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Consolidated Tape, Market Data Reform

We strongly recommend prior to selecting and authorizing Consolidated Tape (CT) Providers, that the European Securities and Markets Authority (ESMA) in EU and the Financial Conduct Authority (FCA) in UK have an appropriate funding model and performance bounding parameters included in its technical standards and guidelines. If omitted, there is no incentive to identify flaws and improvements upon the design of CT. Vendors would do the bare minimum at the lowest possible cost to maximize profit. It is like 'building a plane in fight,' i.e., disastrous. So, let's identify the critical success factors for the development of CT.

1. What constitutes as a data Licensing framework on a 'reasonable commercial basis"?

A licensing framework "based on costs incurred to provide the data" only leads to endless arguments (see the different perspectives from IEX, NASDAQ, and others). Inequity cannot be measured by accounting costs. For example, would fund companies need to assert their physical ownership of self-generated fund and trade data by restricting the data vendor from reselling their own data before they send the data? *"Case at point would be fund data given today for free to Morningstar, except in Denmark where Morningstar is paying today the local industry owned Fund Connect platform for getting the DK fund data."* Market reform should be about the divergence between private and social costs.

For-profit exchanges or integrated conglomerates are operating a "Jukebox model" to extract rent, hurting all, but mostly the smaller players. Policy makers should consider Exchanges, Approved Publication Authorities (APAs), Multilateral Trading Facilities (MTFs), Systematic Internalisers (SIs), Single Dealer Platforms (SDPs) as different streaming platforms to have the right focus for CT.

2. WHO OWNS THE DATA – muddle through the intricacies and learning from the music industry

WHO OWNS THE DATA? Should market participants be compensated when aggregators sell market data? While every market participant negotiates to be more equal for lower fees, higher rebates, more incentives, and other privileges, who dictates the outcome? How are conflicts addressed? What is considered as unreasonable, unfair and/or discriminatory? When accessing the Values of Composing Trades to determine who gets what, has anyone forgotten that the traders and algorithm developers are indeed the composers deserving the most credit?

Replicating the revenue sharing model of Securities Information Processor (SIP) in the US is flawed. Market data, BestEx disclosure, access fee rebate, payment for order flow (PFOF), and other market structure issues are all intertwined. Schwab's empirical evidence proves that "Order routing revenue and price improvement are NOT zero-sum". The noumenon of rebate incentives serves as royalty payments for the use of others' copyrighted material.

The Music Industry's licensing framework has been proven successful. It has over a half century of litigations experience to align rights and obligations globally. We have learned that, when one is not required to pay for the use of others' intellectual property, streamers exploit the content creators with rent seeking behaviours and/or selectively paying rebates and other perks to the elites. Therefore, trading venues and APAs should bear royalty payments and earn appropriate subscription fees to cover their cost. Nevertheless, the Facebook case affirmed that data should be owned by "content creators" instead of the streaming platforms. Therefore, we strongly suggest that policy makers revisit the definition of Market Data Contributors (MDCs) when considering a revenue-sharing scheme for CT.

There are many relevant use-cases to learn from the Music Industry (e.g., licensing terms for direct usage, allowing the re-use of contents, and derivative works). It helped music reach a wider audience and grow the overall pie. See point 3 for a high-level description and ANNEX 1 for a visual description of how the Music industry's Copyright Licensing Mechanism can hypothetically apply to our capital markets.

3. Our suggestions – Copyright Licensing Mechanism

We picture traders as performance artists; algorithm developers (including the risk control professionals) as musicians, composers, and sound engineers producing songs; then their respective financial institutions as record label companies. Using the prevailing rates in the music industry as a hypothetical case study, 50% of performance royalty is allocated to the "publishers", 45% is allocated to the "featured artists", and 5% is allocated to the non-featured supporting team.

There are upsides for the HUNTER type of firms (i.e., Performance Optimizers, Asset Gathering firms). They can help reduce the number of unknown unknowns in the markets, create better algorithms and more "hit songs" that deepen market liquidity. Equally, there will be opportunities for the FARMER type of firms (i.e., Asset Maximisers, Retails, Wealth Advisory). To grow their AUM and improve profitability (e.g., by off-loading some of the traders and algo developers' costs to be paid for by the royalty's system, aggregating and attracting new investors).

There are upsides for the traders and algo developers to earn more. For example, if they are willing to do more than 12 to 20 "songs" a year and/or create one or more "hit song(s)" that deepen market liquidity, and/or identify trade irregularities, etc. At the same time, entitlement of royalties must accompany the burden of potential liability, if trade activity is market manipulation and/or trading violations. Copyright Licensing mechanism provides excellent traceability (no more scapegoats) by aligning rights with obligations.

Agency trading, retail brokerage, order routers or other non-algorithm market participants to some extents are functions like the "non-featured" musicians or "DJ mixing engineers". They typically earn the 5% in the music industry, and the remaining 95% would be a "pass-through" payment to the original "content" creators. In an example of 20 days' trade/ order sequence per month; the equivalent to twenty songs; and a retail broker might keep 5% of the royalty. The retail broker would have discretion to determine how the remaining 95% "pass-through" would be allocated. For example: (i) fee/ commission waiver; (ii) designate the restricted fund to investor education programs; (iii) rebate directly back to the end investors, etc. Different retail brokers can have different reward programs – by quotes / trades contribution, different rate for different classes of liquid or illiquid securities, etc. Terms and conditions of rewards, fee waivers, and/or investor education programs must be fully disclosed and be subjected to audit to ensure no retention of the "pass-through" money by the retail broker. A rule of thumb under this hypothetical model is: 5% performance royalty for each layer of data aggregation.

4. Governance of WHAT GETS PAID and WHO GETS WHAT

The setup would require an organization like the SoundExchange, in the music industry, as an administrator of rights and royalties. This administrator can be a non-profit governed by the industry.

If we picture the 'index providers', benchmark or 'model portfolio providers', pricing services or Credit Rating Agency (CRA) as either 'Algo Publishing' (artists) or 'DJ Mixing Engineers' (aggregate and push upstream), it is not hard to see that their "derivative works" may or may not have significant difference from the original "songs" or trade strategies (45% versus 5%). So, the deterministic factor is whether these CRAs, Benchmark Indices firms are artistic enough to "create" original "contents" that are uniquely different from the underlying securities and the rivalries.

Firms may be allowed to keep their algorithms secretive and opt-out of royalty payments. However, they would be missing out on opportunities compared to their peers and gradually convert. Algorithms are part of our world. The race between reverse engineering of others' algos and preserving confidentiality is inevitable. Nevertheless, if one can trust the "Cloud" for trade reporting, there is no reason to oppose the enforcement of copyrights for their artistic composition of trades.

Using live or historical data to run test systems or other applications is a commercial matter rather than "derivative works" in our eyes. 15-minute delayed data is FREE in the EU per traditional exchange practice. Alternatively, one can choose to use CT or PP, which is why we recommend using 4-Part test for objective rate setting (see point 5).

5. Objective rate setting based on 4-Part test rather than regulatory price control

We advocate for a "4-part test" that taken directly from the music industry's copyright laws. “4-Part Test” deemed an agreeable principle universally – (1) willing seller willing buyer standard; (2) same parties’ test; (3) “effective competition” test; and (4) same rights test. It is time-tested and simple enough to be used by the Music Industry. What gets paid and who gets what should NOT be dictated by regulators NOR by a small group of people in a “governance committee” (see this). We see the Securities and Exchange Commission (SEC)’s CT-Plan and related proposals in the US as problematic.

6. “Professionals” versus the “non-Professionals” and Investor Protection

One may ask the question whether simple data (prices, rating, index values, reference data, etc.) would or would not be protected by copyright. See last paragraph of point 3 regarding retail agency trading and “pass-through” royalty payment.

It is noteworthy that those who play only a few single notes (e.g., ‘do, ‘ra’, ‘me’) are not entitled to copyright royalty. Those able to compose a full song (meaningful sequences of a series of notes) are compensated. The music industry’s rationale for not allowing anyone to claim copyright over a few single notes is that they do not want someone claiming exclusive right over, e.g., ‘do, ‘ra’, ‘me’ and preclude the broader composer community to use these basic notes for creative works. Similar logic should apply to our capital markets. If someone is only able to play a few “music notes” (individual orders) rather than compose a complete “song” (trade algo), then it is our opinion that they deserve the appropriate investor protection. Regulators may then better draw the line in distinguishing between the “Professionals” versus the “non-Professionals” (retail, average investors).

7. Additional benefits of harmonizing across trading venues and better disclosure

Think about what gives rise to arbitrage or pick off pricing. Anyone would do it if they did not have to bear the corresponding cost in using others’ copyrighted materials. Bilateral or multilateral trading facilities have the upper hand in terms of nimbleness to manoeuvre around in crafting niches than public stock exchanges. So, the proper way to “harmonize” across trading venues is:
On-Exchange would be treated as non-interactive streaming platforms. Off-Exchange platforms would be required to have a ‘catalogue’ to operate their interactive streaming platforms. By shining light on the MTFs and SIs, it allows bargaining on which type of trading venue should have what capabilities to maximize overall reach and efficiency for the collective markets (just as music reached a wider audience).

Trading venues and APAs should bear royalty payments and earn appropriate subscription fees to cover their costs. Engaging in non-productive fights only destroys value. By putting a value on quote and trade composition, proper considerations will be given to eliminate conflict of interest. It will also ensure efficiency in deployment of resources. Market forces will determine the optimal subscription/ access fees by the different venues.

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Enhancing post-trade transparency is ONLY the first step towards the (esma70-156-4305) original aspirations – *“MiFID II/MiFIR introduced provisions to ensure that market data is available to market participants in an easily Accessible, Fair and Non-Discriminatory manner, to DECREASE the Average COST of the market data and to make data Available to a WIDER range of market participants”*. Latency gaps would determine how big a difference is in the demand of the CT. We further recommend the following:

8. SYCHRONIZATION of both CT and Proprietary Products (PPs) and prohibit circumvention of SECURITY measures.

Determining where the CT data centre is located (Frankfurt, Zurich, Stockholm, Madrid, Bergamo) is one of the toughest challenges but an unavoidable matter. Aggregation distance / location differential issues will lead to fairness concerns. Requiring *“transmitting or releasing data no sooner than to a CT”* only describes one aspect of ‘Fair, Reasonable and Not unreasonably Discriminatory’ (FRAND). It omits the fact that market data is highly valuable. Time sensitive information requires proper SECURITY protection.

Aggregation distance/ location differential issues can be solved by Time-Lock Encryption (TLE). TLE is NOT a speedbump. It is a method to encrypt data such that it can only be decrypted after a certain deadline has passed. The goal is to protect data from being decrypted prematurely. The online gaming industry is using TLE to promote FRAND. This is by no means asking regulators to prescribe a certain technology. Yet, the ESMA in EU and the FCA in UK have full authority to mandate proper SECURITY protection over both CT and the trading venues' PPs. Requiring SYCHRONIZATION of both CT and PP in accordance with an Atomic Clock and prohibits the circumvention of SECURITY measures. It eliminates the problem of where the CT data centre is located.

9. No Compromise to Fair Access and Closing Latency Gap

We believe that ESMA has good intentions in requiring harmonization of the data format in easing a bit on the CT Provider's connectivity cost to multiple trading venues. However, Exchanges have no incentive to convert their data format into a conformed CT format in the least amount of time. It is indeed in their favour to prolong such time, so that CT would be slower than their PPs. This introduces latency and reinforces the need of TLE as mentioned in point 8.

The Exchanges may persuade the industry to make compromises and turn to their favours in adopting a near real-time CT Provider "cloud" solution, when it is indeed unfair to latency disadvantaged market participants. "Cloud" would not help to lower the cost of market data and connectivity. Everyone is and will continue to be subservient to those cloud and telecom infrastructure vendors, so long as the CT is NOT in competition with PPs. If the dominate Trading Venues and the APAs incur almost no incremental cost to become a CT Provider, they would not mind the CT acting as a "SECOND LINE PRODUCT" to generate additional profits for them.

Research has shown that Exchanges may optimally restrict access to price information by charging a high fee so that only a fraction of speculators buy their PPs. The US SEC recently issued an order to the Exchanges, asking for improved governance of market data plans citing *"heightened the inherent conflicts of interest … maximizing the viability of the proprietary data products they sell."* Policy makers around the world should take precautions of inequitable revenue sharing schemes or tier rebates that further fragment the markets and discriminate access.

10. Do NOT base decisions on the advice of those who do not have to bear the consequences

Chanting FREE redistribution of displayed market data for RETAIL may be popular. However, we doubt the dominant Trading Venues and APAs would agree to such an approach. The US Market Data Infrastructure Rule (MDIR) did not adopt similar suggestions by Charles Schwab. Even if political pressure pushes the Exchanges and APAs to consider, it would be at the expense of further heightening costs on PPs, exacerbating the latency difference, changing rebates/ incentives, etc.

Some would want expanded core data like the MDIR in the US, especially PERFORMANCE OPTIMIZERS, latency arbitrageurs, alternative investment/ hedge funds, etc. They are unlikely to switch to CT and their demand for PP is inelastic. Exchanges and APAs would argue that it would increase the cost of CT beyond the initial estimate of 7 or 10 million euro. Who is going to pay for that? Current subscribers to depth-of-book and additional data would want the entire industry to share the cost with them. Ultimately, the end investors suffer.

"One size does not fit all and not everyone needs the fastest connectivity" is a half-truth. Although portfolio rebalancing and other non-high-frequency-trading activities may not use market data in millisecond/ nanosecond precision currently, latency arbitrage is attributed to firms being "sniped" whenever they trade. Either they lose a few basis-points each time, or they must rely on certain transaction cost analysers, "liquidity sourcing", "outsource execution" services. These "bandages" are indeed added layers of cost to transact in the market. The pursuit of a pre-trade tape should continue.

*By **Kelvin To**, Founder and President of Data Boiler Technologies*

At Data Boiler, we see big to continuously boil down the essential improvements that fit for your purpose. Between my patented inventions and the wealth of experience of my partner, Peter Martyn, we are about finding rare but high-impact values in controversial matters, straight talk of control flaws, leading innovation and change, creation of viable paths toward sustainable development and economic growth.

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ANNEX 1

Copyright Licensing Mechanism

Realign according to 4Vs

~ $4.5 billion a year in market data and connectivity for US equity and options + $2.5 billion in access fee rebate + $3.6 billion in payment for order flow = over $10.6 billion. Realign for more effective and Efficient use – i.e., ↑ # of diversified market participants, ↓ unknowns, weed out any conflicts, fund investor education, and enrichment programs, partially off-loading cost, promoting FRAND.

Discretion of different agents to allocate (w/ require disclosure)

DJ Mixing Engineers

Agency trading, Retail, Order router
NOT liable unless in cahoots / known, of manipulative attempt.

Original "content" creator/ retail investors for executed trades.

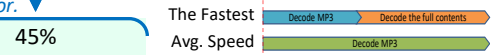
Original "content" creators/ retail investors for quotes contribution

Investor education enrichment programs
Restricted purposes, Periodic audits

Give average investors a fighting chance!

TLE protects data from being decrypted prematurely.

The Fastest Avg. Speed



Accelerate process speed, savings from compression Optimize contents' richness, balance diverse interests.

Rate NOT set by any one group or regulator.

Enable real-time risk control, auto-detect irregular activities + early warnings to modernize CAT's outdated design.

Rate set by Free Market

Mechanical Royalty
Obtain algo license to accelerate own development, new use case (treasure hunt others' trash)

Crowd intelligence

Sound library

Algorithms
80% of algo-wheel no longer generate Alpha & become sunk cost, license out unused algo. to earn 2nd profit

Alpha

Shared lessons to benefit the community while earn $$$

Discovery and reduce unknowns make markets safer!
(98% → 99.9% incremental improvement is better than 85% → 90% because it is 95% error reductions vs just 33%)

Varieties ↑
Decentralize → more resilient, mass customization, better reach, field knowledge, equips next-gen investors, sustainable.

Veracity ↑
↓ MEME/irrational exuberance, deter insurgent/ adversaries, contribute to price discovery.

50%

Performance Royalty in replacements of today's incentives

Broker-Dealers "Publishers"

4 Part-Test
- Willing seller willing buyer standard 75 FR 3597
- Same parties
- Same rights
- Effective competition

5%

Bonus Pool

No change to today's pay

Healthy markets need both farmers and hunters.

Value Chain
- Performance Optimizers
- Asset Gathering
- Intermediaries
- Asset Maximisers
- Retail and Client Services

45%

Royalty cover 50% + unlimited upside
Partially off-loading BDs cost to be paid for by the mechanism.

Base pay 50% of today's total package

Machine learning A.I. shouldn't be exclusive to the elite groups.

Accelerate learning-curve: trade pattern recognition for every investor would enable the crowd to trade competitively.

Pick & Choose, Pay for Channel Subscription(s)

Velocity
Time-lock Encryption (TLE) to make market data available securely in synchronized time.

Consolidated Tape and Self-Aggregators

Proprietary data feeds

Secured Synchronized Starting Line

Non-Featured

Supporting Team employed by publishers

Featured Artists

Algo Publishing Index Benchmark

Record Trade/ Order Sequence

Pareto Improvement
Market efficiency gain

Order Flow

Volume ↑
(1) Fairness ↑ # of participants
(2) ↓ unknowns ↑ transparency
(3) New econ opportunities spur by innovations/ patented tech.

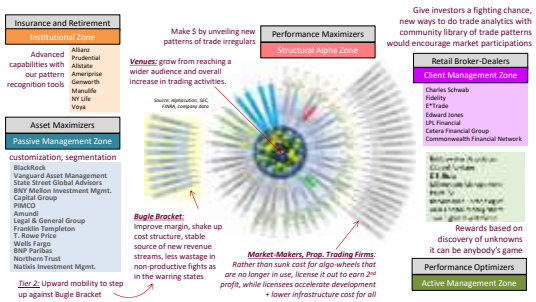
12-20 Algo or "Songs" per annum

20 Days' trade/ order sequence per month

Share liabilities w/ Publishers if caused market chaos/ manipulation.

Trade Match

Different "streamers" based on who they want to serve, how many subscriptions they are going to get and determine whether to carry a broader or narrower "catalogue", which align and address the economic viability of a constituent to exploit its economy of scope and/or economy of scale, hence weed out potential conflicts



Reach wider audience.

Exchanges
→ Online radios or cable TVs, timeless classics, big liquidity pool big royalty burden

MTFs Dark Pools
→ Disney+ as an analogy for an established Bulge Bracket that also owns an MTFs (Netflix)

SIs Wholesalers
→ The broader the "catalogue", the platform would pay a wider range of BDs artists in royalties.

SDPs
→ Single Dealer Platforms/ Comm. Protocols; niche(s) may incl. profane content (Showtime)

Catalogue to disclose served segment(s)
Whose order-flow typically stream on the platform.

Interactive

Immunity up to certain limit
Passive distributors actively curate, moderate contents

Rights → Obligations ⇢ Pass through ⇢ Liabilities →