

Central Clearing and Trade Cancellation: The Case of LME Nickel Contracts on March 8, 2022

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Why These Findings Are Important

The use of mass trade cancellation is a risk management tool that was applied unprecedentedly by the London Metal Exchange (LME) to alleviate market conditions during an episode of nickel market stress in March 2022. The author shows that the use of trade cancellation may disincentivize central counterparties (CCPs) to conduct risk management before a market event occurs. Further, the trade cancellation may benefit some parties at the expense of others and have adverse and unintended consequences for financial stability and a CCP's authority going forward

Key Findings

1

Trade cancellation runs in tension with a primary function of CCPs, which is to help ensure contract performance.

2

Because of contract cancellation, LME Clear avoided declaring members in default, but other market participants incurred losses.

3

A CCP that avoids drawing on its "skin-in-the-game" capital because of trade cancellation could have less incentive to monitor clearing members' creditworthiness.

4

The UK High Court upheld the LME's authority to cancel trades, making future instances of trade cancellations more likely.

How the Authors Reached These Findings

The author documents the March 2022 nickel market stress and the LME's response. The magnitude of the market stress at LME Clear, the clearinghouse for the LME, is quantified using account breaches reported in publicly available disclosure data and a hypothetical default episode reported in the LME's legal filings.

Central Clearing and Trade Cancellation: The Case of LME Nickel Contracts on March 8, 2022*

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Abstract

In March 2022, nickel prices on the London Metal Exchange (LME) nearly quadrupled in just three trading days, threatening to put several clearing members into default and exhaust the default fund at LME Clear, its central counterparty (CCP). The LME responded in an unprecedented fashion, by canceling eight hours of nickel market trades. Though challenged in court, its authority to do so was ultimately upheld. This paper documents the market stress and LME's response to understand the implications of the trade cancellation decision for financial stability and CCP powers going forward. While LME's trade cancellation helped to alleviate distress, its decision lies in tension with the function of a CCP, which is to ensure contract performance. In upholding LME's right to void contracts, the court's verdict could change how CCP rulebooks are applied under financial distress, potentially creating scope for moral hazard or other adverse consequences.

Keywords: central counterparty, trade cancellation, default waterfall

JEL Codes: G10, G23, K22

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1 Introduction

In March 2022, nickel prices on the London Metal Exchange (LME) nearly quadrupled in just three trading days. The surge in prices forced the clearinghouse associated with the exchange, LME Clear, to issue large margin calls. The size of these calls threatened to put 12 of its 45 clearing members into default and exhaust its default fund. The LME responded by suspending trade and canceling eight hours of trades in nickel contracts. Though exchanges commonly halt trading on outsized price moves – circuit breakers in some markets do that automatically – canceling trades is rare. And though the sheer volume of trades voided by the LME was unprecedented, the UK High Court upheld its authority to do so when market participants challenged it in court.

The response of the LME Group to the stress in the nickel market was as noteworthy as the stress itself. Central counterparties (CCPs), like LME Clear, are third parties that guarantee contract performance to both buyer and seller, should either fail. They do so by requiring clearing members to provide collateral and mutualized resources that can be used to cover losses in the event of default. CCPs have a "playbook" of procedures they plan to undertake to resolve distress, with rules for how to allocate losses. The predictability of these procedures is important, particularly because of the rise in cleared product volumes due to derivatives clearing mandates in the aftermath of the 2007-2009 financial crisis. During nickel market stress in March 2022, however, loss allocation deviated from this playbook because the LME, an exchange, intervened to void trades.

Trade cancellation runs in tension with a primary function of CCPs, which is to help ensure contract performance. By providing assurances that financial products will behave as expected, CCPs enable disparate market participants, who may not know or trust each other, to trade derivatives more easily. It is true that market participant default represents an important threat to contract performance and that, by canceling contracts, the LME allowed LME Clear to avoid declaring members in default. But the canceled contracts themselves left other market participants empty-handed, even if such non-performance was exchange-sanctioned.

This paper explores key questions about LME's cancellation of trades. Why did the LME cancel trades? How did trade cancellation help? Whose interests were harmed? Trade cancellations alleviated margin demands on market participants who were holding short nickel positions based on a belief that prices would fall. The cancellations eased margin demands on them when their liquid assets were already reduced. Other market participants, however, were harmed and sued LME. They had sold nickel at elevated prices, and the trade cancellation eliminated their profits.

The paper also assesses trade cancellation more generally as a tool for risk management at CCPs. When could it be used? What incentives, good or bad, could it create? Courts have upheld exchanges' wide latitude to define "market disorder" and to cancel trades *en masse* when markets are disorderly. Among other consequences, such powers could reduce the incentives of CCPs to monitor members' positions to prevent default scenarios from arising.

2 How Central Clearing Works

Consider two banks, B_1 and B_2 , that sign a derivative contract, X , e.g., a futures or swap contract. Under the contract, no payment is made today, but there may be payment in the future, which takes two possible states. If state-1 materializes, B_1 is to receive X from B_2 and *vice versa* in state-2 (see **Figure 1a**). Each

bank may be concerned about counterparty credit risk, i.e., that the other bank fails to pay as promised should the obligation arise. To mitigate these concerns, banks may use *hypothecation* of collateral, i.e., each bank may set aside funds that, should it default, may be seized by the other.

Another way to guarantee payment is to involve a third party. Central clearing is an institutional arrangement where the management of counterparty credit risk is performed by a single common entity, known as a CCP. Under central clearing, after B_1 and B_2 sign a contract, X , it is *novated* to the CCP, i.e., it is replaced by two contracts, X_1 between B_1 and the CCP and X_2 between the CCP and B_2 . Under the new arrangement, in state-1, B_2 owes X to the CCP, which in turn owes X to B_1 ; the obligations are reversed in state-2 (see **Figure 1b**). Because the CCP signs contracts in offsetting pairs, it does not take on market risk, i.e., no matter the state of the world, what it is owed exactly offsets what it owes. However, CCPs do face counterparty risk because market participants could still default. For example, if B_2 fails to pay the CCP in state-1, the CCP is still obliged to pay B_1 and so will incur losses.

CCPs manage default risk in several ways. They carefully screen and monitor members and prospective members and permit them to clear transactions only if they are deemed sufficiently creditworthy. When the value of the contract changes, they demand payment of variation margin (VM). They also require their members to post collateral in the form of initial margin (IM) and default fund (DF) contributions. These are posted in advance to help mitigate default losses.

Upon default, the CCP closes out the positions of the defaulted member. It may, for example, auction them off, paying or being paid by entities who take over the associated future payment obligations. Having auctioned off the portfolio, the CCP is no longer exposed to the market risk associated with it. The prefunded resources are used to cover any net losses in the auction in a prescribed order called the *default waterfall*. As necessary, the CCP draws first on the defaulted member's IM, then on the defaulted member's DF contribution, and finally on the DF contributions of the non-defaulting members and prefunded resources provided by the CCP called "skin-in-the-game" (SITG).¹ If necessary, further losses are covered by various mechanisms that demand additional resources from the non-defaulting members, who may also be asked to reconstitute the default fund.

3 Nickel Market Stress at the LME in March 2022

The LME is a commodities exchange with contracts in metal forwards, futures, and options. The three-month futures contract for nickel traded on the LME (3M Nickel) is an international benchmark for the market. In 2021, the volume of daily outright nickel trades on the LME averaged 66,000 metric tons (mt), and the open interest averaged 1.3 million mt.² LME Clear is the CCP affiliated with the LME; together, the two constitute the LME Group.

LME Clear provides clearing services to over 40 clearing members, about half of which are banks and most of which are domiciled in the UK. These clearing members provide access to clearing services for a wide variety of clients. Among these clients, and of particular importance to the events of March 2022, are the Tsingshan Holding Group (THG), Jane Street Global Trading (Jane Street), and Elliot Associates (Elliot). THG is a large manufacturer of nickel alloy and stainless steel,³ while the other two

¹Depending on the CCP, SITG capital may be used before, alongside, or after mutualized DF contributions. At LME Clear, SITG capital is used before DF contributions.

²Oliver Wyman 2023.

³Desai 2023; Segan, Molyneaux, and Higgins 2023.

operate hedge funds. On the exchange, THG is considered to be a “physical trader,”⁴ in that it does not exclusively speculate on the movement of metal prices but instead accepts physical delivery of nickel,⁵ which is an input to its production of stainless steel. By contrast, Jane Street and Elliot are considered “financial traders” in that they primarily take speculative positions.

THG began accumulating short positions in nickel forward contracts as early as December 2021 (see **Figure 2** for a timeline of the following events).⁶ By March 2022, THG had accumulated short positions on anywhere from 100,000-300,000 mt⁷ of nickel at prices of \$18,000-19,000/mt. This amounted to as much as five times the nickel held by the LME for settlement.⁸ Roughly 20% of these positions were placed with LME;⁹ the remainder were placed in over-the-counter (OTC) markets with JPMorgan Chase, BNP Paribas, Standard Chartered, and United Overseas Bank Ltd.¹⁰ THG’s off-exchange positions were not fully visible to the LME, though some news reports of them broke in mid-February.¹¹

On February 24, Russia invaded Ukraine. In the following days and weeks, Ukraine’s Western allies began to impose economic sanctions on Russia’s exports of fossil fuels and other commodities. Russia supplies 12%¹² of global nickel and 15-20% of battery-grade nickel.¹³ By early March, investor concerns about possible disruptions to global supply put upward pressure on nickel prices. What followed was a large spike in the price of 3M Nickel, which rose from ~\$27,000/mt to \$29,100/mt on March 4,¹⁴ and then to \$50,300/mt on March 7.¹⁵ Then, in the early hours of March 8,¹⁶ the price doubled to over \$101,000/mt before falling again to \$85,000/mt¹⁷ (see **Figure 3a**).

During the price spike, margin calls strained the liquid resources of market participants with short positions. During this period, LME Clear made record numbers of intra-day (ITD) margin calls and even began to defer collection after some members were unable to make timely ITD payments (see **Figure 4**). In addition to variation margin demands, on Friday, March 4, LME Clear announced an increase in IM requirements for nickel contracts of 12.5% to \$2,250/mt, to apply beginning at the close of business the following Tuesday, March 8. This increase alone implied a margin obligation for THG of about ~\$675 million (see **Figure 4**).^{18,19} The subsequent dramatic price rise implied additional obligations in the form of VM for nickel shorts—THG faced a VM call from LME Clear of ~\$1.1 billion on its cleared positions. THG may have faced simultaneous VM calls on its uncleared OTC positions of ~\$4.4 billion.²⁰

The demand that drove the rise in nickel prices came from several types of traders. Some came

⁴Desai and Daly 2019; Oliver Wyman 2023.

⁵Stafford and Wigglesworth 2022.

⁶Whitson 2022; Wallace 2022.

⁷Hume and Lockett 2022; Jones 2022; Desai 2022b.

⁸Jones 2022.

⁹Stafford and Wigglesworth 2022; Wallace 2022.

¹⁰Jones 2022.

¹¹Segan, Molyneaux, and Higgins 2023.

¹²Hume and Lockett 2022.

¹³Onstad 2022a.

¹⁴Oliver Wyman 2023, p. 17.

¹⁵Home 2023; Segan, Molyneaux, and Higgins 2023; Oliver Wyman 2023.

¹⁶The LME permits trade from 1:00 am - 5:00 pm GMT. It opens in the early hours of the morning, from 1:00 am - 8:00 am GMT, so that trades can be placed during Asian market hours.

¹⁷Jones 2022; Segan, Molyneaux, and Higgins 2023.

¹⁸Desai 2022b.

¹⁹I estimate the aggregate IM call on March 8 using max IM call in Q1 2022 of ~\$7 billion

²⁰I estimate this based on a ~55,000/mt rise in price on 3M Nickel, a cleared position of ~20,000mt, and an uncleared position of ~80,000mt for THG.

from “physical clients,” like THG, who had pre-existing short exposures to nickel. Some came from clearing members whose counterparties in the OTC market, like THG, had defaulted on large OTC margin payments.²¹ Both channels represent efforts to close short positions, whether originally placed in the cleared or uncleared markets, to avoid future margin calls associated with the rise in nickel prices. Of course, they had the counterproductive effect of further contributing to that rise in prices.

Additional demand in the afternoon of Monday, March 7, came from “financial clients,” like Jane Street and Elliot, with no systematic pre-existing short exposure.²² It is possible that this demand represented an effort to raise prices and, by extension, VM obligations of shorts like THG. Were they unable to make margin calls, the shorts would have to close out their positions and purchase back the nickel at a higher price. Reports show that Jane Street and Elliot were among those who sold nickel during Asian trading hours on the morning of Tuesday, March 8, while THG attempted to cover some of its short position by buying nickel at the same time.²³

4 Market Stress and Prefunded Resources at LME Clear

CCPs try to anticipate episodes of market stress and require members to set aside prefunded resources to cover potential default losses. Based on public disclosures by LME Clear, in March 2022 the prefunded resources were outmatched by the extent of stress in the nickel market, i.e., they were insufficient to absorb losses accruing to the CCP if members with losing positions had been permitted to default. Additionally, in court filings for a subsequent lawsuit, the LME submitted statistics on default losses under a hypothetical scenario in which it continued making margin calls as usual. Because the LME intervened to prevent precisely these losses, they are counterfactual estimates. Still, the estimates and intervention suggest that the LME deemed such losses not only possible but also likely.

4.1 Margin Breaches at LME Clear in Q1 2022

In a margin breach, the VM call on a participant exceeds their prefunded IM resources. The size of a margin breach is measured as the excess of VM over prefunded IM. Margin breaches are not necessarily instances of default because a member may still make good on their VM payment. Still, they measure potential CCP exposure to losses in the event of such a default.

Margin breaches at the LME in Q1 2022 were severe. In total, LME Clear faced \$23.3 billion in breach volume that quarter, which was two orders of magnitude larger than the breach volume it experienced in prior quarters. The single largest account breach was \$2.0 billion in volume, which alone exceeded the size of LME’s \$1.1 billion DF (see **Figure 5**).²⁴

The severity of margin breaches at the LME is extreme, even compared to other CCPs at times when faced with market stress. I construct a measure that captures the sufficiency of the default fund to accommodate losses due to the default of the clearing member experiencing the largest breach by

²¹Oliver Wyman 2023, p. 23.

²²Oliver Wyman 2023, p. 23.

²³Elliot Associates sold 9,660 mt of nickel during these hours through Goldman Sachs, JP Morgan, and Sigma Broking (Tobin, Onstad, and Desai 2023; Carss-Frick, Steele, and Krishnan 2023; Segan, Molyneaux, and Higgins 2023). See Jones 2022 for information regarding THG trading.

²⁴Instances of margin breaches are reported in public disclosure data (see **Appendix B.1**).

setting:

$$Relative\ Breach\ Size_{cq} \equiv 100 \times \frac{Max\ Breach\ Size_{cq}}{Default\ Fund_{cq}}$$

A measure greater than 100% indicates that the default fund resources are insufficient to cover such losses. In Q1 2022, LME Clear had a relative max breach size of 182%.²⁵ For comparison, a group of large CCPs²⁶ with comparable risk profiles pre-March 2022 never exhibited breaches exceeding 50% of their default fund size (see **Figure 6a**). If we compare LME Clear to a group of commodity CCPs,²⁷ we still find that the March 2022 episode is the most extreme (see **Figure 6b**).

In addition to being severe, the margin breaches at LME were persistent in that they recurred over multiple consecutive days. This means that had a member in breach defaulted, the CCP would have faced the prospect of accumulating losses and little time to replenish expended prefunded resources. Conservatively, 65% of Q1 2022 excess breach volume can be attributed to VM calls from LME Clear on March 3, 4, and 7 (See **Appendix B.2**). Considering potential default losses as the breach volume across all three days exceeds the default fund by an order of magnitude (see **Figure 5**).

The breaches associated with the nickel episode in March 2022 were not only large, but they were also extensive. Rather than being restricted to one or two market participants, they took place among many of the accounts at the LME. LME Clear has a total of ~430 accounts and experienced roughly 105 new account breaches during the quarter due to the nickel episode. If these breaches took place only during March 3, 4, and 7, this implies a daily breach rate of 8.1% on those days (see **Figure 7**). More conservatively, if they were distributed evenly among the 15 trading days during which nickel was traded between March 3 and the end of the quarter, it implies a daily breach rate of 1.6%. Even this more conservative estimate is still considerably larger than 0.003%, which is the average daily breach rate at LME before Q1 2022.

4.2 Hypothetical Defaults at LME Clear on March 8, 2022

Despite indications that stress in nickel markets was outsized relative to LME Clear's prefunded resources, no defaults took place through the end of March 7. Still, as leadership at the LME deliberated the consequences of extreme price movements in the early hours of March 8, they were concerned that defaults could be imminent.²⁸ In the account of the firm, for LME Clear to proceed as normal would have entailed making additional intra-day margin calls at 7:30 am in the amount of \$19.75 billion²⁹ to be paid by 9:00 am together with existing overnight obligations (see **Figure 4**). The LME evaluated the likely consequences of such a margin call, both for defaults by members and for losses born by the CCP after the auctioning of defaulted members' positions.

LME concluded that the burden of additional calls would have forced seven members into default.³⁰ They further estimated that losses due to default would amount to ~\$2.6 billion and that, of these, \$220

²⁵Note that this measure does not increase with simultaneous losses in accounts other than that of the largest breach, or with breaches in the same account across multiple days – it likely understates the stress on LME's resources.

²⁶B3, CME, DTCC, ICC CDS, JSCC CDS, JSCC IRS, LCH SA, and OCC.

²⁷CCG Agrex; BMEC Power; ECC; Eurex Commodities and Precious Metals; ICE NGX; JSCC Agricultural, Energy, Petroleum, Precious Metals, and Rubber; MGEX; Nodal; and SCH Freight & Commodities.

²⁸Segan, Molyneaux, and Higgins 2023, §33, §35.

²⁹Oliver Wyman 2023; Crow et al. 2023.

³⁰At the time, LME estimated the calls would initially force five members into default, then subsequently revised their estimate upward to seven. (Crow et al. 2023)

million would exceed LME Clear’s pre-funded resources.³¹ Were the CCP to attempt to cover excess losses and additionally replenish the default fund,³² it would have required further margin calls of \$1.17 billion. This would have threatened an additional five clearing members with default—for a total of twelve—which in turn would have generated further losses to the CCP of \$170 million.³³

The scale of losses in the hypothetical default scenario may be better interpreted by comparison to the size of LME Clear (see **Figure 8**). The twelve clearing members to default in the hypothetical represent 27% of the 45 clearing members belonging to LME Clear before the stress in the nickel market. The LME does not report account-level results, but data on margin breaches indicate that roughly 2-8% of LME Clear’s 430 clearing member and client accounts would have been affected. Approximately \$1.3 billion would have been defrayed by the IM resources of the defaulting firms, accounting for 10% of the \$13 billion of IM collateral. The remaining \$1.3 billion would have wiped out the DF, exceeding available resources by 18%. The \$170 million in losses from the second round of defaults would have been divided between IM and DF, bringing DF exceedance potentially as high as 35%.³⁴

5 Trade Cancellation and the LME Group Response to Market Stress

The LME Group responded to the price spike and market stress by moderating margin calls on members taking losses. First, at 6:16 a.m. GMT, LME Clear agreed to freeze margin requirements at the March 7 closing price.³⁵ Members would still need to make the end-of-day (EOD) payment due to trading on March 7, but the early morning movements in nickel prices would prompt no additional margin calls. Second, the LME suspended trading of nickel across all venues starting at 8:15 a.m. GMT for the remainder of the day.^{36,37} Finally, at noon GMT, the LME announced a decision to void any nickel trade placed on the exchange on March 8.³⁸ This cancellation applied to all nickel trades placed between 1:00 a.m. GMT, when the exchange opened for Asian market hours and 8:15 a.m. GMT when nickel trading was suspended.³⁹ It applied both to trades that had been cleared as well as executed trades that had not yet been cleared.⁴⁰ This amounted to the cancellation of 5,000⁴¹-9,000⁴² trades with an aggregate market value of \$3.9 billion⁴³-\$12 billion⁴⁴ (or possibly more when including the value of executed but non-cleared trades).⁴⁵ The cancellation eliminated \$1.3 billion⁴⁶ of profit and loss between parties to the

³¹Crow et al. 2023.

³²Though this is the scenario considered by the firm, it may be overly conservative. Prefunding a default fund helps, in part, to ensure that surviving clearing members are not faced with sudden liquidity demands when a different clearing member defaults. But making calls to immediately replenish the default fund would partially defeat this purpose.

³³Crow et al. 2023.

³⁴At the end of Q4 2021, LME Clear’s own prefunded capital—its skin-in-the-game (SITG)—was \$22.75 million. Under the default scenario considered by LME, this SITG would have been expended.

³⁵Crow et al. 2023.

³⁶Onstad 2022a; Segan, Molyneaux, and Higgins 2023.

³⁷This suspension was eventually extended through the following week, and trade only resumed on March 16.

³⁸Onstad 2022a; Segan, Molyneaux, and Higgins 2023.

³⁹The text of the decision voids nickel trades after midnight GMT on March 8.

⁴⁰Segan, Molyneaux, and Higgins 2023.

⁴¹Stafford and Wigglesworth 2022.

⁴²Goodkind 2022.

⁴³Jones 2022; Stafford and Wigglesworth 2022; Wallace 2022.

⁴⁴Hook, Beioley, and Stafford 2023; Mourselas 2022; Segan, Molyneaux, and Higgins 2023; Mr Justice Bright and Mr Justice Swift 2023, p. 3.

⁴⁵Segan, Molyneaux, and Higgins 2023.

⁴⁶Stafford and Wigglesworth 2022.

trades.

These interventions eased liquidity demands on clearing members and their clients, particularly those like THG, who held large short positions in nickel. With sufficient liquid capital, market participants with large shorts could make good on their margin obligations without resorting to taking long positions, which had exacerbated the upward price spiral. The margin freeze delayed the demand for margin, giving the shorts more time to source liquid assets, though it simultaneously exposed the clearinghouse to potentially larger default losses. Suspending trade in the nickel market prevented prices from rising further while participants sourced liquidity. This further extended the time participants had and limited the counterparty exposure of the clearinghouse, but it came at the cost of potential gains from trade.

Instead of extending deadlines, the decision to cancel eight hours of trades reduced the size of margin demands altogether. With the cancellation of trades, the prevailing price of nickel fell some \$30,000/mt to the March 7 exchange closing price of \$50,300/mt. Because of the price drop, surviving nickel futures contracts required less variation margin. This would be true for contracts signed recently or further in the past. It would be true for cleared contracts and uncleared OTC contracts, provided that the margining agreements for the latter were indexed to LME nickel prices.⁴⁷ This reprieve came at the expense of those parties whose favorable trades were canceled. These were the investment firms like Elliott and Jane Street, who had sold nickel at elevated prices on the morning of March 8.

The interventions of the LME Group, which applied broadly to nickel market participants, reduced THG's margin obligations from ~\$15 billion⁴⁸ to ~\$4.5 billion⁴⁹-\$8 billion⁵⁰. Though considerably alleviated, additional intervention by actors outside the nickel market was required to ease the stress at THG entirely. On March 15,⁵¹ THG announced it had negotiated a "standstill agreement" in which, for the time being, its brokers would not make margin calls on or close out its nickel positions on the LME.⁵² This agreement would give it time to work out how to fund and unwind its positions. During the standstill, THG received emergency credit through a facility established by JP Morgan and funded by a variety of creditors, including the China Construction Bank (CCB).⁵³ By March 16, according to China state media, THG had reached an agreement with two non-disclosed nickel users to swap its less-refined nickel matte for 4,000 mt of nickel warrants monthly. The warrants were for a grade of nickel that could be delivered against THG's outstanding short positions,⁵⁴ which, by some reports, still amounted to 200,000 mt of nickel.^{55,56}

Following the March 2022 episode, the LME implemented changes to its trading rules. It placed limits on daily price movements in a variety of metal contracts,⁵⁷ began requiring clearing members to

⁴⁷ Additionally, the trade cancellation removed volatility from the historical price path of LME Nickel, and the intervention itself might mitigate volatility concerns going forward. For these reasons, it is possible the clearinghouse's models might reduce IM recommendations for all nickel market participants, including those short nickel.

⁴⁸ Wallace 2022; Jones 2022.

⁴⁹ Wallace 2022.

⁵⁰ Jones 2022; Yang, Feng, and Wallace 2022.

⁵¹ Goliya 2022.

⁵² Desai 2022a.

⁵³ Jones 2022.

⁵⁴ Although THG is itself a producer of nickel, the grade of its output is not deliverable against contracts at the LME. (Hume and Lockett 2022)

⁵⁵ Zhang and Patton 2022.

⁵⁶ Possibly, by posting deliverable nickel, THG further managed to reduce its cash margining requirements.

⁵⁷ Onstad 2022b; Stafford and Wigglesworth 2022.

report OTC nickel positions,⁵⁸ and halted trade of nickel during Asian market hours.⁵⁹ However, irregularities in the trade of nickel contracts have persisted. On several occasions, trading has halted because transaction prices hit price bands,⁶⁰ and in December 2022, futures prices exceeded spot prices in nickel by the largest amount in a decade.⁶¹ Persistent investor concerns about the soundness of nickel trading at LME have been reflected in reduced trading activity on the exchange⁶² (see **Figure 3b**) and speculation about the possible movement of nickel trading to the Chicago Mercantile Exchange (CME).⁶³

The March 8 episode also changed banks' risk perceptions of LME Clear. Before the March 8 episode, LME had an implied default probability of $\sim 1\%$, which was persistently lower than that of the average CCP. In the quarter after the episode, LME's implied default probability increased by 0.5% relative to other CCPs and closed this gap (see **Figure 9a**). Similarly, LME was a persistently better credit than the average CCP before Q1 2022 but fell 2.5-3 rating notches relative to the average in the following quarter (see **Figure 9b**).⁶⁴

The cancellation of orders prompted a series of lawsuits and investigations. Elliott Management and Jane Street filed a suit against the LME seeking \$456 million and \$15 million, respectively.⁶⁵ AQR Capital Management sued for £80 million along with DRW Commodities, Flow Traders, Capstone Investment Advisors, and Winton Capital Management Ltd.⁶⁶ A third suit was filed by Commodity Asset Management, Pala Investments Ltd, Pentimon Ltd, Welton Investment Partners, and Sunrise Capital Partners.⁶⁷ Additionally, the FCA announced on March 3, 2023, that it would investigate the actions of the exchange.⁶⁸

6 The High Court Ruling on Trade Cancellation by the LME

The Elliott Management and Jane Street suit was the largest and most prominent of the lawsuits. The case was notable for being an instance of *judicial review*, a kind of case typically brought against public sector authorities. The reason for this is that LME is a "Recognised Investment Exchange" and is overseen by the UK's Financial Conduct Authority (FCA). Due to this distinction and the novel use of contract cancellations, the case has the potential to set a precedent for the regulation of exchanges.

Elliot and Jane Street each made a variety of claims against LME in their legal filings. Many of these are related to the process and purpose for which LME chose to cancel trades. Two of the central arguments about the lawfulness of the decision to cancel trades were that:

- (i) In canceling the trades, the exchange had acted outside of its authority⁶⁹
- (ii) The trade cancellation violated the claimants' "human rights" by depriving them of their possessions

⁵⁸Desai 2022c.

⁵⁹Trade during Asian market hours resumed in March 2023 (Burton 2023).

⁶⁰Zhang and Patton 2022; Hume and Stafford 2022; Onstad 2022c; Dempsey 2022a.

⁶¹Dempsey 2022b.

⁶²Dempsey 2022a.

⁶³Stafford and Wigglesworth 2022.

⁶⁴The data is provided in reports by large U.S. banks subject to stress-testing requirements.

⁶⁵Mr Justice Bright and Mr Justice Swift 2023, §3.

⁶⁶Sridharan and Onstad 2023.

⁶⁷Sridharan and Onstad 2023.

⁶⁸Sridharan and Onstad 2023.

⁶⁹Mr Justice Bright and Mr Justice Swift 2023, §97.

The claim that the LME exceeded its authority revolved around the appropriate interpretation of the LME rulebook. The rulebook enumerates the powers of the exchange relative to market participants, but the exchange itself is governed by government legislation. In particular, the LME is governed by the Recognition Requirements Regulation (RRR) and the Regulator Technical Standards (RTS 7, as amended during Brexit). These pieces of legislation, in turn, implement the Markets in Financial Instruments Directive (MiFID II), which is an EU law aimed at increasing transparency in financial markets.⁷⁰

The key provision of the LME rulebook at issue in the case was Trading Rule (TR) 22.1, which states (emphasis added):

22. ORDER CANCELLATION AND CONTROLS

22.1 Notwithstanding, and without prejudice to, the general power set out at Trading Regulation 1.3, the Exchange may temporarily halt or constrain trading in accordance with the relevant procedures established by Notice if there is a significant price movement during a short period in a financial instrument on the Exchange or a related trading venue (as such term is defined in Article 4(1)(24) of the MiFID II Directive). *Where the Exchange considers it appropriate, the Exchange may cancel, vary or correct any Agreed Trade or Contract.*⁷¹

The claimants pointed out that other sections of the LME rulebook enumerate alternative powers more limited in scope (e.g., the power of trade modification or required sale of concentrated positions) and more limited use cases for cancellation powers (e.g., malfunctions or trades placed in error).⁷² They also point out that the legislation governing the rulebook requires exchanges to have cancellation powers but enumerate more limited use cases for them (e.g., operational malfunctions).⁷³ On this basis, they argued that the cancellation powers of TR 22.1 did not extend to their use in the March 2022 episode.⁷⁴

The court ruled against the claimants, asserting that LME did have the power to cancel trades and that this power was not circumscribed by the various pieces of legislation. Whatever statutes governed market operators, the court reasoned that the cancellation powers given to LME by its rulebook simply represented terms of trade, to which market participants had agreed as a pre-condition for trading at LME.

The claim that LME violated the claimants' "human rights" relates to Article 1 Protocol 1 (A1P1) from the Human Rights Act (HRA 1998), which states:

ARTICLE 1

Protection of property

Every natural or legal person is entitled to the peaceful enjoyment of his possessions. No one shall be deprived of his possessions except in the public interest and subject to the conditions provided for by law and by the general principles of international law. The preceding provisions shall not, however, in any way impair the right of a State to enforce such laws as it deems necessary to control the use of property in accordance with the general interest or to secure the payment of taxes or other contributions or penalties.⁷⁵

⁷⁰Mr Justice Bright and Mr Justice Swift 2023, §39-52.

⁷¹Mr Justice Bright and Mr Justice Swift 2023, §39.

⁷²Mr Justice Bright and Mr Justice Swift 2023, §51-2.

⁷³Mr Justice Bright and Mr Justice Swift 2023, §43-50.

⁷⁴Mr Justice Bright and Mr Justice Swift 2023, §97.

⁷⁵Mr Justice Bright and Mr Justice Swift 2023, §218.

For a violation of A1P1 to have occurred, it must both be true that a party can be considered to have property and that the party was deprived of this property in a fashion that was unlawful or else not in service of the public interest.

Though the court ruled against both Jane Street and Elliott, it did so for different reasons that rely on the rules of the clearing process enumerated in the LME and LME Clear rulebooks. On the exchange, market participants make “Agreed Trades.” These are subject to administrative checks by the market operators, LME and LME Clear. Subsequently, matching contracts are created between each participant and LME Clear, which are termed “Cleared Contracts.” After this, the agreement between market participants becomes a “Client Contract.” In the view of the court, the “Client Contract” constitutes a possession but not the “Agreed Trade,” which is merely a commitment to take steps necessary to create such a contract.⁷⁶

The court found that Elliott submitted their trades by the inter-office market, and these had not yet been cleared. Given that the court considered that uncleared contracts were not property, it ruled that LME had not violated A1P1 in Elliott’s case. On the other hand, Jane Street submitted their trades through the online system, LME Select, and these trades had been cleared. The court found that Jane Street was deemed to have property and to have been deprived of property. But because the court had decided that TR22 was used lawfully to cancel these trades, they determined that no violation of A1P1 had taken place in Jane Street’s case either.⁷⁷

7 Features of a Mass Trade Cancellation Regime

Before the ruling, market participants may have anticipated trade cancellation in limited quantities to deal with errors or malfunctions. Given the ruling, market participants will have to consider the possibility of trade cancellations that effect large wealth transfers and changes in margining requirements. Though the ruling only applies in the UK, and, to date, no comparable rulings have been issued elsewhere, it could set a precedent in other jurisdictions.

The ruling emphasizes that clearing members and their clients assent to the terms of the exchange rulebook, which is the basis for the authority of the cancellation decision.⁷⁸ In principle, then, cancellations like those at the LME could take place wherever exchange rulebooks provide similarly broad cancellation powers. Still, corporate structure may impose some practical limits. When CCPs are connected to the exchanges they clear, it may facilitate the use of trade cancellation, as this falls under the authority of the exchanges. Varying degrees of connection are possible. The CCP and exchange may belong to a single legal entity, as in the case of the CME, or they may merely share common ownership, as in the case of the LME Group. Other clearing houses related to exchanges by corporate structure include Eurex and ICE Futures Europe.⁷⁹ By contrast, clearing houses for OTC markets or unaffiliated exchanges may be more limited in relying on trade cancellation. These include the FICC, the NSCC, and the OCC.

Regarding the transactions at issue, only recent transactions, i.e., from the eight hours of trading,

⁷⁶Mr Justice Bright and Mr Justice Swift 2023, §31-34.

⁷⁷Mr Justice Bright and Mr Justice Swift 2023, §218-250.

⁷⁸Mr Justice Bright and Mr Justice Swift 2023, §133-7.

⁷⁹Clancy 2023.

were canceled.⁸⁰ However, the ruling turns on the language of the LME rulebook, and this language does not place limits on the authority of the exchange to cancel trades further in the past.⁸¹ As it relates to claims that the exchange deprived market participants of their possessions, the ruling distinguishes between “contingent agreements to trade” and “client contracts.” A change in the rulebook might limit the authority of an exchange to cancel trades, but the court indicates that “contingent agreements to trade,” i.e., recently placed trades that have not yet cleared, do not constitute property and therefore might still be canceled without a violation of “human rights.”

The ruling clarifies that mass cancellations like the one at LME could take place during systemic events characterized by price volatility and default contagion. The ruling deemed that market “disorder” provided a suitable basis for the cancellation decision.⁸² In parsing the term “market disorder,” the ruling cites definitions from NASDAQ and IOSCO. Both definitions mention short covering (or short-long imbalances) among potential causes of a disorderly market.⁸³ Indeed, this appears to have been the case at the LME on March 8, 2022. But the ruling is amenable to an even more general definition of “disorderly,” such as that offered by LME CEO Chamberlain, namely that market prices were “disconnected from fundamentals.”⁸⁴ The ruling rejects the claim that the purpose of cancellation was improper because LME appealed to contagion concerns, stating that defaults might spread between institutions or across metal markets.⁸⁵

Finally, the ruling indicates that market participants can expect very little involvement or advance notice when market operators decide to pursue cancellations. Although the court insists that a market operator is accountable to some definition in declaring a market ‘disorderly,’⁸⁶ it largely defers to the expertise of the market operator in identifying a specific instance,⁸⁷ particularly in urgent circumstances.⁸⁸ For this reason, market participants should not expect operators to have to consult with them or follow any particular procedures in advance of declaring a disorderly market and then canceling trades.

8 CCP Risk Management in a Mass Trade Cancellation Regime

The ruling suggests the possibility that, going forward, market operators may be authorized to cancel large quantities of trades during times of market stress. Such a regime has implications for the risk management conducted by the market operators.

Trade cancellation implies various transfers between market participants. First, if the trade itself was made at a favorable price for one party, the cancellation represents a transfer from the winner to the loser of the trade. Second, if the canceled contracts represent the prevailing market price used to set margin requirements for a larger class of trades at the CCP, the cancellation may represent a transfer from winners to losers for other instances of this larger class. Because winners and losers would be clearing members or clients, this transfer would not affect the net liquid resources available to the CCP. Finally, cancellations could affect margin transfers between participants in the non-cleared OTC market

⁸⁰Mr Justice Bright and Mr Justice Swift 2023, §2.

⁸¹Mr Justice Bright and Mr Justice Swift 2023, §39.

⁸²Mr Justice Bright and Mr Justice Swift 2023, §220.

⁸³Mr Justice Bright and Mr Justice Swift 2023, §112-3.

⁸⁴Mr Justice Bright and Mr Justice Swift 2023, §122.

⁸⁵Mr Justice Bright and Mr Justice Swift 2023, §181-3.

⁸⁶Mr Justice Bright and Mr Justice Swift 2023, §121.

⁸⁷Mr Justice Bright and Mr Justice Swift 2023, §123-6.

⁸⁸Mr Justice Bright and Mr Justice Swift 2023, §127-132.

if margining agreements on those contracts are indexed to prevailing exchange prices. In principle, participants struggling to make payment obligations in the cleared market could see competing non-cleared payment obligations reduced.

It is useful to contrast the transfers implied by trade cancellation to those resulting from executing the standard default waterfall. In the standard waterfall structure, when clearing members fail to pay their margin obligations, they are declared in default, their positions are auctioned, and pre-funded resources are seized to cover the shortfall of these auctions. In order, these pre-funded resources come from: (i) the defaulting member's IM and DF contributions, (ii) the CCP's skin-in-the-game, and (iii) other clearing members' mutualized DF contributions. When a member does not have sufficient resources to make margin payments, funds must still be raised to cover the shortfall; the use of trade cancellation changes who pays. Under trade cancellation, the clearing member threatened with default has some of its obligations eliminated. The canceled trades represent transfers from counterparties, who lose winning positions, to the member. Moreover, as canceled trades change prevailing prices and margining requirements, it pays less, and its counterparties receive less.

These transfers suggest several potential adverse consequences:

- (i) **The power of trade cancellation may reduce the incentives of a CCP to monitor the credit-worthiness of its clearing members.**

When following the standard waterfall procedures, the capital posted by the CCP as SITG is lost in the event of a sufficiently large clearing member default. This motivates the owners of the CCP to ensure that members do not default. As in the case of LME Clear, rather than follow the waterfall, a CCP may instead defer IM payments, halt trading, and rely on the associated exchange to cancel contracts. None of these steps require it to sacrifice its skin-in-the-game, which reduces incentives to monitor clearing members.

A CCP will be motivated to do better monitoring only if its posted skin-in-the-game will plausibly be forfeited in the event of market stress. One way to ensure this might be to limit the market circumstances in which the CCP is permitted to cancel contracts. Another approach might be to allow mass contract cancellation only at a later stage in the waterfall, for instance, after skin-in-the-game or some of the default fund resources have been lost.

- (ii) **The use of trade cancellation during episodes of market stress may, in contexts other than the episode at LME, merely transmit or reallocate distress rather than alleviate it.**

In the episode at the LME, the canceled trades threatened default for the losing parties (e.g., THG) and were largely speculative on the part of the winning parties (e.g., Jane Street and Elliott). Because of this, transferring resources from the winners to the losers through cancellation did not threaten to put the winners themselves into default. Were the winning parties to the trade themselves hedging some risk, then the cancellation might cause them to default instead. The case raises questions of how the exchange might proceed with a more challenging case in which trade cancellation determines who defaults and who do not.

- (iii) **The use of trade cancellation by the market operator may have unforeseen consequences in un-cleared bilateral markets.**

An exchange or its affiliated CCP may not have much insight into bilateral contracts with margin obligations indexed to prevailing on-exchange prices. The cancellation of contracts, in moving prices, might cause stress in these markets. To the extent that trade cancellation effects a net transfer of margin from non-affiliated market participants to CCP clearing members and their clients through non-cleared bilateral contracts, the CCP stress may be resolved at the expense of other participants.

(iv) **The threat of trade cancellation may reduce the use of central clearing.**

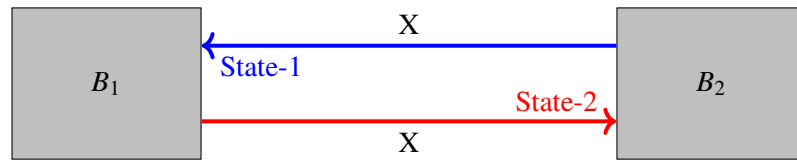
Among their other functions, CCPs are intended to be monitors and risk managers. They facilitate liquid markets by insuring clearing members against counterparty default risk, both by distributing losses and by screening and managing moral hazard. CCPs have regulatory benefits because of the transparency they provide in derivative transactions and because of their ability to spread large losses among multiple parties. To the extent that powers of trade cancellation cause uncertainty on the part of market participants or fail to align market operators' incentives with thorough vetting and monitoring, it may discourage participants from continuing to use central clearing. This could lead to markets that are less liquid and less transparent.

9 Conclusion

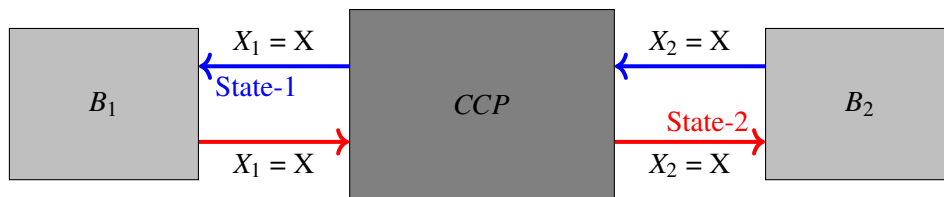
The unprecedented decision to cancel eight hours of trades on the morning of March 8, 2022, at the London Metal Exchange (LME) has been upheld in court. Barring renegotiations of exchange rulebooks by clearing members, such mass cancellations may come to be seen as a tool for risk management in stress episodes in the UK. Moreover, similar applications of trade cancellation could be tested globally. In the LME case, trade cancellation successfully mitigated defaults by large market participants ex-post and caused no losses beyond lost trading profits from large speculative positions by financial players in the market. Going forward, however, the power of trade cancellation could imply threats to financial stability, including distortions to risk-management decisions of market operators and large market makers.

A Figures

Figure 1: Contract Novation in Central Clearing



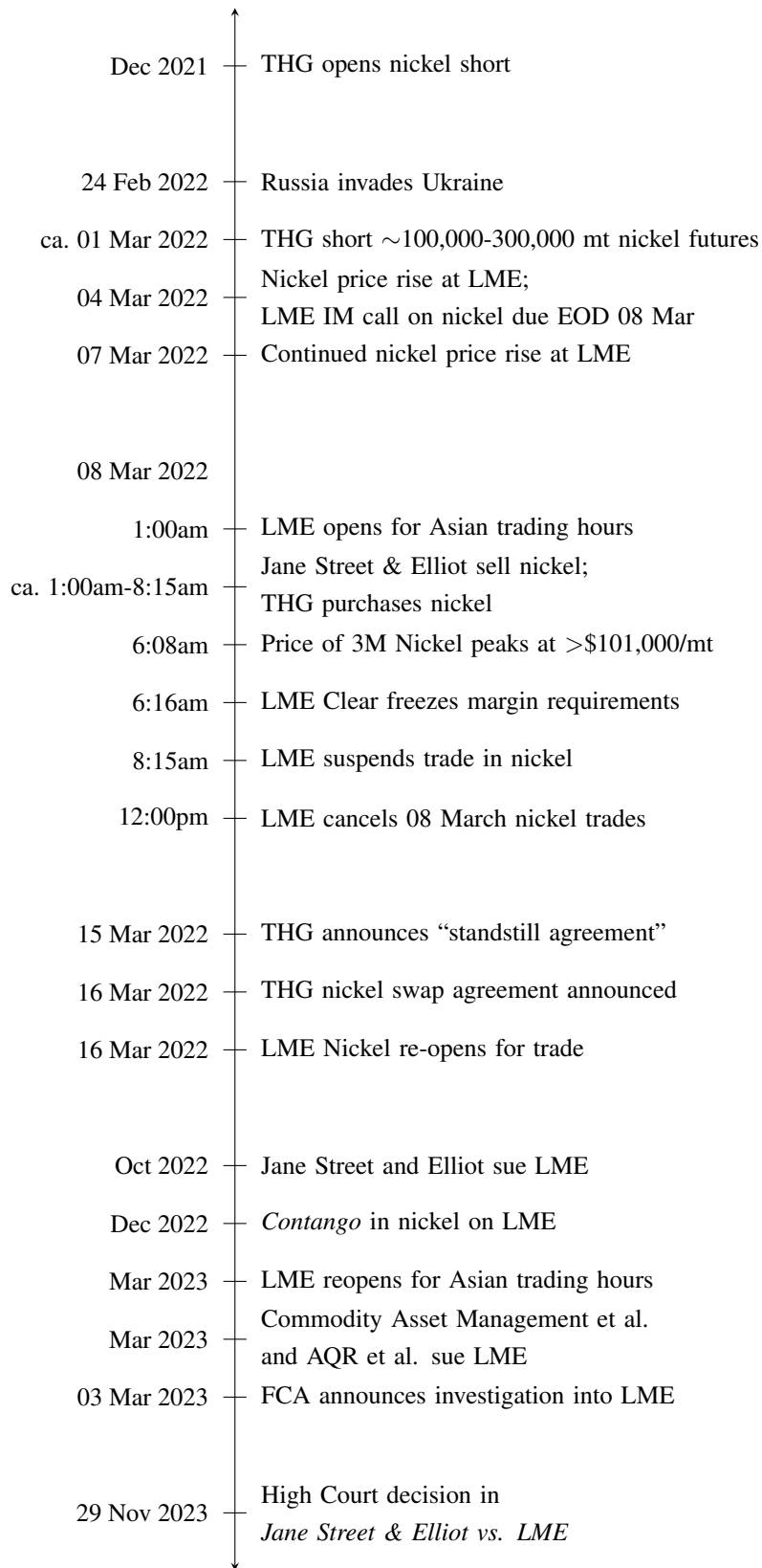
(a) Bilateral Contract



(b) Novated Contract

Sources: *Author's Analysis*

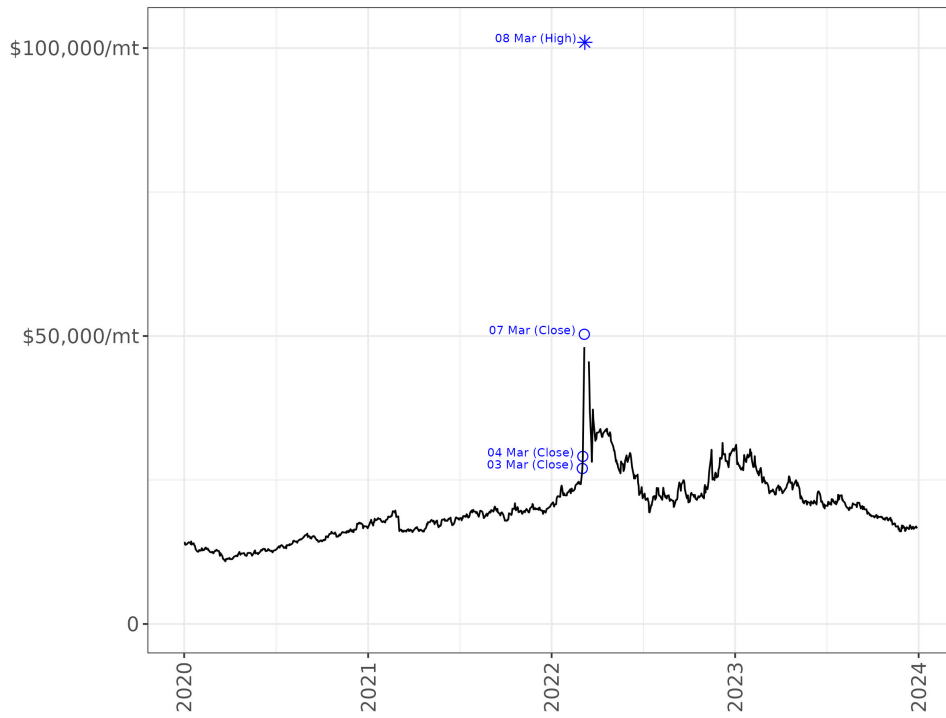
Figure 2: Timeline of Events for Trade Cancellation at the LME



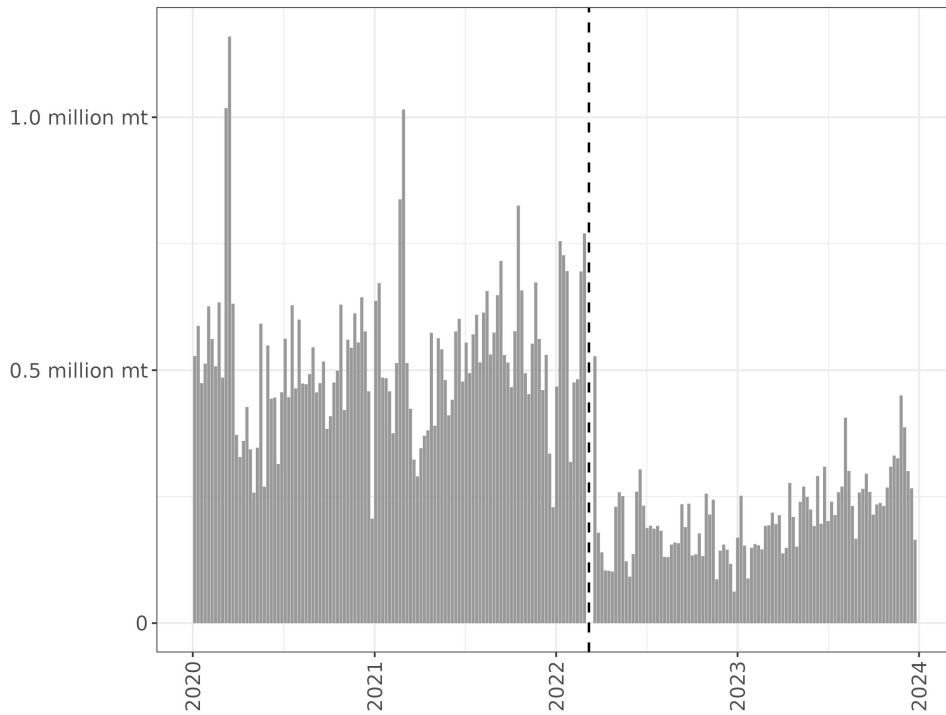
Sources: *Author's Analysis*

Figure 3: LME 3M Nickel Price and Trade Volume, 2020 - 2023

(a) Daily Price

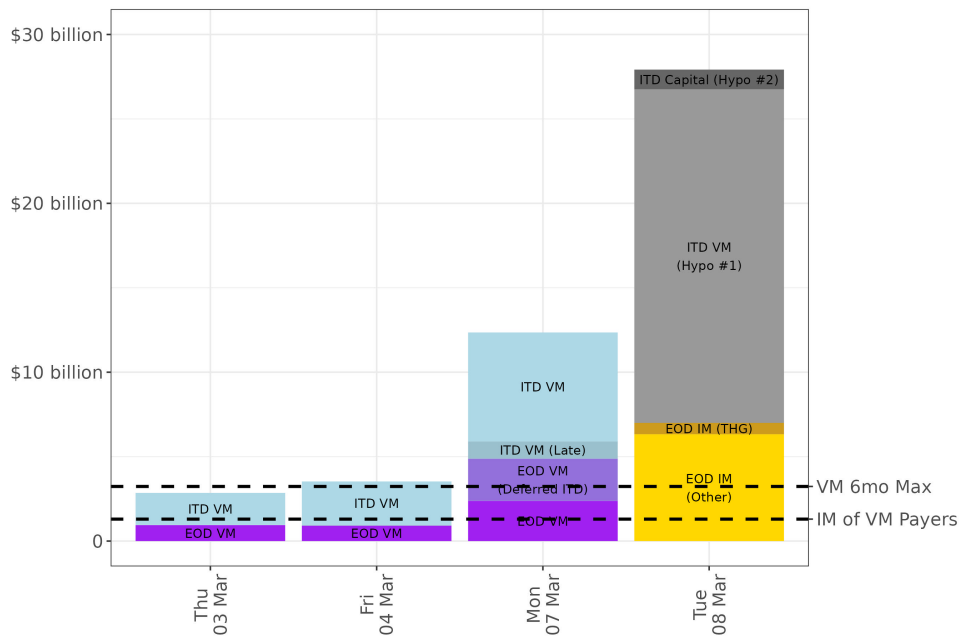


(b) Weekly Trade Volume



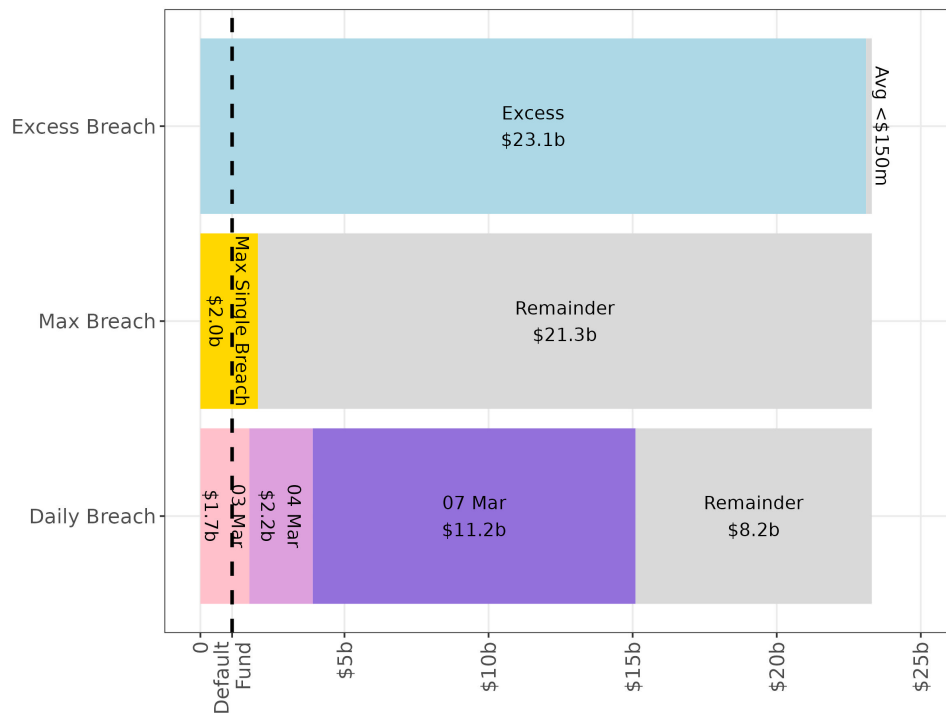
Sources: Bloomberg, Oliver Wyman 2023, Author's Analysis

Figure 4: Rising ETD Margin Calls at the LME, 04 Mar - 08 Mar



Sources: ClarusFT, Oliver Wyman 2023, Author's Analysis

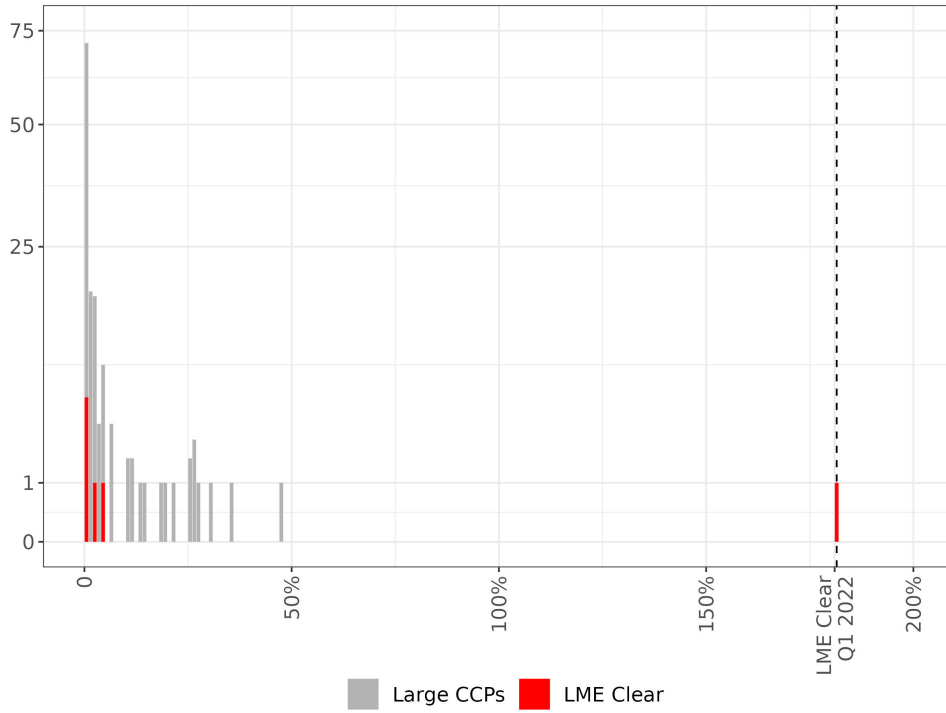
Figure 5: Decomposition of New Breach Volume at LME Clear, Q1 2022



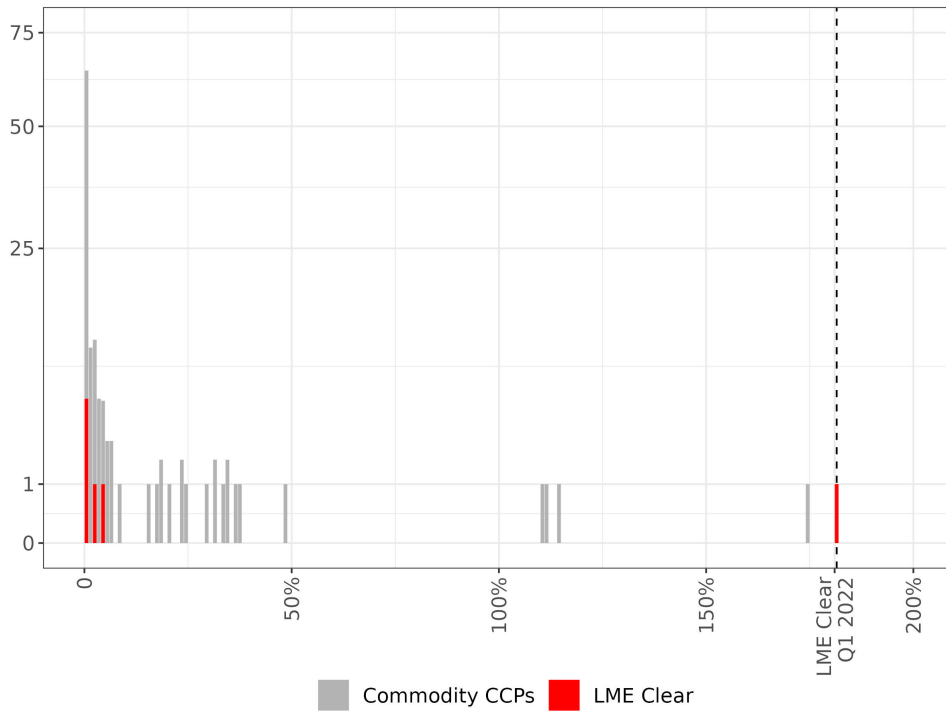
Sources: ClarusFT, Oliver Wyman 2023, Author's Analysis

Figure 6: Distribution of Relative Breach Sizes, 2017 - 2023

(a) LME Clear vs. Large CCPs

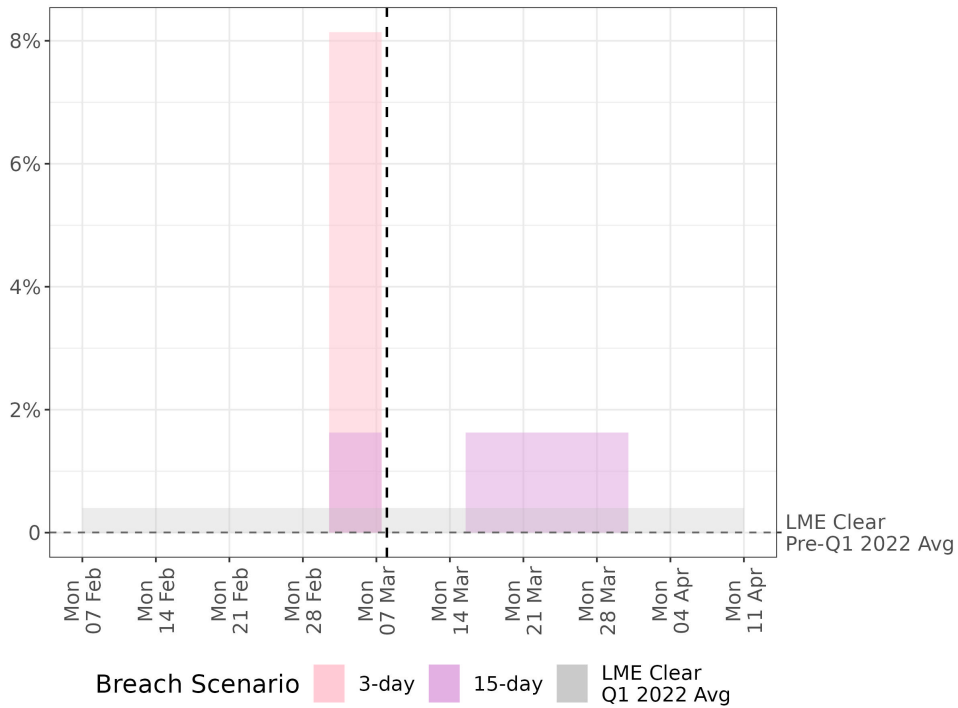


(b) LME Clear vs. Commodity CCPs



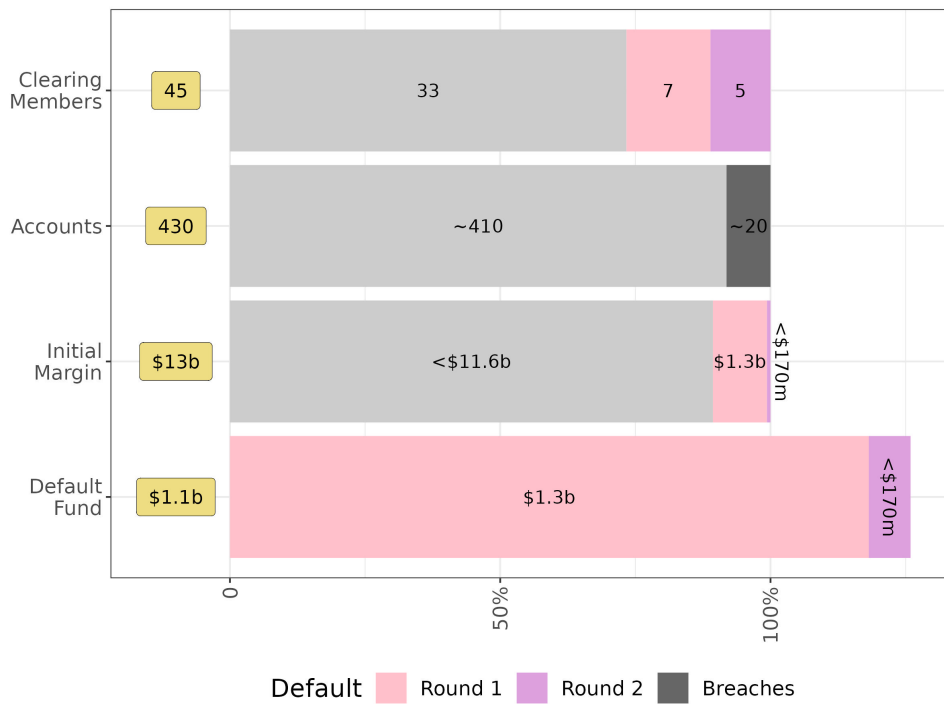
Sources: ClarusFT, Author's Analysis

Figure 7: Estimated Daily New Breach Frequency at LME Clear, Q1 2022



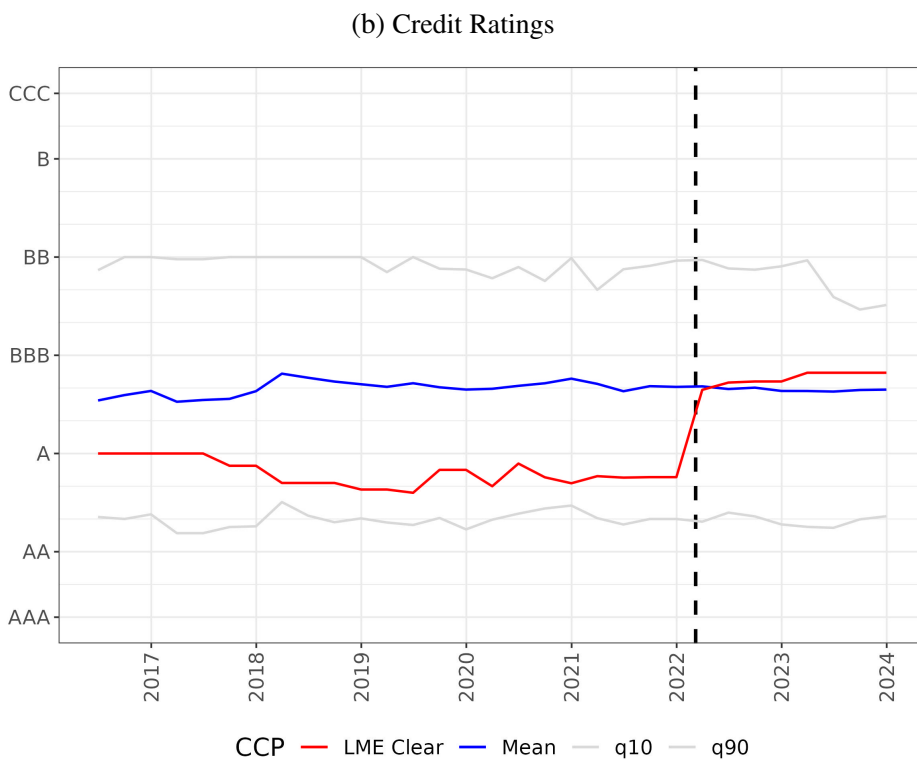
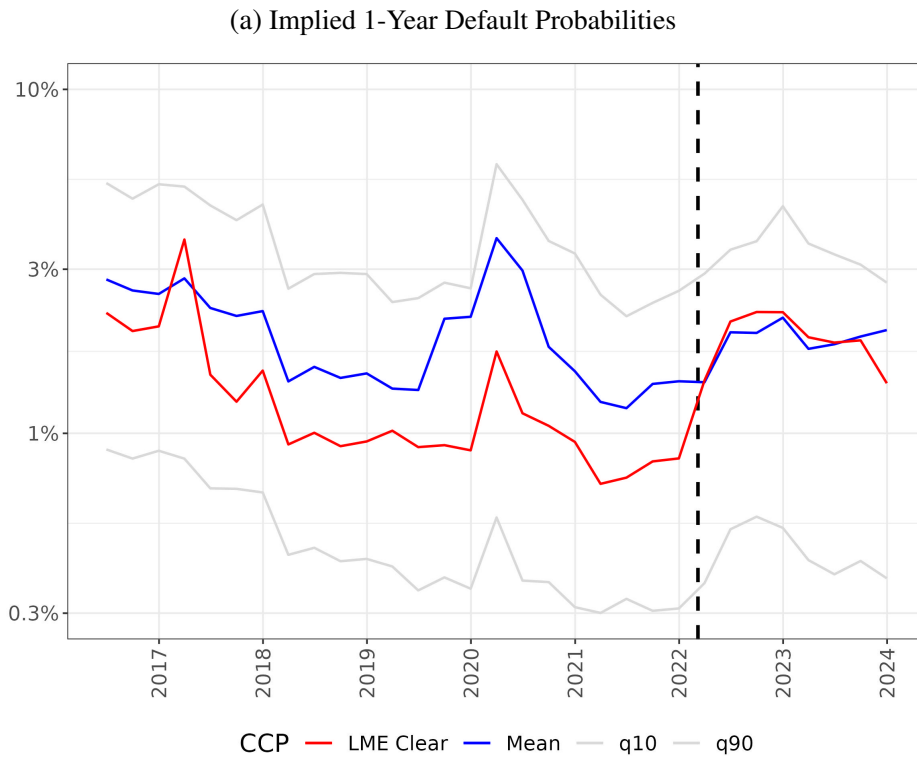
Sources: ClarusFT, Author's Analysis

Figure 8: Hypothetical Default Scenario at LME Clear, 08 Mar 2022



Sources: ClarusFT, Author's Analysis

Figure 9: Bank Risk Assessments of LME Clear and Other CCPs, 2016-2023



Sources: FR Y-14Q Schedule L, Author's Analysis

This figure plots implied 1-year default probabilities and credit ratings for various CCPs in the FR Y-14Q data. Each CCP is assigned the average default probability or credit rating across all reporting institutions in the data. The result for LME Clear is plotted together with the mean, q10, and q90 in the population of all CCPs.

B Breach Analysis

B.1 Quarterly New Breach Volume and Incidence

The data report the number of breaches and average non-zero breach size, from which it is possible to recover the total breach volume. Both statistics are reported as rolling stocks covering the prior four quarters. I will describe the method in terms of the number of breaches, but the approach for the aggregate breach volume is identical.

The object of interest in the analysis are the new breaches in the quarter, NB_q . The object reported in the data is the new breaches in the past year, \widehat{YB}_q . These can be related:

$$\widehat{YB}_q = \sum_{j=0}^3 NB_{q-j}$$

Taking first differences, we obtain:

$$\widehat{YB}_q - \widehat{YB}_{q-1} = NB_q - NB_{q-4}$$

Define the remainder when the quarter index is divided by four, $q^o = q \% 4 \in \{0, 1, 2, 3\}$. Then, rearranging the above equation and using a recursion, we have:

$$NB_q = NB_{q-4} + [\widehat{YB}_q - \widehat{YB}_{q-1}] = \dots = NB_{q^o-4} + \sum_{j=q^o, q^o+4, \dots}^q [\widehat{YB}_j - \widehat{YB}_{j-1}]$$

This indicates that the quantity of new quarterly breaches can be determined for the entire series, given a choice of the number of new quarterly breaches in the four quarters before the start of the series. I choose these values in a somewhat ad-hoc fashion, but in a way that roughly solves the following optimization problem:

$$\begin{aligned} \{NB_j\}_{j \in \{-3, -2, -1, 0\}} &= \arg \min_{q \geq 0} \sum_{q \geq 0} NB_q \\ \text{s.t. } NB_q &= NB_{q^o-4} + \sum_{j=q^o, q^o+4, \dots}^q [\widehat{YB}_j - \widehat{YB}_{j-1}] & \forall q \geq 0 \\ NB_q &\geq 0 & \forall q \end{aligned}$$

In the data, it is not possible to satisfy the non-negativity constraint, so I instead try to minimize this. The results in the paper are not sensitive to the choice of initial values.

B.2 Variation Margin and Breach Volume on March 3-7, 2022

I estimate the amount of breach volume at LME Clear due to margin calls on March 3-7. (I do not include the hypothetical margin call on March 8 because it was never made.)

I begin by defining the set of market participants declared in default in the first round of LME's hypothetical scenario on March 8, D . I assume that, in this default scenario, the initial margin of all defaulting members is entirely exhausted in default. This assumption yields conservative estimates of

breach volume on March 3-7. With this assumption, I obtain the following relationship between default losses and excess losses:

$$DefaultLosses \equiv \sum_{i \in D} im_i + DF + ExcessLosses$$

From the default scenario, we have that initial default losses are \$2.6 billion and excess losses are \$0.2 billion (Crow et al. 2023). From the public disclosures, we have that the default fund is \$1.1 billion. We obtain that the initial margin of defaulters is roughly \$1.3 billion.

Next, I define a set of market participants experiencing breaches on March 3-7, B . I assume it is the same market participants experiencing breaches on each day and note that experiencing a breach means the participant has a larger variation margin call than it has prefunded initial margin resources, $vm_i > im_i$. The aggregate breach volume on a given day, BV_t , is then:

$$BV_t = \sum_{i \in B} (vm_{it} - im_i) = \sum_{i \in B} vm_{it} - \sum_{i \in B} im_i$$

I assume that the entire variation margin call on March 3-7 fell on participants experiencing breaches (that is, all other participants were paid out variation margin). This ensures that the aggregate variation margin call for the day can be used in the above expression, $VM_t = \sum_{i \in B} vm_{it}$. I also assume that the members experiencing the breaches are the same as those experiencing defaults in the hypothetical default scenario, $B = D$.

Using these substitutions and aggregating over the three trading days, March 3-7, we obtain:

$$\sum_{t \in Mar3-7} BV_t = \sum_{t \in Mar3-7} VM_t - 3 * \sum_{i \in D} im_i$$

According to Oliver Wyman 2023, the VM calls made by LME Clear were roughly \$3.0 billion, \$3.5 billion, and \$12.5 billion on March 3-7, respectively. I use the \$1.3 billion initial margin estimate from before and obtain that the total breach volume is roughly \$15.1 billion.

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