

ECB Foreign Exchange Contact Group

Review of recent markets developments and outlook

Alan StewartGlobal Markets Division

Confidential

7th December 2022

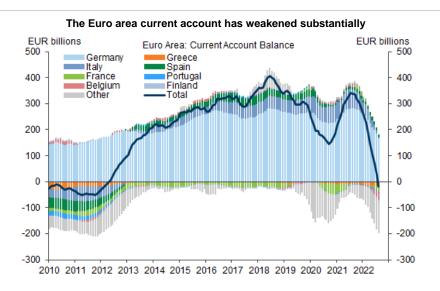
Prepared by a Goldman Sachs sales and trading desk, which may have a position in the products mentioned that is inconsistent with the views expressed in this material. In evaluating this material, you should know that it could have been previously provided to other clients and/or internal Goldman Sachs personnel, who could have already acted on it. The views or ideas expressed here are those of the desk and/or author only and are not an "official view" of Goldman Sachs; others at Goldman Sachs may have opinions or may express views that are contrary to those herein. This material is not independent advice and is not a product of Global Investment Research. This material is a solicitation of derivatives business generally, only for the purposes of, and to the extent it would otherwise be subject to, CFTC Regulations 1.71 and 23.605.

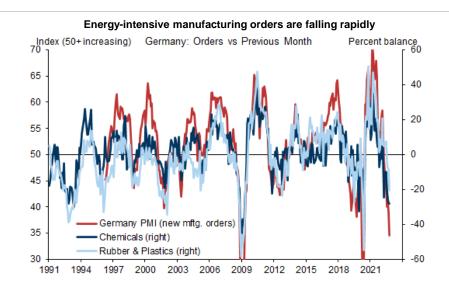
- 1. FX performance, backdrop and outlook
- 2. European economic summary
- 3. China developments and FX market implications
- 4. EMFX performance and drivers
- 5. FX volatility market developments
- 6. Latest FX spot market structure developments
- 7. Questions and talking points

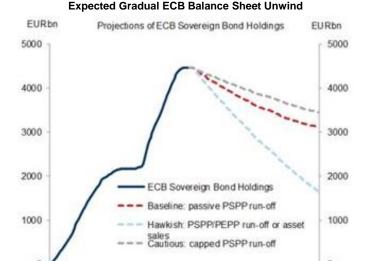


FX performance, backdrop and outlook

EUR/USD drivers: Terms of trade, supply shocks, policy



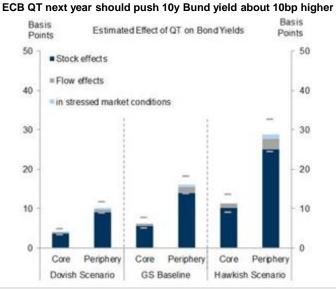




2025

2027

2029



Source: Global Investment Research. Note: Terms contained in the presentation are for discussion purposes only and do not impose a legally binding obligation on any party. Goldman Sachs does not provide tax, accounting, or legal advice to our clients, and all clients are advised to consult with their own advisers regarding any potential investment/transaction. This material is for discussion purposes only.

2017

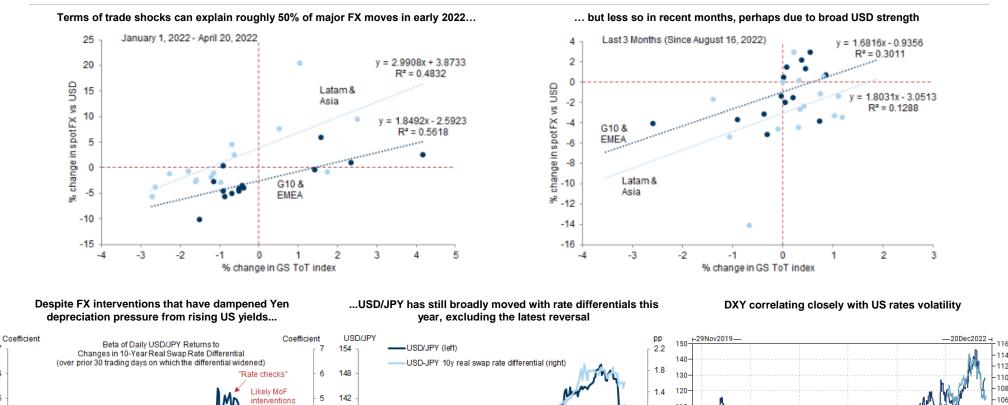
2019

2021



FX performance, backdrop and outlook

Global FX drivers: Terms of trade, interventions, interest rate uncertainty



Source: Global Investment Research. Note: Terms contained in the presentation are for discussion purposes only and do not impose a legally binding obligation on any party. Goldman Sachs does not provide tax, accounting, or legal advice to our clients, and all clients are advised to consult with their own advisers regarding any potential investment/transaction. This material is for discussion purposes only.

Jul-22

Sep-22

Nov-22

136

130

124

Jan-22

Mar-22

May-22

1.0

0.6

0.2

-0.2

-0.6

100

USD 6m10y ATM Implied Vol (ann. bps) [LHS] DXY [RHS]

Mar-22

Jul-22

Sep-22

Nov-22

Jan-22

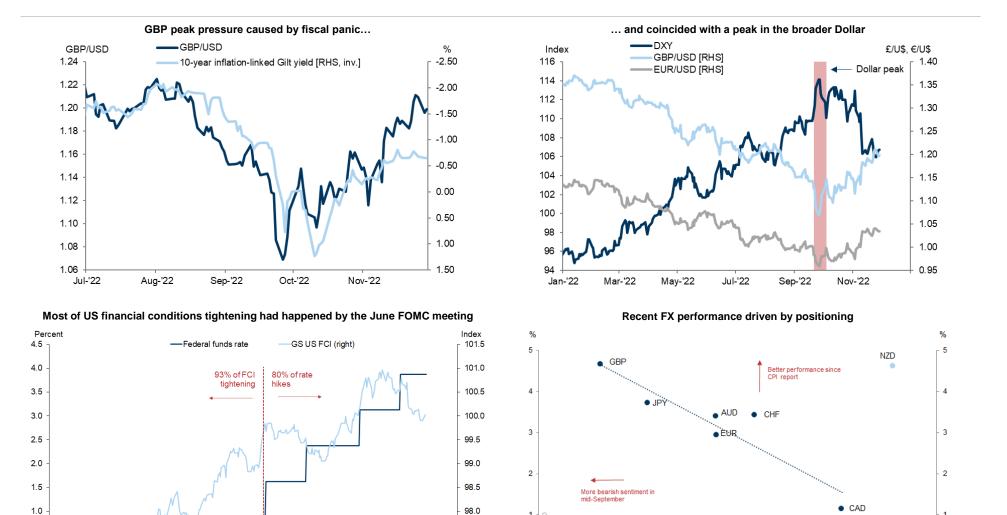
102

-92 -90



FX performance, backdrop and outlook

The Dollar peak: GBP pressures, FCI turning, positioning unwind



Source: Global Investment Research. Note: Terms contained in the presentation are for discussion purposes only and do not impose a legally binding obligation on any party. Goldman Sachs does not provide tax, accounting, or legal advice to our clients, and all clients are advised to consult with their own advisers regarding any potential investment/transaction. This material is for discussion purposes only.

10

20

30

GS Sentiment Index as of 13 September

40

97.5 97.0

0.5

0.0

Nov-21

Jan-22

May-22

Sep-22

Nov-22

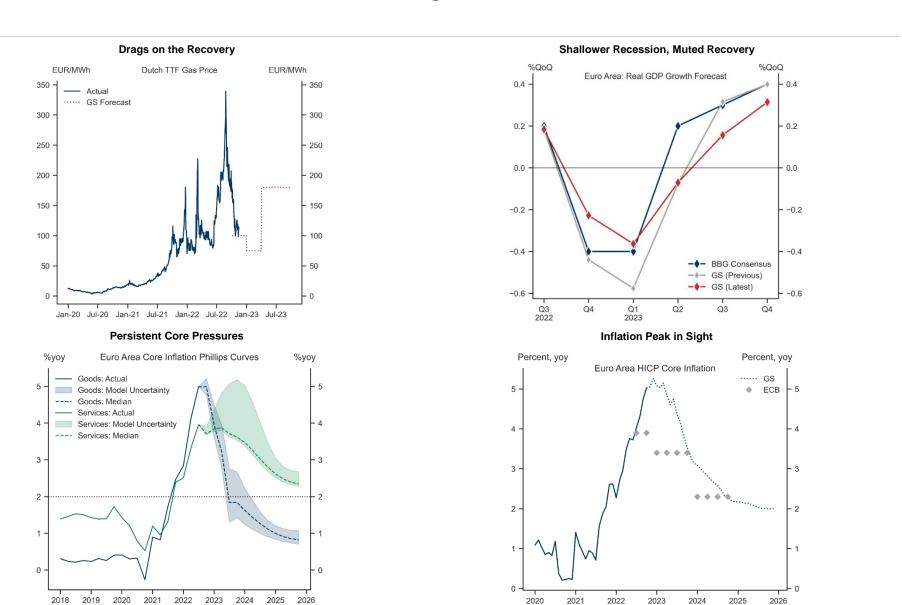
70

60



European economic summary

Core Eurozone: milder recession, higher terminal rate



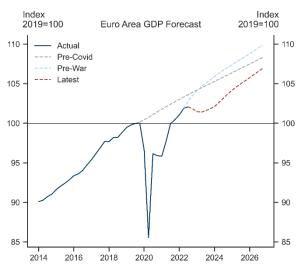
Source: Global Investment Research, GS Global Markets Division. Note: Terms contained in the presentation are for discussion purposes only and do not impose a legally binding obligation on any party. Goldman Sachs does not provide tax, accounting, or legal advice to our clients, and all clients are advised to consult with their own advisers regarding any potential investment/transaction. This material is for discussion purposes only.



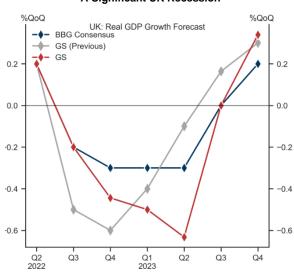
European economic summary

Ongoing risks: cost of war, Italian fiscal risk, UK stagflation

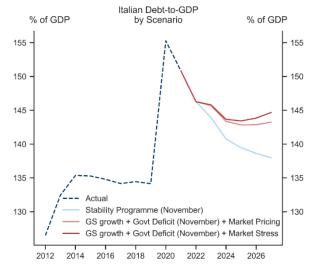
The Permanent Cost of the Energy Crisis



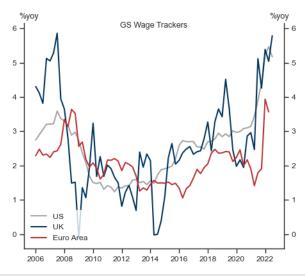
A Significant UK Recession



The Risk of Sovereign Stress Remains



A Hotter UK Labour Market



Source: Global Investment Research, GS Global Markets Division. Note: Terms contained in the presentation are for discussion purposes only and do not impose a legally binding obligation on any party. Goldman Sachs does not provide tax, accounting, or legal advice to our clients, and all clients are advised to consult with their own advisers regarding any potential investment/transaction. This material is for discussion purposes only.



China developments and FX markets

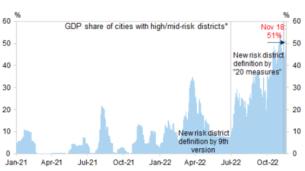
GLOBAL MARKETS
DIVISION

Covid and property in focus. Rate differentials and portfolio outflows drove weaker RMB and remain in play

Property sales and Fixed Asset Investment declined sharply

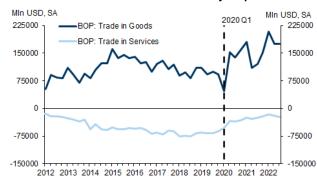


Covid restriction impact has surged

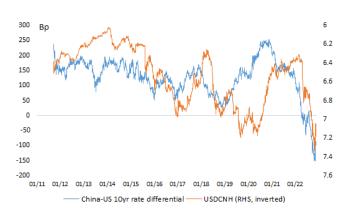


*Definitions of high/mid/low risk districts were changed by the government in late June and were simplified to a two-tier regime with "high" and "low".

Pandemic-induced boost to external balances should reverse as the economy reopens



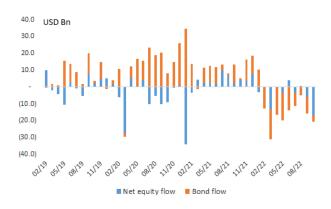
Negative China-US rate differential drove weaker RMB



Chinese Fixed income flows face stiffer global competition for inflows



Portfolio outflows accelerated



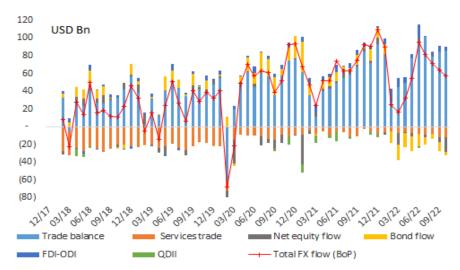
Source: WIND, Bloomberg, CEIC, Global Investment Research, GS Global Markets Division. Note: Terms contained in the presentation are for discussion purposes only and do not impose a legally binding obligation on any party. Goldman Sachs does not provide tax, accounting, or legal advice to our clients, and all clients are advised to consult with their own advisers regarding any potential investment/transaction. This material is for discussion purposes only.



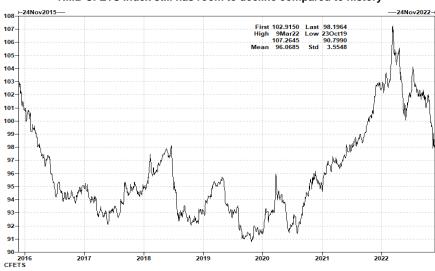
China developments and FX markets

Reopening to create BoP pressure in China, but demand for EM currencies





RMB CFETS index still has room to decline compared to history



China reopening may have greater impact on economies exposed to China

(Unit: Billion		Exports to World	
USD)	in 2021	in 2021	China
Chile	37	94	38.9
Australia	130	344	37.7
Brazil	88	282	31.4
Peru	18	62	29.0
Taiwan	126	446	28.2
South Korea	163	644	25.3
Japan	164	758	21.6
Indonesia	45	232	19.3
Philippines	12	75	15.5
Saudi Arabia	54	290	18.6
Vietnam	55	329	16.7
Malaysia	46	299	15.5
Singapore	68	457	14.8
Russian	68	492	13.9
Thailand	37	266	13.7
South Africa	14	122	11.3
Israel	4	59	7.3
Switzerland	33	379	8.7
United States	151	1759	8.6
Gemany	124	1632	7.6
India	23	395	5.8
United Kingdom	24	460	5.1
France	28	585	4.9
Canada	23	502	4.6
Euro Area	238	5457	4.4
Italy	19	610	3.0
Spain	10	384	2.7
Netherlands	19	838	2.3
Mexico	9	495	1.9
Belgium	10	545	1.7
Hungary	2	142	1.4
Czech Republic	3	226	1.3
Poland	4	338	1.1

Source: WIND, Bloomberg, CEIC, IMF, GS Global Markets Division. Note: Terms contained in the presentation are for discussion purposes only and do not impose a legally binding obligation on any party. Goldman Sachs does not provide tax, accounting, or legal advice to our clients, and all clients are advised to consult with their own advisers regarding any potential investment/transaction. This material is for discussion purposes only.



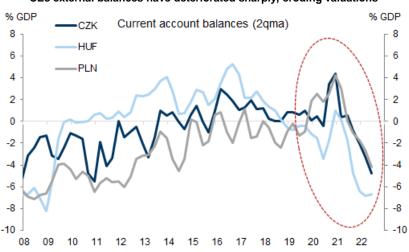
EMFX performance and drivers

Relative resilience with Latam outperformance whilst CE3 struggles

EMFX has been resilient so far, but the flipside is restrained upside in a dollar turn Average total returns, indexed to 100 on January 4th, 2021.

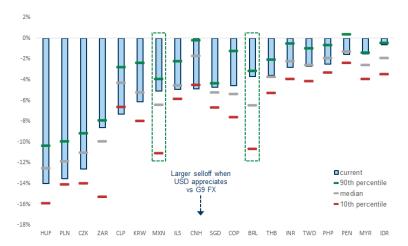


CE3 external balances have deteriorated sharply, eroding valuations

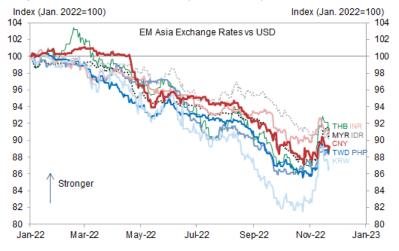


Relative to history, BRL & MXN have been resilient during periods of Dollar strength

Estimated % appreciation of the displayed currency vs USD given a 10% appreciation in the USD vs G9 FX, using rolling 1-year samples estimated over the post-GFC period. Results control for a broad set of non-Dollar market factors.



Lesser pressure on Asia's interveners (INR, IDR, THB), but risk of reserves rebuild



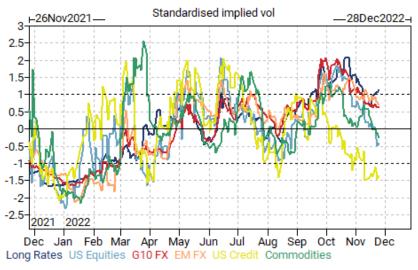
Source: Global Investment Research. Note: Terms contained in the presentation are for discussion purposes only and do not impose a legally binding obligation on any party. Goldman Sachs does not provide tax, accounting, or legal advice to our clients, and all clients are advised to consult with their own advisers regarding any potential investment/transaction. This material is for discussion purposes only.



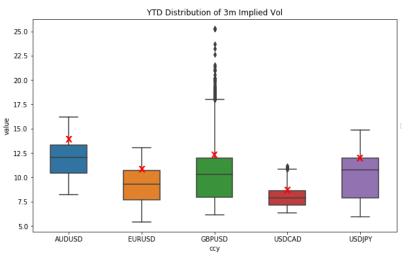
FX volatility market developments

Still elevated FX implied volatility; but not priced to revisit 2022 Dollar highs

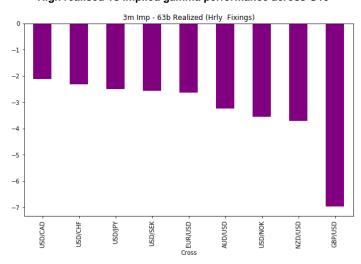
FX and rates vol remaining more elevated than equity and credit



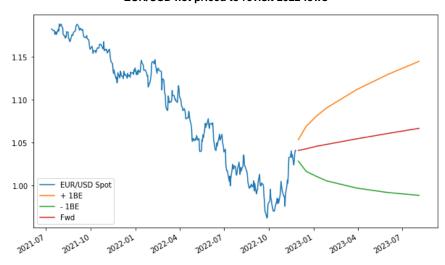
FX vol off the highs, but still in the top quartile YTD



High realised vs implied gamma performance across G10



EUR/USD not priced to revisit 2022 lows



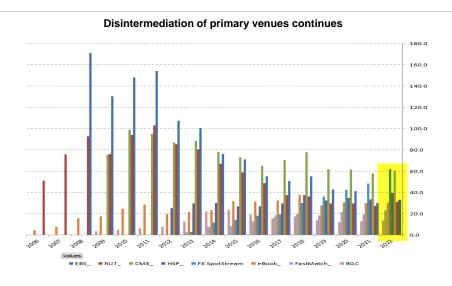
Source: GS Global Markets Division. Note: Terms contained in the presentation are for discussion purposes only and do not impose a legally binding obligation on any party. Goldman Sachs does not provide tax, accounting, or legal advice to our clients, and all clients are advised to consult with their own advisers regarding any potential investment/transaction. This material is for discussion purposes only.

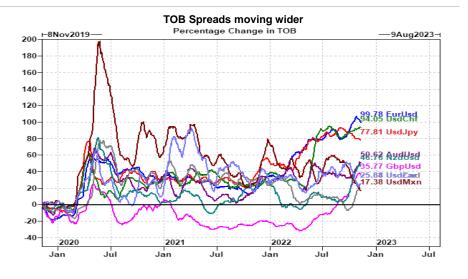




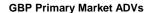
FX spot market structure developments

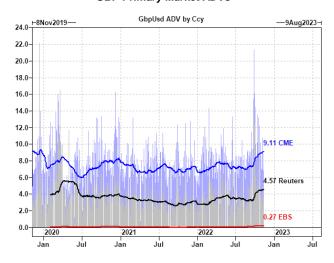
Disintermediation continues; volumes dropping amidst elevated volatility

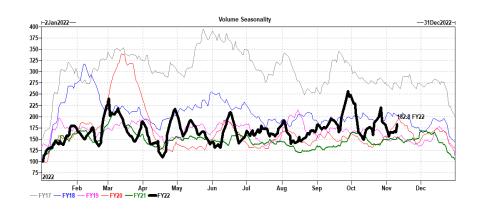




Volume seasonality – notable drop in volumes to 2021 levels in early Oct/Nov yet volatility remained elevated







Source: GS Global Markets Division. Note: Terms contained in the presentation are for discussion purposes only and do not impose a legally binding obligation on any party. Goldman Sachs does not provide tax, accounting, or legal advice to our clients, and all clients are advised to consult with their own advisers regarding any potential investment/transaction. This material is for discussion purposes only.



Questions and talking points

- 1. Does the group expect the levels of implied and realised volatility observed in FX markets this year to continue into 2023?
- 2. Have we seen the peak in pricing for G10 hiking cycles and how do we expect that to influence relative FX performance going forward?
- 3. Are markets paying sufficient attention to the potential impact from QT?
- 4. The drivers of FX performance this year have been quite clear and distinct. What do we expect to be the most dominant and impactful factors in 2023?
- 5. Can the relative resilience in EM currencies (on a TWI basis) seen this year be repeated in 2023?
- 6. What might the Chinese exit from Covid look like and what are its implications for the renminbi and global energy prices?
- 7. Does the group expect the trend for disintermediation of primary venues to continue and with what implications?



References

Referenced publications by Goldman Sachs Global Investment Research

- 1. European Economics Analyst: 2023 Europe Outlook: Milder Recession, Higher Terminal Rate, 16-Nov-2022
- 2. 2023 Global Rates Outlook: Chasing Neutral, 21-Nov-2022
- 3. EM Macro Navigator: 2023 Outlook Seeking a Better Growth/Inflation Mix, 28-Nov-2022
- 4. 2023 Global FX Outlook: Waiting for a Challenger, 18-Nov-2022
- 5. EM Market Outlook 2023: Resilience Behind, Restrained Upside Ahead, 22-Nov-2022



This message has been prepared by personnel in the Global Markets Division of one or more affiliates of The Goldman Sachs Group, Inc. ("Goldman Sachs") and is not the product of Global Investment Research. It is not a research report and is not intended as such.

Non-Reliance and Risk Disclosure: This material is for the general information of our clients and is a solicitation of derivatives business generally, only for the purposes of, and to the extent it would otherwise be subject to, CFTC Regulations 1.71 and 23.605. This material should not be construed as 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. We are not soliciting any specific action based on this material. For the purposes of U.S. rules and regulations, it does not constitute a recommendation or take into account the particular investment objectives, financial conditions, or needs of individual clients. Before acting on this material, you should consider whether it is suitable for your particular circumstances and, if necessary, seek professional advice. The price and value of the investments referred to in this material and the income from them may go down as well as up, and investors may realize losses on any investments. Past performance is not a guide to future performance. Future returns are not guaranteed, and a loss of original capital may occur. We do not provide tax, accounting, or legal advice to our clients, and all investors are advised to consult with their tax, accounting, or legal advisers regarding any potential investment. The material is based on information that we consider reliable, but we do not represent that it is accurate, complete and/or up to date, and it should not be relied on as such. Opinions expressed are our current opinions as of the date appearing on this material only and only represent the views of the author and not those of Goldman Sachs, unless otherwise expressly noted.

Conflict of Interest Disclosure: We are a full-service, integrated corporate advisory, investment management, and brokerage firm. The professionals who prepared this material are paid in part based on the profitability of The Goldman Sachs Group, Inc., which includes earnings from the firm's trading, capital markets, corporate advisory and other business. They, along with other salespeople, traders, and other professionals may provide oral or written market commentary or trading strategies to our clients that reflect opinions that are contrary to the opinions expressed herein or the opinions expressed in research reports issued by our Research Departments, and our market making, investing and lending businesses may make investment decisions that are inconsistent with the views expressed herein. In addition, the professionals who prepared this material may also produce material for, and from time to time, may advise or otherwise be part of our trading desks that trade as principal in the securities mentioned in this material. This material is therefore not independent from our interests, which may conflict with your interests. We and our affiliates, officers, directors, and employees, including persons involved in the preparation or issuance of this material, may from time to time have "long" or "short" positions in, act as principal in, and buy or sell the securities or derivatives (including options) thereof in, and act as market maker or specialist in, and serve as a director of, companies mentioned in this material. In addition, we may have served as manager or co manager of a public offering of securities by any such company within the past three years

Not a Fiduciary: To the extent this material is provided to an employee benefit plan or account subject to the Employee Retirement Income Security Act of 1974, as amended ("ERISA") or Section 4975 of the Internal Revenue Code of 1986, as amended (the "Code") (each, a "Benefit Plan Investor"), by accepting this material such Benefit Plan Investor will be deemed to have represented, warranted and acknowledged that (1) the Benefit Plan Investor is represented by a fiduciary that is independent of Goldman Sachs and its affiliates (the "Independent Fiduciary"), (2) the Independent Fiduciary is a bank (as defined in section 202 of the Investment Advisers Act of 1940 (the "Advisers Act")) or a similar institution that is regulated and supervised and subject to periodic examination by a State or Federal agency; an insurance carrier which is qualified under the laws of more than one State to perform the services of managing, acquiring or disposing of assets of a plan; an investment adviser registered under the Advisers Act or, if not registered as an investment adviser under the Advisers Act by reason of paragraph (1) of section 203A, is registered as an investment adviser under the laws of the State in which it maintains its principal office and place of business; a broker-dealer registered under the Securities Exchange Act of 1934; or an Independent Fiduciary that holds or has under management or control total assets of at least \$50 Million; (3) the Independent Fiduciary is capable of evaluating investment risks independently, both in general and with regard to the information contained in this material; (4) the Independent Fiduciary is a fiduciary under ERISA and/or the Code with respect to, and is responsible for exercising independent judgment in evaluating, the information contained in this material is provided to any Benefit Plan Investor's subsequent investment decisions; and (6) any financial interest of Goldman Sachs and its affiliates is or has been disclosed. To the extent this material is provided to any ot



Not a Municipal Advisor: Except in circumstances where Goldman Sachs expressly agrees otherwise in writing, Goldman Sachs is not acting as a municipal advisor and the opinions or views contained herein are not intended to be, and do not constitute, advice, including within the meaning of Section 15B of the Securities Exchange Act of 1934.

Phone recording: Telephone conversations with Goldman Sachs personnel may be recorded and retained.

Legal Entities Disseminating this Material: This material is disseminated in Australia by Goldman Sachs Australia Pty Ltd (ABN 21 006 797 897); in Canada by either Goldman Sachs Canada Inc. or Goldman Sachs & Co. LLC; in Hong Kong by Goldman Sachs (Asia) L.L.C. or by Goldman Sachs Asia Bank Limited, a restricted licence bank; 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 Singapore by Goldman Sachs(Singapore) Pte. (Company Number: 198602165W), by Goldman Sachs Futures Pte.Ltd (Company Number: 199004153Z) or by J.Aron & Company (Singapore) Pte (Company Number: 198902119H); in India by Goldman Sachs (India) Securities Private Limited, Mumbai Branch; in the United Kingdom, Belgium, Cyprus, Denmark, Ireland, Italy, Liechtenstein, Luxembourg, Norway and Portugal by Goldman Sachs International ("GSI"); in France by Goldman Sachs Paris Inc. et Cie or GSI Paris branch; in Spain by GSI Madrid branch; in Sweden by GSI Stockholm branch; in all other European Economic Area jurisdictions by Goldman Sachs Bank Europe SE, including through its authorised branches ("GSBE"); in Switzerland by GSI; in the Cayman Islands by Goldman Sachs (Cayman) Trust, Limited; in Brazil by Goldman Sachs do Brasil Banco Múltiplo S.A.; and in the United States of America by Goldman Sachs & Co. LLC (which is a member of FINRA, NYSE and SIPC) and by Goldman Sachs Bank USA. You may obtain information about SIPC, including the SIPC brochure, by contacting SIPC (website: http://www.sipc.org/;phone: 202-371-8300). GSI, which is authorised by the Prudential Regulation Authority ("PRA") and regulated by the Financial Conduct Authority ("FCA") and the PRA, has approved this material in connection with its distribution in the United Kingdom. GSI, whose registered office is at Plumtree Court, 25 Shoe Lane, London EC4A 4AU, appears in the FCA's Register (Registration No.: 142888). GSI is registered as a Private Unlimited Company in England and Wales (Company Number: 2263951) and its VAT registration number is GB 447 2649 28. GSI is subject to the FCA and PRA rules and guidance, details of which can be found on the websites of the FCA and PRA at www.fca.org.uk and www.bankofengland.co.uk/pra.The FCA is located at 12 Endeavour Square, London E20 1JN, and the PRA is located at Bank of England, 20 Moorgate, London EC2R 6DA, GSBE is a credit institution incorporated in Germany and, within the Single Supervisory Mechanism established between those Member States of the European Union whose official currency is the Euro, subject to direct prudential supervision by the European Central Bank and in other respects supervised by German Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufischt, BaFin) and Deutsche Bundesbank. Unless governing law permits otherwise, you must contact a Goldman Sachs entity in your home jurisdiction if you want to use our services in effecting a transaction in the securities mentioned in this material. This material is not for distribution to retail clients, as that term is defined under The European Union Markets in Financial Instruments Directive(2014/65/EU) (including as implemented in the United Kingdom), and any investments, including derivatives, mentioned in this material will not be made available by us to any such retail client.

Reproduction and Re-Distribution: Without our prior written consent, no part of this material may be (i) copied, photocopied or duplicated in any form by any means or (ii) redistributed. Notwithstanding anything herein to the contrary, and except as required to enable compliance with applicable securities law, you (and each of your employees, representatives and other agents) may disclose to any and all persons the U.S. federal income and state tax treatment and tax structure of the transaction and all materials of any kind (including tax opinions and other tax analyses) that are provided to you relating to such tax treatment and tax structure, without Goldman Sachs imposing any limitation of any kind.

Information Not for Further Dissemination: To the extent this communication contains Goldman Sachs' pricing information, such pricing information is proprietary and/or confidential and is provided solely for the internal use of the intended recipient(s). You are notified that any unauthorized use, dissemination, distribution or copying of this communication or its contents, including pricing information, in whole or in part, is strictly prohibited. Further, unless prohibited by local law, any use, review or acceptance of this information is subject to and manifests your agreement with Goldman Sachs to use such information only in accordance with the terms set forth above. Goldman Sachs has caused its proprietary information to be delivered to you in reliance upon such agreement.

Not a Valuation: Values herein are not customer valuations and should not be used in lieu of a customer valuation statement or account statement. These values may not reflect the value of the positions carried on the books and records of Goldman Sachs or its affiliates and should not be relied upon for the maintenance of your books and records or for any tax, accounting, legal or other purposes. The information provided herein does not supersede any customer statements, confirmations or other similar notifications.

Receipt of Orders: An order sent to Goldman Sachs by email or instant message is not deemed to be received by Goldman Sachs until a Goldman Sachs representative verifies the order details with a phone call to the client or acknowledges receipt of the order via email or instant message to the client. Goldman Sachs does not accept client orders sent via fax or voicemail systems.

Indicative Terms/Pricing Levels: This material may contain indicative terms only, including but not limited to pricing levels. There is no representation that any transaction can or could have been effected at such terms or prices. Proposed terms and conditions are for discussion purposes only. Finalized terms and conditions are subject to further discussion and negotiation.



OTC Derivatives Risk Disclosures:

Terms of the Transaction: To understand clearly the terms and conditions of any OTC derivative transaction you may enter into, you should carefully review the Master Agreement, including any related schedules, credit support documents, addenda and exhibits. You should not enter into OTC derivative transactions unless you understand the terms of the transaction you are entering into as well as the nature and extent of your risk exposure. You should also be satisfied that the OTC derivative transaction is appropriate for you in light of your circumstances and financial condition. You may be requested to post margin or collateral to support written OTC derivatives at levels consistent with the internal policies of Goldman Sachs.

Liquidity Risk: There is no public market for OTC derivative transactions and, therefore, it may be difficult or impossible to liquidate an existing position on favorable terms. Transfer Restrictions: OTC derivative transactions entered into with one or more affiliates of The Goldman Sachs Group, Inc. (Goldman Sachs) cannot be assigned or otherwise transferred without its prior written consent and, therefore, it may be impossible for you to transfer any OTC derivative transaction to a third party.

Conflict of Interests: Goldman Sachs may from time to time be an active participant on both sides of the market for the underlying securities, commodities, futures, options or any other derivative or instrument identical or related to those mentioned herein (together, "the Product"). Goldman Sachs at any time may have long or short positions in, or buy and sell Products (on a principal basis or otherwise) identical or related to those mentioned herein. Goldman Sachs hedging and trading activities may affect the value of the Products.

Counterparty Credit Risk: Because Goldman Sachs, may be obligated to make substantial payments to you as a condition of an OTC derivative transaction, you must evaluate the credit risk of doing business with Goldman Sachs or its affiliates.

Pricing and Valuation: The price of each OTC derivative transaction is individually negotiated between Goldman Sachs and each counterparty and Goldman Sachs does not represent or warrant that the prices for which it offers OTC derivative transactions are the best prices available, possibly making it difficult for you to establish what is a fair price for a particular OTC derivative transaction; The value or quoted price of the Product at any time, however, will reflect many factors and cannot be predicted. If Goldman Sachs makes a market in the offered Product, the price quoted by Goldman Sachs would reflect any changes in market conditions and other relevant factors, and the quoted price (and the value of the Product that Goldman Sachs will use for account statements or otherwise) could be higher or lower than the original price, and may be higher or lower than the value of the Product as determined by reference to pricing models used by Goldman Sachs. If at any time a third party dealer quotes a price to purchase the Product or otherwise values the Product, that price may be significantly different (higher or lower) than any price quoted by Goldman Sachs. Furthermore, if you sell the Product, you will likely be charged a commission for secondary market transactions, or the price will likely reflect a dealer discount. Goldman Sachs may conduct market making activities in the Product. To the extent Goldman Sachs makes a market, any price quoted for the OTC derivative transactions, Goldman Sachs may differ significantly from (i) their value determined by reference to Goldman Sachs pricing models and (ii) any price quoted by a third party. The market price of the OTC derivative transaction may be influenced by many unpredictable factors, including economic conditions, the creditworthiness of Goldman Sachs, the value of any underlyers, and certain actions taken by Goldman Sachs.

Market Making, Investing and Lending: Goldman Sachs engages in market making, investing and lending businesses for its own account and the accounts of its affiliates in the same or similar instruments underlying OTC derivative transactions (including such trading as Goldman Sachs deems appropriate in its sole discretion to hedge its market risk in any OTC derivative transaction whether between Goldman Sachs and you or with third parties) and such trading may affect the value of an OTC derivative transaction.

Early Termination Payments: The provisions of an OTC Derivative Transaction may allow for early termination and, in such cases, either you or Goldman Sachs may be required to make a potentially significant termination payment depending upon whether the OTC Derivative Transaction is in-the-money to Goldman Sachs or you at the time of termination. Indexes: Goldman Sachs does not warrant, and takes no responsibility for, the structure, method of computation or publication of any currency exchange rates, interest rates, indexes of such rates, or credit, equity or other indexes, unless Goldman Sachs specifically advises you otherwise.

Emerging Market Risks: The following are a number of risk factors associated with emerging markets to which the attention of investors is drawn. However, these are not intended to be exhaustive and there may be other considerations that should be taken into account in relation to an investment. Investors should consult their own advisers before considering an investment in emerging markets. Investors should also note that it is a feature of emerging markets generally that they are subject to rapid change and the risks involved may change relatively quickly. Political and Economic Risks Emerging market countries are by definition "in transformation" and they are therefore more exposed to the risk of swift political change and economic downturns than their industrialised counterparts. Indeed, in recent years, many emerging market countries have undergone significant political, economic and social change. In many cases, far-reaching political changes have resulted in constitutional and social tensions and in some cases instability and reaction against market reforms has occurred. With respect to any emerging or developing nation, there is the possibility of nationalisation, expropriation or confiscation, political changes, government regulation, uncertainties as to the status, interpretation and application of laws, possible lower levels of disclosure and regulation, social instability or other developments (including war) which could affect adversely the economies of such nations or the foreign exchange rates. There can be no assurance that in the future such factors and in particular political changes will not adversely affect the economic conditions of an emerging market country. Political or economic instability may affect investor confidence, which could in turn have a negative impact on the creditworthiness of the Asset Issuer, the value of the Assets and on foreign exchange markets.

Interest Rate Benchmark Transition Risks: This transaction may require payments or calculations to be made by reference to a benchmark rate ("Benchmark"), which will likely soon stop being published and be replaced by an alternative rate, or will be subject to substantial reform. These changes could have unpredictable and material consequences to the value, price, cost and/or performance of this transaction in the future and create material economic mismatches if you are using this transaction for hedging or similar purposes. Goldman Sachs may also have rights to exercise discretion to determine a replacement rate for the Benchmark for this transaction, including any price or other adjustments to account for differences between the replacement rate and the Benchmark, and the replacement rate and any adjustments we select may be inconsistent with, or contrary to, your interests or positions. Other material risks related to Benchmark reform can be found at https://www.gs.com/interest-rate-benchmark-transition-notice. Goldman Sachs cannot provide any assurances as to the materialization, consequences, or likely costs or expenses associated with any of the changes or risks arising from Benchmark reform, though they may be material. You are encouraged to seek independent legal, financial, tax, accounting, regulatory, or other appropriate advice on how changes to the Benchmark could impact this transaction.



Notice to Australian Investors: When this document is disseminated in Australia by Goldman Sachs & Co. LLC ("GSCO"), Goldman Sachs International ("GSI"), Goldman Sachs (Asia) L.L.C. ("GSALLC"), or Goldman Sachs (Singapore) Pte ("GSSP") (collectively the "GS entities"), this document, and any access to it, is intended only for a person that has first satisfied the GS entities that:

- the person is a Sophisticated or Professional Investor for the purposes of section 708 of the Corporations Act of Australia; and
- the person is a wholesale client for the purpose of section 761G of the Corporations Act of Australia.

To the extent that the GS entities are providing a financial service in Australia, the GS entities are each exempt from the requirement to hold an Australian financial services licence for the financial services they provide in Australia. Each of the GS entities are regulated by a foreign regulator under foreign laws which differ from Australian laws, specifically:

- GSCO is regulated by the US Securities and Exchange Commission under US laws;
- GSI is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority, under UK laws;
- · GSALLC is regulated by the Hong Kong Securities and Futures Commission under Hong Kong laws; and
- GSSP is regulated by the Monetary Authority of Singapore under Singapore laws.

Notice to Brazilian Investors Marquee is not meant for the general public in Brazil. The services or products provided by or through Marquee, at any time, may not be offered or sold to the general public in Brazil. You have received a password granting access to Marquee exclusively due to your existing relationship with a GS business located in Brazil. The selection and engagement with any of the offered services or products through Marquee, at any time, will be carried out directly by you. Before acting to implement any chosen service or products, provided by or through Marquee you should consider, at your sole discretion, whether it is suitable for your particular circumstances and, if necessary, seek professional advice. Any steps necessary in order to implement the chosen service or product, including but not limited to remittance of funds, shall be carried out at your discretion. Accordingly, such services and products have not been and will not be publicly issued, placed, distributed, offered or negotiated in the Brazilian capital markets and, as a result, they have not been and will not be registered with the Brazilian Securities and Exchange Commission

(Comissão de Valores Mabiliários), por have they been submitted to the foregoing agency for approval. Documents relating to such services or products, as well as the information contained therein, may

(Comissão de Valores Mobiliários), nor have they been submitted to the foregoing agency for approval. Documents relating to such services or products, as well as the information contained therein, may not be supplied to the general public in Brazil, as the offering of such services or products is not a public offering in Brazil, nor used in connection with any offer for subscription or sale of securities to the general public in Brazil. The offer of any securities mentioned in this message may not be made to the general public in Brazil. Accordingly, any such securities have not been nor will they be registered with the Brazilian Securities and Exchange Commission (Comissão de Valores Mobiliários) nor has any offer been submitted to the foregoing agency for approval. Documents relating to the offer, as well as the information contained therein, may not be supplied to the public in Brazil, as the offer is not a public offering of securities in Brazil. These terms will apply on every access to Marquee. 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. Canal de Denúncias: 0800 047 4065 e/ou Formulário eletrônico: https://gs.tnwreports.com/

Public Communication Channel Goldman Sachs Brazil: 0800 727 5764 and/or contatogoldmanbrasil@gs.com.

Available Weekdays (except holidays), from 9am to 6pm. Business Integrity Issues Channel: 0800 047 4065 and/or Web Form: https://gs.tnwreports.com/

Note to Investors in Israel: GS is not licensed to provide investment advice or investment management services under Israeli law.

Notice to Investors in Japan

Marquee is made available in Japan by Goldman Sachs Japan Co., Ltd.

本書は情報の提供を目的としております。また、売却・購入が違法となるような法域での有価証券その他の売却若しくは購入を勧めるものでもありません。ゴールドマン・サックスは本書内の取引又はストラクチャーの勧誘を行 うものではございません。これらの取引又はストラクチャーは、社内及び法規制等の承認等次第で実際にはご提供できない場合がございます。

<適格機関投資家限定 転売制限>

ゴールドマン・サックス証券株式会社が適格機関投資家のみを相手方として取得申込みの勧誘(取得勧誘)又は売付けの申込み若しくは買付けの申込みの勧誘(売付け勧誘等)を行う本有価証券には、適格機関投資家に譲渡する場合 以外の譲渡が禁止されるこの制限が付されています。本有価証券は金融商品取引法第4条に基づく財務局に対する届出が行われておりません。なお、本告知はお客様によるご同意のもとに、電磁的に交付させていただいておりま

す。 <適格機関投資家用資料>

本資料は、適格機関投資家のお客さまのみを対象に作成されたものです。本資料における金融商品は適格機関投資家のお客さまのみがお取引可能であり、適格機関投資家以外のお客さまからのご注文等はお受けできませんので、 ご注意ください。 商号等/ゴールドマン・サックス証券株式会社 金融商品取引業者 関東財務局長(金商)第69号

加入協会/ 日本証券業協会、一般社団法人金融先物取引業協会、一般社団法人第二種金融商品取引業協会、一般社団法人投資信託協会、一般社団法人日本投資顧問業協会

本書又はその添付資料に信用格付が記載されている場合、日本格付研究所(JCR)及び格付投資情報センター(R&I)による格付は、登録信用格付業者による格付(登録格付)です。その他の格付は登録格付である旨の記載がない 場合は、無登録格付です。無登録格付を投資判断に利用する前に、「無登録格付に関する説明書」(http://www.goldmansachs.com/disclaimer/ratings.html)を十分にお読みください。

If any credit ratings are contained in this material or any attachments, those that have been issued by Japan Credit Rating Agency, Ltd. (JCR) or Rating and Investment Information, Inc. (R&I) are credit ratings that have been issued by a credit rating agency registered in Japan (registered credit ratings). Other credit ratings are unregistered unless denoted as being registered. Before using unregistered credit ratings to make investment decisions, please carefully read "Explanation Regarding Unregistered Credit Ratings" (http://www.goldmansachs.com/disclaimer/ratings.html).

Notice to Mexican Investors: Information contained herein is not meant for the general public in Mexico. The services or products provided by or through Goldman Sachs Mexico, Casa de Bolsa, S.A. de C.V. (GS Mexico) may not be offered or sold to the general public in Mexico. You have received information herein exclusively due to your existing relationship with a GS Mexico or any other Goldman Sachs business. The selection and engagement with any of the offered services or products through GS Mexico will be carried out directly by you at your own risk. Before acting to implement any chosen service or product provided by or through GS Mexico you should consider, at your sole discretion, whether it is suitable for your particular circumstances and, if necessary, seek professional advice. Information contained herein related to GS Mexico services or products, as well as any other information, shall not be considered as a product coming from research, nor it contains any recommendation to invest, hold or sell any security and may not be supplied to the general public in Mexico.

Notice to New Zealand Investors: When this document is disseminated in New Zealand by Goldman Sachs & Co. LLC ("GSCO"), Goldman Sachs International ("GSI"), Goldman Sachs (Asia) L.L.C. ("GSALLC") or Goldman Sachs (Singapore) Pte ("GSSP") (collectively the "GS entities"), this document, and any access to it, is intended only for a person that has first satisfied; the GS entities that the person is someone:

- (i) who is an investment business within the meaning of clause 37 of Schedule 1 of the Financial Markets Conduct Act 2013 (New Zealand) (the "FMC Act");
- (ii) who meets the investment activity criteria specified in clause 38 of Schedule 1 of the FMC Act;
- (iii) who is large within the meaning of clause 39 of Schedule 1 of the FMC Act; or
- (iv) is a government agency within the meaning of clause 40 of Schedule 1 of the FMC Act.

No offer to acquire the interests is being made to you in this document. Any offer will only be made in circumstances where disclosure is not required under the Financial Markets Conducts Act 2013 or the Financial Markets Conduct Regulations 2014.

Notice to Swiss Investors: This is marketing material for financial instruments or services. The information contained in this material is for general informational purposes only and does not constitute an offer, solicitation, invitation or recommendation to buy or sell any financial instruments or to provide any investment advice or service of any kind.

Notice to investors in Korea: Marquee is made available by Goldman Sachs (Asia) L.L.C. Seoul Branc

The information contained in this document does not constitute, and is not intended to constitute, a public offer of securities in the United Arab Emirates in accordance with the commercial companies law (federal law no. 2 of 2015), esca board of directors' decision no. (9/r.m.) of 2016, esca chairman decision no 3/r.m. of 2017 concerning promoting and introducing regulations or otherwise under the laws of the United Arab Emirates. accordingly, the interests in the securities may not be offered to the public in the UAE (including the Dubai International Financial Centre and the Abu Dhabi global market). this document has not been approved by, or filed with the central bank of the United Arab Emirates, the securities and commodities authority, the Dubai financial services authority or any other relevant licensing authorities in the United Arab Emirates. If you do not understand the contents of this document, you should consult with a financial advisor. This document is provided to the recipient only and should not be provided to or relied on by any other person.

© 2022 Goldman Sachs. All rights reserved.