

15 November 2024 | 5:14AM HKT

Asia Views: 2025 Outlook – Positioning for Trade War Two

1. In last year's Asia outlook we noted that "Historically, Asian economies and markets benefited when China's growth was strong and Fed policy loose".

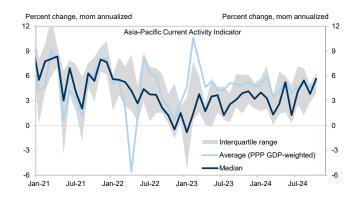
Neither has been the case in 2024. Still, the year has featured a broad and strong export performance from China, a surge in tech/semiconductor exports via Korea, Taiwan, Malaysia, and Vietnam, and healthy domestic demand growth in several EM Asia economies. Recent high-frequency data have looked a little stronger (Exhibit 1) as China starts to roll out policy support and the Fed easing cycle is underway; lower oil prices have also been a plus for most economies. While more fiscal easing from China and more Fed cuts are likely in store for 2025, there are also obvious headwinds: trade/tariff uncertainty has surged following the election of Donald Trump to a second presidential term in the United States, and prolonged US dollar strength could constrain EM Asia monetary easing.

2. In 2025, we expect modestly slower growth in EM Asia and a shift towards domestic demand in China, but pickups in a few developed markets. Export growth could slow across the region - particularly from China, given we expect the Trump administration to increase the average tariff on Chinese goods by 20pp. India, notwithstanding its solid long-term growth prospects, is in the midst of a material fiscal tightening. ASEAN should be steadier, with economies like Vietnam potentially bucking the slowdown trend if they can benefit from trade reallocation without facing US tariffs themselves. Domestically, shifts in real incomes are an important driver of our growth forecasts: the 2022 spike in inflation came down earlier in regional EMs (particularly China) than in DMs, but the lack of stimulus left EMs with more spare capacity and generally weaker wage growth. The result has been that real income growth in the median DM Asia-Pacific economy has recently overtaken that in the median EM (Exhibit 2). Key developed markets that posted slow growth in part or all of 2024 (Japan, Australia, New Zealand) are likely to see improving domestic demand and GDP growth in 2025 as inflation decelerates further and real wage growth and consumption rise.

Andrew Tilton

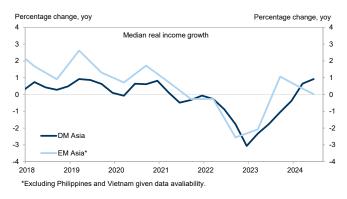
+852-2978-1802 | andrew.tilton@gs.com Goldman Sachs (Asia) L.L.C.

Exhibit 1: Regional growth data have picked up in recent months



Source: Goldman Sachs Global Investment Research

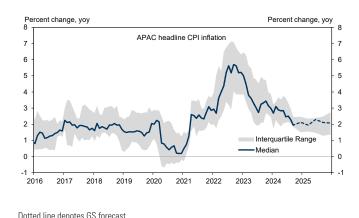
Exhibit 2: Real wage growth has accelerated recently in the median Asian DM economy, but slowed in the median EM



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

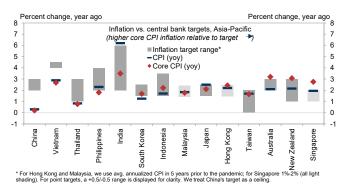
3. Inflation pressures have declined and should remain low (Exhibit 3). Oil prices have approached the lower end of our commodity strategists' forecast range (\$70-85/bbl), though there are significant risks on both sides (short-term upside related to possible Iran supply disruption, medium-term downside given still-significant spare capacity elsewhere). Food prices have been notably higher in recent months in some countries, but we think the spike is likely temporary – some recent price increases may relate to poor weather, the favorable "La Nina" phase of the Pacific climate cycle appears to be approaching, and India recently resumed rice exports after a 15-month ban. As for core inflation, we see a risk of excess China goods capacity being reallocated to regional markets in the event of tariffs, while in higher-income economies, service prices are still decelerating from elevated Covid-era levels. The obvious exception is Japan (discussed below), where policymakers have stoked wage and service price inflation pressures intentionally.

Exhibit 3: Inflation pressure continues to ebb in Asia...



Source: Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 4: ...and key inflation metrics have generally returned to or below targets



 $Source: CEIC, Haver\ Analytics,\ Goldman\ Sachs\ Global\ Investment\ Research$

4. Monetary easing is likely to proceed cautiously (ex-Japan). Inflation has come down to or below targets in most of the region (Exhibit 4), and is falling in the rest. Most countries' policy rates are still above neutral on estimates from our proprietary machine_learning model (Exhibit 5). External balances are generally in good shape and the Fed

> has begun cutting, which opened the door for broader rate cuts around the region. However, a strong USD — likely to be supported by US tariff increases in early 2025 complicates the picture for countries targeting stable exchange rates. We expect a broad but relatively shallow and gradual easing cycle around the region (Exhibit 6). Relative to prior forecasts, we have taken out 25bp of cuts in Taiwan/Indonesia and 50bp in Philippines; we also recently pushed back our forecast for cuts in India to early 2025 due to still-elevated food inflation there.

Exhibit 5: Policy rates still above neutral in most of EM Asia

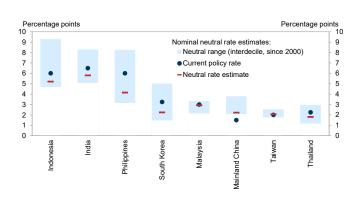


Exhibit 6: We expect a broad but relatively shallow rate cut cycle

Policy rates - actual and forecast								
	2024				2025			
	Q1	Q2	Q3	Q4F	Q1F	Q2F	Q3F	Q4F
us			-50bp	-50bp	-50bp	-25bp	-25bp	
Euro area		-25bp	-25bp	-50bp	-50bp	-50bp	-25bp	
Japan	+10bp		+15bp		+25bp		+25bp	
China			-30bp			-20bp		-20bp
India					-25bp	-25bp		
Indonesia		+25bp	-25bp	-25bp	-25bp			
Malaysia								
Philippines			-25bp	-50bp	-25bp	-25bp	-25bp	
Korea				-25bp	-25bp	-25bp	-25bp	-25bp
Taiwan	+12.5bp				-12.5bp		-12.5bp	
Thailand				-25bp	-25bp			
Australia					-25bp	-25bp	-25bp	-35bp
New Zealand			-25bp	-100bp	-50bp	-50bp	-25bp	

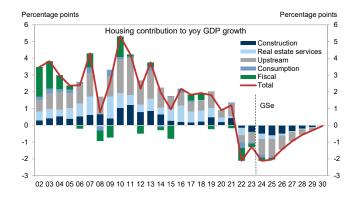
Source: Goldman Sachs Global Investment Research

Source: Goldman Sachs Global Investment Research

5. The combination of tariffs and policy support will rotate China's growth towards domestic demand (ex-housing) in 2025. The drag on activity from the housing downturn remains large, but should gradually diminish in coming years (Exhibit 7). Deceleration in real exports from the current double-digit growth pace seems assured, though strength could persist over the next couple of months as firms attempt to frontload shipments ahead of higher US tariffs. We estimate that a 20pp increase in the average US tariff on Chinese goods (our baseline assumption) would reduce Chinese GDP by about 70bp (Exhibit 8). A small part of this could be offset by RMB depreciation (we assume USDCNY moves to 7.40-7.50 following the imposition of tariffs), but policymakers' tolerance for further RMB depreciation may be lower than in 2018-19, given the weaker starting point. Fiscal policy should provide an additional (partial) offset: we expect China's "augmented fiscal deficit" to rise to 13% of GDP in 2025 (Exhibit 9), which we think will be critical for real GDP growth to plausibly approach the target (even presuming the target is lowered a little from this year's 5%). Collectively, these forces should shift the composition of China's economic activity materially (Exhibit 10). Long-term, China's top leadership still appear focused on technological advancement and manufacturing upgrading, and appear to view support to local governments (and potentially households) as a means to alleviate short-term social and economic pressures rather than an end in itself.

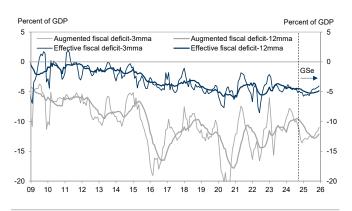
15 November 2024 3

Exhibit 7: Housing downturn still a large drag on Chinese growth in 2025



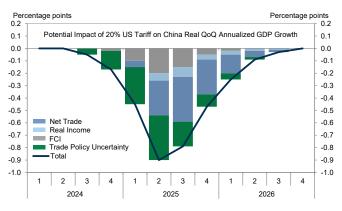
Source: Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 9: Beijing to step up fiscal support in 2025



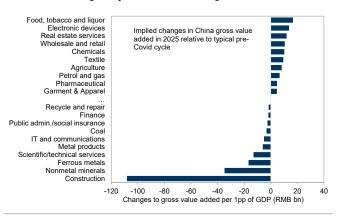
Source: CEIC, Wind, Goldman Sachs Global Investment Research

Exhibit 8: Tariffs and trade uncertainty a headwind in 2025



Source: Goldman Sachs Global Investment Research

Exhibit 10: Shifting composition of Chinese growth



Source: Goldman Sachs Global Investment Research

6. Japan's economy is at a critical stage in its reflation experiment. Real economic growth should surpass 1% in 2025 as real wages are now rising faster than prices. (As elsewhere, US tariffs are a risk — we estimate that a 10% tariff on vehicles would reduce Japan's auto exports to the US by about 10%, lowering GDP by around 0.1-0.2pp.) Policy remains stimulative: monetary conditions are still loose, and the ruling LDP's poor performance in recent elections limits the scope for fiscal consolidation (potential pressure from the new US administration to increase defense spending could also be a factor). The feedback loop between domestic wages and service prices is key for reflation to be sustained (as import price pressures, which kick-started the inflationary process in 2021-22, are fading). Japan's long-term consumption growth has averaged around 0.5-0.7%, but we expect 2025 consumption growth of more than 1% as real income growth improves. We expect gradual BOJ normalization to continue at a pace of two 25bp hikes per year, with the next hike in January.

Exhibit 11: Modestly positive growth ahead in Japan

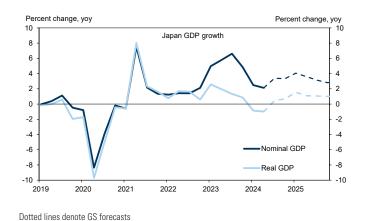
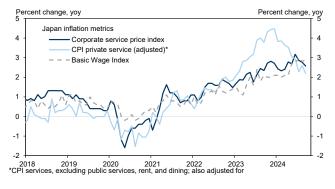


Exhibit 12: Wage/service price feedback loop must be sustained near current pace

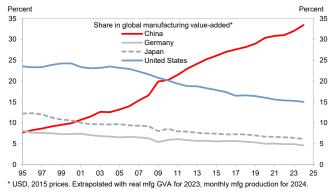


Source: Haver Analytics, Goldman Sachs Global Investment Research

Source: Haver Analytics, Goldman Sachs Global Investment Research

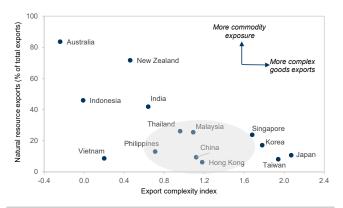
7. Smaller export-oriented economies around the region have posted widely varying performances this year (our Current Activity Indicators have ranged between 0-10%). Policymakers frequently cite increasing imports from China (and export competition with China) as a challenge — China has steadily taken global manufacturing share over the past two decades (Exhibit 13) and remains the lowest-cost producer in many sectors. While US tariffs could provide new opportunities for some of China's regional export rivals to sell into the US, they could also put more downward pressure on goods prices in ex-US markets. We see relatively better prospects for exporters differentiated from China (Exhibit 14), either via their role as significant commodity exporters (e.g., Australia) or specialization in higher-tech products (e.g., Korea/Taiwan). Those with more overlap in lower/mid-tech manufacturing goods (Vietnam, Philippines, and to some extent Thailand, Malaysia) face a balancing act – they conceivably could benefit from trade reallocation away from China, but could also be hurt by intensifying deflationary goods pressures from Chinese exports. They could also be at risk of facing US tariffs themselves, especially if bilateral trade surpluses with the US grow further.

Exhibit 13: China manufactures about a third of all goods globally



Source: United Nations, Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 14: Low- to mid-tech manufacturing exporters have faced most overlap with China



Source: UNCTAD, OEC, Goldman Sachs Global Investment Research

8. India, Indonesia, and the Philippines have the strongest growth prospects (5-6.5% over the next several years) on favorable demographics (Exhibit 15) and

more catch-up potential (lower per-capita income levels). India, in particular, also has more insulation against global shocks than it did even a few years ago. Its economy is now nearly the size of Japan's (\$3.6tn GDP at current exchange rates), its current account deficit mild (about 1% of GDP, in comparison with 4-5% prior to 2014's "taper tantrum"), its foreign reserves ample (>\$600bn), and it stands to benefit from structural FDI inflows from supply chain relocation. Indonesia has some of these characteristics (a \$1.4 tn economy, a similarly low current account deficit, and in addition low debt thanks to a strict fiscal rule) but not others (e.g., more limited reserves). The Philippines economy is smaller and its external position has gone from surplus to deficit over the past decade (Exhibit 16), so it could be somewhat more sensitive to global shifts than previously. Despite its greater domestic policy flexibility, India is hunkering down with continued fiscal consolidation and decelerating credit growth (partly due to proactive RBI regulation) - we expect below-consensus growth of 6.3% in the coming year. In contrast, Indonesia's new administration has ambitions to push growth well above 5% via increased "downstreaming" (onshore refining/processing of Indonesia's vast natural resources) and potentially a larger fiscal deficit. Philippines growth should benefit from falling inflation and a modest acceleration in real incomes in 2025.

Exhibit 15: India, Indonesia, Philippines have favorable demographics

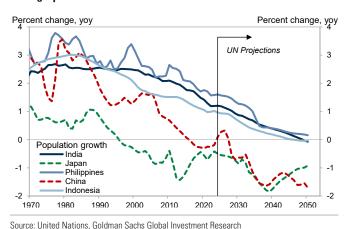
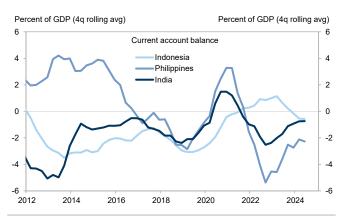


Exhibit 16: ..and relatively modest external defiicts



Source: Haver Analytics, Goldman Sachs Global Investment Research

- **9. US tariffs—when, how much, and on what countries—represent the most important "known unknown" for Asia in 2025.** Our baseline forecast assumes an average 20% additional tariff on US imports from China, but it's easy to envision other possible scenarios:
- A China-US negotiated "deal". While China ultimately did not purchase the full set of US goods envisioned in 2020's "phase one" trade deal, another agreement is still possible. A détente could be precipitated by some combination of renewed Chinese purchase pledges (though US tariffs would probably remain high pending compliance), more RMB appreciation, or Chinese cooperation in resolving geopolitical challenges (e.g., Ukraine), for example. The likely result would be an earlier/faster decline in the USD, easier regional monetary policy, and upside growth risks from reduced tariffs/trade uncertainty. But we would put a low probability on this outcome in 2025.
- An escalating trade conflict. Conversely, the China-US bilateral trade conflict could

intensify and become more damaging for both sides if the US imposes larger tariffs than we anticipate up front and/or China chooses to retaliate aggressively (for example, by significantly restricting exports of rare earths, or imposing large costs on US firms operating in China). In either case, the result would be weaker regional and global growth. Presumably, Chinese policymakers' incentives would be to retaliate in a manner that discourages escalation, but there is always room for miscalculation.

■ Broader regional or global tariffs. The new US administration might decide to go after other big US bilateral trade deficits, many of which are with Asian economies. Vietnam, Korea, and Taiwan have seen the biggest trade gains vis-a-vis the US in recent years (Exhibit 17). Tariff threats could weigh on equities and FX in targeted economies, while tariff imposition would, of course, hit exports and growth. Smaller, export-oriented Asian economies are much more sensitive to tariffs than China, as their exports overall (and to the US in particular) typically represent two to three times the GDP share that they do in China. Of course, rather than a "whack-a-mole" approach, the Trump administration could just impose an across-the-board tariff on all other economies — our US and global economists have laid out the potential_adverse growth and inflation impacts in recent analysis (Exhibit 18). We view global tariffs as a major risk (40% probability) but not our baseline assumption; in any case, these would likely take longer to implement procedurally than would a China-specific escalation.

Exhibit 17: Rising US trade deficits across EM Asia

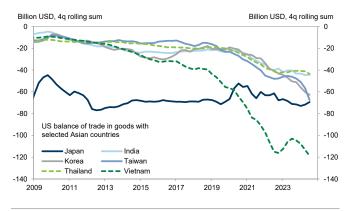
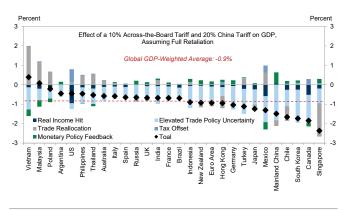


Exhibit 18: Significant regional growth hits from broader US tariffs



Source: Haver Analytics, Goldman Sachs Global Investment Research

Source: Goldman Sachs Global Investment Research

10. Our baseline market views envision modestly lower short-term interest rates, but higher long-term rates, in most Asian economies. (Japan is the exception where we see both short- and long-term rates moving higher as monetary policy normalization continues.) Asian local currency bonds should face a challenging year given the backdrop of shallow easing cycles, a stronger US dollar and a heavy bond supply pipeline. Credit spreads are tight, but we broadly expect them to stay "lower for longer" – while US tariffs could have idiosyncratic effects on particular firms, most firms in China (and likely Asia) USD credit indices do not have large US revenue exposure. In equities, our strategists continue to see some upside in China given undemanding valuations and policymakers' shift towards overt policy support for markets. In FX, we think tariffs (and the threat thereof) are likely to prolong USD strength, with USDCNY to move higher in

early 2025 and other Asian FX to move in sympathy, particularly low-yielding exporters. That said, a combination of high USD valuation, large government borrowing requirements, a move towards neutral rates in the US, and less central bank tolerance for further depreciation (particularly in north Asia) should limit the scale of the moves and allow regional currencies to recover somewhat in subsequent years. Our colleagues will publish more detail on our 2025 market views over the coming week.

Disclosure Appendix

Reg AC

I, Andrew Tilton, hereby certify that all of the views expressed in this report accurately reflect my 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.

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; 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.

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, 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. Investment in securities market are subject to market risks. Read all the related documents carefully before investing. 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 Investor Grievance E-mail: india-client-support@gs.com. Compliance Officer: Anil Rajput |Tel: + 91 22 6616 9000 | Email: anil.m.rajput@gs.com. 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 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.

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 resolution ("ACPR") and regulated by the Autorité de contrôle prudentiel et de resolution and the Autorité des marches 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 (Finansinpektionen) 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.

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 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.isp 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 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.

© 2024 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.