ASIA ECONOMICS ANALYST

How Much More Can China's Exports Grow?

Hui Shan
+852-2978-6634 | hui.shan@gs.com
Goldman Sachs (Asia) L.L.C.

Goohoon Kwon, CFA
+852-2978-0048 |
goohoon.kwon@gs.com
Goldman Sachs (Asia) L.L.C.

China in the Long Run
Explore >



- China's export rise is historically exceptional. From 2000 to 2025, China's share of global nominal goods exports increased from 4% to 15%, surpassing the peaks of Germany in the 1970s and Japan in the 1980s. With import volumes unlikely to rise significantly given the pursuit of "self-reliance", China's trade surplus continues to reach new highs, raising the question of how much further Chinese exports can expand.
- Unlike "China Shock 1.0" in 2001-07, when export growth coincided with overall industrial profit growth, the current export boom coincides with stagnating or falling profitability, a sign of supply-driven export strength. For example, the value of Chinese auto exports nearly doubled from 2021 to 2025, while profit margins fell from 6.4% to 4.8%. Future growth therefore depends increasingly on foreign markets' ability to absorb additional Chinese supply.
- The absorption capacity of China's trading partners appears to be shrinking somewhat. Emerging markets now take a larger share of Chinese exports, but many have developed large bilateral deficits with China. The number of countries running deficits above 3% of GDP with China rose from 24 in 2005 to 82 in 2025, and their combined share of Chinese exports increased from 24% to 44%. The majority of these countries—67 out of 82—are low-income EM economies.
- One offsetting factor is that China's trading partners may buy less from elsewhere when buying more from China. We estimate that over 2021-25, on average each 1pp-of-GDP increase in the deficit with China was associated with a 0.7pp decline in the deficit with all other countries, slightly more than the 0.6pp estimated for "China Shock 1.0" in 2001-07. This shift toward deficits with China and surpluses with non-China is most pronounced among ASEAN countries, likely reflecting regional supply chain reconfiguration over the past decade.
- We conduct a thought experiment where we assume China's share in other countries' non-mineral imports reaches the previous record high by any country during 2000-24. China supplied 17.6% of global ex-China non-mineral imports in

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.

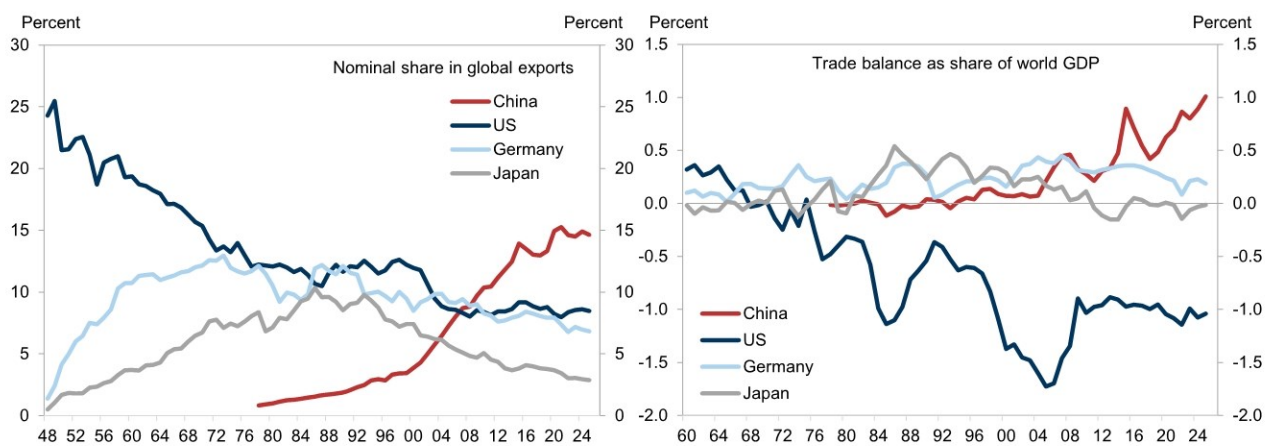
2024. Under different assumptions, we estimate that this share could rise to 19.2-27.6%. With each 1pp gain in China's share adding about 5.5% to Chinese exports, this benchmarking exercise implies that robust real export growth can continue over the next few years. The runway is therefore clear for now—but eventually will depend on stronger economic growth in importing economies.

How Much More Can China's Exports Grow?

The rise in Chinese exports and the trade surplus over the past few decades has been extraordinary. From 2000 to 2025, China's share of global goods exports rose from less than 4% to nearly 15%—above Germany's peak of 13% in the late 1970s and Japan's peak of 10% in the 1980s, and surpassed only by the US before 1970 during the post-WWII period (left panel of Exhibit 1). Even as Chinese exports have continued to rise in recent years, imports have stalled amid weak domestic demand and the pursuit of self-reliance. From 2021 to 2025, China Customs' official data show that export volume increased by around 25%, whereas import volume was largely unchanged. This pattern is highly unusual: in the early 1960s, when US exports accounted for 19% of the global total, the US trade surplus was only 0.3% of global GDP, far below China's 1% in 2025 (right panel of Exhibit 1).

The natural question is: "How much more can China's exports grow?" This is especially relevant because Chinese imports are unlikely to rise much from here, given the strategic shift away from fossil fuels and toward technological self-sufficiency (crude oil, natural gas, and semiconductors accounted for 30% of Chinese imports in 2025). In this note, we examine the profitability of Chinese exports and trading partners' balance-of-payments constraints to assess the sustainability of China's export growth. Our analysis suggests that, at least over the next few years, there is still room for Chinese exports to maintain their strong momentum. Over the longer term, however, stronger economic growth in importing economies will be required for continued Chinese export gains.

Exhibit 1: China's export strength and trade surplus are exceptional by historical standards



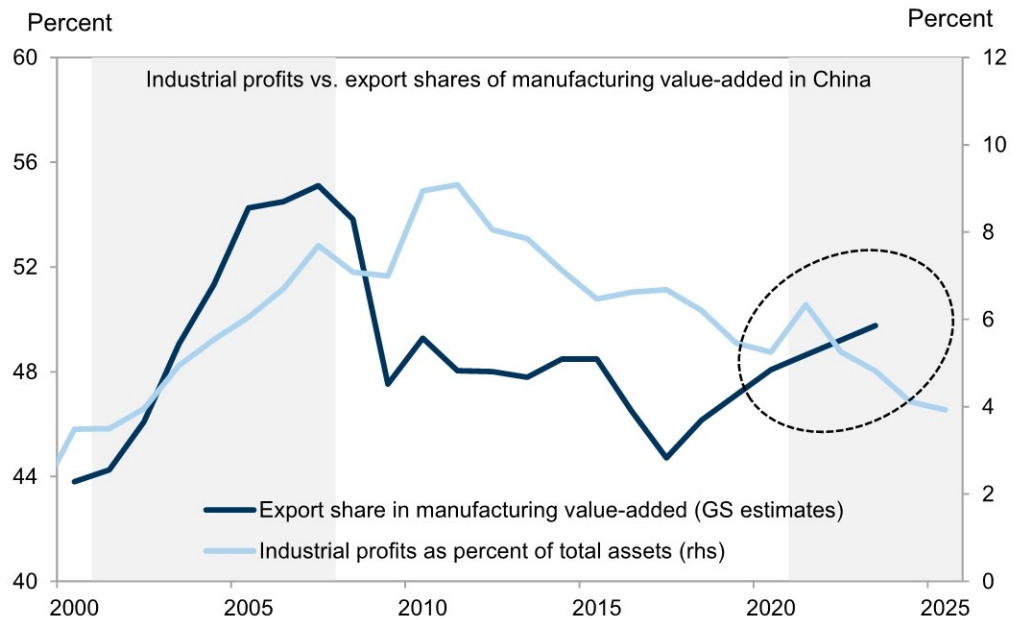
Source: Haver Analytics, Goldman Sachs Global Investment Research

Sustainability Through the Profitability Lens

One way to assess export sustainability is to ask whether rising exports coincide with rising profits. If so, the export boom is likely demand-driven and more persistent. During "China Shock 1.0" in 2001-07, this was indeed the case: Exhibit 2 shows that China's industrial profits as a share of total industrial assets rose alongside the export share of manufacturing value-added in the early 2000s. In recent years, however, this relationship has reversed: the export share of manufacturing value-added has climbed again, while industrial profits as a share of assets have declined. In other words, unlike

"China Shock 1.0," "China Shock 2.0" since 2021 appears to be supply-driven, featuring rising export volumes but falling overall profitability.

Exhibit 2: The export share of manufacturing value-added and industrial profits were positively correlated in the early 2000s but have become negatively correlated in recent years



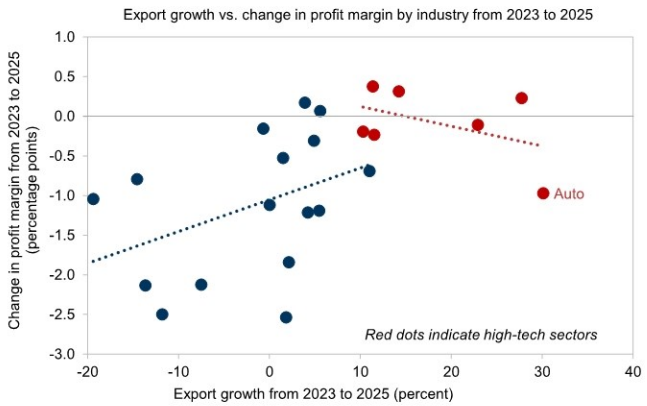
Shaded areas indicate the "China Shock 1.0" period of 2001-07 and the "China Shock 2.0" period since 2021. The latest input-output table published by the China National Bureau of Statistics (NBS) was from 2023 and we cannot estimate export share of manufacturing value-added for 2024 and 2025.

Source: NBS, Haver Analytics, Goldman Sachs Global Investment Research

While the lack of a detailed Chinese input-output table for recent years makes it difficult to assess the latest trends in the export share of manufacturing value-added, our study of export growth and changes in profit margins across industries from 2023 to 2025 suggests that profit margins have not improved along with rising exports in recent years, in contrast to the pattern during the early period of export-driven growth.[1] Exhibit 3 shows that high-tech sectors (red dots), which have received significant government support, experienced rapid export growth without noticeable increases in profit margins. In fact, the auto industry's profit margin fell from 6.4% in 2021 to 4.8% in 2025 despite an almost 100% increase in export value over the period, illustrating China's enormous production capacity. The sustainability of Chinese export growth therefore depends on trading partners' ability to absorb more Chinese products. We turn to China's trading partners next.

[1] Because the NBS sector classification for industrial profits is different from the HS code classification for export growth, we map the two and only show sectors where we can bridge the two classifications.

Exhibit 3: High-tech sectors have seen strong export growth recently, but not rising profit margins

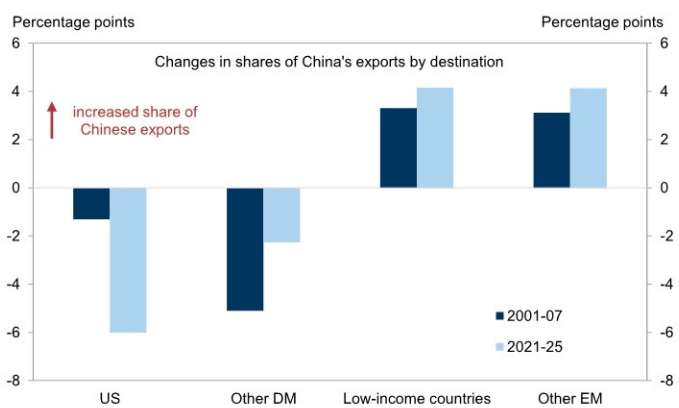


Source: CEIC, Goldman Sachs Global Investment Research

Pressures Are Increasing…

On the surface, China Shock 1.0 and China Shock 2.0 look similar in terms of shifting export destinations. In both 2001-07 and 2021-25, emerging markets—including low-income and other EM countries—accounted for rising shares of Chinese exports.[2] By contrast, developed markets—including the US and other DM countries—accounted for falling shares (Exhibit 4). Our previous research has documented the growing importance of EM countries to Chinese exports (see here and here, for example).

Exhibit 4: In both 2001-07 and 2021-25, the EM share of Chinese exports increased



Source: Haver Analytics, Goldman Sachs Global Investment Research

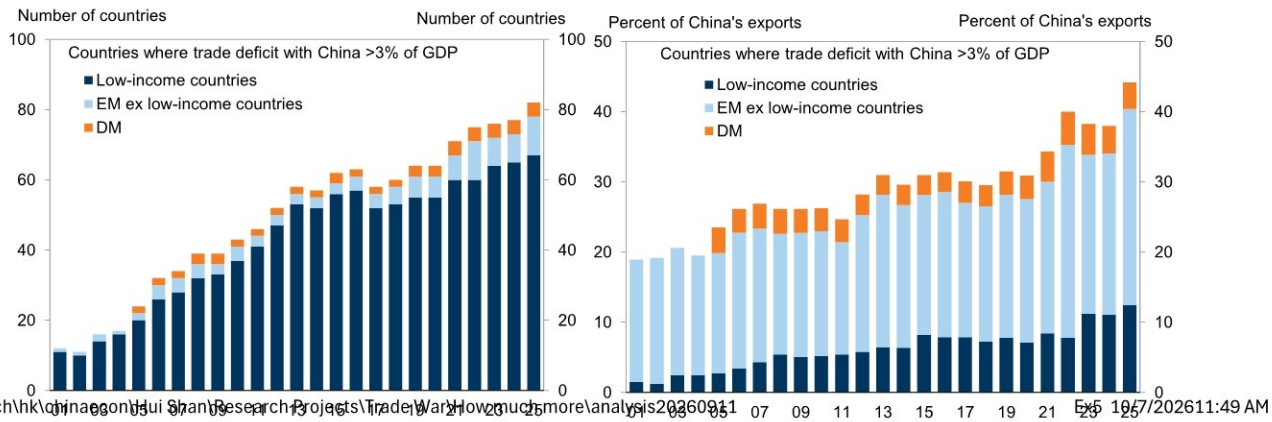
Beneath the surface, however, bilateral trade balances between EM countries—especially low-income countries—and China have deteriorated notably over the past two decades. For example, in 2005, only 24 countries had trade deficits with China exceeding 3% of their GDP, and these countries received 24% of total Chinese exports. In 2025, however, the number of countries with bilateral trade deficits above 3% of GDP rose to 82, and collectively they accounted for 44% of total Chinese exports (Exhibit 5). Among the 82 countries, 67 are low-income countries. These tend to be small

[2] "Other EM" include 27 countries with relatively large financial markets or large population/high GDP levels. "Low-income countries" include 128 economies with per-capita incomes of less than US$ 4000 per annum.

economies, many of which are in Africa, the Caribbean and Oceania. The 67 countries combined accounted for 12% of Chinese exports in 2025, compared with 28% for the 11 other EM economies whose trade deficits with China exceeded 3% of GDP (the biggest four of which are Vietnam, Malaysia, Thailand, and Mexico).

Because trading partners' trade deficits cannot rise indefinitely, the sharp increase in the number of countries already facing large and still-rising deficits with China points to balance-of-payments constraints for some of China's trading partners.

Exhibit 5: An increasing number of China's trading partners face bilateral trade deficits exceeding 3% of GDP



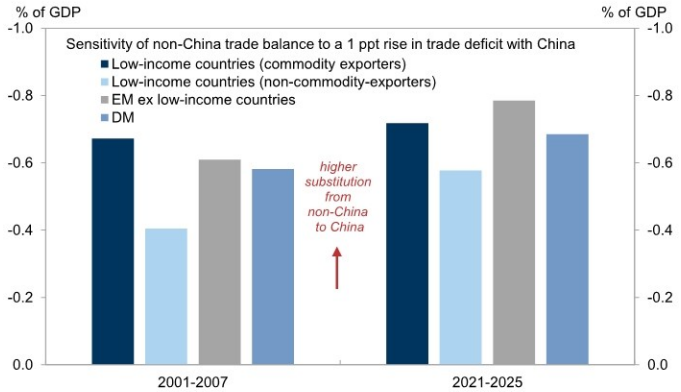
Source: Haver Analytics, Goldman Sachs Global Investment Research

… But There Is Still Room to Import More from China Over the Next Few Years

One offsetting factor is trading partners' substitution away from imports from other countries and toward imports from China, limiting the impact on their overall trade deficits even as their bilateral deficits with China rise. To gauge the extent of this substitution, we estimate a panel regression model using annual data for more than 170 countries. Exhibit 6 presents the results separately for 2001-07 and 2021-25, from which we draw two conclusions.

First, there is meaningful substitution between imports from China and those from elsewhere. Second, this effect has strengthened slightly in recent years. We estimate that each 1pp-of-GDP increase in the deficit with China was associated with a 0.7pp decline in the deficit with non-China in 2021-25, compared with 0.6pp in 2001-07. This pattern suggests that the overall pressure on trading partners from higher imports from China may be smaller than bilateral trade deficits alone imply. That said, our estimates still point to weaker balance-of-payments positions, as the offset is less than one-for-one.

Exhibit 6: China's trading partners shifted away from imports from non-China sources when they increase imports from China



Source: Goldman Sachs Global Investment Research

In many EM economies, balance-of-payment pressures manifest themselves through FX depreciation. In Exhibit 7, we assess the sustainability of bilateral trade deficits with China from a financing perspective, focusing on trade deficits as a share of FX reserves rather than as a percentage of GDP. We separate the analysis into ASEAN and EM ex ASEAN because of the distinct patterns in the two groups.

ASEAN countries' trade deficits as a share of FX reserves have diverged sharply. While deficits with China have increased significantly in recent years, trade balances with non-China have improved meaningfully. This clear offsetting pattern likely reflects the reconfiguration of regional supply chains over the past decade.

For the remaining EM countries, trade deficits with China have edged up in recent years, while deficits with non-China have increased notably, suggesting weaker overall balance-of-payments conditions and scope to shift imports from non-China to China. Within this broader EM ex ASEAN group, there remains significant heterogeneity: for some low-income countries, both deficits with China and deficits with non-China approach 50% of FX reserves, underscoring significant balance-of-payments vulnerability, although their combined shares of global GDP and Chinese exports remain small.

Exhibit 7: ASEAN countries' widening deficits with China are fully offset by rising surpluses with non-China, while EM ex ASEAN countries show wider deficits with both China and non-China



\\firmwide.corp.gs.com\root\Projects\Research\hk\chinaecon\Hui Shan\Research Projects\Trade War\How much more\analysis20260911 Ex711:26 AM10/6/2026

Source: Haver Analytics, Goldman Sachs Global Investment Research

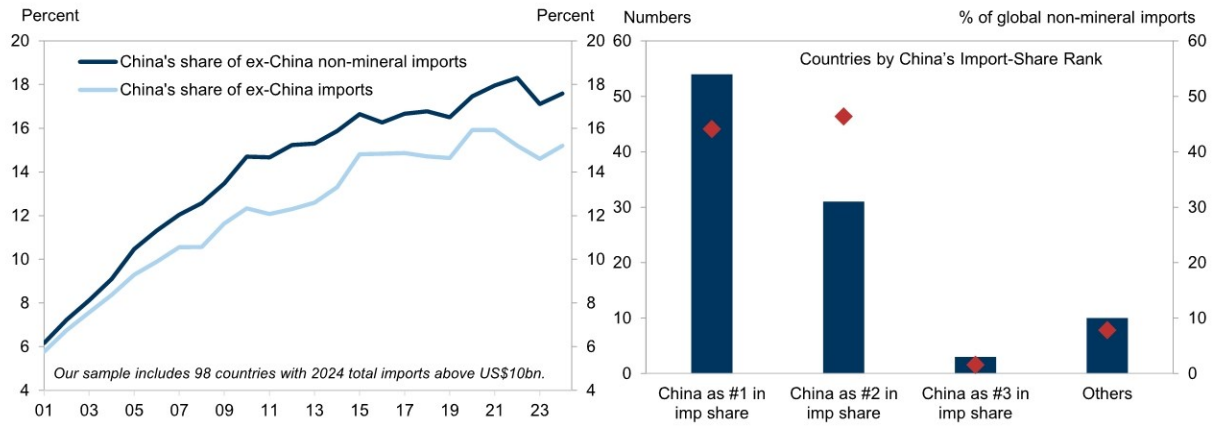
Benchmarking the Upside for Chinese Exports

To quantify how much further Chinese exports can grow, we perform a simple thought experiment. We examine 98 ex-China countries whose total imports were at least US$10bn in 2024, the latest year for which HS-2-level trade data are available for all sample countries at the time of writing. We exclude mineral imports, mostly crude oil, because China does not export oil and only non-mineral trade is relevant to gauging the potential increase in China's market share.[3] The left panel of Exhibit 8 shows that China accounted for 15.2% of total imports and 17.6% of total non-mineral imports by the 98 countries in 2024.

Together, our sample of 98 countries represents roughly 90% of global ex-China trade. In 2024, China was the largest source of imports for 54 of them. These countries, however, tend to be smaller and accounted for 44% of global ex-China non-mineral imports (right panel of Exhibit 8). China was the second-largest supplier for another 31 countries, which accounted for 46% of global ex-China non-mineral imports. The remaining 13 countries accounted for the final 10%.

[3] Although China does export refined petroleum products, its potential to grow significantly in the coming years is capped by the leadership's pledge to reach peak carbon emissions by 2030. Our analysis excludes both crude oil and refined petroleum products imports.

Exhibit 8: China accounted for 17.6% of global ex-China non-mineral imports in 2024 and was the largest source of imports for more than half of the countries in our sample



Source: Comtrade, Trademap, Haver Analytics, Goldman Sachs Global Investment Research

In a benchmarking exercise, we set China's share of each country's non-mineral imports equal to the highest bilateral share that country recorded with any trading partner during 2000-24. For example, Germany accounted for 16.3% of the UK's non-mineral imports in 2014, the highest share for any single country during the 2000-24 period. We therefore replace China's actual 2024 share of 13.4% of UK non-mineral imports with 16.3%. This approach may overstate China's upside in some markets: Mexico's highest import share was 67%, supplied by the US in 2000. China is unlikely to reach 67% of Mexico's non-mineral imports because of Mexico's geographic proximity to the US and the two countries' free-trade agreement. Conversely, our methodology may understate China's upside in some markets because it does not allow out-of-sample extrapolation. China accounted for 24% of Saudi Arabia's imports in 2024, and we leave that share unchanged because it was Saudi Arabia's highest bilateral share during 2000-24. In practice, however, China's share is likely to rise further if the recent trend continues.

Exhibit 9 shows that, in this thought experiment, China's share of global non-mineral imports could rise from 17.6% to 27.6%, an increase equivalent to 9.5pp of China's GDP and 1.9pp of global GDP. If we hold China's shares of US, Canadian, and Mexican non-mineral imports unchanged from their 2024 levels, the estimate falls to 23%. Under more conservative assumptions—holding China's shares unchanged for the US, Canada, Mexico, and all other DM countries—the estimate falls further to around 19.2%, still noticeably above the actual 17.6% recorded in 2024.

Exhibit 9: Various scenarios suggest potentially significant upside in China's share of global non-mineral imports

China share of global non-mineral exports under different scenarios	China share of global exports (%)	China exports to China GDP ratio (%)	China exports to global GDP ratio (%)
2024 Actual	**17.6**	**16.5**	**3.5**
Scenario 1 China takes the highest single-country market share that importing country had ever seen in 2000-2024	27.6	26.0	5.4
Scenario 2 Scenario 1 + Keep US/Canda/Mexico's import share from China unchanged	23.0	21.6	4.5
Scenario 3 Scenario 2 + Keep DM's import share from China unchanged	19.2	18.1	3.8

Source: Goldman Sachs Global Investment Research

For every 1pp increase in China's share of global non-mineral imports, Chinese exports would grow by 5.5%. Combined with annual trend growth of 2.5% in global trade, this implies 8% annual growth in Chinese real exports in the near term, even under the most conservative scenario shown in Exhibit 9. Under similar assumptions but using the less conservative Scenario 2, China could see 8% annual real export growth through 2031.

Taken together, our analysis suggests that Chinese export growth still has some runway over the next few years, despite the historically high trade surplus. However, pockets of vulnerability remain, particularly among low-income countries whose trade deficits exceed 50% of FX reserves. Chinese exporters may temporarily ease these balance-of-payments constraints through vendor financing, but extending the runway sustainably will require stronger economic growth in importing countries.

Hui Shan and Goohoon Kwon

We thank Ming Yang, an intern of the Asia Economics team, for his contribution to this note.

The China Economics Team

Andrew Tilton
+852-2978-1802
andrew.tilton@gs.com
Goldman Sachs (Asia) L.L.C.

Hui Shan
+852-2978-6634
hui.shan@gs.com
Goldman Sachs (Asia) L.L.C.

Lisheng Wang
+852-3966-4004
lisheng.wang@gs.com
Goldman Sachs (Asia) L.L.C.

Xinquan Chen
+852-2978-2418
xinquan.chen@gs.com
Goldman Sachs (Asia) L.L.C.

Yuting Yang
+852-2978-7283
yuting.y.yang@gs.com
Goldman Sachs (Asia) L.L.C.

Chelsea Song
+852-2978-0106
chelsea.song@gs.com
Goldman Sachs (Asia) L.L.C.

Disclosure Appendix

Reg AC

We, Hui Shan and Goohoon Kwon, CFA, hereby certify that all of the views expressed in this report accurately reflect our personal views, which have not been influenced by considerations of the firm's business or client relationships.

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

Contributing Authors: Hui Shan Goldman Sachs (Asia) L.L.C., Goohoon Kwon, CFA Goldman Sachs (Asia) L.L.C..

Unless otherwise stated, the individuals listed in the Contributing Authors disclosure of this report are analysts in Goldman Sachs' Global Investment Research division.

Disclosures

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; registered market maker. 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 a subject company, public appearances and trading in securities covered by the analysts.

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 Global Investment Research 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 Resolution n. 20 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 Resolution n. 20, is the first author named at the beginning of this report, unless indicated otherwise at the end of the text. **Canada:** This information is being provided to you for information purposes only and is not, and under no circumstances should be construed as, an advertisement, offering or solicitation by Goldman Sachs & Co. LLC for purchasers of securities in Canada to trade in any Canadian security. Goldman Sachs & Co. LLC is not registered as a dealer in any jurisdiction in Canada under applicable Canadian securities laws and generally is not permitted to trade in Canadian securities and may be prohibited from selling certain securities and products in certain jurisdictions in Canada. If you wish to trade in any Canadian securities or other products in Canada please contact Goldman Sachs Canada Inc., an affiliate of The Goldman Sachs Group Inc., or another registered Canadian dealer. **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, 10th Floor, Ascent-Worli, Sudam Kalu Ahire Marg, Worli, 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. Registration granted by SEBI and certification from NISM in no way guarantee performance of the intermediary or provide any assurance of returns to investors. Goldman Sachs (India) Securities Private Limited compliance officer and investor grievance contact details, a copy of the annual compliance audit report and other relevant information and disclosures can be found at this link: https://www.goldmansachs.com/worldwide/india/research-analyst. **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 person recommendation as defined in Russian laws and regulations, are not addressed to a specific client, and are prepared without ana circumstances, investment profiles or risk profiles of clients. Goldman Sachs assumes no responsibility for any investment decisio by a client or any other person based on this research report. **Singapore:** Goldman Sachs (Singapore) Pte. (Company Number: 19 regulated by the Monetary Authority of Singapore, accepts legal responsibility for this research, and should be contacted with re arising from, or in connection with, this research. **Taiwan:** This material is for reference only and must not be reprinted without p should carefully consider their own investment risk. Investment results are the responsibility of the individual investor. **United Ki** would be categorized as retail clients in the United Kingdom, as such term is defined in the rules of the Financial Conduct Authori research in conjunction with prior Goldman Sachs research on the covered companies referred to herein and should refer to the r been sent to them by Goldman Sachs International. A copy of these risks warnings, and a glossary of certain financial terms used



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, and Investment Management Association of Japan. 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.

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: 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 within the European Economic Area.

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.

We and our affiliates, officers, directors, and employees will from time to time have long or short positions in, act as principal in, make a market or act as liquidity provider in, and buy or sell, any securities, derivatives, or other financial instruments referred to in this research (including any financial instruments issued by the companies referred to herein), 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 focused on investment themes across markets, industries and sectors. It does not attempt to distinguish between the prospects or performance of, or provide analysis of, individual companies within any industry or sector we describe.

Any trading recommendation in this research relating to an equity or credit security or securities within an industry or sector is reflective of the investment theme being discussed and is not a recommendation of any such security in isolation.

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.goldmansachs.com/disclosures/cftc_fcm_disclosures. 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.

© 2026 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.