman Sachs responsible for the redistribution of our research by third party aggregators. For research, models or other data related to one or more securities, markets or asset classes (including related services) that may be available to you, please contact your GS representative or go to <https://research.gs.com>.

Disclosure information is also available at <https://www.gs.com/research/hedge.html> or from Research Compliance, 200 West Street, New York, NY 10282.

© 2020 Goldman Sachs.

No part of this material may be (i) copied, photocopied or duplicated in any form by any means or (ii) redistributed without the prior written consent of The Goldman Sachs Group, Inc.