

Q&A: Treatment of Intraday, Expected and Unexpected Market Closures in the MSCI Equity Indexes

March 2020

Contents	1	Introduction	3
	2	General Questions on Market Closures	4
	3	MSCI Unexpected Market Closure Indexes Methodology	7
	4	Appendix: List of Indexes with Contracts	10

1 Introduction

Stock exchanges may unexpectedly halt or close for a variety of reasons, including technical issues, external factors such as weather or social/political events, or market conditions. The ongoing market conditions from the COVID-2019 pandemic resulted in a number of such closures, some of which were determined by “circuit breakers”, while others by unexpected holidays imposed by the relevant authorities. For example, markets, including in the U.S., Canada, Indonesia, Thailand and Pakistan, have had several trading halts due to triggered circuit breakers. At the same time, in both Kuwait and the Philippines, extended market holidays were implemented, followed by an announcement that the stock exchanges will commence reduced operations.

The MSCI Equity Index daily performance calculations are impacted by these closures in three areas: real time index ticks, end of day official index levels and settlement values for exchange traded future contracts based on MSCI Indexes. Implementation of index reviews may also be impacted by trading suspensions and market closures.

The impact of such closures on the index calculation and rebalancing is governed by the MSCI Index Calculation¹ and the MSCI Unexpected Market Closure Indexes² methodologies.

The aim of this Q&A document is to answer key questions regarding MSCI’s policy on treatment of such trading closures. It describes in detail the treatment of market closures in the MSCI Equity Indexes and the different scenarios that may occur in the event of prolonged closures.

¹ https://www.msci.com/eqb/methodology/meth_docs/MSCI_IndexCalcMethodology_Jan2020.pdf

² <https://www.msci.com/index/methodology/latest/Marketclosure>

2 General Questions on Market Closures

What is the impact of an intraday market outage on the real time index ticks?

In case of an intraday outage, MSCI uses the last available tick for the impacted market while continuing to calculate all indexes throughout the day, at every 15 seconds or 60 seconds depending on the Index. MSCI does not stop calculating real time indexes.

What is the impact of an intraday market outage on the end of day official index levels?

For an intraday outage that lasts through the close, MSCI will use the last available real time tick as the close price. MSCI will use the official closing price if provided by the relevant stock exchange. If the market never opened, MSCI uses the previous day close price.

What price is used in the MSCI Equity Index calculations if a security (or a market) does not trade on a specific day or period?

In case of market closure or if a security does not trade on a specific day or within a specific period, MSCI carries the latest available closing price to calculate indexes. In case of market outage, MSCI will use the prices provided up to the point of the outage of that market for calculation of MSCI indexes on that day if available (see next FAQ).

What price is used for Real time and the End of day calculations in case of a market outage?

For the Real time calculations MSCI uses the last available traded price and for the End of day calculations MSCI uses the last official closing price or last traded price.

Would MSCI postpone corporate event implementation in case of expected market closure?

Yes. A pre-announced full day exchange trading suspension will lead to postponement of implementation of a corporate event that occurred during the suspension period to the date when market resumes trading again.

Would MSCI postpone corporate event implementation in case of unexpected market closure or intraday market outage?

Corporate events would be reviewed independently and the decision to postpone will depend on several factors, including but not limited to duration of halt, trading volume, timing of the trading halt. If the decision is made to postpone the implementation, an announcement will be made as soon as practicable.

Would MSCI postpone corporate event implementation in case of price limit breach at security level?

For individual securities breaching price limits, MSCI postpones by two full business days the implementation of selected index changes when the trading remains impacted by a price limit mechanism at 12PM time³ of the stock exchange where the security is followed.

For more details please refer to section 5.2 of the MSCI Corporate Events methodology available at https://www.msci.com/eqb/methodology/meth_docs/MSCI_CEMethodology_Feb2020.pdf

How would Index Reviews be affected by unexpected and extended market closures or intraday market outages?

MSCI Index Review/rebalancings are unaffected by outages or closures as the methodological facets designed to ensure continuity of index calculation and maintenance pertain to these events as well.

However, if MSCI determines based on exceptional market dynamics or lack of data availability due to an outage or closure that an exception is warranted to regularly scheduled index reviews, MSCI would communicate such information publicly, with sufficient lead time, and to all clients simultaneously.

Would market closures and short selling bans automatically impact market accessibility ratings of countries covered by MSCI?

MSCI monitors measures such as market closures and short selling ban implemented by markets. MSCI will assess the impact of such measures as part of the 2020 Market Accessibility Review, taking into consideration

³ The cutoff is at 11AM for stock exchanges that close before 2PM local time

the measures implemented in various markets given the ongoing market conditions.

3 MSCI Unexpected Market Closure Indexes Methodology

What is the objective of the MSCI Unexpected Market Closure Indexes methodology?

The MSCI Unexpected Market Closure Indexes methodology aims to account for unexpected market closure events affecting the trading of underlying MSCI Index constituents on the day of a scheduled index futures expiry. In case of such events, an alternatively calculated index level will be made available as an Unexpected Market Closure Index level, upon the resumption of trading within the affected markets.

What is the definition of a market disruption under the MSCI Unexpected Market Closure Indexes Methodology?

Trading is considered disrupted if 1) a limitation on trading⁴ remains in effect during the half hour period preceding the close of trading for that exchange and 2) if the interruption in trading affects at least 50% of the securities (by number) within MSCI All Country World Index (ACWI) IMI and MSCI Frontier Markets IMI Index constituents listed on that exchange.

What is the impact of an Unexpected Market Closure Event on index level calculation?

In the event of an Unexpected Market Closure Event affecting an exchange within an underlying Index on a respective index futures expiry day, the only impact will be on the Unexpected Market Closure Index level, which will be additionally provided on subsequent business days to account for the interruption in trading.

When will MSCI provide Unexpected Market Closure Index levels when a disruption occurs on futures expiry date?

The Unexpected Market Closure Index level will be updated at the close of the first reopen day for each of the affected stock exchanges until no such index constituents remain affected, or 5 business days have elapsed after the expiry day.

Unexpected Market Closure Index levels will only be calculated for a fixed period of 5 business days following scheduled index futures expiry. If any

⁴ A limitation on trading will be recognized as complete lack of trading for associated index constituent listed on given exchange

of the affected exchanges do not reopen at the close of this period, the security prices from expiry day will be carried over for the calculation of the final Unexpected Market Closure Index level for the period

How is an Unexpected Market Closure Index level calculated when a disruption occurs?

The Unexpected Market Closure Index level is calculated using closing market prices from the index futures expiry day for stock exchanges that operate as per regular schedule, while closing market prices from the reopen day for stock exchanges that are affected by Unexpected Market Closure Events are used. The WM Reuters Spot FX rates from the same day corresponding to security prices are used for the index level calculation. (For more details, please refer to MSCI Unexpected Market Closure Indexes Methodology book)

Which indexes are covered by the MSCI Unexpected Market Closure Indexes Methodology?

For the list of indexes covered by the MSCI Unexpected Market Closure Indexes Methodology, please refer to Section 4 of this Q&A document.

Will an intraday market stoppage be considered as an Unexpected Market Closure Event?

An exchange that has reopened for trading within the day on which a trading stoppage occurred during earlier hours will not be considered an unexpected market closure if it stays open through the last half hour preceding the scheduled market close.

If securities in the underlying index are halted by reason of price movements exceeding pre-set levels permitted by the relevant exchange (e.g. circuit breakers being triggered) on the futures expiry days, will the market be considered as disrupted?

Yes, if more than 50% of the securities (by number) within MSCI ACWI IMI and MSCI Frontier Markets IMI constituents listed on that exchange do not trade in the half hour preceding the close of the stock exchange, then the market will be considered disrupted.

When will MSCI announce that an Unexpected Market Closure Event has occurred?

MSCI distributes two “Daily Disrupted Markets” emails on settlement dates, one sent at 12:30 UTC (20:30 SGT), another one sent at 20:30 UTC (16:00 NYT). The email includes the list of exchanges that are unexpectedly closed according to the MSCI Unexpected Market Closure Indexes Methodology, and the start and end dates of the unexpected market closure.

Any markets that have been identified as unexpectedly closed by MSCI systems at the time of generation of the Daily Disrupted Markets email will be included in the distribution. Additionally, the list of markets with unexpected closure are included in the end of day distribution of the Daily Unexpected Market Closure File for Asia Pacific, Europe and World product distributions, respectively. Please note that the Daily Disrupted Markets emails are distributed only on settlement dates, and only if one or more markets has an unexpected closure.

What time will the Unexpected Market Closure Index levels be published?

MSCI distributes index levels on settlement dates (and subsequent business dates up to t+5 for indexes with an unexpected market closure) for the MSCI Unexpected Market Closure Indexes Methodology along with end of day product delivery for the Asia Pacific, Europe and World production cycles. Please note that the Asia Pacific product delivery is expected at approximately 13:30 EST (17:30 UTC) with a delivery deadline of 14:00 EST (18:00 UTC), Europe product delivery is expected at 15:30 EST (19:30 UTC) with a delivery deadline of 16:15 EST (20:15 UTC), while World product delivery is expected at 17:30 EST (21:30 UTC). Please note that index levels for indexes covered by the MSCI Unexpected Market Closure Indexes Methodology are sent only on settlement dates.

Has there been any Unexpected Market Closure Event during a futures expiry date?

No, there has not been any Unexpected Market Closure Event during a futures expiry date since the launch of the MSCI Unexpected Market Closure Indexes in November 2018.

4 Appendix: List of Indexes with Contracts

Please find below the unique list of indexes that are covered by the MSCI Unexpected Market Closure Indexes Methodology:

MSCI Index Code	Index Name
105768	MALAYSIA
903600	AUSTRALIA
939200	JAPAN
891800	EM (EMERGING MARKETS)
990300	EAFE
106491	ACWI ex EUROPE
899800	AC ASIA ex JAPAN
899903	AC ASIA PACIFIC ex JAPAN
892200	AC FAR EAST ex JAPAN
907600	BRAZIL
127300	BRIC
912400	CANADA
990500	EUROPE
106646	EUROPE/CONSUMER DISCR
106647	EUROPE/CONSUMER STAPLES
106643	EUROPE/ENERGY
991700	EUROPE ex UK
106649	EUROPE/FINANCIALS
106648	EUROPE/HEALTH CARE
106645	EUROPE/INDUSTRIALS
106650	EUROPE/INFORMATION TECH
106644	EUROPE/MATERIALS
106651	EUROPE/COMM SVC
106652	EUROPE/UTILITIES
925000	FRANCE
934400	HONG KONG
991200	KOKUSAI INDEX (WORLD ex JP)
991400	PACIFIC ex JAPAN
971000	SOUTH AFRICA
982600	UNITED KINGDOM
984000	USA
990100	WORLD

106799	WRLD/CONSUMER DISCR
106800	WRLD/CONSUMER STAPLES
106806	WRLD/ENERGY
106802	WRLD/FINANCIALS
106801	WRLD/HEALTH CARE
106798	WRLD/INDUSTRIALS
106803	WRLD/INFORMATION TECH
106807	WRLD/MATERIALS
106804	WRLD/COMM SVC
106805	WRLD/UTILITIES
995200	EUROPE ex SWITZERLAND
106400	EMU
975600	SWITZERLAND
113648	ACWI ex AUSTRALIA
132085	WRLD/REAL ESTATE
132981	EUROPE/REAL ESTATE
136614	FM (FRONTIER MARKETS)
915200	CHILE
917000	COLOMBIA
920000	CZECH REPUBLIC
105766	EGYPT
934800	HUNGARY
105765	MOROCCO
960400	PERU
860800	PHILIPPINES
961600	POLAND
105653	RUSSIA
105769	THAILAND
105843	EUROPE GROWTH
105844	EUROPE VALUE
129612	MSCI EM ex KOREA
711295	EM ASIA ex CHINA
701475	EM ASIA ex KOREA
935600	INDIA
870200	SINGAPORE FREE
123163	EM EMEA
892000	EM LATIN AMERICA
955400	NEW ZEALAND
998100	SINGAPORE

990800	PACIFIC
136647	VIETNAM
705405	SAUDI ARABIA
106855	EM/COMM SVC
106850	EM/CONSUMER DISCR
106853	EM/FINANCIALS
106852	EM/HEALTH CARE
106847	EM/ENERGY
106875	EM/REAL ESTATE
903200	ARGENTINA
700719	USA ESG LEADERS
700713	WORLD ESG LEADERS
938000	ITALY
105767	INDONESIA
106700	EMU/FINANCIALS
106699	EMU/HEALTH CARE
106696	EMU/INDUSTRIALS
106695	EMU/MATERIALS
106694	EMU/ENERGY
106725	EMU/TELECOM SVC
106722	EMU/REAL ESTATE
106698	EMU/CONSUMER STAPLES
106701	EMU/INFORMATION TECH
106703	EMU/UTILITIES
106697	EMU/CONSUMER DISCR
106849	EM/INDUSTRIALS
106854	EM/INFORMATION TECH
106856	EM/UTILITIES
106851	EM/CONSUMER STAPLES
106848	EM/MATERIALS
145993	EM LATIN AMERICA ex BRAZIL
700715	EAFE ESG LEADERS
703304	EM (EMERGING MARKETS) ESG LEADERS
700717	EUROPE ESG LEADERS
713021	EM (EMERGING MARKETS) ex CHINA
915800	TAIWAN
105825	USA GROWTH
105826	USA VALUE

106229	USA SMALL CAP
106570	PAN-EURO
899700	EM ASIA
106569	EURO
892400	ACWI
899901	ACWI ex USA
848400	MEXICO
302401	CHINA FREE
133715	QATAR
133717	UNITED ARAB EMIRATES
652555	WORLD MID CAP
302000	AC ASIA PACIFIC
990200	NORTH AMERICA
127200	AC ASEAN
301700	AC ASIA
713321	EM EMEA ex TURKEY
106062	EM (EMERGING MARKETS) GROWTH
145999	EM LATIN AMERICA ex BRAZIL VALUE
106063	EM (EMERGING MARKETS) VALUE
106336	EMU GROWTH
106335	EMU VALUE
958600	PAKISTAN
105867	WORLD GROWTH
105868	WORLD VALUE

Contact us

clientservice@msci.com

AMERICAS

Americas	1 888 588 4567 *
Atlanta	+ 1 404 551 3212
Boston	+ 1 617 532 0920
Chicago	+ 1 312 675 0545
Monterrey	+ 52 81 1253 4020
New York	+ 1 212 804 3901
San Francisco	+ 1 415 836 8800
São Paulo	+ 55 11 3706 1360
Toronto	+ 1 416 628 1007

EUROPE, MIDDLE EAST & AFRICA

Cape Town	+ 27 21 673 0100
Frankfurt	+ 49 69 133 859 00
Geneva	+ 41 22 817 9777
London	+ 44 20 7618 2222
Milan	+ 39 02 5849 0415
Paris	0800 91 59 17 *

ASIA PACIFIC

China North	10800 852 1032 *
China South	10800 152 1032 *
Hong Kong	+ 852 2844 9333
Mumbai	+ 91 22 6784 9160
Seoul	00798 8521 3392 *
Singapore	800 852 3749 *
Sydney	+ 61 2 9033 9333
Taipei	008 0112 7513 *
Thailand	0018 0015 6207 7181 *
Tokyo	+ 81 3 5290 1555

* = toll free

ABOUT MSCI

MSCI is a leading provider of critical decision support tools and services for the global investment community. With over 45 years of expertise in research, data and technology, we power better investment decisions by enabling clients to understand and analyze key drivers of risk and return and confidently build more effective portfolios. We create industry-leading research-enhanced solutions that clients use to gain insight into and improve transparency across the investment process.

To learn more, please visit www.msci.com.

Notice and disclaimer

This document and all of the information contained in it, including without limitation all text, data, graphs, charts (collectively, the "Information") is the property of MSCI Inc. or its subsidiaries (collectively, "MSCI"), or MSCI's licensors, direct or indirect suppliers or any third party involved in making or compiling any Information (collectively, with MSCI, the "Information Providers") and is provided for informational purposes only. The Information may not be modified, reverse-engineered, reproduced or disseminated in whole or in part without prior written permission from MSCI.

The Information may not be used to create derivative works or to verify or correct other data or information. For example (but without limitation), the Information may not be used to create indexes, databases, risk models, analytics, software, or in connection with the issuing, offering, sponsoring, managing or marketing of any securities, portfolios, financial products or other investment vehicles utilizing or based on, linked to, tracking or otherwise derived from the Information or any other MSCI data, information, products or services.

The user of the Information assumes the entire risk of any use it may make or permit to be made of the Information. NONE OF THE INFORMATION PROVIDERS MAKES ANY EXPRESS OR IMPLIED WARRANTIES OR REPRESENTATIONS WITH RESPECT TO THE INFORMATION (OR THE RESULTS TO BE OBTAINED BY THE USE THEREOF), AND TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, EACH INFORMATION PROVIDER EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES (INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF ORIGINALITY, ACCURACY, TIMELINESS, NON-INFRINGEMENT, COMPLETENESS, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) WITH RESPECT TO ANY OF THE INFORMATION.

Without limiting any of the foregoing and to the maximum extent permitted by applicable law, in no event shall any Information Provider have any liability regarding any of the Information for any direct, indirect, special, punitive, consequential (including lost profits) or any other damages even if notified of the possibility of such damages. The foregoing shall not exclude or limit any liability that may not by applicable law be excluded or limited, including without limitation (as applicable), any liability for death or personal injury to the extent that such injury results from the negligence or willful default of itself, its servants, agents or sub-contractors.

Information containing any historical information, data or analysis should not be taken as an indication or guarantee of any future performance, analysis, forecast or prediction. Past performance does not guarantee future results.

The Information should not be relied on and is not a substitute for the skill, judgment and experience of the user, its management, employees, advisors and/or clients when making investment and other business decisions. All Information is impersonal and not tailored to the needs of any person, entity or group of persons.

None of the Information constitutes an offer to sell (or a solicitation of an offer to buy), any security, financial product or other investment vehicle or any trading strategy.

It is not possible to invest directly in an index. Exposure to an asset class or trading strategy or other category represented by an index is only available through third party investable instruments (if any) based on that index. MSCI does not issue, sponsor, endorse, market, offer, review or otherwise express any opinion regarding any fund, ETF, derivative or other security, investment, financial product or trading strategy that is based on, linked to or seeks to provide an investment return related to the performance of any MSCI index (collectively, "Index Linked Investments"). MSCI makes no assurance that any Index Linked Investments will accurately track index performance or provide positive investment returns. MSCI Inc. is not an investment adviser or fiduciary and MSCI makes no representation regarding the advisability of investing in any Index Linked Investments.

Index returns do not represent the results of actual trading of investable assets/securities. MSCI maintains and calculates indexes, but does not manage actual assets. Index returns do not reflect payment of any sales charges or fees an investor may pay to purchase the securities underlying the index or Index Linked Investments. The imposition of these fees and charges would cause the performance of an Index Linked Investment to be different than the MSCI index performance.

The Information may contain back tested data. Back-tested performance is not actual performance, but is hypothetical. There are frequently material differences between back tested performance results and actual results subsequently achieved by any investment strategy.

Constituents of MSCI equity indexes are listed companies, which are included in or excluded from the indexes according to the application of the relevant index methodologies. Accordingly, constituents in MSCI equity indexes may include MSCI Inc., clients of MSCI or suppliers to MSCI. Inclusion of a security within an MSCI index is not a recommendation by MSCI to buy, sell, or hold such security, nor is it considered to be investment advice.

Data and information produced by various affiliates of MSCI Inc., including MSCI ESG Research LLC and Barra LLC, may be used in calculating certain MSCI indexes. More information can be found in the relevant index methodologies on www.msci.com.

MSCI receives compensation in connection with licensing its indexes to third parties. MSCI Inc.'s revenue includes fees based on assets in Index Linked Investments. Information can be found in MSCI Inc.'s company filings on the Investor Relations section of www.msci.com.

MSCI ESG Research LLC is a Registered Investment Adviser under the Investment Advisers Act of 1940 and a subsidiary of MSCI Inc. Except with respect to any applicable products or services from MSCI ESG Research, neither MSCI nor any of its products or services recommends, endorses, approves or otherwise expresses any opinion regarding any issuer, securities, financial products or instruments or trading strategies and MSCI's products or services are not intended to constitute investment advice or a recommendation to make (or refrain from making) any kind of investment decision and may not be relied on as such. Issuers mentioned or included in any MSCI ESG Research materials may include MSCI Inc., clients of MSCI or suppliers to MSCI, and may also purchase research or other products or services from MSCI ESG Research. MSCI ESG Research materials, including materials utilized in any MSCI ESG Indexes or other products, have not been submitted to, nor received approval from, the United States Securities and Exchange Commission or any other regulatory body.

Any use of or access to products, services or information of MSCI requires a license from MSCI. MSCI, Barra, RiskMetrics, IPD and other MSCI brands and product names are the trademarks, service marks, or registered trademarks of MSCI or its subsidiaries in the United States and other jurisdictions. The Global Industry Classification Standard (GICS) was developed by and is the exclusive property of MSCI and Standard & Poor's. "Global Industry Classification Standard (GICS)" is a service mark of MSCI and Standard & Poor's.

MIFID2/MIFIR notice: MSCI ESG Research LLC does not distribute or act as an intermediary for financial instruments or structured deposits, nor does it deal on its own account, provide execution services for others or manage client accounts. No MSCI ESG Research product or service supports, promotes or is intended to support or promote any such activity. MSCI ESG Research is an independent provider of ESG data, reports and ratings based on published methodologies and available to clients on a subscription basis. We do not provide custom or one-off ratings or recommendations of securities or other financial instruments upon request.

Privacy notice: For information about how MSCI ESG Research LLC collects and uses personal data concerning officers and directors, please refer to our Privacy Notice at <https://www.msci.com/privacy-pledge>.