# Beyond Reg NMS

## A Market Structure Framework for the Modern Era

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# Executive Summary

This paper explores the recent evolution of securities market structure and regulation. It argues that the foundation of the current securities market regulatory framework, Regulation NMS, has become increasingly ill-suited to meet the needs of the market and the investor community as markets have continued to evolve with substantial technological developments and, most recently, the transformative potential of blockchain technology. In considering developments in the cryptocurrency market against this backdrop, the paper outlines a number of policy reforms that regulators at the U.S. Securities and Exchange Commission ("SEC" or the "Commission") should consider to ensure that U.S. capital markets remain competitive, fair and efficient, and the envy of the world. These include: (1) defining a new, multi-factor standard for measuring trade execution quality and best execution; (2) shifting to a principles- and disclosures-based framework for routing compliance; (3) embracing modern data feeds, including first-party data systems such as Pyth, for best execution and price dissemination; and (4) prioritizing transparency, innovation, and competition over overly prescriptive regulatory structures.

# Introduction

Two decades ago, most Americans did not have easy, direct access to the stock market. Today, U.S. equities trading is largely accessible to anyone with a smartphone or an internet connection. For most, executing a trade is now easier and more convenient than buying a physical copy of the newspaper.

Yet, regulation has too often been at odds with progress. The core set of regulatory safeguards designed twenty years ago to protect consumers and ensure a well-functioning U.S. securities market are still in place, even though the market looks nothing like it did when they were originally conceived.

Rapid technological change is the only constant. Market participants have continuously employed new technologies to drive a more efficient market, with greater access for consumers, tighter spreads, and lower fees. However, we should not mistake these observed gains for what could have been possible in a different, more permissive regulatory environment—one where market structure was determined by competition and innovation rather than dictated by overly prescriptive regulatory structures.

We can learn a lot from the crypto market, which has evolved over the last decade with virtually zero regulatory guidance. The results are telling: the crypto market's core infrastructure is gradually absorbing the financial system and taking a substantial portion of investor dollars historically dominated by "traditional" financial institutions and assets.

Specifically, the landscape of trading venues is becoming more fragmented, with an ever-increasing number of globally-distributed platforms, products, and exchanges playing a role in price discovery and liquidity provision. Here, modern data feeds, including first-party data systems such as Pyth, have proven to be a valuable alternative to traditional price information distribution feeds, such as the Securities Information Processors ("SIPs").

In this dynamic environment, policymakers at the SEC and elsewhere should go back to basics and focus on promoting transparency, prosecuting fraud, and fostering competition.

# The Current National Market System Regulatory Framework is obsolete

The national market system was designed to ensure fair competition, efficient execution and the widespread availability to brokers, dealers, and investors of information with respect to quotations for and transactions in securities. However, more than two decades of technological advancement and explosive growth in off-exchange trading have led to major shifts in market structure, exposing critical limitations in the current regulatory framework. Today, regulators are contending with these issues and beginning to reconsider the foundational legal regime that underpins our capital markets.

## Reg NMS

In 2005, the SEC adopted Regulation National Market System, commonly known as Reg NMS. Emerging in the wake of the Dotcom Bubble and a concurrent surge of innovation in technology and market structure, the regulation reflected growing pressures on the national market system first established in the 1970s under Section 11A of the Securities Exchange Act of 1934

(Exchange Act). By the early 2000s, market participants and regulators were again confronting the implications of electronification, antiquated trading models and expanded market access.[1]

According to the SEC, a core motivation for adopting Reg NMS was to promote fair competition among trading venues while ensuring that investors receive the best-available execution price. Before Reg NMS, intermarket price protection relied on the Intermarket Trading System ("ITS"), an electronic communications network linking exchanges established in 1978. However, at the turn of the century, the ITS had become slow, difficult to integrate operationally, and provided incomplete coverage of quotes across markets.[2] Notably, the SEC did not advance proposals for a single, market-wide central limit-order book ("CLOB"), opting instead to strengthen linkages among the fragmented trading venues that comprised the national market system.[3] The resulting system features 17 (and growing) national securities exchanges (for equities) and approximately 37 alternative trading systems ("ATSs") that trade NMS securities.[4]



The National Market System

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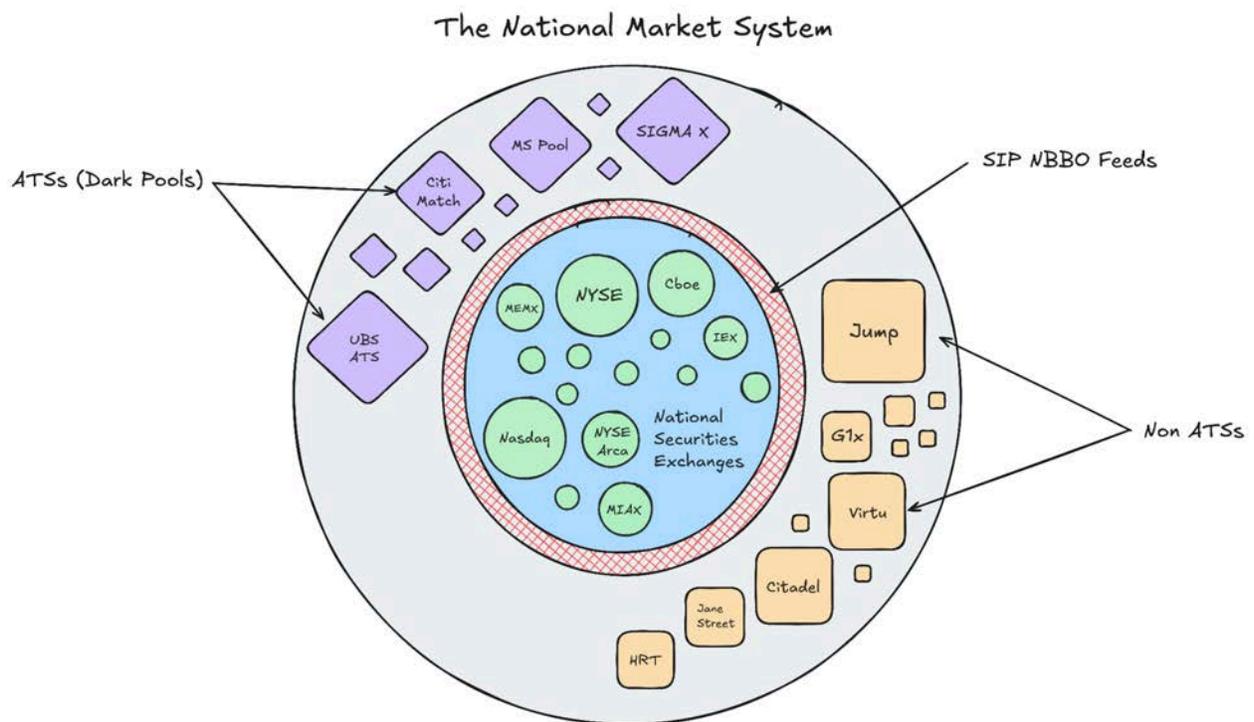
[1] SEC Historical Society, Museum of Am. Fin. History, Market Structure Reform, https://www.sechistorical.org/museum/galleries/msr/index.php.

[2] Regulation NMS, 69 Fed. Reg. 11,126, 11,130 n.7 (proposed Mar. 9, 2004) (to be codified at 17 C.F.R. pts. 200, 201, 230, 240, 242, 249), https://www.federalregister.gov/documents/2004/03/09/04-4712/regulation-nms.

[3] Gray Shorter, Cong. Rsch. Serv., RS20631, The Central Limit Order Book (CLOB) Option for Linking U.S. Stock Markets (Jan. 26, 2001), https://digital.library.unt.edu/ark:/67531/metadc807123/.

[4] SEC, Div. of Trading & Mkts., National Securities Exchanges, https://www.sec.gov/about/divisions-offices/division-trading-markets/national-securities-exchanges; SEC, Div. of Trading & Mkts., Form ATS-N Filings and Information, https://www.sec.gov/about/divisions-offices/division-trading-markets/alternative-trading-systems/form-ats-n-filings-information.

To ground the discussion of tokenization and decentralized technologies, this paper focuses on two core regulatory pillars: (i) the Order Protection Rule (Reg NMS Rule 611); and (ii) the role of ATSs in off-exchange trading of NMS securities.[5]

## The Order Protection Rule and NBBO

The Order Protection Rule is intended to mitigate "trade-throughs," or executions at prices worse than the best-available quotes across markets.[6] A critical part of this framework is the National Best Bid and Offer ("NBBO"), which provides an aggregated real-time view of the best prices across all exchanges using price feeds provided by SIPs governed and operated by Self-Regulatory Organization ("SROs").[7] Rule 611 also establishes limited exemptions that permit trade-throughs under a narrow set of circumstances.

## Alternative Trading Systems

In designing the national market system, the SEC faced the challenge of balancing consistency with competition. Order protection through the NBBO and Rule 611 promotes fair and uniform execution across venues, ensuring investors receive the best available prices regardless of broker or exchange. Yet, like any standardization, these safeguards constrain innovation. The SEC's oversight of ATSs represents an effort to strike this balance by fostering competition while providing an opportunity for smaller trading venues to grow under a less rigid ruleset and a potential path to transition into national securities exchanges once they cross certain thresholds.

Under Reg ATS, the SEC allows ATSs that offer trading in NMS securities to operate subject to a tailored regulatory framework.[8] If an ATS displays quote data externally and its average daily trading volume of a specific NMS stock was 5% or more of the aggregate daily share volume for that stock (during at least four of the last six months), the ATS must make its data available for

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[5] The off-exchange trading landscape encompasses a broader range of venues than ATSs alone, including single-dealer platforms ("SDPs") and other bilateral trading mechanisms—all of which represent potential distribution channels for decentralized pricing infrastructure such as Pyth price feeds. ATSs are used here as an illustrative example because they operate under a defined regulatory framework that facilitates comparison with proposed reforms; however, it bears noting that ATSs represent only a minority of off-exchange trading activity. Non-ATS off-exchange trading (principally bilateral, dealer-intermediated volume) has grown substantially and now accounts for the majority of off-exchange CADV, with ATSs comprising roughly 11–13% of total consolidated equity volume. *See* SIFMA, Analyzing the Meaning Behind the Level of Off-Exchange Trading, Part II (Apr. 14, 2025), https://www.sifma.org/resources/research/insights/insights-analyzing-the-meaning-behind-the-level-of-off-exchange-trading-part-ii/. (noting ATS share of total equity transaction volume averaged approximately 12.5% from 2017–2019 and declined to approximately 10.7% in 2020); *see also* Nasdaq, Off-Exchange Trading Increases Across All Types of Stocks, Nasdaq.com, https://www.nasdaq.com/articles/exchange-trading-increases-across-all-types-stocks (last visited Feb. 19, 2026) (observing that ATS (dark pool) market share has remained "rangebound since at least 2019" while bilateral non-ATS off-exchange volume has driven virtually all off-exchange share growth).
[6] 17 C.F.R. § 242.611 (2024).
[7] Press Release, SEC, SEC Adopts Rules to Modernize Key Market Infrastructure Responsible for Collecting, Consolidating, and Disseminating Equity Market Data (Dec. 9, 2020), https://www.sec.gov/newsroom/press-releases/2020-311.
[8] 17 C.F.R. § 242.304 (2024).

inclusion in the NBBO.[9] If an ATS becomes large enough or the scope of its activities expands, it may be required to meet the fair access provisions of the rule or reduce its activity in its >5% securities. Regardless of size or status, ATSs trading NMS securities cannot execute trades above or below the SIP NBBO unless the trades are exempted.

## Market fragmentation and barriers to entry

When it granted the SEC the statutory authority to establish the NMS in the 1970s, Congress had in mind five overarching objectives: "(i) economically efficient execution of securities transactions; (ii) fair competition among brokers and dealers, among exchange markets, and between exchange markets and markets other than exchange markets; (iii) the availability to brokers, dealers, and investors of information with respect to quotations for and transactions in securities; (iv) the practicability of brokers executing investors' orders in the best market; and (v) an opportunity, consistent with the provisions of clauses (i) and (iv) of this subparagraph, for investors' orders to be executed without the participation of a dealer."[10]

Markets have undoubtedly improved in the last fifty years. For example, according to research cited by the CFA Institute, equity market volumes have gone up, and spreads have tightened (with faster execution and lower transaction costs) since Reg NMS was adopted in 2005.[11] However, it is very possible that structural and operational outcomes might have been *even better* under a more open, less-prescriptive regime. Two SEC Commissioners (Cynthia Glassman and Paul Atkins, the current SEC Chair) dissented from the adoption of Reg NMS, arguing that it would stifle innovation and competition.[12] Subsequent analyses by Commissioner Hester Peirce and the Heritage Foundation have similarly concluded that Reg NMS exacerbated fragmentation and complexity by prioritizing too heavily price and speed.[13] In a 2004 speech before Reg NMS was finalized, Atkins urged the Commission to focus on its core strengths, "Set disclosure standards; prosecute fraud; allow competition; prohibit monopoly." He added, "I would have liked to see us come out with proposals that set objective standards, which would allow the markets to operate efficiently and would remove the Commission from acting as a referee."[14]

In 2024, the top five exchanges (Nasdaq, NYSE, NYSE Arca, Cboe EDGX, and Cboe BZX) accounted for roughly 81% of on-exchange trading volume in U.S. equities. The 12 exchanges outside of the three most dominant exchanges (NYSE, Nasdaq, and Cboe) represented less than 12% of overall equities market volume.[15] These numbers suggest that, in practice, Reg NMS has *not* fostered broad-based competition among trading venues. Moreover, the provision

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[9] Regulation of NMS Stock Alternative Trading Systems, Exchange Act Release No. 34-83663 (July 18, 2018), https://www.sec.gov/files/rules/final/2018/34-83663.pdf.

[10] Securities Exchange Act of 1934 § 11A, 15 U.S.C. § 78k-1.

[11] CFA Inst., Regulation NMS: Review and Recommendations (2017), https://rpc.cfainstitute.org/policy/positions/regulation-nms-review-and-recommendations.

[12] Dissenting Statement of Commissioners Cynthia A. Glassman and Paul S. Atkins, Regulation NMS, Exchange Act Release No. 34-51808 (June 9, 2005), https://www.sec.gov/files/rules/final/34-51808-dissent.pdf.

[13] Hester Peirce, Rethinking the National Market System, 43 J. Corp. L. 649 (2018); Daniel M. Gallagher, How to Reform Equity Market Structure: Eliminate "Reg NMS" and Build Venture Exchanges, in Prosperity Unleashed: Smarter Financial Regulation ch. 7 (Norbert J. Michel ed., Heritage Found. 2017).

[14] Paul S. Atkins, Comm'r, SEC, Remarks Before the Exchequer Club (Feb. 24, 2004), https://www.sec.gov/news/speech/spch022404psa.htm.

[15] SIFMA, US Equity Market Structure Compendium, *2024 Market Metrics & Looking to 2025 with Our Market Structure Survey* (Feb. 2025), https://www.sifma.org/wp-content/uploads/2024/03/SIFMA-Insights-Equity-Market-Structure-Compendium _as-of-2-26-1.pdf.

and maintenance of SIP data (and order flow guaranteed by protected quotes) has been incredibly profitable for exchanges, due to the exclusive and non-competitive nature of the SIP operations and governance.[16] And, while SIP revenue sharing may be lucrative to new exchanges, the costs, rules, and auditing complexities tied to the use of SIP data are formidable blockers to new non-exchange entrants pursuing a low cost alternative for investors and innovative platforms.

# Transparency and competition lead to the best outcomes

Because crypto market structure evolved in the absence of prescriptive regulation, these markets, including both centralized and decentralized finance ("DeFi") platforms, have become some of the most open and competitive in the world. This makes them a valuable natural experiment in how market design unfolds under minimal constraints. It is unclear how and to what extent the NBBO or Order Protection Rule currently applies in decentralized, peer-to-peer trading environments where distributed, automated code is the primary "intermediary" between market participants.  We believe that Rule 611(b)(2) — the "not a regular way contract" exception to the Order Protection Rule – is applicable when instant or near real time or atomic settlement occurs.[17]

Another distinctive feature of crypto markets is the coexistence of both centralized exchanges and fully onchain trading through DeFi platforms. Unlike traditional markets, this spectrum of venues, which also includes intermediated off-exchange platforms and OTC liquidity, operates within a global and highly accessible environment.

## Innovation in price discovery and exchange

Crypto markets have pioneered several new, innovative mechanisms for matching buyers and sellers, particularly in the DeFi ecosystem. Historically, DeFi protocol designers have had to contend with practical constraints (e.g., transaction costs/latency, order queue transparency, permissionless access, etc.) that have forced them to look beyond traditional CLOB-based matching systems.

### Automated market makers

Automated market makers ("AMMs") facilitate trading by replacing order books with pools of liquidity (i.e. inventory) and mathematical pricing formulas. Asset prices adjust automatically based on the pool's relative asset balances, and arbitrageurs align AMM prices with those

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[16] Phil Mackintosh, Nasdaq, SIP Accounting 101 (Mar. 25, 2021), https://www.nasdaq.com/articles/sip-accounting-101-2021-03-25.

[17] Rule 611(b)(2) is "not a regular way contract" exception to the Order Protection Rule. Rule 611 says a trade-through prohibition doesn't apply if "[t]he transaction that constituted the trade-through was not a 'regular way' contract." See 17 C.F.R. § 242.611(b)(2) (2024). In industry compliance plumbing you'll also see it labeled exactly that way (e.g., FINRA's modifier chart lists "SEC Rule 611(b)(2) (Not Regular Way)"). Protected quotations / NBBO assume regular-way settlement economics (i.e., standardized settlement convention for the market/asset). Onchain (atomic / DvP / T+0) settlement is a different bargain: different settlement timing, mechanics, and often different failure/operational-risk profile than conventional regular-way equity settlement. Therefore, an execution that "trades through" a protected quote should be able to rely on 611(b)(2) because it's not "regular way"—it's a non-standard settlement contract, so the quote they "traded through" is not economically equivalent on settlement terms. *See also* FINRA, Trade Modifier Reference Chart, (listing "SEC Rule 611(b)(2) (Not Regular Way)" as a recognized trade modifier), https://www.finra.org/sites/default/files/Industry/p118609.pdf.

offered on other venues, including centralized exchanges. In contrast, for a CLOB to operate efficiently, traders must be able to update their quotes at high frequency and at as low of a cost as possible. This has traditionally been a challenge for permissionless blockchains, which typically exhibit higher latency than privately-managed databases and face variable transaction costs because of endogenous fee markets and non-negligible gas prices.

Despite these challenges, AMMs experienced rapid growth in DeFi as a reliable exchange mechanism because of their relative simplicity, with advances in blockchain technologies introducing economic efficiencies, making AMMs more attractive. A 2022 study found that Uniswap Protocol v3 had deeper liquidity in multiple major trading pairs than leading centralized exchanges.[18] In recent months, we have seen the emergence and widespread adoption of so-called "proprietary" AMMs. Whereas more traditional, constant-product AMMs rely on passive liquidity, proprietary AMMs allow market makers to turn their market-making strategies (including pricing and execution) into programs that can be regularly updated and executed onchain. Proprietary AMMs are significantly less computationally expensive to operate compared to having to continually update quotes onchain.[19]

## Auctions

Most blockchain networks propagate blocks of a fixed size at frequent, discrete intervals. Prior to a block being confirmed by the network's validators in a process known as consensus, there is no canonical ordering of transactions. Pre-settled transactions "arrive" at different validators, which are geographically dispersed, at different times, so traditional ordering in the form of price-time priority is not applicable. Several networks and protocols award blockspace (i.e. execution priority) based on the results of a public or semi-private auction where participants compete on price instead of latency.

## Onchain CLOBs

In the past 5 years, public blockchains have become more performant with respect to latency and throughput.[20] It is now possible to operate a continuous limit order book fully onchain. Although not a novel mechanism, onchain CLOBs benefit from the fact that the order-matching mechanism and settlement infrastructure are completely integrated. When an order is "matched" in the order book, it automatically executes and settles onchain.

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[18] See Uniswap Labs, The Dominance of Uniswap v3 Liquidity (2022), https://blog.uniswap.org/uniswap-v3-dominance.

[19] See, e.g., Helius, Solana's Proprietary AMM Revolution, https://www.helius.dev/blog/solanas-proprietary-amm-revolution.

[20] As an example, LayerZero Labs unveiled a new blockchain called Zero on February 10, 2026. It's designed specifically for high-throughput applications in traditional finance (TradFi), addressing scalability limitations in existing decentralized networks. This project involves collaboration with major institutions including Citadel Securities, the Depository Trust & Clearing Corporation (DTCC), and Intercontinental Exchange (ICE)—the parent company of the New York Stock Exchange (NYSE)—along with others like ARK Invest and Google Cloud. Press Release, LayerZero Labs, LayerZero Announces Zero Blockchain to Build Global Market Infrastructure (Feb. 10, 2026), https://www.businesswire.com/news/home/20260210491975/en/LayerZero-Announces-Zero-Blockchain-to-Build-Global-Market-Infrastructure-In-Collaboration-with-Citadel-Securities-The-Depository-Trust-Clearing-Corporation-Intercontinental-Exchange-With-Strategic-Investment-in-ZRO-from-Citadel-Securities.

Intent-based markets

The DeFi ecosystem has fragmented as it has grown, resulting in a suboptimal user experience for the average retail trader. Builders in the crypto space have designed workarounds for traders using intents and solvers. In a traditional onchain transaction, a user will cryptographically sign a message that, once validated, automatically executes. Intents allow traders to sign messages that define execution parameters (e.g., price and size) while not requiring an opinion on execution venue or modality. A separate set of actors, known as solvers, then compete to fill the order using whichever venue or venues give them the best execution (within the parameters set by the intent signer). This structure eliminates search costs for the end user and places those responsibilities in the hands of the solvers, which benefit from specialization and economies of scale.

Despite its fragmentation and the absence of a regulatory mandate promoting price coherence, DeFi markets are naturally efficient thanks to openness and competitive forces. For example, if the price of an asset on one decentralized exchange ("DEX") is too low, arbitrageurs will buy the asset and push up the price until prices are aligned across markets.

## Innovation in execution and settlement

Legacy market infrastructures have needed to utilize complicated legal and institutional arrangements to facilitate linked or conditional settlement across one or more asset classes or settlement systems. The most-common form is known as "delivery-versus-payment" ("DvP"), which involves the sale of a security in exchange for cash. In a DvP transaction settlement is conditional, meaning the payment leg settles if, and only if, the securities leg settles. This conditionality guarantee reduces settlement risk by making it impossible for the seller of a security to relinquish control of the security without getting paid. Traditionally, this is done using an intermediary, such as a clearinghouse, and a legal process known as novation.[21]

Public blockchains can facilitate conditional settlement, known as "atomic settlement," without the need for an intermediary. Atomic settlement is possible because blockchains serve as an open, programmable settlement layer. For linked transactions occurring within a single blockchain network, smart contracts can be used to facilitate complex transactions where tens or hundreds of assets move in a coordinated fashion. One particularly useful primitive is known as a flash loan, which occurs when someone borrows an asset and repays the loan (plus interest) within a single network block. Since each leg of the flash loan must settle within the same block, it is impossible for the borrower to default on the loan (i.e., if they fail to repay, the entire transaction is cancelled). Flash loans are extremely important for price efficiency in DeFi because they reduce inventory costs for arbitrageurs.

Protocols have also been developed to facilitate atomic swapping across different blockchain networks. Analytically, this scenario is most similar to the DvP example in traditional clearing and settlement because settlement must be coordinated across two systems that are not natively interoperable. Today, cross-chain interoperability protocols allow for trustless transfers between one or more blockchains.[22]

This is a striking contrast to traditional securities markets, in particular, equities. Under Reg NMS, prescriptive rules like the Order Protection Rule enshrine a narrow version of "best

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[21] Comm. on Payment & Settlement Sys., Bank for Int'l Settlements, Delivery Versus Payment in Securities Settlement Systems (Sept. 1992), https://www.bis.org/cpmi/publ/d06.pdf.
[22] Wormhole, Native Token Transfers, https://wormhole.com/products/native-token-transfers.

execution," but often at the expense of innovation and competition, as then-Commissioner Paul Atkins warned.[23] As a result, traditional markets have not embraced mechanisms such as intents-based trading, automated market makers, decentralized price oracles, or atomic cross-domain settlement, which all emerged naturally in crypto. Crypto demonstrates what U.S. equities market structure might have looked like if structures including Reg NMS were more geared toward fostering free-market outcomes.

# Crypto and traditional markets are converging

Despite their different histories and regulatory settings, traditional markets and crypto markets face many of the same underlying market microstructure issues. For example, both must contend with fragmentation across trading venues, adverse selection, and dynamics around speed and order sequencing. Over time, we expect market infrastructures in the two domains to converge in response to demand from their customers, and we are already seeing signs of this today. Policymakers and market participants should work toward markets that are maximally transparent, efficient, and competitive.

## Legacy financial services companies are launching crypto-related products

Increasingly, institutional actors are offering new crypto products and services or incorporating crypto primitives into their existing market infrastructure and customer offerings.

- Bitcoin ETFs have brought many broker-dealers and asset managers into the crypto ecosystem. Bitcoin futures, traded on the Chicago Mercantile Exchange (CME) and Chicago Board Options Exchange (Cboe) play an important role in price discovery, according to a group of researchers at Fidelity.[24]
- Several firms have investigated ways to use blockchain rails to upgrade legacy settlement infrastructure, including the Depository Trust and Clearing Corporation (DTCC) and J.P. Morgan.[25]
- BlackRock and Apollo offer tokenized funds, which are available for purchase and custody onchain and can be used as collateral in many DeFi protocols. Compared to traditional fund structures and administration, the BlackRock BUIDL and Apollo ACRED tokens offer several benefits, including 24/7/365 transfers and real-time net asset value calculations.[26]

As legacy providers have more touchpoints with the crypto ecosystem, they will inevitably look for ways to leverage shared infrastructure. In addition, 2025 saw multiple firms issue products that purport to be tokenized versions of publicly-traded US equities (e.g., NMS stocks). However, under the taxonomy set forth in the SEC's January 2026 Joint Staff Statement on Tokenized Securities, most of the existing tokens would likely be classified as synthetic tokenized securities—specifically, linked securities or security-based swaps issued by a third party that provide synthetic exposure to the referenced equity—rather than custodial tokenized

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[23] Dissenting Statement of Commissioners Cynthia A. Glassman and Paul S. Atkins, supra note 12.
[24] Kevin Robertson & Rene Zhang, Price Discovery in Bitcoin Spot and Futures Markets, 159 J. Int'l Money & Fin. 103415 (2025), https://www.sciencedirect.com/science/article/abs/pii/S0261560625001500.
[25] DTCC, Digital Assets, https://www.dtcc.com/digital-assets; J.P. Morgan, Kinexys, https://www.jpmorgan.com/kinexys/index.
[26] Securitize, BlackRock BUIDL, https://securitize.io/blackrock/buidl; Securitize, Apollo Diversified Credit Fund, https://securitize.io/primary-market/apollo-diversified-credit-securitize-fund.

securities representing a security entitlement in the underlying shares.[27] In practice, these tokens are typically structured as a security interest in a private fund holding the underlying stocks, meaning they neither convey direct or indirect ownership in the referenced equity nor confer upon the holder any rights as a holder of the underlying security.[28]

## Policymakers are gradually bringing crypto primitives into the regulatory perimeter

As markets converge technologically and institutionally, regulation inevitably follows. Several jurisdictions are already harmonizing their treatment of tokenized assets and traditional securities, taking a technology-agnostic approach. In other cases, sandboxes or pilots are being tried to allow for new use cases and functionality provided by distributed ledgers and blockchain technologies, including the integration of trading and settlement systems in the European Union.[29] In the US, the Commission is currently considering an "Innovation Exception" that is expected to provide various exemptions to innovative market participants. However, when tokenized securities achieve scale and legal comparability to traditional securities, it will be increasingly untenable to apply two different regulatory frameworks to assets that are economically identical. As such, it is imperative that exemptive relief, where granted, is applicable both to unregistered and registered entities that seek to benefit from the deployment of new blockchain capabilities.[30]

From a purely operational perspective, aggregating and disseminating the NBBO from a location using a centralized SIP is relatively straightforward, starting with the assumption that there is a  small number of known, authorized exchanges, that are geographically concentrated, and a relatively small set of tradeable securities. This set of assumptions has become detached from reality. As noted above there are currently 17 active securities exchanges and more expected to commence trading operations soon. The geographic concentration in the New Jersey triangle (Mahwah, Carteret, and Secaucus) may end with the impending launch of the Texas Stock Exchange. The geographically centralized aggregation of data for the NBBO is already a broken construct as was recognized in the SEC's approved Market Data Infrastructure Rule, which envisioned decentralized aggregation by competing consolidators.[31] And, the longstanding NMS Plan governance model for the exclusive SIPs has failed to evolve, innovate and, importantly, develop a reasonable pricing model that has adequately made SIP data available to retail investors. The result is that, already, most retail brokers today are providing

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[27] Div. of Corp. Fin., Div. of Inv. Mgmt. & Div. of Trading & Mkts., SEC, Statement on Tokenized Securities (Jan. 28, 2026), https://www.sec.gov/newsroom/speeches-statements/corp-fin-statement-tokenized-securities-012826-stat ement-tokenized-securities.

[28] See, e.g., Dinari, dShares, https://dinari.com/dshares.

[29] ESMA, DLT Pilot Regime, https://www.esma.europa.eu/esmas-activities/digital-finance-and-innovation/dlt-pilot-regime.

[30] This concern is not merely theoretical. A number of registered ATSs are actively seeking to enable atomic settlement of tokenized securities—a capability that would be significantly more cost-effective and operationally viable if those platforms could utilize modern, blockchain-ready price feeds and were not categorically required to comply with the Vendor Display Rule and exclusive reliance on SIP data. To date, regulatory attention under the Innovation Exception framework has focused predominantly on exemptive relief for unregistered platforms. It is equally important that the Commission extend meaningful flexibility to registered entities seeking to deploy blockchain-based infrastructure, so that the regulatory perimeter does not inadvertently penalize compliance.

[31] Market Data Infrastructure, Exchange Act Release No. 34-90610 (Dec. 9, 2020), https://www.sec.gov/files/rules/final/2020/34-90610.pdf.

non-SIP top-of-book proprietary data feeds (e.g., Cboe One, NASDAQ BASIC, etc.) to investors when making investment decisions. These do not include the full quotation data across exchanges, but have been considered viable alternatives for retail investors under most circumstances.

The current exclusive SIPs lack meaningful competition, continue to focus on centralized aggregation (far from where trades are executed), and have failed to establish pricing that is affordable for most retail brokers. Proprietary alternatives that represent subsets of NMS data have already become more viable for most retail broker-dealers and investors. New proprietary data alternatives are emerging that are consumable, competitive, and cost effective for new, innovative blockchain platforms. These alternatives can assist innovative trading platforms, assuming current regulatory strictures and monopolistic display rules do not block their adoption.  Exclusive SIPs are no longer functionally fit-for-purpose in this new world we are entering.

# Pyth price feeds can improve traditional markets, today

The crypto market has developed efficient infrastructure for delivering critical market services, including affordable, accurate, low-latency data feeds. Pyth price feeds are real-time financial data products generated by aggregating proprietary pricing information contributed directly by market participants—market makers, trading firms, brokers, and asset managers—who bear actual risk in the assets they price. This first-party data model stands in contrast to the traditional SIP framework, where exchanges consolidate and resell displayed quotation and transaction data that originates from those same participants' order flow.
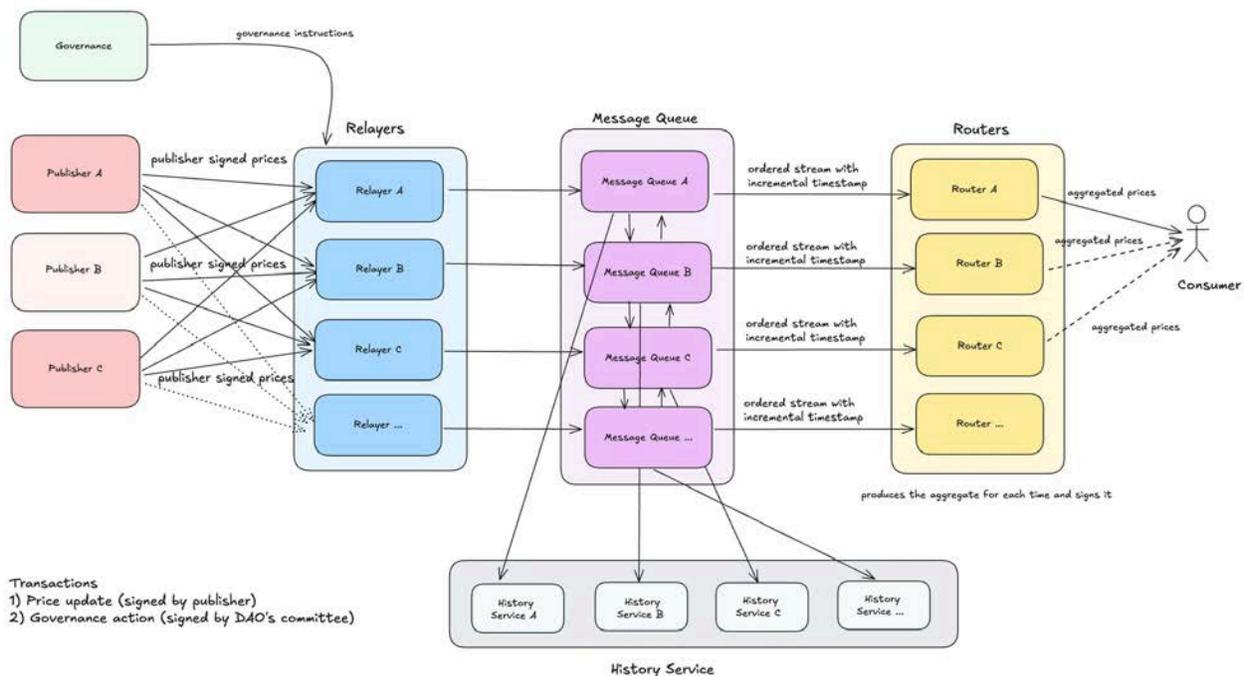


## Pyth realigns market data value accrual

The key driver behind the Pyth network is that, in the existing NMS framework, the economic value of displayed market prices is captured by regulated exchanges—the technical

intermediaries that consolidate and resell data through the SIPs and proprietary feeds—rather than by the market participants whose quoting and trading activity actually produces those prices. Pyth believes that data quality and its economic value should accrue to the risk-takers directly participating in price formation. These participants are well positioned to contribute to a consolidated view of market prices through the combination of executed trade prices and the prices at which they would be willing to transact at the time of publication (e.g., internal evaluated prices), and should be rewarded for their contributions. To that end, contributors to Pyth price feeds are compensated in relation to the quality and consistency of their data provision, among other factors. Pyth further aligns contributor incentives through a tokenized economic model in which data publishers stake reputation and economic value against the quality of their contributions, creating accountability mechanisms absent from the traditional SIP framework. For end users, the result is meaningfully lower data costs and flexible distribution through both onchain and offchain APIs, reducing barriers to entry for firms that have historically been priced out of real-time consolidated market data or locked into expensive proprietary feed agreements. In effect, Pyth serves two core functions analogous to the SIP model—publication and dissemination of market data, and aggregation of multiple sources into a single consolidated price indicator—while realigning the economics so that the value of data accrues to the participants who produce it.

## Global coverage across asset classes

Traditional market data is fragmented by geography, asset class, and vendor—requiring firms to maintain multiple feed agreements, normalization layers, and reconciliation processes to assemble a coherent cross-asset pricing view. Pyth addresses this by aggregating contributor data across equities, fixed income, commodities, foreign exchange, and digital assets into a single standardized interface with consistent formatting, delivery, and pricing methodology regardless of asset class or jurisdiction. Feed inputs are distributed across multiple independent data publishers, eliminating the single-point-of-failure risk inherent in centralized SIP infrastructure.

This unified framework is particularly critical as markets converge around tokenized securities, real-world assets, and hybrid instruments that span traditional and onchain venues. Rather than layering additional data infrastructure to price these emerging products, market participants can access a single consolidated source of truth that already covers the underlying reference assets. Pyth's architecture also accommodates the inclusion of adjacent datasets—such as volatility surfaces, yield curves, and reference data—extending the network's utility beyond spot pricing toward a comprehensive market data layer.

## How Pyth achieves price quality

Pyth aggregates prices from multiple trading firms and achieves high quality of pricing through:

- **Sufficient market representation:** A sufficiently large number of price publishers per asset provide statistically representative price measurements that supplement best execution for investor orders.
- **Publicly-disclosed publisher identities:** To mitigate collusion and manipulation risk, Pyth requires all data publishers to identify themselves and put their reputations on the line.
- **First-party market participants as publishers:** The publishers for each asset are active trading firms that are consistently setting inside market prices (i.e., price

discovery) at SROs. The result is high quality, representative prices coming from the very sources that set the SIP NBBO, provided at low latency and a reduced cost.

- **Economic incentives that reward accuracy and penalize outliers:** Economic incentives are implemented to compensate price contributors for high quality, consistent data and deter bad actors.
- **Transparent price aggregation:** The methodology for the aggregation of publisher prices is open source and accessible to all consumers to better inform consumers as to how Pyth prices are derived.
- **Weighting and confidence intervals with outlier controls:** Pyth employs weighting/confidence intervals and automated systems to detect and suppress outliers that fall materially outside pre-set bounds, enhancing resiliency and resistance to manipulation.

The number of assets priced by Pyth has grown 8.8x over the past two years (Figure 1), primarily driven by growing demand for accurate pricing of equities and other real-world assets (Figure 2).
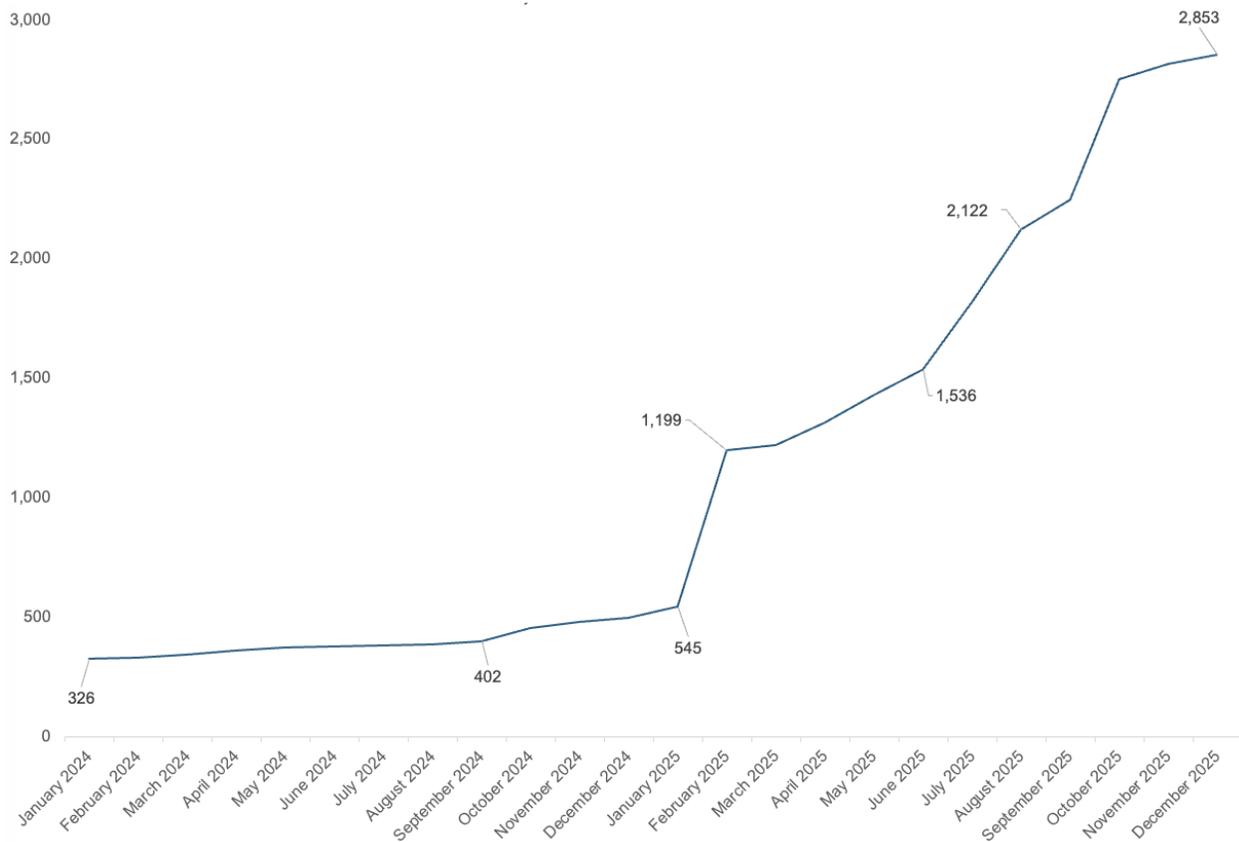


*Figure 1: The number of assets priced on Pyth across all asset classes (Crypto, Forex, etc.) over time*
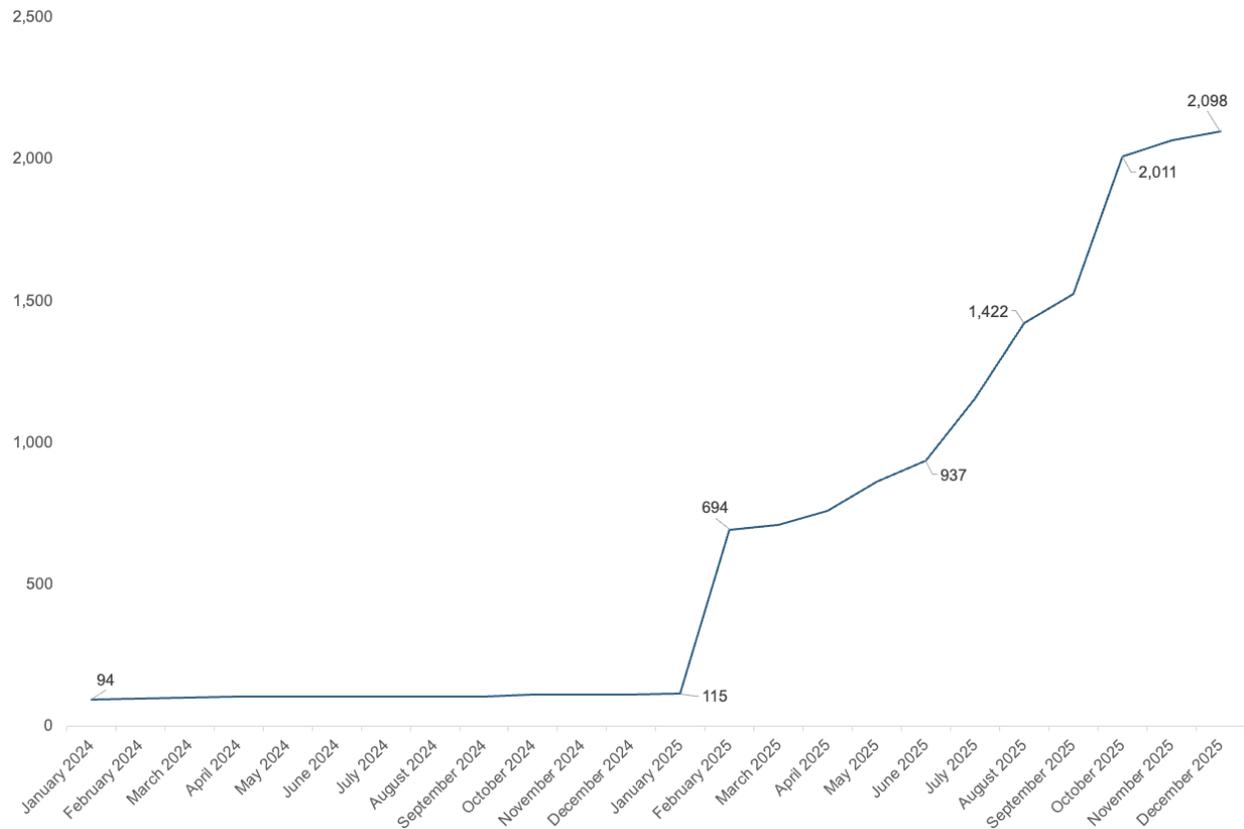
*Figure 2: The number of RWA assets priced on Pyth including Equities, Forex, Commodities and Rates*

## Pyth data is already comparable to the SIP—and improving

Using publicly available SIP data, Douro Labs—one of the initial contributors to the Pyth network—has compared the quality of Pyth prices against the NBBO for U.S. equities and futures and the equivalent best bid-ask prices reported on LSEG's tick history platform. The key outcomes measured are the frequency at which Pyth prices fall within the NBBO, and the median distance from the best bid and ask prices when they do not.

| | Measured Period | Number of Observations | Percentage within NBBO | Median deviation from NBB | Median deviation from NBO |
|---|---|---|---|---|---|
| US Equities (top 100 by market cap) | 2025-11-17 ~ 2025-12-15 | 929,293,360 | 94.2% | 1.49bp | 1.46bp |
| US Equities (top 100 by market cap, excluding MAG7) | 2025-11-17 ~ 2025-12-15 | 864,242,832 | 96.1% | 1.32bp | 1.35bp |
| Equity Futures (top 3 index futures) | 2025-12-01 ~ 2025-12-15 | 1,291,717,770 | 99.1% | 2.13bp | 2.70bp |
| Commodities Futures (Oil) | 2025-12-01 ~ 2025-12-15 | 322,929,443 | 98.1% | 1.72bp | 1.51bp |

*Table 1: Pyth Price quality in comparison to the NBBO for US Equities and Futures*

The analysis shows that Pyth produces comparably accurate pricing information relative to the NBBO. Excluding the MAG7 stocks that trade at penny spreads, Pyth prices fall within the NBBO 96.1% of the time. Accuracy is even higher on futures, where prices fall within the NBBO more than 98% of the time. When prices fall outside the NBBO, the median deviation remains low, with a maximum of 2.70 basis points.

## Policymakers should continue to look toward sensible market reforms

### It is time to revisit the concept of "best execution" with an eye toward how markets operate today

The SEC should adopt four broad reforms to make markets more efficient and able to embrace tokenization.

1. Implement a principles-based approach that considers multiple factors and recognizes the differences and benefits that accompany tokenization

The current regulatory conception of "best execution" is overly simplistic, because it reduces a multidimensional problem into a single variable: displayed price at the time of order routing. The regulatory framework should recognize that execution quality is contextual. A multi-factor framework for "best execution" would better accommodate the diverse array of market needs compared to the current one-size-fits-all standard, which treats execution priorities as constant across a diverse array of market participants with different needs. In reality, market participants value a multitude of factors when executing trades, including: (i) certainty of execution, (ii) privacy, (iii) atomicity, (iv) finality, and (v) all-in cost.

- **Certainty of execution.** In many applications, particularly risk management, certainty of an order fill is strictly more important than a small degree of price improvement. For example, during a period of heightened volatility, a missed fill by a trader caused by routing to a "better" price could mean they are unable to put on a hedge, leaving them exposed to market risk and potentially forcing them to enter the market later at an even worse price. Execution quality should take into account things like fill rates and liquidity depth, acknowledging that sometimes it is worth paying a premium to guarantee execution.
- **Privacy.** Many institutional investors prefer to execute large trades off exchange due to concerns around privacy and information leakage. Such trades are reported to the SIP *after* execution, post-trade. The framework for evaluating execution quality should be flexible enough to allow market participants to continue to make trade-offs between price transparency and price protection, when seeking to achieve optimal execution outcomes.
- **Atomicity.** Many trading strategies involve multiple, conditional or connected trades. This is particularly true of arbitrage strategies, which are vital to keeping prices aligned and markets efficient. If one leg of an arbitrage trade fills while another fails, price (relative to some market average) does not matter. The trader would be exposed to directional risk. A modern execution framework built on this infrastructure would allow traders to execute at prices outside the prevailing best bid or offer when doing so is a component of a fully hedged, multi-leg strategy—achieving by design what Reg NMS requires by exemption.[32]
- **Finality.** Tokenization is opening up several new settlement modalities that offer flexibility superior to the market-convention of T+1. In many cases, it will be desirable for market participants to have the ability to prioritize which settlement platform and window they use, even if that means execution at a marginally-worse price.
- **All-in cost.** The Rule 611 order protection execution paradigm often ignores other factors that contribute to the cost of a trade, including access fees, latency, missed fills, adverse selection and slippage. Specifically, one of the major deficiencies of the NBBO is that it completely ignores the depth of liquidity at a particular price and venue, which is not always sufficient. Depth at the inside market price will further diminish with the implementation of new round lots and, eventually $0.005 trading increments. Research on AMMs has shown that the depth of liquidity on DEXs exceeds that on centralized exchanges, meaning less slippage for large trades at a given price.[33] However, AMMs cannot display any other price than what is implied by a given liquidity pool. Under the current ruleset, traders must execute inefficient trades that actually cost more than the NBBO price.

In order to implement these reforms, we would likely need to see an overhaul of Reg NMS as it exists today. As part of this, the SEC should more closely align the securities market structure with the competitive market structure that emerged organically in the crypto space, which does

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[32] Traditional market structure addressed this problem through the Qualified Contingent Trade exemption under Rule 611(d) of Reg NMS, which permits execution of multi-component contingent orders outside the Order Protection Rule's trade-through provisions, provided all legs are executed at or near the same time and the NMS stock component is fully hedged by the other components. Rule 611(d) of Regulation NMS, 17 C.F.R. § 242.611(d). DeFi protocols enforce this same conditionality natively through atomic transaction execution: smart contracts guarantee that either all legs of a multi-component trade settle simultaneously or the entire transaction reverts, eliminating the partial-fill risk that the QCT exemption was designed to mitigate.

[33] See Uniswap Labs, supra note 18; Nasdaq, New Round Lots Helped Decrease Spreads, https://www.nasdaq.com/articles/new-round-lots-helped-decrease-spreads.

not have prescriptive order routing or any conception of "one price" in the market. In the interim, the SEC should make clear that  the rigid protected NBBO standard of Rule 611 is not applicable for any transactions that offer non-regular way (shorter) settlement.[34]

2. Shift from prescriptive routing to principles- and disclosures-based compliance

In moving away from a one-dimensional measure of execution quality, it is still important that investors be protected. However, rather than a top-down system that attempts to enshrine investor protection in prescriptive routing, the SEC should instead focus its efforts on principles- and disclosures-based compliance. This could take many forms, and it will be critical to engage industry to ensure that it works in practice, especially as Rule 611 is revisited and, ideally, repealed.

3. Embrace Pyth price feeds as a viable substitute to costly, exclusive, and geographically centralized data providers

As NMS stocks are tokenized for trading on more platforms, the market needs to evolve its sources of truth when it comes to price discovery. Relying on the SIP is impractical in today's global market where there is an ever-growing number of execution venues. Along these lines, modern price feeds, such as Pyth's first-party data feeds, should be permitted to be the primary data source in market participants' execution policies.

At a minimum, carrying out this recommendation would likely include providing guidance or other regulatory relief to broker-dealers regarding their use of Pyth data to fulfill execution decisions and disclosure responsibilities, both for onchain (e.g., tokenized) and traditional securities. As more securities trade off of national securities exchanges, the market needs all available tools to disseminate price signals.

4. Regulators should prioritize transparency, competition, and innovation

Instead of layering additional prescriptive rules onto an already complex and rapidly-changing landscape, the SEC should establish mechanisms to study new trading paradigms and market structures.

- One method for doing this could be through the establishment of a "best execution" experimentation sandbox that would allow market participants to test new execution modalities for public and private securities.
- Instead of viewing innovation as a threat to market integrity, policymakers should view it as an essential precondition for maintaining competitiveness and efficiency on the global stage. Rules should be regularly reviewed, and those that fail to demonstrate clear benefits should be promptly rescinded.

Amidst increasing complexity and rapid technological change, the SEC should focus its efforts on areas where it has made the largest historical impact, instead of mandating specific routing and execution mechanics. As then-Commissioner Paul Atkins said in 2005 when he presciently

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[34] This is not a request for novel exemptive relief, but rather a clarification of existing law. Rule 611 by its terms applies to "protected quotations" in NMS stocks traded on a regular-way settlement basis; transactions settling on a compressed timeline fall outside the traditional assumptions underpinning the Order Protection Rule. The SEC should confirm, consistent with the existing regulatory framework, that Rule 611's trade-through protections do not attach to non-regular-way transactions—a position that follows logically from the rule's structure and purpose rather than requiring any new rulemaking or exemption.

voiced his concerns about Reg NMS, it should be "...competitive forces, rather than unnecessary regulation, [that] guide the development of the national market system," and that the regulation as approved was "arbitrary, unreasonable and anticompetitive."[35]

The SEC did not heed Atkins' advice in 2005, but it now has another opportunity to course correct. By focusing on things it can control, like ensuring transparency, prosecuting fraud, and promoting competition among market participants and trading venues, the SEC can promote market efficiency while protecting the integrity of capital markets.

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[35] Dissenting Statement of Commissioners Cynthia A. Glassman and Paul S. Atkins, supra note 12.