

CONSULTATION ON PROPOSED MARKET DISRUPTIONS INDEXES METHODOLOGY

February 2018

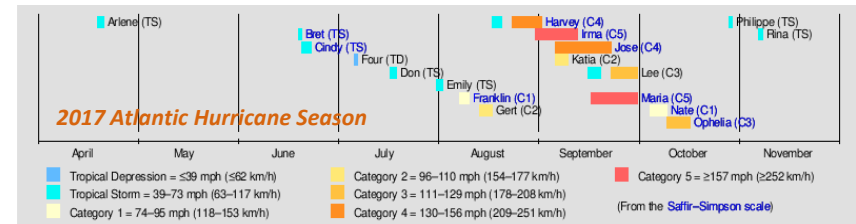
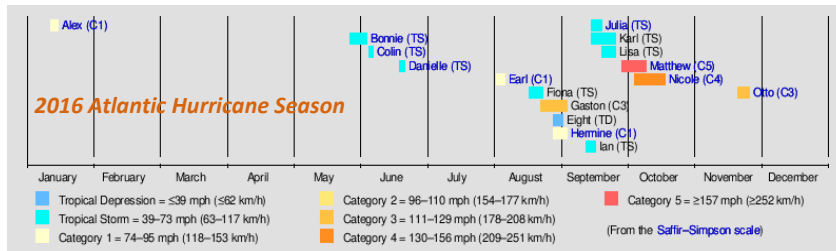
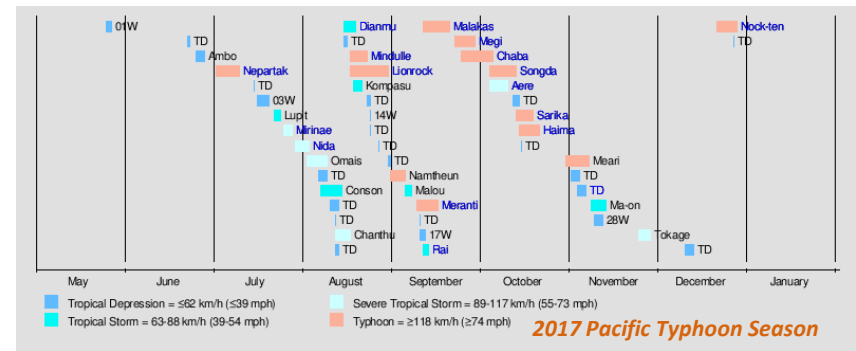
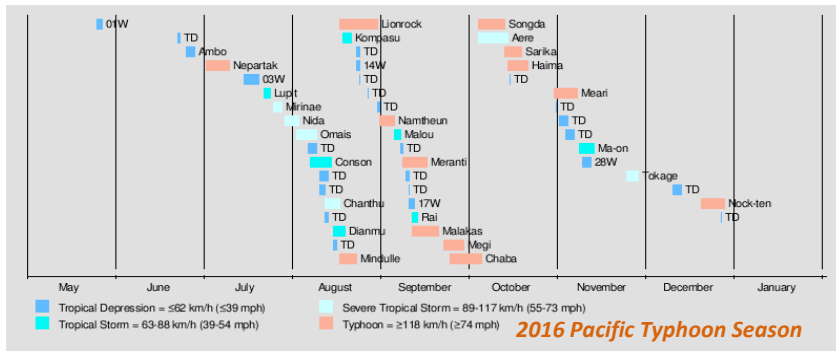
This consultation may or may not lead to the implementation of any or all of the proposed changes in the highlighted or any other MSCI indexes. Consultation feedback will remain confidential. MSCI may publicly disclose feedback if specifically requested by specific market participants. In that case, the relevant feedback would be published together with the final results of the consultation.

PROPOSAL SUMMARY

- ❖ “In case of market closure or if a security does not trade on a specific day or a specific period, MSCI carries the latest available closing price to calculate its indexes”¹
- ❖ In the face of unexpected market disruption that affects the trading of index constituents at the expiry of an Index futures contract, the Index level calculated for the day is not retrospectively changed using tradable prices for affected securities when the market re-opens.
- ❖ MSCI seeks feedback on a proposal that would apply potential adjustments required to the Index level calculation for a Final Settlement Price for the Index futures contract, such that it would take account of “Market Disruption events” on the Index futures expiry date.
- ❖ MSCI is not proposing a change to the current MSCI Index Calculation methodology. This is a proposal for an alternative provision of adjusted Index levels accounting for potential “Market Disruption events” during Index futures expiry.
- ❖ MSCI welcomes any feedback from the investment community on the proposal on or before March 09, 2018

¹As per the closing price policy within the MSCI Index Calculation methodology

THE RISK OF MARKET DISRUPTIONS



Source: Wikipedia

- ❖ During both the 2016 and 2017 typhoon season, 5 typhoons were registered in September
- ❖ The Taiwan market was closed for 3 days (2 in September) in 2016 while Hong Kong closed for 1 day in October 2016 and August 2017
- ❖ The index calculation methodology used for an underlying to an Index futures contract should address “Market Disruption events” arising from natural or human action

WHAT IS A MARKET DISRUPTION EVENT?

Market Disruption Event: Proposal

An event on a given market (exchange) will be considered a **Market Disruption event** when **all** of the below criteria are met:

- It is a regular business day for a given exchange (Market Disruption events cannot occur on scheduled stock exchange holidays)
 - A limitation on trading* occurs during the one-half hour period preceding the close of trading for the exchange
 - Disruption in trading affects at least 50%** of the securities (by number) within MSCI ACWI (FM) IMI constituents listed on the given exchange
- ❖ Securities that are halted by reason of price movements otherwise exceeding pre-set levels permitted by the relevant exchange (i.e. circuit breakers being triggered) will be considered disrupted if they do not trade in the one-half hour preceding the exchange close.
- ❖ Suspended securities will be considered disrupted in evaluating the fulfilment of the criterion of at least 50% securities being affected

* limitation on trading will be recognized through nil trading volumes for associated index constituents

** Threshold level is part of consultation

A MARKET DISRUPTION EVENT WOULD NOT BE

- ❖ An exchange that has reopened for trading during a day on which a market disruption has occurred during earlier trading hours will not be considered disrupted if it stays open through the last half hour preceding the scheduled market close
- ❖ A limitation on the hours in a trading day and/or number of days of trading will not constitute a Market Disruption event, if it results from an announced change in the regular business hours of the relevant exchange on an ongoing basis
- ❖ A decision to permanently discontinue trading (i.e. delisting) in one or more of the stocks which then comprise the index will not constitute a Market Disruption event
- ❖ A suspension of, or material limitation to, trading on the relevant exchange does not include any time when that exchange is closed for trading under ordinary circumstances (example: day before Christmas for US exchanges), or scheduled holidays listed in the exchange calendar

DISCUSSION POINTS: “MARKET DISRUPTION EVENT” DEFINITION

1. Does the proposed definition align closely with your view of a Market Disruption Event?
2. Should there be consideration for limitation on trading beyond the one-half hour period preceding the close of trading, for determination of a Market Disruption event?
3. Do you foresee any issues with MSCI proposal to implement no special (disruption) treatment when exchange holiday on Index futures expiry dates have been announced in advance?
4. Should Market Disruption event within an Index be implemented at a Stock Exchange level or incorporate materiality standard for proportion of Index affected?
 - ISDA definition notes a “materiality” standard, such as 20% constituents contributing to the Index level should be disrupted to trigger an Adjusted Settlement Index level calculation. In such a case, only disruption in China would trigger an alternate Index level calculation using MSCI Emerging Markets Index as parent

DISCUSSION POINTS: MARKET DISRUPTION EVENT DEFINITION

5. Do you agree with MSCI proposal to implement a Market Disruption event based on 50% of the number of securities disrupted on a given exchange?
6. Does MSCI proposal to consider suspended MSCI Country (IMI) Index securities as disrupted during the evaluation of the 50% securities threshold for determining a Market Disruption event make sense?
7. Considering the trading frequency differences on DM, EM and FM exchanges, should there be consideration for less stringent thresholds for EM and FM, compared to DM?

ACCOUNTING FOR MARKET DISRUPTIONS

In ISDA (International Swaps and Derivatives Association, Inc.) agreements used for OTC transactions, “Market Disruption events” are defined in detail.

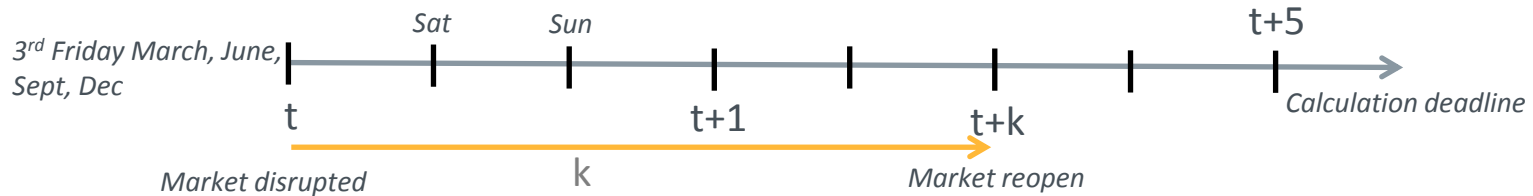
In case of index constituents being rendered untradable due to unforeseen circumstances, their basic principle is that market participants avoid mismatches between the Final Settlement Prices and their basket hedge.

- ❖ If someone uses futures as hedge for options, they might be indifferent on adjustments, as long as the Final Settlement Price for the futures matches those of the options
- ❖ However, market participants, who trade Index futures against cash or swaps might be in favour of adjustments in cases of Market Disruption events causing whole markets to be closed

The goal is to provide the Index levels that are replicable and transparent, while aim to adjust them relatively infrequently.

ADJUSTED SETTLEMENT INDEX LEVEL CALCULATION

In order to align the Index level used by Index futures exchanges to calculate Final Settlement Price with the actual trading by market participants around disrupted market, we would need to (re)calculate an Index level as



Adjusted Settlement Price Index level formula: As a general principle, today's Index level is obtained by applying the change in the market performance to the previous period Index level.

$${}^{\#}EDPriceIndexLevelUSD_{t+k} = PriceIndexLevelUSD_{t-1} * \frac{IndexAdjustedMarketCapUSD_{t+k}}{IndexInitialMarketCapUSD_t}$$

$$IndexAdjustedMarketCapUSD_{t+k} = \sum_{V \in I, t \leq V, j} \frac{EndOfDayNumberOfShares_{t-1} * PricePerShare_{t+j} * InclusionFactor_t * PAF_{tAggregate}}{FXrate_{t+j}}$$

V – Exchange for Constituents (*s*) comprising the Index (*I*)

j – full non-disrupted day of trading for market, $j = 0, 1, \dots, 5$ where 0 = non-disrupted market

ADJUSTED SETTLEMENT INDEX LEVEL CALCULATION

Daily Total Return Index also needs to consider impact of daily dividends, in addition to applying the change in the market performance to the previous period Index level

Adjusted Settlement Daily Total Return Index level formula:

$$EDSettlementDTRIndexLevelUSD_{t+k} = DTRIndexLevelUSD_{t-1} * \frac{(IndexAdjustedMarketCapUSD_{t+k} + IndexDividendImpactUSD_{t+k})}{IndexInitialMarketCapUSD_t}$$

$$IndexAdjustedMarketCapUSD_{t+k} = \sum_{V \in I, t \in V, j} \frac{EndOfDayNumberOfShares_{t-1} * PricePerShare_{t+j} * InclusionFactor_t * PAF_{tAggregate}}{FXrate_{t+j}}$$

- ❖ For market that is still deemed disrupted as of the end of the 5th business day after expiry, closing prices and 4PM LN FX from the day of the expiry will be used in the Adjusted Settlement Index Level calculation

DISCUSSION POINTS: ADJUSTED INDEX LEVEL CALCULATION

1. Do you agree with MSCI proposal to the impose a limit of 5 business days to accommodate re-opening of a market that is deemed disrupted on the day of the index futures expiry?
2. Should MSCI align closing prices and 4PM London FX rate used for calculation of the Adjusted Settlement Index level for constituents affected by Market Disruption events on expiry day, to the first non-disrupted open for the respective market? This is to give due consideration to trading in FX relative to exchanges that close before or after 4PM London time
3. Do you see any problems with MSCI proposal to deem a market disrupted for the calculation of the Adjusted Settlement Index level, regardless of whether the Market Disruption event started before or on the day of the index futures expiry?

CORPORATE EVENTS TREATMENT

- ❖ MSCI proposal for the Adjusted Settlement Index level calculation which accounts for Market Disruption events attempts to minimize the discrepancy in Corporate Events implementation as compared to the MSCI Global Investable Market Indexes calculation
- ❖ All Corporate Actions for securities listed on a disrupted market on an Index futures expiry day will be deferred to the first non-disrupted re-open day for the market
- ❖ MSCI proposal incorporates the impact of Corporate Events relative to the market-open on the Index futures expiry day, similar to the performance portion of the Adjusted Settlement Index level calculation

CORPORATE EVENTS IMPLEMENTATION

Events occurring during the disrupted period	MSCI proposal summary	MSCI proposal Implementation details
Corporate Events Price Adjustment Factor (PAF)	Aggregate PAF: Calculate using all PAF events ex between t (market disrupted) and t+k (market reopen)	Use price as of 1 st non-disrupted day P(t+k) to compute PAF value
Cash dividends	<ul style="list-style-type: none"> • Index Dividend Impact: Calculate using all • Cash dividends ex between t (market disrupted) and t+k (market reopen) 	<ul style="list-style-type: none"> • Use NOS as of settlement date -1 • Cash Dividends are only considered in DTR Indexes but not in Price Indexes
<p>Deletions due to:</p> <ol style="list-style-type: none"> 1. Acquisitions M&A, tender offers 2. Delisting, Bankruptcies 3. Prolonged Suspensions 4. Deletions due to a transformation like conversion, country reclassification 	Delete using same price as in GIMI Indexes calculation	<ul style="list-style-type: none"> - Follow the Corporate Events Methodology: offer price, last trading price, calculated price, OTC, lowest system price - Proposed Rules: <ul style="list-style-type: none"> • If security still trades on 1st non-disrupted day (t+k), use its market price as a deletion price • If security stopped trading during disruption period, use same deletion price as in GIMI Indexes calculation - Potential replicability issue: It is important to highlight that clients may face replicability issues due to the deletion price even if we decide to follow the MSCI Corporate Events Methodology and use the same deletion price as in GIMI Indexes calculation. Indeed, if the clients are not able to realize this deletion price, MSCI would have to consider deleting it at the lowest system price in order to avoid replicability issues. We propose to discuss this topic during the consultation.

DISCUSSION POINTS: CORPORATE EVENTS IMPLEMENTATION

1. Do you see any potential issues from MSCI proposal to use closing prices and FX from the first non-disrupted open for the disrupted market to compute the Aggregate Price Adjustment factor (PAF)?
2. Do you agree with MSCI proposal to use Number of Shares (NOS) as of “settlement date - 1” (rather than NOS as of “ex-date -1”) to more accurately reflect entitlement to a cash dividend for Index Dividend impact calculation?
3. Do you have any additional feedback regarding MSCI proposal to follow the MSCI Corporate Events Methodology and use the same deletion price as in GIMI Indexes calculation to remove index constituents (due to M&As, acquisitions, bankruptcies, delistings, prolonged suspensions during Market Disruption event period) for the calculation of the Adjusted Settlement Index level?

ADJUSTED SETTLEMENT INDEX LEVEL DELIVERY

- ❖ MSCI proposes to only provide adjustments of the Parent Index levels if Market Disruption events are present on (quarterly) futures expiry, until 5 business days from the futures expiry date

For other periods, the Market Disruption Index could will reflect the Parent Index level for the specified variant without any adjustments.

- ❖ MSCI proposes to notify clients about any Market Disruption events on futures expiry date, which will trigger the calculation of an Adjusted Settlement Index level.
- ❖ A notification will also be sent to communicate the calculation on an Adjusted Settlement Index level where all disrupted markets have resumed or the fixed period for the adjusted Index level calculation has ended
- ❖ No notification to be sent if there are no disrupted markets on expiry day
- ❖ Mode of Delivery for expiry day Index levels or Adjusted Settlement Index level (and possibly associated constituent data) will be subject to client feedback

DISCUSSION POINTS: INDEX DELIVERY

1. Do you agree MSCI proposal for Adjusted Settlement Index level delivery only at expiry (including following 5 business days)?
2. Are the mentioned notifications for Market Disruption events at expiry and market re-open necessary and sufficient?
3. Would a MSCI proposal to deliver the Adjusted Settlement Index levels for the MSCI Market Disruption Indexes via Integrated Custom Files (ICF) packages, containing both Index constituents and Index level data work for you?
4. Should MSCI consider another mode of delivery for Adjusted Settlement Index level?
5. For the remaining quarter (month) outside of the Index futures expiry until fixed adjusted calculation period (+5 business days), do you require delivery of constituents and index levels data that mirrors the MSCI Parent Index?
6. At the current expiry period (including the 5 business day calculation horizon), do you require any (parent) index data for the following expiry period?

DISCUSSION POINTS: INDEX IMPLEMENTATION

1. Is a Real-time solution required, or will an only Adjusted Index level end of day calculation suffice for expiry day (+ 5 business days)?

APPENDIX

MSCI INDEX LEVELS: RETURN TYPES

Index futures can use any of the following return variants provided by MSCI for its indexes

❖ Price Daily Return

Price indexes measure the market prices performance for a selection of securities. They are calculated daily and, for some of them, on a real time basis. Each index captures the market capitalization weighted return of all constituents included in the index.

❖ Gross Daily Total Return

This series approximates the maximum possible reinvestment of regular cash distributions (cash dividends or capital repayments).

❖ Net Daily Total Return

This series approximates the minimum possible reinvestment of regular cash distributions. Provided that the regular capital repayment is not subject to withholding tax, the reinvestment in the Net Daily Total Return is free of withholding tax. Effective December 1, 2009, the regular cash dividend is reinvested after deduction of withholding tax by applying the maximum rate of the company's country of incorporation applicable to institutional investors. MSCI uses different withholding taxes depending if the indexes are international or domestic:

- International indexes: the maximum rate applicable to non-resident institutional investors who do not benefit from double taxation treaties.
- Domestic indexes: the maximum rate applicable to resident institutional investors

MSCI PRICE DAILY RETURN INDEX

MSCI Price Daily Return Index level formula has dependency on security prices, applicable FX and adjustments calculated using security prices

$$PriceIndexLevelUSD_t = PriceIndexLevelUSD_{t-1} * \frac{IndexAdjustedMarketCapUSD_t}{IndexInitialMarketCapUSD_t}$$

Where:

- $PriceIndexLevelUSD_{t-1}$ is the Price Index level in USD at time t-1
- $IndexAdjustedMarketCapUSD_t$ is the Adjusted Market Capitalization of the index in USD at time t
- $IndexInitialMarketCapUSD_t$ is the Initial Market Capitalization of the index in USD at time t

$$IndexAdjustedMarketCapUSD_t =$$

$$\sum_{s \in I, t} \frac{EndOfDayNumberOfShares_{t-1} * PricePerShare_t * InclusionFactor_t * PAF_t}{FXrate_t}$$

$$IndexInitialMarketCapUSD_t =$$

$$\sum_{s \in I, t} \frac{EndOfDayNumberOfShares_{t-1} * PricePerShare_{t-1} * InclusionFactor_t}{FXrate_{t-1}}$$

Where:

- $EndOfDayNumberOfShares_{t-1}$ is the number of shares of security s at the end of day t-1.
- $PricePerShare_t$ is the price per share of the security s at time t.
- $InclusionFactor_t$ is the inclusion factor of the security s at time t. The inclusion factor can be one or the combination of the following factors: Foreign Inclusion Factor, Domestic Inclusion Factor, Growth Inclusion Factor, Value Inclusion Factor, Index Inclusion Factor (*).
- PAF_t is the Price Adjustment Factor of the security s at time t.
- $FXrate_t$ is the FX rate of the price currency of security s vs USD at time t. It is the value of 1 USD in foreign currency.

MSCI TOTAL DAILY RETURN INDEX

MSCI Total Daily Return Index level formula includes dependencies on security prices, applicable FX and adjustments calculated using security prices

$$DTRIndexLevelUSD_t = DTRIndexLevelUSD_{t-1} * \frac{(IndexAdjustedMarketCapUSD_t + IndexDividendImpactUSD_t)}{IndexInitialMarketCapUSD_t}$$

Where:

- $DTRIndexLevelUSD_{t-1}$ is the Daily Total Return index level in USD at time t-1
- $IndexDividendImpactUSD_t$ is the gross or net amount of dividends in USD to be reinvested in the index in USD at time t

$$IndexDividendImpactUSD_t =$$

$$\sum_{s \in I, t} \frac{EndOfDayNumberOfShares_{ex-date-1} * DividendPerShare_t * InclusionFactor_t}{FXrate_t}$$

Where:

- $EndOfDayNumberOfShares_{ex-date-1}$ is the number of shares of the security s at the end of the dividend ex-date-1.
- $DividendPerShare_t$ is the gross or net dividend per share expressed in the same currency unit as the price per share of the security s to be reinvested at time t.

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