

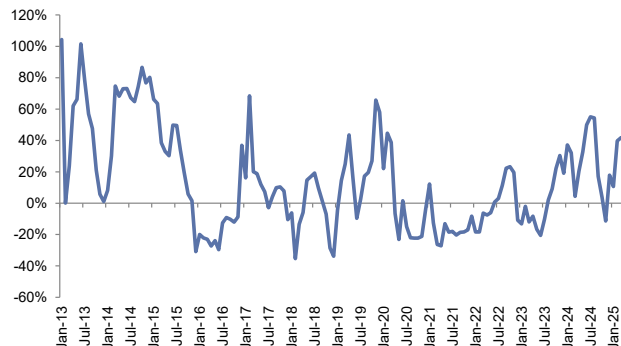
Largan (3008.TW): 3-month preview: 1Q25 revenues beat; 2Q25 slow season, while form factor changes to support 2H25 growth; Buy

Largan reported March revenues at +42% YoY, or 3% ahead of our estimates, leading 1Q25 revenues to +29% YoY, or 9% ahead of our and Bloomberg consensus estimates. The strong revenues growth in 1Q25 reflects solid high-end smartphone models shipment driven by new model launch of its major customer, leading China smartphone brand late launch of flagship models in 4Q24, and nationwide subsidies in China supporting high-end models demand. The coming 2Q is traditional slow season of its major customer, along with subsidies potentially resulting in consumption pull in, we expect 2Q25 revenues to decline by 12% QoQ. However, with form factor change of the coming new models in 3Q25 and 3Q26, we maintain our positive view on Largan, expecting the form factor change to support Largan's growth ahead, given (1) brand customers would rely more on technology leader to redesign the lens to fit in the slim model, supporting Largan to resume market share gain and (2) form factor change brings differentiation to end consumers, supporting end market demand. Maintain Buy.

Verena Jeng
+852-2978-1681 | verena.jeng@gs.com
Goldman Sachs (Asia) L.L.C.

Allen Chang
+852-2978-2930 | allen.k.chang@gs.com
Goldman Sachs (Asia) L.L.C.

Exhibit 1: Largan monthly revenues YoY



Source: Company data

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.html. Analysts employed by non-US affiliates are not registered/qualified as research analysts with FINRA in the U.S.

Exhibit 2: Largan 3-month revenues preview

	Jan 2025	Feb 2025	Mar 2025	Apr 2025E	May 2025E	Jun 2025E	4Q24	1Q25	2Q25
Rev (NT\$m)	4,948	4,735	4,893	4,404	4,183	4,169	18,210	14,575	12,756
YoY	11%	40%	42%	27%	20%	3%	2%	29%	16%
MoM/QoQ	-12%	-4%	3%	-10%	-5%	0%	-4%	-20%	-12%
GS estimates (NT\$m)	4,227	4,438	4,758				17,973	13,423	
Act. Vs. GS	17%	7%	3%				1%	9%	

Source: Company data, Goldman Sachs Global Investment Research

Tariff impact: As we highlighted on April 6 ([report link](#)), we cut 30 companies' earnings and TPs to reflect US additional tariffs against 180+ countries ([News link](#), [GS Macro report](#)). In our April 6 report, we cut Largan's earnings and TPs by 4% to reflect the potential impact on smartphones demand under the tariff. In the report, we assume Largan's major customers' smartphones for the US market to be assembled in India (tariff at 26%), Vietnam (46%), and Brazil (10%), and these additional tariffs will be passed to end consumers, reflecting in the higher selling price, and based on a 0.5x price sensitivity, bringing down the end market demand. The upside risks to our sector report where we cut our estimates on April 6 report include: (1) Largan's major customer being granted a waiver of this tariff: US government announced on April 5 that for articles in which at least 20% of the value of an article is U.S. originating, the U.S. content will not be subject to the reciprocal tariff ([link](#)), and (2) Some countries could potentially negotiate a waiver of the tariffs: Vietnam and U.S. under discussion to remove tariffs ([link](#)). **The downside risks** include: (1) failure of negotiation to earn waivers, or further increase in tariffs, negatively affecting global production and trade, and (2) stronger than expected price sensitivity on smartphones, which could lead to weaker than expected demand, or brand customers slowdown specification upgrade to save costs, or pressure on supply chain margins.

Earnings revision: We factor in 1Q25 revenues, and keep EPS unchanged in 2025-27E. The net income is 1% higher in 2025-27E mainly on higher GM, reflecting our positive view on high-end models end market demand in 1Q25, and we expect premium models to be affected less on demand under the tariff impact given the lower price sensitivity, along with Largan's focus on high-end lens. We update sharecounts forecast to latest sharecounts, which is from 134m to 135m.

Exhibit 3: Earnings revision

NT m	2025E			2026E			2027E		
	Old	New	Chg	Old	New	Chg	Old	New	Chg
Revenue	67,946	67,847	0%	70,962	71,033	0%	73,587	73,464	0%
GP	34,453	34,782	1%	36,523	37,305	2%	39,196	39,771	1%
OP	26,730	26,787	0%	29,003	29,207	1%	31,423	31,763	1%
Net income	25,121	25,379	1%	26,738	27,070	1%	28,084	28,443	1%
EPS (Diluted)	187.47	187.48	0%	199.53	199.97	0%	209.58	210.13	0%
Margins									
GM	50.8%	51.3%		51.6%	52.5%		53.4%	54.1%	
OPM	40.1%	39.5%		41.6%	41.1%		43.5%	43.2%	
NM	37.5%	37.4%		38.2%	38.1%		38.7%	38.7%	

Source: Goldman Sachs Global Investment Research

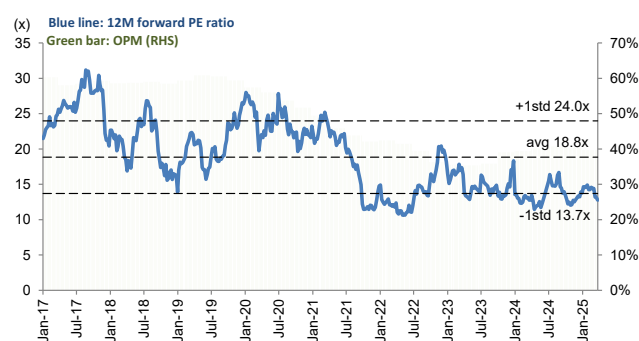
Compared to Bloomberg consensus, our operating income is 2% / 4% higher in 2025 / 26E, mainly on higher revenues and GM, reflecting our positive view on form factor changes (e.g. slim models, foldable phones) to better secure Largan's market share, dollar content, and end market demand.

Exhibit 4: GS vs. Bloomberg consensus

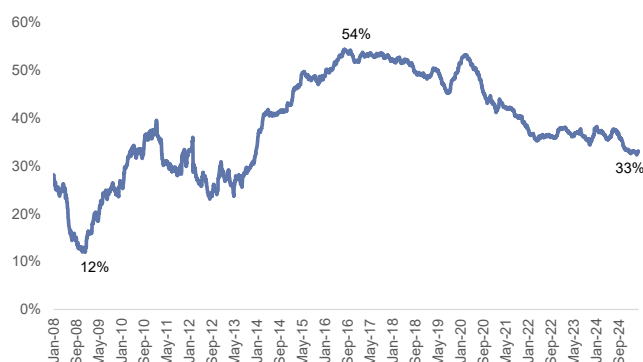
NT m	2025E			2026E		
	GS	BB	Diff %	GS	BB	Diff %
Revenue	67,847	65,462	4%	71,033	69,168	3%
GP	34,782	33,347	4%	37,305	35,582	5%
OP	26,787	26,292	2%	29,207	28,022	4%
Net income	25,379	24,794	2%	27,070	26,462	2%
Margins						
GM	51.3%	49.8%		52.5%	50.6%	
OPM	39.5%	40.2%		41.1%	40.5%	
NM	37.4%	37.9%		38.1%	38.3%	

Source: Goldman Sachs Global Investment Research, Bloomberg

Valuation: We continue to use near term PE to derive target price, and our target PE multiple is unchanged at 17.9x, which is derived from Largan's historical trading avg. during periods when its OPM is recovering (2015-17, from 49.5% to 60.1%; 2022 - at 43%), methodology unchanged. We use the average P/E of these periods (2015-17, 2022), as we expect OPM expansion to continue in 2026-27E, from 36.5% in 2023 to 43.2% in 2027E. Maintain Buy with 12m target price unchanged at NT\$3,356 (17.9x 2025E P/E).

Exhibit 5: Largan 12M forward PE chart

Source: Company data, Goldman Sachs Global Investment Research

Exhibit 6: Largan QFII holdings

Source: TEJ

Price Target Risks and Methodology - Largan

We have a 12-month target price of NT\$3,356, which is based on 2025E P/E. Our target P/E multiple of 17.9x is derived from Largan's average P/E over periods when it has enjoyed OPM expansion and when its OPM last reached 43% as we expect Largan's OPM to recover in the coming years to 43% in 2027E (vs. 36.5% in 2023). Compared to Largan's trading range, the 17.9x is below its avg. of 18.8x since 2017, reflecting that forward year OPM (43% in 2027E) is below historical avg. of 48% in 2018-25E.

Key risks: (1) slower-than-expected smartphone market growth, (2) fiercer competition in handset lenses, (3) slower-than-expected smartphone camera lens specification upgrades or Largan's handset lens pixel mix upgrade.

3008.TW	12m Price Target: NT\$3,356.00	Price: NT\$2,450.00	Upside: 37.0%			
Buy	GS Forecast					
	Market cap: NT\$327.0bn / \$9.9bn	Revenue (NT\$ mn) New	12/24	12/25E	12/26E	12/27E
	Enterprise value: NT\$206.8bn / \$6.2bn	Revenue (NT\$ mn) Old	59,457.6	67,846.8	71,033.0	73,464.1
	3m ADTV: NT\$2.2bn / \$67.8mn	EBITDA (NT\$ mn)	30,262.5	33,090.3	35,448.8	38,038.9
	Taiwan	EPS (NT\$) New	196.38	190.15	202.82	213.11
	Greater China Technology	EPS (NT\$) Old	178.98	188.22	200.33	210.41
	M&A Rank: 3	P/E (X)	12.9	12.9	12.1	11.5
	Leases incl. in net debt & EV?: No	P/B (X)	1.9	1.7	1.6	1.5
		Dividend yield (%)	3.8	3.8	4.1	4.3
		CROCI (%)	15.3	13.2	12.9	12.7
		12/24	3/25E	6/25E	9/25E	
	EPS (NT\$)	67.22	41.35	35.61	53.71	

Source: Company data, Goldman Sachs Research estimates, FactSet. Price as of 2 Apr 2025 close.

Disclosure Appendix

Reg AC

We, Verena Jeng and Allen Chang, 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 universe of rated stocks) 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 Largan is/are relative to the other companies in its/their coverage universe: AAC, ACM Research, AMEC, ASMPT, AVC, AccoTest, Anji Micro, Arcsoft, Asus, Auras, BOE, BYDE, CFME, CR Micro, Cambricon, Chenbro, China Mobile (HK), China Telecom, China Tower Corp., China Unicom, China United Network Comm, Chinasoft Intl, Compal, Dahua, Desay SV, E Ink, EHang, Empyrean, Eoptolink, Fositek, Foxconn Industrial Internet, GalaxyCore, Gigabyte, Gigadevice, Glodon Co., HG Tech, HTC Corp., Hengtong, Hikvision, Hon Hai, Horizon Robotics, Hua Hong, Hwatsing, ISoftStone, Innolight, Inventec, Jingce, King Slide, Kingdee, Kingsoft Office, LandMark, Largan, Lenovo, Luxshare, Maxscend, Montage, NAURA, NSIG, Nexchip, O-film, Pegatron, Piotech, Pony AI Inc., Primarius, Quanta, SG Micro, SICC, SMIC (A), SMIC (H), SZS, Sanan, Sangfor, Shennan Circuits, SinoWealth, StarPower, Sunny Optical, TFC Optical, Thundersoft, Transsion, UMT, VPEC, Vanchip, Venustech, VeriSilicon, WNC, Will Semi, Wistron, Wiwynn, YJ Semitech, YOFC (A), YOFC (H), Yonyou, ZTE (A), ZTE (H), ZWSOFT, iFlytek

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 Goldman Sachs Global Investment Research and referred to in this research.

There are no company-specific disclosures for: Largan (NT\$2,450.00)

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	48%	34%	18%		64%	57%	43%

As of January 1, 2025, Goldman Sachs Global Investment Research had investment ratings on 3,021 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.

<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 and United Kingdom: 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 (including as that Delegated Regulation is implemented into United Kingdom domestic law and regulation following the United Kingdom's departure from the European Union and the European Economic Area) 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 Type II Financial Instruments Firms Association, The Investment Trusts Association, Japan, and Japan Investment Advisers 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, Early-Stage Biotech, Coverage Suspended or Not Covered), is deemed Neutral. Each region manages Regional Conviction Lists, which are selected from Buy rated stocks on the respective region's Investment Lists and 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 are managed by the Investment Review Committee or other designated committee in each respective region and 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, target price and earnings estimates (where relevant) are removed pursuant to Goldman Sachs policy when Goldman Sachs is acting in an advisory capacity in a merger or in a strategic transaction involving this company, when there are legal, regulatory or policy constraints due to Goldman Sachs' involvement in a transaction, and in certain other circumstances. **Early-Stage Biotech (ES).** An investment rating and a target price are not assigned pursuant to Goldman Sachs policy when this company neither has a drug, treatment or medical device that has passed a Phase II clinical trial nor a license to distribute a post-Phase II drug, treatment or medical device. **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 an investment rating or target price. The previous investment rating and target price, 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.

Global product; distributing entities

Goldman Sachs Global Investment Research 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.; Public Communication Channel Goldman Sachs Brazil: 0800 727 5764 and / or contatogoldmanbrasil@gs.com. Available Weekdays (except holidays), from 9am to 6pm. Canal de Comunicação com o Público Goldman Sachs Brasil: 0800 727 5764 e/ou contatogoldmanbrasil@gs.com. Horário de funcionamento: segunda-feira à sexta-feira (exceto feriados), das 9h às 18h; in Canada by 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.

Goldman Sachs International ("GSI"), authorised by the Prudential Regulation Authority ("PRA") and regulated by the Financial Conduct Authority ("FCA") and the PRA, has approved this research in connection with its distribution in the United Kingdom.

European Economic Area: GSI, authorised by the PRA and regulated by the FCA and the PRA, disseminates research in the following jurisdictions within the European Economic Area: the Grand Duchy of Luxembourg, Italy, the Kingdom of Belgium, the Kingdom of Denmark, the Kingdom of Norway, the Republic of Finland and the Republic of Ireland; GSI - Succursale de Paris (Paris branch) which is authorised by the French Autorité de contrôle prudentiel et de résolution ("ACPR") and regulated by the Autorité de contrôle prudentiel et de résolution and the Autorité des marchés financiers ("AMF") disseminates research in France; GSI - Sucursal en España (Madrid branch) authorized in Spain by the Comisión Nacional del Mercado de Valores disseminates research in the Kingdom of Spain; GSI - Sweden Bankfilial (Stockholm branch) is authorized by the SFSA as a "third country branch" in accordance with Chapter 4, Section 4 of the Swedish Securities and Market Act (Sw. lag (2007:528) om värdepappersmarknaden) disseminates research in the Kingdom of Sweden; Goldman Sachs Bank Europe SE ("GSBE") is a credit institution incorporated in Germany and, within the Single Supervisory Mechanism, subject to direct prudential supervision by the European Central Bank and in other respects supervised by German Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin) and Deutsche Bundesbank and disseminates research

in the Federal Republic of Germany and those jurisdictions within the European Economic Area where GSI is not authorised to disseminate research and additionally, GSBE, Copenhagen Branch filial af GSBE, Tyskland, supervised by the Danish Financial Authority disseminates research in the Kingdom of Denmark; GSBE - Sucursal en España (Madrid branch) subject (to a limited extent) to local supervision by the Bank of Spain disseminates research in the Kingdom of Spain; GSBE - Succursale Italia (Milan branch) to the relevant applicable extent, subject to local supervision by the Bank of Italy (Banca d'Italia) and the Italian Companies and Exchange Commission (Commissione Nazionale per le Società e la Borsa "Consob") disseminates research in Italy; GSBE - Succursale de Paris (Paris branch), supervised by the AMF and by the ACPR disseminates research in France; and GSBE - Sweden Bankfilial (Stockholm branch), to a limited extent, subject to local supervision by the Swedish Financial Supervisory Authority (Finansinspektionen) disseminates research in the Kingdom of Sweden.

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 Global Investment Research. 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 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, unless otherwise prohibited by regulation or Goldman Sachs policy.

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/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 Goldman Sachs Global Investment Research 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.

© 2025 Goldman Sachs.

You are permitted to store, display, analyze, modify, reformat, and print the information made available to you via this service only for your own use. You may not resell or reverse engineer this information to calculate or develop any index for disclosure and/or marketing or create any other derivative works or commercial product(s), data or offering(s) without the express written consent of Goldman Sachs. You are not permitted to publish, transmit, or otherwise reproduce this information, in whole or in part, in any format to any third party without the express written consent of Goldman Sachs. This foregoing restriction includes, without limitation, using, extracting, downloading or retrieving this information, in whole or in part, to train or finetune a machine learning or artificial intelligence system, or to provide or reproduce this information, in whole or in part, as a prompt or input to any such system.