ASX 3 Year Treasury Bond Futures Minimum Tick Increment

Consultation Paper
September 2024

Invitation to comment

ASX is seeking submissions on this consultation by Friday, 8 November 2024.

Submissions should be sent to:

E rates@asx.com.au

Office of General Counsel
ASX Limited
20 Bridge Street
Sydney NSW 2000

ASX prefers to receive submissions in electronic form.

If you would like your submission, or any part of it, to be treated as confidential, please indicate this clearly. All submissions will be provided to regulators on request. Submissions may also be published on the ASX website, unless they are clearly marked as confidential or ASX considers that there are reasons not to do so.

ASX is available to meet with interested parties for bilateral discussions on the ASX 3 Year Futures minimum price increment.

Contacts

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Contents

ASX 3 Year Treasury Bond Futures Minimum Tick Increment – Consultation

September 2024

Executive Summary

The purpose of the paper is to seek feedback regarding the minimum price increment ('tick' size) of the 3 Year Treasury Bond futures (the 3 Year Contract).

ASX invites submissions on the questions set out in Section 3 of this paper.

We are taking a multifaceted approach to consultation by seeking written feedback through a public consultation process and also engaging via working groups and bilateral meetings. Stakeholder feedback is integral to ensure that we reach the optimal outcome for the market.

When providing your feedback, we ask you to consider the broader implications for your business and provide feedback that accounts for the various internal stakeholders within your organisation.

Please provide written feedback by Friday, 8 November 2024.

If you would like to discuss the consultation further, please do not hesitate to contact ASX (contact details on page 2).

Overview

ASX has issued this consultation paper to collect views, comments and opinions from market participants on the appropriate minimum tick size for ASX's 3 Year Treasury Bond Futures Contract. The specific questions are summarised in Section 3. Feedback is most helpful if you:

1. Respond to the question stated;
2. Indicate the specific question to which the comment relates;
3. Contain a clear rationale; and
4. Describe any alternatives ASX should consider.

Key points:

- The minimum tick increment was increased from 0.5bp to 1bp for outright trades in October 2022 following the removal of the RBA's Yield Curve Control (YCC) measures and deterioration in order book volume over multiple months in 3 Treasury Bond futures.
- The minimum tick increment was widened in response to changing market conditions noting that the impact of the wider tick increment would be monitored to determine whether the narrower tick could be re-introduced without being detrimental to overall liquidity and tradability of the contract.
- The data shows recovery of order book levels both at top of book, depth and throughout the trading hours of the day session.
- Night session volumes (as a percentage of Day session volumes) are currently elevated in comparison to pre-pandemic levels.
- Average trade size has restored but not to pre-pandemic levels.
- Implicit spread (as measured by Quantitative Brokers) shows a decrease in price volatility and elevated cost impact.

The paper is structured as follows:

- Section 1 provides background and overview of ASX's role, 3 Year Treasury Bond futures minimum tick size and measures of liquidity.
- Section 2 examines data across various liquidity measures.
- Section 3 contains Consultation questions
- Section 4 Appendix including comparative analysis of competing futures contracts (microstructure and fees).

Background

1.1. ASX's Role

One of the roles of a securities exchange is to facilitate high quality price discovery for the market through optimal bid-offer spreads and striking the balance between transaction cost and having sufficient depth in the order book. One of the strategies that an exchange can employ to optimize the efficient functioning of a contract is the calibration of the minimum tick increment (the minimum change in price of a trading instrument). The minimum tick size seeks to balance liquidity and price discovery.

If the tick is too large, crossing the spread becomes expensive, leading to increased queue sizes and favouring participants with faster connectivity. It also decreases the effectiveness of price discovery. Where the tick is too small, liquidity becomes scattered across multiple price points which has the effect of discouraging liquidity providers and hence depth within the order book.

ASX monitors the microstructure of all its derivative contracts on a continuous basis to ensure the structure is best fit to serve the market. As market operator, facilitating visibility of price discovery and efficient transfer of risk are integral to what we do.

1.2 Overview of ASX Treasury Bond Futures and Liquidity

3 Year Treasury Bond Futures

ASX's 3 Year Treasury Bond Futures are the benchmark derivative product (along with 10 Year Treasury Bond Futures) for investors trading and hedging medium to long term Australian dollar interest rates. The product acts as an anchor point on the curve for spread and legged trading.

3 Year Minimum Price Increment

The 3 Year minimum price increment ('tick' size) has been amended over time as market conditions have evolved (see appendix Table 2). Most recently, following the removal of the RBA's YCC in November 2021, a deterioration in top of book bid and offer volume and market depth was noted in the 3 Year futures contract. In October 2022, ASX increased the minimum price increment on the contract from 0.5 to 1 basis point for outright trades to support a better balance between liquidity at each price point and optimal spreads for the prevailing market conditions[1].

Measurement of Liquidity

The Committee of the Global Financial System defines liquidity as 'the ability to rapidly execute large financial transactions at low cost with limited price impacts'[2]. Data is provided in this paper to represent different facets

[1] The minimum price increment is reduced to 0.2 basis points during the 5 days prior to contract expiry.
[2] CGFS Papers No 55 Fixed Income Market Liquidity, January 2016

of liquidity, including trade-based measures (Average Daily Volume, Trade Size and Slippage) and order-based measures (top of book and depth) as well as 'Implicit Spread' which seeks to define the market's implied spread[34]. We include data for the 10 Year Treasury Bond Contract to control for changing market conditions.

[3] Nongchao Li and Shankar Narayanan. Tick Size changes in ASX 3-Year Futures and its impact on microstructure variables. Technical report, Quantitative Brokers, March 2023

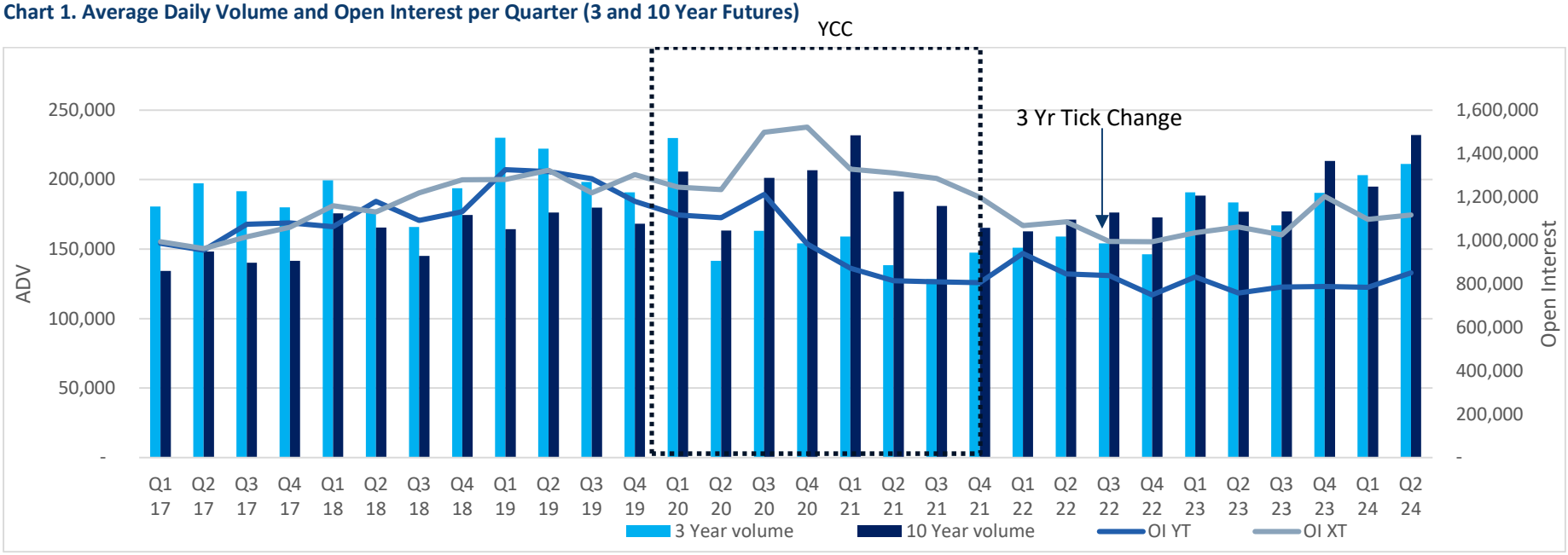
[4] Khalil Dayri and Mathieu Rosenbaum. Large tick assets: Implicit Spread and optimal tick size. *Market Microstructure and Liquidity*, 1:1-1, June 2015

2. Data Analysis

This section presents a set of data to show the evolution of activity and liquidity in the 3 and 10 Year Treasury Bond Futures Contracts. Traded volume, trade size and order book data are sourced from ASX. To provide different perspectives on liquidity, ASX have worked with Quantitative Brokers to provide slippage and implicit spread.

Average Daily Volume and Open Interest

Chart 1. Average Daily Volume and Open Interest per Quarter (3 and 10 Year Futures)



SOURCE: ASX

2.1. Order Book Volumes

Chart 2. 3 Year Top of Book Volume (Daily Average per Quarter)

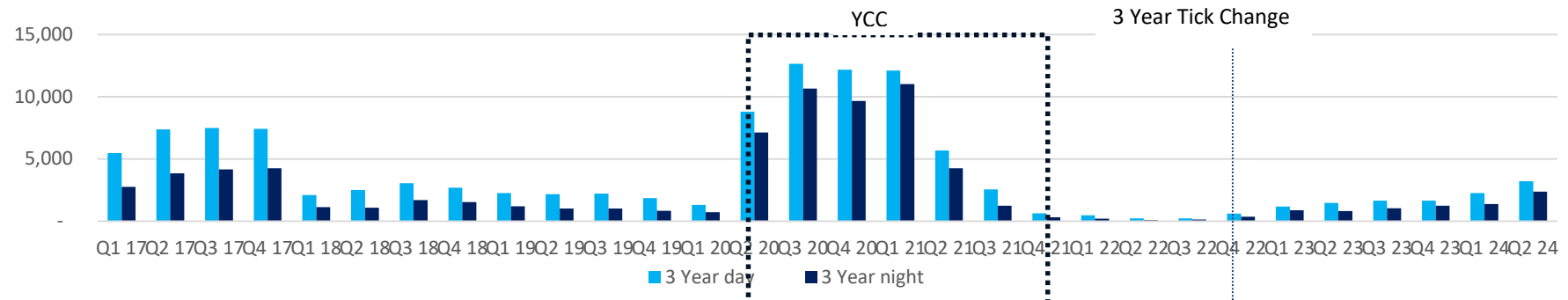
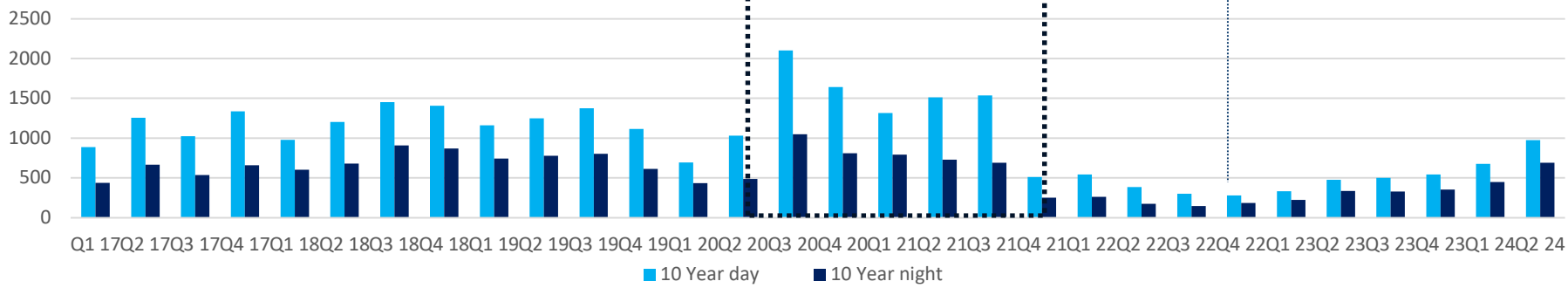


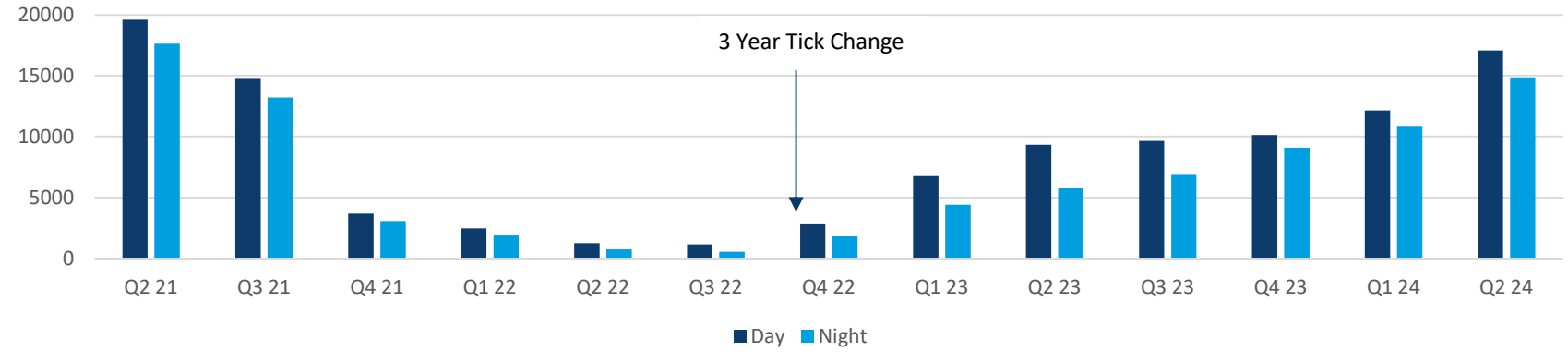
Chart 3. 10 Year Top of Book Volume (Daily Average per Quarter)



Source: ASX

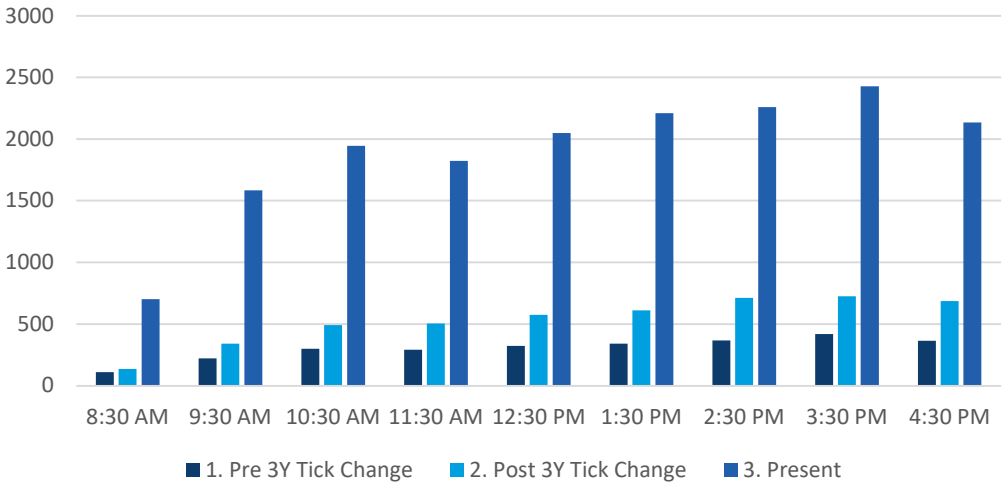
Please note: the Y axis scales differ between charts 2 and 3.

Chart 4. 3 Year Order Book Depth (Top 5 Price Points)



Source: ASX

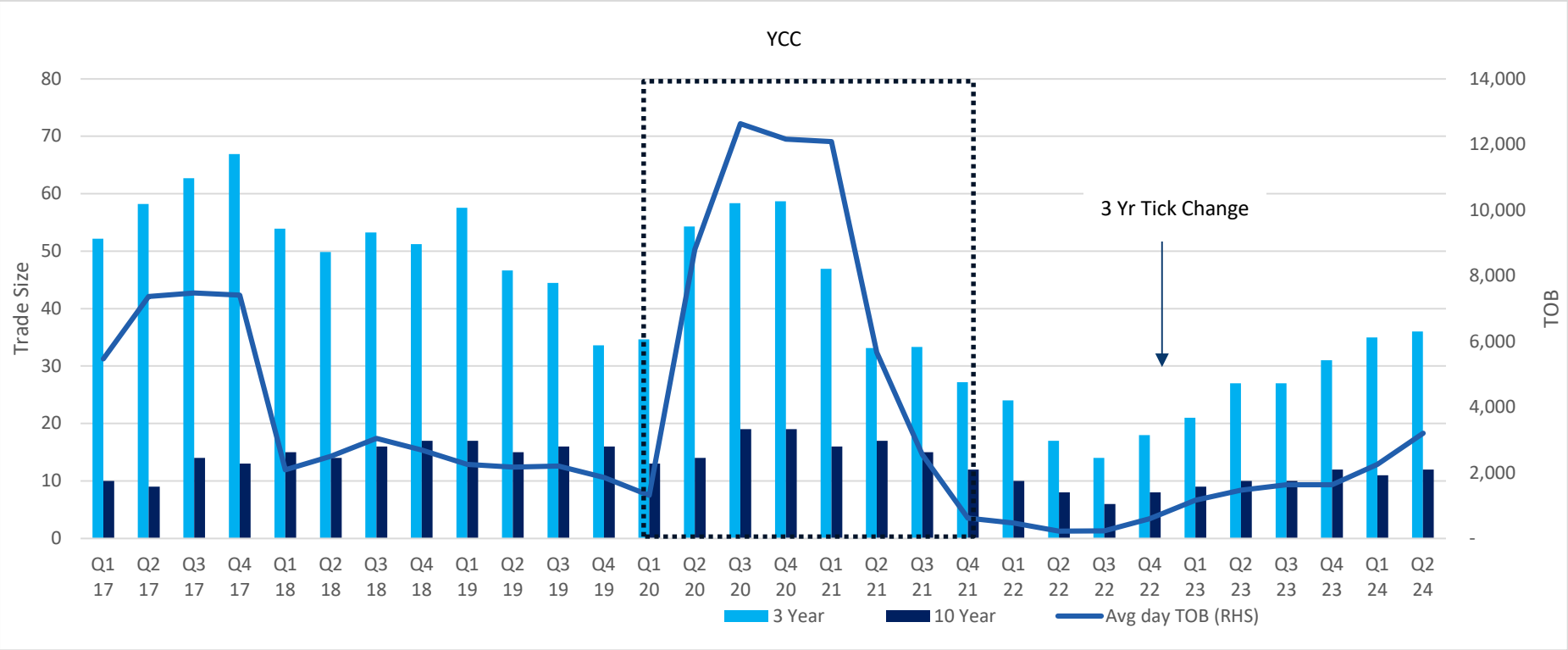
Chart 5. 3 Year Top of Book (Spot Contract Only) by time of day (average over June 2024)



Top of book volumes have restored across all times of day including pre-Tokyo open which was a particular source of concern prior to the tick increase.

2.2. Trade Size

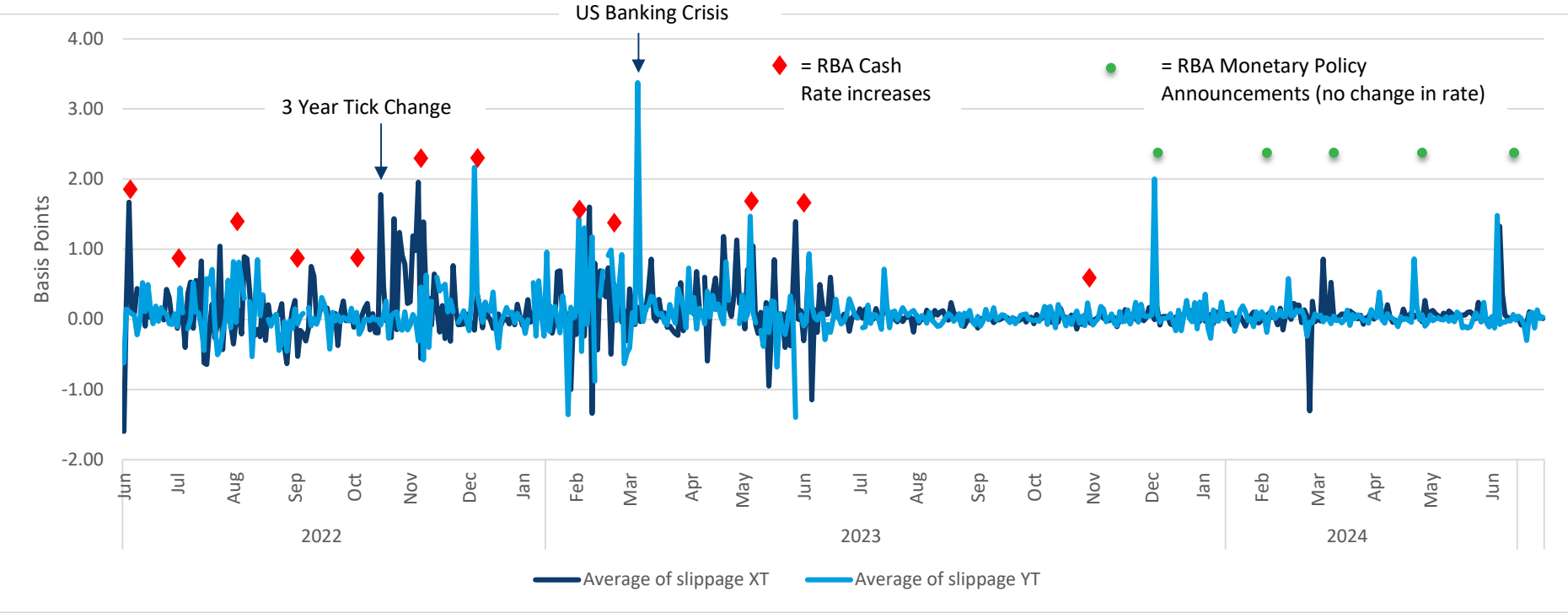
Chart 6. Average Trade Size by quarter overlaid with 3 Year Top of Book Volume



SOURCE: ASX

2.3. Slippage

Chart 9. Price Slippage. Pre-tick Change to 30 June 2024



Source: quantitative Brokers (BOLT price algorithm), market orders only for all outright (spot and deferred) trades. Weighted average by date. Slippage = side *(exec price – arrival price), where side =1 for buy and -1 for sell

Slippage is defined as the extent to which an order is executed at a price away from the price requested and is an implicit cost of trading.

The above chart shows the impact of bond market volatility during second half of 2022 and first half of 2023. There is no conclusive evidence suggesting that slippage either improved or deteriorated following the tick change. The data also suggests that algorithmic trading and execution adapted quickly to the tick change.

2.5 Implicit Spread

An increase in volume at the top of book is positive for the overall liquidity of the contract, allowing participants to get filled in size and in a timely manner. It should also be noted, however, that much higher volume at top of book can manifest itself as bid-ask bounce activity (i.e. price is bouncing back and forth within a range which is between the bid and ask price, but no movement in price is achieved), inhibiting price discovery and causing queues on the order book.

As bond futures tend to be large tick assets (i.e. bid-ask spread equal to one tick), it is useful to have a way to quantify the market's implied view of spreads. Quantitative Brokers use a measure called 'Implicit Spread' to bring this concept to life[5]. Implicit spread is measured as a fraction of the minimum tick increment and indicates the number of price continuations over alternations in a fixed time window.

The below table shows changes in spread and Implicit Spread. The indicator 0 denotes data prior to the tick change, 1 denotes post tick change.

Table 1.

Instrument	Ind	Spread	Implicit spread
XT	0	0.005	**0.23%**
XT	1	0.005	**0.14%**
YT	0	0.005	**0.39%**
YT	1	0.010	**0.15%**

What does the implicit spread tell us?

Implicit spreads of over 30% suggest more volatility i.e. a lot of movement between price points. In September 2022, prior to the minimum tick increase, the implicit spread was 0.39% of tick size (0.5bp) (see Table 1). This suggests higher price volatility than usually seen in the 3 Year Treasury Bond futures. Liquidity in the order book at that point in time was suppressed and the data suggests that this was causing orders to work through multiple price points to be filled, hence the volatility in price.

Following the minimum tick increase the implicit spread has fluctuated between 0.15% and 0.22% of new tick size (1bp), suggesting less volatility. This could imply that orders are sitting in the queue for longer periods and are then having to cross the spread twice to get filled.

Implicit Spread Liquidity Definition

η (Robert, Rosenbaum, and Dayri), is especially effective for large-tick instruments. It measures the optimal tick size with the expression:

$$\eta = \frac{N_c}{N_a}$$

where N_c stands for the number of price continuations, and N_a the number of price alterations over a fixed time window. A continuation-alteration balance of the underlying price is struck when η = 1, indicating that an optimal spread is achieved. When too much liquidity is provided on both sides, traders are prevented from trading across price levels, leaving the market dominated primarily by bid-ask bounces, and thus resulting in too many price alterations, i.e. a small η; similarly, insufficient liquidity would result in a larger η[6].

[5] Nongchao Li and Shankar Narayanan. Tick Size changes in ASX 3-Year Futures and its impact on microstructure variables. Technical report, Quantitative Brokers, March 2023

[6] Khalil Dayri and Mathieu Rosenbaum. Large tick assets: Implicit Spread and optimal tick size. *Market Microstructure and Liquidity*, 1:1-1, June 2015

2.6 Summary of Data Analysis

Trade Based Measures

3 Year Treasury Bond futures average daily volume (ADV) decreased 1% between Q4 2021 (end of YCC) and Q3 2022 (immediately prior to increase in price increment). Since the change in minimum price increment ADV has increased, growing 40% since Q4 2022. 10 Year Treasury Bond futures ADV increased by 5% following the end of YCC to Q3 2022, and then increased 34% between Q4 2022 and Q2 2024.

Open interest has remained flat for 3 Year Treasury Bond futures since the increase in minimum price increment (to end Q2 2024), whilst 10 Year Treasury Bond futures Open interest has grown by 12%.

Average trade size has restored but not quite to pre-pandemic levels. For the two years prior to the pandemic, trade size was an average of 50 contracts whilst for the two years post pandemic the trade size has averaged 22 contracts. In Q1 and Q2 2024 the average trade size has been 35 and 36 respectively.

Quantitative Brokers slippage data shows no conclusive evidence that slippage either improved or deteriorated following introduction of the wider minimum tick increment.

Implicit Spread data suggests less volatility in price with the possible implication that orders are sitting on the order book for longer periods of time. When the spread is crossed, the cost impact is twice that of prior to the widening of the minimum tick increment.

Order Based Measures

Order book levels both at top of book and depth (to 5 price points) in the 3 Year Treasury Bond futures have regained levels consistent with those seen during the 2 years prior to the pandemic. Average top of book for Q2 2024 was 3,200 lots. 10 Year Treasury Bond futures have increased more slowly than the 3 Year Treasury Bond futures, although top of book levels are showing increasing levels over recent quarters (average of 972 lots in Q2 2024).

For 3 Year Treasury Bond futures, night session volumes as a proportion of total volume are slightly elevated in comparison to pre-pandemic levels. Over the last 4 quarters, order book sizes in the night session have been 40% of total volume. For the 4 quarters prior to the pandemic, this average was 30%.

3. Consultation

3.1. Scope of Market Consultation

The purpose of the consultation is to identify opportunities to optimize the efficient functioning of the 3 Year Treasury Bond futures contract for market participants. The following section outlines the potential benefits and risks of implementing a reduction to the minimum price increment. This is followed by a set of questions to collect your preferences and supporting arguments.

Where a change to the minimum price increment is deemed appropriate, ASX will arrange for changes to ASX 24 Rules Procedures and implement the change and provide appropriate time required for operational readiness.

3.2. Out of scope

This consultation focuses on the 3 Year Treasury Bond futures contract. As part of this consultation, ASX is not seeking feedback on minimum price increments on any other ASX Interest Rate derivative products including the roll or other product options including:

- **Block Trading in the day session (to be discussed separately)**
- **Maintenance of wider ticks during the roll period for outright trading (survey recently completed)**

3.3. Comparative Analysis

ASX has collated information on minimum price increments and fees for comparable international products, located in *Appendix A* of this paper. The following exchanges are included: CME Group (CME), Montreal Exchange (TMX), Eurex Exchange (Eurex), ICE Europe Exchange (ICE), and Japan Exchange Group (JPX).

3.4. Minimum Tradeable Tick Increment

Potential benefits and risks of reduced tick increment
Potential benefits of a reduced tick increment • May reduce total cost of execution, provided there is sufficient liquidity at the top of the order book / in the order book to minimize slippage. • May encourage participants with open positions to cross the spread rather than passively work bids or offers, resulting in a more timely outcome for open position holders. • May introduce additional trading opportunities through the provision of additional tradeable price levels. • A reduction in the tick increment may reduce top of book volume and consequently reduce the potential for the order book to lock up. **Potential risks** of a reduced tick increment • A reduced tick increment may reduce the attractiveness of liquidity provision in the product, and thereby reduce overall liquidity in the order book. • As the 3 Year Treasury Bond futures act as an anchor on the curve, loss of liquidity providers in the order book may also have a flow-on impact to adjacent contracts, particularly the 90-Day Bank Accepted Bills futures and to a lesser extent the 10 Year Treasury Bond futures.

- Reduced liquidity may result in less available volume in the order book, increasing potential for price slippage and volatility.
- Following a change in tick increment it can take time for liquidity providers to adjust to market structure changes, resulting in reduced market participation for a period of time and potential impact to levels of order book liquidity.

3.5. Consultation Questions

Note: Currently system configuration only allows minimum price increments up to 3 decimal places, e.g. 0.005% is configurable, whilst 0.0025% is not.

Consultation Questions

1. What is your preferred tick increment for the 3 Year Treasury Bond futures? Please explain your reasons.
2. Please explain how a 1bp or a 0.5bp minimum tick increment impacts different constituents across your business(es) / organisation.
3. Please tell us whether reduced liquidity in the order book would reduce your willingness / ability to trade.
4. How would your trading behaviour adapt to lower provision of on-screen liquidity?

If there is less liquidity at top of book and greater depth of book, there is the increased chance of price slippage.

5. Does this concern you or reduce your willingness / ability to trade?
6. Do you prefer a tighter bid / offer over increased certainty of being filled at a level?

Order Book dynamics

7. Do you think the dynamics of the order book have changed i.e. less resting liquidity / more algorithmic execution models?

Market Quality Indicators

8. What impact do you think a narrower minimum tick increment would have on market quality broadly, or more specifically for:
   a) Liquidity provision
   b) Price formation
   c) Top of book volume
   d) Efficient functioning of the contract
   e) Execution efficiency
   f) Liquidity in other contracts on the curve
   g) Tradeability of other contracts on the curve

4. Appendix

Appendix A: International Microstructure Comparisons

The following table provides a high-level summary of the comparative analysis across the following exchanges: The CME Group (CME), Montreal Exchange (TMX), Eurex Exchange (Eurex), ICE Europe Exchange (ICE), Japan Exchange (JPX) and ASX.

Global Exchange Contract Specifications

	CME	TMX	Eurex	ICE	JPX	ASX
Product	US Treasury Note Futures	Canadian Government Bond Futures	German Bond Futures	UK Gilt Futures	Japanese Government Bond Futures	Australian Treasury Bond Futures
Minimum tick increment	0-00$\frac{1}{8}$- 2yr 0-00$\frac{1}{4}$ – 5yr 0-01 64ths – 10yr 0-01 32nds - 30yr	0.005- 2yr 0.01- 5yr 0.01- 10yr 0.05- 30yr	0.005-Schatz 2yr 0.01- Bobl 5yr 0.01- Bund 10yr 0.02- Buxl 30yr	0.01- 10yr	0.01- 10yr	0.01- 3yr 0.005-5yr 0.005- 10yr 0.005- 20yr
Face Value: 2 YR	$200,000 USD	$100,000 CAD	€100,000 EU			$100,000 – 3 yr
5 YR	$100,000 USD	$100,000 CAD	€100,000 EU			$100,000 - 5 Yr
10 YR	$100,000 USD	$100,000 CAD	€100,000 EU	£100,000	¥100,000,000	$100,000 – 10 yr
30 YR	$100,000 USD	$100,000 CAD	€100,000 EU			$65,000 – 20 yr
Dollar value per tick (converted into AUD equivalent)	$12.01 $12.01 $24.03 $31.25	$5.61 $11.23 $11.23 $56.17	$8.19 $16.39 $16.39 $32.78	$18.86- 10 yr	$95.00- 10yr	$29.08- 3 yr $21.38- 5yr $43.84-10 yr $40.64-20 yr
Tick value / face value (bp)[7] 2 YR	0.60	0.56	0.81			2.90
5 YR	1.20	1.12	1.63			2.13
10 YR	2.40	1.12	1.63	1.88	9.5	4.38
30 YR	1.90	5.61	3.27			4.06
Tick value / current contract value (bp) 2 YR	0.38	0.48	0.45			2.74 3yr
5 YR	0.73	0.90	0.85			2.34 5yr
10 YR	1.43	0.84	0.76	1.02	0.69	3.84 10yr
30 YR	1.43	3.13	1.54			6.70 20yr
Lit Market Exchange Fee for end user / client (AUD)*	1.00	0.56- 2yr 0.92- 5yr	0.41	0.33	1.38	0.9

Source: Bloomberg. (Data and AUD conversions as of June 2024).
*https://www.cmegroup.com/company/clearing-fees.html; https://www.m-x.ca/en/trading/programs/fees-and-incentives; https://www.eurex.com/ex-en/trade/transaction-fees; https://www.ice.com/publicdocs/IFEU_Exchange_Clearing_Fees.pdf; https://www.jpx.co.jp/files/ose/f/public_comments/65/wysiwyg/050125a_3.pdf;

Minimum Tradeable Tick Increment and Dollar Value

When comparing the minimum tradeable increment, it should be noted that most global exchanges' bond futures contracts have a different price quotation approach to ASX Bond Futures. ASX Treasury Bond Futures are quoted on a

[7] Bid-offer spread as a proportion of contract face value identifies the cost to obtain exposure based on face value.

yield basis while global equivalents are quoted on a capital price basis. For ASX's Bond Futures contracts a 1 basis point move is equivalent to a 2 to 3 dollar move in terms of capital price.

For example, in the 3 Year Treasury Bond futures contract, a 1 basis point move is a move over two price points of the minimum 0.50bp increment. As a result, this is not a 1:1 comparison as the equivalent dollar value per exchange varies depending on each individual pricing formula. The dollar value per increment has been converted into Australian dollars to assist in the comparison of the relative cost associated with crossing the minimum tradeable increment.

Appendix B: Historical Changes to the 3 Year Treasury Bond Future Minimum Tick Increment

Markets change over time, and therefore market structure needs to continually evolve to ensure efficiency in operation. ASX has delivered several market structure changes to the Bond Futures contracts as shown in the table below. These changes were implemented following feedback from market users collected via formal and informal consultations as well as interest rate working groups.

Table 2. The following table provides a timeline of significant developments since 2005:

Year	Action
2005	Consultation on minimum tick increment for 3 Year Treasury Bond futures
2006	Reduced minimum tick from 1 to 0.5 basis points for 3 Year Treasury Bond futures Roll
May 2009	Tick reverted to 1 basis point
2012 - 2014	Consultation paper for 3 and 10 Year Bond Futures Roll resulted in a reduced minimum price increment from 0.5 to 0.25 basis points for 10 Year Bond Futures Roll
Oct 2015	Increased the minimum contractual period for ASX 24 Liquidity Cross Connects (LCC) gateways from 1 to 3 months
Mar 2017	Transition from SYCOM to NTP. Introduced Pre-Trade Risk Management (PTRM) limit controls
Dec 2017	Minimum tick size for 3 Year Treasury Bond futures changed from 1 to 0.5 basis points for normal trading periods.
Sep 2019	Implementation of PTRM rule amendments to limit the number of message rejects
Oct 2022	Increased minimum tick from 0.5 to 1 basis points for 3 Year Treasury Bond futures