



Session 6 –

How to QA the Metric Results for Existing Markets on MQD



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Introduction

- We are constantly working on expanding the amount of markets we cover in MQD
- Metrics are the core output of our computations
- Errors and other problems can occur, e.g.
 - Thomson Reuters Data errors / absence of data
 - Wrong classification/qualifiers
 - Converting issues / code bugs
- To make sure we eradicate these issues, we scan each market individually visually and in WorkFlow

Recap Daily QA Routine

- The first and most crucial part of QA is the daily routine of checking the assigned market visually
- Given the amount of metrics, it is useful to check the main metrics (spreads, daily stats, etc.) daily and a variety of 'non-core' metrics sporadically
- Vary the time-frame, trend line, and winsorization options!

For all Quality Assurance visit:
<http://mqd-qa.aws.cmcrc.com/>

Recap Daily QA Routine

- The second part is checking the WorkFlow for failed and long-running jobs
- The WorkFlow calendar offers a variety of ways to check for failed jobs
- Each team member has to decide if a failed job can be handled by the business team or developers

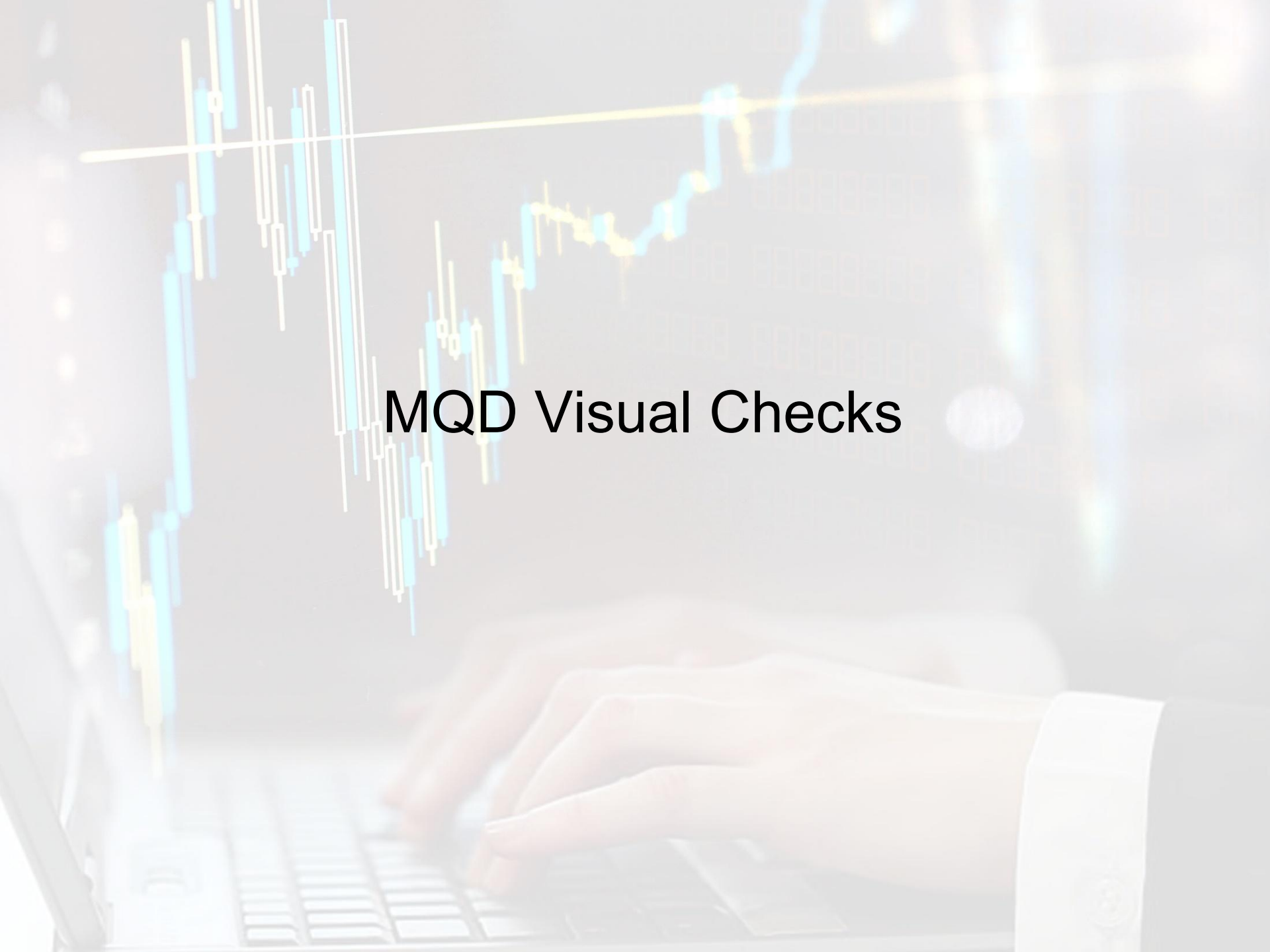
The WorkFlow is available at:
<http://WorkFlow.aws.cmcrc.com/>

Existing Metric QA

- After a market is built, we need to QA the metric results in depth and frequently, this includes:
 - Downloading raw data
 - Comparing raw data to publicly available data (e.g. Yahoo! Finance)
 - Calculating metric results yourself (Excel, Python,...)
 - Confirming accuracy or reporting an issue

Existing Metric QA

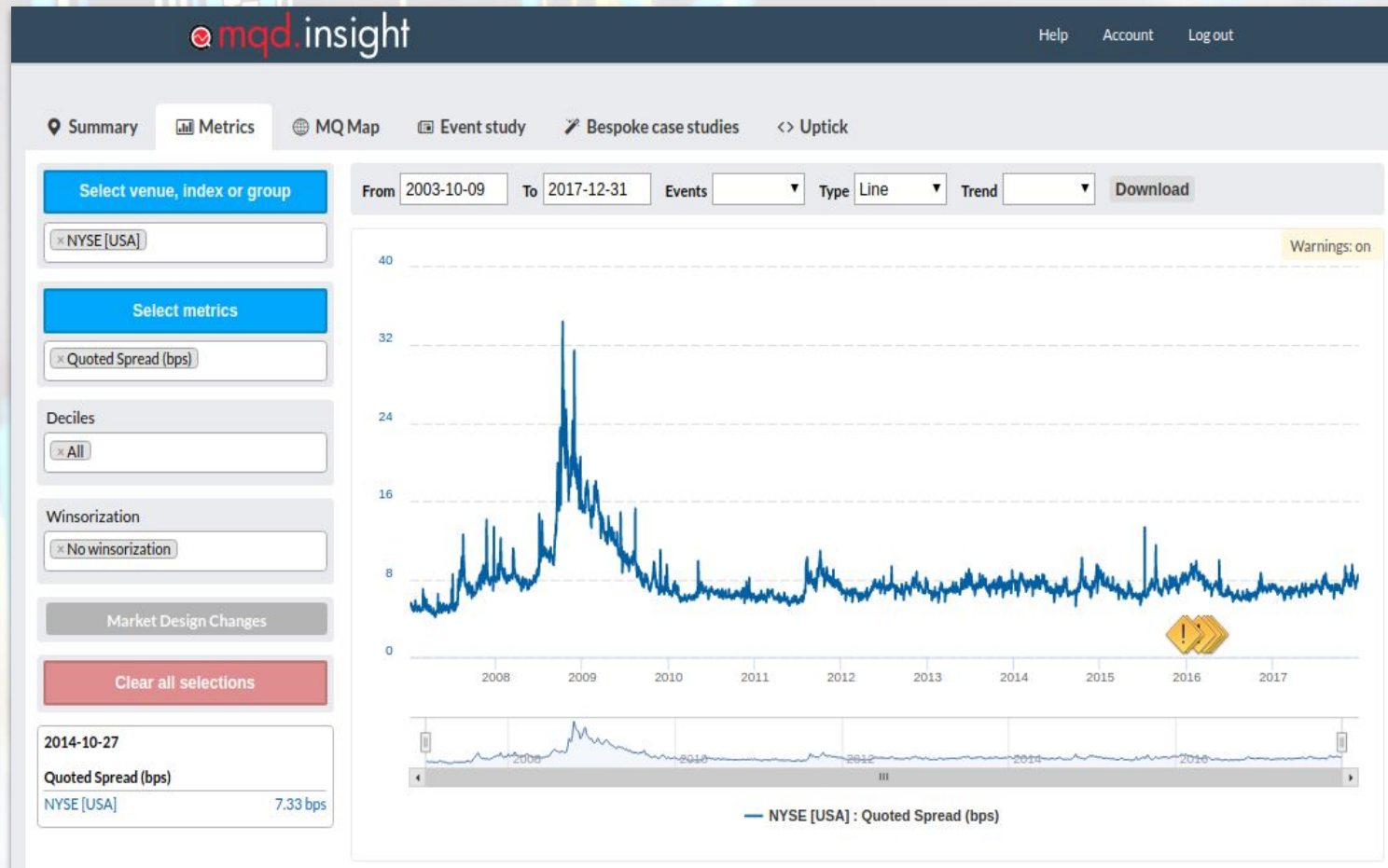
- What follows:
 - Visually scanning a market and checking WorkFlow (metric generate and sync)
 - Opening a JIRA ticket
 - Checking one NYSE stock and downloading MQD output
 - Checking AWS S3 for results
 - Downloading raw data from TRTH
 - Comparing Close and Volume to Yahoo! Finance
 - Calculating the Quoted Spread in Excel and comparing

The background image is a blurred photograph of a person's hands typing on a laptop keyboard. Overlaid on the left side of the image is a financial candlestick chart with blue and yellow bars. A yellow line graph is also visible, trending upwards from left to right. The text "MQD Visual Checks" is centered in the middle of the image.

MQD Visual Checks

MQD Visual Checks

On first sight we can determine if the market and metric results 'look good'. This is not a substitute for a proper QA but gives us a general impression about the markets' health.



MQD Visual Checks

Market-wide example

We need to check the data for the time prior and after the structure break in TRTH

Eventually problematic metric results -> 1) Structure break

*Resolving the issue included:
TRTH raw data check and contacting Thomson Reuters (see next slide)*



MQD Visual Checks

Market-wide example

We need to check the data for the time prior and after the structure break in TRTH

Also, the trading hours were out of sync and we needed to amend it in marketconfig.

```
CBT_FUT.yaml × IEU_FUT.yaml × CMX_FUT.yaml × CBF_FUT.yaml × JNB.yaml × listing_markets.yaml × SAO.yaml ×
37
38 sessions: #Trading hours taken from TRTH data observation
39 2007-01-01:
40   '11:00:00': PRE_OPEN
41   '11:02:00': OPEN
42   '18:00:00': CLOSING
43   '18:15:00': CLOSED
44
45 2007-03-10:
46   '10:00:00': PRE_OPEN
47   '10:02:00': OPEN
48   '17:00:00': CLOSING
49   '17:15:00': CLOSED
50
51 2007-10-15:
52   '11:00:00': PRE_OPEN
53   '11:02:00': OPEN
54   '18:00:00': CLOSING
55   '18:15:00': CLOSED
56
57 2008-03-18:
58   '10:00:00': PRE_OPEN
59   '10:02:00': OPEN
60   '17:00:00': CLOSING
61   '17:15:00': CLOSED
62
63 2008-10-20:
64   '11:00:00': PRE_OPEN
65   '11:02:00': OPEN
66   '18:00:00': CLOSING
67   '18:15:00': CLOSED
```

MQD Visual Checks

Eventually problematic metric results -> 2) Missing data

Here, we had to re-convert data but did not perform a matrefresh



- Steps to locate the root of missing data include WorkFlow job include checking (matrefresh, data output), S3 raw data check, and S3 metric output check

MQD Visual Checks

Eventually problematic metric results -> 3) Spike



- Steps to locate the root of a spike are similar to missing data but include the search for an event that could have caused the spike

MQD Visual Checks

Eventually problematic metric results (Spike)

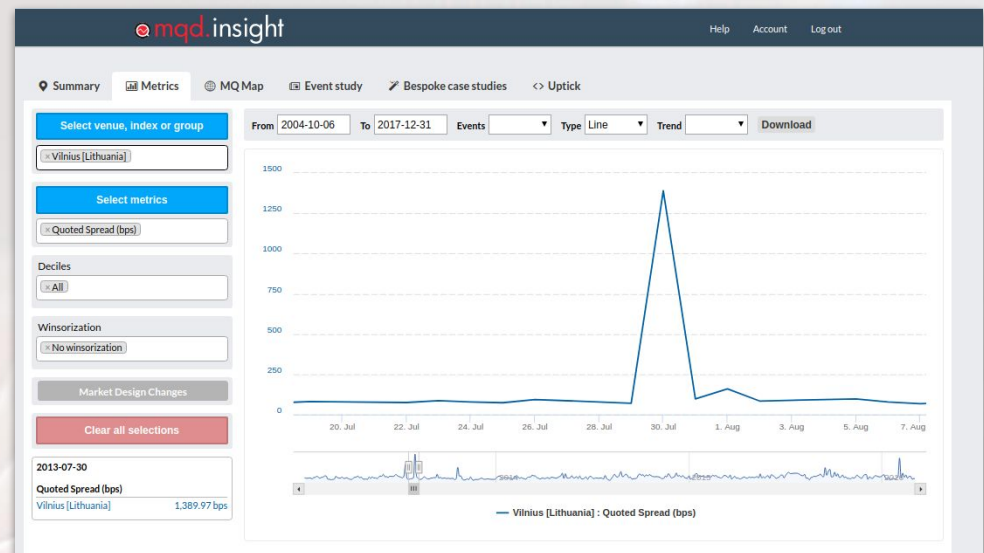
On Vilnius there is a spike on 2013-07-30 in quoted spread. The Quoted Spread is at 1,390bps while the average values are under 100bps.

- we investigate this spike the following way:

1. Market wide or security only?
(Click on spike to get a top security list)
2. Events on that day
3. WorkFlow job
4. S3 metric generate output
5. TRTH raw data

**And always:
OPEN A JIRA TICKET**

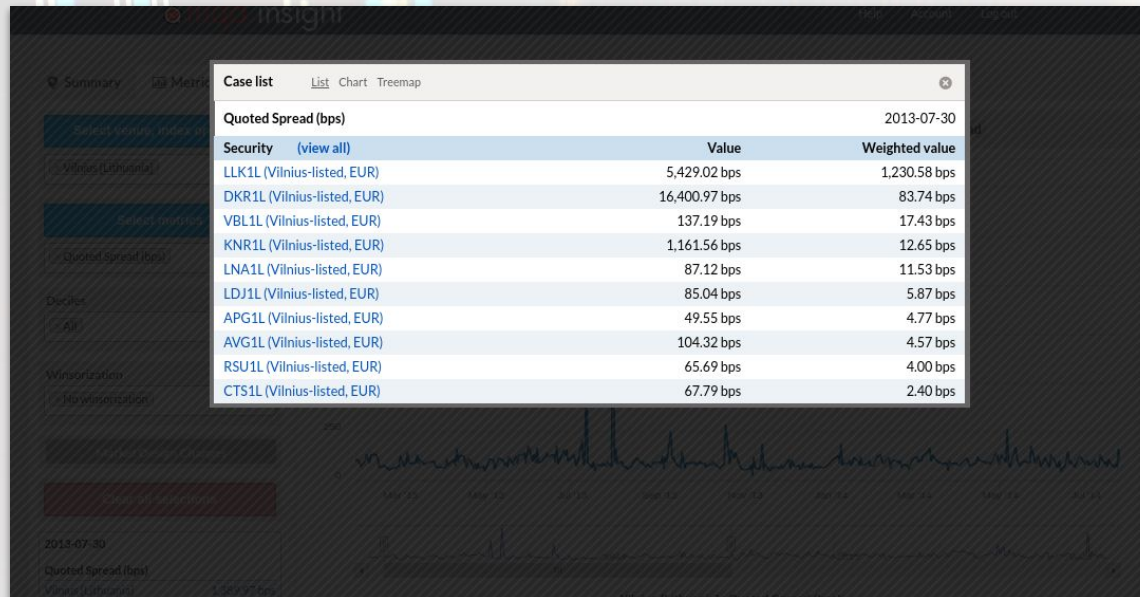
Let's try a live example...



MQD Visual Checks

Single security example

By clicking on the spike, we see the security list:



We see that the Quoted Spread spike is caused by one security: LLK1L

A quick check tells us it is 'Limarko'

Let's check TRTH how trading in Limarko looks like...

Given the trading stop and the wight allocated by the enormous volume in this small market, we can exclude the day (see previous Workshops)

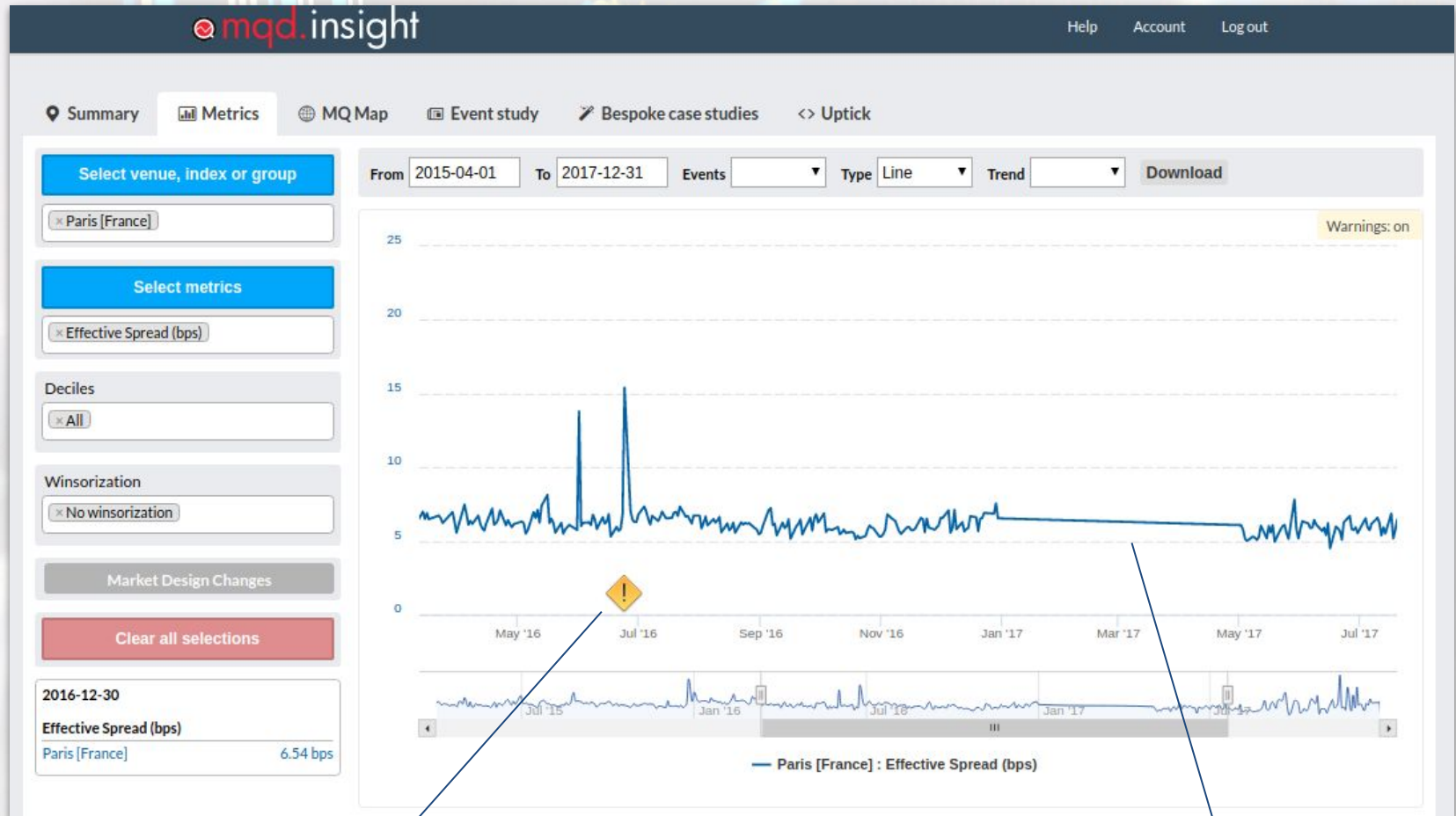
MQD Visual Checks

Further examples can be found in our JIRA database, for example:

- (1) BUS-1245 -> Spike was caused by news in one company and hidden (other possibility: *Winsorization* by user)
- (2) DATA-1342 -> Spike was caused by a missing qualifier and fixed in the .yaml file
- (3) BUS-2553 -> Structure break was caused by pretended WorkFlow jobs
- (4) BUS-1692 -> Structure break due to trading hour change and fixed by amending market config file appropriately

MQD Visual Checks

Further examples

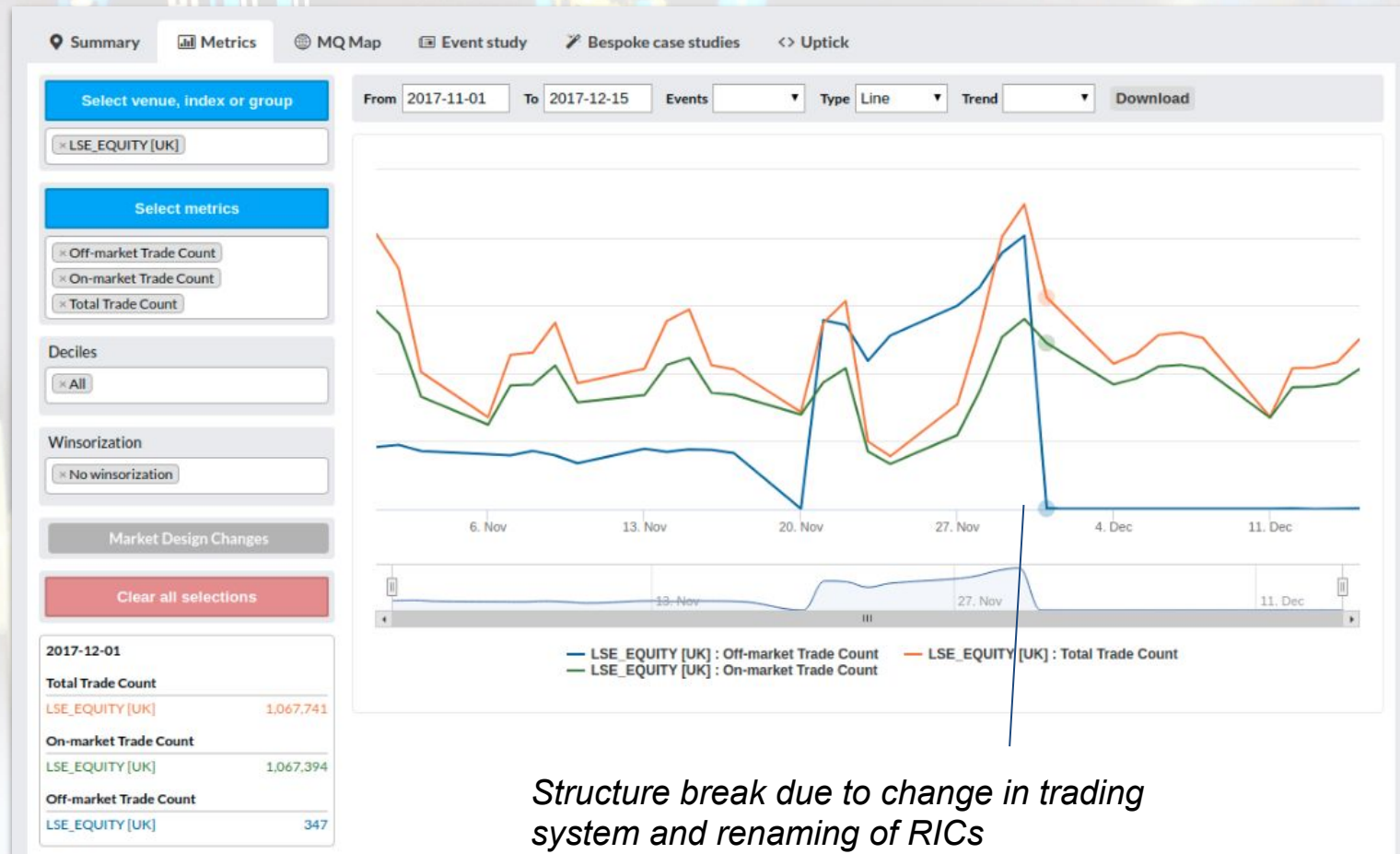


Brexit Warning (maket-wide)

Missing data (jobs ran out of order)

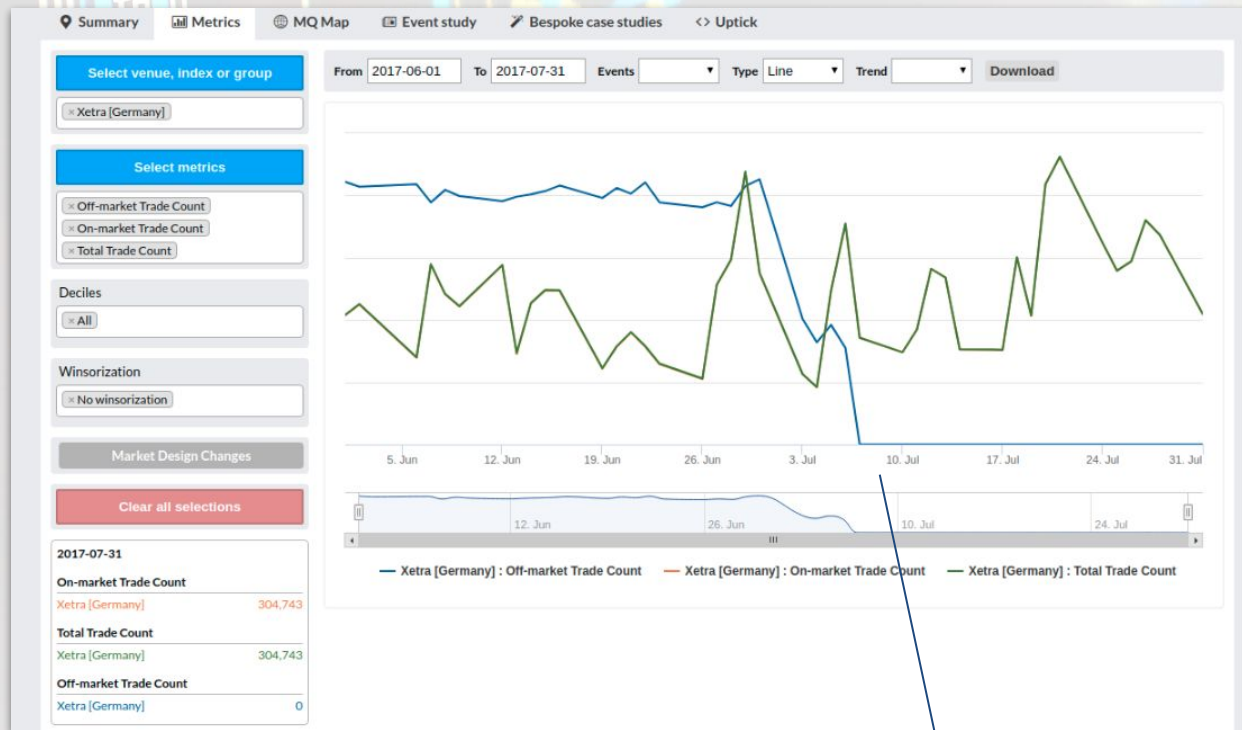
MQD Visual Checks

Further examples



MQD Visual Checks

Further examples



Another structure break due to change in trading system and removal of qualifiers.

In all cases it was crucial to check the stock exchange website as well as the intraday TRTH output (see next slide)!

MQD Visual Checks

Further examples

TRTH data can be faulty which is usually depicted in MQD as a spike or dip. Here is an example of a data error by TRTH which was fixed in market config:

RIC	Date[L]	Time[L]	Type	Price	Volume	Market VWAP	Bid Price	Bid Size	Ask Price	Ask Size	Qualifiers
OASJ.J	20101213	14:02:09.668050	Quote				1211	3000	1220	10000	
OASJ.J	20101213	14:02:09.871903	Quote				1211		0	0	
OASJ.J	20101213	14:02:09.871903	Trade	1220	10000						" [ACT_FLAG1]:Open High Low[USER]"
OASJ.J	20101213	14:02:24.983150	Quote				1211		1220	1282156	
OASJ.J	20101213	14:02:25.186176	Quote				1211		0	0	
OASJ.J	20101213	14:02:25.186176	Trade	1220	1282156						" [ACT_FLAG1]"
OASJ.J	20101213	14:02:40.535482	Quote				1211		12200	400	
OASJ.J	20101213	16:50:07.254499	Quote				1211		0	0	
OASJ.J	20101213	19:22:44.023403	Trade								" [PRC_QL_CD]"
OASJ.J	20101213	19:22:46.580569	Trade								Open[USER]

The size of these quotes does not make sense

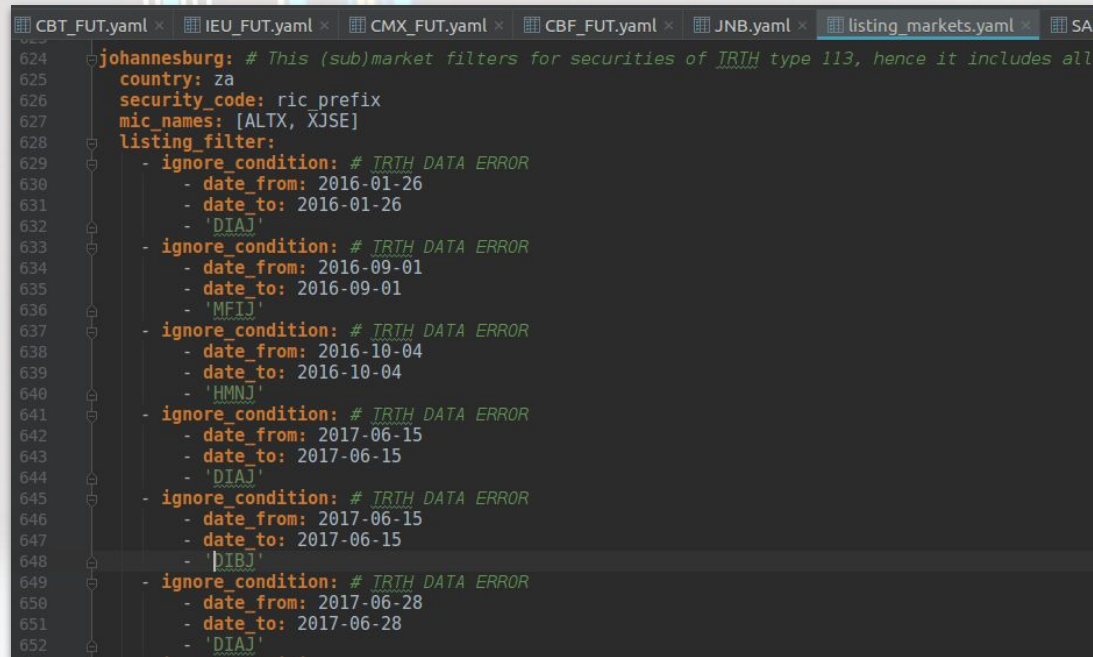
RIC	Date[L]	Time[L]	Type	Price	Volume	Market VWAP	Bid Price	Bid Size	Ask Price	Ask Size	Qualifiers
DIBJ.J	20171006	06:31:24.913800	Quote				0	0	0	0	" [ASK_TONE]: [BID_TONE]"
DIBJ.J	20171006	07:00:00.217633	Quote				450	4500			" [BID_TONE]"
DIBJ.J	20171006	08:46:30.175987	Quote						1030	20000	" [ASK_TONE]"
DIBJ.J	20171006	11:08:33.455716	Quote						0	0	" [ASK_TONE]"
DIBJ.J	20171006	11:10:20.273946	Quote						1030	312909	" [ASK_TONE]"
DIBJ.J	20171006	11:10:20.293267	Trade	1030	312909						" [ACT_FLAG1]:448882511167941972 [GN_TX20_3]"
DIBJ.J	20171006	11:10:20.293267	Quote						0	0	" [ASK_TONE]"
DIBJ.J	20171006	11:10:20.293292	Trade	1030							Open[USER]
DIBJ.J	20171006	15:17:32.657212	Quote				455	55000			" [BID_TONE]"
DIBJ.J	20171006	15:17:45.916482	Quote						10031	5000	" [ASK_TONE]"
DIBJ.J	20171006	16:50:02.455989	Quote						0	0	" [ASK_TONE]"
DIBJ.J	20171006	16:50:02.455989	Quote				450	4500			" [BID_TONE]"
DIBJ.J	20171006	20:00:53.716746	Quote				450		0		

MQD Visual Checks

Further examples

TRTH data can be faulty which is usually depicted in MQD as a spike or dip. Here is an example of a data error by TRTH which was fixed in market config:

The solution in this case is to exclude this security for this day.



```
CBT_FUT.yaml x IEU_FUT.yaml x CMX_FUT.yaml x CBF_FUT.yaml x JNB.yaml x listing_markets.yaml x SA
624 johannesburg: # This (sub)market filters for securities of TRTH type 113, hence it includes all
625   country: za
626   security_code: ric prefix
627   mic_names: [ALTJ, XJSE]
628   listing_filter:
629     - ignore_condition: # TRTH DATA ERROR
630       - date_from: 2016-01-26
631       - date_to: 2016-01-26
632       - 'DIAJ'
633     - ignore_condition: # TRTH DATA ERROR
634       - date_from: 2016-09-01
635       - date_to: 2016-09-01
636       - 'MFII'
637     - ignore_condition: # TRTH DATA ERROR
638       - date_from: 2016-10-04
639       - date_to: 2016-10-04
640       - 'HMNJ'
641     - ignore_condition: # TRTH DATA ERROR
642       - date_from: 2017-06-15
643       - date_to: 2017-06-15
644       - 'DIAJ'
645     - ignore_condition: # TRTH DATA ERROR
646       - date_from: 2017-06-15
647       - date_to: 2017-06-15
648       - 'PIBJ'
649     - ignore_condition: # TRTH DATA ERROR
650       - date_from: 2017-06-28
651       - date_to: 2017-06-28
652       - 'DIAJ'
```

Careful, if the spike is coming from an event (see Brexit), then we do not exclude or hide it. It belongs to regular trading and market activity! Hiding events is a possibility and needs to be discussed with the teamleads.

The image is a composite background. It shows a person's hands in a white shirt sleeve typing on a laptop keyboard. Overlaid on the laptop screen is a financial candlestick chart with blue and yellow bars. A yellow line graph is also visible, trending upwards. The entire image has a light, hazy, and slightly blurred aesthetic.

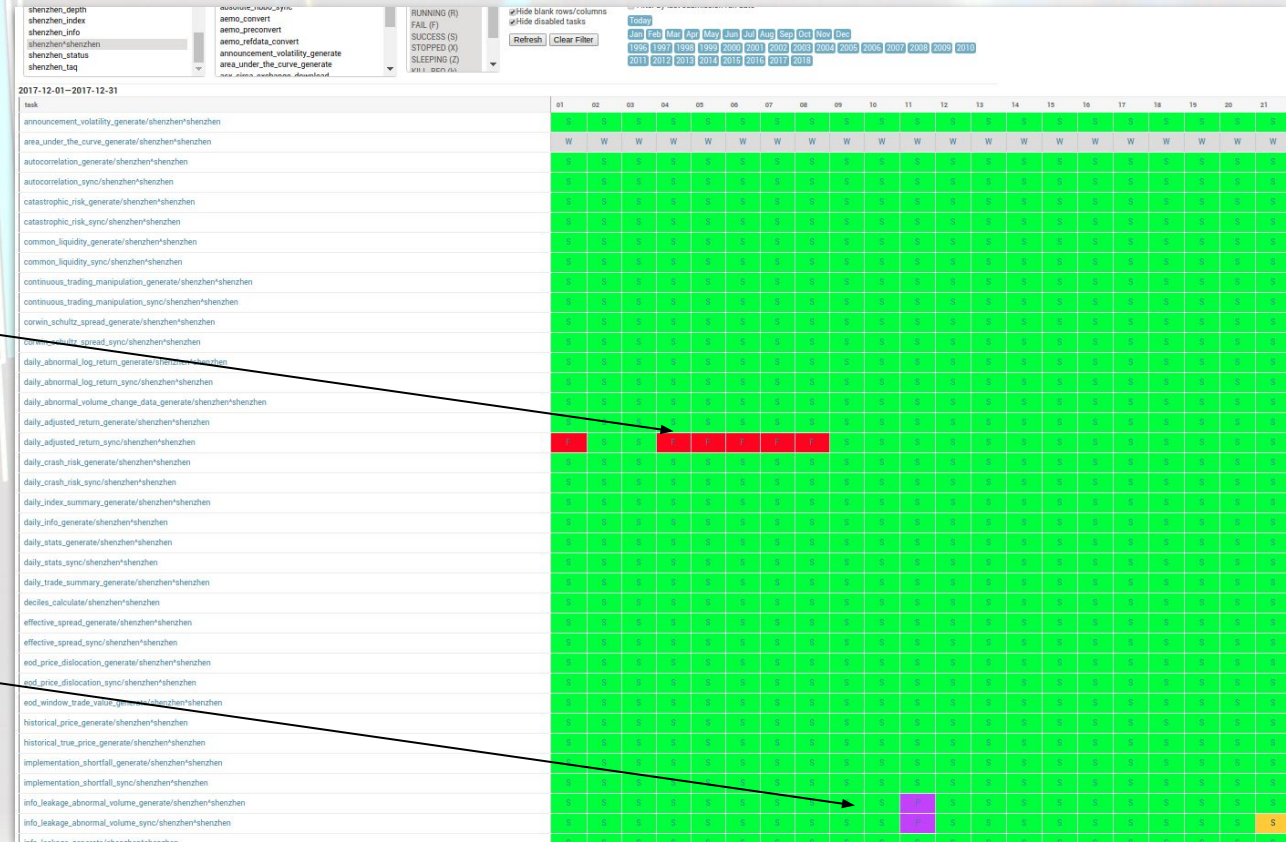
WorkFlow Check

WorkFlow Check

<http://WorkFlow.aws.cmcrc.com/>

Why did these jobs fail?

Be aware why jobs are pretended in your market!



Note: After 100 fails, jobs are deactivated automatically!

WorkFlow Check

<http://WorkFlow.aws.cmcrc.com/>

Check the failed job summary on a daily basis to get an overview:

The screenshot displays the CMCRC WorkFlow web application interface. At the top, there is a header bar with the text "CMCRC WorkFlow" and a "Home" link. Below the header, the section "Running jobs" is visible. On the left, there is a list of variables: `vltn`, `vltnus`, `vltnus*`, `vltnus_depth`, `vltnus_index`, `vltnus_imo`, `vltnus_status`, `vltnus_tag`, and `vltnus*vltnus`. In the center, there is a list of tasks: `ateokyle_nbbs_generate`, `ateokyle_nbbs_sync`, `atmo_convert`, `atmo_povconvert`, `atmo_refdata_convert`, `announcement_volatility_generate`, `area_under_the_curve_generate`, and `axc_atmc_archives_download`. To the right of the tasks, there is a status legend: WAITING (W), READY (I), RUNNING (R), FAIL (F), SUCCESS (S), STOPPED (O), SLEEPING (Z), and KILL RFD (K). Below the legend, there are checkboxes for "display: auto", "Hide blank rows/columns", and "Hide disabled tasks", along with "Refresh" and "Clear Filter" buttons. On the far right, there is a date range selector set to "2016-01-01" to "2016-03-31" and a "Filter by last submission run date" option. Below this, there is a calendar view showing the months of January, February, and March 2016. At the bottom, there is a table with the following data:

state	jobs	task names	task types	date
44	vltnus* (44)	atmo_convert, atmo_povconvert, atmo_refdata_convert, announcement_volatility_generate, area_under_the_curve_generate, axc_atmc_archives_download		2016-01-04~2016-03-04

Below the table, there is a section titled "All 44 jobs:" with a list of actions: `restart jobs`, `stop jobs`, `resume jobs`, `kill jobs`, `preload jobs`, and `cancel test action`. At the bottom of the interface, there are navigation arrows.

WorkFlow Check

WorkFlow checking

Analyse errors!

The reasons for failing can include:

Codeing bugs

Missing data

Qualifier issues

Currency issues

Dependency issues

Memory/time out issues

-
-
-

The screenshot displays the CMCRC Workflow management interface. At the top, it shows the workflow name 'daily_adjusted_return_sync/shenzhen/shenzhen' and its ID '2017-12-05 job 26316531'. The status is 'Failed' (red square). Below this, a table lists job submissions with columns for Timestamp, Prior Status, New Status, and Details. The most recent submission at 2017-12-19 11:07:27 is in a 'Failed' state. The 'Details' column for this submission contains a link to the error log. The error log itself is visible below the table, showing a 'Standard error' section with a detailed traceback. The traceback starts with 'Using test database masterdb, connect to masterdb, error on loadload' and continues through various file paths and function calls, eventually leading to a 'RuntimeError: Failed to load the module' error. The error message at the bottom of the traceback states: 'RuntimeError: Failed to load the module: /usr/local/lib/python2.7/site-packages/django/core/management/commands/generate_data.py, line 17, in handle; ImportError: No module named django.core.management.commands.generate_data'. The error log also includes a 'Standard output' section which is currently empty.

Excursion: Opening a JIRA Ticket

After we found an error/spike/structure break or anything that needs our attention, we open a JIRA ticket

A JIRA ticket serves the function of documentation and assignment to the appropriate person

We distinguish between BUS, ETL, and PDEV tickets

- BUS tickets are solved by us – the Business team
- ETL and PDEV tickets are solved by the developers

Excursion: Opening a JIRA Ticket

Opening a ticket:

- 1) Go to jira.aws.cmcrc.com
- 2) Click on create
- 3) Follow the steps in the form (live example)

The description must be clear and precisely expressing what the issue is and what is expected as a result!

The screenshot shows the 'Create Issue' form in JIRA for the 'Business Team (BUS)' project. The form is titled 'Create Issue' and includes a 'Configure Fields' button. The 'Project' is set to 'Business Team (BUS)' and the 'Issue Type' is 'Feature'. The 'Summary' is 'MARKET: SHORT DESCRIPTION'. The 'Assignee' is 'Automatic'. The 'Description' field is a rich text editor with the text 'CLEAR DESCRIPTION', 'ADD WORKFLOW LINK IF AVAILABLE', and 'WHAT IS THE EXPECTED OUTCOME?'. The 'Attachment' section has a 'Drop files to attach, or browse.' button. The 'Components' section is set to 'None'. The 'Priority' is 'Normal'. The 'Fix Version/s' field is empty. The 'Labels' field is empty. The 'Due Date' field is empty. The 'Kanban colour' is 'white'. The left sidebar shows a list of projects including 'Market Quality Dashboard (QUALITY)', 'Outsourced Surveillance (OS)', 'Research Infrastructure (RIN)', 'Trading Platform (TRDPLTFM)', 'ACAS: General (ACA)', 'Business Team (BUS)', 'CDT - Devops (DEVOPS)', 'CDT - ETL (ETL)', 'CDT - Health Development (HDEV)', 'CDT - Product Development (PDEV)', 'CMCRC IT Services (ITS)', 'DO NOT USE (WFOBS)', and 'Expert Witness Services (EWS)'. The 'Business Team (BUS)' project is highlighted.

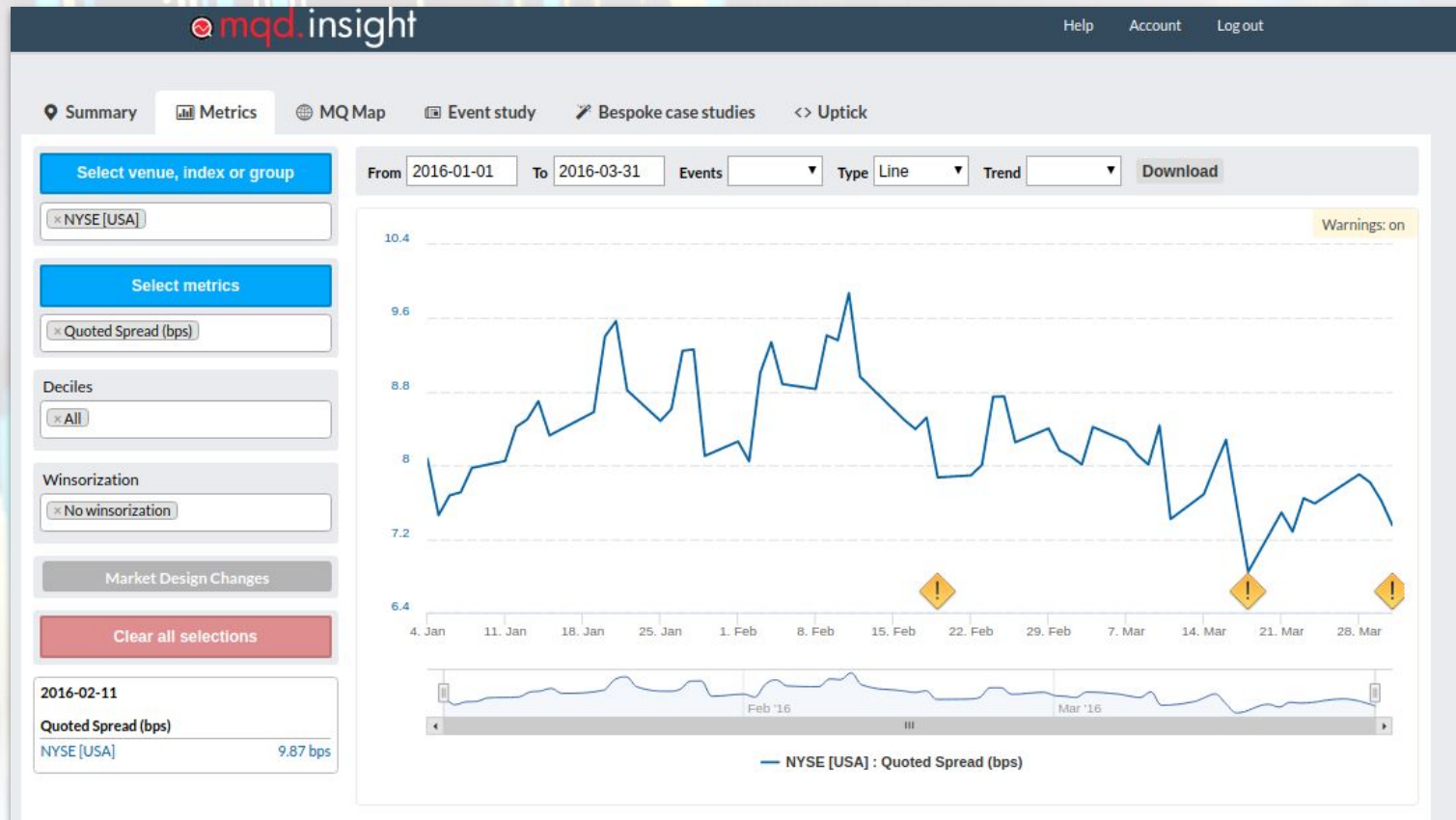


Random Metric QA

Random Metric QA

QA – one stock

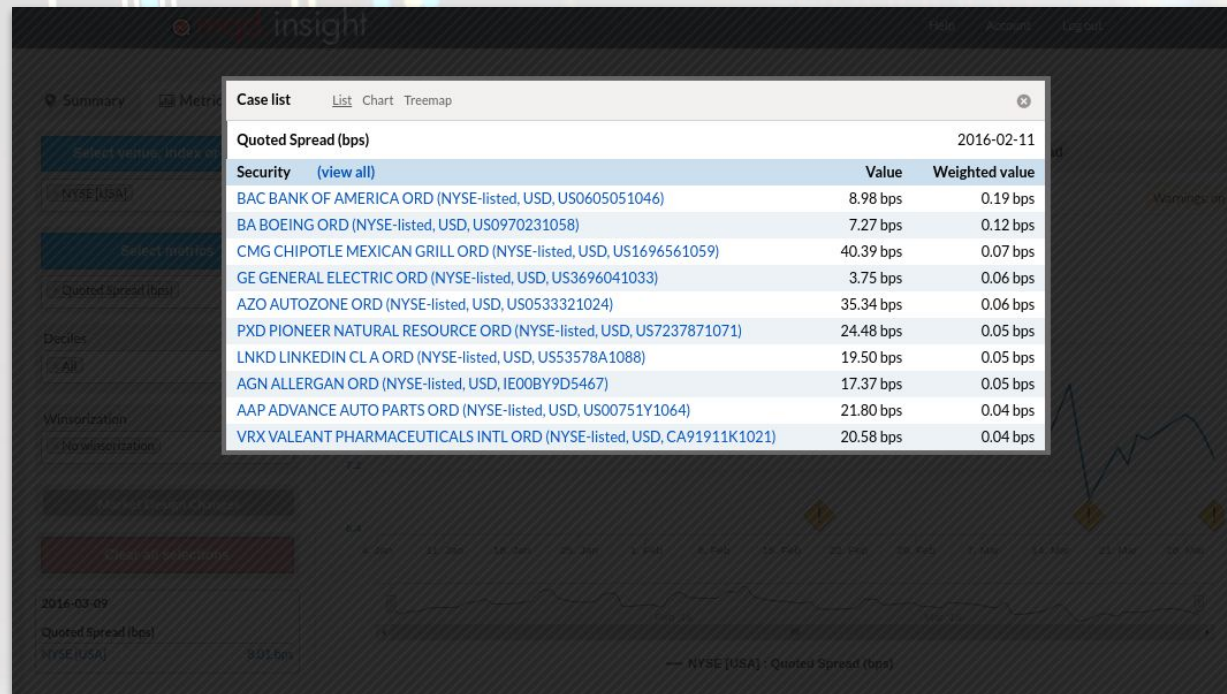
Checking a random day (Quoted Spread) (2016-02-11)



Random Metric QA

QA – one stock

*By clicking
on the graph,
we can see a
list of
constituents
(weighted)*

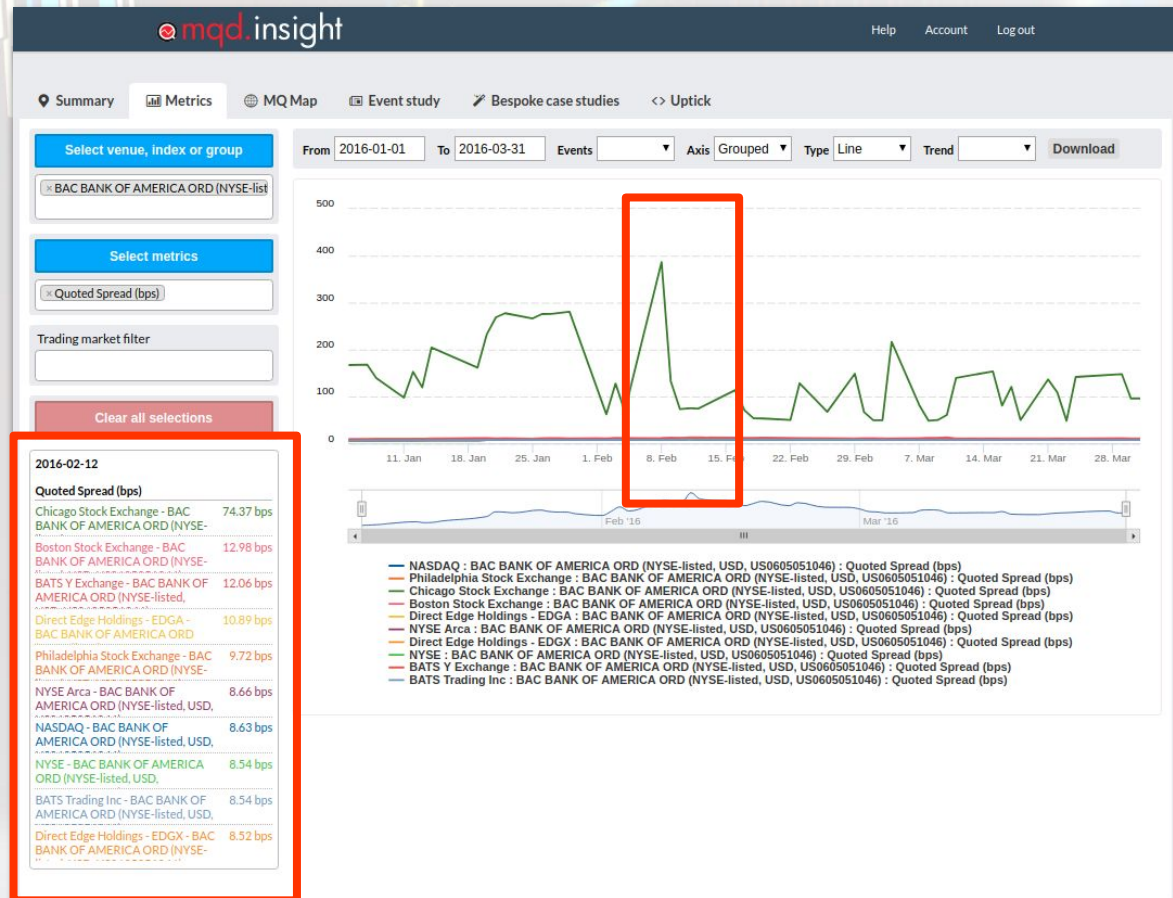


Random Metric QA

QA – one stock

We choose one stock (BAC) and check the quoted spread. The stock is listed on multiple exchanges!

We compare these spreads with

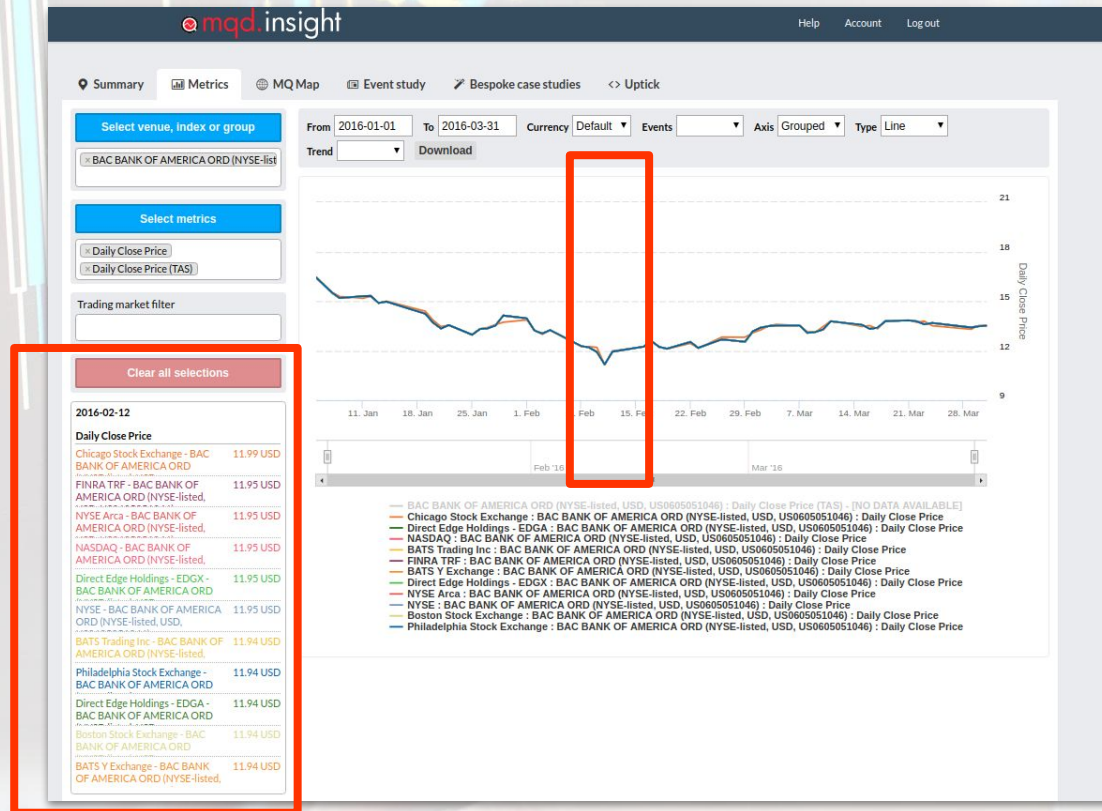


Random Metric QA

QA – one stock

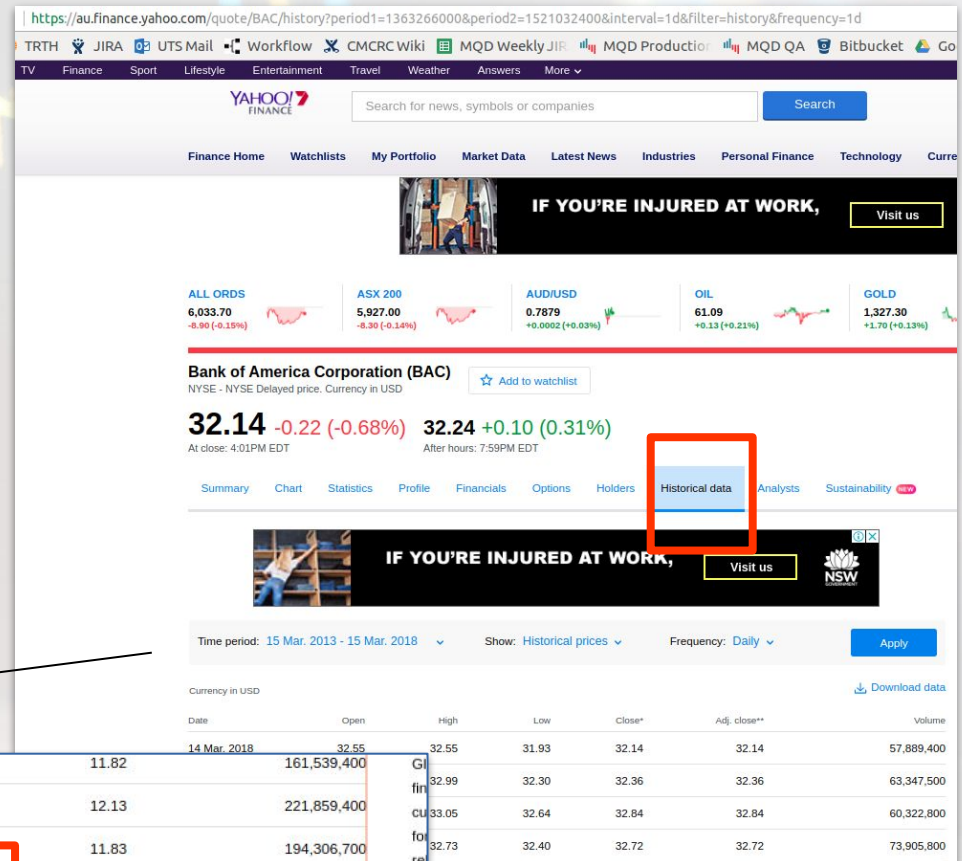
*We also want
to double
check the
closing price!*

→ Yahoo!
Finance



→ *Yahoo! Finance* → US\$ 11.95

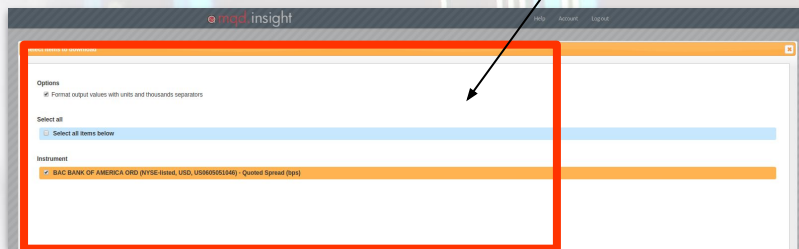
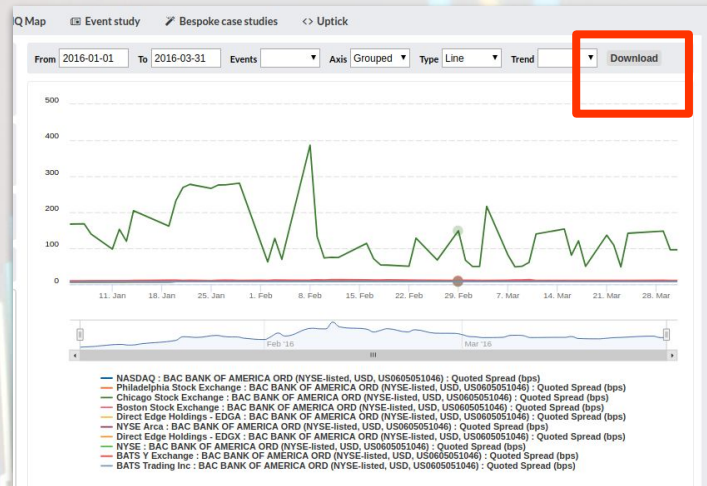
	18 Feb. 2016	12.71	12.74	12.10	12.24	11.82	161,539,400
	17 Feb. 2016	12.57	12.69	12.47	12.56	12.13	221,859,400
	16 Feb. 2016	12.38	12.39	12.11	12.23	11.83	194,306,700
	12 Feb. 2016	11.48	12.03	11.40	11.95	11.54	245,388,400
	11 Feb. 2016	11.46	11.55	10.99	11.16	10.78	375,088,700
	10 Feb. 2016	12.42	12.54	11.91	11.98	11.57	227,530,000



Random Metric QA

QA – one stock

Download the data!



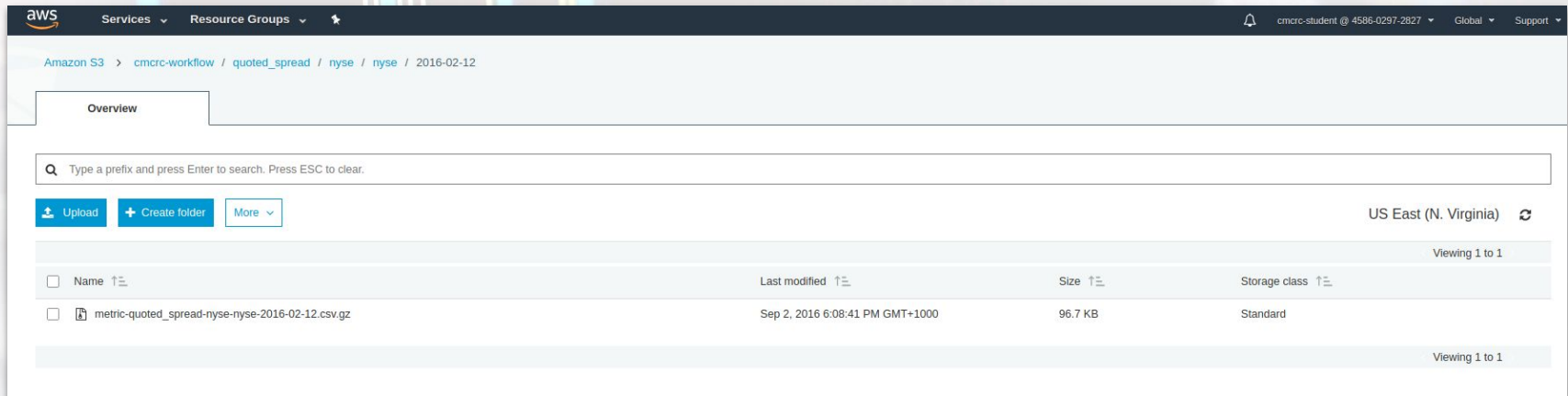
We can download the results directly from the MQD website...

H25	A	B	C	D	E	F	G	H	I	J	K
1	Date	NASDAQ - BAC	Philadelphia St	Chicago Stock	Boston Stock	Direct Edge Hol	NYSE Arca - B	Direct Edge Hol	NYSE - BAC	BATS Y Exchan	BATS Trading I
2	2016-01-05	6.42 bps	7.35 bps	167.23 bps	9.45 bps	8.12 bps	6.17 bps	6.11 bps	6.11 bps	8.69 bps	6.15 bps
3	2016-01-07	6.49 bps	8.38 bps	168.26 bps	9.49 bps	8.43 bps	6.49 bps	6.40 bps	6.42 bps	8.81 bps	6.44 bps
4	2016-01-08	6.57 bps	8.43 bps	139.59 bps	10.28 bps	8.30 bps	6.56 bps	6.50 bps	6.51 bps	9.23 bps	6.52 bps
5	2016-01-11	6.72 bps	8.77 bps	97.65 bps	10.13 bps	8.73 bps	6.88 bps	6.62 bps	6.63 bps	9.38 bps	6.64 bps
6	2016-01-12	6.64 bps	8.22 bps	152.67 bps	10.23 bps	8.75 bps	6.63 bps	6.58 bps	6.57 bps	9.37 bps	6.62 bps
7	2016-01-13	6.67 bps	7.79 bps	119.53 bps	10.14 bps	8.51 bps	6.67 bps	6.62 bps	6.62 bps	9.50 bps	6.65 bps
8	2016-01-14	6.78 bps	8.16 bps	204.38 bps	10.64 bps	8.98 bps	6.74 bps	6.71 bps	6.67 bps	9.55 bps	6.74 bps
9	2016-01-19	7.16 bps	8.65 bps	161.61 bps	11.39 bps	9.62 bps	7.13 bps	7.08 bps	7.08 bps	10.60 bps	7.16 bps
10	2016-01-20	7.55 bps	9.33 bps	232.16 bps	11.53 bps	9.99 bps	7.56 bps	7.42 bps	7.43 bps	10.87 bps	7.45 bps
11	2016-01-21	7.53 bps	8.56 bps	268.92 bps	10.76 bps	9.21 bps	7.50 bps	7.41 bps	7.41 bps	10.11 bps	7.43 bps
12	2016-01-22	7.47 bps	8.65 bps	277.56 bps	11.59 bps	9.21 bps	7.48 bps	7.42 bps	7.42 bps	10.03 bps	7.45 bps
13	2016-01-25	7.70 bps	8.56 bps	266.52 bps	10.47 bps	8.93 bps	7.73 bps	7.65 bps	7.65 bps	9.90 bps	7.67 bps

Random Metric QA

QA – one stock

*...or get them on a daily basis
through Amazon S3 (AWS)*



The screenshot displays the AWS S3 console interface. The top navigation bar includes the AWS logo, 'Services', 'Resource Groups', and a user profile 'cmrc-student @ 4586-0297-2827'. The breadcrumb trail shows the path: Amazon S3 > cmrc-workflow > quoted_spread > nyse > nyse > 2016-02-12. The 'Overview' tab is selected. Below the breadcrumb, there is a search bar and buttons for 'Upload', 'Create folder', and 'More'. The region is set to 'US East (N. Virginia)'. A table lists the contents of the bucket:

<input type="checkbox"/>	Name ↑	Last modified ↑	Size ↑	Storage class ↑
<input type="checkbox"/>	metric-quoted_spread-nyse-nyse-2016-02-12.csv.gz	Sep 2, 2016 6:08:41 PM GMT+1000	96.7 KB	Standard

The table indicates that there is one object in the bucket, 'metric-quoted_spread-nyse-nyse-2016-02-12.csv.gz', which was last modified on September 2, 2016, at 6:08:41 PM GMT+1000, with a size of 96.7 KB and is stored in the Standard storage class. The bottom right corner of the table area shows 'Viewing 1 to 1'.

Random Metric QA

QA – one stock

Now we can compare the data with the raw data from TRTH

The screenshot displays a financial data application interface. On the left, the 'New Request' form is visible, featuring tabs for 'Instruments', 'Fields', and 'Output Settings'. The 'Instruments' tab is active, showing a table with columns: RIC, ISIN, CUSIP, SEDOL, GICS, Exchange, and Name. The table contains one entry for BAC.N (Bank of America). Below the table, there are input fields for 'From' (20160212) and 'To' (20160212), and 'Local' (00:00:00.000) and '23:59:59.999'.

On the right, the 'Search' form is shown. It includes a dropdown for 'Asset Class' (Equities) and a section for 'Instrument Type' (Both, Equities, Equity-Linked). The 'Search' section has input fields for 'Identifier' (RIC), 'Name' (Starts With), 'Exchange' (Select Exchanges), 'Currency' (Select Currencies), and 'Chain' (e.g. 0#.DI). Below the search fields is a table with columns: RIC, Name, Exchange, Type, Currency, First Date, and Last Date. The table lists various Bank of America instruments, with BAC.N highlighted in green. At the bottom right, there are buttons for 'Add To Request' and 'Close'.

RIC	ISIN	CUSIP	SEDOL	GICS	Exchange	Name
BAC.N	US0605051046	060505104	N/A	N/A	->NYS->NY	BANKAMER

RIC	Name	Exchange	Type	Currency	First Date	Last Date
BAC.DF	BANK OF AMERIC ADC->THM->ADC	113	USD	20060513	20100	
BAC.Z	BANK OF AMERIC BAT	113	USD	20081103	20100	
BAC.B	BANKAMERICA CC ->BOS->NYQ->B	113	USD	19960101	20100	
BAC.ZY	BANK OF AMERIC BTY	113	USD	20101012	20100	
BAC.C	BANKAMERICA CC ->CIN->NYQ->CI	113	USD	19960102	20100	
BAC.DY	BANK OF AMERIC TOE->DEA	113	USD	20100716	20100	
BAC.DG	BANK OF AMERIC ALB->DEX	113	USD	20100716	20100	
BAC.HW	BANKAMERICA CC ->MID->NYQ->M	113	USD	19960102	20100	
BAC.NB	BANK OF AMERIC NBN	113	USD	20120923	20100	
BAC.NOI	BANK OF AMERIC NOI	113	USD	20100415	20100	
BAC.NYO	BANK OF AMERIC NY2	113	USD	20020124	20100	
BAC	BANKAMERICA CC NYQ	113	USD	19960101	20100	
BAC.N	BANKAMERICA CC ->NYS->NYQ->N	113	USD	19960102	20100	
BACRP.PK	BK AMER 7.0 B->I PNK->N/A->PNK	113->97->113->9	USD	20010111	20100	
BACRP.PQ	BK AMER 7.0 B->I ->OTC->PNK->O	113->97->113->9	USD	20010314	20100	
BAC.P	BANKAMERICA CC ->PSE->NYQ->PS	113	USD	19960101	20100	
BAC.TH	BANKAMERICA CC ->THM->NYQ->T	113	USD	19960102	20100	

Random Metric QA

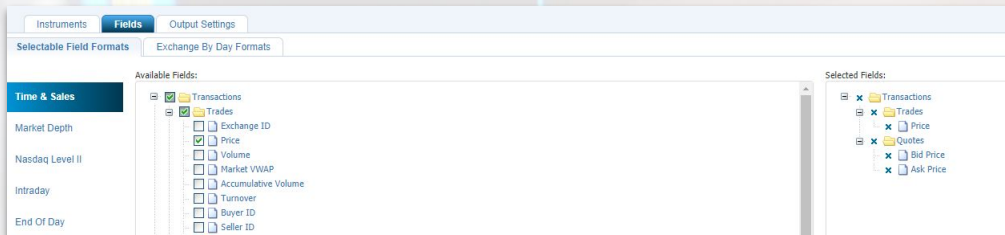
QA – one stock

For Quoted Spread, we just need to download quotes.

Calculate now the metric by yourself (Excel, Python, ...)

The result should be similar to the TRTH value.

Allow for some error as we use precise qualifiers and filtering in MQD.



	A	B	C	D	E	F	G	H	I
1	#RIC	Date[L]	Time[L]	Type	Price	Bid Price	Ask Price		
2	BAC.N	20160212	30:14.7	Trade	11.47				
3	BAC.N	20160212	30:14.7	Quote		11.47	11.48		
4	BAC.N	20160212	30:14.7	Quote		11.47	11.49		
5	BAC.N	20160212	30:14.7	Trade	11.48				
6	BAC.N	20160212	30:14.7	Quote		11.47	11.49		
7	BAC.N	20160212	30:14.7	Quote		11.47	11.49		
8	BAC.N	20160212	30:14.7	Trade	11.49				
9	BAC.N	20160212	30:14.7	Trade	11.47				
10	BAC.N	20160212	30:14.7	Trade	11.49				
11	BAC.N	20160212	30:14.7	Quote		11.45	11.49		
12	BAC.N	20160212	30:14.7	Quote		11.45	11.49		
13	BAC.N	20160212	30:14.7	Trade	11.47				
14	BAC.N	20160212	30:14.7	Trade	11.46				
15	BAC.N	20160212	30:14.7	Trade	11.45				
16	BAC.N	20160212	30:14.7	Quote		11.45	11.49		
17	BAC.N	20160212	30:14.7	Quote		11.45	11.49		
18	BAC.N	20160212	30:14.7	Quote		11.45	11.49		
19	BAC.N	20160212	30:14.7	Quote		11.45	11.49		
20	BAC.N	20160212	30:14.7	Trade	11.45				
21	BAC.N	20160212	30:14.7	Trade	11.49				
22	BAC.N	20160212	30:14.7	Trade	11.49				
23	BAC.N	20160212	30:14.7	Trade	11.49				
24	BAC.N	20160212	30:14.7	Trade	11.49				
25	BAC.N	20160212	30:14.7	Trade	11.49				
26	BAC.N	20160212	30:14.7	Quote		11.45	11.49		
27	BAC.N	20160212	30:14.7	Quote		11.45	11.49		
28	BAC.N	20160212	30:14.7	Quote		11.45	11.49		
29	BAC.N	20160212	30:14.7	Quote		11.48	11.49		
30	BAC.N	20160212	30:14.7	Quote		11.48	11.49		
31	BAC.N	20160212	30:14.7	Quote		11.48	11.49		
32	BAC.N	20160212	30:14.7	Quote		11.48	11.49		
33	BAC.N	20160212	30:14.7	Trade	11.48				
34	BAC.N	20160212	30:14.7	Quote		11.47	11.49		



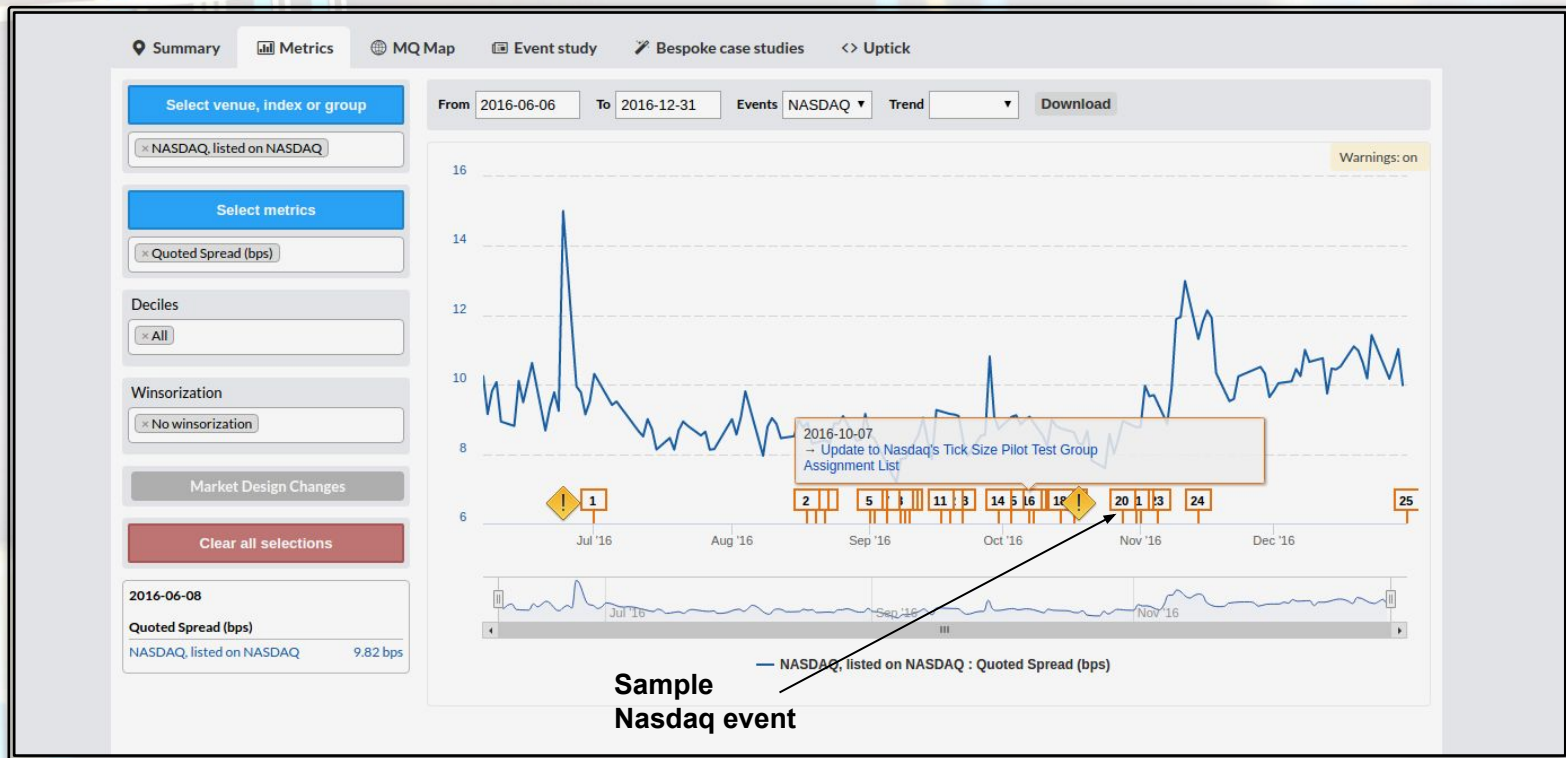
Event Collection

Credit to Pallab Dey

What are Market events

- ‘Exchange and Regulatory related changes that impact market design in Financial Markets. ‘
 - Examples:
 - Tick size changes in Markets – impacts market liquidity/efficiency;
 - Short sell restrictions;
 - New trading venues, instruments types;
 - Technology change – low latency trading engine, co-location;
 - Anti-market manipulation rules.
- Event attributes for MQD:
 - Title, information content, Event categories, Effective date of the event.

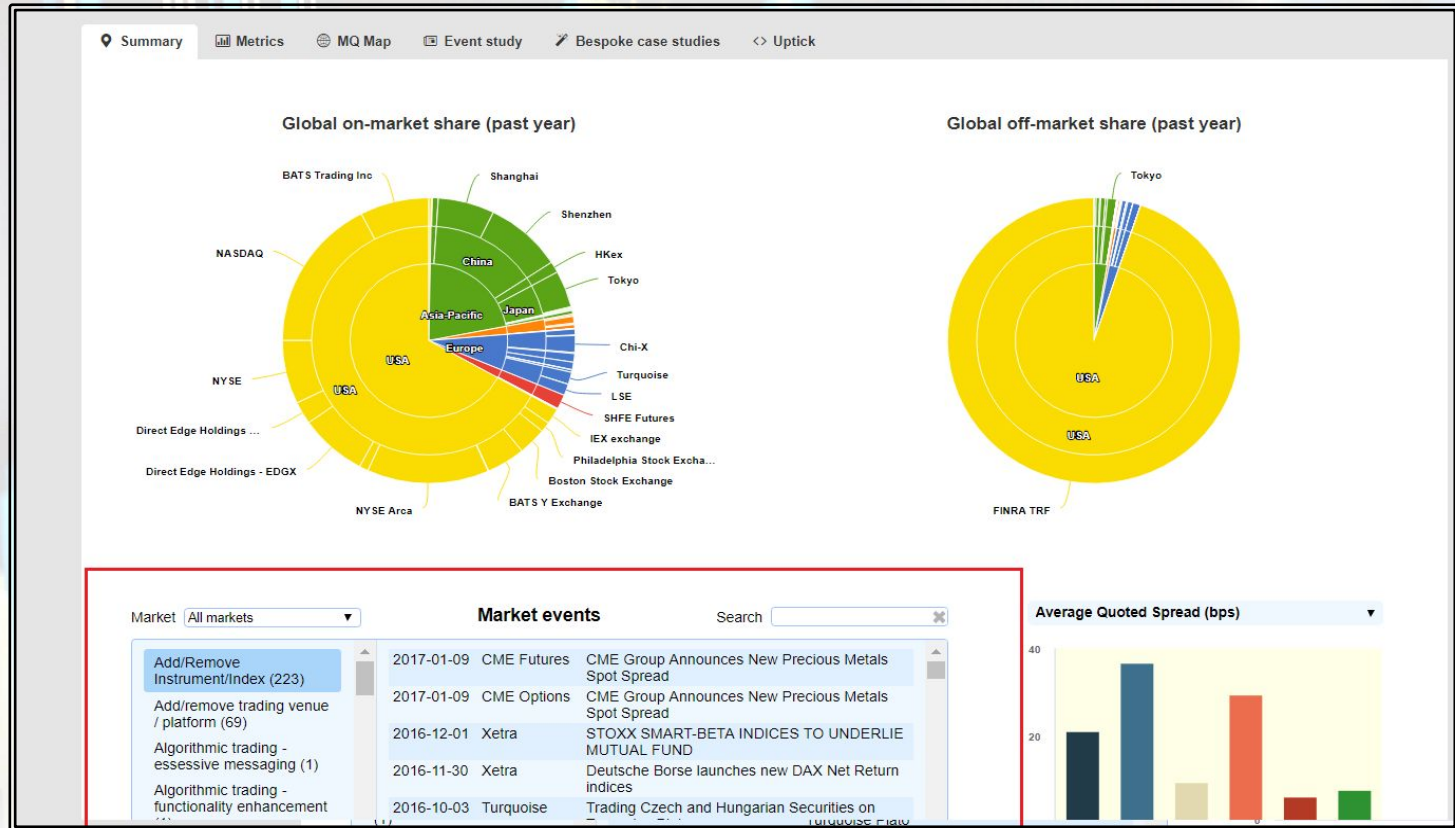
Events in MQD (Metrics)



Important difference: Warning vs Event!

- A warning is marked as an exclamation mark with yellow background and describes data errors and other changes other important issues with the data where the user should be aware of.
- An event is depicted as a number on white background. Events are effects on the market design as described previously.

Events in MQD (MQD Summary)



Steps for Event Collection

- **Identify event source:** exchange news website, regulatory website – For example ASIC (Australia), SEC (US), MAS (Singapore), FCA (UK)
 - Pick up the events that are relevant for MQD
- Collect Event titles, url, date. The events are collected in “**Ongoing Event Collections**” tab in the shared sheet:
<https://docs.google.com/spreadsheets/d/18CeWkHauTufRg0ksDA5Sgx0kA0Hf5fпкиJ05exLlzMI/edit#gid=1568489002>
- **Assign event categories:**
 - TRIPI model (Technology, Regulation, Instrument, Participant, Information)
 - Types of Events – Refer to “Current Event Types” for the list of categories in the shared sheet. The categories configured as dropdown list in the event collection tab.
- Assign a unique id to events: (**ID Format: market_id + "d" + date (yyyy/mm/dd) + "n" + number**). For example, if there are two events on Nasdaq on 2016-09-18, the first one should be 7d20160918n1 and the second one: 7d20160918n2
- Save the event as PDF with "unique id as the file name in following shared location:
<https://drive.google.com/drive/folders/0BxXihysuXrhAdjBqNElwOW8yaTg>
- Capture effective date as event date. Example situations:
Example1: STOXX events (Announcement date: 01-Aug-2016, Effective Date: 08-Aug-2016. Event date should be: 08-Aug-2016)



PDF File

If any announcements causes temporary shocks/spike – this should not be added as events. This needs to be captured as warning (a separate feature in MQD)

Steps for Event Collection (Contd..)

- What is not important for MQD market events? Events that are irrelevant to market microstructure design changes. Just to name few:
 - News about trading statistics in an exchange.
 - Individual securities information.
 - Example: *"SGX Welcomes China Jinjiang Environment to Mainboard"*
 - Trading holidays and half-days (to be captured as warning)
 - Platform version upgrades.
 - Exchange testing:
 - Example: *"ASX Cash Market Services conducts BCP Testing"*
 - Any general news. Example:
 - *"SGX INITIATIVES TO GROW AND DEVELOP THE TR COMMUNITY"*
 - *"Update from Bats Global Markets: New Logo and Naming Conventions"*
- *As a general rule of thumb: Do not ignore if you are not sure whether the particular event is relevant for MQD. This can be further reviewed and filtered out if necessary.*

Interface to add New Events in MQD (MQD Admin / Teamleads)

Adding an event using MQD Admin

- Specify unique id (format: ***market_id + "d" + date (yyyy/mm/dd) + "n" + number***)
- Specify Market
- Event date
- Title
- URL as the public weblink of the event.
- Original URL – Copy from URL
- Choose Type of event – event category and TRIPI option.
- Click Save

Additional Action :

- Save the event as PDF file using the unique id as file name.
- Create a JIRA and attach the event PDF file (the PDF file needs to be uploaded using back-end script)

The screenshot shows the MQD Admin interface for adding a new event. The form includes the following fields and options:

- Uniqueid:** A text box containing "12890". Below it, a note states: "The CMSCB-managed unique ID for this event."
- Market:** A dropdown menu set to "NASDAQ".
- Date:** A text box containing "2015-12-08" and a "Today" button with a calendar icon.
- Title:** A text box containing "NASDAQ to acquire Chi-X Canada".
- Url:** A text box containing "http://mqd-public-static.s3.amazonaws.com/events/12890.pdf". Below it, a "Change:" link is followed by "http://mqd-public-static.s3.amazonaws.com/".
- Original url:** A text box containing "http://cmsca.chi-x.com/Portals/11/Docs/Press_Release_Nasdaq_to_Acquire_Chi-X_Canada.pdf". Below it, a "Change:" link is followed by "http://cmsca.chi-x.com/Portals/11/Docs/Press_Release_Nasdaq".
- Types:** A list box with the following options: Co-location, Contract size change, Dark Pools, Derivatives, Direct market access, Earthquake, ETFs, and Exchange M&A or Partnerships. "Exchange M&A or Partnerships" is selected.
- Tripi:** A list box with the following options: EventTripi(id=Technology), EventTripi(id=Regulation), EventTripi(id=Instrument), EventTripi(id=Participant), and EventTripi(id=Information). "EventTripi(id=Participant)" is selected.

At the bottom, a note reads: "Hold down 'Control', or 'Command' on a Mac, to select more than one."