

2017年全球年度交易所 Global Exchange of the Year



Futures Market Dynamic Price Banding Mechanism

Invigorating Futures Trading and Serving the Real Economy Fulfilling Hedging Needs and Facilitating Price Discovery

> Taiwan Futures Exchange Oct-Nov, 2018

Outline



- PurposeIntroduction
- Examples



Purpose





- Reduce abnormal price fluctuations by preventing erroneous trades, fat finger incidents and momentary intraday order book imbalances
- Enhance market integrity
- Stay in line with global markets

Introduction

Applicable products



Phase-one products (Launched on 22th January 2018)

TAIEX Futures and Mini-TAIEX Futures: Spot month contracts, next calendar month contracts and the calendar spread orders composed of a spot month contract and the next calendar month contract of.

Phase-two products (TAIFEX will launch on 19th November 2018): All Domestic Equity Index Futures

- TAIEX Futures: The next third calendar month contract, the next three quarterly months and the calendar spread
- Mini-TAIEX Futures: The weekly contract, the next third calendar month contract, the next three quarterly months and the calendar spread
- Electronic Sector Index Futures, Finance Sector Index Futures, Non-Finance Non-Electronics Sub-Index Futures, Taiwan 50 Index Futures and Taipei Exchange Stock Index Futures: The spot month, the next two calendar months, and the next three quarterly months and calendar spread

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Applicable trading time



Applicable trading time¹

Regular Trading	Opening Call Auction (8:30 ~ 8:45)	Not Applicable
Session	Continuous Matching (8:45 ~ 13:45)	Applicable
After-Hour	Opening Call Auction (14:50 ~ 15:00)	Not Applicable
Trading Session	Continuous Matching (15:00 ~ next day 5:00)	Applicable

1. Dynamic price banding is not applicable to block trades.



How dynamic price banding works



- TAIFEX checks each new order¹ (including limit orders, market orders and market with protection orders²) and simulates matched prices based on the order book at the time.
 - Buy Orders: simulated matched price > the upper limit of dynamic price band → reject order
 - Sell Orders: simulated matched price < the lower limit of dynamic price band → reject order
 - Only new orders that may cause abnormal price movements will be rejected; other transactions remain unaffected.

*When simulated matched prices can't be generated for a newly submitted buy (sell) order because there is no existing counterparty sell (buy) order in the order book, TAIFEX will reject the buy (sell) order if the designated bid (offer) price of the buy (sell) order is above (below) the upper (lower) limit of TAIFEX's dynamic price band.

- 1. Price modifications are treated as new orders and are subject to dynamic price banding.
- 2. Implied orders constructed by TAIFEX' trading system are not actual orders and therefore not subject to dynamic price banding.



Calculation of the limits of dynamic price band



Upper limit : base price + Variation range

Lower limit : base price - Variation range

- Ranges are calculated before market open every day.
- The range is fixed for during the trading session.

Base price determination sequence

1. The last effective traded price

be within a predetermined

- The last traded price must be

within a predetermined range

from the effective mid-price of

number of seconds.

bid and ask

2. Effective mid-price of bid and ask

- The last traded price has to fulfill the criteria of the effective traded price. The time lag between the effective traded price and the base price must
 The effective mid-price is a volume-weighted average price of a series of bid and ask prices starting from the best ones.
 The accumulated bid/ask volume used in coloridation.
 - volume used in calculating the effective mid-price should reach a predetermined threshold set by TAIFEX.
 - (The volume-weighted average ask price ÷ The volume-weighted average bid price)<= a predetermined ratio

TAIFEX will determine the base price by referring to the underlying index price, the impact of index-component dividends, and relevant global and domestic product prices.

3.Price decided

by TAIFEX

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Calculation of the variation range



Variation Range

- Outright Month Contracts: the most recent closing price of the underlying index × 2%
- ◆ Calendar Spread: the most recent closing price of the underlying index × 1%

Example: Assuming a TAIEX index closing price of 11,000 points on Nov. 5:

- For the after-hour trading session beginning at 3pm on Nov. 5 and the regular trading session beginning at 8:45am on Nov. 6:
 - The TX and MTX variation range for spot month and the next calendar month contracts is 220 points (=11,000 × 2%).
 - The TX and MTX variation range for calendar spread orders is 110 points (=11,000 × 1%).



Dynamic price banding with different order types



Order type	Treatment	
Rest of Session (ROD)	Any portion of the order of which the simulated matched price is above (below) the upper (lower) limit of TAIFEX' dynamic price band will be rejected, while the remainder of the order with simulated matched prices within the dynamic price band will be executed.	
Immediate or Cancel (IOC)		
Fill or Kill (FOK)	If any of the simulated matched prices are above (below) the upper (lower) limit of TAIFEX' dynamic price band, the whole order will be rejected.	

- Example: an investor submits a limit order to buy 5 lots of the TX spot month contract. The simulated matched prices of 4 lots are within the dynamic price band, while the simulated match price of 1 lot exceeds the upper limit.
 - If the limit order is an ROD or IOC order: 4 lots will be executed, while 1 lot will be rejected.
 - If the limit order is an FOK order: the whole order (5 lots) will be rejected.

Other issues



Unusual market conditions: TAIFEX may adjust the variation range or suspend the dynamic price banding mechanism when necessary.

- Quantitative indicators: When predetermined quantitative indicators are triggered, TAIFEX may adjust the variation range. (For example, double the original variation range.)
- Qualitative indicators: In the event of a natural disaster, riot, war, or other force majeure event, TAIFEX may adjust the variation range or suspend the dynamic price banding mechanism.

System messages

- When an order is rejected due to dynamic price banding: the "simulated matched prices exceeded dynamic price banding" system message and "the base price belonging to the rejected order" will be sent.
- Variation range: the dynamic price banding variation ranges of applicable products will be sent through the system before market open.
- Adjustment to variation range: the "variation range relaxed" system message will be sent before market open or during trading hours.
- Suspension of the dynamic price banding mechanism:
 - Qualitative indicators reached: the "dynamic price banding mechanism suspended" system message will be sent;
 - Suspension of dynamic price banding due to system failure: the "dynamic price banding mechanism suspended" system message will be sent. Once the system issue is resolved, the "dynamic price banding mechanism resumed" system message will be sent.

Examples

Example 1: Limit buy order with simulated matched prices below the upper limit

- Assuming the base price (the last effective traded price) is 1,250 pts and the variation range is 25 pts, the upper limit of the dynamic price band is 1,275 pts (=1,250+25).
- If an investor submits an ROD limit order to buy 15 lots of the TF spot month contract at 1,255 pts:
- According to the order book at the time, the simulated matched prices are 1,250 pts (7 lots), 1,250.2 pts (3 lots), and 1,250.4 pts (5 lots).
 Therefore, the order will not be rejected.

Bid	Price	Ask	
	1275.2	8	1 075 pto
			1,275 pts – the upper
	1250.8	15	limit of DPB
	1250.6	12	•
	1250.4	5	•
	1250.2	3	•
	1250	7	•
15	9999		•
22	9998		•
13	9997		
10	9996		
10	9995		

*DPB=dynamic price band

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Example 2: Limit sell order with simulated matched prices above the lower limit

- Assuming the base price (the last effective traded price) is 450 pts and the variation range is 9 pts, the lower limit of the dynamic price band is 441 pts (=450-9).
- If an investor submits an ROD limit order to sell 15 lots of the TE next calendar month contract at 449.5 pts:
- According to the order book at the time, the simulated matched prices are 449.95 pts (5 lots), 449.9 pts (3 lots), 449.85 pts (3 lots) and 449.8 pts (4 lots). Therefore, the order will not be rejected.

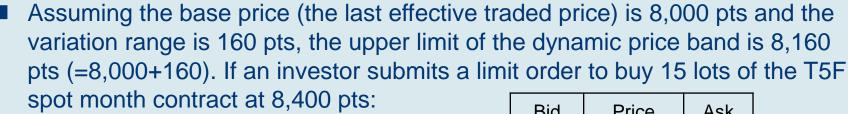
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			_
Bid	Price	Ask	
	450.2	15	
	450.15	10	
	450.1	7	
	450.05	8	
	450	10	
5	449.95		
3	449.9		
3	449.85		
10	449.8		
5	449.75		
			441 pts –
20	440.9		 the lower limit of DPB





Example 3: Limit buy order with simulated matched prices above the upper limit



- According to the order book at the time, the simulated matched prices are 8,001 pts (10 lots), 8,300 pts (2 lots) and 8,400 pts (3 lots):
 - If the order is an ROD order or IOC order: 10 lots will be matched at 8,001 pts, while the remaining 5 lots will be rejected as their simulated matched prices are above the upper limit.
 - If the order is an FOK order: the whole order will be rejected.

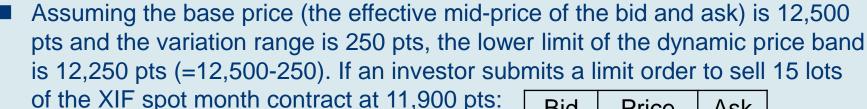
Bid	Price	Ask	
	8600	10	
	8500	10	
	8400	3	
_	8300	2	_ 8,160 pts –
	8001	10	the upper
5	7999		limit of DPB
2	7998		
3	7997		
10	7996		
10	7995		

*DPB=dynamic price band

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Example 4: Limit sell order with simulated matched prices below the lower limit



- According to the order book at the time, the simulated matched prices are 12,499 pts (5 lots), 12,050 pts (3 lots), 12,000 pts (3 lots) and 11,990 pts (4 lots):
 - If the order is an ROD order or IOC order: 5 lots will be matched at 12,499 pts, while the remaining 10 lots will be rejected as their simulated matched prices are below the lower limit.
 - If the order is an FOK order: the whole order will be rejected.

Bid	Price	Ask	
	12505	10	
	12504	10	
	12503	7	
	12502	5	
	12501	10	
5	12499		12,250 pts
3	12050		- the lower
3	12000		limit of DPB
10	11990		
5	11980		

*DPB=dynamic price band



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Example 5: Market buy order with simulated matched prices above the upper limit

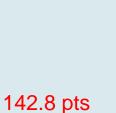
- Assuming the base price (the last effective traded price) is 140 pts and the variation range is 2.8 pts, the upper limit of the dynamic price band is 142.8 pts (=140+2.8). If an investor submits a market order to buy 15 lots of the GTF spot month contract:

 Bid
 Price
 Ask
- According to the order book at the time, the simulated matched prices are 140 pts (10 lots), 144 pts (2 lots) and 145 pts (3 lots):
 - If the order is an IOC order: 10 lots will be matched at 140 pts, while the remaining 5 lots will be rejected as their simulated matched prices are above the upper limit.
 - If the order is an FOK order: the whole order will be rejected.

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	146	20	
	145.5	10	
	145	3	
	144	2	
-	140	10	
5	139.95		
2	139.9		
3	139.85		
10	139.8		
20	139.75		

*DPB=dynamic price band



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- the upper limit of DPB

Example 6: Market sell order with simulated matched prices below the lower limit

- Assuming the base price (the effective mid-price of the bid and ask) is 10,900 pts and the variation range is 218 pts, the lower limit of the dynamic price band is 10,682 pts (=10,900-218). If an investor submits a market order to sell 20 lots of the MTX weekly contract:

 Bid
 Brice
 Ask
- According to the order book at the time, the simulated matched prices are 10,899 pts (10 lots), 10,650 pts (4 lots) and 10,600 pts (6 lots):
 - If the order is an IOC order: 10 lots will be matched at 10,899 pts, while the remaining 10 lots will be rejected as their simulated matched prices are below the lower limit.
 - If the order is an FOK order: the whole order will be rejected.

Price	Ask	
10905	10	
10904	10	
10903	7	
10902	5	
10901	20	
10899		10,682
10650		pts – the lower limit
10600		of DPB
10500		
10400		
	10905 10904 10903 10902 10901 10899 10650 10600 10500	10905 10 10904 10 10903 7 10902 5 10901 20 10899



Example 7: Market with protection buy order with simulated matched prices above the upper limit



- Assuming the base price (the last effective traded price) is 10,800 pts and the variation range is 216 pts, the upper limit of the dynamic price band is 11,016 pts (=10,800+216). If an investor submits a market with protection order to buy 15 lots of the TX next calendar month contract:
- If the converted buying price of the MWP order is 11,068 pts (=11,014 pts [best bid] + 54 pts [protected range]):
- According to the order book at the time, the simulated matched prices are 11,015 pts (10 lots), 11,018 pts (2 lots) and 11,050 pts (3 lots):
 - If the order is an IOC order: 10 lots will be matched at 11,015 pts, while the remaining 5 lots will be rejected as their simulated matched prices are above the upper limit.
 - If the order is an FOK order: the whole order will be rejected.

Bid	Price	Ask	
	11200	10	
	11100	10	
	11050	3	
	11018	2	11,016 pts
	11015	10	- the upper
1	11014		limit of DPB
2	10800		
3	10799		
10	10798		
10	10797		

*DPB=dynamic price band

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Example 8: Market with protection sell order with simulated matched prices below the lower limit



- Assuming the base price (the last effective traded price) is 13,000 pts and the variation range is 260 pts, the lower limit of the dynamic price band is 12,740 pts (=13,000-260). If an investor submits a market with protection order to sell 15 lots of the XIF spot month contract:

 Bid
 Price
 Ask
- If the converted selling price of the MWP order is 12,685 pts (=12,750 pts [best ask] - 65 pts [protected range]):
- According to the order book at the time, the simulated matched prices are 12,745 pts (6 lots), 12,735 pts (3 lots) and 12,725 pts (6 lots)
 - If the order is an IOC order: 6 lots will be matched at 12,745 pts, while the remaining 9 lots will be rejected as their simulated matched prices are below the lower limit.
 - If the order is an FOK order: the whole order will be rejected.

Bid	Price	Ask	
	13004	20	
	13003	9	
	13002	7	
	13001	15	
	12750	1	12,740 pts
6	12745		– the lower
3	12735		limit of
7	12725		DPB
10	12715		
15	12710		

Example 9: Limit buy order without simulated matched prices, bid price above the upper limit

- Assuming the base price (the last effective traded price) is 1,200 points and the variation range is 24 points, the upper limit of the dynamic price band is 1,224 (=1,200+24). If an investor submits a limit order to buy 15 lots of the TX spot month contract at 1,240 pts:

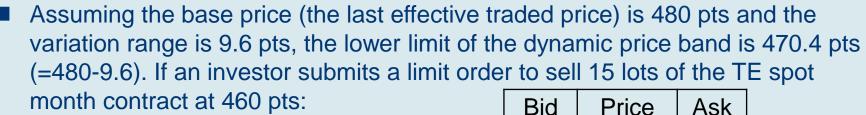
 Bid
 Price
 Ask
- According to the order book at the time, the simulated matched prices are 1,200.2 pts (8 lots) and 1,200.4 pts (2 lots) while the remaining 5 lots do not have simulated matched prices as there are no matching counterparty orders:
 - If the order is an ROD or IOC order: 8
 lots will be matched at 1,200.2 pts and 2
 lots at 1,200.4 pts, while the remaining 5
 lots will be rejected as the bid price
 1,240 is above the upper limit (1,224).
 - If the order is an FOK order: the whole order will be rejected.

Bid	Price	Ask	
	1270	10	
	1260	10	
	1250	3	1,224 pts –
	1200.4	2	the upper limit of
	1200.2	8	DPB
5	1200		
2	1199.8		
3	1199.6		
10	1199.4		
10	1199.2		





Example 10: Limit sell order without simulated matched prices, ask price below the lower limit



- According to the order book at the time, no simulated matched prices can be generated :
 - If the order is an ROD or IOC order: the whole order will be rejected as the ask price 460 pts is below the lower limit (470.4 pts).
 - If the order is an FOK order: the whole order will be rejected.

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Bid	Price	Ask	
	480.8	10	
	480.6	10	
	480.4	3	
	480.2	2	•
	480	7	170 1 pto
3	450		 470.4 pts – the lower
10	445		limit of DPB
5	440		
No other			
orders			

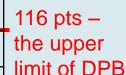


Example 11 (Combination order): Limit buy order with simulated matched prices above the upper limit

- Assuming the base price (the effective mid-price of the bid and ask) is -9 pts and the variation range is 125 pts, the upper limit of the dynamic price band is 116 pts (=-9+125). If an investor submits a limit order to buy 20 lots of the XIF spot / next calendar month spread at 150 pts:
- According to the order book at the time, the simulated matched prices are -8 pts (10 lots), -7 pts (2 lots) and 120 pts (8 lots):
 - If the order is an ROD or IOC order: 10 lots will be matched at -8 pts and 2 lots at -7 pts, while the remaining 8 lots will be rejected as their simulated matched price(120 pts) is above the upper limit(116 pts).
 - If the order is an FOK order: the whole order will be rejected.

Bid	Price	Ask	
	125	5	
	122	7	
	120	10	1 [.]
	-7	2	th
	-8	10	lir
15	-10		
2	-11		
3	-12		
4	-13		
5	-14		

*DPB=dynamic price band



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Example 12 (Combination order): Limit sell order with simulated matched prices below the lower limit,

- Assuming the base price (the last effective traded price) is -9 pts and the variation range is 80 pts, the lower limit of the dynamic price band is -89 (=-9-80). If an investor submits a market order to sell 15 lots of the T5F spot / next calendar month spread:

 Bid
 Price
 Ask
- According to the order book at the time, the simulated matched prices are -10 pts (10 lots), -11 pts (2 lots) and -95 pts (3 lots):
 - If the order is an ROD or IOC order: 10 lots will be matched at -10 pts and 2 lots at -11 pts, while the remaining 3 lots will be rejected as their simulated matched price(-95 pts) is below the lower limit(-89 pts).
 - If the order is an FOK order: the whole order will be rejected.

Bid	Price	Ask	
	-4	5	
	-5	7	
	-6	10	
	-7	2	
	-8	6	
10	-10		
2	-11		-89 pts –
3	-95		the lower
4	-100		limit of DPB
5	-105		



Example 13 (Combination order): Market with protection buy order with simulated matched prices above the upper limit



- Assuming the base price (the last effective traded price) is -10 pts and the variation range is 100 pts, the upper limit of the dynamic price band is 90 pts (=-10+100). If an investor submits a market with protection order to buy 15 lots of the TX spot / next calendar month spread:
 Bid _ Brice _ Ask
- If the converted buying price of the MWP order is 105 pts (=80 pts [best bid] + 25 pts [protected range]):
- According to the order book at the time, the simulated matched prices are 82 pts (5 lots), 95 pts (2 lots) and 100 pts (8 lots):
 - If the order is an IOC order: 5 lots will be matched at 82 pts, while the remaining 10 lots will be rejected as their simulated matched prices are above the upper limit.
 - If the order is an FOK order: the whole order will be rejected.

Bid	Price	Ask	
	110	5	
	105	7	
	100	10	
	95	2	• 90 pts –
	82	5	the upper
5	80		limit of
2	-10		DPB
3	-11		
4	-12		
5	-13		

Example 14 (Combination order): Limit buy order without simulated matched prices, bid price above the upper limit



- Assuming the base price (the effective mid-price of the bid and ask) is -1 pts and the variation range is 4.5 pts, the upper limit of the dynamic price band is 3.5 pts (=-1+4.5). If an investor submits a limit order to buy 15 lots of the TE spot / next calendar month spread at 5 pts:
- According to the order book at the time, the simulated matched prices are -0.5 pts (5 lots), 0.5 pts (2 lots) but the remaining 8 lots do not have simulated matched prices because there are no matching counterparty orders:
 - If the order is an ROD or IOC order: 5 lots will be matched at -0.5 pts, 2 lots at -0.5 pts while the remaining 8 lots will be rejected as the bid price of 5 pts is above the upper limit (3.5 pts).
 - If the order is an FOK order: the whole order will be rejected.

Bid	Price	Ask
	7.4	5
	7.2	7
_	7	10
	0.5	2
	-0.5	5
5	-1	
2	-1.1	
3	-1.15	
4	-1.2	
5	-1.3	

*DPB=dynamic price band

3.5 pts – the upper limit of DPB

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Thank You

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