



Nasdaq Calypso

Option Lifecycle

Version 18

Revision 2.0

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Approved

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Document History

Revision	Published	Summary of Changes
1.0	February 2024	First revision for version 18.
2.0	June 2024	Second revision for version 18 - Added Structured Product with Sub-product Equity Structured Option.

The Option Lifecycle analysis allows monitoring Barrier and Exercise information for CMD options, FX options, EQD options, Swaptions, and Structured Product with Sub-product Equity Structured Option, and applying actions.

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1. Option Lifecycle

The Option Lifecycle analysis is configured using **Configuration > Reporting& Risk > Analysis Designer**. It allows monitoring Barrier and Exercise information for CMD options, FX options, EQD options, Swaptions, and Structured Product with Sub-product Equity Structured Option, and applying actions.

Right-click an Option Lifecycle folder in Analysis Designer, and choose "New Analysis" to add a parameter configuration, you will be prompted to enter a configuration name. The parameters are described below. Save your configuration once you are done.

The following types of configurations can be defined: Barrier (monitoring of barriers, triggers, and digitals), and Exercise (monitoring of deals that require a decision in terms of exercise).

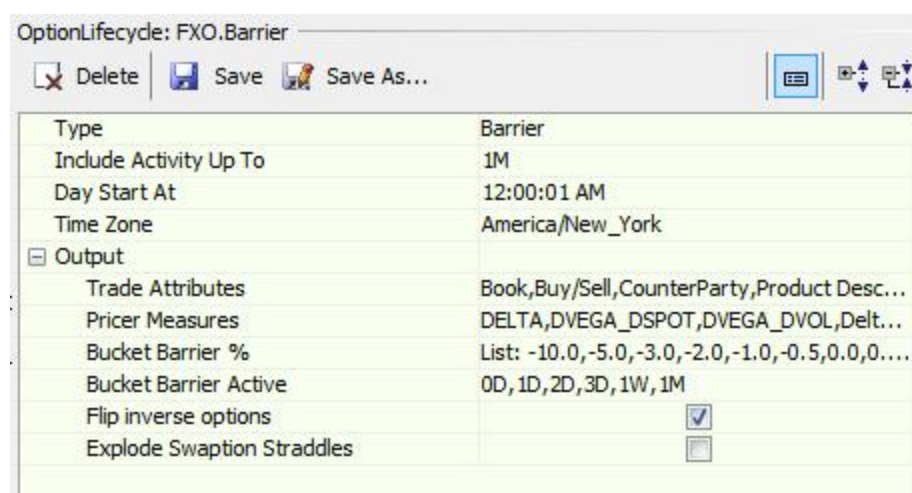
Option Lifecycle results can be viewed in the Calypso Workstation.

► Refer to Calypso Workstation documentation for setup details.

1.1 Barrier - FX Options

1.1.1 Sample Configuration

The configuration is very simple, you mostly select what trade attributes you want to display, and what buckets you want to analyze.



OptionLifecycle: FXO.Barrier	
Type	Barrier
Include Activity Up To	1M
Day Start At	12:00:01 AM
Time Zone	America/New_York
Output	
Trade Attributes	Book,Buy/Sell,CounterParty,Product Desc...
Pricer Measures	DELTA,DVEGA_DSPOT,DVEGA_DVOL,Delt...
Bucket Barrier %	List: -10.0,-5.0,-3.0,-2.0,-1.0,-0.5,0.0,0...
Bucket Barrier Active	0D,1D,2D,3D,1W,1M
Flip inverse options	<input checked="" type="checkbox"/>
Explode Swaption Straddles	<input type="checkbox"/>

- » Enter the start time and select the timezone of the start time.

This dictates when the 'day starts' for the purpose of tenor buckets. Since barrier monitoring is time dependent, this is important.

- » Select trade attributes as needed. The number of trade attributes that can be displayed is limited to 30.

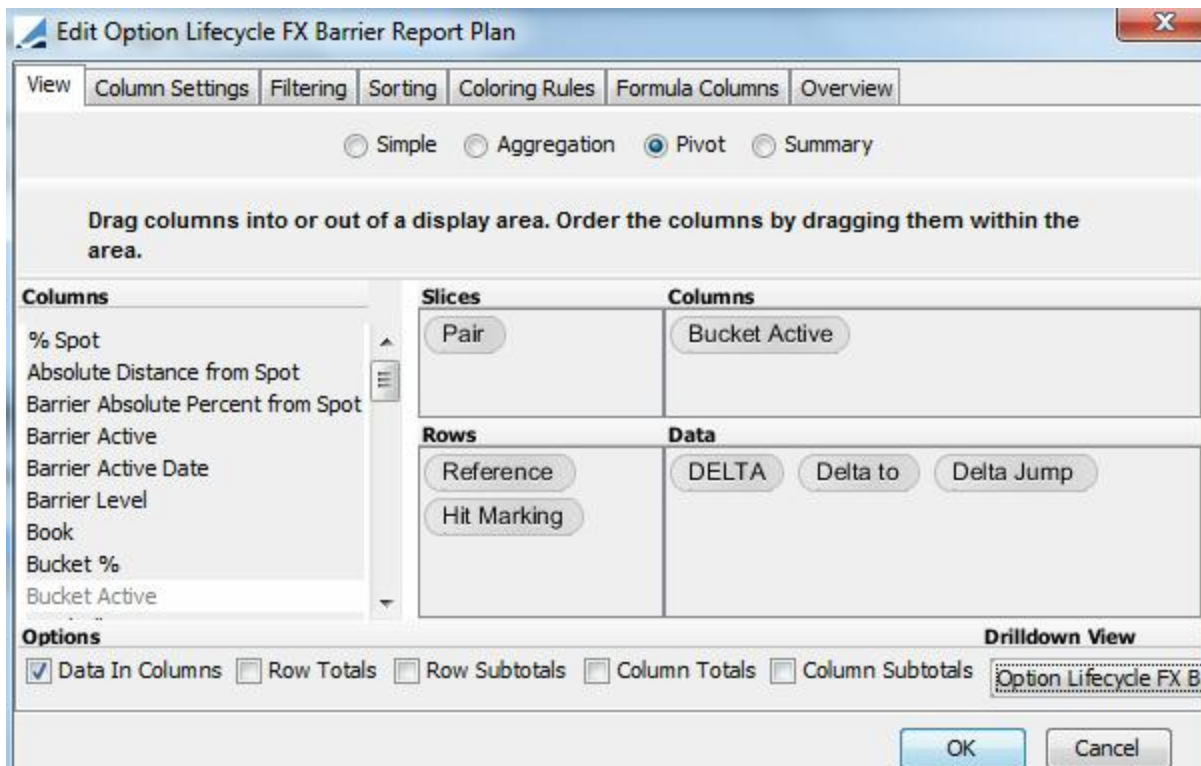
- » Select Greeks pricer measures as needed.
 - » Select the "Bucket Barrier %" buckets, and the "Bucket Barrier Active" buckets. These buckets are used to monitor barriers, triggers, and digitals.
- You can enter the individual buckets, or generate buckets on-the-fly.
- » Specific to FX Options - You can check "Flip inverse options" to display the trades based on the currency pair defined as "Pair Pos Ref" in the Currency Pair Definition. Otherwise they are displayed based on the currency pair selected upon trade capture.

1.1.2 Barrier Report Plan in Calypso Workstation

Barrier Risk Report Plan

You can see the Delta Risk in the buckets as percentage from forward rate, to and over the barriers.

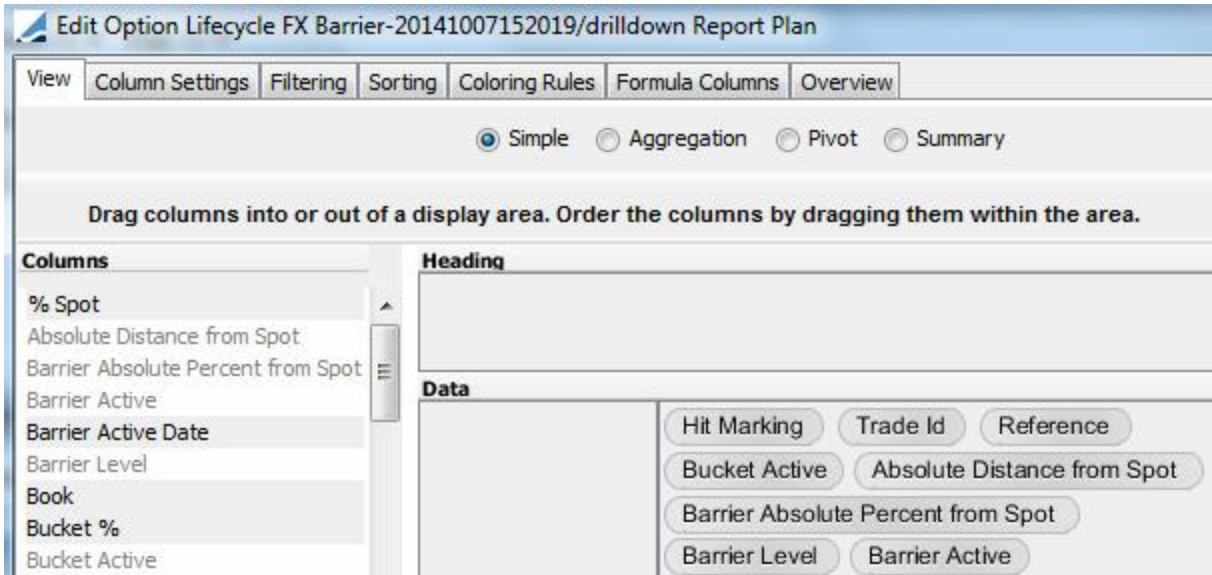
You can create a Pivot view as shown below.



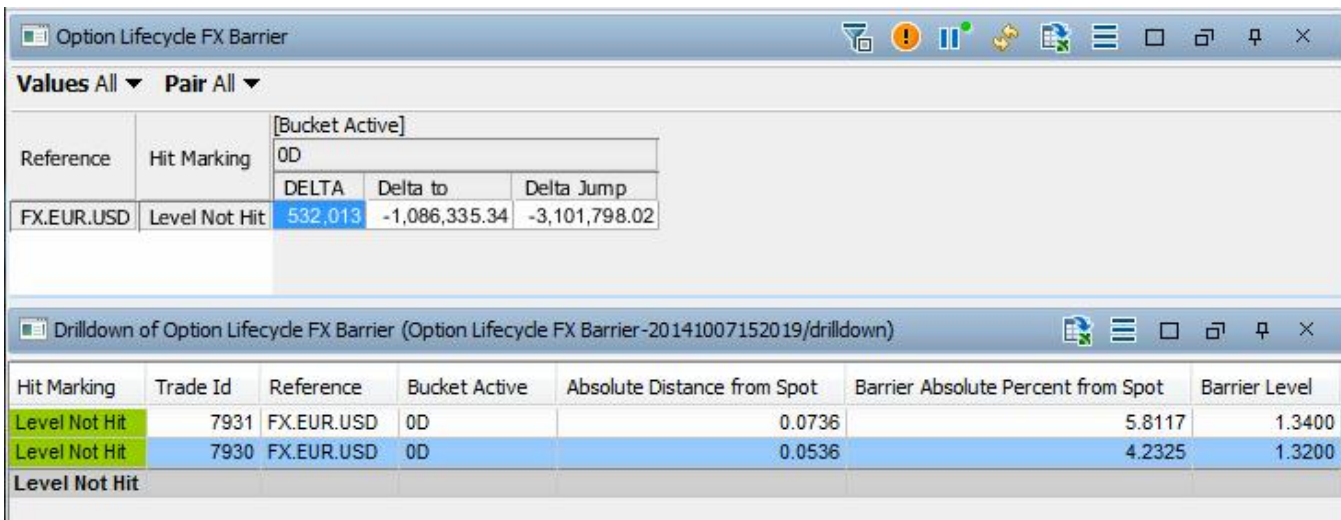
This view can also be considered as a navigation window to drill down into further details for a particular bucket. For example, you can drill-down into the "Triggered" bucket to see what actual barriers the system considers to be triggered.

Configure the drilldown report plan as shown below and make sure to associate it with the Pivot view.

Choose  > [Create New Drilldown Report Plan](#).



The Barrier Risk report will look as shown below in the Calypso Workstation.



Reference	Hit Marking	[Bucket Active]	DELTA	Delta to	Delta Jump
FX.EUR.USD	Level Not Hit	0D	532,013	-1,086,335.34	-3,101,798.02

Hit Marking	Trade Id	Reference	Bucket Active	Absolute Distance from Spot	Barrier Absolute Percent from Spot	Barrier Level
Level Not Hit	7931	FX.EUR.USD	0D	0.0736	5.8117	1.3400
Level Not Hit	7930	FX.EUR.USD	0D	0.0536	4.2325	1.3200
Level Not Hit						

Barrier List Report Plan

This is a list of barriers. You can setup a Simple view as shown below.

Edit Option Lifecycle Barrier List Report Plan

View
Column Settings
Filtering
Sorting
Coloring Rules
Formula Columns
Overview

☒ Simple
☐ Aggregation
☐ Pivot
☐ Summary

Drag columns into or out of a display area. Order the columns by dragging them within the area.

Columns

- % Spot
- Absolute Distance from Spot
- Barrier Absolute Percent from Spot
- Barrier Active
- Barrier Active Date
- Barrier Level
- Book
- Bucket %
- Bucket Active
- Buy/Sell
- Count
- CounterParty
- Cut Time
- Delivery Information
- DELTA
- Delta Jump
- Delta to
- DVEGA_DSPOT
- DVEGA_DVOL

Slices

- Bucket Active
- Sub Type
- CounterParty

Heading

Data

- Hit Marking
- Barrier Active
- Barrier Level
- Low
- High
- % Spot
- Ref Rate
- Option Style
- DELTA
- Buy/Sell
- CounterParty
- Pair
- Delta to
- Delta Jump
- Notional
- N Ccy
- Rebate
- R Ccy
- Reference
- Ref
- Product Description
- Inverse
- Settlement
- Sub Type
- Trade Id
- TradeStatus
- Book
- Barrier Active Date
- Start Date
- End Date
- Bucket %
- Bucket Active
- To Spot
- PV

The Barrier List report will look as shown below in the Calypso Workstation.

Option Lifecycle Barrier List									
Bucket Active All ▾ Sub Type All ▾ CounterParty All ▾									
Hit Marking ▾	Barrier Active ▾	Barrier Level	Low	High	% Spot ▾	Ref Rate	Option Style ▾	DELTA	
Level Not Hit	Active	1.3400	1.2660	1.2679	5.6866	1.2679	Vanilla EUR-Put, Barrier Reverse UI	216,261	
Level Not Hit	Active	1.3200	1.2660	1.2679	4.1092	1.2679	Vanilla EUR-Put, Barrier Reverse UI	336,422	

Applying Actions

From the Barrier list, you can right-click an option and select an action to be applied: Knock-in, Knock-out, Trigger-in, Trigger-out, etc. based on your workflow configuration.

Termination keywords attach to Barrier Options that are hit.

Keyword Window	
Termination Keywords for Hit Barrier	
Domain ...	
Name	Value
TerminationDate	07-22-2005
TerminationPayIntFlow	true
TerminationTradeDate	7/20/05 1:20:40 PM
TerminationType	UpBarrierIN

The exercise keyword attaches to triggered Digital Options that payout.

Keyword Window	
Keyword for Digital with Payout	
Domain ...	
Name	Value
EXERCISED_DATETIME	7/20/05 12:48:41 PM

Un-triggered barriers are identified by default by trades in status VERIFIED.

Triggered barriers are identified by default by trades in status EXERCISED, EXPIRED, KNOCKED_IN, or KNOCKED_OUT.

Recommended trade workflow:

- VERIFIED - EXERCISE - EXERCISED
- EXERCISED - UNEXERCISE - VERIFIED, workflow rule: UnexerciseOption
- VERIFIED - EXPIRE - EXPIRED
- EXPIRED - UNEXPIRE - VERIFIED, workflow rule: UnexerciseOption
- VERIFIED - KNOCK_IN - KNOCKED_IN
- KNOCKED_IN - UN_KNOCK_IN - VERIFIED, workflow Rule: UnexerciseOption
- VERIFIED - KNOCK_OUT - KNOCKED_OUT
- KNOCKED_OUT - UN_KNOCK_OUT - VERIFIED, workflow Rule: UnexerciseOption
- VERIFIED - TRIGGER_IN - TRIGGERED_IN
- TRIGGERED_IN - UN_TRIGGER_IN - VERIFIED, workflow Rule: UnexerciseOption
- VERIFIED - TRIGGER_OUT - TRIGGERED_OUT
- TRIGGERED_OUT - UN_TRIGGER_OUT - VERIFIED, workflow Rule: UnexerciseOption

The following table describes the option types and lifecycle actions that can be processed in the Barrier View.

Option Type	Action	Description
Barrier (KI, KIKO)	Knock In	Knocking in a barrier whose in barrier has been breached will create a new vanilla option or a KO barrier (if KIKO Type B). This action can be done on any date within the barrier window.
Barrier (KO)	Knock Out	Knocking out a barrier whose out barrier has been breached will terminate the option. This action can be done on any date within the barrier window.
Digital (OT, OTNT)	Trigger In	Triggering in a digital option whose in trigger has been breached will create a payoff in the form of an exercise fee, or will create a no touch digital (if one touch, no touch Type B). This action can be done on any date within the trigger window.
Digital (NT)	Trigger Out	Triggering out a no touch digital option whose out trigger has been breached will terminate the option. This action can be done on any date within the trigger window.

NOTE: Digital with Barrier follows the same lifecycle action as the Barrier defined on it. Once knocked-in, it follows the same lifecycle action as Digital at Expiry.

1.2 Exercise - FX Options

1.2.1 Sample Configuration

The configuration is similar to which of the barrier - You mostly select what trade attributes you want to display, and what buckets you want to analyze.

OptionLifecycle: FXO.Exercise

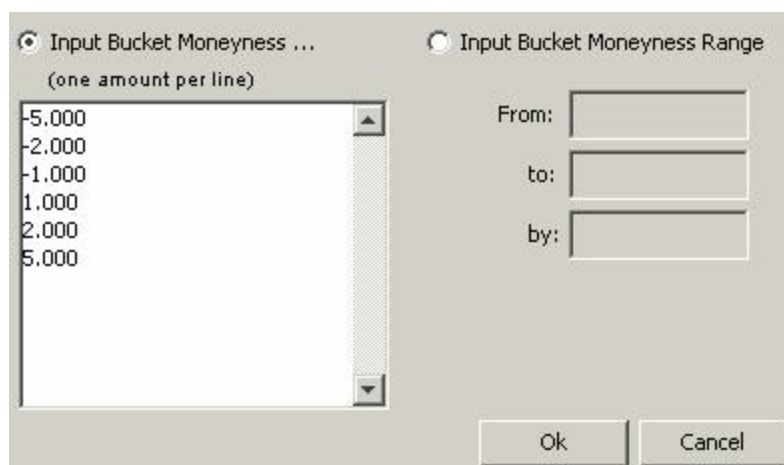
Type	Exercise
Include Activity Up To	1M
Day Start At	12:00:01 AM
Time Zone	America/New_York
<input checked="" type="checkbox"/> Output	
Trade Attributes	Book,Buy/Sell,CounterParty,Product Desc...
Pricer Measures	DELTA,DVEGA_DSPOT,DVEGA_DVOL,GAM...
Strike Bucket Units	Pips
Strike Buckets	List: -100.0,-50.0,-25.0,0.0,25.0,50.0,10...
Bucket Moneyiness	List: -2.0,-1.0,0.0,1.0,2.0
Bucket Next Exercise	0D,1D,2D,1W,2W,3W,1M
Display American Option based on	First Exercise Date
Flip inverse options	<input checked="" type="checkbox"/>
Explode Swaption Straddles	<input type="checkbox"/>

- » Time selection is as in Barrier. Since expiries go on 24 hours you just decide when your day starts so there is no confusion.
- » Select trade attributes as needed. The number of trade attributes that can be displayed is limited to 30.
- » Select Greeks pricer measures as needed.
- » Select the strike bucket unit - percentage, basis points, or pips.
- » Select the "Strike Buckets", "Bucket Moneyness", and "Bucket Next Exercise" buckets as needed.

Strike Buckets display trades based on their distance from underlying spot, whether in Pips or % Rel. The Strike-Spot column calculates the distance from strike as Strike – Ref. Rate, regardless of put/call.

The underlying spot is the current spot rate as of report calculation time, for the underlying currency pair of each trade.

You can enter the individual buckets, or generate buckets on-the-fly.



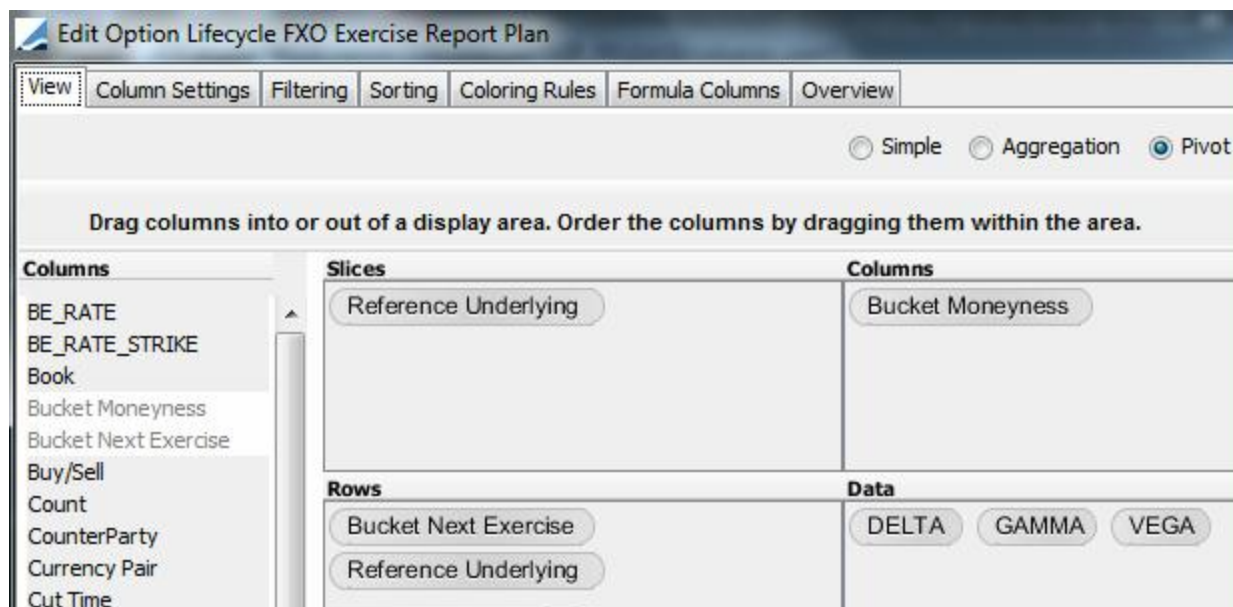
- » You can choose how to display American options: by First Exercise Date, or by Expiry Date.
- » Specific to FX options - You can check "Flip inverse options" to display the trades based on the currency pair defined as "Pair Pos Ref" in the Currency Pair Definition. Otherwise they are displayed based on the currency pair selected upon trade capture.
- » Specific to European Swaptions - You can check "Explode Swaption Straddles" to explode only Swaption Straddles into their two underlying Swaptions (RTP, RTR).

1.2.2 Exercise View in Calypso Workstation

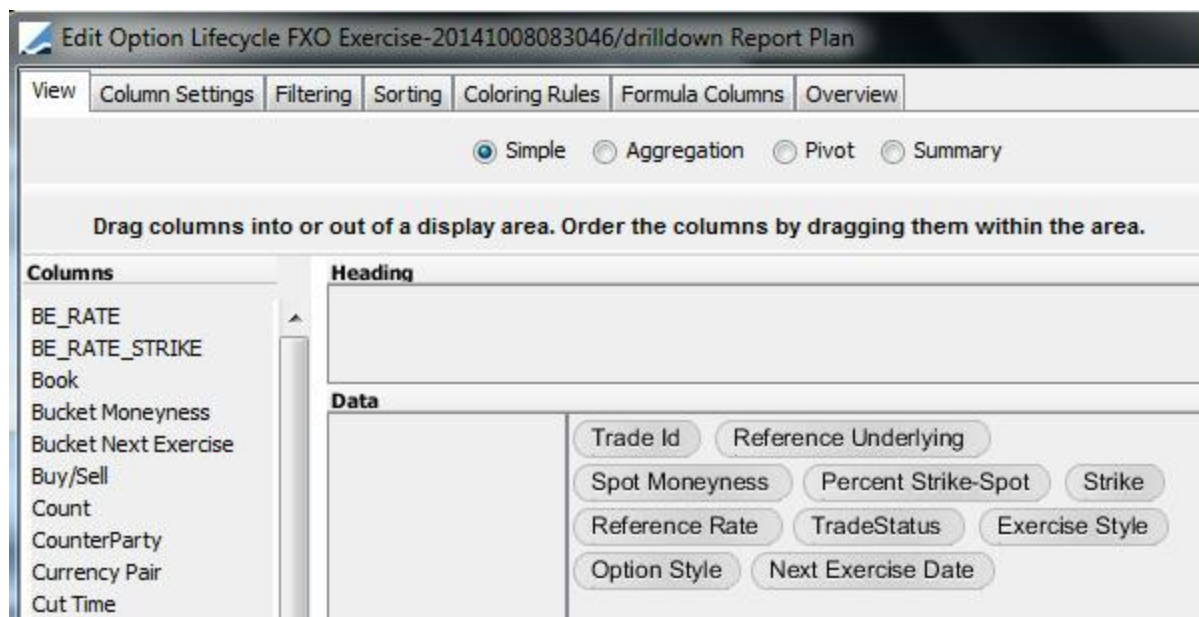
Exercise Pin Risk Report Plan

It is somewhat different as it displays based on moneyness of the option – i.e. % strike from Underling Spot, this is the Percent from Spot column, and is used to build the buckets for that axis as well. This calculation also dictates if the option is flagged as in-the-money (ITM) or out-of-the-money (OTM) in the Moneyness column. This is useful in the trade level drilldown view as a quick indicator.

For options without bucket moneyness, the Bucket Moneyness column will display "Misc.". You can create a Pivot View as shown below.



Configure the drilldown view as shown below and make sure to associate it with the Pivot View. Choose [≡ > Create New Drilldown Report Plan](#).



The Exercise Pin Risk report will look as shown below in the Calypso Workstation.

Option Lifecycle FXO Exercise

Values All

Reference Underlying All

Bucket	Next Exercise	Reference Underlying	[Bucket Moneyness]			
			< -2%	-1 to 0%	>2	
OD		EUR/USD	DELTA	0.00	0.00	-2,000,000.00
		GAMMA	0.00	0.00	0.00	
		VEGA	0.00	0.00	0.00	

Drilldown of Option Lifecycle FXO Exercise (Option Lifecycle FXO Exercise-20141008083046/drilldown)

Trade Id	Reference Underlying	Spot Moneyness	Percent Strike-Spot	Strike	Reference Rate	TradeStatus	Exercise Style
8431	EUR/USD	ITM	2.8169	1.4200	1.3800	VERIFIED	European
8431		ITM	2.8169			VERIFIED	European

Applying Actions

From the Exercise drilldown view, you can right-click an option and select an action to be applied: Exercise, Expiration, etc. based on your workflow configuration.

For cash settlement exercise, an exercise fee is attached to the option trade, and the trade moves to status EXERCISED.

For physical exercise, a trade is created for the underlying product, and the option trade moves to status EXERCISED.

- The ExercisedUnder trade keyword is set on the option trade. It contains the trade id of the trade generated for the underlying product.
- The ExercisedOption trade keyword is set on the trade generated for the underlying product. It contains the trade id of the option trade.

For expiration, the trade moves to EXPIRED.

Recommended trade workflow configuration:

- VERIFIED - EXERCISE - EXERCISED
- EXERCISED - UNEXERCISE - VERIFIED, workflow rule: UnexerciseOption
- VERIFIED - EXPIRE - EXPIRED
- EXPIRED - UNEXPIRE - VERIFIED, workflow rule: UnexerciseOption

For partial exercise, a trade is created with the residual unexercised amount. If you add the workflow rule CancelRemainderOfPartialExercise on the VERIFIED - EXERCISE - EXERCISED transition, the trade for the residual amount will be in status CANCELED, otherwise it will be in status VERIFIED.

The following table describes the option types and lifecycle actions that can be processed with the Exercise view.

Option Type	Action	Description
Vanilla (American and European)	Exercise	Exercising a vanilla option will generate the appropriate payoff. European options may only be exercised after the expiration time. American options may be exercised on any date between the first exercise date and the expiration date.
Vanilla (American and European)	Expire	Expiring a vanilla option will terminate the option. Vanilla options may only be expired after the expiration time.
Asian	Exercise	Exercising an Asian option will generate the appropriate payoff.
Asian	Expire	Expiring an Asian option will terminate the option. This action can only be done after expiration time.
Fader	Exercise	Exercising a Fader will generate the appropriate payoff.
Fader	Expire	Expiring a Fader will terminate the option. This action can only be done after expiration time.
Forward Starting	Exercise	Exercising a Forward Starting option will generate the appropriate payoff.
Forward Starting	Expire	Expiring a Forward Starting option will terminate the option. This action can only be done after expiration time.
Digital (OT, OTNT & at Expiry), Barrier (KI, KO, KIKO), Digital with Barrier	Expire	Expiring an option will terminate the option. This action can only be done after expiration time.
Barrier (KO)	Exercise	Exercising a barrier option whose knock-out barrier has not been breached will create the appropriate payoff. This action can be done only after expiration time. Knock In barriers will have been knocked in to a vanilla; therefore KI exercise is not valid.
Digital (at Expiry)	Exercise	Exercising a digital at expiry option will create a payoff in the form of an exercise fee.
Lookback	Exercise	Exercising a Lookback option will generate the appropriate payoff.
Lookback	Expire	Expiring a Lookback option will terminate the option. This action can only be done after expiration time.
Range Accrual	Exercise	Exercising a Range Accrual option will generate the appropriate payoff.
Range Accrual	Expire	Expiring a Range Accrual option will terminate the option. This action can only be done after expiration time.
European Range Binary	Exercise	Exercising a European Range Binary option will generate the appropriate payoff.
European Range Binary	Expire	Expiring a European Range Binary option will terminate the option. This action can only be done after expiration time.
Volatility Forward	Exercise	This is actually a volatility fixing rather than an exercise. "Exercising" a volatility forward will create the appropriate payoff.

Distance from Spot View

This is a pivot table.

Slices	Columns
Reference Underlying	Bucket Next Exercise
Rows	Data
Strike Bucket	DELTA

The Distance from Spot report will look as shown below in the Calypso Workstation.

Slices

Pivot

(All)

Reference Underlying

EUR/USD

Filtered By: NONE | Sorted By: NONE

Bucket Next Exercise						
Strike Bucket	Data	Expired	OD	1W to 2W	2W to 3W	3W to 1M
< -500 pips	DELTA			-2,072.76	-91,537.60	-18,166.61
No Strike	DELTA					

1.3 Barrier - Equity Derivatives Options

For Equity Derivatives Options, the Option Lifecycle analysis can be used to monitor the barriers. The actual knock-in / knock-out should be done from the Trade Blotter or the Option Exercise window.

1.3.1 Sample Configuration

The configuration is very simple, you mostly select what trade attributes you want to display, and what buckets you want to analyze.

OptionLifecycle: EQD.Barrier

Type	Barrier
Include Activity Up To	1M
Day Start At	12:00:01 AM
Time Zone	America/New_York
<input type="checkbox"/> Output	
Trade Attributes	Book,Buy/Sell,CounterParty,Product Desc...
Pricer Measures	
Bucket Barrier %	List: -10.0,-5.0,-3.0,-2.0,-1.0,-0.5,0.0,0....
Bucket Barrier Active	0D,1D,2D,3D,1W,1M
Flip inverse options	<input type="checkbox"/>
Explode Swaption Straddles	<input type="checkbox"/>

- » Enter the start time and select the timezone of the start time.

This dictates when the 'day starts' for the purpose of tenor buckets. Since barrier monitoring is time dependent, this is important.

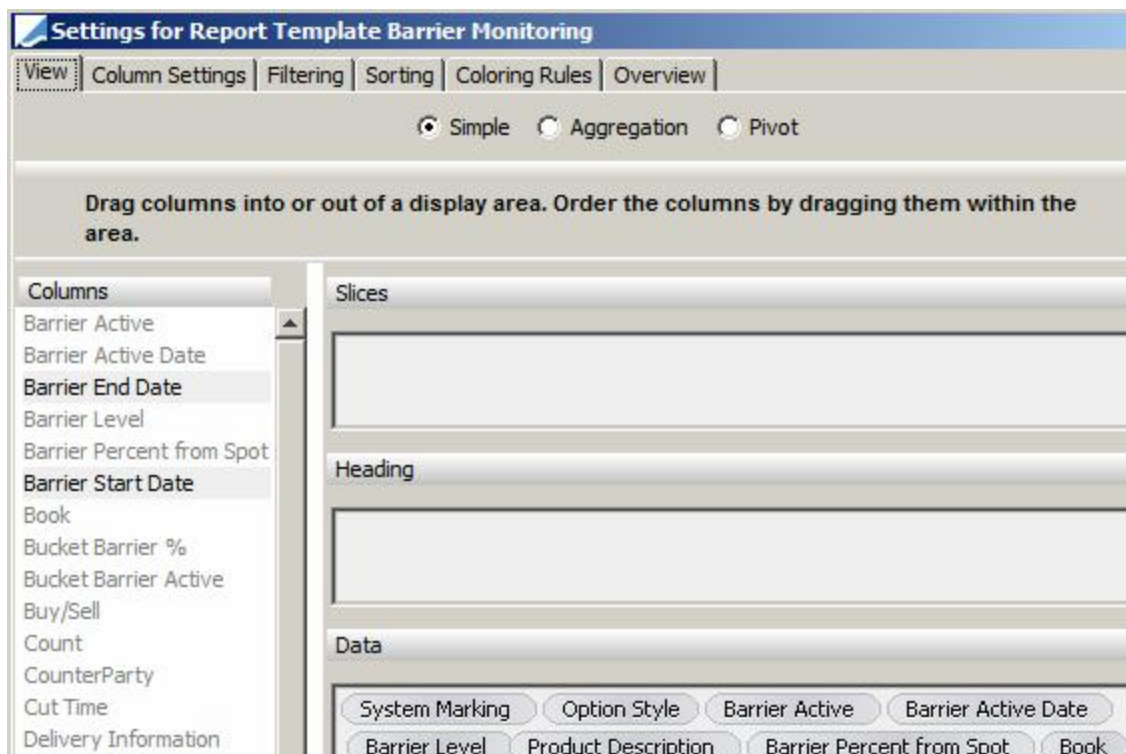
- » Select trade attributes as needed. The number of trade attributes that can be displayed is limited to 30.
- » Select the "Bucket Barrier %" buckets, and the "Bucket Barrier Active" buckets. These buckets are used to monitor barriers, triggers, and digitals.

You can enter the individual buckets, or generate buckets on-the-fly.

1.3.2 Barrier Report Plan in Calypso Workstation

Barrier List Report Plan

This is a list of barriers. You can setup a Simple view as shown below.



The Barrier List report will look as shown below in the Calypso Workstation.

System Marking	Option Style	Barrier Active	Barrier Active Date	Barrier Level	Product Description
Level Not Hit	Up and Out	Active	10/08/2014	460.00000	OTCOption/PUT BARRIER Equity.GOOG
Level Not Hit	Up and Out	Active	10/08/2014	258.00000	OTCOption/PUT BARRIER Equity.AMZN
Level Not Hit	Up and Out	Active	10/08/2014		

Applying Actions

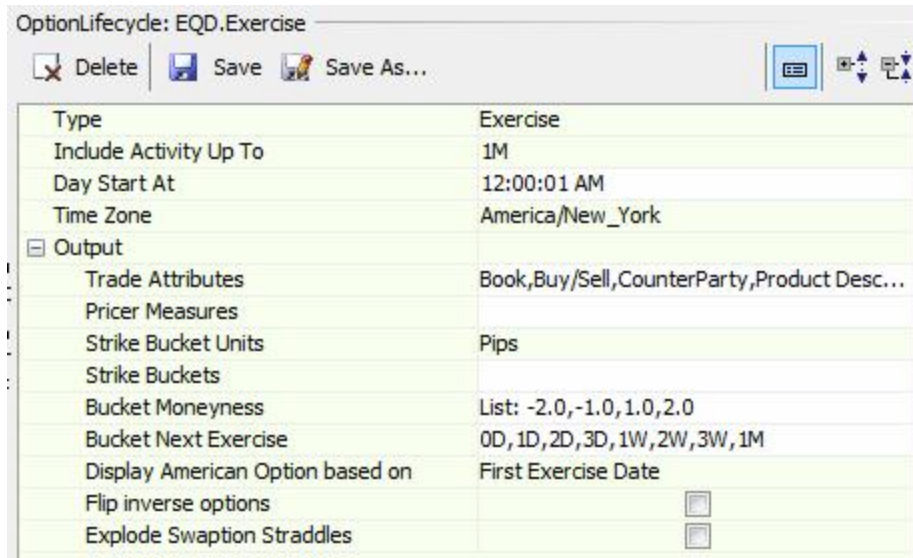
You can load the trades you want to knock in the Trade Blotter, and apply the actions from there (recommended for bulk processing). Or you can apply the actions from the Option Exercise window.

► Refer to Calypso Equity Structured Options documentation for details.

1.4 Exercise - Equity Derivatives Options

1.4.1 Sample Configuration

The configuration is similar to which of the barrier - You mostly select what trade attributes you want to display, and what buckets you want to analyze.



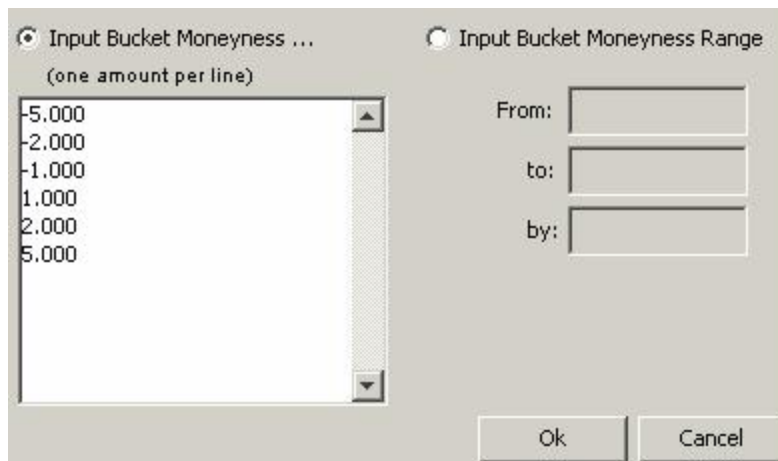
OptionLifecycle: EQD.Exercise

☐ Delete
 ☐ Save
 ☐ Save As...

Type	Exercise
Include Activity Up To	1M
Day Start At	12:00:01 AM
Time Zone	America/New_York
<input checked="" type="checkbox"/> Output	
Trade Attributes	Book,Buy/Sell,CounterParty,Product Desc...
Pricing Measures	
Strike Bucket Units	Pips
Strike Buckets	
Bucket Moneyness	List: -2.0,-1.0,1.0,2.0
Bucket Next Exercise	0D,1D,2D,3D,1W,2W,3W,1M
Display American Option based on	First Exercise Date
Flip inverse options	<input type="checkbox"/>
Explode Swaption Straddles	<input type="checkbox"/>

- » Time selection is as in Barrier. Since expiries go on 24 hours you just decide when your day starts so there is no confusion.
- » Select trade attributes as needed. The number of trade attributes that can be displayed is limited to 30.
- » Select the "Bucket Moneyness" and "Bucket Next Exercise" buckets as needed.

You can enter the individual buckets, or generate buckets on-the-fly.



☒ Input Bucket Moneyness ...
 (one amount per line)

☐ Input Bucket Moneyness Range

From:

to:

by:

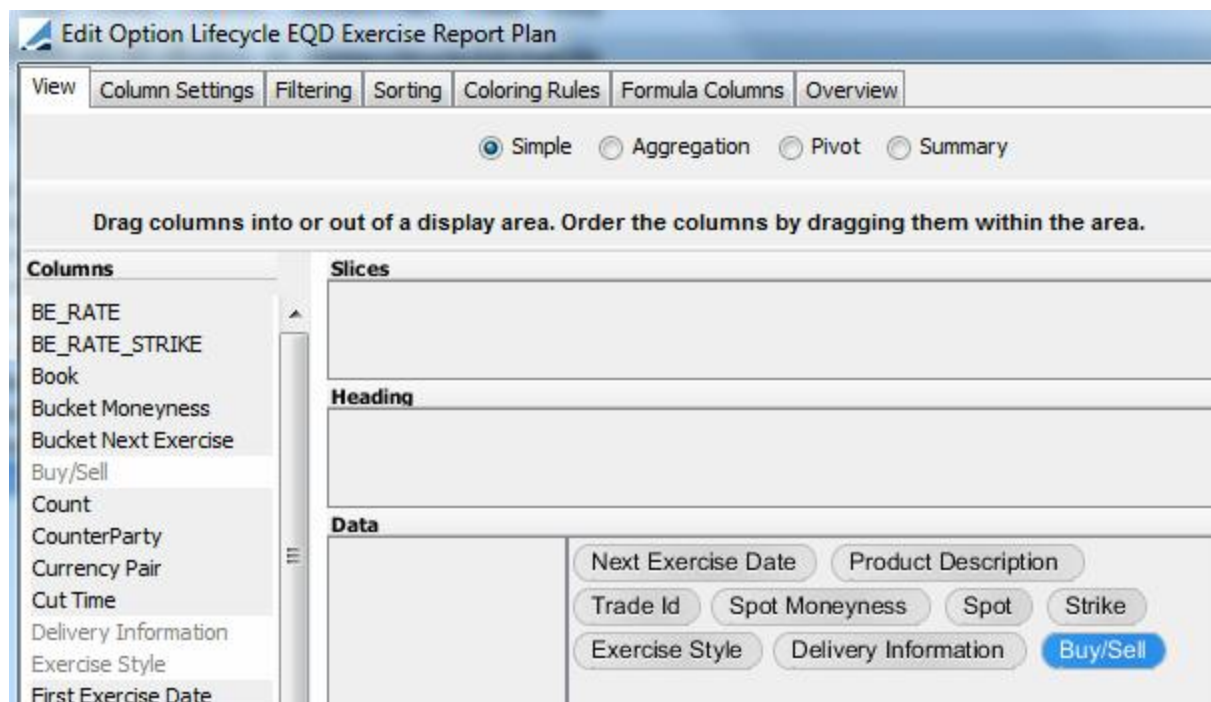
Ok Cancel

- » You can choose how to display American options: by First Exercise Date, or by Expiry Date.

1.4.2 Exercise Report Plan in Calypso Workstation

Exercise List Report Plan

This is a list of barriers. You can setup a Simple view as shown below.



The Exercise List View will look as shown below in the Calypso Workstation.

Next Exercise Date	Product Description	Trade Id	Spot Moneyiness	Spot	Strike	Exercise Style
10/08/2014	OTCOption/PUT American Equity.AMZN...	8432	OTM	235.00000	220.00000	American
10/08/2014	OTCOption/PUT American Equity.AMZN...	8433	ITM	235.00000	245.00000	American
11/01/2014	OTCOption/PUT BARRIER Equity.AMZN ...	8434	OTM	235.00000	232.00000	European
10/08/2014	OTCOption/PUT American Equity.GOOG...	8435	OTM	450.00000	435.00000	American

Applying Actions

You can right-click an option and select an action to be applied: Exercise, Expiration, etc. based on your workflow configuration.

For cash settlement exercise, an exercise fee is attached to the option trade, and the trade moves to status EXERCISED.

For physical exercise, a trade is created for the underlying product, and the option trade moves to status EXERCISED.

- The ExercisedUnder trade keyword is set on the option trade. It contains the trade id of the trade generated for the underlying product.
- The ExercisedOption trade keyword is set on the trade generated for the underlying product. It contains the trade id of the option trade.

For expiration, the trade moves to EXPIRED.

Recommended trade workflow configuration:

- VERIFIED - EXERCISE - EXERCISED
- EXERCISED - UNEXERCISE - VERIFIED, workflow rule: UnexerciseOption
- VERIFIED - EXPIRE - EXPIRED
- EXPIRED - UNEXPIRE - VERIFIED, workflow rule: UnexerciseOption