Guide to Implied Pricing for Base Metals

March 2020

LME
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SETTING THE GLOBAL STANDARD

Implied pricing: introduction

What is implied pricing and what metals are covered?

Implied pricing combines liquid outright orders with “carry” (or calendar spread) orders to “create” (or imply) new outright orders. Similarly two outright orders for different prompt dates can combine to imply a new carry order between the respective prompt dates.

The LME has extended implied pricing functionality on LMEselect (originally available for LME Gold and LME Silver) to include:

13	29	82	28	50	30
Al	**Cu**	**Pb**	**Ni**	**Sn**	**Zn**
LME Aluminium	LME Copper	LME Lead	LME Nickel	LME Tin	LME Zinc

The change is designed to improve access to the existing monthly liquidity and tighten spreads for:

- all the 3rd Wednesday outright order books preceding the 3-month (3M) rolling prompt and the nearest 3rd Wednesday order book immediately following the 3M prompt (here known as “pre-3M 3rd Wed” and “post-3M 3rd Wed”)*;
- the cash contract order books, and;
- associated 3-month and nearby 3rd Wednesday carry order books

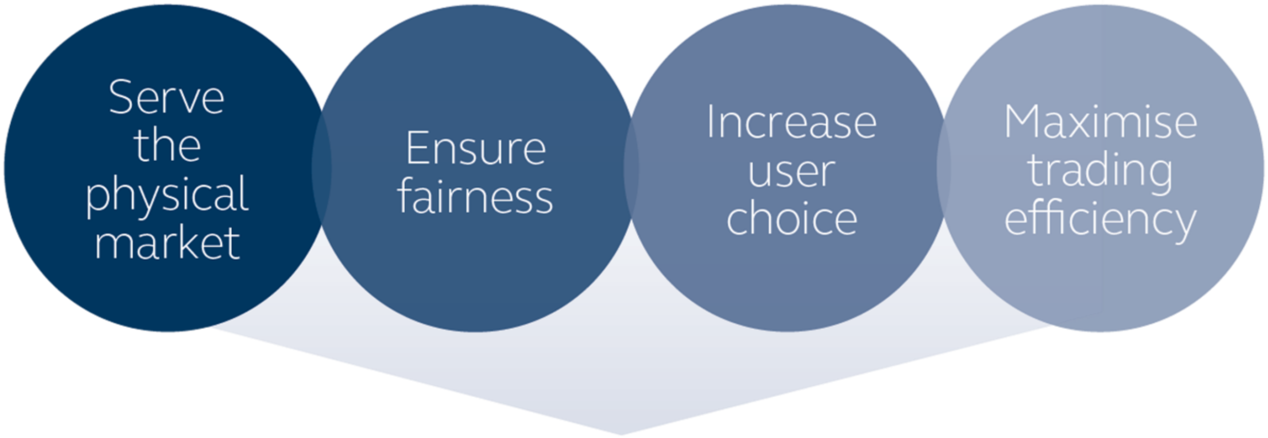
The implied functionality has also been enabled for ferrous steel scrap and steel rebar contracts since July 2019, and HRC contracts since January 2020.

*see slide six for examples of implied months

Implied pricing

Why has the LME introduced implied pricing functionality?

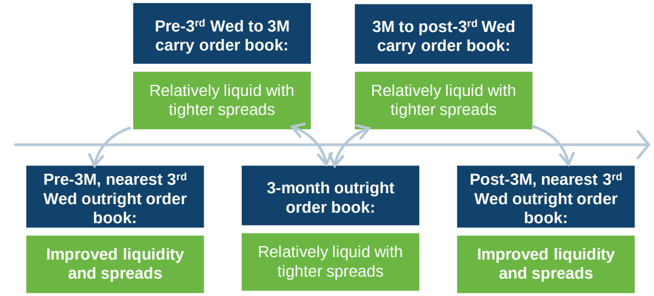
We have introduced implied pricing, which is an industry standard methodology, to further improve displayed liquidity by combining existing liquidity pools. Implied pricing comes as part of the LME Strategic Pathway which had four key strategic principles:



Monthly liquidity is already available – as evidenced by healthy carry (calendar spread) volume. The LME wants to give the market more choice in how they access that liquidity and broaden participation. Ultimately, each market participant can choose their preferred method.

Implied pricing

Key features



- Two specific implied pricing routes are available, connecting the 3-month outright order book, via the respective carry order books to:
  a) All 3rd Wednesdays preceding the 3-month
  b) The cash contract*
  c) Nearest 3rd Wednesday immediately following the 3-month
- Implied pricing always implies in three directions simultaneously:
  – combines 3-month outright orders with carry orders to “create” (or imply) new 3rd Wednesday outright orders
  – 3rd Wednesday outright orders will combine with carry orders to imply a new 3-month outright order
  – 3-month outright orders will combine with 3rd Wednesday outright orders to imply new 3-month to 3rd Wednesday carry orders
- If an implied order is filled, the underlying components from the 3-month and carry order books will be auto-filled with associated order book adjustments made
- An implied price will always be comprised of the best price from each of the order books for the underlying legs

*See Slide 13 for detail on cash-3m implied route

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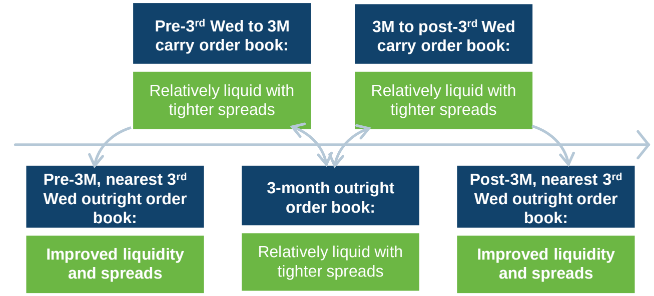
Implied pricing

Key features



- Newly implied prices may provide operational and fee benefits (fewer legs than the 3-month and monthly carry trade) and reduced legging risk
- Better priced explicit orders can rest in the order book along with the best priced implied order from each route
- The newly created implied orders appear as "normally" entered orders: LMEselect market data (GUI, SelectMD, and LMEsource) does not show that the price is an implied price (LMEsource does include an implied indicator on *trades*)
- Implied orders will not be chained – implied prices cannot be used to build second generation implied "ins" and "outs" (see explanation on ins and outs on next slide)
- Rounding – given the granularity of tick size differs between the 3-month order book and carry order books (for example, copper outright = $0.50, carry = $0.01), implied out prices will be rounded. When rounded implied orders are filled, any improvement will be given to the carry order.

Implied pricing

Which 3rd Wednesday prompts are being implied?

Examples:

1) On trade date 30 July 2018, 3-month is 30 Oct 2018. The implied months will be Aug-18 (15 Aug 2018), Sep-18 (19 Sep 2018), Oct-18 (17 Oct 2018) and Nov-18 (21 Nov 2018).
2) On trade date 17 Sep 2018, 3-month is 17 Dec 2018. The implied months will be Oct-18 (17 Oct 2018), Nov-18 (21 Nov 2018) and Dec-18 (19 Dec 2018). Note the Sep-18 (19 Sep 2018) contract is now the Cash prompt and no longer implied.

When 3-month is a 3rd Wednesday, the implied routes will still be enabled. The 3rd Wednesday contract will be solely listed as the 3-month contract in these instances.

3) On trade date 20 Nov 2018, 3-month is 20 Feb 2019, which is the 3rd Wednesday prompt in Feb-19. The implied months will be Dec-18 (19 Dec 2018), Jan-19 (16 Jan 2019) and Mar-19 (20 Mar 2019).

Implied pricing

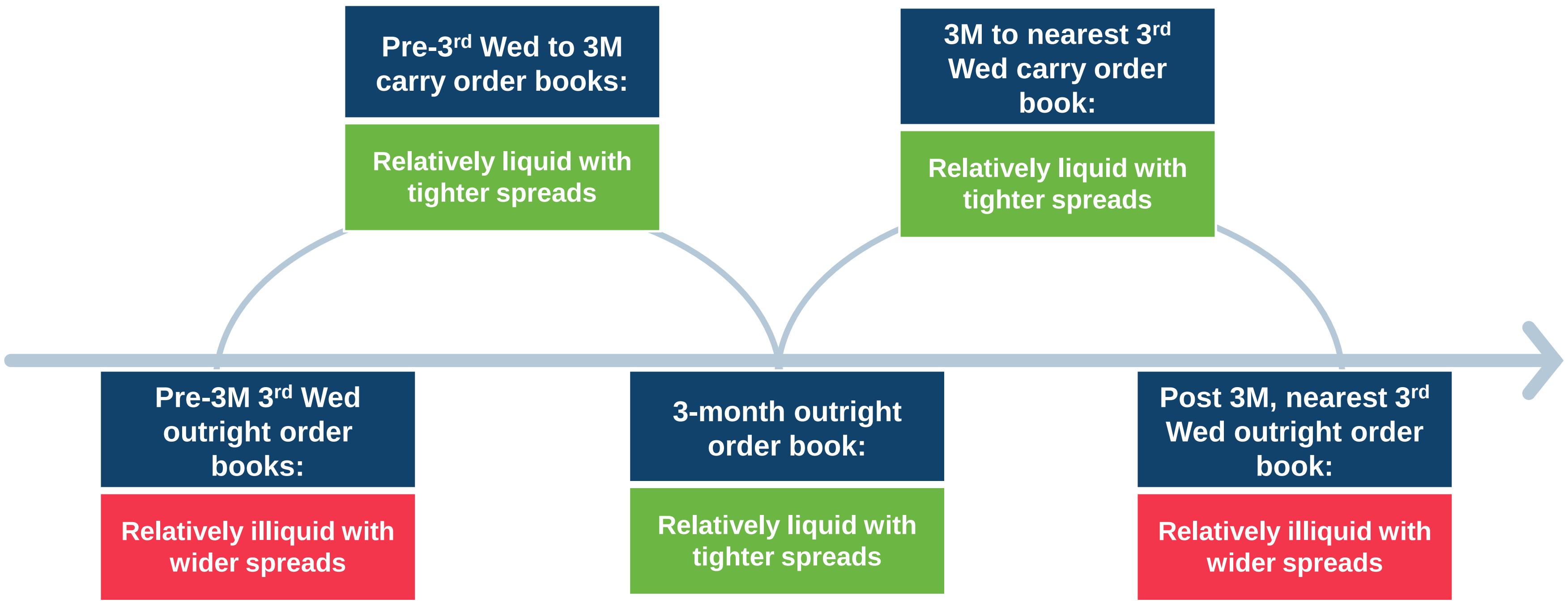
Old model

The old forward curve and prompt date structure could make it challenging to access to monthly liquidity.

Users had a choice if they waned to trade a 3rd Wednesday future outright to either:

a) Trade the 3rd Wednesday monthly outright future (which can be less liquid and has wider spreads) or;

b) Trade the 3M outright and associated pre or post 3rd Wednesday to 3M carry



Implied pricing

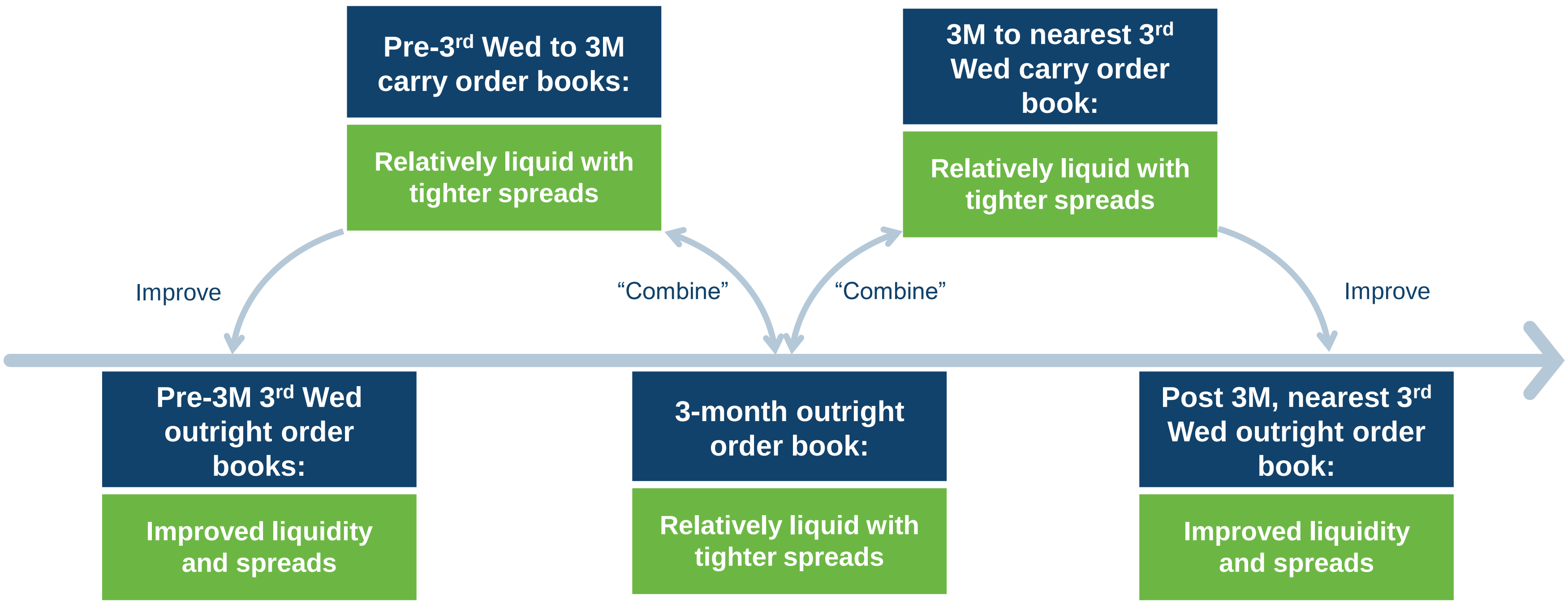
New model

By “combining” 3-month outright and monthly carry orders together we have improved the volumes and spreads* of the pre-3M 3rd Wed, and post-3M 3rd Wed outright order books.

Users will still have a choice in how they access monthly liquidity:

a) Trade the improved 3rd Wed outright order books or

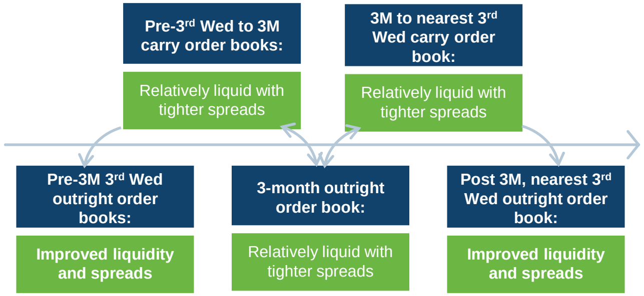
b) Trade the 3-month order book *and* the associated 3rd Wed carry order books



*Basis December 2018 figures – source, LME Research team

Implied pricing

Implied OUT and implied IN orders



Implied OUT

- LMEselect “implies out” orders – carries will combine with outrights to create new outright implied prices
- One explicit order in 3-month can provide the underlying volume for a number of implied outrights
- When an implied price is traded LMEselect will recalculate outright prices and volumes

Implied IN

- LMEselect “implies in” orders – outrights will combine to create new implied carry prices
- At least two outright orders combine to create a new implied carry order

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Implied pricing

example trade date 30 Jul 2018

Order book example

Figure 1 – without implied pricing

Monthly contracts are relatively illiquid compared with the 3-month market

Oct 18 – 3M

Vol	Bid	Ask	Vol
15	-11	-10.5	36
5	-11.5	-10	20
20	-12	-9.75	100

3M – Nov 18

Vol	Bid	Ask	Vol
11	-15	-14	4
15	-15.5	-13.25	10
5	-17	-13	10

Oct 18

Vol	Bid	Ask	Vol
2	6987	6995	3

3M

Vol	Bid	Ask	Vol
10	7002	7004	5
5	7001.5	7005	8
7	7000	7005.5	2

Nov 18

Vol	Bid	Ask	Vol
2	7015	7023	1

Figure 2 – with implied pricing

Implied pricing automatically combines best bids and offers to create new implied bids and offers on monthly contracts

Oct 18 – 3M

Vol	Bid	Ask	Vol
15	-11	-10.5	36
5	-11.5	-10	20
20	-12	-9.75	100

3M – Nov 18

Vol	Bid	Ask	Vol
11	-15	-14	4
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5	-17	-13	10

Oct 18

Vol	Bid	Ask	Vol
10	6991	6993.5	5
2	6987	6995	3

3M

Vol	Bid	Ask	Vol
10	7002	7004	5
5	7001.5	7005	8
7	7000	7005.5	2

Nov 18

Vol	Bid	Ask	Vol
4	7016	7019	5
2	7015	7023	1

- Implied pricing combines the best 3-month and carry price to show the best implied outright price for each enabled month
- Implied pricing will only create one level (best bid and offer) for each implied route
- Implied orders can exist with explicit outright orders, which will be visible and tradeable in the outright monthly order book
- There is no preference for explicit outright trades in the order book as all orders are filled on a FIFO basis

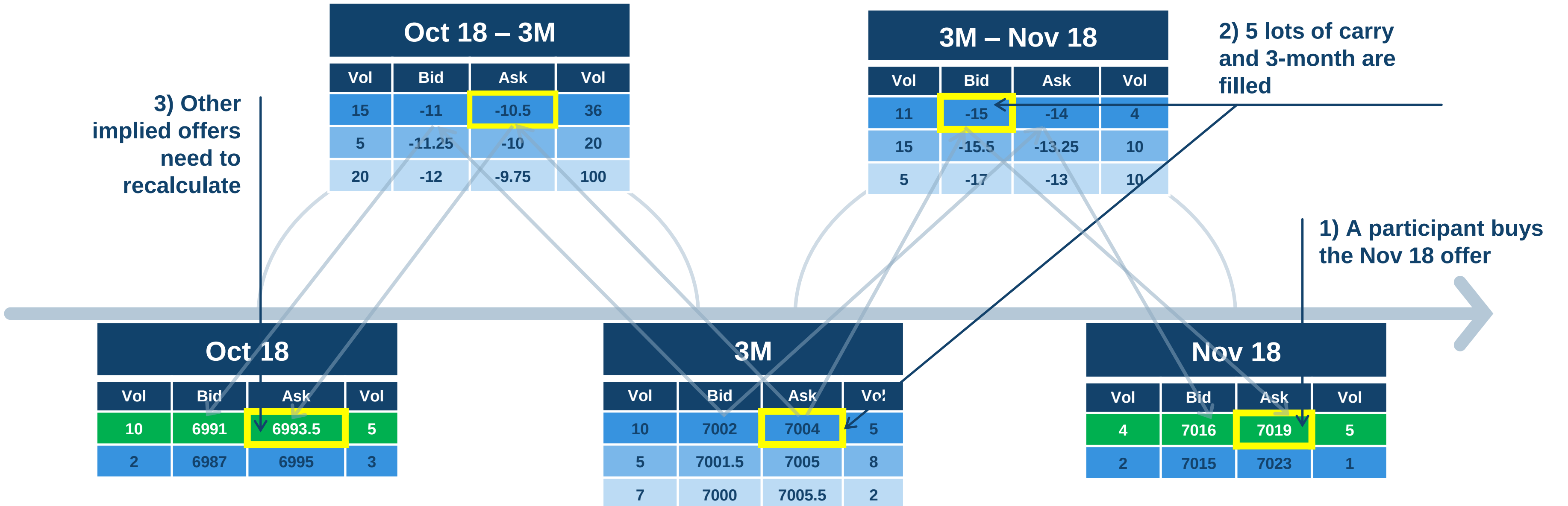
*Market in contango, represented as negative spread prices
** Example months as of implementation at go-live.

Implied pricing

example trade date 30 Jul 2018

Order book example - continued

Figure 3 – with implied pricing



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7	7000	7005.5	2

Nov 18

Vol	Bid	Ask	Vol
4	7016	7019	5
2	7015	7023	1

- A market participant buys the implied out outright offer of 5 lots of Nov 18 at $7019
- This was constructed with the best 3-month offer ($7004) and the best 3-month – Nov 18 carry bid (-15) which both drop away (5 lots of the carry is filled, the rest remains in the order book)
- As the best 3-month offer has traded there will momentarily be no implied volume in the outright offers whilst the book recalculates

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Implied pricing

Order book example - continued

example trade date 30 Jul 2018

Figure 4 – with implied pricing

Next best 3-month offer remains in the order book

Oct 18 – 3M

Vol	Bid	Ask	Vol
15	-11	-10.5	36
5	-11.25	-10	20
20	-12	-9.75	100

3M – Nov 18

Vol	Bid	Ask	Vol
6	-15	-14	4
15	-15.5	-13.25	10
5	-17	-13	10

Implied prices are recalculated to show new best price given with combination of outright and carry orders

Oct 18

Vol	Bid	Ask	Vol
10	6991	6994.5	8
2	6987	6995	3

3M

Vol	Bid	Ask	Vol
10	7002	7005	8
5	7001.5	7005.5	2
7	7000		

Nov 18

Vol	Bid	Ask	Vol
4	7016	7020	6
2	7015	7023	1

- The prices are then recalculated and, provided no new orders are submitted, the depth will reduce in 3-month order book
- The 3-month – Nov 18 spread depth will also reduce, providing no new orders are submitted (from 11 lots bid, down to 6)
- The Oct 18 bid/offer spread will also wider as the top of book implied order was constructed using the same underlying 3-month order

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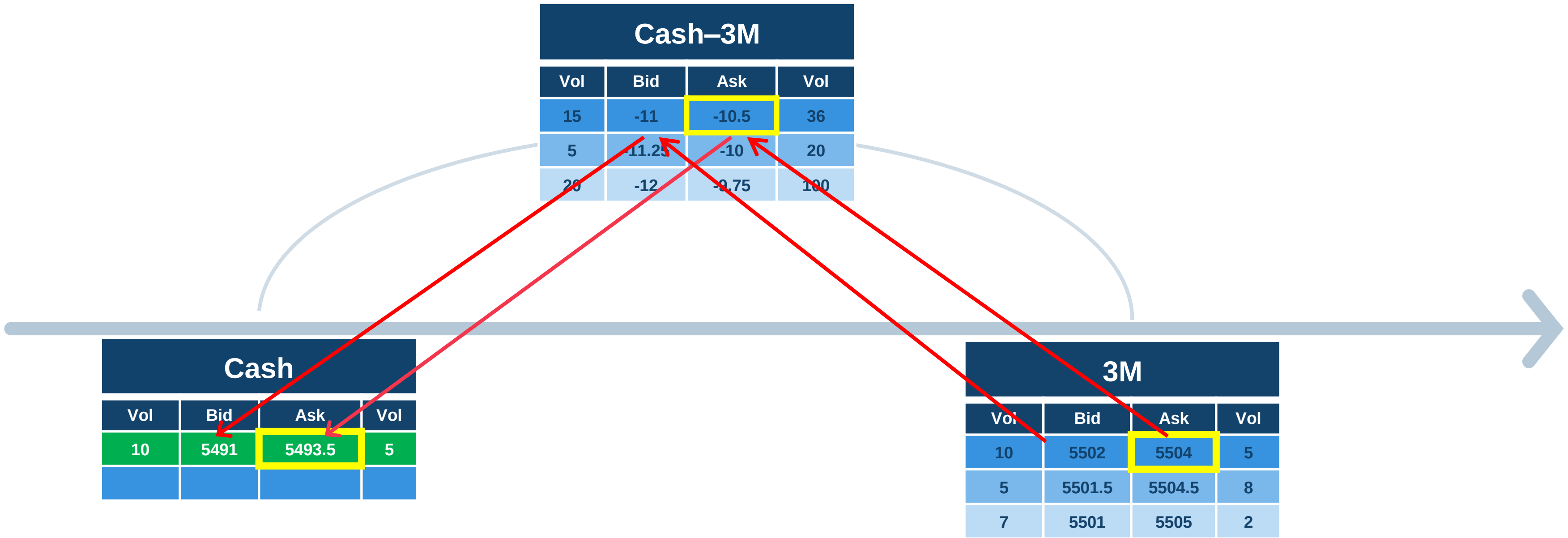
Order book example - continued

Figure 5 – an example of cash-3m



- The construction of the cash contract's implied offer, highlighted above, is the offer of the Cash-3m carry, added to the offer of the 3m order book
  - Effectively: $(\text{offer}_{\text{cash}} - \text{offer}_{\text{3m}}) + \text{offer}_{\text{3m}} = \text{offer}_{\text{cash}}$, -10.5 + 5504 = 5493.5
- The construction of the cash contract's implied bid is the bid of the Cash-3m carry, added to the bid of the 3m order book
  - Effectively: $(\text{bid}_{\text{cash}} - \text{bid}_{\text{3m}}) + \text{bid}_{\text{3m}} = \text{bid}_{\text{cash}}$, -11 + 5502 = 5491

Implied pricing

Effect of rounding on implied OUT prices

Granularity (tick size)

	Outright futures	Spread trades
Aluminium, copper, lead, zinc	$0.50 per metric tonne	$0.01 per metric tonne
Nickel, tin	$5 per metric tonne	$0.01 per metric tonne

Rounding for implied OUT prices

- An implied bid price will be rounded down to the nearest exact multiple of the tick size in the outright market
- An implied offer price will be rounded up to the nearest exact multiple of the tick size in the outright market
- Any improvement from rounding is allocated to the resting carry order used in the implied out order

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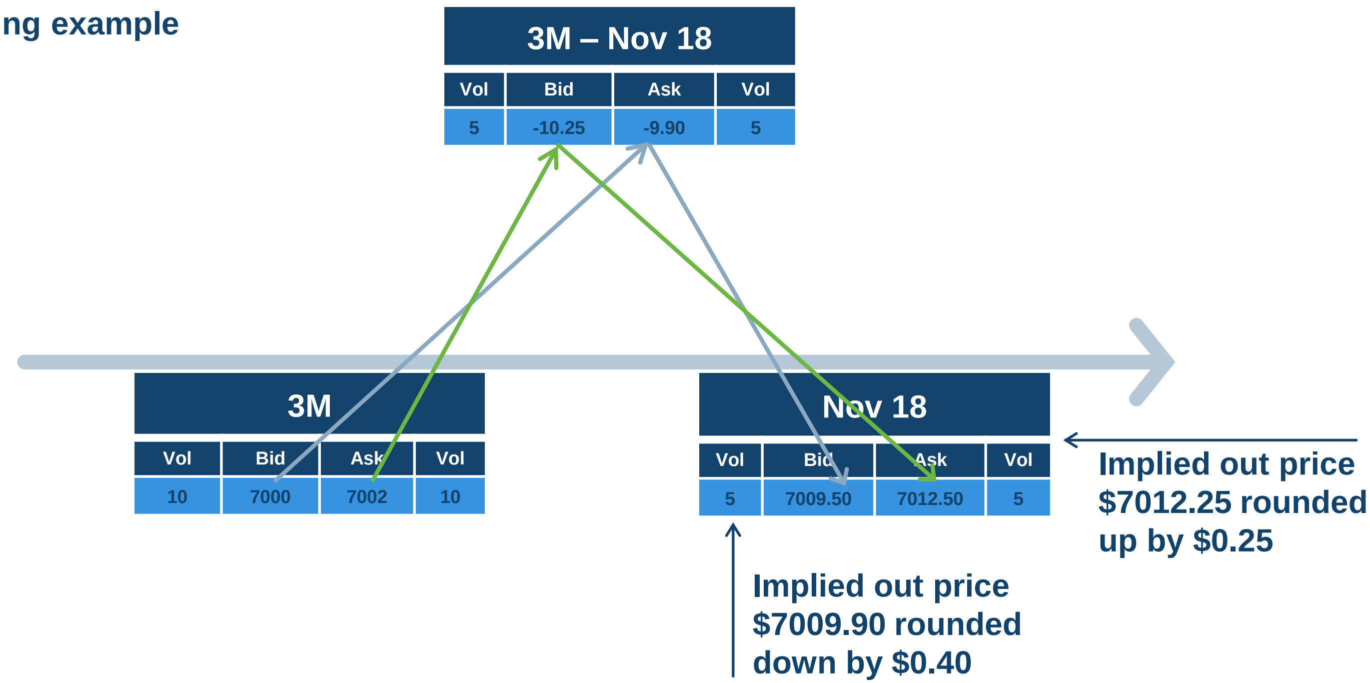
Implied pricing

example trade date 30 Jul 2018

Effect of rounding on implied OUT prices example – improved spreads

Figure 6 – rounding example



Trade view – a participant hits 2 lots of the Nov 18 implied bid at 7009.50

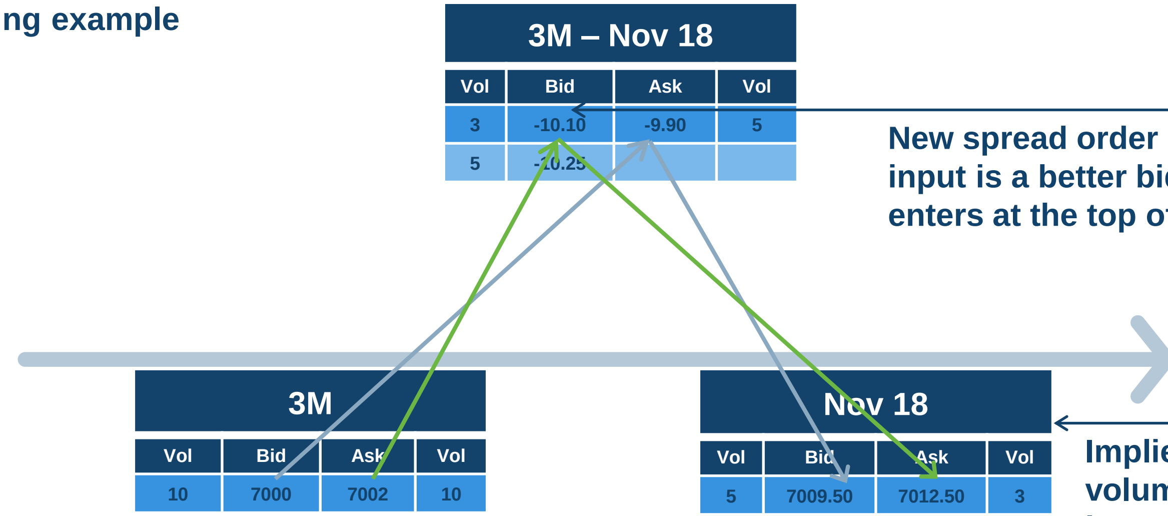
Market	Volume	Price	Buy / Sell	Trade and Price Improvement allocation
Nov 18	2	7009.50	S	Implied Out bid partially trades 2 lots
3-month	2	7000	B	3-month bid partially filled 2 lots
3-month – Nov 18	2	**-9.50**	S/B	Price **improvement of $0.40** is allocated to the 2 lot offer partially filled in the carry

Implied pricing

example trade date 30 Jul 2018

A better spread at the top of book – implied outright volume changes

Figure 7 – rounding example



New spread order of -10.10 input is a better bid so enters at the top of book

Implied out offer volume now 3 lots, price unchanged as unrounded offer now $7012.10, which is still rounded up to nearest tick of $7012.50

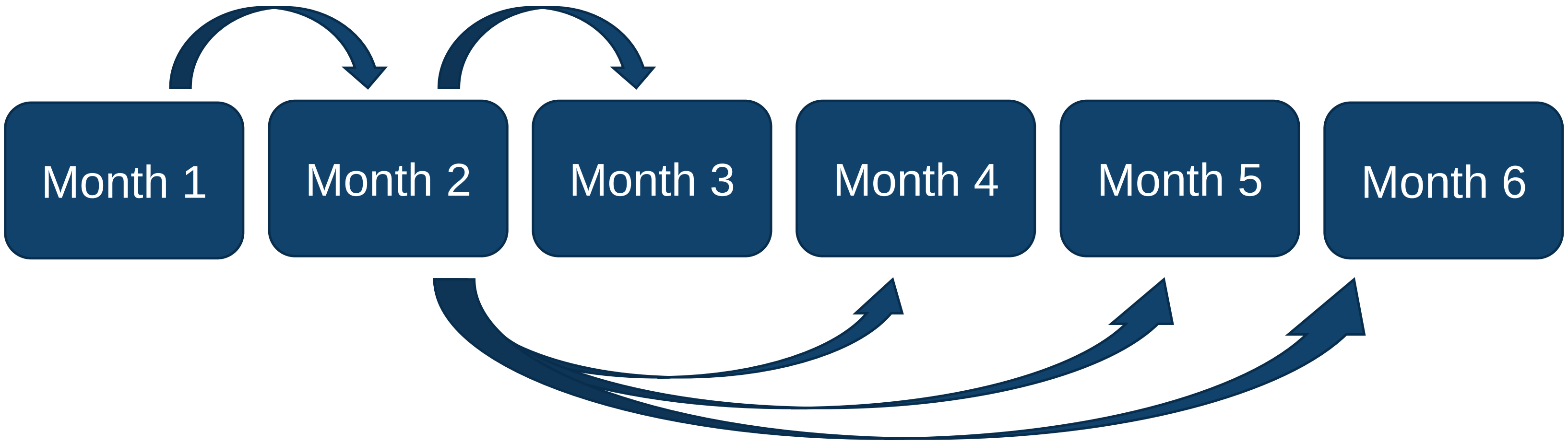
Each implied route will use the best price for each component part

This means that the volume of an implied out order may change if a new explicit spread order is entered at a better price, since one of the underlying market orders has changed

Implied Markets in Ferrous

Based on market feedback, the implied functionality was applied to ferrous contracts from July 2019

- Implied pricing functional in Steel Scrap (SC), Steel Rebar (SR), FOB China HRC (HCD), and North America HRC (HUD) contracts.
- Implied routes include months 1-2 and 2-3 for serial routes. For expanded implied pricing, months 2-4, 2-5, and 2-6 have implied routes enabled.
- All the mechanics of implied pricing work the same as have been described for base contracts.



Each implied route incorporates the combination of outright and carry orders. Carry orders have not been included in the diagram above but each implied route must include a carry connecting the two outright contracts.

Implied pricing

What next, contact

- Dependent on the success of implied pricing, and market feedback, the LME may look to introduce further implied routes in future

- The LME may, at its sole discretion, enable further implied routes or disable implied routes, at any point in time and without notice

- Trading in relation to implied prices shall be conducted pursuant to the LME Rulebook, as it applies to current LMEselect activities

Any questions, please contact: **impliеds@lme.com**

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