

FX Watch

Japan BoP: yen's spring rally

Exhibit 1: Cumulative investment by Japanese trust accounts by asset class (¥tn)

Public pension funds likely rebalancing out of stocks into bonds



Source: BofA Global Research, INDB

BofA GLOBAL RESEARCH

Structural outflow, pension rebalancing, hedged inflow

On Mar 8, Japan's MoF released BoP data for Jan and a preliminary portfolio investment report for Feb.

- Structural outflow intact: Japan's structural outflows continue with FDI deficit, service deficit, and outward equity investments by retail investors.
- Pension funds rebalance: Trust accounts continued to sell equities and buy bonds in Feb and the rebalancing is likely to continue given the estimated allocation of public pension funds.
- Banks accumulating UST: Japanese banks continued to buy foreign bonds and have likely been accumulating exposure to UST.
- Inward equity investment with FX hedge: Foreign investors continued to buy Japanese equities and short yen in Feb.

JPY view: yen short may meet policy resistance

We remain structurally bearish on the yen given structural outflows. However, we think the yen can rebound in the spring due to positioning, the BoJ's likely policy changes, and the MoF's potential FX intervention to stop the yen's slide beyond 152 vs USD (see: USD/JPY may face policy resistance in spring 27 February 2024).

The correlation between Japanese equities and USD/JPY has risen to the highest since May 2023 (Exhibit 9) likely on rising currency-hedged investments in Japanese equities (Exhibit 10). Given the high level of uncertainty around the BoJ's normalization measures on YCC and QE, there is a scope for yen shorts to be unwound (Exhibit 11).

Shorting yen could become attractive again with USD/JPY < 145 given still elevated carry and structural outflow. For now, the market is likely to sell USD/JPY's rise into the BoJ's March MPM (Mar 18-19). The JGB market has likely been supported by rebalancing by public pension funds. The rebalancing can go on for a while, but once it is done, the yields may become more responsive to the BoJ's potential policy shift.

Trading ideas and investment strategies discussed herein may give rise to significant risk and are not suitable for all investors. Investors should have experience in relevant markets and the financial resources to absorb any losses arising from applying these ideas or strategies.

BofA Securities does and seeks to do business with issuers covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision. Refer to important disclosures on page 16 to 17.

12668567

08 March 2024

G10 FX Strategy Global

Shusuke Yamada, CFA FX/Rates Strategist BofAS Japan +81 3 6225 8515 shusuke.yamada@bofa.com

MoF: the Ministry of Finance

BoP: Balance of Payments

BoJ: Bank of Japan

MPM: Monetary Policy Meeting

FDI: Foreign direct investment

NISA: Nippon Individual Savings Account

Toshin: Japan's investment trust

YCC: Yield curve control

QE: Quantitative easing **UST: US Treasuries**

Structural outflow intact

Japan's structural outflow remains intact, weighing on the basic balance of payments, and should exert downward pressure on the yen over the long-term (Exhibit 2):

- Outward FDI likely to accelerate in 2024: Japan's FDI account registered a ¥3.4tn deficit (net outward investment) in Jan, most since Jul 2023, as foreign companies sold Japanese assets (Exhibit 3). Outward FDI decelerated somewhat in Jan but rising outward M&A announcements imply an expansion in outward FDI in 2024 (Exhibit 4).
- Japan's service deficit expanding again: Japan's service balance registered a ¥307bn deficit in Jan. Japan's service balance recovered last fall due to a one-off factor (see: <u>Japan BoP: Signs of acceleration in Japan's structural outflow 12 January 2024</u>), but appears to be expanding again as a rising deficit in high value-added service industries offset a recovery in the travel balance (Exhibit 5).
- Outward equity investment by retail investors: Investment trust accounts bought ¥1.0tn in foreign equities in Feb, only slightly below the Jan number (Exhibit 25). Foreign equity Toshins continue to attract steady inflows since the beginning of the year when the new NISA scheme started (Exhibit 6).

Pension rebalancing from equities to bonds

Trust accounts sold ¥1.2tn in foreign equities and ¥1.5tn in domestic equities, while they added ¥1.0tn in foreign bonds given the rally in US and Japanese equities (Exhibit 1). They may have bought JGBs in Feb, contributing to a tight supply/demand balance. We estimate the public pension funds to be still underweight bonds (¥3.0tn underweight in foreign bonds, ¥1.3tn in domestic bonds) and overweight equities (¥1.6tn in foreign equities, ¥2.6tn in domestic equities), implying continued rebalancing activity (Exhibit 12). However, rebalancing into domestic bonds may run its course soon, which may make the JGB market more responsive to the Bol's policy change.

Banks buying UST

Japanese banks have also been buying foreign bonds since 1Q23 (Exhibit 7). During this period Japanese investors have accumulated UST, implying banks may now be long UST (Exhibit 8).

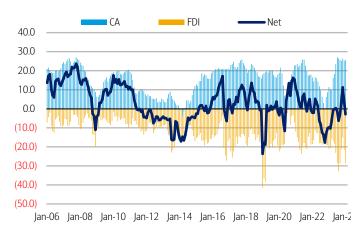
Inward equity investment with FX hedge

Foreign investors bought net ¥708bn in Japanese equities after ¥2.8tn net buying in Jan. Shorting in yen futures among non-commercial traders at CFTC extended in Feb to the highest level since Nov 2017, implying rising FX-hedged investments into Japanese equities (Exhibit 11). Japanese equity ETFs listed in offshore markets have seen net inflows, and inflows to hedged ETFs seem to be accelerating (Exhibit 10). This may have increased the correlation between Japanese equities and USD/JPY to the highest level since May 2023 as foreign investors have to adjust FX hedges on fluctuations in equity prices (Exhibit 9). These dynamics may make USD/JPY vulnerable to a hawkish policy shift by the BoJ in the spring.



Exhibit 2: Japan's basic balance of payments (annualized rolling 3m, ¥tn)

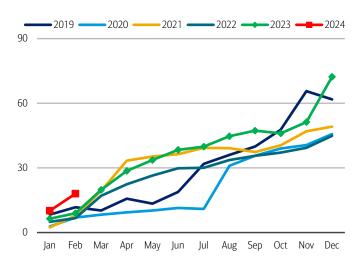
Balance back to deficit as the service balance normalized from one-off factor leading to strong surplus in Oct/Nov.



Source: BofA Global Research, Haver BofA GLOBAL RESEARCH

Exhibit 4: Japan Inc.'s cumulative outward M&A announcements by calendar year* (\$bn, net of disposition)

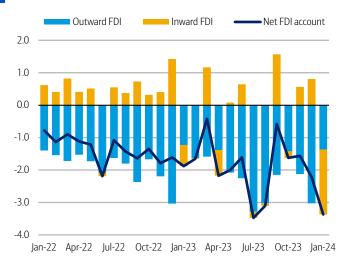
Japan's outward M&A accelerating



Source: BofA Global Research, Bloomberg *Excluding Softbank related deals BofA GLOBAL RESEARCH

Exhibit 3: Monthly FDI account balance (¥tn)

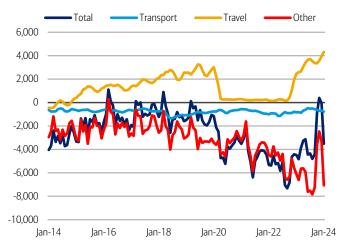
FDI deficit continues



Source: BofA Global Research, Haver BofA GLOBAL RESEARCH

Exhibit 5: Japan service balance (annualized rolling 3m, ¥bn)

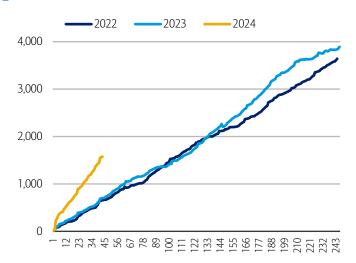
 $\mbox{Oct/Nov}\mbox{ service}$ balanced boosted by one-off rise in intellectual property surplus



Source: BofA Global Research, Haver. BofA GLOBAL RESEARCH

Exhibit 6: Cumulative net flow into largest Japanese investment trusts (Toshin) invested in foreign equities (incl. REIT, fund of funds) by calendar year* (¥bn, number of business days, our estimate)

YTD flow is up +125% YoY



Source: BofA Global Research, Bloomberg

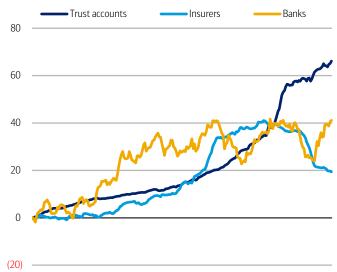
*We screen 100 largest investment trusts by assets under management (AUM) available in Japan and invested in foreign assets with price and AUM history since 2022 by Bloomberg's screening function (excluding bond and commodity funds, balance funds which also invest in domestic assets; including real estate investment trusts (REITs), fund of funds)

We estimate net daily flow as AUM change not explained by price change

BofA GLOBAL RESEARCH

Exhibit 7: Cumulative investment in foreign bonds by Japanese institutional investors (¥tn)

Trust accounts and banks have been buying foreign bonds



Jan-05 Jan-07 Jan-09 Jan-11 Jan-13 Jan-15 Jan-17 Jan-19 Jan-21 Jan-23

Source: BofA Global Research, Haver BofA GLOBAL RESEARCH

Exhibit 8: Cumulative investment in foreign bonds by Japanese investors (¥tn)

Japanese investors have been buying US sovereign bonds while unwinding non-US bonds



Source: BofA Global Research, Haver, MoF BofA GLOBAL RESEARCH

Exhibit 9: Nikkei 225 index – USD/JPY correlation (rolling 20 days) Correlation highest since May 2023

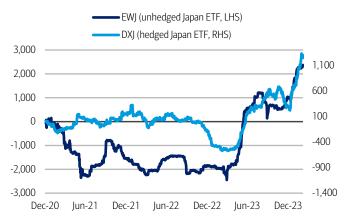


Source: BofA Global Research, Bloomberg BofA GLOBAL RESEARCH



Exhibit 10: Estimated net cumulative flow* to major Japan ETF (EWJ = unhedged, DXJ = hedged, \$mn)

Both unhedged and hedged Japanese equity ETF attracting inflow



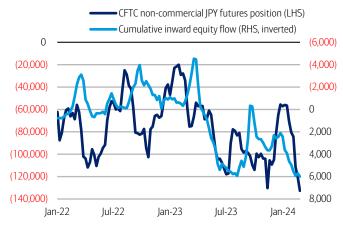
Source: BofA Global Research, Bloomberg

*We estimate net daily flow as AUM change not explained by price change

BofA GLOBAL RESEARCH

Exhibit 11: Spec JPY positioning vs inward equity investment

Foreign investors may have increased hedged Japan equity investments



Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 12: Simulation of public pension rebalancing

Allocation of assets under management (AUM) for Government Pension Investment Fund (GPIF) and three other public pension funds (estimation methodology cited below)

\sim		-
G	ч	r

OI II			
	Allocation estimate as of Mar 8 (%)	Model portfolio (%)	Rebalancing to be done (¥bn)
Domestic bond*	24.8	25	533
Domestic equity	25.7	25	-1,649
Foreign bond (unhedged)	24.1	25	2,207
Foreign equity	25.4	25	-1,091

AUM (bn JPY) 243,092

3 Funds

	Allocation estimate as of Mar 8 (%)	Model portfolio (%)	Rebalancing to be done (¥bn)
Domestic bond*	23.9	25	759
Domestic equity	26.4	25	-993
Foreign bond (unhedged)	23.9	25	744
Foreign equity	25.7	25	-510
AUM (bn JPY)	70,833		

GPIF + 3 other public pension funds

	Allocation estimate as of Mar 8 (%)	Model portfolio (%)	Rebalancing to be done (¥bn)
Domestic bond*	24.6	25	1,291
Domestic equity	25.8	25	-2,642
Foreign bond (unhedged)	24.1	25	2,951
Foreign equity	25.5	25	-1,601

AUM (bn JPY) 313,924

 $\textbf{Source:} \ \textbf{BofA Global Research, Government Pension Investment Fund (GPIF), Chikyoren, KKR, Shigaku Kyosain Shigaku Shig$

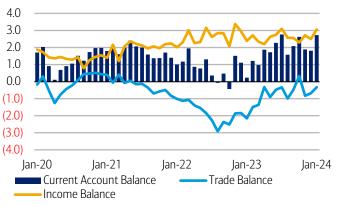
*Domestic bonds include hedged foreign bonds and short-term liquidity

For estimation methodology, please see <u>FX Watch: Japanese pension-fund rebalancing progressing 09 March 2020</u>



Exhibit 13: Japan's monthly current account balance

(seasonally adjusted, ¥tn)



Source: BofA Global Research, MoF, Haver

BofA GLOBAL RESEARCH

Exhibit 15: Japan's outward investment

Country breakdown of sovereign bonds (Japan BoP, ¥bn)

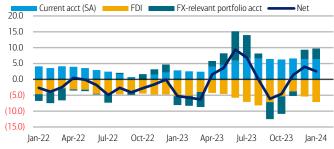
						Netherla		
	US	Australia	Germany	France	Italy	nd	UK	Canada
Q1 '23	9,419	-4	638	-614	213	-146	316	-224
Q2 '23	6,851	477	269	-319	61	-44	117	-127
Q3 '23	3,574	143	-63	-191	-241	-64	253	-388
Q4 '23	2,642	-89	774	-351	75	-275	419	-127
Feb-23	4,595	-38	0	-87	-49	14	-60	-5
Mar-23	4,383	188	365	-692	116	-36	112	-118
Apr-23	-2,127	327	-96	460	-7	-22	65	-5
May-23	3,115	213	-471	313	-254	38	5	-32
Jun-23	1,779	25	-426	51	90	190	161	103
Jul-23	-161	14	-43	-541	35	-56	242	-204
Aug-23	557	150	192	152	-77	57	95	-28
Sep-23	3,178	-22	-212	198	-199	-64	-84	-155
Oct-23	1,726	101	644	-312	299	25	114	-14
Nov-23	-27	-223	20	-38	-240	-304	43	-31
Dec-23	943	34	110	-2	17	4	261	-82
Jan-24	3,056	-8	298	93	-53	-27	40	-199

Source: BofA Global Research, MoF, Haver

BofA GLOBAL RESEARCH

Exhibit 14: Major components of Japan's BoP

(rolling 3 months sum, ¥tn)



Source: BofA Global Research, MoF, Haver.

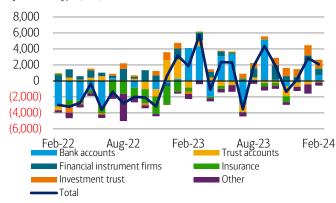
*BBoP (Basic balance of payment = Current account + FDI account + FX relevant part of portfolio flow

*FX relevant part of portfolio flow = equity flow, trust accounts' foreign bond investment, 1/3 of life insurers' foreign bond investment

BofA GLOBAL RESEARCH

Exhibit 16: Outward portfolio investment

By investor type (¥bn)

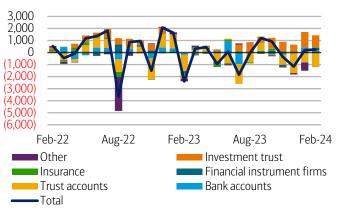


Source: BofA Global Research, MoF, Haver. Preliminary figure for most recent month

BofA GLOBAL RESEARCH

Exhibit 17: Outward equity investment

By investor type (¥bn)

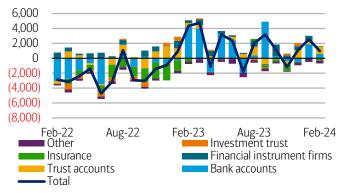


Source: MoF, BoJ, BofA Global Research, Preliminary figure for most recent month

BofA GLOBAL RESEARCH

Exhibit 18: Outward long-term debt investment

By investor type (¥bn)



Source: MoF, BoJ, BofA Global Research, Preliminary figure for most recent month



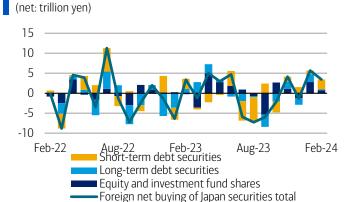
Portfolio investment assets/liabilities

Exhibit 19: Portfolio investment assets (net: trillion yen) 8 6 4 2 0 -6 Feb-22 Feb-23 Aug-23 Feb-24 Aug-22 Short-term debt securities Long-term debt securities Equity and investment fund shares

Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 20: Portfolio investment liabilities

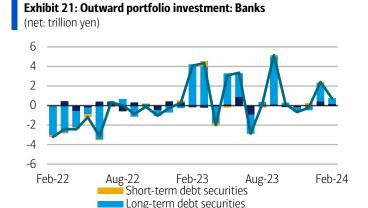


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Portfolio investment assets by investor type

Japan net buying of foreign securities total

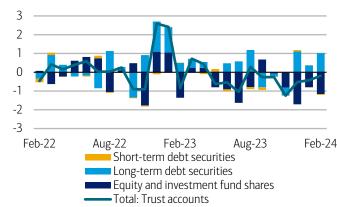


Equity and investment fund shares

Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 22: Outward portfolio investment: Trust accounts (net: trillion yen)



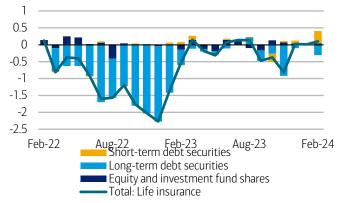
Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 23: Outward portfolio investment: Life insurance companies

Total:Banking account

(net: trillion yen)

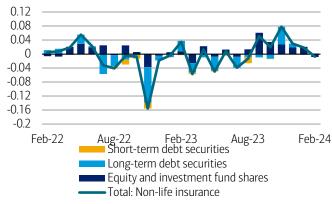


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 24: Outward portfolio investment: Non-life insurance companies

(net: trillion yen)



Source: MoF, BoJ, BofA Global Research



Exhibit 25: Outward portfolio investment: Investment trust management companies

(net: trillion yen)



firms

(net: trillion yen)

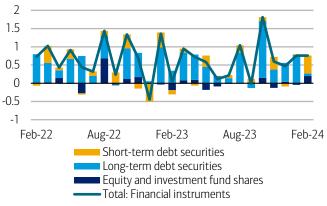


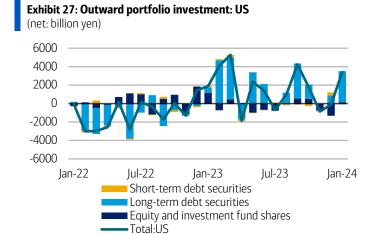
Exhibit 26: Outward portfolio investment: Financial instruments

Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Outward portfolio investment, country

breakdown



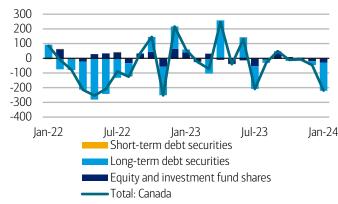
Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

BofA GLOBAL RESEARCH

Exhibit 28 Outward portfolio investment: Canada

(net: billion yen)

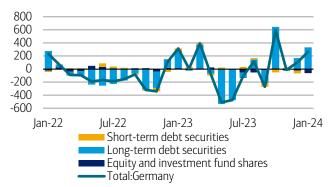


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 29: Outward portfolio investment: Germany

(net: billion yen)

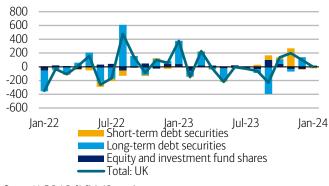


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 30: Outward portfolio investment: UK

(net: billion yen)



Source: MoF, BoJ, BofA Global Research

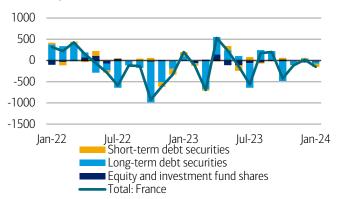
BofA GLOBAL RESEARCH



8

Exhibit 31: Outward portfolio investment: France

(net: billion yen)

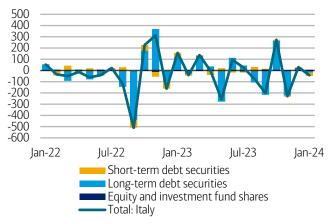


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 33: Outward portfolio investment: Italy

(net: billion yen)

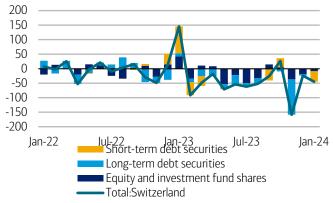


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 35: Outward portfolio investment: Switzerland

(net: billion yen)

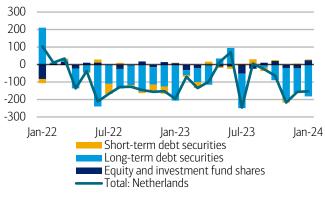


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 32: Outward portfolio investment: The Netherlands

(net: billion yen)

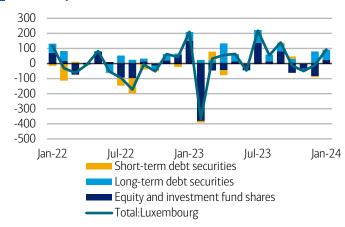


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 34: Outward portfolio investment: Luxembourg

(net: billion yen)



Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 36: Outward portfolio investment: Sweden

(net: billion yen)



Source: MoF, BoJ, BofA Global Research



Exhibit 37: Outward portfolio investment: Spain



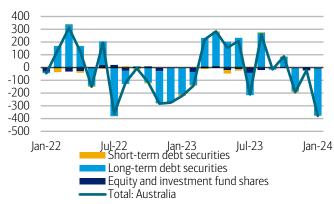


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 39: Outward portfolio investment: Australia

(net: billion yen)

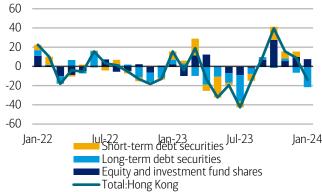


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 41: Outward portfolio investment: Hong Kong



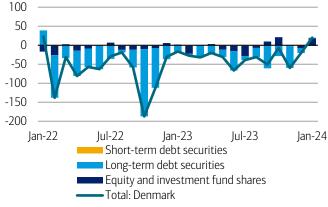


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 38: Outward portfolio investment: Denmark

(net: billion yen)

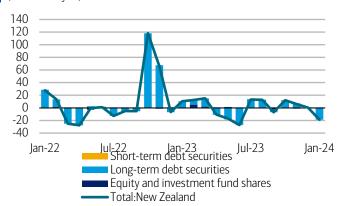


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 40: Outward portfolio investment: New Zealand

(net: billion yen)



Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 42: Outward portfolio investment: S. Korea

(net: billion yen)



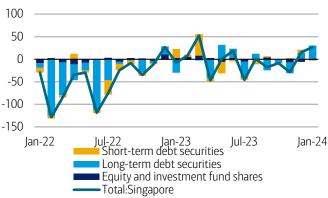
Source: MoF, BoJ, BofA Global Research



Exhibit 43: Outward portfolio investment: Singapore

(net: billion yen)

100 ———



Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 45: Outward portfolio investment: Mexico

(net: billion yen)

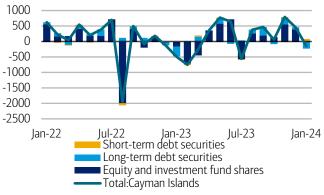


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 47: Outward portfolio investment: Cayman Islands

(net: billion yen)



Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 44: Outward portfolio investment: Indonesia

(net: billion yen)

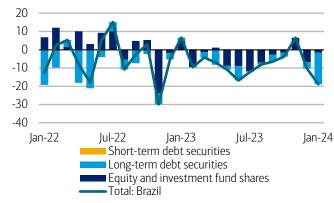


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 46: Outward portfolio investment: Brazil

(net: billion yen)



Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 48: Outward portfolio investment: Bermuda

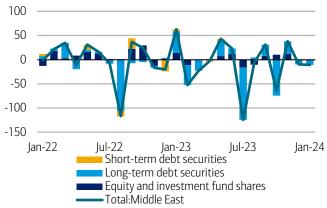
(net: billion yen)



Source: MoF, BoJ, BofA Global Research

Exhibit 49: Outward portfolio investment: The Middle East

(net: billion yen)

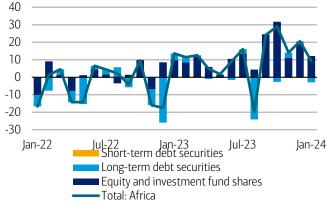


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 50: Outward portfolio investment: Africa

(net: billion yen)



Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Portfolio investment assets, country breakdown of sovereign bonds

Exhibit 51: Sovereign bonds: US

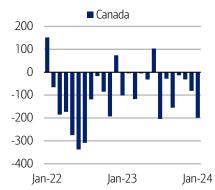
(net: billion yen)



Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 52: Sovereign bonds: Canada (net: billion yen)

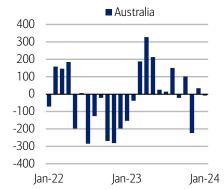


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 53: Sovereign bonds: Australia

(net: billion yen)

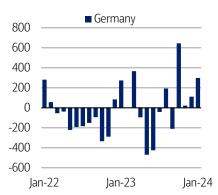


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 54: Sovereign bonds: Germany

(net: billion yen)

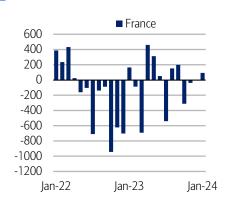


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 55: Sovereign bonds: France

(net: billion yen)

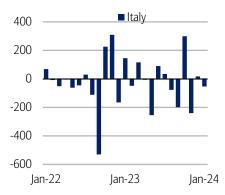


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 56: Sovereign bonds: Italy

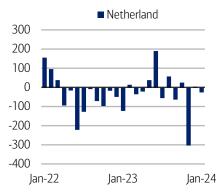
(net: billion yen)



Source: MoF, BoJ, BofA Global Research

Exhibit 57: Sovereign bonds: The Netherlands

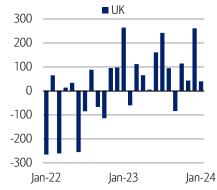
(net: billion yen)



Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 58: Sovereign bonds: The UK (net: billion yen)



Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 59: Sovereign bonds: Denmark (net: billion yen)

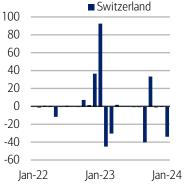


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 60: Sovereign bonds: Switzerland

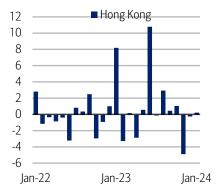
(net: billion yen)



Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 61: Sovereign bonds: Hong Kong (net: billion yen)



Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 62: Sovereign bonds: Sweden





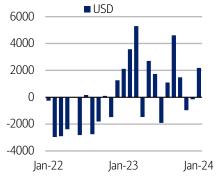
Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Outward portfolio investment by quotation currency

Exhibit 63: Outward portfolio investment: USD

(net: billion yen)

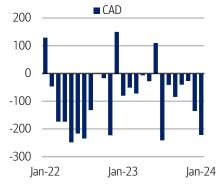


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 64: Outward portfolio investment: CAD

(net: billion yen)

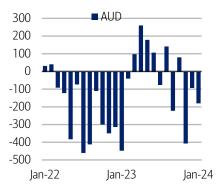


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 65: Outward portfolio investment: AUD

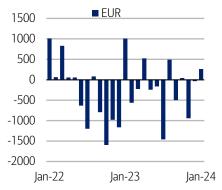
(net: billion yen)



Source: MoF, BoJ, BofA Global Research

Exhibit 66: Outward portfolio investment: EUR

(net: billion yen)

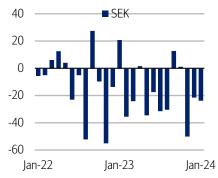


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 69: Outward portfolio investment: SFK

(net: billion yen)

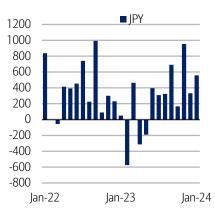


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 72: Outward portfolio investment: JPY

(net: billion yen)

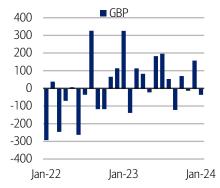


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 67: Outward portfolio investment: GBP

(net: billion yen)

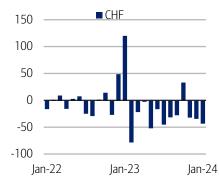


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 70: Outward portfolio investment: CHF

(net: billion yen)

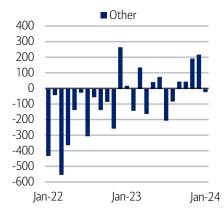


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 73: Outward portfolio investment: Other

(net: billion yen)

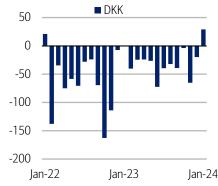


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 68: Outward portfolio investment: DKK

(net: billion yen)

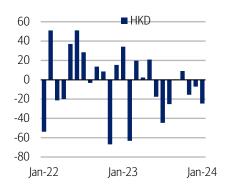


Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 71: Outward portfolio investment: HKD

(net: billion yen)



Source: MoF, BoJ, BofA Global Research

Portfolio investment liabilities by type of debt security





Source: MoF, BoJ, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 75: Portfolio investment liabilities: Short-term debt (net: billion yen)





Disclosures

Important Disclosures

BofA Global Research personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible.

BofA Securities fixed income analysts regularly interact with sales and trading desk personnel in connection with their research, including to ascertain pricing and liquidity in the fixed income markets.

Other Important Disclosures

Prices are indicative and for information purposes only. Except as otherwise stated in the report, for any recommendation in relation to an equity security, the price referenced is the publicly traded price of the security as of close of business on the day prior to the date of the report or, if the report is published during intraday trading, the price referenced is indicative of the traded price as of the date and time of the report and in relation to a debt security (including equity preferred and CDS), prices are indicative as of the date and time of the report and are from various sources including BofA Securities trading desks.

The date and time of completion of the production of any recommendation in this report shall be the date and time of dissemination of this report as recorded in the report timestamp.

Recipients who are not institutional investors or market professionals should seek the advice of their independent financial advisor before considering information in this report in connection with any investment decision, or for a necessary explanation of its contents.

Officers of BofAS or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments. Refer to BofA Global Research policies relating to conflicts of interest.

"BofA Securities" includes BofA Securities, Inc. ("BofAS") and its affiliates. Investors should contact their BofA Securities representative or Merrill Global Wealth Management financial advisor if they have questions concerning this report or concerning the appropriateness of any investment idea described herein for such investor. "BofA Securities" is a global brand for BofA Global Research.

Information relating to Non-US affiliates of BofA Securities and Distribution of Affiliate Research Reports:

BofAS and/or Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") may in the future distribute, information of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by The Financial Service Board; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); BofASE (France): BofA Securities Europe SA is authorized by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers (AMF). BofA Securities Europe SA ("BofASE") with registered address at 51, rue La Boétie, 75008 Paris is registered under no 842 602 690 RCS Paris. In accordance with the provisions of French Code Monétaire et Financier (Monetary and Financial Code), BofASE is an établissement de crédit et d'investissement (credit and investment institution) that is authorised and supervised by the European Central Bank and the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers. BofASE's share capital can be found at www.bofaml.com/BofASEdisclaimer; BofA Europe (Milan): Bank of America Europe Designated Activity Company, Milan Branch, regulated by the Bank of Italy, the European Central Bank (ECB) and the Central Bank of Ireland (CBI); BofA Europe (Frankfurt): Bank of America Europe Designated Activity Company, Frankfurt Branch regulated by BaFin, the ECB and the CBI; BofA Europe (Madrid): Bank of America Europe Designated Activity Company, Sucursal en España, regulated by the Bank of Spain, the ECB and the CBI; Merrill Lynch (Australia): Merrill Lynch (Hong Kong): Merr (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSFC); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch (Canada): Merrill Lynch (Canada): Merrill Lynch (Mexico): Merrill Mexico): Merrill Lynch (Mexico): Merrill Lynch (Mexico): Merrill Lynch (Mexico): Merrill Lynch (Me de Bolsa, regulated by the Comisión Nacional Bancaria y de Valores; Merrill Lynch (Argentina): Merrill Lynch Argentina SA, regulated by Comisión Nacional de Valores; BofAS Japan: BofA Securities Japan Co., Ltd., regulated by the Financial Services Agency; Merrill Lynch (Seoul): Merrill Lynch International, LLC Seoul Branch, regulated by the Financial Supervisory Service; Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd., regulated by the Securities and Futures Bureau; BofAS India: BofA Securities India Limited, regulated by the Securities and Exchange Board of India (SEBI); Merrill Lynch (Israel): Merrill Lynch (I Financial Services Authority (DFSA); Merrill Lynch (Brazil): Merrill Lynch (SA. Corretora de Títulos e Valores Mobiliários, regulated by Comissão de Valores Mobiliários; Merrill Lynch KSA Company: Merrill Lynch Kingdom of Saudi Arabia Company, regulated by the Capital Market Authority.

This information: has been approved for publication and is distributed in the United Kingdom (UK) to professional clients and eligible counterparties (as each is defined in the rules of the FCA and the PRA) by MLI (UK), which is authorized by the PRA and regulated by the FCA and the PRA - details about the extent of our regulation by the FCA and PRA are available from us on request; has been approved for publication and is distributed in the European Economic Area (EEA) by BofASE (France), which is authorized by the ACPR and regulated by the ACPR and the AMF; has been considered and distributed in Japan by BofAS Japan, a registered securities dealer under the Financial Instruments and Exchange Act in Japan, or its permitted affiliates; is issued and distributed in Hong Kong by Merrill Lynch (Hong Kong) which is regulated by HKSFC; is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch (Singapore) (Company Registration No 198602883D). Merrill Lynch (Singapore) is regulated by MAS. Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distributes this information in Australia only to "Wholesale' clients as defined by s.761G of the Corporations Act 2001. With the exception of Bank of America N.A., Australia Branch, neither MLEA nor any of its affiliates involved in preparing this information is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this information in Brazil and its local distribution is by Merrill Lynch (Brazil) in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the DFSA Information in Germany and is regulated by BaFin, the ECB and the CBI. BofA Securities entities, including BofA Securities group. You may b

This information has been prepared and issued by BofAS and/or one or more of its non-US affiliates. The author(s) of this information may not be licensed to carry on regulated activities in your jurisdiction and, if not licensed, do not hold themselves out as being able to do so. BofAS and/or MLPF&S is the distributor of this information in the US and accepts full responsibility for information distributed to BofAS and/or MLPF&S clients in the US by its non-US affiliates. Any US person receiving this information and wishing to effect any transaction in any security discussed herein should do so through BofAS and/or MLPF&S and not such foreign affiliates. Hong Kong recipients of this information should contact Merrill Lynch (Asia Pacific) Limited in respect of any matters relating to dealing in securities or provision of specific advice on securities or any other matters arising from, or in connection with, this information. Singapore recipients of this information should contact Merrill Lynch (Singapore) Pte Ltd in respect of any matters arising from, or in connection with, this information. For clients that are not accredited investors, expert investors or institutional investors Merrill Lynch (Singapore) Pte Ltd accepts full responsibility for the contents of this information distributed to such clients in Singapore.

General Investment Related Disclosures:

Taiwan Readers: Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Securities. This document provides general information only, and has been prepared for, and is intended for general distribution to, BofA Securities clients. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options,



futures, warrants, and contracts for differences). This document is not intended to provide personal investment advice and it does not take into account the specific investment objectives, financial situation and the particular needs of, and is not directed to, any specific person(s). This document and its content do not constitute, and should not be considered to constitute, investment advice for purposes of ERISA, the US tax code, the Investment Advisers Act or otherwise. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this document and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this document.

Securities and other financial instruments referred to herein, or recommended, offered or sold by BofA Securities, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. Digital assets are extremely speculative, volatile and are largely unregulated. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

Futures and options are not appropriate for all investors. Such financial instruments may expire worthless. Before investing in futures or options, clients must receive the appropriate risk disclosure documents. Investment strategies explained in this report may not be appropriate at all times. Costs of such strategies do not include commission or margin expenses. BofA Securities is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned in this report. Investors in such securities and instruments effectively assume currency risk.

BofAS or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. BofAS or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Securities, through business units other than BofA Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented herein. Such ideas or recommendations may reflect different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Securities is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this information. In the event that the recipient received this information pursuant to a contract between the recipient and BofAS for the provision of research services for a separate fee, and in connection therewith BofAS may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom BofAS has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by BofAS). If such recipient uses the services of BofAS in connection with the sale or purchase of a security referred to herein, BofAS may act as principal for its own account or as agent for another person. BofAS is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including transactions in any securities referred to herein.

Copyright and General Information:

Copyright 2024 Bank of America Corporation. All rights reserved. iQdatabase® is a registered service mark of Bank of America Corporation. This information is prepared for the use of BofA Securities clients and may not be redistributed, retransmitted or disclosed, in whole or in part, or in any form or manner, without the express written consent of BofA Securities. BofA Global Research information is distributed simultaneously to internal and client websites and other portals by BofA Securities and is not publicly-available material. Any unauthorized use or disclosure is prohibited. Receipt and review of this information constitutes your agreement not to redistribute, retransmit, or disclose to others the contents, opinions, conclusion, or information contained herein (including any investment recommendations, estimates or price targets) without first obtaining express permission from an authorized officer of BofA Securities. Materials prepared by BofA Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Securities, including investment banking personnel. BofA Securities has established information barriers between BofA Global Research and certain business groups. As a result, BofA Securities does not disclose certain client relationships with, or compensation received from, such issuers. To the extent this material discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this material. BofA Global Research personnel's knowledge of legal proceedings in which any BofA Securities entity and/or its directors, officers and employees may be plaintiffs, defendants, co-defendants or co-plaintiffs with or involving issuers mentioned in this material is based on public inform

This information has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of BofAS any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing such rating, recommendation or investment thesis.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Securities and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This information may contain links to third-party websites. BofA Securities is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content contained on such third-party websites is not part of this information and is not incorporated by reference. The inclusion of a link does not imply any endorsement by or any affiliation with BofA Securities. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Securities is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

All opinions, projections and estimates constitute the judgment of the author as of the date of publication and are subject to change without notice. Prices also are subject to change without notice. BofA Securities is under no obligation to update this information and BofA Securities ability to publish information on the subject issuer(s) in the future is subject to applicable quiet periods. You should therefore assume that BofA Securities will not update any fact, circumstance or opinion contained herein.

Certain outstanding reports or investment opinions relating to securities, financial instruments and/or issuers may no longer be current. Always refer to the most recent research report relating to an issuer prior to making an investment decision.

In some cases, an issuer may be classified as Restricted or may be Under Review or Extended Review. In each case, investors should consider any investment opinion relating to such issuer (or its security and/or financial instruments) to be suspended or withdrawn and should not rely on the analyses and investment opinion(s) pertaining to such issuer (or its securities and/or financial instruments) nor should the analyses or opinion(s) be considered a solicitation of any kind. Sales persons and financial advisors affiliated with BofAS or any of its affiliates may not solicit purchases of securities or financial instruments that are Restricted or Under Review and may only solicit securities under Extended Review in accordance with firm policies.

Neither BofA Securities nor any officer or employee of BofA Securities accepts any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this information.

