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Australian Securities and Investments Commission (ASIC) 3rd September 2024

Level 5, 100 Market Street, Sydney, 2000

Dear Sir/Madam

RE: Response to "Reassessing the case for central clearing of bonds and repos in Australia" – Consultation Paper by the Council of Financial Regulators (July 2024)

My name is Assoc. Prof Rand (Kwong Yew) Low. I am an Associate Professor of Quantitative Finance at Bond University, and an Honorary Associate Professor at the University of Queensland. I am joined by my mentor and associate, Professor Emeritus Terry Marsh of the Haas School of Business, University of California Berkeley (also a University of Queensland alumnus).

Thank you for drawing our attention to the consultation paper on bond and repo clearing: Central Clearing of Bonds and Repos , and requesting our submission in response to the questions raised by ASIC. "For lack of guidance a nation falls, but victory is won through many advisers" (Proverbs 11:14), thus, we are pleased that ASIC welcomes a diversify of responses to their consultative paper, including that of academe. We have put together a quick draft of our thoughts upon the issue and welcome any further queries from ASIC regarding our submission.

Prof. Marsh and I have slightly different approaches to analysing and understanding the benefits and costs of central clearing of bonds and repos. I have summarised by understanding of the consultative paper in Section 1. Section 2 of this letter will begin with my analysis of the matter, followed by Prof. Marsh's thoughts of the matter in section 3.

Thank you,

Regards,

Assoc Prof. Rand (Kwong Yew) Low

Prof. Terry Marsh

1. Summary of case for central clearing of bonds and repos in Australia

ASIC is reviewing centralised clearing of bonds and repos in Australia primarily due to "substantial growth in the underlying markets" and "structural change to the composition of market participants". The public consultation performed by the RBA on the issue was in 2015. A summary of changes to the market since then are as follows:

- **Australian bond market has grown.** It has grown from $175 billion in $380 billion (2015-2023) which means it has doubled within 8 years purportedly due to COVID-19 financial exigencies.
- **More international buyers of AGS and semis.** Use of international central security depositories (ICSDs) and growth of non-residents from $275 billion to $400 billion (2015-2023).
- **Private market for Australian bond and repos has grown.** Commercial banks use of AGS and semis have doubled from 2015-2023. Top 15 participants in interbank market account for greater than 90% of potential netting benefits.
- **Research and changes in clearing rules from financial regulators in other countries.** The Financial Stability Board, Federal Reserve Bank of New York, Bank of Canada, and Bank of England have recommendations and conducted research indicative that central clearing can enhance market functioning during stress events. In 2023, The US Securities and Exchange commission has adopted rule changes to increase clearing of US Treasury securities transactions in

Benefits of Centralised Counterparty (CCP) are as follows:

- **Novation**. Novation results in a reduction in the size of outstanding obligations, leading to savings in liquidity and collateral requirements.
- **Reduction of Credit Risk**. Centralizing clearing with a single operator can enhance the management of default risks across the market.
- **Reduction of Operational Risk**. Centralized clearing reduces operational risks for market participants by consolidating them under one operator.
- **Focal Point of Regulation and Oversight**. Having a single point of record/transactions through central clearing facilitates regulatory monitoring and oversight, enhancing risk management.
- **Market Adoption of Delivery-Versus-Payment (DvP) Basis**. The adoption of DvP by most market participants minimizes settlement chains, as participants borrow securities to fulfill obligations within settlement cycles.

Risks of CCP are as follows:

- **Reduced market flexibility.** The presence of a CCP can lead to a standardized, uniform approach, potentially impacting market dynamics. This uniformity may result in reduced trade and transaction flexibility, as well as liquidity constraints.
- **Greater systemic risks.** When all market participants adhere to a single set of rules enforced by the CCP, there is a risk of increased systemic vulnerability. During stressed conditions, uniform behaviour across participants could create a "single-point-of-failure."
- **Operational dependency on CCP.** Market participants might rely heavily on the CCP's risk management processes, potentially diminishing the robustness of their own risk management practices.

- **Costs of joining and maintaining access to CCP.** Introducing a CCP can bring economic and bureaucratic overhead. If the benefits for the market are minimal, this could increase costs for lending and borrowing across the entire market.

2 Assoc. Prof. Rand Low's analysis

I have professional experience working for Bank of America Merill Lynch and BlackRock leading quantitative research & model development teams in trading strategy, portfolio optimisation, regulatory/economic capital estimates, and risk management. I will approach this consultative paper based on my industry and academic experience.

My approach for analysing complex financial issues (i) use an everyday analogy (ii) theoretical considerations for market regulation (iii) quantitative framework for modelling the financial risks (iii) Potential solutions. From my professional and academic experience, explaining and resolving complex financial issues to a well-educated but non-specialist audience of executives is well-served by such an approach of using an everyday analogy.

2.1 Everyday analogy: Pay-day loans

Repo market.	**Pay-day loans.**
The repo market facilitates short-term borrowing and lending for financial institutions that need liquidity (i.e., cash) for operations or prudential liquidity requirements, and other financial institutions that have excess funds. Financial institutions that need liquidity post collateral in the firm of AGS or semis to other financial institutions (including the RBA) and agrees to repurchase them for a higher price at a later date. This higher repurchase price from the borrower to the lender incorporates the interest rate for the loan over its tenure. Settlement chains/circles can occur in repo markets where the same security is bought or sold multiple times in a single day without clearance. It is possible that in this situation no participant in the settlement chain/circle has the security required to facilitate settlement.	Everyday Aussie battlers who need cash to pay for bills (e.g., groceries, fuel) and do not have adequate funds until their next pay day will go to a pawn shop (e.g., Cash Converters) with an item of value (e.g., Rolex watch of AUD5,000). The pawn shop values the item (e.g., Values Rolex watch for AUD4,000) and provides cash-in-hand to the Aussie battler that is lower than the value of the item itself (e.g., provides cash of AUD3,000). The Aussie battler enters an agreement with the pawnshop will buy back the item of value at a higher amount at a later date (e.g., pawner will buy back the Rolex watch at AUD4,500 in 2 weeks time). The difference between the amount being repaid and the amount of cash-in-hand being provided is the interest on the loan. If the pawner doesn't come back for his item of value, the pawnshop is able to sell the item to another client. Issues such as settlement chains/circles are unlikely to happen in the pay day loans market. Such a situation would be analogous to the pawner saying he has a Rolex at home, but doesn't give it to the pawnshop but provides an IOU instead, and then the pawnshop going to another lender and providing an IOU to exchange for cash instead of the Rolex, and this

	process repeating itself several times in a single day.

Often financial professionals can complicate market dynamics and claim that the size of transactions result in systemic risks, therefore requiring greater regulatory oversight and centralisation of transactions (i.e., CCP) for transparency. I find that comparing this to an everyday example provides clarity of mind:

- Would we expect the government to intervene an insist that all pay day loans need to be centrally cleared?
- Does the government need to intervene by stating on a central register or record what items are being held for collateral on the pay-day loans market, how they are being valued and what interest rates are being charged?
- Is there any danger that the company which accepts the items for collateral will misvalue that collateral in the pay-day loans market? Is this under the purview of the government or regulator to ensure this doesn't happen?
- What if the collateral is used in a settlement chain/circle in a pay day loans market (if it could exist)? Would a government/regulator need to intervene?

In my view, centralisation of transactions via a CCP is a form of regulatory oversight. My answer all of the above is "no". There is no compelling reason as why you would need/want centralised clearing for the pay-day loans market. Therefore, similar logic applies to the repo market. Thus, I continue my analysis on theoretical reflections on when market conditions require regulation is required, and a quantitative risk modelling approach to validate use of a CCP for the repo market.

2.2 Theoretical reflections on CCP and further regulation for the repo market

- Why would centralised clearing of these repos (i.e., a central register transaction data, buyer information, seller information, item valuations, date of transactions, etc.) need to be performed? Should we expect regulatory frameworks to be designed and enforced by the government/regulator? Are the free markets able to self-regulate without using a CCP?
- Standard economic theory states that market regulation is required in situations whereby (i) monopolies exist (ii) externalities (iii) information asymmetry (iv) anti-competitive behaviour (v) ensuring continuity and availability of services.
    - **Monopolies existing.** Has the regulator detected the possibility of monopolies occurring on the repo market?
    - **Externalities.** Has the regulator detected any negative externalities due to an OTC repo market on other 3rd parties?
    - **Information asymmetry.** Has the regulator any reason to believe that the financial market participants' do not misvalued the underlying AGS and semis being traded? An information asymmetry problem can occur in the settlement chain/circle scenario as financial market participants do not know if the counter party has the security to settle the transaction. However, this can be resolved using already available technology to clear trades. Furthermore, participants in the repo market are sophisticated investors that should perform adequate due diligence before entering a trade. A failure to perform adequate due diligence is a risk management failure of the market participants, and not an issue that a regulator should manage away on behalf of market participants. However, the regulators are entitled to request that

all market participants provide proof of their risk management processes in dealing with the repo market, settlement, and valuation of AGS/semis.
    - **Anti-competitive behaviour.** Does ASIC believe that collusion, fraud, or other types of anti-competitive behaviour is occurring in the repo market?
    - **Ensuring continuity and availability of services.** During times of economic distress, it is possibility that there is a "dash for cash" and liquidity constraints may ensue. However, in such a situation the RBA can act as a lender of last resort to calm financial markets and be beacon of stability.

2.3 Quantitative risk modelling framework

- What type of risks are we specifically looking to mitigate? Systemic risks?
- During periods of economic distress, it is reasonable to expect the number of repos/payday loans to increase; however, would such a situation lead to a systemic crisis?
- Has such a systemic crisis occurred in the past in Australia? Has such a systemic crisis occurred in other countries?
- When did these events occur? Why did these events occur?
- What are the probabilities of such events occurring?
- Are those risks worth mitigating due to the increased bureaucratic costs for oversight?
- What are these bureaucratic costs? How do we model them? What is a quantitative modelling framework for doing so?
- Can we model the expected loss during a hypothetical systemic crisis?
    - Recommendation: Use a Value-at-Risk (VaR) or Conditional Value-at-Risk (CVaR) estimate? See Low (2018) and Low et al. (2013).
    - A basic framework is to model the expected outcome based upon (i) the probability of the event occurring (e.g., historical frequencies, a parametric model fit) (ii) estimated loss (e.g., historical losses, parametric model fit)
    - Generate a Monte-Carlo simulation if a parametric model fit is being applied.
    - Select an appropriate risk level (e.g., 99% or 95% VaR or CVaR).
    - The expected loss (i.e., probability of event occurring x projected loss function) provides an estimate of an upper limit for the bureaucratic cost/overhead of using a CCP to ensure continuity and availability of services during a liquidity crisis caused by a period of economic distress.
    - Alternatively, review the Basel framework for operational risk as an alternative quantitative risk modelling framework.
    - If there is a large VaR/CVaR estimate ensues, that may be used to support use of a CCP for the repo market.

2.4 Responses to questions

1. **Have the potential benefits of central clearing the Australian bond and repo markets increased in recent years? What costs/benefits do you view as being the most relevant for consideration of central clearing in the Australian bond and repo markets?**

I do not see any clear benefits of CCP as the consultative paper did not give a strong rationale for having one aside from a doubling of transaction volume, more foreign market participants, and additional rules being implemented by regulators from other countries. My view is imposing a CCP is similar to additional market regulation as all market participants will have to adhere to the requirements of the CCP in order to trade, clear and settle any trades.

I recommend that ASIC consider the theoretical reflections that I have described on when a need for greater market regulation is required and whether any of the situations have highlighted above have occurred on the repo market.

There are some economic benefits of novation, but sophisticated investors participate in the repo market, thus each market participant should have rigorous in-house valuation and transaction record systems to minimize over-collateralization.

As there is no risk framework provided in the consultative paper, ASIC should consider using a quantitative modelling framework to of expected loss using Monte-Carlo simulation and an appropriate CVaR/VaR estimate to quantify whether the potential risk during a systemic risk situation is worth the additional economic and bureaucratic overhead of having a CCP.

2. **What do you consider to be the minimum product scope and participation necessary to support effective central clearing in Australian bond and repo markets? Do you envisage any issues arising if a prospective CCP was to clear for a single segment of the market (e.g. bonds only or repos only)?**

For the additional cost and overhead of having a CCP, it should centrally clear both bonds and repos. There will be certain transaction minutiae which will be different for bonds and repos, but these can be easily overcome.

I recommend contacting the Australian Bond Exchange for a proposal of costs to act as a CCP with their existing fixed income trade clearing and settlement technology.

3. **Under what conditions would you participate in a bond and repo CCP if there was one servicing the Australian market?**

One that was had minimal overhead and could indicate comparable transaction costs as without having a CCP.

4. **In your experience, including with bond and repo CCPs in other jurisdictions, are there likely to be material challenges faced by the Australian market in transitioning to a centrally cleared environment and how might these be overcome?**

None aside from additional economic costs and potential regulatory overheads.

5. **What do you view as being material impediments, if any, to the safe and efficient operation of a bond and repo CCP in Australia? Please consider the effects of an extended disruption on your business (such as liquidity and risk management), as well as broader effects such as those related to financial stability and market confidence.**

By having a bond and repo CCP, there are concerns that market participants may “risk transfer” a bulk of the operational and market risk management of these transactions to the CCP. In addition, by centralising, it becomes a single-point-of-failure.

There will always be pros and cons of centralising and decentralizing a process. Generally, a decentralized approach is a market based approach where each market participant takes on board their own operational, credit, and market risk processes and manage it individually rather than depending on a regulator. A regulator can provide guidelines, or request that each market participant provide a detail list of their individual operational, credit and market risk processes for review (not approval) by the regulator. By centralizing, one can argue that regulation is agreed to

collaboratively between the regulator and market participants. However, if all market participants are behaving in a certain manner, this may blind everyone to other potential risks. Often it is the unknown unknowns that predicate exigent systemic risks. Thus a decentralised market based system with some oversight by a regulator to assess the quality of internal risk management processes is often adequate.

If severe financial exigent circumstances do occur, it is often due to unforeseen circumstances and often a reserve bank is required to provide financial stability, restore market confidence by acting as a lender of the last resort.

6. **How material are issues with settlement chains on the safety and efficiency of the Australian bond and repo markets? In your experience, what are the factors behind these issues? What steps, if any, should a prospective bond and repo CCP or its participants take to mitigate the risk of issues associated with settlement chains?**

From the consultative document, it has been described that the market has transitioned towards DvP so the issue of settlement chains seems to be irrelevant. In any case, settlement chains in essence are credit risk and transactional trust issues (i.e., transparency). The participant who is willing to accept what is essentially the "IOU" of the AGS/Semi, must trusts that the counter party has the underlying security. The repo market consists of sophisticated investors that need to have their own due diligence processes to ensure their counterparties are trustworthy. If the settlement chain is broken due to inadequate due diligence processes, that is negligence on the market participants and not necessarily requires regulatory intervention. If the concern is that such exigent market events can affect the value of the underlying AGS/semi, why would it? Take the pay-day analogy as an example. If a bunch of pawnshops kept distributing IOUs based on a Rolex watch that one of their customer's says they have at home, and when settlement occurs, they realise that none of the pawnshops actually has the Rolex watch at hand, none of this actually negatively impacts the brand or value of the Rolex watch itself. It serves to highlight a failure in the due diligence processes of each pawnshop to take at face value that the other pawnshop did have a Rolex and is able to deliver the item on settlement due date.

7. **Are there any aspects of the bond and repo markets that in your view are not functioning efficiently? For example, would enhanced transparency in bond and repo markets improve the efficiency of these markets?**

Enhanced transparency, and reduction of information asymmetry increases the efficiency of any market. One needs to recall that sophisticated investors participate in repo markets, so regulators need not be as concerned on information asymmetry. Any increase in transparency needs to be well-supported by (i) what increases in efficiency does it lead to? (ii) what are the costs of this increase in transparency (iii) why are market participants unable to have appropriate due diligence or research processes to address any information asymmetries?

8. **What actions could regulators or industry take to improve the efficiency and/or resilience of the bond and repo markets, including to reduce information asymmetry and improve price and liquidity discovery?**

If ASIC seeks to reduce information asymmetry and improve price and liquidity discovery, we have been working with on R&D with the Australian Bond Exchange (ABE) to address these issues on the corporate bond market as follows:

- **Centralized database systems.** The ABE is a market place for debt securities and focusing on being a trading solution for investors to clear and settle their trades much more efficiently and quickly compared to T+2.
- **CBDC Blockchain technology.** With the ABE**,** we have worked on the Digital Finance CRC and the RBA on the Australian Central Bank Digital Currency Pilot Project to perform Real-time CBDC bond settlements. The blockchain code written for corporate bonds can be modified to suit AGS and repos to allow settlement of these securities on the blockchain
- **Credit Risk rating systems.** Based on Michalski and Low (2024), we have developed a corporate credit prediction system with ABE on quantrand.tech. This technology can be modified as a trust predictor to evaluate the likelihood of a counter party having the underlying securities to settle a trade.

9. **Some other major jurisdictions have CCPs operating bond and repo clearing services in their domestic markets. What are your views on an overseas operator providing clearing services for the Australian bond and repo markets?**

This is not necessary as there are Australian financial services firms such as the Australian Bond Exchange that is capable of providing clearing services. Settlement and clearing is not a complicated service if what is being traded are vanilla AGS and semis. I recommend to use a domestic operator for providing clearing services.

10. **Based on your experience, including in other jurisdictions and markets, what features of an overseas-based CCP could present difficulties or introduce risks in the Australian context? How are these challenges managed in other jurisdictions and are they managed successfully?**

If there is an overseas-based CCP, and there are lawsuits that have occurred due to a breach it may be difficult to enforce based on Australian law.

11. **With the increasing internationalisation of Australian bond and repo markets, do you consider it desirable for a potential bond and repo service to have effective links to trading and settlement services, including international central securities depositories?**

I do not see how having international central securities depositories is necessary to facilitate trade of Australian AGS and semis. Australian govvies would be highly rated compared to other countries to our low levels of political risk and consistent federal and state tax revenue collection. Thus if they would like to access Australian debt securities, they can do so with Australian firms, on Australian ground.

2.5 References

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3 Prof. Terry Marsh's analysis

The seemingly never-ending dialog and prototypes for updated securities clearing and settlement hints at the complexities involved!

At the broad policy level across securities, Kyle and Marsh (1994) pointed out that centralized clearing, or at least an ideal standardized network with open access to broker-dealers and exchanges, might be better than an alternative where clearing and settlement services are provided by each exchange on which respective trades are being executed. For example, suppose that a successful contract is listed and traded on Exchange X and cleared and settled non-centrally by that Exchange X's in-house clearing corporation. In this case, Exchange X could make it more difficult for say Exchange Y to develop a competitive product which could be arbitraged against X's listings and thus enhance its execution attractiveness.

Arguably "the business of the clearing and settlement business" is reliable plumbing, the technology infrastructure. In the extreme where network plumbing has become completely distributed and inter-operable with database and API connectivity (and *sans* concomitant cyber-security issues), the boundaries of firms in Coase's famous analysis are increasingly blurry.

Moreover, especially in the case of securities clearing and settlement, the choice of technology and function don't proceed with a blank slate. Rather, they sit on top of a hodge-podge of legacy systems which were once themselves at the bleeding edge of innovative solutions.

The historical context for U.S. securities clearing is well discussed in Geis (2023):

> [T]he current, second-generation stock settlement system led to entrenched centralization. This did not happen by accident, of course, but was the key design feature of the solution. As we have seen, the cure to Wall Street's [1960s] paperwork nightmare was to centralize all formal stock ownership and manage the actual economic ownership changes with bookkeeping adjustments. And the fix worked. But stepping back from everything fifty years later, we should recognize that the curious system now in place is a kludge—and hardly the type of architecture that would be designed from scratch. Why should a central owner keep everything locked in its vaults? More importantly, we should consider the possibility that centralization of control has led to a situation where some vested interests might prefer not to modernize. This is not necessarily to fault DTCC [and its subsidiary for clearing fixed income, FICC]; it is amazing what the centralized clearinghouse has been able accomplish over our decades of rocketing trading volume. And, as mentioned, DTCC is conducting experiments that might lead to a new generation of clearing technology. But one must question how strong the imperative for change is felt. And DTCC is not the only large organization that has resulted from centralized clearing. A handful of other players, especially Broadridge Financial, have grown enormous (and highly profitable) as solutions providers that can help corporations navigate the current complex web of stock transfers, communications, and governance.

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> [I]n the early 2000s, the SEC approved rules to shore up centralized settlement. In 2003, after one company sought to pull back its shares from DTCC control, the SEC approved a rule allowing DTCC to refuse an issuer request to withdraw securities. Another firm sought to address this upfront by adopting a corporate bylaw that made its shares ineligible for DTCC ownership and services. Again, the SEC said no by approving Rule 17Ad-20 to effectively prohibit this act. These changes made good sense: these efforts would have taken these firms "off the grid" and made it much more difficult for investors to trade their stock. But today, they work to lock in the status quo in ways that run counter to the fundamental goals stated in the preamble to [Rule] 17A (p. 597).

Of course, costs aside, centralization which reduces the fragmentation in securities clearing and settlement at a granular processing level can unambiguously (by construction) be a winner. This seems likely to be the case for fixed income Governments and Government-backed repos, for which settlement fails are likely to be highly correlated. Indeed, Baranova et. al. (2023) and Fleming and Keane (2021) have shown that central netting of U.K. gilt and gilt repo trades would have reduced dealers' daily gross settlement obligations by some 60% to 70% in the 2020 financial market turbulence. Of course, this assumes that centralized netting would not in practice have created a higher probability of fails despite an arguably more concentrated single point of failure.

Pilot Program: Paxos for Blockchain Clearing of U.S. Equities (2019)

https://finopsinfo.com/operations/clearing/goodbye-nscc-hello-paxos-for-clearing-us-equities/

3.1 References

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