

Tokenized Stocks

Price Discovery Under Continuous Fractional Trading

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Cornell/NTU · UNC Chapel Hill · NUS · Tsinghua · NUS

Presented by Che Zhang · May 2026

Motivation: Equities Are Migrating On-Chain

Finance

Share

BlackRock is betting billions that tokenized funds will do for Wall Street what the internet did to mail

In his annual letter, BlackRock CEO Larry Fink argues that digital wallets and tokenized assets could modernize markets and expand investor access.

By [Helene Braun](#), [AI Boost](#) | Edited by [Sheldon Reback](#)

Mar 24, 2026, 12:12 a.m.

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BlackRock CEO Larry Fink (Paul Morigi/Getty Images)

► **Takeaway:** A continuously open, retail-driven venue for U.S. equities — promising timelier price discovery, but with new liquidity and oversight risks.

“The next step . . . will be the tokenization of financial assets — every stock, every bond will be on one general ledger.”

— Larry Fink, Chairman & CEO, BlackRock

- **Tokenized stocks:** blockchain tokens, each backed **1:1** by a real share held in custody.
- Trade **24/7**, in **fractions**, and **globally**; settle on-chain in **seconds**, not T+1.
- An economic mirror of the equity — price and dividends pass through (no voting rights).
- Already **≈\$1.5B** across **2,000+** assets; **≈95%** via Backed (xStocks) & Ondo; Citi projects **\$4–5T** by 2030.

Breaking News: Wall Street and Regulators Go On-Chain

Finance

Share

Here is why Nasdaq and owner of NYSE are putting the \$126 trillion equity market on blockchain

The race for the "everything exchange" makes Wall Street operators and crypto exchanges rivals and partners at the same time.

By Kristian Sandor | Edited by Ayvon Ashraf

Mar 16, 2026, 12:00 a.m.

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Nasdaq sign on a building (Wikipedia Commons/CC BY 2.0, modified by CoinDesk)

Nasdaq & NYSE pitch the \$126T equity market on-chain

SEC · CoinDesk – Mar & Apr 2026

SEC greenlights tokenized securities on Nasdaq *and* NYSE

Same tickers, prices, and investor rights as ordinary shares

Bloomberg – Dec 2025

Kraken acquires Baked (xStocks); trading volume tops \$10B

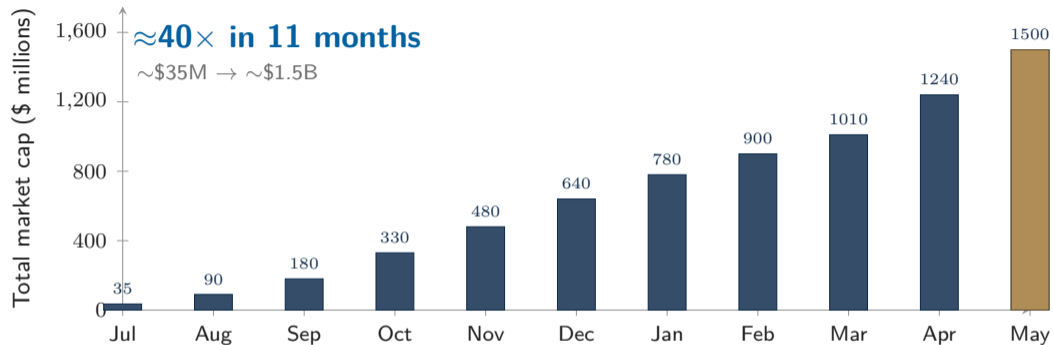
Vertically integrating issuance, trading, and settlement

The Block – 2025

Citadel Securities urges the SEC to hold tokenized equities to the *same* rules

The debate has shifted from *whether* to *how*

The Market: Capitalization Growth, Jul 2025 → May 2026



Milestones: **Jul'25** Backed launches · **Sep'25** Ondo lists 100+ · **Mar'26** crosses \$1B · **May'26** ≈\$1.5B.

Approx. month-end on-chain capitalization; source: rwa.xyz, CoinMarketCap, Kaiko (latest: **\$1.64B**, 2 Jun 2026).

The Largest Tokenized Stocks (Excluding ETFs)

#	Company (ticker)	Mkt cap	Lead issuer(s)
1	Circle Internet (CRCL)	\$196M	Ondo · xStocks
2	Micron Technology (MU)	\$106M	Ondo
3	NVIDIA (NVDA)	\$93M	Ondo · xStocks
4	Tesla (TSLA)	\$87M	xStocks · Ondo
5	Exodus Movement (EXOD)	\$64M	Securitize
6	Alphabet (GOOGL)	\$58M	Ondo · xStocks
7	Strategy (MSTR)	\$41M	xStocks · Ondo
8	Hims & Hers (HIMS)	\$28M	Ondo
9	Forward Inds. (FWDI)	\$26M	Superstate
10	Marvell Tech. (MRVL)	\$21M	Ondo

Per-company value (xStocks + Ondo + others aggregated); ETFs (S&P 500, Nasdaq-100, iShares) excluded. Source: rwa.xyz / CoinMarketCap / Kaiko, 2 Jun 2026.

- Backed (xStocks) + Ondo still account for $\approx 95\%$ of tokenized-equity value.
- A **2026 surge** in Circle, Micron, and NVIDIA as Ondo expanded its catalog.
- Tesla — our case study — remains a top name and the most actively traded.
- Long tail: **2,000+** tokenized assets, but value is concentrated in a handful.

2025–2026: From Proof-of-Concept to Production Infrastructure



- For the first time, the **core plumbing of U.S. capital markets** — NYSE, Nasdaq, DTCC — is actively building tokenization rails.
- Yet the venues lack **circuit breakers** and **unified oversight** — benefits come with new risks.

The Research Question

Traditional exchanges open only **6.5 hours a day** — but more than **70%** of earnings announcements arrive while U.S. markets are **closed**. The same economic claim now trades **continuously, fractionally, and globally** on-chain.

Do tokenized stocks serve as a **complementary venue for price discovery** in traded equities — and if so, is it driven by **informed trading** rather than noise?

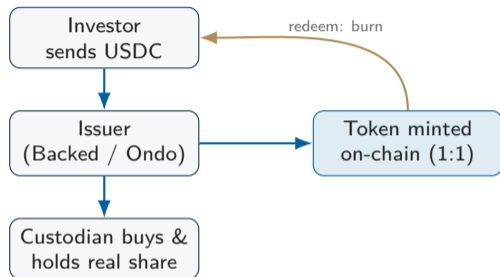
- A natural laboratory: the information event (off-hour earnings) is **held fixed**, while we **vary** whether investors can trade on it immediately.
- Isolates trading-hour constraints from disclosure-processing and attention frictions (DellaVigna & Pollet 2009; Blankespoor et al. 2020).
- **First large-sample empirical assessment** of the tokenized-equity market.

Institutional Background: How Tokenized Stocks Work

A digital bearer claim on a real share

- 1 token (e.g. AAPLx / AAPLon) = **1 share held 1:1 in custody**.
- Economic mirror: price moves + dividends pass through; **no** voting rights.
- Trades peer-to-peer on blockchains (DEXs); settles in **seconds**, not T+1.
- Continuous (24/7), fractional, global — needs only a wallet + stablecoins.

► **Takeaway:** Mint/redeem arbitrage tethers token prices to fundamentals — like ADRs or ETF authorized participants.



If token > stock \Rightarrow mint & sell.

If token < stock \Rightarrow buy & redeem.

Two Market Leaders — $\approx 95\%$ of the Market

	Backed Finance (xStocks)	Ondo Global Markets
Trading hours	24/7/365 (fully decentralized)	24/5 (synced to U.S. hours)
Blockchains	Multi-chain (Solana, ETH, BNB...)	Ethereum (+ planned cross-chain)
Target users	Retail, global	Institutional-leaning
Coverage	~ 60 popular names	100+ stocks & ETFs
Weekend trading	Active price discovery	Limited liquidity
Mint / redeem	Arbitrageurs police 24/7	Restricted to market hours
Regulation	Swiss law	U.S. exemptions

- Two philosophies — **open/continuous/retail** vs. **institutional/compliant** — a **natural experiment in market design**.
- We exploit this contrast throughout the analysis.

What We Find — A Preview

Part I — Tokenized markets contribute to price discovery off-hours

1. Token prices **respond** to value-relevant news released while U.S. exchanges are closed.
2. Off-hour token returns **predict** the underlying's next open: 1% \Rightarrow **+0.28%** close-to-open.
3. Tokenized firms show **weaker post-earnings drift** (**-3.3pp**) vs. matched controls.

Part II — This discovery reflects *informed* trading, not noise

1. Variance decomposition: earnings news = **87.6%** of the explained 3-hour token response.
2. Sophisticated wallets' share roughly **doubles** (10% \rightarrow **25.8%**) before earnings.
3. Transaction-level: off-hour / savvy wallets are **directionally informed**.

Plus — first stylized facts on fractional trading, DeFi, holders & global access (TSLA case).

Data & Sample

Scope

- **Top 100** tokenized stocks by market cap, matched to U.S.-listed underlyings.
- Period: **July 2025 – May 2026**.
- Issuers: Backed (xStocks) + Ondo (>95% of market).

On-chain (the key advantage)

- **>2.1M** Solana transactions across 60 tickers in first 3 months alone.
- Wallet-level transfers via **Helius** API; USD via CoinGecko; holdings via Solscan.
- Every trade & holding is **publicly observable**.

Market & fundamentals

- Token prices/volumes: CoinMarketCap (hourly & 3-hour).
- Underlying prices: Yahoo Finance (aligned to ET).
- Earnings & forecasts: **I/B/E/S**; fundamentals: **Compustat**.

Off-hours = U.S. exchange closed: weekday overnight (16:00–09:30) and weekend (Fri 16:00–Mon 09:30).

Summary Statistics: Fractional, Continuous, Retail

TSLAx — the deepest single-token sample

Total transfers	4,728,485
Total transfer volume	\$1.31B
Mean daily transfers	15,503
Share < \$100	79.9%
Share > \$10,000	0.34%

- Tokens observed on **40% more** days than underlyings (continuous trading).
- Daily return means & vols closely match the underlying (0.16% vs. 0.11%).

Fractional trade-size distribution (in underlying-share units)

Trade size (tokens)	% of transfers	% of \$ vol.
< 1 (fractional)	92.25	14.10
< 0.1	71.26	2.03
< 0.01	39.88	0.08
< 0.001	27.22	0.01

► **Takeaway:** A very large population of **micro**, **fractional** trades coexists with a few large ones — the empirical basis for a retail-driven, fractional-trading venue.

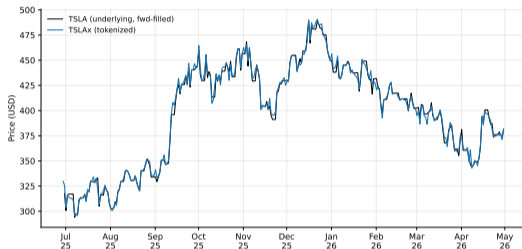
Baseline: Tokens Track the Underlying Nearly One-for-One

During **overlapping** trading hours, are token and stock prices mechanically linked?

$$\log P_{i,t+0.5}^{token} = \alpha + \beta \log P_{i,t}^{stock} + \mu_i + \tau_t + \epsilon_{i,t}$$

- Elasticity $\hat{\beta} = \mathbf{0.74}^{***}$ ($t = 5.4$).
- Adjusted $R^2 = \mathbf{0.994}$ — the underlying explains almost all token-price variation.

► **Takeaway:** Arbitrage works: the token market is tightly coupled to the underlying when both are open. The interesting question is what happens when the underlying is **closed**.



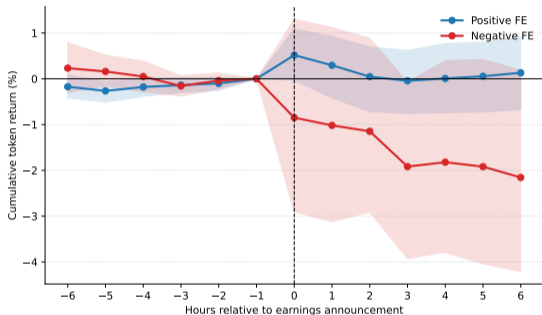
TSLAx (token) vs. TSLA (underlying), Jun 2025 – May 2026.

PART I

Tokenized Stocks Contribute to Price Discovery

Three results during off-hours

Result 1 — Token Prices Respond to Off-Hour Earnings News



Cumulative token returns around off-hour earnings, by sign of surprise.

$$R_{i,e,[0,1h]}^{token} = \alpha + \beta ES_{i,e}^P + \mu_i + \tau_m + \varepsilon_{i,e}$$

- Tokens **rise** on positive surprises, **fall** on negative — while NYSE is dark.
- $\hat{\beta} = \mathbf{0.048}^{***}$ ($t = 3.23$); response concentrated at announcement.
- Trading volume **spikes** around off-hour earnings.

► **Takeaway:** The token market is **not a casino** — it processes the same fundamental information as NYSE, but 24/7.

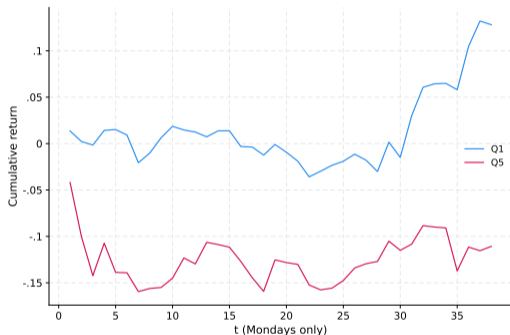
Result 2 — Off-Hour Returns Anticipate the Next Open

$$R_{i,t}^{stock} = \alpha + \lambda R_{i,t}^{token} + \mu_i + \tau_t + \epsilon_{i,t}$$

- A 1% off-hour token return forecasts a **+0.28%***** close-to-open return ($t = 3.09$, $N=23,931$).
- Tokens **lead**, not merely echo, the underlying across sessions.

Duration of closure matters:

- **Overnight** (17h): reversals — noise dominates.
- **Weekend** (65h): anticipation — weekend winners keep winning Monday.



Weekend token returns vs. Monday underlying open — genuine anticipation.

Result 3 — Weaker Post-Earnings Announcement Drift

PEAD — prices drifting in the direction of the surprise for weeks — is a 60-year-old anomaly (Ball & Brown 1968). If limited trading time partly **causes** it, a continuous venue should **weaken** it. Matched difference-in-differences (treated = tokenized firms; 3 PSM controls each):

$$PEADCAR_{[1,20]} = \alpha + \beta(Treated \times Post) + \gamma X + \mu_i + \tau_q + \varepsilon$$

	(1)	(4)
<i>Treated</i> × <i>Post</i>	−0.033** (−2.56)	−0.033** (−2.47)
<i>N</i>	2,657	2,657
Firm controls	Yes	Yes
Quarter FE	No	Yes
Matched-set FE	No	Yes

► **Takeaway:** Once a continuously-open parallel venue exists, earnings information is incorporated more completely — drift falls by **~3.3 percentage points**.

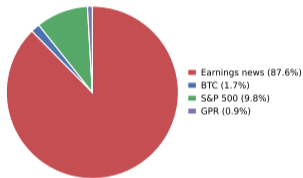
PART II

Is It Informed Trading — or Noise?

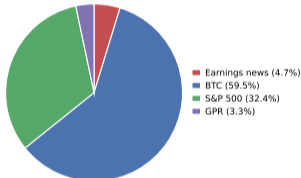
Three tests using on-chain wallet data

Test 1 — Decomposing the Off-Hour Response (Shapley)

Allocate explained within-firm R^2 of token returns across **idiosyncratic** (earnings), **crypto** (BTC), and **systemic** (S&P 500, geopolitical-risk) components.



Token, 3-hour window

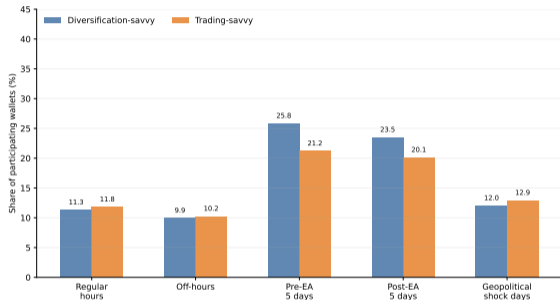


Stock close-to-open

► **Takeaway:** In the 3-hour window, **87.6%** of the explained token response is **firm-specific earnings news** — vs. only 4.7% for the underlying's overnight return. This is information, not crypto beta.

	Earnings	Tok.	Stk.
share		87.6%	4.7%
BTC		1.7%	59.5%
S&P		9.8%	32.4%

Test 2 — Sophisticated Investors Cluster Before Earnings



Share of participating wallets that are
diversification-/trading-savvy.

Savvy = top-decile portfolio diversification or trade count (infrastructure wallets excluded).

- Ordinary off-hours: ~10% of wallets are diversification-savvy.
- 5 days **before** earnings: rises to **25.8%**
— roughly **doubles**.
- 5 days after: stays elevated at 23.5%.
- Geopolitical extreme-move days: only ~12%.

► **Takeaway:** Participation tilts toward sophisticated wallets exactly around **firm-specific** information events.

Test 3 — Off-Hour Trades Are Directionally Informed

For each wallet–event, is the pre-earnings net flow on the **correct side** of the next-open move?

Sophistication horse-race (wallet level)

- **Off-hours trading ratio**: +, significant — habitual off-hour traders are better positioned.
- Trading intensity: **negative** — hyperactive wallets look like market-makers.
- Diversity & trade size: insignificant.

► **Takeaway**: Among everything that could predict informed positioning, the **propensity to trade off-hours** survives — much discovery is traceable to the investors most likely to be informed.

Transaction level (savvy \times window)

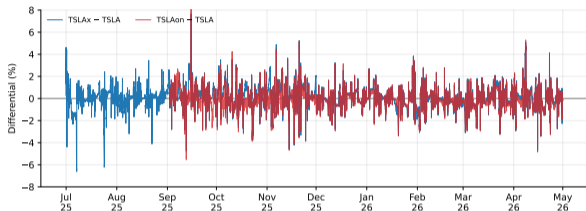
- 1 day **before**: savvy wallets **+11.9pp** more likely correct ($t = 2.09$).
- 5 days **after**: **+16.3pp** ($t = 3.59$) — rapid reaction to public news.
- PIN tests: positive but weak (hence the transaction-level evidence).

PART III

Stylized Facts

A first look inside the market — Tesla (TSLAx) case

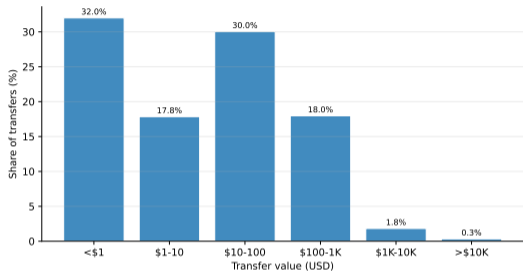
The Tesla Case: Tight Tracking, Informative Weekend Gaps



Token – underlying price differential (xStock, Ondo).

- Median absolute deviation $\approx 0.56\%$ during market hours.
 - Gaps $>1\%$ are more common over **weekends** (24% vs. 18% of hours).
 - **Sept 15, 2025:** TSLAx ran to a $\approx 14\%$ pre-market premium on Musk's purchase news — then converged at the open.
 - Tracking error **widens at earnings**, closes as arbitrageurs realign.
- **Takeaway:** Continuous access works — but thin off-hour liquidity & no circuit breakers allow occasional large, news-driven dislocations.

Fractional Ownership Meets DeFi Composability



Distribution of 4.73M TSLAx transfers by value.

Fractional

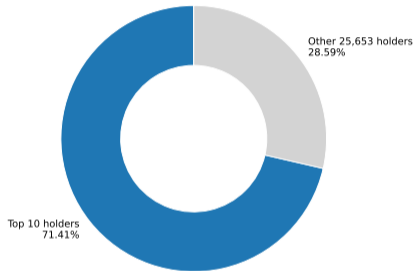
- ~50% of transfers < \$10; ~80% < \$100.
- As little as **0.01** of a Tesla share — infeasible on NYSE.

DeFi-composable

- TSLAx as **collateral** on Kamino (\$4B TVL) since Jul 2025.
- ~2.1M swaps (\approx \$421M); 114k liquidity events (\approx \$108M).
- Tokens become productive assets, not idle holdings.

► **Takeaway:** Lower barriers broaden participation while keeping prices disciplined by arbitrage.

On-Chain Flows & Top-Holder Analysis



229,639 TSLAx across 25,663 owners (May 2026).

- Top 10 hold **71%** — but mostly **infrastructure**: issuer/treasury ($\approx 21\%$) + a market-maker holding the whole catalog ($\approx 20\%$).
- The largest genuine **investor** wallet: **\$24.7M** across 29 tokens — SPYx 23%, TSLAx 22%, QQQx 18%, NVDAx 13%...
- Not a Tesla speculator but a **diversified index investor**; $\approx 14\times$ turnover (active two-way flow).

► **Takeaway:** The "whales" are largely diversified, actively-trading participants and market infrastructure — not concentrated retail hoarding.

Global Access: Demand Skews to Emerging Markets

Top non-U.S. traffic sources (web traffic,

	Country	Share
	Vietnam	22.7%
Backed & Ondo)	Turkey	15.0%
	Malaysia	8.7%
	India	7.3%
	Saudi Arabia	7.5%

- These markets share **high local-currency volatility, limited access** to U.S. brokerages, and **growing crypto adoption**.
- Stablecoins + tokenized stocks = a hedge against local depreciation *and* access to U.S. equity returns.
- A Vietnamese investor with \$10 and a phone can now own fractional Tesla — **financial inclusion** at the frontier.

► **Takeaway:** Continuous, fractional, global access broadens the population that can express views on U.S. equities.

Conclusion — Three Contributions

1. **Disclosure timing & PEAD.** Token prices respond to off-hour earnings surprises, and underlying drift **weakens** once a continuous venue exists — some "anomalies" are partly **market-structure artifacts**.
2. **Retail & fractional informativeness.** In an almost entirely retail setting, small fractional trades (**92.25%** of trades) are **informative**: off-hour returns forecast the next open, and off-hour traders are best positioned.
3. **Price discovery across venues.** A continuously-open, blockchain-based venue is **not a redundant mirror** — it impounds value-relevant news while the primary exchange is closed.

Tokenized stocks do **genuine informational work** — a complementary channel for price discovery in U.S. equities.

Implications for Regulated Digital-Asset Markets

Benefits

- Timelier information incorporation; smoother opening gaps.
- Broader global & fractional access.
- Erodes the strategic value of **off-hour disclosure timing** — "always-on" markets exist now.

► **Takeaway:** As regulators & incumbents move on-chain (Nasdaq 24/5, NYSE, DTCC), these tensions are first-order — tokenized stocks are an early glimpse of a broadly-adopted continuous market.

Costs / risks

- Thin off-hour liquidity \Rightarrow volatility & dislocations.
- No circuit breakers or unified oversight.
- Concentration / manipulation risk; \sim 95% in two issuers.

Thank you

Tokenized Stocks

Price Discovery Under Continuous Fractional Trading

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Comments & questions welcome — zhangche@sem.tsinghua.edu.cn

TOKENIZED STOCKS

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Abstract

Tokenized stocks – blockchain-based representations of traditional equities – are reshaping how markets incorporate information. They enable continuous 24/7 trading, global accessibility to several trading platforms, and fractional ownership. Leveraging a novel dataset covering the hundreds of tokenized stocks launched since July 2025, we provide the first empirical assessment of this market, with a focus on price discovery under continuous fractional trading. While token markets remain small (\$420M market capitalization), they exhibit several economically meaningful dynamics: (i) tokenized stocks incorporate value-relevant news (e.g., earnings announcements) in real time, including announcements released on weekends; (ii) token prices closely track their underlying stocks during regular trading hours but can deviate modestly during off-hours when primary markets are closed; (iii) off-hour trading redistributes the traditional Monday return, with weekend price movements anticipating rather than amplifying subsequent stock market openings; (iv) fractionalization enables a high volume of micro-trades without persistent mispricing, consistent with effective arbitrage; and (v) short-horizon off-hour token returns exhibit reversals, highlighting the role of liquidity and market microstructure when only one trading venue is open. Our results provide a comprehensive empirical assessment of tokenized stocks, offering early insights with broad implications for market efficiency, disclosure, and investor access as traditional equity exposure migrates to fast-growing crypto markets.

JEL classification: G12, G14, G15, G18, G19, G29, M41, M42, M48, K22, K24, O16.

Keywords: DeFi, tokenized stocks, value-relevant news, price discovery, continuous trading, micro trading.

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“We believe the next step going forward will be the tokenization of financial assets, and that means every stock, every bond [...] will be on one general ledger.” – Larry Fink, Chairman and CEO of BlackRock.¹

I Introduction

Financial markets are venturing into a new frontier with the advent of *tokenized assets*, which are digital tokens on blockchains that represent claims on real assets such as equities. The market for tokenized equities was launched in July 2025. Tokenized equities are essentially digital bearer instruments backed one-for-one by shares held in custody and settled on public blockchains. They trade globally, near-instantly, and 24/7 in fine increments, unhindered by the traditional exchange hours of 9:30–4:00 E.T. Proponents of tokenized assets posit that tokenization can enhance price discovery and market efficiency by allowing investors to react immediately to news in a 24-hour news cycle and by democratizing access to global markets.² Critics, however, highlight risks including thin liquidity, regulatory grey areas, and potential mispricing on these unofficial venues. After-hours trading typically suffers from low volume and wide spreads, making prices more volatile and executions costlier.³ Observers note that decentralized token markets lack the protections of traditional exchanges – there are no circuit breakers or unified oversight – raising concerns about manipulation or insider trading.⁴ Even industry insiders warn “it’s a can of worms... people will find ways to do something illegal with these tokens.”⁵ In short, tokenized stock markets promise continuous access but also pose new challenges.

This paper provides one of the first empirical investigations of tokenized equities by examining whether and how the unique features of on-chain trading – continuous market hours, fractional ownership, and a decentralized structure – influence asset prices and trading behavior. In doing so, we focus on several interrelated questions:

1. **Timely Information Incorporation:** Do tokenized stocks facilitate more *timely* incorporation of information, for example, news arriving on weekends or after traditional exchanges close? In other words, does 24/7 availability allow investors to impound news into prices immediately rather than waiting for the next day’s open?

¹In an interview on Bloomberg Television, January 12, 2024.

²See <https://www.nasdaq.com/articles/regulators-consider-24-7-trading-heres-what-investors-need-know>

³See <https://www.investopedia.com/ask/answers/06/afterhourstrading.asp>

⁴See <https://www.starcompliance.com/tokenized-stocks-raise-big-questions-for-compliance-teams/>

⁵See <https://www.coindesk.com/markets/2023/11/16/tokenized-stock-platforms-launch-shares-in-openai-and-spacex-without-the-companies-consent/>

2. **Fractional Ownership and Global Access:** How does tokenization impact investor participation, especially for retail or international users? Can fine-grained ownership reduce barriers to entry and support broader equity exposure, without sacrificing pricing efficiency?
3. **Volatility and Market Quality:** Does 24/7 trading introduce excessive volatility or noise, especially during off-peak times with lower liquidity? How do token markets handle corporate events such as dividends or earnings announcements outside normal hours?
4. **Cross-Market Frictions:** What frictions arise when an asset trades simultaneously on-chain and in traditional venues? For instance, are there persistent price differentials between the token and the underlying stock, and what arbitrage mechanisms – such as redemptions – or market design choices help keep the two in sync?

To address these questions, we compile a dataset covering the most liquid tokenized stocks as of October 2025. We document their price behavior, trading volumes, and holder composition across the major platforms. The aggregate market capitalization of tokenized equities is about \$420 million as of October 2025 – negligible compared to the \$46 trillion U.S. stock market – but it has grown more than 14-fold since trading began in July of 2025. Roughly 95% of the market value is dominated by two issuers, Backed Finance, which issues “xStocks”, and Ondo Finance. These two platforms provide contrasting market designs and investor bases, which we exploit in our analysis. In particular, whereas Backed enables fully decentralized 24/7 trading across multiple blockchains, Ondo synchronizes token redemptions and settlements with U.S. market hours, resulting in an effective 24/5 structure. This difference – a continuous round-the-clock market vs. a quasi-continuous market tied to traditional hours – offers a unique opportunity to observe how market design choices affect liquidity and price dynamics. Our findings are summarized as follows:

Response to Value-Relevant News: A prerequisite for tokenized markets to enhance price discovery is that token prices respond to value-relevant information rather than merely reflecting liquidity or speculative trading. We therefore examine whether tokenized stocks react to fundamental corporate news in ways comparable to their underlying equities. Focusing on a sample of the 100 most liquid tokenized stocks and their corresponding U.S.-listed underlying assets, we study how token prices behave around earnings announcements – canonical information events with clear valuation implications – particularly when such news is released outside regular U.S. trading hours. Our evidence shows that tokenized stocks respond systematically to earnings announcements, with price

movements aligned with earnings surprises and heightened trading activity around disclosure. This finding establishes that tokenized stocks process fundamental information, providing a foundation for subsequent analyses of price discovery beyond traditional trading hours. Notably, tokenized stocks display weaker post-earnings announcement drift (PEAD) compared to the underlying stocks. This attenuated drift suggests that token markets incorporate earnings information more completely at the time of announcement.

Continuous Price Discovery: Token prices closely track their underlying stocks during regular exchange hours, confirming tight arbitrage linkage when both markets are open. When the primary market is closed – overnight or on weekends – token prices can deviate from the last observed stock price, reflecting the absence of contemporaneous trading in the underlying asset. Importantly, these off-hour price movements often anticipate the direction of the next official trading session. For example, during a late-September 2025 weekend, the tokenized Tesla on Backed and Ondo fell by about 3%, previewing the Monday morning decline in Tesla’s stock when U.S. markets reopened. These patterns suggest that token markets process information in real time, enabling intertemporal price discovery across trading sessions, albeit with greater noise when liquidity is thin.

Fractional Ownership and Access: Tokenization democratizes participation in equity markets by enabling fractional ownership and global access. Fractional tokens allow investors to acquire small exposures to high-priced equities – for example, 0.01 of a Tesla share for only a few dollars – and to trade them from anywhere in the world using only a crypto wallet and stablecoins. This lowers barriers to entry and expands the geographic scope of price discovery, allowing information and order flow from international investors to influence prices at any time. We document that many token holders are located outside the United States and that micro-trades (often below \$100) occur at high frequency without generating persistent mispricing, suggesting that arbitrage and issuer mechanisms remain effective even at very small trade sizes.

Market Microstructure Differences: Differences in platform design play a central role in shaping liquidity and price dynamics. Backed’s tokens trade continuously on decentralized exchanges across multiple blockchains, supporting active weekend and overnight trading by a broad base of retail participants. In contrast, Ondo’s tokens synchronize creation and redemption with U.S. market hours, resulting in an effective 24/5 structure and more limited off-hour activity. As a consequence, whereas Ondo’s token prices tend to remain tightly anchored to the underlying during weekdays, Backed’s tokens exhibit greater off-hour price variation and participation. These contrasts illustrate that continuous market access does not guarantee uniform liquidity at all times; instead, market

quality depends critically on platform design and participant composition.

Arbitrage and Link to Fundamentals: Despite differences in trading intensity and market design, token prices remain tightly linked to their fundamental value – the price of the underlying stock – through arbitrage mechanisms analogous to those observed in cross-listed securities such as ADRs. Deviations between token and stock prices are typically small and short-lived, particularly for fully backed tokens that are redeemable one-for-one for the underlying asset. Larger price gaps occasionally arise when arbitrage is constrained, such as during weekends or holidays, but these gaps generally close once trading or redemption resumes. This behavior indicates that, even in a decentralized and continuously open environment, market forces enforce parity with fundamentals in the medium term. We further document that tracking errors around earnings announcements are transient. Although token–stock price gaps spike briefly at the moment of announcement, they close rapidly as arbitrageurs realign the two markets, confirming that arbitrage mechanisms remain effective even during high-information events.

Return Predictability and Anticipation of Stock Prices: Beyond contemporaneous price adjustment, we examine whether tokenized stock returns realized during off-hours contain information about subsequent price movements in the underlying equities. Using the same sample of 100 tokenized stocks and their corresponding underlying assets, we test whether off-hour token returns predict the stock’s next opening return. We find that token returns accumulated while traditional exchanges are closed – particularly over weekends – systematically anticipate subsequent stock market openings. This evidence suggests that tokenized markets not only reflect information as it arrives, but can also lead the underlying market in incorporating information across trading sessions.

Overall, our results show that although tokenized stock markets are still small and sometimes illiquid, they function as a useful laboratory for continuous trading. Prices in these markets generally do reflect fundamental information and even incorporate news that breaks outside of Wall Street’s schedule. At the same time, the costs of thin liquidity are evident in higher short-term volatility and occasional price dislocations. Regulatory commentary has noted these concerns: token venues operate in a gray area without the standard investor protections or circuit breakers of traditional exchanges.⁶⁷ Indeed, we observe that extreme movements can occur on token exchanges that likely would have triggered halts in regulated markets. Nonetheless, our evidence suggests that continuous trading can extend price discovery across temporal boundaries – weekend token trading often foreshadows the direction of Monday’s stock moves, smoothing what might otherwise be a sharp gap at the open. In this sense, tokenization

⁶See <https://www.starcompliance.com/tokenized-stocks-raise-big-questions-for-compliance-teams/>

⁷See <https://www.congress.gov/bill/118th-congress/house-bill/4763>

offers a glimpse of what a future with nearly continuous equity trading might look like if broadly adopted, which comes timely given Nasdaq's recent proposal to extend trading hours.⁸ It shows both the potential benefits of moving beyond the 9:30–4:00 paradigm, such as timelier information incorporation and broader global access, and the associated challenges, including liquidity fragmentation and regulatory arbitrage.^{9,10}

Our findings thus have implications for market efficiency, the design of trading platforms, and even corporate disclosure policies in a world where markets never sleep.

Literature. Our study connects to work in market microstructure, international finance, and crypto-asset markets.¹¹ First, we relate to research on after-hours trading and extended market windows. Equity markets traditionally operate with limited trading hours, and off-hours activity typically exhibits lower liquidity and higher volatility. Nonetheless, after-hours prices partially incorporate information, as evidenced by ECN tradings in the 1990s. Recent interest in 24-hour trading (e.g., [Newbery, 2025](#)) reflects this trend, with major exchanges proposing 24/5 or 22/5 sessions. Tokenized stocks offer a market-driven version of near-continuous trading. We examine whether 24/7 token markets enhance price discovery or instead suffer from thin liquidity during off-peak hours. Our findings on weekend token returns foreshadowing Monday openings suggest that continuous trading can smooth information incorporation, even if market quality may degrade in low-liquidity segments ([Fama, 1965](#); [O'Hara, 2015a](#)).

Second, we add to the emerging literature on real-world asset (RWA) tokenization. Although RWA tokenization has long been discussed conceptually, scalable applications are recent ([Harvey et al., 2025](#); [Cong et al., 2025b](#)). Market reports show rapid growth in tokenized equities, from \$9 million to \$127 million between early 2025 and September 2025, with total projects valued at \$342 million.¹² Yet the market is concentrated (95% issued by two firms) and operates under regulatory uncertainty. Compliance concerns surrounding manipulation and unauthorized listings remain salient (e.g., [Brown, 2024](#)).¹³ Our analysis provides empirical evidence on how these markets function in practice.

⁸See <https://www.reuters.com/business/finance/nasdaq-seeks-extend-trading-hours-wall-street-gears-up-24-7-move-2025-12-15/>

⁹See <https://www.nasdaq.com/articles/24-7-trading-coming-it-good-thing>

¹⁰See <https://www.nasdaq.com/articles/why-around-the-clock-trading-for-stocks-could-be-coming-soon>

¹¹A large and fast-growing literature in decentralized finance examines governance ([Cong et al., 2025c](#)), open-source innovation ([Gefen et al., 2024](#); [Landsman et al., 2025a](#)), disclosure ([Luo and Yu, 2024](#); [Anderson et al., 2025](#); [Awyong, 2024](#)), auditing ([Bourveau et al., 2024](#); [Bhambhwani and Huang, 2024](#); [Landsman et al., 2025b](#); [Knechel et al., 2025](#)), capital formation ([Bourveau et al., 2022](#); [Lyandres et al., 2022](#)), interoperability ([Cong et al., 2023b](#)), market manipulation ([Amiram et al., 2025](#); [Cong et al., 2023d](#); [Aloosh and Li, 2024](#)), illicit flows ([Foley et al., 2019](#); [Amiram et al., 2022](#); [Makarov and Schoar, 2022](#)), cybercrime ([Sokolov, 2021](#); [Cong et al., 2025a, 2023a](#)), taxation ([Cong et al., 2023c](#); [De Simone et al., 2024](#); [Hoopes et al., 2022](#)), and corporate blockchain adoption ([Harvey and Rabetti, 2024](#); [Luo et al., 2024](#); [Lee et al., 2024](#)). To our knowledge, we provide the first empirical examination of tokenized stocks.

¹²See <https://www.mexc.com/en-PH/news/tokenized-stock-market-dominated-by-only-two-players-study-reveals/117504>.

¹³See <https://www.starcompliance.com/tokenized-stocks-raise-big-questions-for-compliance-teams/>.

Finally, our study speaks to work showing that small, off-exchange, and fractional trades can be informative. Fang et al. (2024) document that fractional trading expands participation without harming efficiency; O’Hara et al. (2023) highlight informational roles of odd-lot activity; and Cong et al. (2023b) examine blockchain-based market design. We extend these insights to on-chain tokenized equities, illustrating how 24/7 crypto trading platforms provide a natural environment to study informational efficiency when traditional access and time constraints are relaxed.

2 Institutional Background and Setting

In this section, we provide an overview of tokenized equity markets and the institutional details of the major platforms studied. We explain how tokenized stocks operate in practice, including issuance, trading mechanisms, and differences between providers and blockchain platforms. Understanding these details is critical for interpreting our empirical results.

2.1 What Are Tokenized Stocks?

Tokenized stocks are digital tokens on a blockchain that represent an economic interest in an underlying equity security. In substance, a tokenized stock functions much like a depository receipt or a share certificate: each token is backed 1:1 by a corresponding share held by a custodian in the fully collateralized model. For example, an Apple token, such as AAPLx or AAPL on depending on the issuer, represents one share of Apple Inc. held in custody by the token issuer or its banking partner. Investors who buy the token receive the financial returns of Apple stock. Increases in Apple’s share price are reflected in token prices, and dividends are designed to be passed through to token holders via changes in either token quantity or price. However, holding the token typically does not confer legal ownership of the share or shareholder rights such as voting or attending annual shareholder meetings. The token is purely an economic mirror of the stock.

Two primary models exist for tokenized stocks: *synthetic* vs. *fully backed*. In the synthetic model, the token issuer might not hold the actual underlying shares but instead promises to pay the token holder the equivalent value. This is essentially a derivative contract and introduces counterparty risk. In contrast, the fully backed model, sometimes referred to as the “1:1 backed” or “wrapped” model, involves the issuer or a custodian holding the actual shares in reserve. Both Backed and Ondo follow the fully backed model for their public stock tokens, thereby providing more security to investors because the tokens are tied to real assets. There are also hybrid cases emerging,

for instance, some platforms tokenizing private or pre-IPO stocks might hold contractual claims or special purpose vehicle interests rather than actual shares arising from legal complexities.¹⁴

An important operational aspect is how tokens are created (minted) and destroyed (redeemed). Typically, eligible participants can deliver cash – often in the form of stablecoins such as USDC – to the issuer to mint new tokens, which triggers the issuer to buy the corresponding real shares in the market. Conversely, token holders can redeem tokens for cash equivalent to the underlying share value, and the issuer will subsequently retire or reallocate the corresponding shares. This arbitrage mechanism is crucial in keeping the token’s price aligned with the stock’s price. If a token trades above the stock’s market price, arbitrageurs can mint new tokens, by buying stock and exchanging for tokens if permitted, and sell them, pushing the price down. If a token trades below the stock price, arbitrageurs can buy the cheap tokens and redeem them for the higher-valued share or cash, pushing the token price up. In practice, these actions may be subject to fees, Know Your Customer (KYC) or Anti-Money Laundering (AML) checks, and time lags. For example, Ondo only allows redemptions during market hours to ensure they can liquidate the shares. But the presence of any redemption/mint mechanism distinguishes these tokens from pure synthetic derivatives and should, in theory, tether prices more closely to fundamentals.

Trading of tokenized stocks takes place on a cryptocurrency infrastructure. Unlike traditional stocks that trade on centralized exchanges such as the NYSE and NASDAQ via brokerage intermediaries, tokenized stocks trade on blockchain networks peer-to-peer. Investors use crypto wallets to hold tokens and can trade them on decentralized exchanges (DEXs) or through centralized crypto exchanges that list these tokens. For example, many Backed xStock tokens are listed on DEXs on Solana and decentralized finance platforms. There are also some centralized crypto exchanges – such as MEXC and Gate.io – that have listed tokenized stocks. Such exchanges effectively act as an interface for users to trade with order books, but settlement still occurs on-chain. One key point is that blockchains operate continuously. As a result, trading can occur at any time, and settlement is near-instant: trades typically settle within seconds or minutes on-chain, as opposed to the T+1 settlement in traditional equities where trades settle one business day after execution.

The regulatory status of tokenized stocks is complex. Because they represent securities, a case could be made that they are securities and subject to securities laws. Issuers have taken different approaches to comply or to fit within exemptions. Ondo, for instance, restricts its offering to non-U.S. investors and qualified purchasers in certain jurisdictions, to avoid running afoul of U.S. securities registration.¹⁵ Backed’s tokens were initially offered

¹⁴ See <https://www.mexc.com/en-PH/news/tokenized-stock-market-dominated-by-only-two-players-study-reveals/117504>.

¹⁵ See <https://www.prnewswire.com/in/news-releases/ondo-brings-over-100-tokenized-us-stocks-and-etfs-onchain-starting-on-ethereum-302545276.html>.

under regulatory sandbox exemptions in Europe, such as in Liechtenstein, and similarly geo-fenced away from U.S. individuals. This means that although the tokens trade permissionlessly on-chain, the primary issuers only directly interface with regulated participants. How enforcement of geographic restrictions can occur on a public blockchain is an open question. For example, it is possible to obtain tokens on a DEX even if technically located in the U.S., thereby raising compliance issues. These regulatory grey areas are a reason why some commentators call tokenized stocks legally a potential “can of worms.” To date, there have been no major legal actions against the leading token issuers, but the space is being watched closely by regulators globally.

2.2 Backed Finance (xStocks) vs. Ondo Finance

Backed Finance (often referred to simply as “Backed”) and Ondo Finance have emerged as the two primary providers of tokenized stocks, but they have notable differences in strategy:

Backed xStocks: Backed Finance, a Swiss-based firm, introduced its tokenized equities – branded as xStocks, with an “X” suffix in tickers – starting in 2022 and expanded through 2023. It initially offered a small selection of popular stocks, such as TSLAx and AAPLx for Tesla and Apple, on the Ethereum and Solana blockchains and supported by partnerships with crypto infrastructure firms and custodians to hold the underlying assets. Backed’s tokens are issued under Swiss law as tokenized securities and reportedly can be freely traded by non-U.S. individuals. A distinguishing feature is that Backed actively listed its tokens on multiple chains and exchanges. For instance, each xStock is available on the Solana network and often also as an ERC-20 on Ethereum or as a BEP-20 on BNB Chain, with the issuer using custodial bridging to mirror the token across chains. This multi-chain presence means xStocks can tap into liquidity on different ecosystems. Solana, with its low fees and high throughput, has exhibited particularly active trading of xStocks; the Phantom wallet (a popular Solana wallet) even integrated a Tokenized Stocks section specifically for Backed’s tokens.¹⁶ Users of Phantom can swap SOL or USDC directly for xStocks. Backed’s design choice is to allow 24/7 trading with no enforced market hour limitation, leaving it to arbitrage to keep prices aligned. Dividends on xStocks are handled by automatically increasing holders’ token balances, which is relatively easy to implement on Solana since tokens are account-based. For example, if Apple pays a dividend of 1%, each AAPLx holder simply finds a balance that is 1% higher. This approach means the token price chart might appear to diverge from the stock price over long horizons because part of the return shows up as token quantity growth, but economically the total return is matched.

¹⁶See <https://help.phantom.com/hc/en-us/articles/44063915243283-How-to-trade-Tokenized-Stocks-in-Phantom>.

Backed's xStocks were among the first to be available and gained a head start in user adoption and exchange listings. By mid-2025, xStocks were listed on at least a half-dozen trading venues and integrated into DeFi protocols for borrowing/lending. This broad availability gave xStocks a larger investor base, as noted in a news report: "*xStocks has more exchange listings, exposing it to a larger investor base, while Ondo's offering is designed for deeper liquidity.*" However, xStocks remained limited in the number of different assets, on the order of 50-60 tickers. Backed has taken a conservative approach to adding new stocks, presumably focusing on those with sufficient demand and liquidity.

Ondo Global Markets: Ondo Finance launched its tokenized stock platform later, in September 2025, but with a splash – over 100 stocks and ETFs listed at once – and was touted as the largest launch of tokenized equities to date. Ondo's offering (tickers ending in "on") is notable for its scale and its emphasis on seamless conversion between on-chain and off-chain. Ondo built its platform with an eye to U.S. institutional standards: daily attestations of reserves, a robust legal structure for bankruptcy remoteness, and partnerships with well-known custodians and brokers in the U.S. to actually hold the stocks. Ondo tokens initially live on Ethereum (an ERC-20 standard token), and the company announced plans to enable cross-chain support to BNB Chain and Solana. Unlike xStocks, which already exist on multiple chains, Ondo, at launch, was only on Ethereum; thus, trading required paying gas fees, which might have kept small retail traders away. Indeed, as our data shows, many Ondo tokens have very few holders. This suggests that usage so far skews to larger players who might be willing to endure Ethereum transaction costs or possibly trade off-chain via partner exchanges. Ondo mentioned support by exchanges, such as MEXC and OKX, at launch.

A key difference between the two markets is trading hours. Ondo explicitly aligns token trading with underlying market hours to some extent. Although participants can transfer tokens 24/7, Ondo only allows creations and redemptions during U.S. market hours and cautions that overnight or weekend trading may face limited liquidity. In fact, Phantom's documentation noted: "*Backed xStocks trade 24/7. ... Ondo tokenized stocks follow U.S. market hours (24/5), with pre-market, core, post-market, and overnight sessions. There may be short pauses between sessions or during events like corporate actions or holidays. Overnight liquidity may be lower.*"¹⁷ This description implies that Ondo might intentionally pause trading over the weekend or that effectively no liquidity is present then. Interestingly, our dataset indicates that there have been price updates for Ondo tokens on weekends, perhaps reflecting sporadic trades or indicative pricing. It remains to be seen whether Ondo will more formally halt trading on weekends if it deems it necessary to maintain parity with underlying markets. The rationale for Ondo's approach is to

¹⁷See <https://help.phantom.com/hc/en-us/articles/44063915243283-How-to-trade-tokenized-stocks-in-Phantom>

prevent large deviations when arbitrage to the underlying is unavailable. If no one can redeem on a Saturday, a token price could, in theory, drift far from economic reality; by discouraging or limiting such trading, Ondo may be trying to preserve stability. In contrast, Backed relies on arbitrageurs – presumably market makers running algorithms 24/7 – to police the price. Given the smaller scale historically, this has worked reasonably well for Backed, but as volumes grow, Ondo’s more controlled approach might be more efficient at preserving the price parity of tokens and the underlying stocks.

Another difference is asset breadth and focus. Ondo not only listed tech stocks – such as Apple, Tesla and Nvidia, but also many large-cap stocks across sectors – such as banks and industrials, and several bond and equity ETFs – such as a high-yield bond ETF and the Russell 2000 Value ETF. This broad selection of 100 tokens initially, with stated plans to reach 1,000 tokens, is a departure from Backed’s curation of the most popular few. By offering a wide menu, Ondo is presumably testing the demand for long-tail assets – securities with relatively low individual trading volume compared with headline stocks. However, the result, as documented, is that many tokens are thinly held/traded. It may be part of Ondo’s strategy to have a comprehensive product suite ready for future growth, or to cater to institutions that might want to tokenize specific holdings.

Both platforms share the similarity of being custodial, i.e., someone holds the real stock, and not conferring shareholder rights to token holders. We note that a third approach, referred to in an Animoca research report as *native issuance*, in which a regulated vehicle issues tokens that actually represent ownership, such as a fund issuing token shares that directly correspond to holding stock. One project called Superstate is experimenting with this for a specific stock – Galaxy Digital’s stock on a blockchain. Native issuance could, in theory, give token holders voting rights or other direct ownership attributes, but it requires complex regulatory approval, essentially creating a mutual fund or trust that is tokenized. As of 2025, such efforts are nascent and not part of mainstream tokenized stock trading. Thus, our study focuses on the prevalent model used by Backed and Ondo.

In summary, Backed’s xStocks and Ondo’s tokenized stocks are similar in that each provides on-chain versions of equities, but they differ in execution details. We will leverage these differences by sometimes treating them as two subsamples in the analysis. For example, when examining liquidity or the number of holders, we compare xStock vs Ondo to highlight how a more retail-focused, multi-chain approach contrasts with a more institutional, Ethereum-based approach.

2.3 Blockchain Platforms

The choice of blockchain platform can influence the trading activity and user base of tokenized stocks. Our dataset includes tokens on multiple chains: Ethereum, where all Ondo tokens reside, and some xStocks have ERC-20 versions; Solana, where all xStocks are available and actively traded; and BNB Smart Chain and Arbitrum for some xStocks.

Each chain has different characteristics. Ethereum is the most decentralized and has the broadest user base in DeFi, but it currently has higher transaction fees and slower throughput (block times 12 seconds), compared to Solana's low fees and sub-second block times. Solana's low fees make it attractive for high-frequency and small-size trading; indeed, retail traders using Phantom can swap tiny amounts of tokens without worrying about gas costs. This likely contributes to the large number of small holders for xStocks on Solana. BNB Chain lies somewhere in between – lower fees than Ethereum, a large user base, especially in Asia, but more centralized. Arbitrum is a fast Ethereum Layer-2 that can host tokens with cheaper fees than the mainnet.

Backed's multi-chain strategy means that liquidity could fragment across chains. However, in practice, arbitrageurs will try to equalize prices across Solana, Ethereum, BNB, etc., using bridging or cross-exchange trading. If one chain's DEX has a token at a lower price, bots can buy there and sell on the other. The presence of integrated cross-chain protocols, such as LayerZero, which Ondo mentions for interoperability, may further unify liquidity. But we cannot assume a perfectly efficient single price; momentary discrepancies and varying liquidity on each chain could mean some chains consistently have better volumes or tighter spreads.

Our study does not separately analyze each chain's order books, which would be complex. However, we note qualitatively that as of 2025, Solana appears to host the most active trading for tokenized stocks, especially via the Jupiter aggregator and other Solana DEXs. Ethereum's on-chain order flow for these tokens is relatively sparse due to cost, though some trades occur on DEXs like Uniswap if liquidity pools exist. BNB Chain has some centralized exchange support, for example through tokens listed on exchanges that use BNB Chain for custody. These nuances might explain some of the volume patterns we see – for example, a token heavily traded on Solana might show higher turnover than one mainly on Ethereum.

Chain differences could also influence investor demographics: Solana's crypto community skews toward retail and DeFi degens; Ethereum has more DeFi whales and NFT participants; BNB Chain has a large base of retail traders, often in Asia, sometimes associated with speculation on Binance-listed products. Thus, the same underlying stock, when tokenized, might attract slightly different trader profiles on each chain. A detailed analysis of

chain-specific microstructure is beyond our scope, but we will be mindful of this context when interpreting results that could be driven by one platform dominating the trading.

In summary, the institutional background presents a picture of a rapidly evolving marketplace where traditional finance meets cryptocurrency infrastructure. Tokenized stocks operate much like cross-listed depositary receipts but trade in a decentralized 24/7 environment. The two main providers, xStocks/Backed and Ondo, have carved out significant market share with differing philosophies on accessibility vs. control. The blockchain platforms hosting these tokens impart their own influence on trading behavior. With this understanding, we next describe our data in detail and then analyze the empirical evidence on the valuation and trading of tokenized equities.

3 Setting, Data, and Framework

3.1 Setting

Our empirical setting leverages the emergence of tokenized equities – blockchain-based representations of traditional stocks that trade continuously and in fractional units. These instruments mirror the economic value of the underlying shares, typically backed one-to-one by custodial holdings, while transacting on decentralized or hybrid crypto infrastructures. Two dominant issuers – Backed Finance and Ondo Finance – jointly account for over 95% of the market capitalization of tokenized equities, amounting to \$420 million as of October 2025. Their contrasting market architectures provide natural variation for studying how trading design affects information incorporation and liquidity.

Backed Finance’s xStocks enable 24/7 decentralized trading across multiple blockchains, primarily on Solana, with cross-chain versions on Ethereum and BNB. Tokens can be swapped peer-to-peer on decentralized exchanges such as Raydium or Orca, and balances update automatically for dividends through programmable contracts. By contrast, Ondo Finance’s Ondo Global Markets operates on Ethereum and restricts minting and redemption to U.S. market hours, effectively a 24/5 regime synchronized with the underlying exchanges. These design choices create meaningful contrasts in market openness, liquidity timing, and investor composition – Backed’s user base is predominantly retail and global, while Ondo’s participation skews institutional.

Each token trades as a bearer instrument on-chain, typically against USD-denominated stablecoins such as USDC. Settlement occurs within seconds, eliminating the T+1 delay characteristic of traditional equity markets. The blockchain infrastructure thus allows continuous trading, global access, and fractional participation. Yet, it also introduces new frictions: fragmented liquidity across chains, varying transaction costs (notably on Ethereum),

and regulatory segmentation with Backed in Switzerland and Ondo under U.S. exemptions. This environment provides a quasi-experimental laboratory to examine how continuous trading, fractionalization, and decentralized settlement alter price discovery relative to conventional exchanges.

3.2 Data

Our dataset integrates on-chain, off-chain, and market-level information for the top 100 most liquid tokenized stocks listed by Backed Finance and Ondo Finance between July and October 2025. The construction proceeds in three steps.

First, we collect token-level trading data directly from public blockchain explorers, such as Solana Explorer and Etherscan, and DeFi analytics interfaces including Jupiter, Orca, and Raydium. These data include transaction identifiers, wallet addresses, timestamps, quantities, token prices, and counterparty types. For Solana-based xStocks, we record over 2.1 million transactions across 60 tickers during the first three months post-launch. Each transaction is denominated in USDC and timestamped at the block level, enabling continuous intraday aggregation. We also obtain on-chain metrics – such as transfers, distributions, and holder counts – from Solana explorer analytics.

Second, we merge these token prices with corresponding underlying stock prices from Yahoo Finance. For each token–stock pair, for example TSLAx–TSLA, we align observations using Eastern Time (ET) to ensure consistency with U.S. equity market hours. This allows us to measure (i) deviations between tokenized and listed prices, (ii) off-hour returns, and (iii) return redistributions across weekdays and weekends. To study price co-movement, we compute token–stock differentials and cross-platform spreads across xStock and Ondo.

Third, we complement market-wide indicators with micro-structure and holder-level metrics. Wallet distributions reveal that over 78% of all token transfers are under \$100 in value, underscoring the dominance of micro-trading and retail participation. The median daily trading volume per token is approximately \$58 thousand, with highly skewed liquidity – Tesla, Apple, and Nvidia account for most turnover. Additional DeFi integrations, such as TSLAx as collateral in Kamino Finance, expand our analysis to secondary uses of tokenized equities.

All price and volume data are resampled to a uniform hourly frequency to match continuous blockchain time with traditional daily stock-market intervals. Token data are cleaned for anomalous transactions, including test mints and airdrops, and cross-checked against issuer-reported supply curves. Market capitalization and token count are obtained from Backed Finance and Ondo Finance dashboards as of October 2025.

3.3 Conceptual Framework

Asset prices summarize a firm’s fundamental value, with market price reflecting the information set captured by accounting and non-accounting data (Ohlson, 1995). The extent to which such information is incorporated is contingent on the institutional environment in which trading occurs. Consequently, when these institutional features change, the mapping from information to prices may strengthen or weaken accordingly (Barth et al., 2008). Tokenized equities represent a shift in this institutional mapping by incorporating three structural features: (i) continuous and global 24/7 trading, (ii) granular fractional ownership, and (iii) decentralized settlement infrastructure. These features jointly reshape the temporal and cross-venue mechanics of price discovery relative to traditional equity markets. They also introduce new frictions – including liquidity fragmentation across blockchains, heterogeneous investor bases, and platform-specific design constraints – that can amplify or attenuate price discovery depending on market conditions. This section outlines a conceptual framework that organizes the economic forces we expect to observe in this setting and motivates the empirical analyses that follow.

3.3.1 Continuous trading and intertemporal information incorporation

In traditional equity markets, price discovery is temporally constrained by fixed trading windows. When news arrives overnight or during weekends, the underlying stock price remains stale until the next opening auction, leading to predictable discontinuities – most notably, the Monday return. Theoretical models of sequential information arrival and market microstructure predict that when an alternative venue remains open, traders in that venue can immediately adjust prices in response to new information (Fama, 1965; O’Hara, 2015b). Tokenized markets, therefore, create a quasi-parallel channel for real-time price adjustment, enabling investors to react to earnings releases, macroeconomic announcements, geopolitical developments, or firm-specific disclosures at any time.

Yet the quality of this intertemporal price discovery depends critically on liquidity depth, investor composition, and the ease of arbitrage with the primary market. Our empirical tests examine whether token markets maintain tight co-movement with the underlying during overlapping hours, how strongly they react to news during non-overlapping hours, and whether weekend or overnight token returns forecast price adjustments once traditional exchanges reopen. Continuous trading may partially smooth or redistribute the timing of return realization across the weekend, reducing the conventional Monday gap even while injecting noise in thinly traded intervals.

3.3.2 Fractional trading, micro-liquidity, and participation

Tokenized equities permit extremely small-dollar trades, often under \$10, enabling participation by retail investors worldwide who lack access to U.S. brokerage accounts or face high minimum-lot constraints. Prior research demonstrates that odd-lot and fractional trades can be informationally meaningful, capturing the views of retail investors who process information continuously and rapidly (O'Hara et al., 2023; Fang et al., 2024). In a decentralized environment, these micro-transactions may aggregate heterogeneous signals across time zones, allowing global order flow to feed into price discovery around the clock.

However, the same micro-liquidity that broadens participation may also introduce noise. Thin depth on decentralized exchanges – especially during off-peak hours – can magnify the impact of small trades, causing prices to temporarily overshoot or undershoot fundamentals. The framework therefore emphasizes two competing mechanisms: (i) micro-trading as a conduit for dispersed information and global investor sentiment; and (ii) micro-trading as a source of transient volatility when liquidity is limited. Our empirical analysis quantifies how micro-level activity contributes to price co-movement, volatility, and the speed with which token markets adjust to news.

3.3.3 Arbitrage coupling and cross-market integration

Because tokenized equities represent claims on underlying stocks, their pricing is anchored by arbitrage through mint and redeem mechanisms. When both venues are open, arbitrageurs can buy the cheaper asset and sell the expensive one, keeping prices tightly aligned. When the underlying stock market is closed, however, arbitrage constraints bind: minting and redemption may be paused, underlying liquidity is unavailable, and cross-chain fragmentation can widen effective arbitrage bands. As a result, price gaps may emerge overnight or over the weekend and persist until overlap in trading hours resumes or redemption mechanisms reactivate.

This framework highlights platform design as an important determinant of cross-market integration. Backed's uninterrupted 24/7 trading allows token prices to float more freely when the primary market is closed, potentially capturing new information but also drifting in response to liquidity shocks. Ondo's synchronization with U.S. market hours, effectively a 24/5 regime, limits weekend liquidity and constrains the degree of off-hour price movement. Our empirical design leverages these contrasts to measure the magnitude, persistence, and correction speed of token–stock differentials and to evaluate how platform architecture shapes arbitrage dynamics.

3.3.4 Off-hour dynamics: reversals versus predictability

Continuous trading does not guarantee continuous informational efficiency. Low-liquidity sessions – especially weekday nights – may exhibit return reversals, consistent with transient order imbalances or overreaction in thin markets. In contrast, full weekend intervals may exhibit informative drift if material public news arrives during the closure of the primary market. In this case, token markets may serve as an early barometer of sentiment, partially preempting Monday adjustments in the underlying stock.

This framework motivates separating off-hour periods into two distinct segments: (i) weekday overnight windows, which are prone to liquidity-driven reversals, and (ii) weekend intervals, where informational re-assessment may accumulate and potentially lead the next official trading session. Our empirical tests examine both segments to disentangle noise-driven volatility from genuine information incorporation, allowing us to assess whether tokenized markets extend price discovery beyond traditional trading hours.

Overall, these mechanisms define a rich microstructure environment in which tokenized equities serve both as complements and as challengers to traditional trading windows. The empirical analyses that follow evaluate how these mechanisms manifest in practice through co-movement patterns, return redistribution across the weekend, deviations from fundamentals, arbitrage dynamics, and information flows across decentralized and traditional trading venues.

4 Stylized Facts

Tokenized Tesla (TSLAx) is one of the newly launched *xStocks* on Solana, a platform that brings real U.S. equities on-chain. Backed Finance launched over 60 tokenized stocks, such as NVDAx and TSLAx, on June 30, 2025. Each TSLAx token is fully backed 1:1 by a real Tesla share held in custody, and trades as an SPL token on Solana. These tokens enable 24/7 trading and settlement globally, bypassing intermediaries and traditional market hours.

In practice, non-US traders can now trade TSLAx around the clock with just a Solana wallet and USDC. This innovation has driven explosive volumes: within 6 weeks of launch, *xStocks* saw roughly \$2.1B of cumulative trading volume, about \$0.5B of which occurred on-chain. Solana captured the majority ($\approx 58\%$) of tokenized stock trading volume by mid-2025, underlining its dominance for on-chain equities. The Solana *xStocks* design also includes programmable compliance, for example KYC gating, and supports composability with DeFi: tokens can be swapped, pooled in AMMs, or used as collateral in lending markets.

4.1 TSLAx Market Activity (First 3 Months)



Figure 1. TSLAx and TSLA market price history. This figure shows the daily TSLAx price together with the Tesla (TSLA) closing price over the period 30 June - 13 March 2026. TSLA prices on non-trading days are forward-filled to align with the continuous nature of token trading.

Figure 1 shows TSLAx trading price since launch. The token began trading at around \$330 in late June 2025 and subsequently rose alongside Tesla’s equity price, reaching approximately \$490 by late December 2025, before declining to about \$400 by March 2026. Several price jumps coincide with major events, such as Tesla earnings and the debut of leverage on exchanges. These price levels are consistent with on-chain xStock quotes and reflect the underlying NASDAQ TSLA price.

Daily trading activity on Solana AMMs, including Raydium and Orca, has been robust (Figure 2). At its trading volume peak around late September, TSLAx saw daily volumes on the order of \$2–2.5 million in Panel A, with 10–12K daily trades in Panel B. In general, daily buy and sell volumes are roughly balanced. Overall, TSLAx DEX trading records weekly trading volumes in the millions of dollars, with thousands of trades per week.

On-chain transfer activity, not shown here, similarly exhibits thousands of transfers per day. The TSLAx supply has grown in steps to meet demand, increasing from 40K tokens at launch to 60K by October. The number of distinct TSLAx holders has steadily risen from 10,000 in July to 14,000 in early October. This reflects growing retail adoption, as each new wallet can hold fractional shares and thereby lowering the barrier to entry.

4.2 Transaction Size Distribution and Fractional Trading

Most TSLAx on-chain transfers are very small, as illustrated in Figure 3. Nearly half of all TSLAx transfers in the first 3 months were under \$10 in value, and about 78% were under \$100. Only a tiny fraction ($\approx 0.3\%$) exceeded

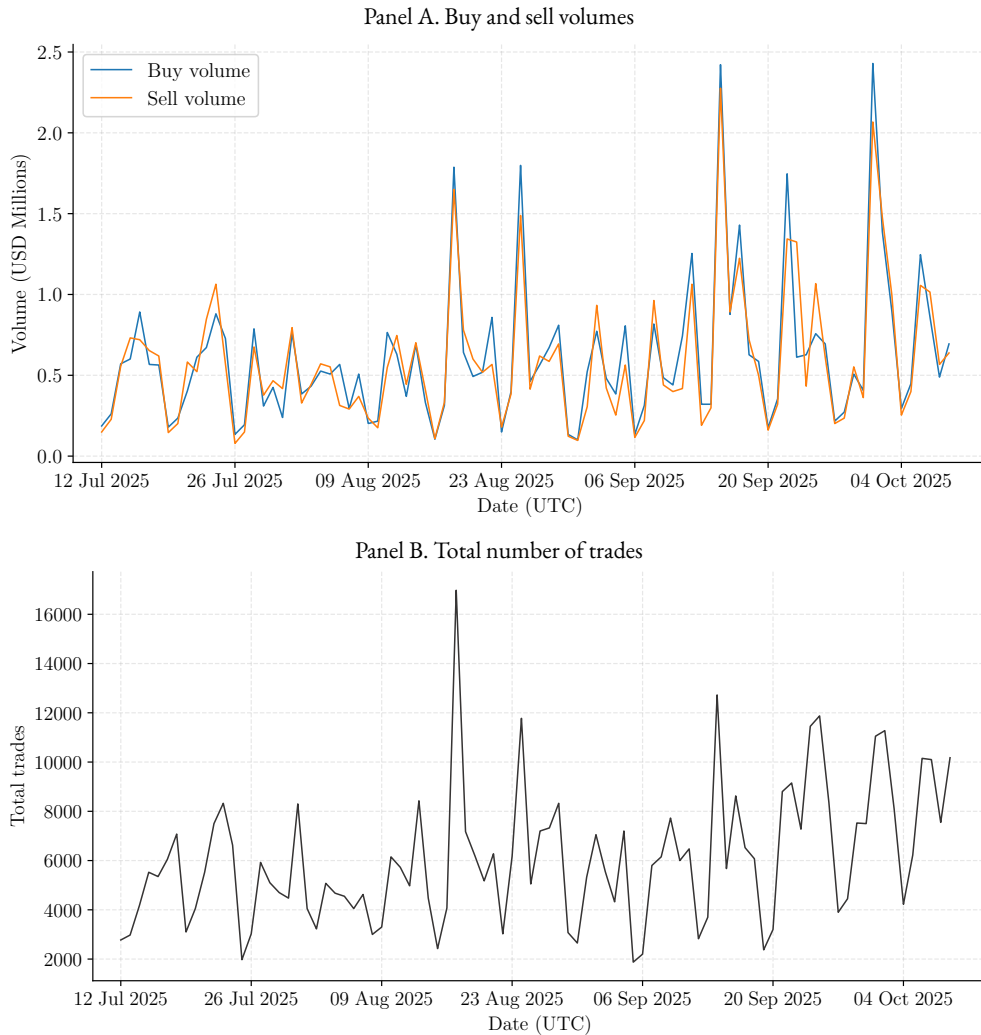


Figure 2. TSLAx DEX trading activity. Panel A shows the daily buy and sell volumes of TSLAx. Panel B plots the daily total number of trades.

\$10,000. In effect, small retail trades dominate the volume. This highlights the fractional nature of tokenized stocks: investors can move minute amounts, such as 0.01 TSLAx, corresponding to cents of value. Such micro-level trading is infeasible in traditional stock markets but becomes routine on-chain. The prevalence of sub-\$100 trades suggests that TSLAx provides accessible U.S. equity exposure to many retail users.

Solana’s xStocks architecture explicitly supports this inclusiveness: the foundation notes that tokenized equities offer “fractional ownership” and 24/7 global market access. In other words, TSLAx trading is inherently sliced into tiny units, which can greatly improve liquidity and participation. These micro-transactions align with the goal of financial inclusion: a trader in, say, India can buy a small fraction of a Tesla share on Solana without a broker account.

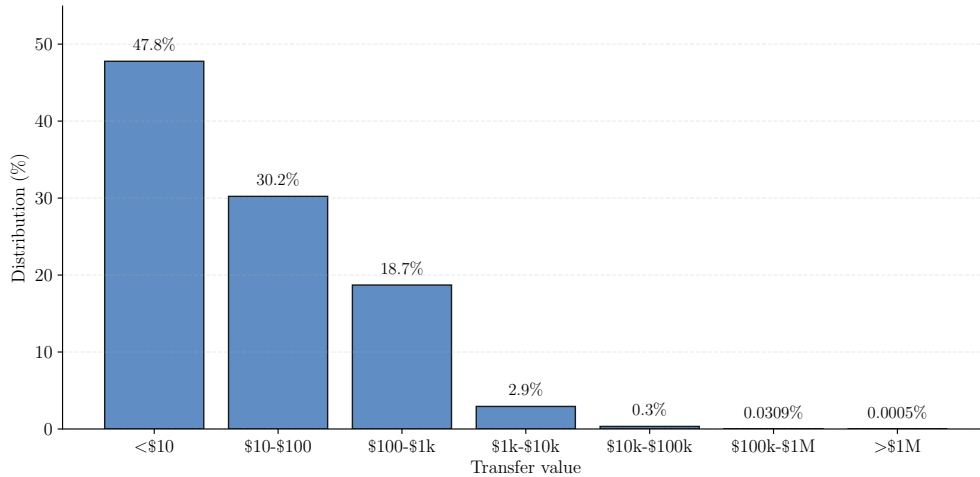


Figure 3. Distribution of TSLAx transfer values (first 3 months). The histogram reports the distribution of TSLAx transactions by transfer value.

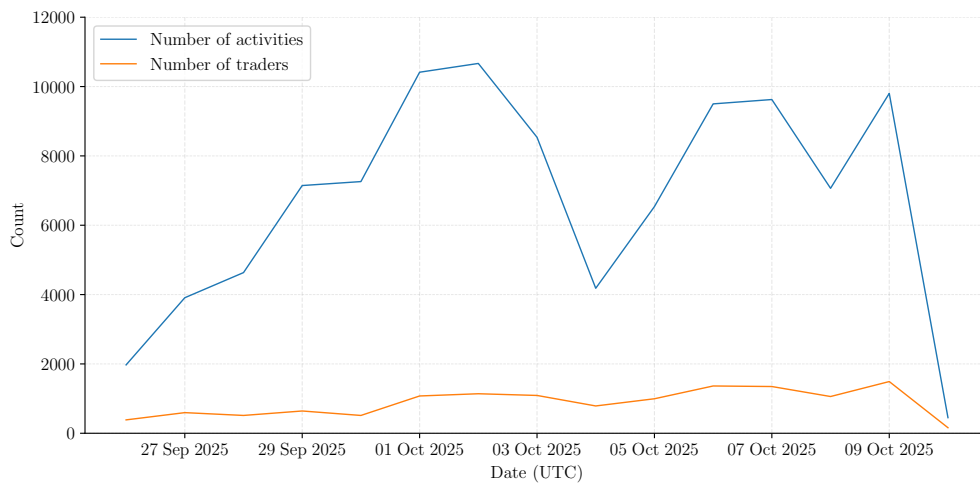


Figure 4. Daily number of activity of TSLAx. The figure plots the daily number of activities (blue line) and the number of unique traders (orange line) over the sample period.

4.3 TSLAx DeFi Markets

Beyond spot trading, TSLAx has already been integrated into DeFi protocols. By mid-July 2025, TSLAx was added as collateral on Kamino Finance, Solana’s leading lending market with \$4 billion in total value locked. This allows users to borrow against their TSLAx positions, as with other tokens, without selling their exposure. Industry commentaries also highlights this milestone¹⁸. Such collateral use-cases extend TSLAx utility into lending/borrowing and margin.

Daily on-chain DeFi activity (swaps, liquidity actions, deposits) has followed an upward trend, as illustrated in

¹⁸See <https://www.gate.com/crypto-wiki/article/how-active-is-the-tslax-community-in-2025>

Figure 4. In late September/early October, the number of daily TSLAx-related DeFi operations regularly exceeded 5–10K per day, with the number of distinct traders reached 0.5–2K per day. In total, TSLAx saw roughly 96,000 swap transactions in 3 months, including token and aggregated swaps, totaling over \$20M in volume. In addition, there were several thousand liquidity-add/remove events of approximately \$4.8 million in volume, according to protocol analytics. This level of activity indicates real engagement, as TSLAx has liquidity pools on major AMMs and is available through wallet-based swaps interfaces such as Jupiter.

Table 1 shows that the types of DeFi actions are concentrated in trading: aggregated and direct token swaps account for the vast majority of TSLAx DeFi volume. Liquidity provision is present but smaller, typically accounting for a few percent of total volume. Moreover, Table 2 indicates that most of the on-chain trading volume flows through centralized exchange deposit addresses and AMM pools. For example, in the first three months, Binance and Gate.io deposit accounts received about \$31 million and \$25 million of TSLAx, respectively. Major Raydium and Orca pool accounts also handled multi-million-dollar flows. For example, the Raydium TSLAx–USDC pool saw on the order of \$6–7M in both inflows and outflows. Notably, daily inflows and outflows often roughly balance, yielding small net flows, since tokens circulate through DeFi liquidity channels.

Table 1. Distribution of TSLAx activity types. This table reports the number of activities and the total transaction volume for each activity type observed for TSLAx. Monetary values are reported in U.S. dollars (USD). “M” and “K” denote million and thousand, respectively.

Activity type	No. Activities	Total Volume (USD)
Token Swap	41,113	11.17M
Aggregated Token Swap	55,396	9.16M
Add Liquidity	1,112	2.44M
Remove Liquidity / Fees	2,108	2.38M
Withdraw / Claim	63	740.02K
Deposit Vault	97	448.71K
Place Order	108	204.38K
Create Pool	3	–

Overall, the picture is that TSLAx is fully composable in Solana DeFi. Any user or protocol can treat TSLAx like any other SPL token: trading on AMMs, providing liquidity, depositing into vaults, or borrowing against it. As one industry summary puts it, stock tokenization “gives DeFi users real exposure to global equity markets” without leaving crypto. In practice, TSLAx’s DeFi footprint is still modest compared to core crypto assets, but it is growing rapidly in step with broader xStock adoption.

Table 2. Top on-chain inflows and outflows of TSLAx. This table reports the largest on-chain inflows (Panel A) and outflows (Panel B) of TSLAx over a three-month window. For each account, the table lists the number of transfers and the total U.S. dollar value transferred.

Account	Number of Transfers	Total Value Transferred (USD)
<i>Panel A. Top inflow</i>		
Binance 2	443	31,165,159.32
Gate.io	4,300	25,362,257.00
Raydium Vault Authority #2	31,959	14,305,780.95
Raydium Authority V4	31,558	9,489,036.48
Raydium (CRCLx-USDC) Market	18,202	7,011,168.64
Raydium (TSLAx-USDC) Market	15,147	6,832,747.79
Orca (SOL-HNT) Market	21,209	6,508,949.28
Raydium (WSOL-TSLAx) Market	13,581	5,228,253.38
Orca (TSLAx-USDC) Market	13,165	3,836,512.41
Orca (WSOL-USELESS) Market	8,269	3,719,853.25
<i>Panel B. Top outflow</i>		
3MnDSR...ExtzB8	7,605	51,398,025.58
3gX2YN...tkHPtT	142	16,782,739.62
Raydium Vault Authority #2	31,959	14,353,468.90
Raydium Authority V4	31,558	9,510,323.89
Raydium (CRCLx-USDC) Market	18,202	7,033,439.69
Raydium (TSLAx-USDC) Market	15,147	6,844,229.13
Orca (SOL-HNT) Market	21,209	6,519,396.71
Raydium (WSOL-TSLAx) Market	13,581	5,240,974.27
D7ziV8...vFg6A6	72	4,933,196.35
Orca (TSLAx-USDC) Market	13,165	3,838,819.51

4.4 Top Holder Analysis: Portfolios and Influence

Despite the hype, TSLAx ownership is relatively concentrated. Figure 5 shows that the largest 10 TSLAx addresses together hold about 50% of total supply, while the rest is spread across over thirteen thousand wallets.

In Table 3, we examine the account with the largest TSLAx balance to assess its participation in DeFi. This top TSLAx address has an extremely diversified portfolio across many assets. The majority of the portfolio is held in wrapped SOL, accounting for about 64% of the wallet’s total on-chain value or roughly \$206,000. The remainder is distributed across various tokens, including stablecoins such as USDC and USDT, governance or meme tokens, and other xStocks such as AAPLx and NVDAx. This indicates that the largest TSLAx holder is not a pure Tesla speculator but likely an active trader or liquidity provider. Indeed, the account’s transaction history shows very high turnover, with around \$16.8 million worth of TSLAx and other assets transferred in just a few dozen large transactions over a short period. For example, the account’s on-chain outflows include a \$16.7 million transfer in 142 transactions, and inflows of similar magnitude, making it a major counterparty in trades. Consistent with this pattern, Figure 6 plots the daily value of token inflows and outflows for this account and shows frequent and sizable movements in both directions. In essence, this address functions like a major pool or market maker.

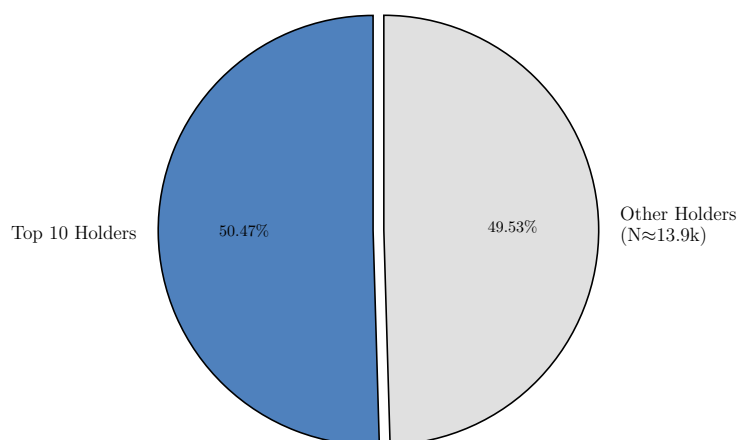


Figure 5. Token distribution by owner. The chart illustrates the distribution of 60,998.22 TSLAx tokens among 13,936 holders. The top 10 addresses hold a majority stake of 50.46%, while the remaining 49.53% is distributed among all other accounts.

Table 3. Top token holdings of the largest TSLAx holder. This table reports the top 15 token holdings of the largest holder of TSLAx. The address controls 779 distinct token accounts in total.

Token name	Symbol	Token balance	Price (USD)	Value (USD)	Share (%)
Wrapped SOL	WSOL	933.82	221	206,382.06	64.31
USELESS COIN	USELESS	79,806.81	0.37	29,781.62	9.28
USDC	USDC	18,538.84	1.00	18,538.84	5.77
Launch Coin on Believe	LAUNCHCOIN	124,270.36	0.12	15,120.42	4.71
USDT	USDT	10,000.74	1.00	10,008.92	3.11
Grass	GRASS	9,697.86	0.78	7,569.50	2.35
Zebec Network	ZBCN	1,014,683.29	0.004869	4,941.40	1.53
Switchboard	SWTCH	45,738.72	0.09968	4,559.64	1.42
Wen	WEN	115,092,250.08	0.00003851	4,432.67	1.38
FWOG	FWOG	130,759.48	0.03208	4,194.81	1.30
Circle xStock	CRCLx	25.14	150.86	3,793.64	1.18
Apple xStock	AAPLx	14.59	253.55	3,700.99	1.15
NVIDIA xStock	NVDAx	13.77	192.83	2,655.71	0.82
Helium Network Token	HNT	812.64	2.62	2,131.61	0.66
SP500 xStock	SPYx	2.94	672.94	1,980.85	0.61

By comparison, several other top addresses also show heavy trading. One address executed nearly 7,700 TSLAx-related operations totaling about \$2.9 million in volume, and others in the top ten moved millions, often in a few large transactions. However, none of these holders are “whales” in the sense of owning a huge percentage of supply: the top 10 collectively own half the supply, so the top 1 may hold on the order of 5–10%. Their influence comes more from trading volume than sheer token hoarding. In summary, the largest TSLAx holders are heavily engaged market participants with diverse portfolios, but TSLAx itself is a small piece of their holdings.

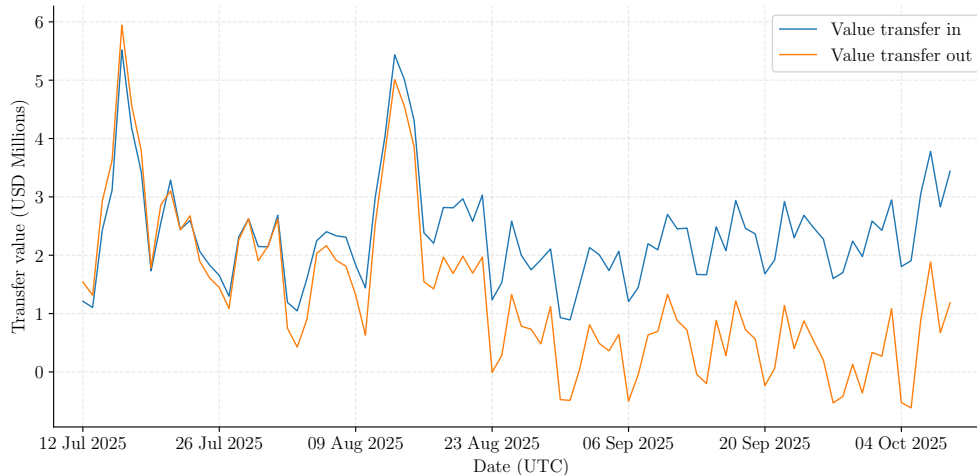


Figure 6. Inflow and outflow values of the top 1 TSLAx holder. This figure plots the daily value of token transfers into and out of the top 1 TSLAx holder. The blue line represents inflows and the orange line represents outflows.

4.5 Price Comparisons

Figures 7–9 overlay XStock and Ondo tokenized stock prices with the underlying equity prices from Yahoo Finance for Tesla, Nvidia, and Alphabet over the study period (September to October 2025). The top panel in each sub-figure shows the asset’s price evolution, while the bottom panel shows the price differential between the tokenized stock and the underlying stock. The underlying stock prices (black line) are plotted at the hourly frequency and forward-filled during non-trading hours, whereas tokenized prices (colored lines) trade continuously throughout the days. Differential lines above zero indicate the token traded at a premium to the underlying stock, and below zero indicates a discount.

We observe that the token prices of Tesla closely track its official price during market hours, but diverge during off-hours. Notably, in mid-September, Tesla tokens traded at a premium of up to \$55, or 14%, relative to the last closing price ahead of a Monday opening. Specifically, TSLAx rose from \$401.59 at 6:00 a.m. ET on Monday, September 15, to \$451.07 by 9:00 a.m. This premium is consistent with positive pre-market news¹⁹, and the tokenized stock price converged with the underlying stock once the market opened.

The tokenized NVDA prices generally track the official NVDA stock with minimal deviation. A transient premium is seen when Nvidia’s Ondo token launched in early September, where the Ondo price spiked above \$180 while the stock was \$170, before arbitrage corrected it. Apart from that initial discrepancy, both token prices stayed within a tight range around the official price, including over weekends, with only a few off-hour deviations.

¹⁹See <https://www.cnbc.com/2025/09/15/tesla-shares-gain-after-elon-musk-discloses-purchase.html>

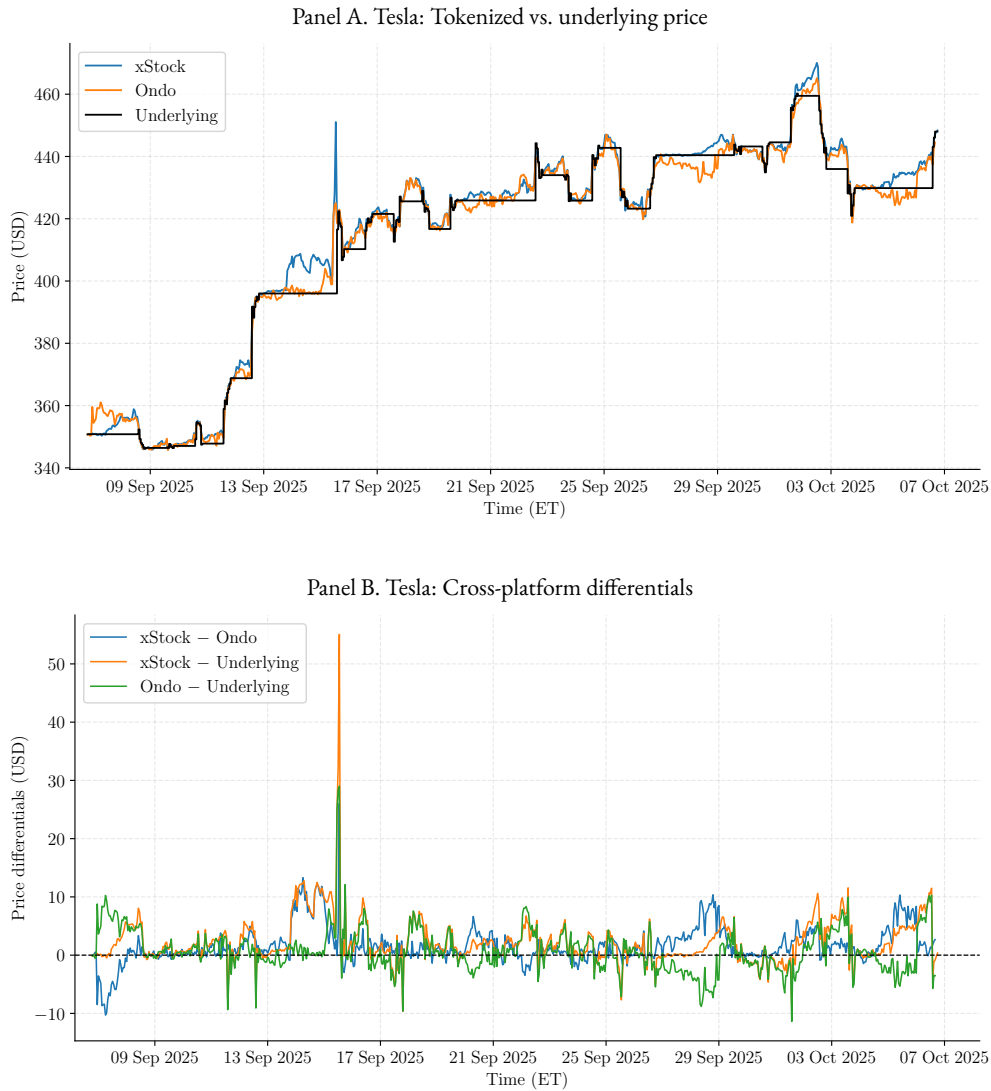


Figure 7. Tesla (TSLA) tokenized stock prices versus underlying equity. Panel A plots Tesla tokenized prices against the underlying stock price. The underlying stock prices are forward-filled to align with continuous token trading. Panel B presents cross-platform and token-versus-underlying price differentials, where positive values indicate a premium relative to the reference price.

Alphabet’s tokenized stock prices show very small differentials from the official GOOGL stock price. The bottom panel shows that deviations rarely exceed $\pm \$5$ ($\approx 2\%$) relative to GOOGL, even during weekends. This suggests limited speculative trading or news impact on Alphabet’s tokens outside market hours, likely because no major off-hour surprise news occurred during the sample period. Both token platforms closely shadow the real stock’s movements.

All three figures show that tokenized stocks closely follow their underlying prices during normal trading hours, consistent with the operation of arbitrage mechanisms. Differences emerge when markets are closed – e.g. overnight or on weekends – especially if significant information arrives. Tesla’s tokens exhibit the largest swings, reflecting its

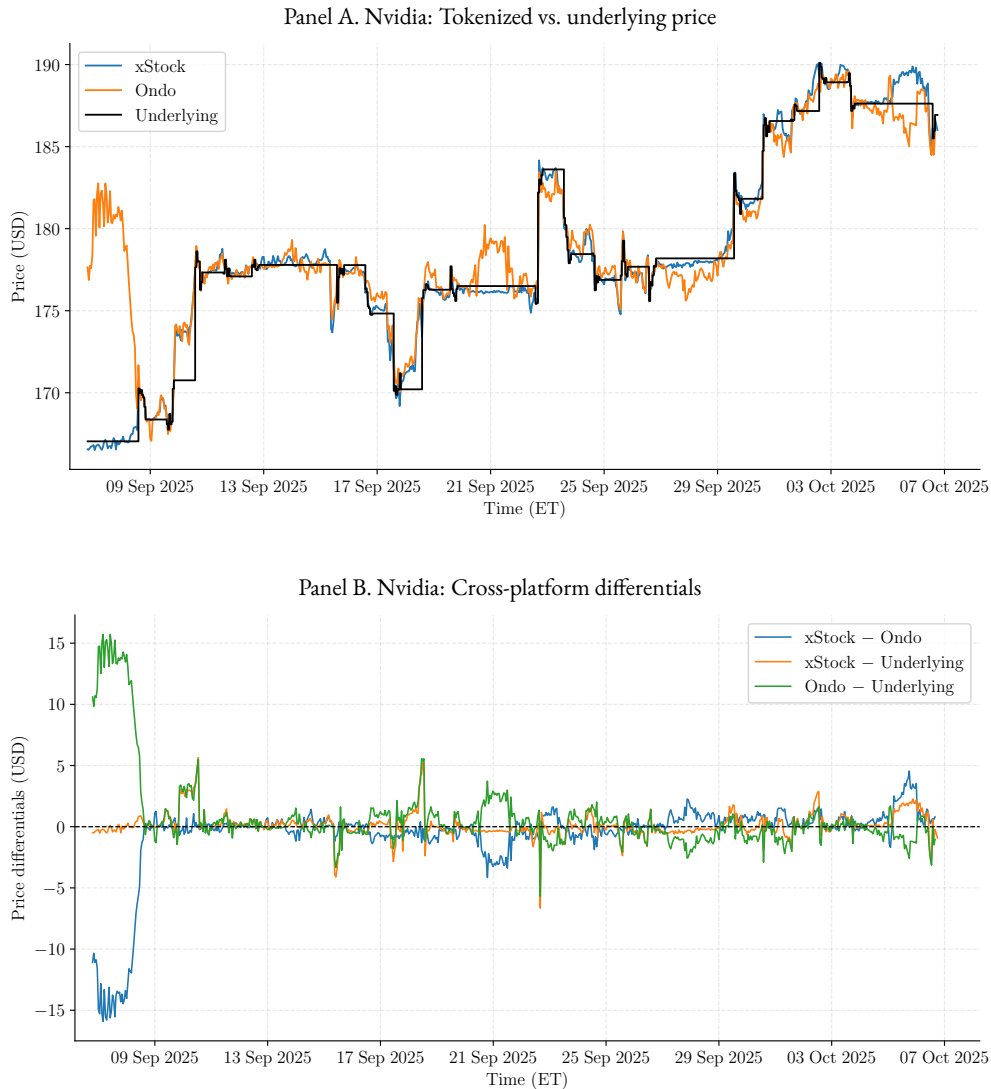


Figure 8. Nvidia (NVDA) tokenized stock prices versus underlying equity. Panel A plots Nvidia tokenized prices against the underlying stock price. The underlying stock closing prices are forward-filled to align with continuous token trading. Panel B presents cross-platform and token-versus-underlying price differentials, where positive values indicate a premium relative to the reference price.

higher volatility and weekend news events. For Nvidia and Alphabet, token deviations are comparatively minor, indicating fewer off-hour surprises. In general, token prices tend to anticipate weekend news by moving in advance of the next official trading session, then converging back once the stock market opens and the underlying price “catches up.”

4.6 Return Distributions by Day of Week

We next analyze daily returns (close-to-close percentage changes) by day of the week. Figure 10 presents the return distribution for the underlying stock and its tokenized counterparts, using Tesla, Nvidia, and Alphabet as

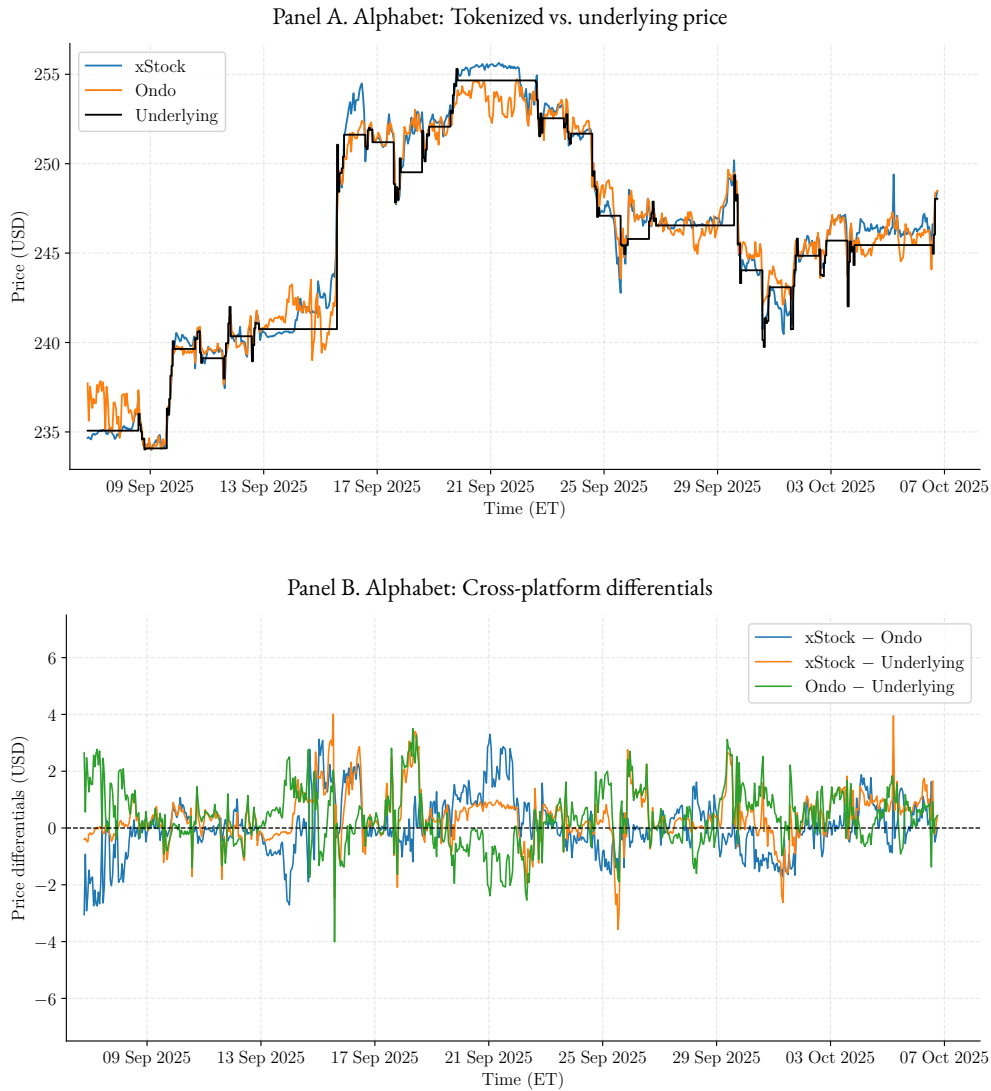


Figure 9. Alphabet Class A (GOOGL) tokenized stock prices versus underlying equity. Panel A plots Alphabet tokenized prices against the underlying stock price. The underlying stock prices are forward-filled to align with continuous token trading. Panel B presents cross-platform and token-versus-underlying price differentials, where positive values indicate a premium relative to the reference price.

examples. The underlying stock returns are only defined from Monday to Friday, whereas the tokenized stocks exhibit returns throughout the week.

The xStock and Ondo boxplots show non-zero return distributions over weekends, while their Monday return distributions are generally less extreme than those of the underlying stock. This pattern suggests that tokenized trading shifts part of price adjustment into Saturday and Sunday, such that tokenized stock holders experience weekend price changes that the stock reflects only on Monday.

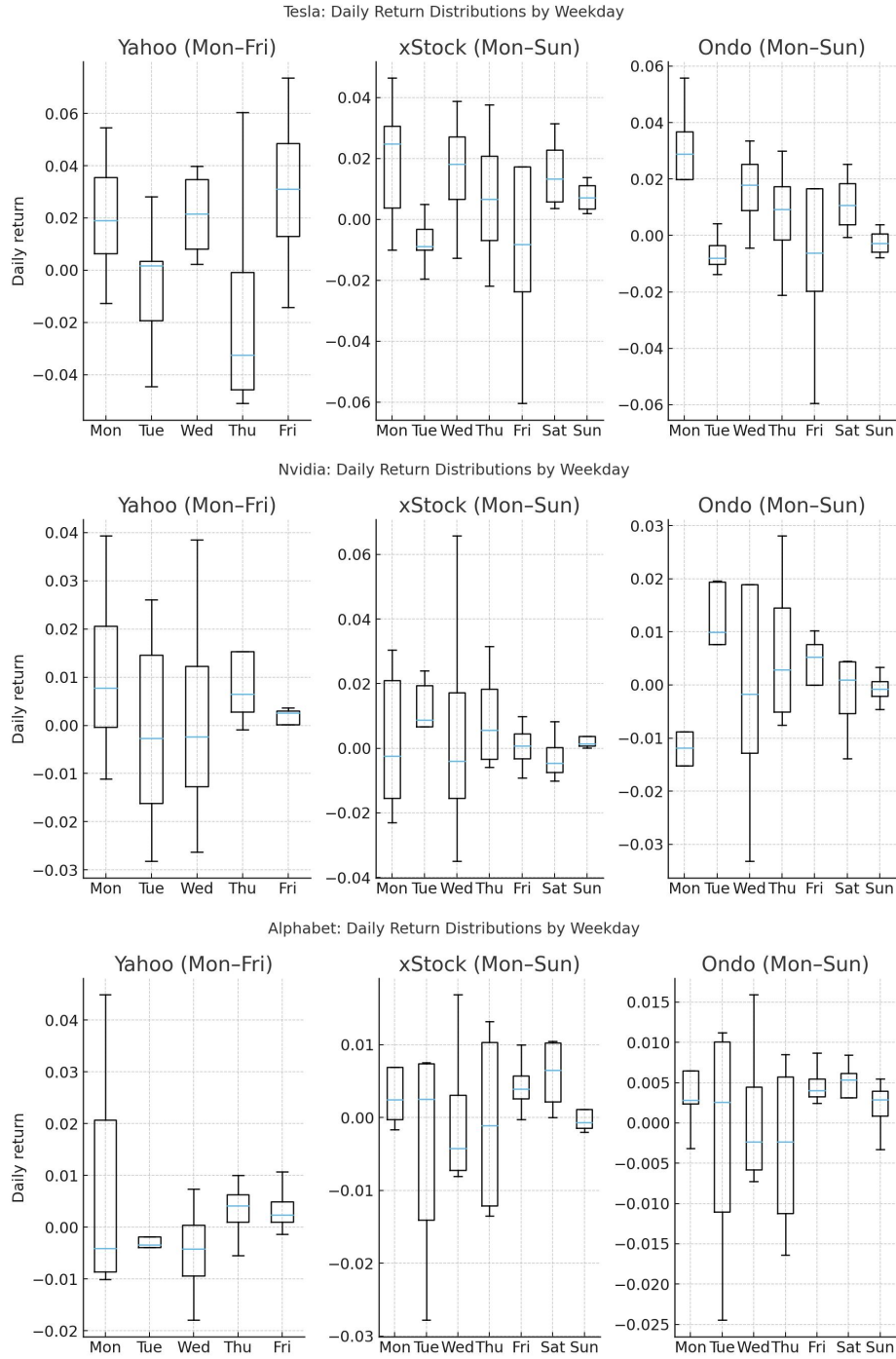


Figure 10. Daily return distributions by day-of-week for tokenized stocks and the underlying stock. This figure plots boxplots of close-to-close daily returns by day of the week for Tesla (top row), Nvidia (middle row), and Alphabet (bottom row). The left column shows underlying stock returns from Yahoo Finance for Monday through Friday. The center column shows xStock returns for Monday through Sunday. The right column shows Ondo returns for Monday through Sunday.

4.7 Cross-Platform Price Differentials by Day of Week

We next examine the distribution of price differentials between tokenized prices and the underlying stock, categorized by day of the week. In particular, we focus on how these platform deviations behave on weekends versus weekdays. Figure 11 plots histograms of the percentage difference between Tesla’s tokenized price and the underlying stock price, for each day of the week. Each subplot represents one weekday, with the distribution of hourly price differences observed on that day.

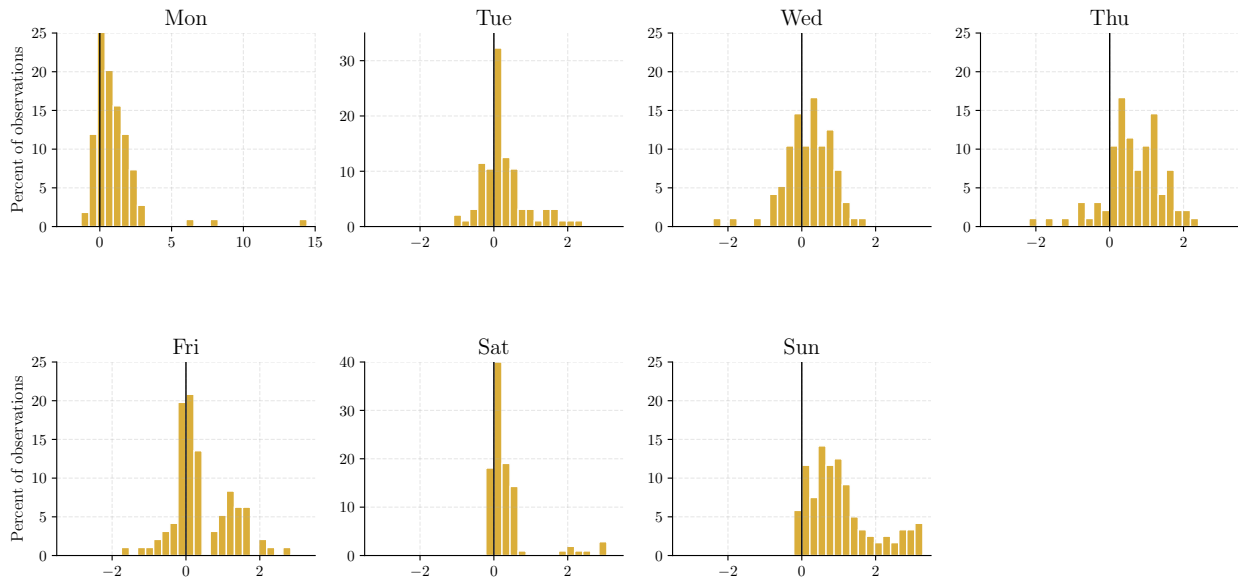
Each panel shows the frequency distribution of the percentage difference $(P_{token} - P_{Yahoo})/P_{Yahoo}$ on that calendar day. Weekdays (Monday to Friday) show distributions tightly centered at 0%, reflecting strong arbitrage coupling during normal periods. On Saturday and Sunday, the distributions are slightly wider – tokens more frequently trade a few percent away from the last close. Importantly, extreme deviations were rare and almost always tied to specific news events. The largest positive token premium ($\approx 14\%$) corresponds to the pre-market news on Monday, Sept 15. In summary, weekend trading allows small divergences to accumulate since the underlying market is closed, but sustained large arbitrage gaps were infrequent and quickly corrected by market participants once stocks resumed trading.

4.8 Slippage Analysis: Daily Maximum Deviation

“Slippage” here refers to the daily maximum percentage deviation of the off-hour tokenized price from the underlying stock’s last close. We compute, for each day t , the largest absolute gap between the xStock price and the last closing price of the underlying stock during the non-trading interval, defined as 16:00 on day t to 09:00 on day $t + 1$ on weekdays (with 09:00 used in place of the market open due to the hourly frequency of token prices) and 09:00 on day t to 09:00 on day $t + 1$ on weekends. This measures how far tokens diverge overnight or over the weekend before converging. Figure 12 plots the daily maximum slippage of Tesla, NVIDIA, and Alphabet over the analysis period.

The largest deviations typically correspond to weekend closures where news or order imbalance occur. For instance, Tesla’s 14% slippage, driven by the pre-market news on September 15, is attributed to the September 14 weekend interval. By contrast, overnight slippage from Monday to Thursday are generally minor. Overall, slippage is modest in most case, with extreme divergences tied to material news events, and any larger gaps are quickly arbitrated away by the next trading session.

Panel A. Price Differential (%) between Tesla xStock and the Underlying Stock



Panel B. Price Differential (%) between Tesla Ondo Token and the Underlying Stock

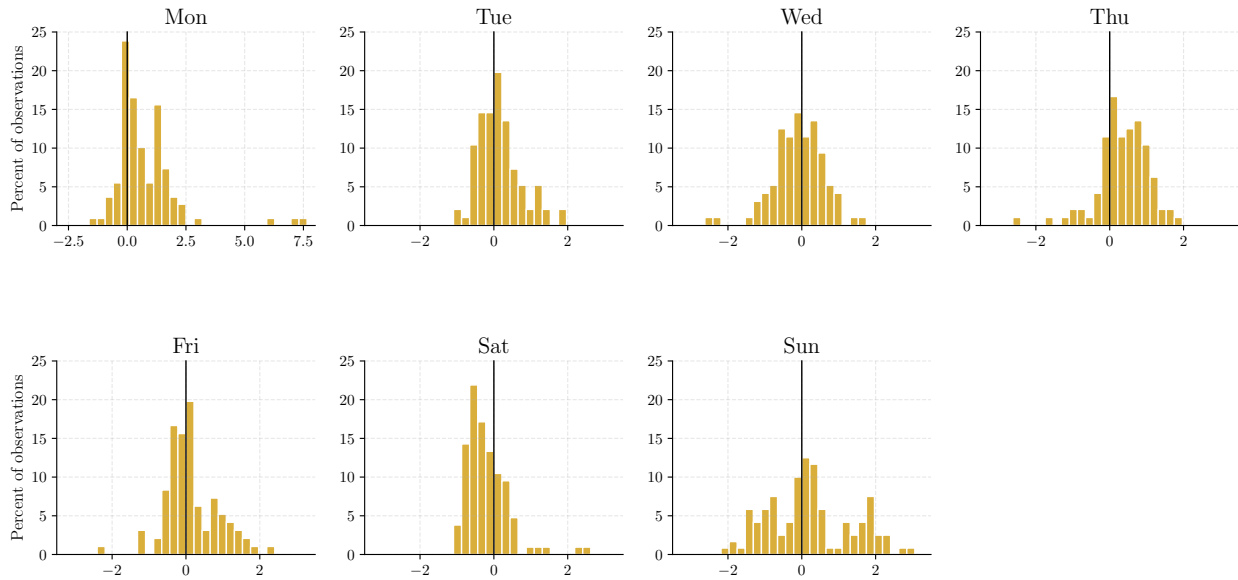


Figure 11. Token-underlying price differentials for Tesla. This figure plots histograms of the percentage price differential between Tesla’s tokenized price and its Yahoo Finance reference price by weekday. The top panel reports differentials for xStock, and the bottom panel reports differentials for Ondo.

Notably, Tesla’s token exhibited both the highest volatility and the largest single-day slippage. This aligns with Tesla’s reputation for significant news and trader interest. Nvidia and Alphabet tokens had low slippage, mostly under 2%, reflecting more efficient pricing or fewer off-hour surprises. Our findings suggest that for blue-chip stocks, tokenized markets generally stay in sync with underlying prices, with slippage on the order of a few percent

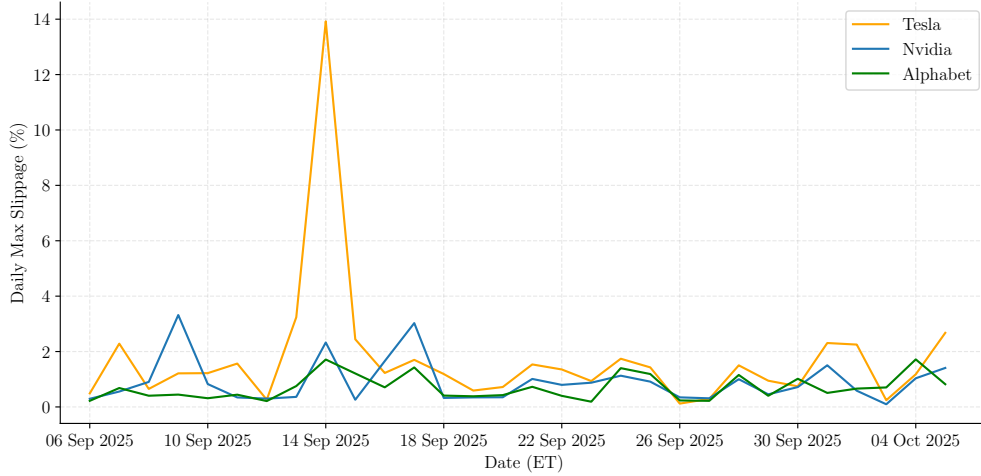


Figure 12. Daily maximum slippage (xStocks vs. underlying stocks). The figure presents the daily maximum absolute percentage deviations of xStock tokenized stock prices from Yahoo closing prices of Tesla, NVIDIA, and Alphabet.

or less. Larger deviations only arise in exceptional circumstances, such as major off-hour news, and are corrected when markets reopen.

4.9 Arbitrage Opportunities (Threshold Exceedance)

Finally, we assess how often sizable arbitrage opportunities arise, measured by instances when the price gap between platforms exceeded certain thresholds. Table 4 summarizes the frequency with which the token price deviated from the underlying by more than 1%, 2%, and 5% for Tesla’s tokens, distinguishing between weekday after-hours and weekend periods.

Table 4. Frequency of large price differentials for Tesla’s tokenized stocks (Sep–Oct 2025). Entries indicate the share of observed hours when tokenized prices deviated by more than the given threshold relative to the Yahoo Finance reference price (the underlying stock’s last close). Weekday includes overnight hours Monday–Thursday, and weekend covers Friday 4pm through Monday 9:30am.

Deviation > from Yahoo	Tesla xStock		Tesla Ondo	
	Weekday	Weekend	Weekday	Weekend
1%	71% of hours	15% of hours	77% of hours	14% of hours
2%	57%	8%	63%	5%
5%	12%	0%	14%	0%

From Table 4, we see that weekday after-hours had a surprisingly higher incidence price gaps exceeding 1–2% than weekends for Tesla. This counterintuitive result stems from the fact that Tesla frequently had news or large moves during weekday evenings, such as earnings releases, leading tokens to move while the underlying stock price was still the prior close. In contrast, most weekends were quiet except for the notable pre-market news on 15 September. Meanwhile, significant mispricings (>5%) were virtually absent – arbitrageurs seem to keep the token markets

efficient to within a few percent.

Importantly, these percentages include any transient deviations. In nearly all cases, the duration of a $>2\%$ deviation was short – arbitrage bots and cross-market traders would act to close the gap by buying the cheaper asset and shorting the expensive one. The absence of sustained large differences confirms that the tokenized stocks and the actual stocks are tightly linked markets.

4.10 Tracking Error Around Earnings Events

To illustrate how tracking quality evolves around a specific corporate event, we examine the daily tracking error – defined as the standard deviation of hourly price deviations between each tokenized stock and its underlying – over a ± 1 -week window centered on the most recent off-hours earnings announcement for Tesla, Alphabet, and Nvidia. Daily tracking error is computed from the set of hours within each calendar day for which both a token price and a matched underlying price are available. Figures 13–15 display, for each underlying, two panels: Panel A plots the daily tracking error series for the XStocks and Ondo tokens, and Panel B plots the corresponding hourly price differences (token minus underlying), together with the Ondo–XStocks spread.

Several patterns emerge consistently across all three stocks. First, tracking error rises sharply around the earnings announcement date (red dashed line), indicating that off-hours corporate news temporarily disrupts the tight arbitrage linkage between token and underlying prices, which we formally quantify in Section 5. Second, the direction of the price deviation in Panel B aligns with the sign of the standardized unexpected earnings (SUE): Tesla, with a negative SUE of -0.33 , exhibits a sharp downward spike in Panel B at announcement; Alphabet (SUE = $+8.1$) and Nvidia (SUE = $+2.0$) both show positive price spikes, consistent with favorable earnings news.

The persistence of elevated tracking error differs across stocks. For Tesla, the spike is concentrated on the announcement day and reverts quickly. For Nvidia, tracking error peaks one day after the announcement, suggesting a short lag in price adjustment. For Alphabet, whose earnings surprise is the largest in the sample (SUE = $+8.1$), tracking error remains elevated for approximately five days post-announcement before gradually normalizing, consistent with a more prolonged price discovery process following a substantial information shock. Taken together, these event-window snapshots suggest that earnings announcements constitute a primary source of short-run tracking error in tokenized equity markets, with the persistence of the disruption increasing with the magnitude of the earnings surprise.

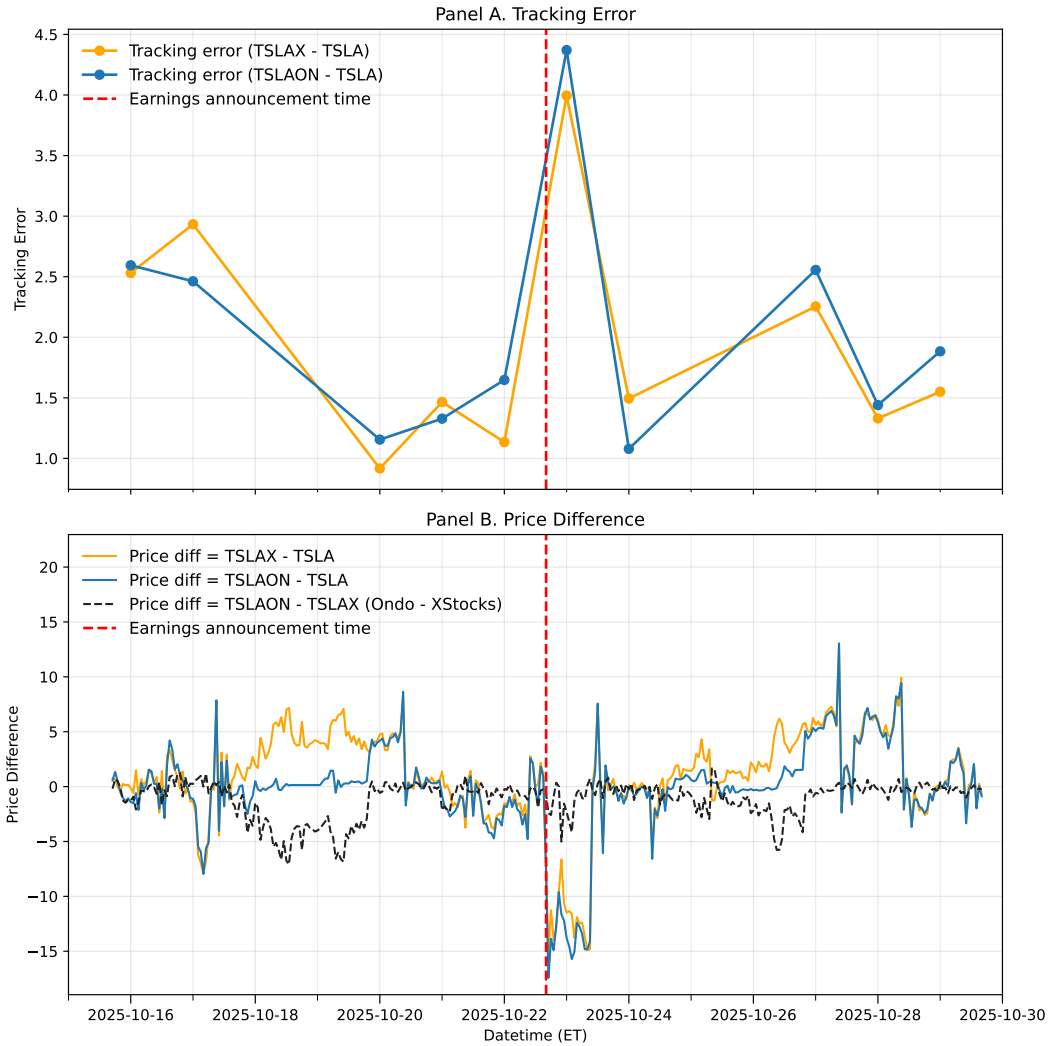


Figure 13. Tesla (TSLA) tracking error and price difference around earnings announcement. Panel A plots the daily tracking error (standard deviation of hourly token-underlying price deviations) for TSLAX (XStocks, orange) and TSLAON (Ondo, blue) over a ± 1 -week window around Tesla’s most recent off-hours earnings announcement (red dashed line, October 22, 2025). Panel B plots the corresponding hourly price differences for each token relative to the underlying stock, together with the Ondo-XStocks spread (dashed black line). Tesla’s standardized unexpected earnings (SUE) for this announcement is -0.33 .

4.II Global Access

A key feature of tokenized stocks is their potential to broaden market access beyond the geographic and temporal constraints of traditional equity markets. Since these tokens trade on blockchain-based platforms and decentralized venues, investors can access them continuously and from jurisdictions where direct participation in U.S. equity markets may be limited.

To provide evidence on the global reach of tokenized stock platforms, Table 5 reports the geographic distribution of web traffic to the websites of Backed Finance and Ondo Finance from July to October 2025. While

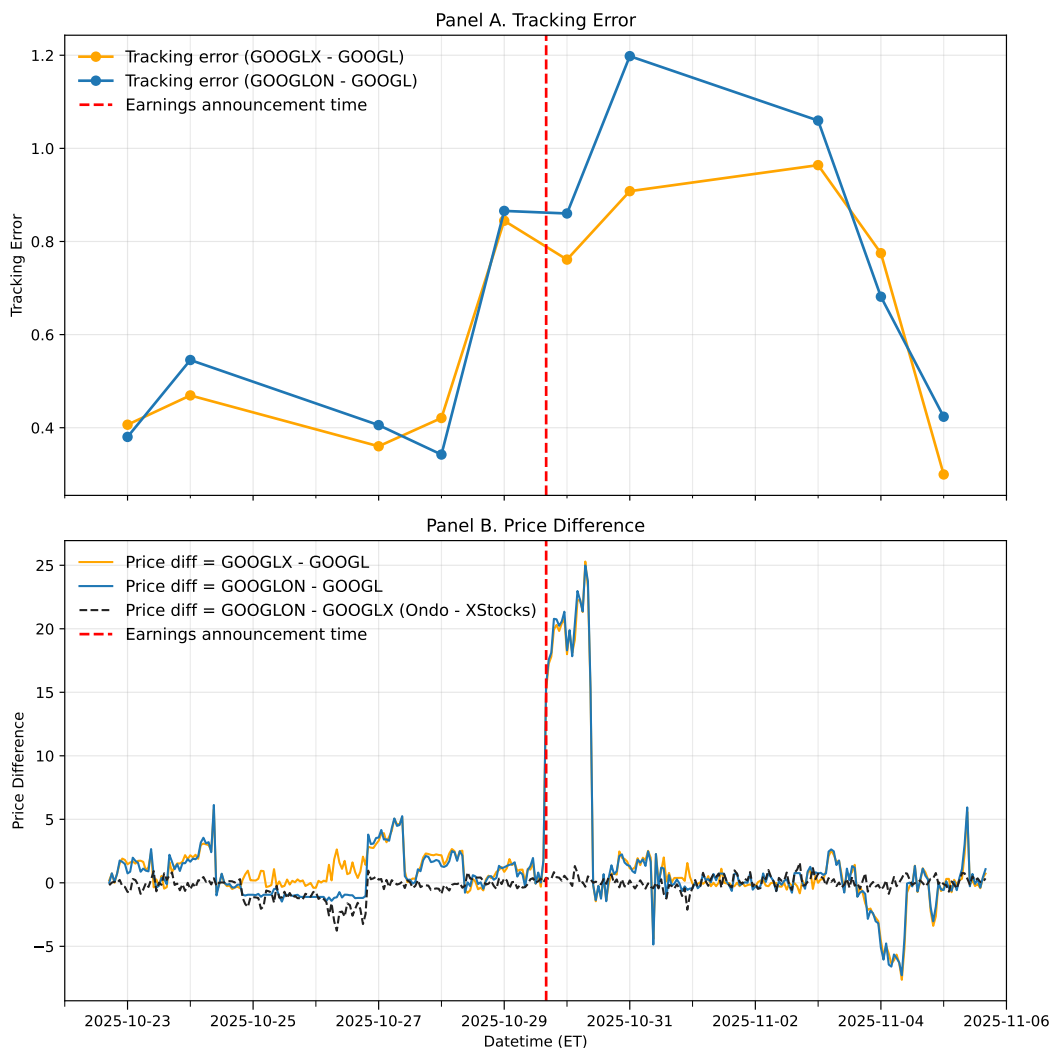


Figure 14. Alphabet (GOOGL) tracking error and price difference around earnings announcement. Panel A plots the daily tracking error for GOOGLX (XStocks, orange) and GOOGLON (Ondo, blue) over a ± 1 -week window around Alphabet’s most recent off-hours earnings announcement (red dashed line, October 29, 2025). Panel B plots the corresponding hourly price differences and the Ondo–XStocks spread (dashed black line). Alphabet’s SUE for this announcement is +8.1.

the United States remains an important source of traffic across all platforms, a substantial share of user interest originates outside the U.S, particularly from emerging markets and regions with more limited access to U.S. equity trading infrastructure. Although web traffic does not directly measure trading activity, it provides indicative evidence that tokenized stock platforms attract international interest.

5 Price Discovery

Tokenized stocks trade continuously, raising the possibility that they incorporate information in real time rather than deferring price adjustment to the next market opening. We therefore examine whether tokenized stocks

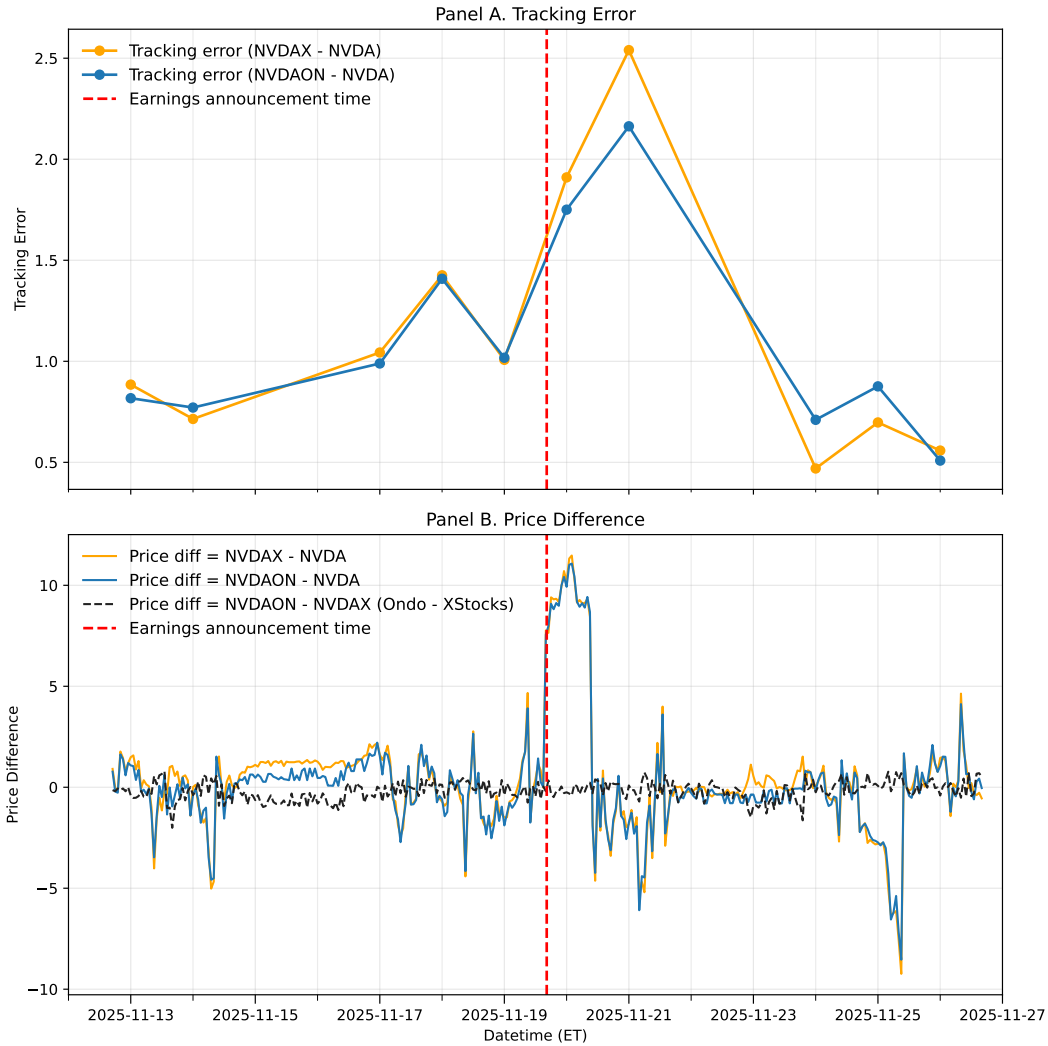


Figure 15. Nvidia (NVDA) tracking error and price difference around earnings announcement. Panel A plots the daily tracking error for NVDAOX (XStocks, orange) and NVDAON (Ondo, blue) over a ± 1 -week window around Nvidia’s most recent off-hours earnings announcement (red dashed line, November 19, 2025). Panel B plots the corresponding hourly price differences and the Ondo–XStocks spread (dashed black line). Nvidia’s SUE for this announcement is $+2.0$.

incorporate value-relevant information, particularly during periods when traditional equity markets are closed.

To conduct this examination, we organize the analysis into several components. First, we establish a baseline by verifying that token prices tightly track their underlying equities during overlapping trading hours, confirming that the token market is mechanically linked to the underlying asset. Second, we examine whether token prices respond to value-relevant news, focusing on earnings announcements released outside U.S. trading hours. Third, we study price movements during off-hour trading windows more broadly, distinguishing between short weekday overnight sessions and longer weekend closures to assess when information incorporation is most likely to occur. Finally, we test whether off-hour token returns anticipate subsequent price movements in the underlying stocks, which would

Table 5. Geographic distribution of web traffic for tokenized stocks issuer websites (July–Oct 2025). Shares represent the top traffic-contributing countries for Backed Finance (Backed.fi and xStocks.fi) and Ondo Finance (Ondo.finance), based on Semrush data.

Country / Region	Traffic Share (%)	Platform
United States	11.66	Backed.fi
Malaysia	8.73	Backed.fi
Turkey	7.66	Backed.fi
Saudi Arabia	7.45	Backed.fi
India	7.32	Backed.fi
United States	24.82	xStocks.fi
Vietnam	22.67	xStocks.fi
Israel	13.14	xStocks.fi
Malaysia	6.68	xStocks.fi
Australia	6.24	xStocks.fi
United States	25.59	Ondo.finance
Turkey	15.04	Ondo.finance
India	6.58	Ondo.finance
France	5.07	Ondo.finance
Germany	3.56	Ondo.finance

indicate that token markets contribute to price discovery rather than simply reacting to it.

Our sample consists of the top 100 tokenized stocks by market capitalization and their corresponding U.S.-listed underlying equities during September 2025. We obtain tokenized stock prices and trading volumes at both hourly and three-hour frequencies from CoinMarketCap, hourly stock prices from Yahoo Finance, earnings announcement data and analyst forecasts from I/B/E/S, and firm fundamentals data from Compustat.

All timestamps are aligned to U.S. Eastern Time. Off-hour periods are defined as intervals during which U.S. equity exchanges are closed, including weekday overnight sessions (16:00 to 09:30) and weekend sessions (Friday 16:00 to Monday 09:30).

5.1 Price Mapping to the Underlying Stock

As a baseline validation, we first assess whether tokenized stocks correctly reflect existing information embedded in the underlying market. Because tokenized stocks represent a claim on the underlying equity and are continuously redeemable, prices in the two markets should remain tightly linked during periods of overlapping trading hours.

To quantify the strength of this linkage, we estimate the elasticity of token prices with respect to their underlying stock prices during overlapping trading hours:

$$\log P_{i,t+0.5}^{token} = \alpha + \beta \log P_{i,t}^{stock} + \mu_i + \tau_t + \epsilon_{i,t}, \quad (1)$$

where $P_{i,t}^{token}$ denotes the token price observed 30 minutes following hour t , and $P_{i,t}^{stock}$ is the corresponding underlying stock price for firm i at hour t , respectively. μ_i are token fixed effects, and τ_t are time fixed effects. A β coefficient close to one indicates that token prices move nearly one-for-one with the underlying stock, confirming tight arbitrage linkage.

Table 6 reports the results from estimation of equation (1). The estimated elasticity is statistically significant and close to unity: a 1% change in the underlying stock price translates almost one-for-one to a 0.98% change in the token price. The adjusted R^2 close to 1 indicates that price movements in the underlying equity explain almost all variation in the token price during trading hours.

Table 6. Arbitrage efficiency during overlapping hours. This table reports the regression results estimating the elasticity of token prices with respect to their underlying equity prices. The dependent variable is the natural logarithm of the token price, and the independent variable is the natural logarithm of the underlying stock price. To account for hourly data granularity, underlying stock prices are matched with token prices observed in the subsequent 30-minute interval. Token and time fixed effects are included. Standard errors are clustered at the token level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Log token price
Log stock price	0.982*** (167.916)
N	13685
Adjusted R^2	1.000
Time FE	Yes
Token FE	Yes

5.2 Response to Value-Relevant News

To test whether tokenized stocks respond to value-relevant information, we examine earnings announcements that occur when the underlying equity market is closed²⁰. Earnings announcements are a well-established source of firm-specific information and provide a clean setting to evaluate informational responsiveness.

For each firm i , we calculate standardized unexpected earnings (SUE):

$$SUE_i = \frac{Actual_i - Consensus_i}{StdDev_i}, \quad (2)$$

where $Actual_i$ is reported earnings, $Consensus_i$ is the mean analyst forecast, and $StdDev_i$ is the cross-sectional standard deviation of analyst forecasts. We measure token returns over the three-hour interval surrounding the

²⁰More than 70% of earnings announcements fall in the weekend based on the IBES summary statistics data.

announcement and estimate the following regression:

$$R_i^{\text{token}} = \alpha + \beta SUE_i + \lambda X_i + \varepsilon_i, \quad (3)$$

where R_i^{token} is the token return around the announcement. The choice of control variables, X_i , follows prior literature (e.g., [Hung et al., 2015](#); [Zhu, 2019](#); [Karolyi et al., 2025](#)) and includes firm size, book-to-market ratio, leverage, and return on assets, measured using the latest available annual data prior to the announcement. The coefficient β reflects whether tokenized stock prices move in the direction implied by earnings news when traditional exchanges are closed, providing evidence on information incorporation rather than mere price following.

Figure 16 presents event-study evidence on tokenized stock price and trading activity around earnings announcements. The figures plot average outcomes in three-hour intervals relative to the interval containing the earnings announcement ($t = 0$), separately for firms with positive and negative standardized unexpected earnings (SUE).

Consistent with the canonical insight that stock prices incorporate earnings-related information around announcement events ([Ball and Brown, 1968](#)), we find that tokenized stock prices also respond systematically to earnings news during off-hours. Panel A shows that token prices respond to earnings news. Token returns increase following positive earnings surprises, while responses to negative surprises are negative but not statistically significant. These price responses are concentrated in the announcement interval and the immediately subsequent intervals, with little evidence of differential trends prior to the announcement. The asymmetry between positive and negative surprises suggests that token prices incorporate the directional content of earnings news, although the reaction to negative news appears weaker in this sample.

Panel B reports the pattern of trading volume, normalized by each token's average pre-announcement volume. Trading volume increases substantially beginning in the announcement interval for both positive and negative surprises, consistent with heightened trading intensity around information releases regardless of news sentiment.

Table 7, which presents findings from estimation of equation (3), provides regression-based evidence consistent with the event-study patterns. The coefficient on SUE is positive and statistically significant in both the univariate and control specifications. Taken together, the results indicate that tokenized stocks respond promptly to value-relevant information during off-hours.

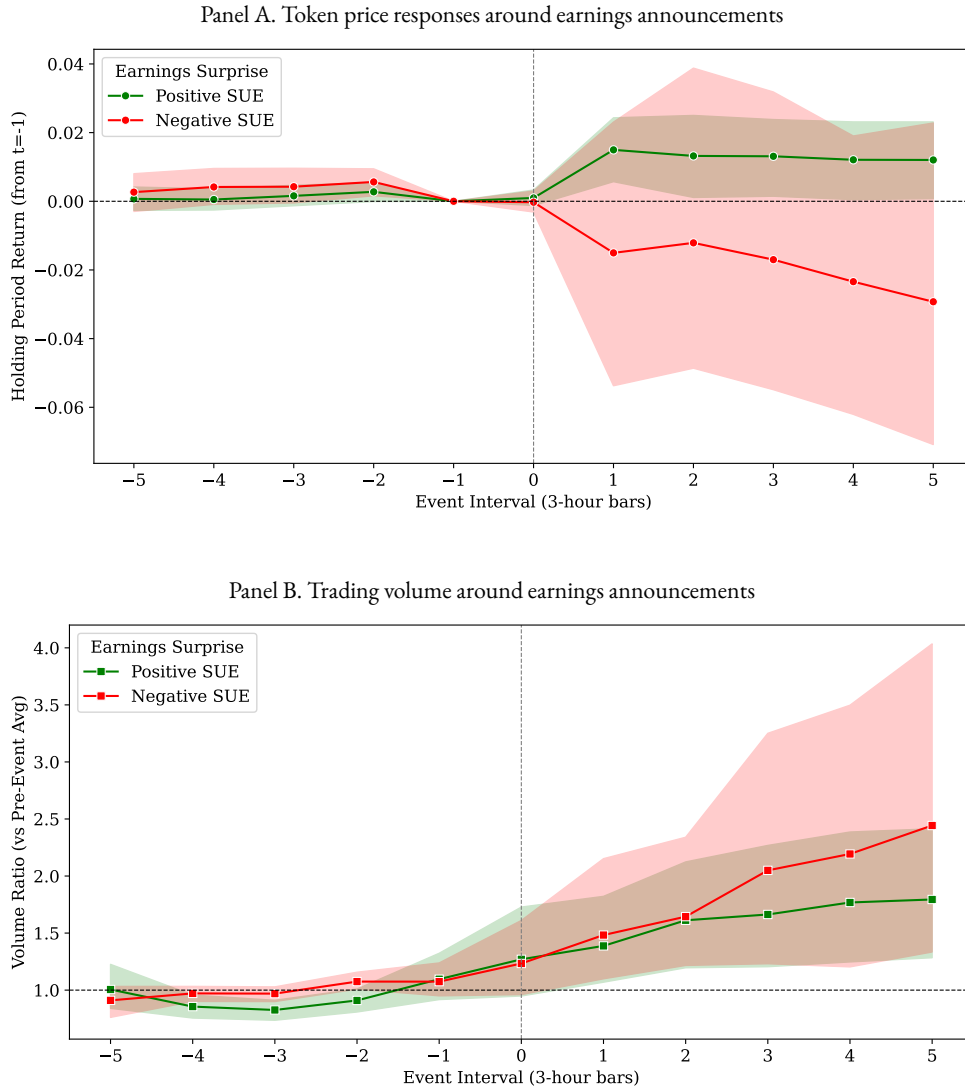


Figure 16. Token price and trading volume responses around earnings announcements. Panel A plots average token holding-period returns around earnings announcements. Event time is defined on a three-hour grid, with $t = 0$ denoting the last observation at or before the announcement time. Returns are measured relative to the token price at $t = -1$. Panel B plots token trading volume around earnings announcements, normalized by each token’s average pre-announcement volume. In both panels, tokens are grouped by the sign of SUE. Shaded areas denote 95% confidence intervals obtained by bootstrap resampling.

5.3 Off-Hour Price Movements

Although earnings announcements reflect scheduled information events, much value-relevant information arrives gradually or unpredictably, particularly during market closures. We therefore examine token price movements during off-hour trading windows more broadly.

We distinguish between two off-hour windows. Weekday overnight sessions are relatively short and often characterized by thin liquidity, where price changes may reflect microstructural reversals rather than information. Week-

Table 7. Off-hour earnings response. This table reports the results of an OLS regression of tokenized stock return in the 3-hour window around earnings announcements (*Token return*) on Standardized Unexpected Earnings (*SUE*). Column (1) presents the univariate regression results. Column (2) includes firm-level control variables: firm size (*Size*), book-to-market ratio (*BM*), leverage (*Leverage*), and return on assets (*ROA*). All control variables are measured using the latest annual financial data available prior to the earnings announcement date. *t*-statistics based on standard errors clustered by token are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	<i>Token return</i>	
	(1)	(2)
<i>SUE</i>	0.003** (2.000)	0.003* (1.805)
<i>Size</i>		0.007 (0.939)
<i>BM</i>		0.012 (0.428)
<i>Leverage</i>		0.033 (1.159)
<i>ROA</i>		0.050 (1.089)
<i>N</i>	85	83
Adjusted <i>R</i> ²	0.059	0.129

end sessions, in contrast, span more than two days and allow a broader set of firm-specific and macroeconomic news to accumulate. Figure 17 shows that token returns during off-hour sessions vary by day and display limited systematic patterns. Returns during Tuesday and Wednesday overnight sessions are mildly negative, reflecting short off-hour intervals in which price movements are dominated by liquidity effects and partial reversals following regular trading earlier in the week. In contrast, Thursday and Friday exhibit positive prior-night returns on average, suggesting the accumulation of firm-specific and macroeconomic information late in the week – for example, earnings announcements clustered in late weekdays and off-hours (Michaely et al., 2016) – and the anticipation of the prolonged market closure over the weekend. The two platforms generally move in the same direction, but Ondo’s prior-night return is more pronounced on Fridays, consistent with its constrained off-hour redemption and arbitrage mechanisms which allow price pressure and expectations to play a greater role during late-week off-hour sessions.

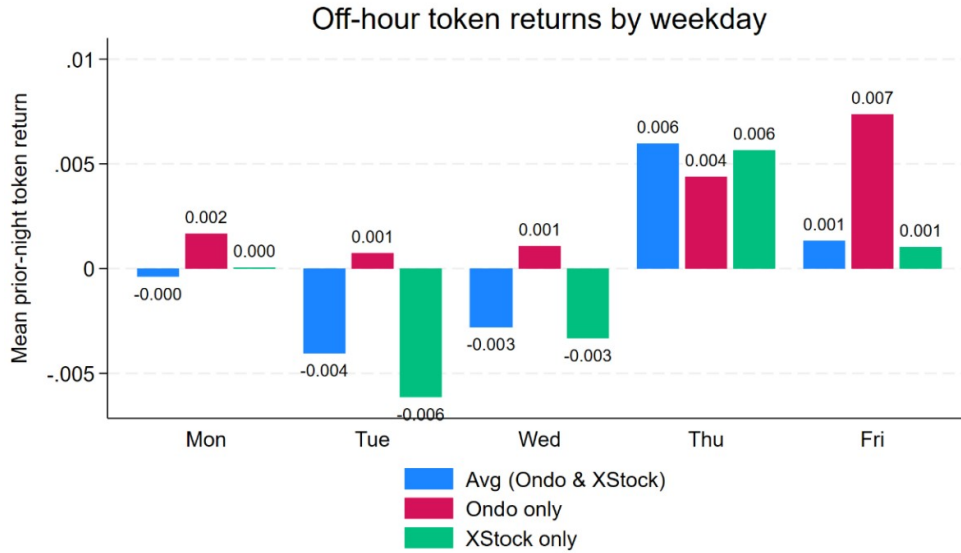


Figure 17. Average token returns during prior off-hour sessions by weekday. This figure reports the average token returns earned during the prior off-hour window, grouped by weekday. For Monday, the prior off-hour window spans the weekend interval, from Friday market close through Monday market open. For Tuesday through Friday, the prior off-hour window corresponds to the preceding weekday overnight period. Blue bars represent the average across Ondo and xStock, while red and green bars correspond to Ondo and xStock, respectively.

Table 8 reports average overnight token returns for portfolios sorted by the prior day’s underlying stock performance. The results exhibit a significant contrarian pattern: tokens tied to stocks that performed strongly during the day (Q₅) tend to underperform that night, whereas tokens of daytime losers (Q₁) tend to outperform.

Table 8. Weekday off-hours token returns sorted by prior day stock performance. This table reports average overnight returns for tokenized stocks (4:00 PM to 9:30 AM) following different daytime performance groups of the underlying stocks. Quintile portfolios are based on that day’s trading session. The negative Q₅–Q₁ spread indicates reversal. Newey–West *t*-statistic ≈ -2.7 .

Daytime Stock Quintile	Q ₁ (Losers)	Q ₂	Q ₃	Q ₄	Q ₅ (Winners)	Q ₅ –Q ₁
Mean token overnight return (%)	+0.4	+0.1	+0.3	+0.2	-1.1	-0.99

This weekday reversal also carries over to the underlying market. Figure 18 shows that stocks associated with high overnight token returns (Q₅) tend to underperform on the subsequent day relative to those with low overnight returns (Q₁). This confirms the short-horizon reversals in lightly liquid weekday overnight sessions (O’Hara, 2015b; Fang et al., 2024).

In contrast, weekend sessions display patterns consistent with price discovery. Table 9 reports cumulative Monday stock returns for portfolios formed by sorting tokens on their weekend return. Stocks linked to higher weekend token returns earn higher Monday returns on average, consistent with token prices impounding information over the weekend.

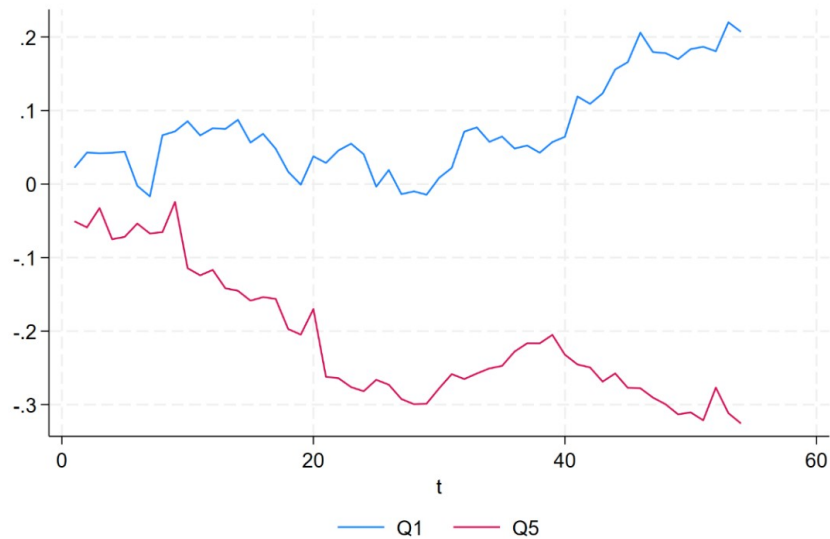


Figure 18. Cumulative next-day stock returns of overnight token winners (Q5) and overnight token losers (Q1). This figure plots cumulative next-day stock returns for portfolios formed by sorting stocks on the overnight token return (from 4:00 PM t to 9:30 AM $t+1$). Q1 (Q5) represents stocks associated with the lowest (highest) token returns.

Table 9. Monday Stock Returns Sorted by Prior Weekend Token Returns. Each weekend, tokens are sorted by return from Friday 4 PM to Monday 9:30 AM. Monday returns of the corresponding stocks are reported. The Q5-Q1 spread is statistically insignificant.

Weekend Token Quintile	Q1 (Worst)	Q2	Q3	Q4	Q5 (Best)	Q5-Q1
Mean Monday stock return (%)	-0.23	-0.22	-0.08	+0.70	+0.54	+0.77

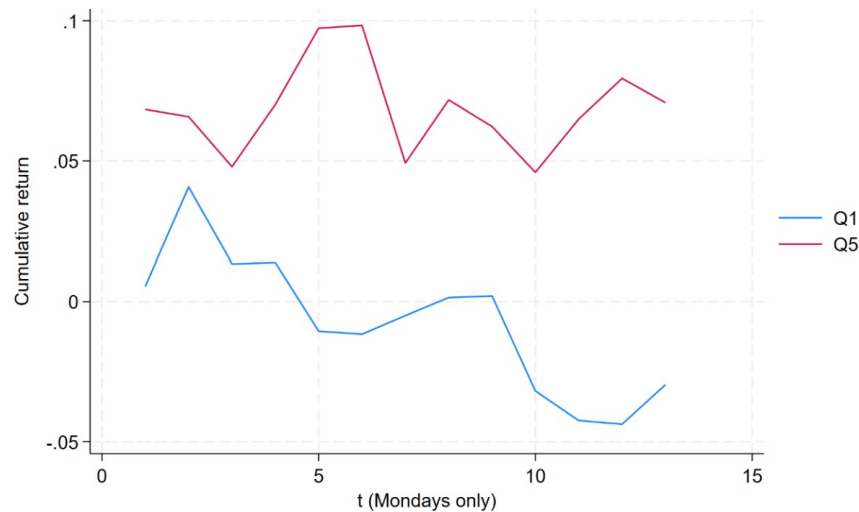


Figure 19. Cumulative Monday stock returns of weekend token winners (Q5) and weekend token losers (Q1). This figure shows cumulative Monday stock returns for portfolios formed by sorting stocks on the weekend token return (from Friday 4 PM to Monday 9:30 AM).

Figure 19 visually confirms this weekend signal: cumulative Monday returns for weekend token winners (Q5) remain persistently higher than for weekend losers (Q1).

Taken together, the results reveal a dichotomy between short-horizon weekday overnights, which exhibit patterns consistent with microstructural reversals, and longer weekend sessions, during which token returns appear more informative about fundamentals.

5.4 Drivers of Weekend Token Returns

Having established that weekend sessions are associated with information incorporation, we ask: what types of information drive token prices during weekends? We conduct a regression that compares crypto market factors, macroeconomic, and geopolitical factors as explanations for weekend token returns.

We estimate the following panel regression for each Saturday and Sunday observation:

$$r_{i,d}^{\text{token}} = \alpha + \beta' \mathbf{X}_d + \mu_i + \varepsilon_{i,d}, \quad (4)$$

where $r_{i,d}^{\text{token}}$ is the return of token i from 00:00 to 23:59 ET on weekend day d , \mathbf{X}_d is a vector of time-varying factors, and μ_i is a token fixed effect. Standard errors are clustered by token.

The factor vector \mathbf{X}_d contains three groups. *Crypto factors* include BTC return, and ETH return orthogonalized against BTC to isolate ETH-specific variation. *Macro factors* include the S&P 500 index daily return, and Gold and Oil futures returns. *Geopolitical factors* include the Geopolitical Risk (GPR) Index of [Caldara and Iacoviello \(2022\)](#). We also include a Saturday dummy that absorbs systematic level differences between Saturday and Sunday. [Figure 20](#) reports pairwise correlations among all regressors.

[Table 10](#) reports results. Several findings stand out. First, BTC return is positive and highly significant in all specifications, confirming that broad crypto market sentiment is a primary driver of weekend token returns since tokenized stocks residing on crypto trading platforms. Second, ETH return orthogonalized against BTC is also positive and significant in both the crypto-only and full specifications, indicating that ETH platform-specific sentiment carries additional information beyond the broad crypto market factor. Third, Gold futures return is the strongest single macro predictor: a 1% rise in gold prices is associated with a 0.10% increase in token returns. The coefficient drops substantially but remains significant in the full specification, suggesting that safe-haven demand and macroeconomic uncertainty spill over into tokenized equity markets even after controlling for crypto factors. Fourth, the S&P 500 return is positive and significant in the macro-only specification, consistent with token prices reflecting equity market expectations during exchange closures. However, the coefficient turns negative in the full specification. This sign reversal indicates that, conditional on crypto and gold exposure, equity market movements

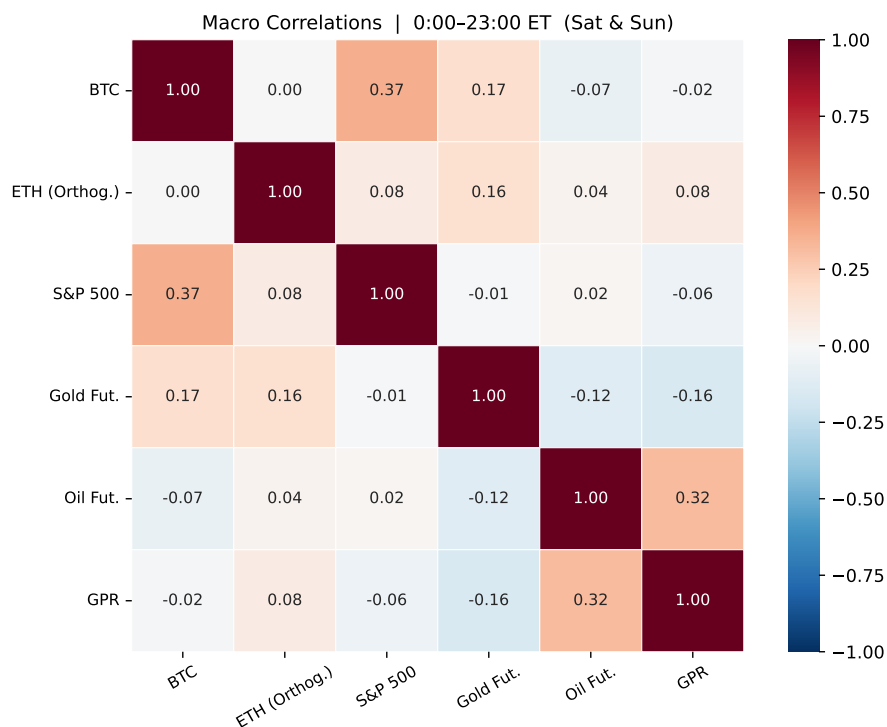


Figure 20. Pairwise correlations among weekend regressors. Pearson correlations computed on weekend (Saturday and Sunday) observations. Returns are measured over the 00:00–23:00 ET window. BTC and ETH (orthogonalized against BTC) trade continuously; Gold and Oil are CME futures with Saturday values forward-filled from Friday. S&P 500 is the Friday close-to-close return, forward-filled. GPR is the daily Geopolitical Risk Index of [Caldara and Iacoviello \(2022\)](#).

are associated with lower token returns. Fifth, Oil futures return enters negatively and significantly, consistent with rising oil prices signaling geopolitical or supply disruptions. Sixth, the GPR Index enters negatively and significantly in the geopolitical-only specification and remains robustly significant in the full specification, indicating that heightened geopolitical risk is associated with lower weekend token returns even after controlling for all other factors.

The full specification yields a R^2 of 0.051. Notably, the crypto group alone ($R^2 = 0.044$) account for substantially more variation than the other two groups. This pattern indicates that weekend token returns are predominantly driven by crypto market sentiment, consistent with tokenized stocks functioning as an asset class spanning both traditional equity and crypto markets.

5.5 Anticipation of Underlying Stock Returns

Finally, we test whether off-hour token returns anticipate the subsequent opening return of the underlying stock. [O’Hara et al. \(2023\)](#) and [Fang et al. \(2024\)](#) show that even small off-exchange or fractional trades can be information-relevant, suggesting that token price movements during nights and weekends could impound new

Table 10. Drivers of weekend token returns: horse race. This table reports panel regressions of token returns on crypto and macro factors over Saturday–Sunday sessions (Equation 4). The dependent variable is the token return from 00:00 to 23:59 ET. BTC and ETH returns are computed over the same 00:00–23:59 ET window. ETH is orthogonalized against BTC. S&P 500 is the Friday close-to-close index return, forward-filled to Saturday and Sunday. Gold and Oil futures returns use the same 00:00–23:59 ET window. Saturday values are forward-filled from Friday (CME closed on Saturday). GPR is the daily Geopolitical Risk Index of [Caldara and Iacoviello \(2022\)](#). Standard errors are clustered by token. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1) Crypto	(2) Macro	(3) Geo	(4) Full
BTC Return	0.1173*** (6.64)			0.1167*** (6.68)
ETH Return (Orthog.)	0.0565*** (4.38)			0.0575*** (4.34)
Gold Futures Return		0.1043*** (8.95)		0.0326*** (3.04)
S&P 500 Return		0.0623** (2.21)		−0.0484** (−2.35)
Oil Futures Return		−0.0244*** (−4.18)		−0.0144** (−2.45)
GPR Index			−0.0000*** (−5.52)	−0.0000*** (−4.13)
Saturday	0.0011** (2.16)	0.0015*** (3.25)	0.0016*** (3.30)	0.0011** (2.35)
<i>N</i>	6,964	6,964	6,964	6,964
Within R^2	0.044	0.018	0.008	0.051
Token FE	Yes	Yes	Yes	Yes

information and *anticipate* the underlying stock’s next-opening move. In theory, positive overnight or weekend token returns should predict a higher opening price for the stock, and vice versa, if tokens serve as efficient price discovery conduits ([Fama, 1965](#); [Hasbrouck, 1995](#)).

To examine whether this is the case, we estimate the following panel regression:

$$R_{i,t}^{stock} = \alpha + \lambda R_{i,t}^{token} + \mu_i + \tau_t + \epsilon_{i,t}, \quad (5)$$

where $R_{i,t}^{stock}$ is underlying stock’s close-to-open return and $R_{i,t}^{token}$ is the cumulative token return over the corresponding off-hour interval. Token and time fixed effects are included. A positive and significant λ indicates that tokenized stock returns contain information about stock price movements at the market opening, which is consistent with off-hour price discovery.

The results from estimation of equation (5) presented in [Table II](#) suggest a near-complete passthrough of information: a 1% increase in the token return during off-hours predicts an approximate 0.90% increase in the underlying stock’s close-to-open return. The regression also exhibits high explanatory power, with an adjusted R^2 of 0.839.

These results suggest that, on average, token price changes during exchange closures contain information about the next opening price of the underlying equity, consistent with off-hour price discovery.

Table 11. Price discovery during off-hours. This table reports regressions of the underlying stock’s close-to-open return on the cumulative return of the corresponding tokenized stock during off-hours when the primary exchange is closed. The sample comprises the top 100 tokenized stocks by market capitalization as of September 2025. Time and token fixed effects are included. Standard errors are clustered at the token level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Close-to-open stock return
Cumulative token return	0.903*** (22.099)
<i>N</i>	1913
Adjusted <i>R</i> ²	0.839
Time FE	Yes
Token FE	Yes

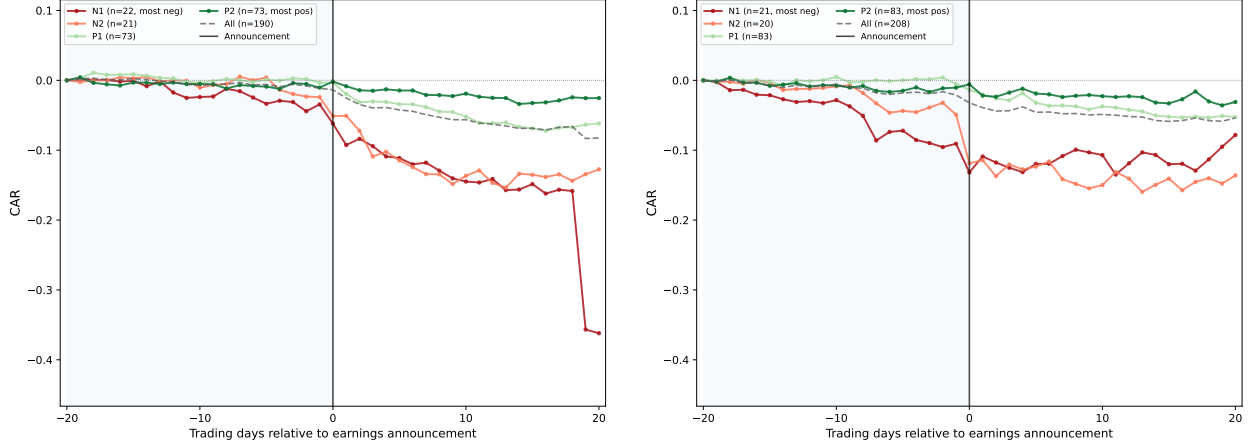
5.6 Post-Earnings Announcement Drift

Post-earnings announcement drift (PEAD)—the tendency for stock prices to continue moving in the direction of earnings surprises for weeks after the announcement—is one of the most well-documented anomalies (Ball and Brown, 1968; Bernard and Thomas, 1989). If tokenized stocks enhance price discovery by enabling continuous trading, one might expect PEAD to be attenuated in token markets, as prices can adjust to earnings news around the clock rather than waiting for the next exchange opening. We investigate this hypothesis through a series of tests.

Event-window evidence. We begin by plotting cumulative abnormal returns (CARs) from 20 trading days before to 20 days after earnings announcements, sorted by standardized unexpected earnings (SUE) portfolios. CARs are size-adjusted using Fama–French market-capitalization decile benchmarks. Figure 21 presents these event-window paths separately for stocks and tokens during the token era.

For stocks (Panel a), all four SUE portfolios are tightly clustered near zero in the pre-announcement window, with little evidence of differential pre-trends. After the announcement, a clear separation emerges: the most negative-SUE portfolio (N1) exhibits a sharp and continued decline, reaching approximately -37% by day +20, while the moderately negative portfolio (N2) drifts to around -13% . In contrast, positive-SUE stocks (P1 and P2) remain roughly flat.

For tokens (Panel b), all portfolios decline at the announcement date, and the post-announcement spread between positive- and negative-SUE portfolios is substantially smaller than for stocks. The most positive-SUE portfolio (P2) recovers slightly and remains near zero, while N1 and N2 stabilize around -10% to -15% . This compressed



(a) Stock CARs by SUE quintile

(b) Token CARs by SUE quintile

Figure 21. Event-window cumulative abnormal returns around earnings announcements: Stocks vs. tokens. This figure plots average cumulative abnormal returns (CARs) from day -20 to day $+20$ relative to earnings announcements, separately for stocks (Panel a) and tokens (Panel b). Observations are sorted into quintiles based on standardized unexpected earnings (SUE). CARs are size-adjusted using Fama–French market-capitalization decile benchmarks. The sample covers the token era (June 2025–March 2026).

spread is consistent with attenuated post-earnings drift in token markets.

PEAD regressions: stocks vs. tokens. To quantify the drift, we estimate:

$$CAR_{i,[1,\tau]} = \alpha + \beta SUE_i + \lambda X_i + \varepsilon_i, \quad (6)$$

where $CAR_{i,[1,\tau]}$ is the cumulative abnormal return from day 1 to day $\tau \in \{5, 10, 20\}$ after the earnings announcement, SUE_i is standardized unexpected earnings, and X_i includes firm size, book-to-market, leverage, and return on assets. We estimate equation (6) separately for stocks and tokens during the token era, restricting the stock sample to announcements occurring after each firm’s token launch date to ensure comparability.

Table 12 presents the results. For stocks, the coefficient on SUE is positive across all horizons, reaching statistical significance at the 10-day window (0.0024 , $t = 2.54$), consistent with the classical PEAD pattern. For tokens, the drift coefficient is not statistically significant across horizons.

To formally test the stock–token difference, we stack the two samples and estimate:

$$CAR_{i,[1,\tau]} = \alpha + \beta_1 SUE_i + \beta_2 IsToken_i + \beta_3 (SUE_i \times IsToken_i) + \lambda X_i + \varepsilon_i, \quad (7)$$

where $IsToken_i$ is an indicator for token observations. The interaction coefficient β_3 captures the differential drift between tokens and stocks. Table 13 shows that β_3 is negative at the 10- and 20-day horizons (-0.0036 and -0.0062 ,

Table 12. Post-earnings announcement drift: Stock vs. token. This table reports OLS regressions of cumulative abnormal returns (CAR) on standardized unexpected earnings (SUE) for stocks and tokenized stocks separately. CARs are computed over [1, 5], [1, 10], and [1, 20] trading-day windows following earnings announcements during the token era. Abnormal returns are size-adjusted using Fama–French market-capitalization decile benchmarks. Control variables include firm size (*Size*), book-to-market ratio (*BM*), leverage (*Leverage*), and return on assets (*ROA*), measured using the latest available annual data. Standard errors are clustered by firm. *t*-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	[1, 5d]		[1, 10d]		[1, 20d]	
	Stock (1)	Token (2)	Stock (3)	Token (4)	Stock (5)	Token (6)
<i>SUE</i>	0.0014 (1.23)	0.0004 (0.32)	0.0024** (2.54)	0.0005 (0.35)	0.0022 (1.44)	-0.0020 (-0.84)
<i>Size</i>	0.0116** (2.12)	0.0034 (1.25)	0.0286*** (3.56)	0.0073 (1.25)	0.0222*** (2.93)	0.0150** (2.22)
<i>BM</i>	0.0596** (2.48)	0.0507*** (3.06)	0.0472 (1.25)	0.0677** (2.01)	0.0641 (1.50)	0.0902** (2.08)
<i>Leverage</i>	0.0334 (1.44)	0.0375** (2.43)	0.0844** (2.38)	0.0659* (1.97)	0.0994** (2.10)	0.1013*** (2.90)
<i>ROA</i>	0.0216 (0.32)	0.0261 (0.62)	-0.0176 (-0.21)	0.0218 (0.28)	0.0204 (0.20)	0.0867 (0.95)
<i>N</i>	123	193	117	192	112	199
Adjusted <i>R</i> ²	0.142	0.088	0.270	0.081	0.136	0.119
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Cluster SE	Firm	Firm	Firm	Firm	Firm	Firm

respectively), with *t*-statistics of -2.13 and -1.85 , statistically significant at the 5% and 10% levels. These results indicate that token prices exhibit significantly weaker post-earnings drift than stocks.

6 Economic Implications and Future Research

The emergence of tokenized equities raises several important implications and open questions for accounting academics, practitioners, and regulators. In this section, we discuss these issues in light of our findings and outline directions for future inquiry.

6.1 Market Efficiency and Price Discovery

One fundamental question is whether a near-24/7 market leads to more efficient pricing of assets. Our evidence shows that token markets quickly incorporate information outside of standard hours, effectively extending the price discovery process. In theory, this could reduce the stale pricing periods and improve overall market efficiency, as prices adjust continuously rather than waiting for the next market opening to reflect new information. This is akin to moving from call auctions to continuous trading in the history of exchanges.

Table 13. Interaction test: Token vs. stock PEAD difference. This table reports OLS regressions of cumulative abnormal returns (CAR) on standardized unexpected earnings (SUE), a token indicator (*IsToken*), and their interaction ($SUE \times IsToken$), using a stacked sample of stock and token observations. CARs are size-adjusted using Fama–French decile benchmarks. Controls include *Size*, *BM*, *Leverage*, and *ROA*. Standard errors are clustered by firm. *t*-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	[1, 5d] (1)	[1, 10d] (2)	[1, 20d] (3)
<i>SUE</i>	0.0012 (0.83)	0.0032** (2.43)	0.0037* (1.67)
<i>IsToken</i>	0.0082 (1.44)	0.0183** (2.06)	0.0246* (1.89)
$SUE \times IsToken$	-0.0009 (-0.67)	-0.0036** (-2.13)	-0.0062* (-1.85)
<i>Size</i>	0.0061** (2.02)	0.0171*** (2.67)	0.0183*** (2.84)
<i>BM</i>	0.0558*** (3.27)	0.0587* (1.89)	0.0759** (2.04)
<i>Leverage</i>	0.0357** (2.43)	0.0745*** (2.79)	0.1005*** (2.85)
<i>ROA</i>	0.0221 (0.50)	-0.0002 (-0.00)	0.0582 (0.66)
<i>N</i>	316	309	311
Adjusted <i>R</i> ²	0.097	0.161	0.137
Controls	Yes	Yes	Yes
Cluster SE	Firm	Firm	Firm

However, the benefit is only realized if the continuous market is liquid enough. In our data, off-hour token trading is often thin, which can result in noisy signals in which prices bounce on little volume. An inefficient continuous market could, paradoxically, introduce inefficiency – for example, if a false rumor on a Saturday causes the token price to crash with no circuit breaker, some traders might panic, or algorithms might feed off that, only for it to revert when humans intervene. Traditional markets, by being closed, sometimes act as a cooling-off period, though at the cost of delaying price reactions to new information. Which is preferable depends on one’s view of rationality and need for cooling off. Newbery (2025) notes concerns that 24/7 trading might lead to more emotional or impulsive trading because people can react instantly at any hour, potentially harming the returns of retail traders who lack discipline.²¹ Our observation of certain tokens having erratic overnight swings supports the notion that lower liquidity and immediate access can equal high volatility. That said, as markets mature and participation broadens at all hours, these swings should dampen.

A related point is the integration of price discovery across venues. With tokenization, we effectively add more trading venues (blockchains) to an already fragmented equity market, which currently include lit exchanges, dark

²¹See <https://www.nasdaq.com/articles/24-7-trading-coming-it-good-thing>.

pools, and foreign exchanges. More venues can either enhance price discovery by bringing in unique participants and information, or cause fragmentation if liquidity is split and arbitrage is slow. We find that arbitrage between token and stock markets is fairly effective, but not instantaneous, especially when one venue is closed. The arbitrage is time-limited to when overlap exists or when redemption is possible. In those gap periods, fragmentation does temporarily occur, as the token market “floats” on its own. Yet, because one venue is closed, it’s not the typical fragmentation scenario; it’s sequential price discovery.

If token trading volume grows, one could foresee the possibility that major price moves happen on-chain first. For example, Sunday night token trading sets a price, which then dictates where Monday opening auctions clear. This would effectively shift some price discovery away from NYSE/NASDAQ to the crypto realm. Exchanges might not favor that, which is perhaps why they themselves are exploring extended hours to not be left behind. Nasdaq’s plans for 24/5 trading by 2026 can be seen as a response to demand for round-the-clock trading that crypto has demonstrated. This reflects an interesting interplay in which crypto token markets acting as a catalyst for traditional market innovation.

6.2 Liquidity and Market Quality

Our results discussed in section 4.4 highlight that liquidity is extremely skewed. This has several implications:

From an investor standpoint, one must be cautious when trading less popular tokenized stocks due to the risk of large price impact and wide spreads. Although we do not have access to direct spread data, the lack of volume suggests poor liquidity. In contrast, highly traded tokens likely have market makers or automated market-maker pools ensuring tighter spreads.

There is a network effect where liquidity attracts liquidity. The fact that flagship tokenized stocks, such as tokenized Tesla and tokenized Apple, attract the most liquidity is likely to reinforce their dominance. In contrast, niche tokens might never take off without targeted effort or underlying company events that spur investor interest.

The involvement of professional liquidity providers is key. Traditional equity markets rely on market makers and high-frequency firms to keep markets orderly. In token markets, similar actors – often crypto-native trading firms – have started to provide liquidity, but they face higher risks stemming from the absence of trading halts, more volatile retail flows, and regulatory uncertainty. Encouraging more market makers to participate, perhaps by having them share in fees or arbitrage opportunities, could improve market quality. Ondo’s approach of aligning with traditional liquidity – referred to as “inherited liquidity”²² – means that large trades ultimately rely on the

²²See <https://ondo.finance/blog/the-growing-role-of-tokenized-securities>

liquidity of the underlying stock market via the redemption process. Under this design, sizable imbalance on-chain can be resolved by tapping the huge liquidity off-chain. However, this mechanism is not instantaneous, as the speed of adjustment is governed by the redemption process.

The median daily trading volume per token of \$58k we observe is in line with StarCompliance's point that many tokens are lightly traded.²³ That discussion also highlights unverified users, which adds to the risk of tokenized stocks. In thinly traded tokens, broad global access and limited oversight can increase vulnerability to price manipulation, such as short-lived pump-and-dump episodes. These considerations underscore the importance of monitoring by regulators and platform operators.

Recent developments suggest that regulatory scrutiny is already emerging. For example, scrutiny surrounding Robinhood's issuance of tokenized stocks linked to OpenAI and SpaceX²⁴ highlights concerns when such products are introduced without company consent and proper safeguards. Our data does include pre-IPO tokens (likely issued via platforms such as PreStocksFi), which introduce extra liquidity complexities as the underlying shares are not freely tradable even off-chain.

An open question is whether tokenization helps the liquidity of the underlying stock. Perhaps by engaging more global investors or by providing an outlet when the main market is closed, tokenized stocks could reduce pent-up supply/demand imbalances at open and therefore smooth opening volatility. On the other hand, tokenization could drain some liquidity from the main market as some volume migrates to tokens, especially if tokenized stocks eventually are allowed in the U.S. At present, however, tokenized trading remains small in scale, and we observe no visible impact on underlying liquidity.

6.3 Regulatory and Accounting Considerations

An important consideration is the implications for financial reporting and valuation from an accounting perspective:

1. If token markets become material, could they provide another reference point for fair value measurement of equities? For instance, if a stock only trades thinly on its home exchange but has a 24/7 token market, would that token price be considered in marking to market? Likely not yet, as tokens are not recognized exchanges.

But it's an interesting thought for future GAAP/IFRS if these become mainstream.

²³See <https://www.starcompliance.com/tokenized-stocks-raise-big-questions-for-compliance-teams/>.

²⁴See <https://www.cnbc.com/2025/07/07/robinhood-stock-tokens-face-scrutiny-in-the-eu-after-openai-warning.html>

2. There might be effects on how information is disseminated. Firms typically try to release earnings after market close to avoid wild trading, but with token markets, there's always a market open somewhere. They could see volatility immediately. Could this influence firms' choices of timing disclosures? Possibly not significantly unless token volume is large enough to matter for existing shareholders.

On the compliance side, as mentioned, insider trading is a major concern. Our findings of token markets quickly reflecting news imply that traders with inside information potentially can exploit their informational advantage out of the reach of regulators. Regulators will likely consider token trades in their surveillance if they suspect leaks, similar to the monitoring of ADRs or foreign market trading ahead of news.

Another consideration is whether market manipulation may be more feasible in token venues. In principle, thin liquidity and limited oversight could make token prices more susceptible to temporary distortions, which might influence investor sentiment or related markets. For example, price movements in token markets during weekends could, in theory, affect expectations of the underlying stocks ahead of the subsequent trading session. Currently, the small scale of tokenized markets suggests that token prices play a limited role in mainstream financial decision-making. Nonetheless, as academics, we could be alert to any such linkages in the future.

6.4 Issuers and Competition

Our study focuses on Backed and Ondo, but the landscape could evolve. Industry coverages have noted other tokenized stock issuers that emphasizes native issuance, such as Superstate,²⁵ as well as players like Securitize²⁶ and Dinari²⁷ that might try regulated token offerings. If competition increases, we might see greater product differentiation. For example, some platforms might tokenize emerging market stocks or offer leverage. Interest from established exchanges further underscores the potential evolution: Kraken has announced plans to offer xStocks to its customers,²⁸ and other large platforms such as Coinbase or Binance may also enter this space. Notably, Binance briefly offered tokenized stocks in 2021 but discontinued the program due to regulatory pressure²⁹. If a major exchange with millions of users reintroduces such products, adoption could increase rapidly.

²⁵See <https://crypto.news/tokenized-stock-market-dominated-by-only-two-players/>

²⁶See <https://www.coindesk.com/business/2025/12/17/securitize-to-offer-first-fully-onchain-trading-for-real-public-stocks-in-early-2026>

²⁷See <https://www.channelnewsasia.com/business/dinari-granted-first-broker-dealer-registration-offer-tokenized-stocks-5205791>

²⁸See <https://blog.kraken.com/news/tokenized-equities-coming-soon>

²⁹<https://cryptonary.com/binance-stops-selling-tokenized-stocks-like-apple-and-tesla/>

Interestingly, Robinhood (the company) in EU launched 24/5 trading via tokens for over 200 stocks.³⁰ This development suggests that traditional brokerages may use tokenization rails to provide extended trading to their clients. If so, tokenization might become backend plumbing rather than a consumer-facing concept. For example, users may simply observe that they can trade Apple at midnight on Robinhood, without being aware that execution occurs through tokenized instruments on a blockchain network. This could greatly expand trading volume while remaining within a walled garden. Absent interoperability, such designs risk fragmenting liquidity across platforms.

Our data hint that as of 2025, the two main issuers combined are essentially *the market*. Should one of them fail or be compromised, it could affect trust in tokenized assets. Both being new, it's a delicate phase. The Animoca research highlighting 95% concentration highlights a systemic risk: a hack or failure at Backed or Ondo could crash this small market. Conversely, if both succeed, their presence may attract others.

6.5 Future Research Directions

The phenomenon of tokenized assets opens many avenues for research. Based on our findings, some potential directions arise:

1. A deeper analysis of price discovery using intraday data: for example, Hasbrouck's information share between the token market and underlying market could be computed, similar to studies comparing ADRs with their home markets.
2. Impact on volatility: future research could examine if stocks that are tokenized have different overnight volatility or opening gap behavior than those that are not tokenized, controlling for firm characteristics. Currently, many major ones are tokenized, but one could find some that are not and compare.
3. Investor behavior: using addresses, one could study the holding periods and trading patterns of token holders, distinguishing short-term speculators from long-term holders and examining whether these patterns vary across assets. If address clustering is observed, future work could identify if the same addresses trade multiple token stocks, shedding lights on diversification strategies or sector rotations on-chain.
4. Corporate events: how do token markets handle dividends, splits, voting events? For instance, when NVIDIA had a 4-for-1 split in 2023, a token representing it would ideally also split 4-for-1. These operational details

³⁰<https://insights4vc.substack.com/p/robinhood-aims-at-400m-24-hour-equities>

can sometimes go awry and manual intervention might be needed for smart contracts. Studying a few events, such as Tesla’s 2022 split if any token existed then, could be instructive for operational robustness.

5. Macroeconomic linkages: as tokenized bonds and stocks grow, one might examine if these on-chain RWA markets start correlating with crypto markets or remain siloed. For example, does Bitcoin crash ever spill into tokenized equity prices via liquidity crunch? While such spillovers are not evident so far, they may become more relevant if more token holders use crypto collateral.
6. Legal structures and investor protection: future research could examine how the legal differences – such as the use of bankruptcy-remote structures by some issuers – affects investor confidence and token pricing. Differences in perceived risk across tokenized stocks might affect valuation, with higher-risk tokens potentially trading at a discount. While arbitrage should eliminate such discounts as long as redemption mechanisms remain credible, concerns about issuer solvency or legal enforceability could limit arbitrage and allow pricing differentials to persist.

From an accounting standpoint, the tokenization of securities may soon surface in debates about how to treat digital representations of equity claims. While tokenization is unlikely to affect the accounting of the issuing firm, it raises classification questions for the holder. If an entity holds tokenized equities, should these tokens be treated as cash equivalents, marketable securities, or another class of financial asset on the balance sheet? This remains largely uncharted territory, but under current standards, such holdings would most plausibly be treated as equity investments measured consistently with their underlying economic exposure.

7 Conclusion

Tokenized equities offer a glimpse into the future of capital markets – global, continuous, and fractionally accessible. Using new data from two leading issuers on Ethereum and Solana blockchains, we document that tokenized stocks partially impound news during off-hours, redistribute return timing over weekends, and enable high-frequency micro-trading without persistent mispricing. These results suggest that blockchain-based trading venues can support timely price discovery and broaden market participation.

Looking ahead, tokenized markets may reshape how and when information enters prices, how corporate events are disseminated, and how investors access equity exposure. As adoption expands and regulatory clarity improves,

these venues could evolve from experimental complements to meaningful extensions of public equity markets. Future research will be critical in understanding their impact on price discovery, volatility, and the global accessibility of financial markets.

Declaration of generative AI and AI-assisted technologies in the writing process: During the preparation of this manuscript, the authors utilized AI tools for copyediting purposes, specifically to enhance readability and clarity, as well as to code LaTeX-based tables and figures. All substantive content, analysis, and interpretations are solely the authors' own. The authors thoroughly reviewed and revised all AI-assisted edits in this manuscript.

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