Tokenized Stocks:

Price Discovery Under Continuous Fractional Trading

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Abstract

Tokenized stocks, blockchain-based representations of traditional equities, have expanded rapidly since their inception in July 2025, reaching $1.5 billion in market capitalization and hundreds of listed assets in May 2026. Leveraging granular on-chain features of this novel setting, we provide the first empirical assessment of this market and examine whether tokenized stocks serve as a *complementary* platform for price discovery in traded equities. We find that token prices, which are mostly traded fractionally (92.25% of trades are less than a unit of their underlying), continuously (24/7), and globally, respond significantly to value-relevant news released when U.S. exchanges are closed. Additionally, off-hours token returns predict the direction of the underlying stock's next open return. Moreover, firms with tokenized stocks exhibit weaker post-earnings announcement drift. These results suggest tokenized stocks as a complementary platform for price discovery on U.S. equities. To assess whether price discovery is driven by informed trading (rather than noise), we conduct three tests: a variance decomposition that attributes the bulk of the off-hour response to idiosyncratic earnings news rather than crypto or systemic factors; an analysis showing that sophisticated investors account for a disproportionate share of off-hour activity around value-relevant news; and PIN-based and transaction-level tests confirming that off-hour trading is directionally informative. Overall, our findings provide novel insights into the informativeness of retail-driven fractional and continuous trading in tokenized stocks, with broad implications for price discovery, regulatory oversight, and investor access as real-world assets increasingly migrate onto public blockchains.

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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]

1 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. Launched in July 2025, tokenized equities are digital bearer instruments backed one-for-one by shares held in custody and settled on public blockchains. They fractionalize and trade continuously globally, unhindered by the traditional exchange hours of 9:30–4:00 ET. The phenomenon is no longer confined to crypto-native venues. The New York Stock Exchange has announced its own platform for trading and settling tokenized securities, and its parent, Intercontinental Exchange (ICE), has taken a strategic stake in a crypto exchange to list NYSE-traded tokenized stocks.[2] Regulators have begun to accommodate the shift: in March 2026 the U.S. Securities and Exchange Commission approved Nasdaq's framework for tokenized securities, under which eligible stocks settle as tokens that trade alongside conventional shares with the same tickers, prices, and investor rights.[3] Proponents of tokenized assets posit that tokenization enhances price discovery and market efficiency by letting investors react immediately to news around the clock and by democratizing access to global markets.[4] Critics counter that these venues suffer from thin liquidity, regulatory grey areas, and potential mispricing, and they lack the circuit breakers and unified oversight of traditional exchanges, thereby raising concerns about the potential for manipulation and insider trading.[5] As tokenized stock markets promise continuous access at the cost of potential new risks, and with Citi forecasting up to $4–5 trillion in tokenized assets by 2030, understanding how this new market incorporates information is no longer a niche question.[6]

Whether the continuous, fractional, and globally accessible market for token equities improves the way information is impounded into equity prices remains an open empirical question we examine in this study. Traditional exchanges are open for only a fraction of each week, so value-relevant news that arrives overnight, on weekends, or during holidays cannot be acted upon until the next session. This institutional friction has long been understood to

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

[2] See https://ir.theice.com/press/news-details/2026/The-New-York-Stock-Exchange-Develops-Tokenized-Securities-Platform/default.aspx and https://fortune.com/2026/03/05/okx-ice-intercontinental-exchange-investment-tokenized-securities-25-billio/.

[3] See https://www.coindesk.com/policy/2026/03/18/sec-approves-nasdaq-s-move-to-allow-tokenized-securities-trading.

[4] See https://www.nasdaq.com/articles/regulators-consider-24-7-trading-heres-what-investors-need-know

[5] See https://www.starcompliance.com/tokenized-stocks-raise-big-questions-for-compliance-teams/

[6] See https://cointelegraph.com/news/killer-use-case-citi-says-trillions-in-assets-could-be-tokenized-by-2030.

shape how prices respond to information: earnings news released outside trading hours is impounded only gradually (Patell and Wolfson, 1984; Berkman and Truong, 2009), and prices continue to drift in the direction of earnings surprises for weeks after their announcement (Ball and Brown, 1968; Bernard and Thomas, 1989). Implications are also managerial, where firms strategically time disclosures around weekends and after the close (Michaely et al., 2016), often to exploit limited investor attention when trading is thin (DellaVigna and Pollet, 2009; Doyle and Magilke, 2009; deHaan et al., 2015). Because the same economic claim trades continuously on-chain even while its underlying market is closed, tokenized equities offer a novel laboratory for a long-standing question at the intersection of the disclosure and market-efficiency literature: how the structure and timing of trading opportunities shape the speed and completeness with which information is impounded into prices (Fama, 1965; Hasbrouck, 1995; Blankespoor et al., 2020).

We assemble what is, to our knowledge, the first large-sample dataset of tokenized equities, integrating on-chain trading records, token prices, and holder composition with earnings announcements, analyst forecasts, and firm fundamentals for the underlying stocks.[7] Although the market is still young – aggregate capitalization is roughly $1.5 billion as of May 2026[8] – it has grown more than fourteenfold since trading began in July 2025, and roughly 95% of its value is concentrated in two issuers, Backed Finance, which issues "xStocks," and Ondo Finance. Beyond their scale, these venues differ structurally from traditional exchanges in ways that bear directly on how information reaches prices. First, trading is fractional: rather than transacting in whole shares, investors trade tokens in fine increments, so that micro-trades—often below $100—account for a large share of activity and broaden the population of participants who can express views on a stock. Second, access is global and largely retail: holdings and trades are distributed across many countries, including jurisdictions with limited access to U.S. equity markets, and require only a crypto wallet and stablecoins rather than a domestic brokerage account. Third, the two main issuers differ in their trading hours: Backed enables fully decentralized, round-the-clock (24/7) trading across multiple blockchains, whereas Ondo synchronizes token creation and redemption with U.S. market hours, resulting in an effective 24/5 structure. Collectively, these features make tokenized equities more than a mirror of the underlying market. Notably, they constitute an alternative, retail-oriented platform on which continuous and fractional trading can be informative, offering a natural setting to study how fractional and continuous trading affect price discovery in U.S. equities.

[7] See Malinova and Park (2026) for an analysis of tokenized stocks for trading and capital raising.
[8] See https://app.rwa.xyz/stocks.

The central question of our study is whether tokenized stocks provide a *complementary* venue for price discovery in traded equities. The empirical approach we employ exploits the fact that more than 70% of earnings announcements for the underlying firms occur while U.S. exchanges are closed, thereby creating a natural laboratory in which the token market is the only place where value-relevant news can be fractionally traded at any time.[9] Around these off-hour disclosures, we measure token returns in tight event windows, relate off-hour token returns to the underlying stock's subsequent opening return in panel regressions with token and time fixed effects, and compare post-earnings drift for tokenized firms against a propensity-matched sample of non-tokenized firms in a difference-in-differences design. We organize the analysis around our central question in two parts. In the first part, we establish three results that collectively indicate that tokenized markets contribute to price discovery during off-hours. First, token prices respond to value-relevant news that arrives while U.S. exchanges are closed: returns move systematically in the direction of earnings surprises released outside trading hours, and trading intensifies around these disclosures. Second, off-hour token returns predict the direction of the underlying stock's return in its next official session—a 1% off-hour token return forecasts a 0.28% higher close-to-open return in the underlying equity. This indicates that tokens do not merely echo information already in prices but can lead the underlying market across trading sessions. Third, firms with tokenized stocks exhibit weaker post-earnings announcement drift than matched non-tokenized firms, which is consistent with earnings information being more fully incorporated once a continuously open parallel venue is available.

In the second part, we examine whether this off-hour price discovery reflects informed trading rather than mechanical price-following or liquidity-driven noise. Here we exploit a key advantage of the on-chain setting: because every trade and holding is recorded on a public ledger, we can observe individual investors' positions and trading histories directly, which permits us to combine a variance decomposition of off-hour returns with wallet-level measures of who trades and when. We provide three pieces of evidence. First, a Shapley decomposition allocates the explained variation in off-hour response-event returns across idiosyncratic (earnings), crypto (Bitcoin), and systemic (market and geopolitical) components; in the three-hour window around announcements, idiosyncratic earnings news accounts for 87.6% of the explained within-firm variation in token returns, against only 4.7% for the underlying stock's close-to-open return over the same window. Second, using portfolio diversification and trading intensity in their on-chain wallets as a proxy to distinguish sophisticated and non-sophisticated investors, we find

[9] Existing extended-hours venues only partly relax this constraint. Although platforms such as Robinhood now offer near-continuous trading (a 24/5 "24 Hour Market" in selected stocks), access is effectively limited to U.S. residents. Funding requires a U.S. bank account, and the service is otherwise available only in the United Kingdom and parts of Europe, which excludes a large share of international retail traders. In addition, such venues also trade only whole shares rather than fractional shares. See https://robinhood.com/us/en/support/articles/24hour-market/.

that sophisticated investors account for a disproportionate share of off-hour activity around disclosures. In particular, the share of participating wallets classified as diversification-savvy roughly doubles, from about 10% during ordinary off-hours to 25.8% in the five days before an earnings announcement. Third, we examine whether off-hour trades actually anticipate the next day's price move. For each transaction, we assess whether the wallet is positioned on the correct side of the upcoming opening move, buying before the stock opens higher or selling before it opens lower. A wallet's tendency to trade outside regular market hours reliably predicts whether it ends up on the correct side of the move. Collectively, these results support the view that tokenization serves as a complementary channel for price discovery in traded equities, with much of that discovery traceable to earnings news and to the investors most likely to be informed.

Because this market has not previously been studied empirically, we also document a set of stylized facts that frame the price discovery results. Tokenization broadens participation through fractional ownership and global access: investors can hold fractions of a share—as little as 0.01 of a Tesla share—and trade from anywhere, with these micro-trades occurring at high frequency and without persistent mispricing. Market design matters for price behavior. Whereas Backed's tokens trade continuously across multiple blockchains, attract broad retail participation, and display greater off-hour price variation, Ondo's tokens, whose creation and redemption are tied to U.S. market hours, remain more tightly anchored on weekdays. Throughout, token prices remain closely linked to fundamentals via arbitrage mechanisms analogous to those that discipline cross-listed shares and ADRs. Deviations between token and stock prices are typically small and short-lived, and tracking errors widen around earnings announcements but close rapidly as arbitrageurs realign the two markets. At the same time, continuous access is not frictionless. The same off-hour windows that make timely price discovery possible are thinly traded, and we observe occasional large dislocations tied to material news. For example, we observe a tokenized Tesla price gap of roughly 14% over one weekend, as well as tracking errors that, after the largest earnings surprises, can stay elevated for several days before normalizing. Because these venues operate without circuit breakers or unified oversight, such episodes can be more pronounced than in regulated markets, highlighting that the benefits of round-the-clock trading come with liquidity and investor-protection risks that scale with the market itself.

Overall, although tokenized equity markets are still young and at times illiquid, our evidence indicates that these markets do genuine informational work. Prices reflect fundamentals and incorporate news that breaks outside Wall Street's schedule, and weekend token trading often foreshadows the direction of Monday's open, thereby smoothing what might otherwise be a sharp gap. These findings speak to long-standing questions in accounting and finance about how the timing of trading opportunities shapes the speed and completeness with which infor-

mation is impounded into prices, and they suggest that a continuously open venue can attenuate frictions—such as post-earnings drift—that arise when news must wait for the next session. In this respect, the tokenized stock setting provides a rare opportunity to hold the information event fixed—an earnings announcement released while the primary market is closed—while varying whether investors can trade on it immediately. This permits us to isolate the role of trading-hour constraints from the disclosure-processing and attention frictions emphasized in the accounting literature (DellaVigna and Pollet, 2009; Blankespoor et al., 2020). Tokenized stocks may also have implications for corporate disclosure policy: once an always-on parallel market exists, the established practice of releasing material news outside trading hours (Michaely et al., 2016) no longer ensures that prices adjust only at the next open, thereby potentially eroding the strategic value of off-hour disclosure timing. At the same time, our results temper the optimism surrounding "round-the-clock" trading. The costs of thin liquidity are evident in higher short-term volatility and occasional price dislocations. In addition, because token venues operate in a regulatory gray area without the standard investor protections or circuit breakers of traditional exchanges,[10] we observe extreme movements that likely would have triggered halts in regulated markets. These tensions are increasingly first-order rather than hypothetical: with regulators and incumbent exchanges now moving on-chain, near-continuous equity trading is migrating from the crypto periphery toward the core of the financial system, a shift that lends timeliness to Nasdaq's recent proposal to extend trading hours.[11] Tokenized stocks thus offer an early glimpse of what a broadly adopted continuous market might look like, bring both benefits, such as timelier information incorporation and broader global access, and costs, including liquidity fragmentation and regulatory arbitrage.[12]

Our study makes three main contributions. First, we connect to research on earnings announcements, disclosure timing, and post-earnings announcement drift. Earnings are a canonical source of value-relevant information (Ball and Brown, 1968; Beaver, 1968), prices continue to drift in the direction of earnings surprises (Bernard and Thomas, 1989; Hung et al., 2015)—a drift commonly linked to investor sophistication, limited attention, and the costs of processing disclosure (Bartov et al., 2000; DellaVigna and Pollet, 2009; Blankespoor et al., 2020)—with recent evidence that even numerical-processing constraints shape how investors react to earnings news (Karolyi et al., 2025), and firms strategically time disclosures around weekends and outside trading hours (Michaely et al., 2016; Doyle and Magilke, 2009; deHaan et al., 2015), with prices reacting rapidly once news arrives (Christensen et al., 2025). A long tradition in this literature studies how prices adjust outside regular trading hours: after-hours

[10] See https://www.starcompliance.com/tokenized-stocks-raise-big-questions-for-compliance-teams/ and https://www.congress.gov/bill/118th-congress/house-bill/4763

[11] See https://www.reuters.com/business/finance/nasdaq-seeks-extend-trading-hours-wall-street-gears-up-247-move-2025-12-15/

[12] See https://www.nasdaq.com/articles/24-7-trading-coming-it-good-thing and https://www.nasdaq.com/articles/why-around-the-clock-trading-for-stocks-could-be-coming-soon.

sessions exhibit lower liquidity and higher volatility, yet still incorporate information (Barclay and Hendershott, 2003, 2004), after-hours trading conveys the information content of earnings announcements (Jiang et al., 2012), and a meaningful portion of the price adjustment to earnings occurs within the after-hours session itself (Patell and Wolfson, 1984; Berkman and Truong, 2009). We document that tokenized stock prices respond to off-hour earnings surprises and that the underlying stocks exhibit weaker drift once a continuous trading venue becomes available.

Additionally, our study contributes to the broad literature on retail investors and the informativeness of their trading. A long line of research debates whether individual investors trade to their own detriment (Barber and Odean, 2000) and documents how their attention and the technology and platforms they use shape their behavior and market quality (Barber et al., 2022; Eaton et al., 2022; Weller, 2018). Despite these concerns, recent evidence suggests that retail activity can be informative in aggregate: Boehmer et al. (2021) show that aggregate retail order flow predicts the cross-section of returns, and Welch (2022) finds that the holdings of the typical retail (Robinhood) investor are not obviously irrational. Within this literature, fractional and odd-lot trading have emerged as a distinct channel for broadening participation: Fang et al. (2024) document that fractional trading expands participation without harming efficiency; O'Hara et al. (2023) highlight the informational roles of odd-lot activity; and Cong et al. (2023b) examines blockchain-based market design. We add direct, transaction-level evidence to this literature. Tokenized equity markets are an almost entirely retail setting in which small, fractional (92.25% of the trades) trades are also informative: off-hour token returns, built largely from such micro-trades, forecast the underlying stock's next opening return, and the wallets that trade most actively outside market hours are the most likely to be positioned in the direction of that move.

Finally, our study contributes to research on price discovery when economically equivalent claims trade in multiple venues. Because each token is an economic claim on the same underlying share, this setting connects to work on how price discovery is shared when one security trades in more than one venue (Hasbrouck, 1995) and on the arbitrage that links economically equivalent claims trading in different locations, as with cross-listed shares, ADRs, and "twin" securities (Froot and Dabora, 1999; Gagnon and Karolyi, 2008). Tokenized stocks offer a market-driven version of the near-continuous trading now being contemplated by major exchanges (e.g., Newbery, 2025).[13] We provide novel evidence that this continuously open, blockchain-based venue is not a redundant mirror of the primary market but contributes price discovery of its own, impounding value-relevant news into token prices while the underlying exchange is closed.

[13] See Cong et al. (2025); Harvey et al. (2025); Lin et al. (2026) for discussions on tokenized assets, gold, and treasuries.

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 AAPLon, 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 greater security for investors, as the tokens are backed by 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

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

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 on centralized crypto exchanges that list them. For example, many Backed xStock tokens are listed on Solana DEXs 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 serve as interfaces for users to trade on 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 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

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

tokenized stocks legally a potential "can of worms." To date, there have been no major legal actions against leading token issuers, but the space is being closely watched 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, launched its tokenized equities – branded as xStocks, with an "X" suffix in tickers – on June 30, 2025. It initially offered a selection of popular stocks, such as TSLAx and AAPLx for Tesla and Apple, on the Ethereum and Solana blockchains, and was 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 limit, leaving 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.

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

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

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 U.S. custodians and brokers to actually hold the stocks. Ondo tokens initially live on Ethereum (as ERC-20 tokens), and the company announced plans to enable cross-chain support for BNB Chain and Solana. Unlike xStocks, which already exist on multiple chains, Ondo was only on Ethereum at launch; 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 from 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 creation and redemption during U.S. market hours and cautions that overnight or weekend trading may have 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 Ondo tokens have been updated 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 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 Backed's historically smaller scale, this has worked reasonably well for Backed, but as volumes grow, Ondo's more controlled approach might be more efficient at preserving price parity between tokens

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

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 demand for long-tail assets – securities with relatively low individual trading volume compared with headline stocks. However, the documented result 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 are custodial, i.e., someone holds the underlying stock, and do not confer shareholder rights on token holders. We note a third approach, referred to in an Animoca research report as *native issuance*, in which a regulated vehicle issues tokens that represent ownership, such as a fund issuing token shares that correspond directly to its holdings of 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 and essentially creates a tokenized mutual fund or trust. 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 across 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, where some xStocks are available.

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, reta,il 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 network that can host tokens at lower 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 microstructures is beyond our scope, but we will be mindful of this context when interpreting results that could be driven by a single platform dominating trading activity.

3 Setting and Data

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, which reached about $1.5 billion by May 2026. 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 are automatically updated for dividends via 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 toward institutional investors.

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 2025 and May 2026. 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 in the first three months post-launch alone, with the count continuing to grow over the full sample period. 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, highlighting 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 May 2026.

3.3 Summary Statistics

Before turning to the analysis, we summarize the main features of our sample. Table 1 reports descriptive statistics for the three most actively traded tokenized stocks in our data—Tesla (TSLA), Nvidia (NVDA), and Alphabet (GOOGL)—each observed in three forms: the U.S.-listed underlying share, the Backed/xStocks token, and the Ondo token. Panel A presents daily price and return statistics over the sample window (30 June 2025–1 May 2026); Panel B summarizes on-chain trading activity for the flagship TSLAx token, our deepest single-token sample.

Two features of Panel A stand out. First, tokenized series are observed on substantially more days than their underlyings: because tokens trade continuously, including weekends, we record 317–339 daily observations for the xStocks tokens against 234 trading days for the underlying shares—roughly 40% more price observations for the same calendar window. Second, despite this continuous trading and a predominantly retail user base, the tokens' daily return distributions closely resemble those of the underlying equities. Mean daily returns are economically similar across all three forms (e.g., 0.16% for TSLA, 0.11% for TSLAx, and 0.13% for TSLAon), and daily return volatilities are comparable in magnitude (2.0–2.7%), with the tokens if anything slightly less volatile at the daily close than the underlying. Average token price levels track the underlying closely, with small differences reflecting

Table 1. Summary Statistics. Panel A reports daily price and return statistics for the three most actively traded names, each in three forms: the U.S.-listed underlying share (Yahoo Finance), the Backed/xStocks token, and the Ondo token. *N* is the number of daily observations; Mean Price is the average daily close in USD; returns are daily percentage log-changes in the close. Panel B summarizes on-chain transfer activity for TSLAx over 30 June 2025–1 May 2026. Panel C reports the distribution of TSLAx transfer sizes measured in units of the underlying Tesla share (tokens), with each row giving the share of transfers, of token volume, and of USD volume below the stated threshold; a transfer below one token is "fractional."

Panel A: Daily price and return statistics

Series	*N*	Mean Price	Mean Ret. (%)	SD Ret. (%)	Min (%)	Max (%)
TSLA (underlying)	234	398.39	0.16	2.72	−8.20	7.62
NVDA (underlying)	234	185.01	0.16	2.14	−5.46	7.87
GOOGL (underlying)	234	283.46	0.36	1.84	−3.85	9.96
TSLAx (xStocks)	337	399.95	0.11	2.32	−8.65	7.89
NVDAx (xStocks)	339	185.24	0.12	2.02	−7.82	9.19
GOOGLx (xStocks)	317	292.98	0.24	1.72	−4.01	8.95
TSLAon (Ondo)	272	416.88	0.13	2.31	−6.12	7.76
NVDAon (Ondo)	272	188.02	0.11	2.18	−7.90	9.37
GOOGLon (Ondo)	272	307.43	0.21	1.71	−4.12	9.19

Panel B: TSLAx on-chain trading activity

Total transfers	4,728,485
Total transfer volume	$1.31 billion
Mean (median) daily transfers	15,503 (12,606)
Mean (median) daily volume	$4.31M ($3.15M)
Share of transfers < $1	31.99%
Share of transfers < $100	79.88%
Share of transfers > $10,000	0.34%

Panel C: TSLAx fractional trade-size distribution (in underlying-share units)

Trade size (tokens)	% of transfers	% of token volume	% of USD volume
< 1 (fractional)	92.25	13.88	14.10
< 0.1	71.26	1.99	2.03
< 0.01	39.88	0.08	0.08
< 0.001	27.22	0.01	0.01

minor tracking deviations and the later start of the Ondo series (which begins trading in September 2025).

Panel B reveals that this market is overwhelmingly retail and high-frequency. Over the 305-day window, TSLAx alone records more than 4.7 million on-chain transfers and roughly $1.31 billion in cumulative transfer volume, averaging about 15,500 transfers per day. The size distribution is heavily skewed toward small trades: nearly 80% of all transfers are below $100 and almost a third are below $1, while transfers above $10,000 account for only 0.3% of the count. These patterns—continuous observation, near one-for-one price tracking, and a retail-dominated, micro-sized trade distribution—directly motivate the price-discovery and fractional-trading analyses that follow.

Panel C measures fractionalization directly, in units of the underlying share rather than in dollars. Trading is overwhelmingly fractional: 92.25% of all TSLAx transfers involve less than one full Tesla share, 71.26% involve less than a tenth of a share, and 39.88% less than a hundredth. These micro-trades dominate in number but not in size:

transfers below one share account for only about 14% of token volume and 14% of dollar volume, so a very large population of small, fractional trades coexists with a much smaller number of large, whole-share transactions. This is the empirical basis for our characterization of tokenized equities as a retail-driven, fractional-trading venue.

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

The central question is whether tokenized stocks provide a *complementary* platform for price discovery in traded equities. We organize the analysis in two parts. We first establish a baseline by verifying that token prices track their underlying equities nearly one-for-one during overlapping trading hours, confirming that the token market is mechanically linked to the underlying asset. Building on this baseline, **Part I** documents three findings that, taken together, indicate that tokenized markets contribute to price discovery while traditional exchanges are closed: (i) token prices respond to value-relevant news that arrives during off-hours; (ii) off-hour token returns predict the direction of the underlying stock's next-open return; and (iii) firms with tokenized stocks exhibit weaker post-earnings announcement drift. **Part II** then investigates whether this price discovery is driven by *informed* trading through three tests: (a) a variance decomposition of off-hour response events into idiosyncratic (earnings), crypto (Bitcoin), and systemic (market and geopolitical) components, which attributes a large share of the explained variation to earnings news; (b) an analysis of whether sophisticated investors – proxied by portfolio diversification and trading intensity – account for a disproportionate share of off-hour trading activity; and (c) a PIN-based and transaction-level analysis showing that off-hour trading is directionally informative. Collectively, the evidence supports tokenization as a complementary channel for price discovery in traded equities.

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).

4.1 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:

$$\log P^{token}_{i,t+0.5} = \alpha + \beta \log P^{stock}_{i,t} + \mu_i + \tau_t + \epsilon_{i,t}, \tag{1}$$

where $P^{token}_{i,t}$ denotes the token price observed 30 minutes following hour t, and $P^{stock}_{i,t}$ 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 2 reports the results from estimation of equation (1). The estimated elasticity is positive and statistically significant: a 1% change in the underlying stock price is associated with a 0.74% change in the token price. The adjusted R^2 is 0.994, indicating that price movements in the underlying equity explain most variation in the token price during overlapping trading hours.

Table 2. 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	0.739***
	(5.436)
N	179,080
Adjusted R^2	0.994
Time FE	Yes
Token FE	Yes

Part I: Tokenized Stocks Contribute to Price Discovery

Having established that token and underlying prices are tightly coupled when both markets are open, we now ask whether the token market does informational work of its own when the underlying market is closed. We present

three findings. The first shows that token prices respond to value-relevant news arriving off-hours; the second shows that these off-hour movements predict the direction of the next opening; and the third shows that the availability of a continuous token venue is associated with weaker post-earnings drift in the underlying stock.

4.2 Information Response to Off-Hour News

To test whether tokenized stocks respond to value-relevant information, we examine earnings announcements that occur when the underlying equity market is closed[18]. Earnings announcements are a well-established source of firm-specific information and provide a clean setting to evaluate informational responsiveness.

For each earnings announcement e for firm i, we measure earnings news using the earnings surprise scaled by the last pre-announcement stock price:

$$ES^{P}_{i,e} = \frac{Actual_{i,e} - Consensus_{i,e}}{P^{stock}_{i,e-}}, \tag{2}$$

where $Actual_{i,e}$ is reported EPS, $Consensus_{i,e}$ is the mean analyst forecast from I/B/E/S, and $P^{stock}_{i,e-}$ is the last available underlying stock price before the announcement.

We measure token returns over the one-hour window after the announcement and estimate the following regression:

$$R^{\text{token}}_{i,e,[0,1h]} = \alpha + \beta\, ES^{P}_{i,e} + \mu_i + \tau_m + \varepsilon_{i,e}, \tag{3}$$

where μ_i are token fixed effects and τ_m are year-month fixed effects. Standard errors are clustered by token. 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 1 presents event-study evidence on tokenized stock prices around earnings announcements. The figure plots hourly cumulative token returns from six hours before to six hours after the announcement, separately for events with positive and negative price-scaled earnings surprises.

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 respond systematically to earnings

[18] More than 70% of earnings announcements fall in the off-hour window based on the IBES summary statistics data.

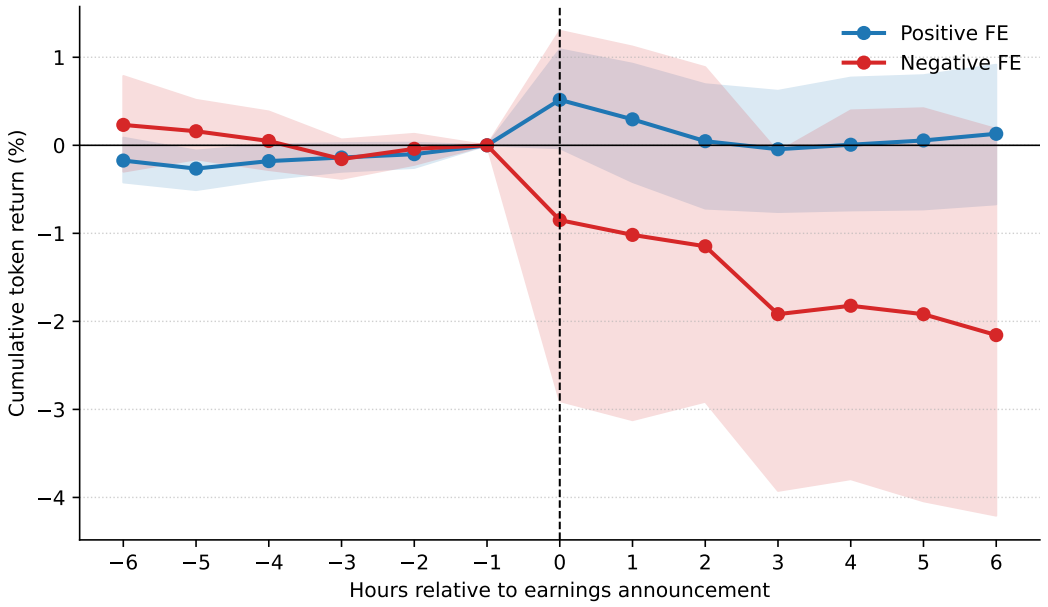


Figure 1. Token price responses around earnings announcements. This figure plots average cumulative token returns around earnings announcements, measured relative to the token price one hour before the announcement. Events are grouped by the sign of the price-scaled earnings surprise. Shaded areas denote 95% confidence intervals obtained by bootstrap resampling.

news during off-hours. Token prices rise around announcements with positive earnings surprises and decline following negative earnings surprises. The price response is concentrated around the announcement and the immediately subsequent hours.

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

Table 3. Off-hour earnings response. This table reports a regression of the one-hour token return after an off-hour earnings announcement on the earnings surprise scaled by the last pre-announcement stock price. The regression includes token and year-month fixed effects. *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.

	1-hour token return
Earnings surprise	0.048***
	(3.232)
N	210
Adjusted R^2	0.255
Token FE	Yes
Year-month FE	Yes

4.3 Off-Hour Returns Anticipate the Opening

Beyond reacting to news as it arrives, off-hour token returns may also *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 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:

$$R_{i,t}^{stock} = \alpha + \lambda R_{i,t}^{token} + \mu_i + \tau_t + \epsilon_{i,t}, \tag{4}$$

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 (4), presented in Table 4, indicate a positive predictive component in off-hour token returns. A 1% increase in the token return during off-hours predicts a 0.28% increase in the underlying stock's close-to-open return.

Table 4. 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	0.281***
	(3.094)
N	23,931
Adjusted R^2	0.286
Time FE	Yes
Token FE	Yes

4.4 Attenuated 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, the underlying stocks may display weaker drift after tokenization because earnings information can be processed in a parallel market before the next regular trading session.

We test this prediction using a difference-in-differences design with a matched sample. Treated firms are the underlying stocks of tokenized equities. Control firms are non-tokenized stocks with I/B/E/S earnings announcements, matched to treated firms using propensity scores based on firm size, book-to-market, leverage, and return on assets, with exact matching on industry and three controls per treated firm. We measure PEAD by:

$$PEADCAR_{i,e,[1,20]} = \text{sign}(SUE_{i,e}) \times CAR_{i,e,[1,20]}, \tag{5}$$

where $CAR_{i,e,[1,20]}$ is the market-adjusted cumulative abnormal return over the 20 trading days following announcement e, measured from the closing price on the announcement date to the closing price on trading day +20, with the market return subtracted over the same window. We estimate:

$$PEADCAR_{i,e,[1,20]} = \alpha + \beta(Treated_i \times Post_{i,e}) + \gamma X_{i,e} + \mu_i + \tau_q + \varepsilon_{i,e}, \tag{6}$$

where $Post_{i,e}$ equals one after the treated firm's token launch date, $X_{i,e}$ includes firm size, book-to-market, leverage, and return on assets, μ_i denotes matched-set fixed effects, and τ_q denotes calendar-quarter fixed effects. A negative β indicates that post-announcement drifts decline after tokenization relative to matched non-tokenized controls.

Table 5 reports a negative coefficient on $Treated_i \times Post_{i,e}$, consistent with attenuated PEAD in the underlying stocks once a continuous tokenized trading venue becomes available.

Part II: Is Off-Hour Price Discovery Driven by Informed Trading?

The three findings above establish that tokenized markets contribute to price discovery while traditional exchanges are closed. We now ask *why*: is this price discovery the byproduct of informed trading, or merely mechanical price-following amplified by liquidity noise? We provide three pieces of evidence. First, we decompose the variation in off-hour response-event returns into idiosyncratic, crypto, and systemic components and show that

Table 5. Matched difference-in-differences test of PEAD in underlying stocks. This table reports regressions of 20-trading-day market-adjusted PEADCAR on the treated-by-post indicator. PEADCAR is defined as $\text{sign}(SUE) \times CAR$, where CAR is market-adjusted. Treated firms are underlying stocks with tokenized equities. Controls are non-tokenized stocks matched using propensity scores based on firm characteristics, with exact matching on the industry and three controls per treated firm. Firm controls include size, book-to-market, leverage, and return on assets. Standard errors are clustered by matched set. *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Treated × Post	-0.033**	-0.034**	-0.033**	-0.033**
	(-2.56)	(-2.56)	(-2.48)	(-2.47)
N	2,657	2,657	2,657	2,657
Adjusted R^2	0.011	0.011	0.002	0.002
Firm controls	Yes	Yes	Yes	Yes
Quarter FE	No	Yes	No	Yes
Matched-set FE	No	No	Yes	Yes

idiosyncratic earnings news accounts for the bulk of the explained variation. Second, we show that sophisticated investors account for a disproportionate share of off-hour trading activity, particularly around earnings announcements. Third, PIN-based and transaction-level tests confirm that off-hour trading is directionally informative.

4.5 Decomposing Off-Hour Information: Idiosyncratic, Crypto, and Systemic Components

We begin by asking how much of the off-hour price response reflects firm-specific information rather than crypto-wide or systematic market movements. To this end, we decompose token price movements during off-market announcement windows into idiosyncratic, crypto, and systemic components. We focus on earnings announcements released while the underlying stock market is closed and use two token-return windows. The first is the full closed-market window from the previous regular-market close to the next market open. The second is a shorter announcement-centered window from the last token price before the earnings announcement to the last token price within three hours after the announcement. For each observation, we define

$$r_{i,e}^{\text{token,close-open}} = \log P_{i,\text{open}(e)}^{\text{token}} - \log P_{i,\text{close}(e)}^{\text{token}}, \tag{7}$$

where $P_{i,\text{close}(e)}^{\text{token}}$ is the last available hourly token price at or after the previous regular-market close, and $P_{i,\text{open}(e)}^{\text{token}}$ is the last available hourly token price at or before the next market open. We also estimate the same decomposition for

$$r_{i,e}^{\text{token,3h}} = \log P_{i,e+3h}^{\text{token}} - \log P_{i,\text{pre}(e)}^{\text{token}},$$

Table 6. Closed-market earnings-window returns: Shapley decomposition. This table decomposes the explained within-fixed-effect R^2 of three outcomes: token return from the previous regular-market close to the next market open, token return from the last pre-announcement price to three hours after the announcement, and the underlying stock return from the previous close to the next market open. Fixed effects include token fixed effects and announcement-timing fixed effects. The Shapley values allocate the incremental within-fixed-effect R^2 across earnings news, BTC, S&P 500, and GPR.

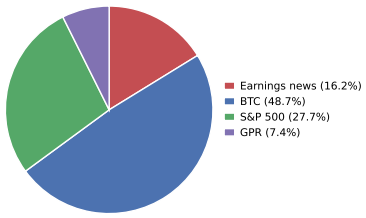
	Token close-to-open		Token pre-ann.-to-3h		Stock close-to-open	
Group	Shapley R^2	Share	Shapley R^2	Share	Shapley R^2	Share
Earnings news	0.0063	16.2%	0.0081	87.6%	0.0028	4.7%
BTC return	0.0189	48.7%	0.0002	1.7%	0.0347	59.5%
S&P500 retun	0.0108	27.7%	0.0009	9.8%	0.0189	32.4%
Geopolitical risk	0.0029	7.4%	0.0001	0.9%	0.0019	3.3%
Within R^2	0.0389		0.0092		0.0584	
Base FE R^2	0.5372		0.5952		0.5416	
Observations	252		247		193	
Events	193		188		193	
Firms	108		107		108	

where $P^{\text{token}}_{i,\text{pre}(e)}$ is the last token price before the announcement and $P^{\text{token}}_{i,e+3h}$ is the last token price within three hours after the announcement. We require at least two token price observations within each token window. As a benchmark, we also decompose the underlying stock close-to-open return over the same previous-close-to-next-open window.

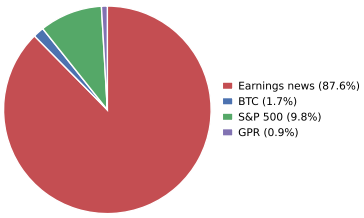
We regress these returns on four groups of variables and use a Shapley decomposition to allocate the within-fixed-effect R^2 across groups. These groups capture three distinct sources of information: an *idiosyncratic* component, a *crypto* component, and a *systemic* component. The idiosyncratic group, *Earnings news*, is the price-scaled earnings surprise, $(ACTUAL - MEDEST)$ divided by the last pre-announcement stock price, winsorized at the 1st and 99th percentiles. The crypto component is the contemporaneous BTC return, and the systemic component comprises the S&P 500 return and the geopolitical risk (GPR) index of Caldara and Iacoviello (2022). All specifications include token fixed effects and announcement-timing fixed effects, which absorb persistent token-level differences and systematic differences between pre-market, post-market, and weekend or holiday announcements.

Table 6 reports the decomposition. In the full closed-market token-return window, fixed effects explain 53.7% of return variation. Conditional on these fixed effects, the four groups explain an additional within-R^2 of 0.0389. Earnings news accounts for 0.0063, or 16.2% of the explained within-R^2.

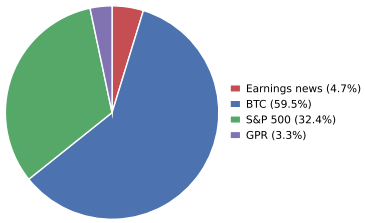
The announcement-centered three-hour window gives a more precise view of the immediate earnings response. Fixed effects explain 59.5% of token-return variation, while the included groups explain an additional within-R^2 of 0.0092. Earnings news accounts for 0.0081, or 87.6% of the explained within-R^2. By contrast, in the underlying-stock close-to-open benchmark on the token-available firm-event sample, earnings news explains 4.7% of the ex-



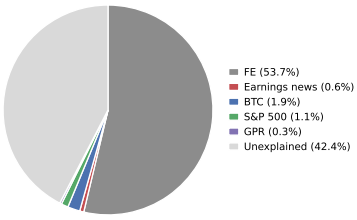
(a) Token close-to-open: explained



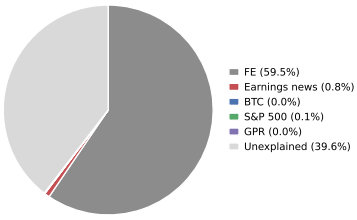
(b) Token pre-ann.-to-3h: explained



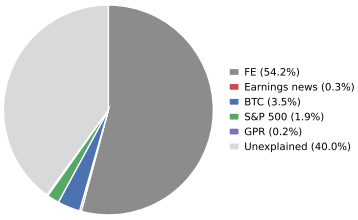
(c) Stock close-to-open: explained



(d) Token close-to-open: total



(e) Token pre-ann.-to-3h: total



(f) Stock close-to-open: total

Figure 2. Earnings-window Shapley decompositions. Panels A–C show the distribution of the explained within-fixed-effect R^2 across the four variable groups. Panels D–F add the fixed-effect R^2 and unexplained component.

plained within-R^2, while BTC and market factors account for most of the explained component. Figure 2 visualizes both the within-R^2 allocation and the full decomposition including fixed effects and unexplained variation.

4.6 Who Drives Off-Hours Price Discovery

We next examine whether off-hours price discovery is broadly shared across the investor population or concentrated among a smaller group of sophisticated wallets. We begin with descriptive wallet-level evidence on which investors participate in different trading windows. We classify investor wallets as diversification-savvy or trading-savvy if they fall in the top decile of portfolio diversification or number of trades over the sample period of 30 June 2025 to 1 May 2026, respectively. To avoid conflating investor behavior with infrastructure activity, we exclude wallets associated with exchanges, liquidity provision or automated trading infrastructure, routing programs, and issuer- or custody-related accounts. We report results both for all investor wallets and for an active-investor sample requiring at least ten trades.

Figure 3 shows that sophisticated participation is more concentrated around firm-specific information events. In the active-investor sample, diversification-savvy and trading-savvy wallets account for 11.3% and 11.8% of wallets

trading during regular market hours, and 9.9% and 10.2% of wallets trading off-hours. By contrast, these shares rise around earnings announcements. In the five calendar days before an announcement, 25.8% of participating wallets are diversification-savvy and 21.2% are trading-savvy, consistent with anticipation of forthcoming information. In the five calendar days after an announcement, the corresponding shares remain elevated at 23.5% and 20.1%, consistent with sophisticated investors reacting to newly released information. Participation on geopolitical extreme-move days is only modestly higher, at 12.0% and 12.9%. The all-investor sample shows a similar qualitative pattern.

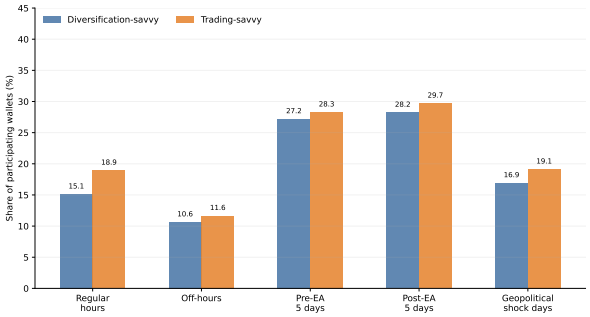
Next, we take a closer look at individual wallet positions around earnings announcements. We use the Helius Enhanced Transaction API to obtain every Solana tokenized stock transfer at the individual transaction level, with block-level timestamps and wallet addresses, converting token amounts to USD using hourly CoinGecko prices. For each earnings announcement in I/B/E/S, we aggregate each investor wallet's net USD flow (purchases minus sales) over the five trading days before the announcement date. We retain wallet-event pairs with at least $10 in gross pre-window volume. The two outcome variables are direction correctness, an indicator equal to one if the sign of the wallet's pre-window net flow matches the sign of the underlying stock's next-open return, and the signed next-open return, which multiplies the flow sign by the return magnitude.

Since a large share of on-chain volume flows through non-investor addresses, we classify every wallet using the Helius identity API, which identifies known entities by address, supplemented by behavioral rules that flag wallets with more than 5,000 transfer rows or activity across more than 10 distinct token types as market-maker or bot candidates. All non-investor types are excluded from the sample. We then compute four sophistication proxies from each wallet's trading history over the full sample period: the *off-hours trading ratio* (share of lifetime trades executed outside market hours), *trading intensity* (log distinct trading days), *portfolio diversity* (one minus the HHI of token holdings), and *average trade size* (log mean USD transaction value). Each proxy is tested individually and jointly, with event fixed effects and standard errors clustered by the underlying stock.

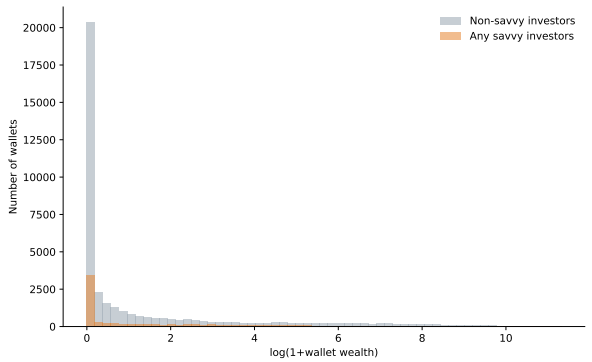
Table 7 shows that this average conceals substantial heterogeneity. The off-hours trading ratio is positive and significant in both the individual and joint specifications: wallets that habitually trade outside market hours are reliably better positioned ahead of earnings. Trading intensity has the opposite sign, indicating that more active wallets are less direction-correct, consistent with high-frequency participants playing a market-making role rather than taking directional views. Portfolio diversity and trade size are insignificant throughout. Panel B, using the continuous signed return, confirms the pattern: off-hours ratio remains positive and significant and trading intensity remains negative. Among all the characteristics one might expect to predict informed positioning, only the propensity to trade outside market hours survives the horse race.



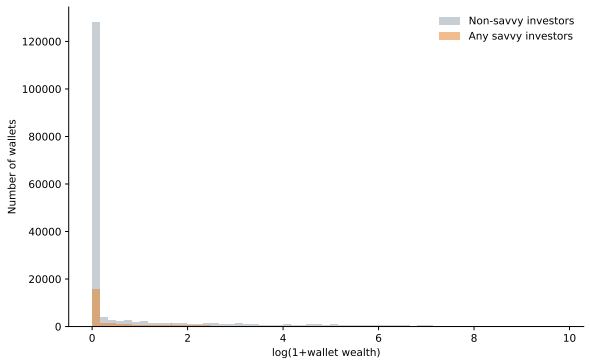
(a) Panel A. Savvy-wallet shares, active wallets



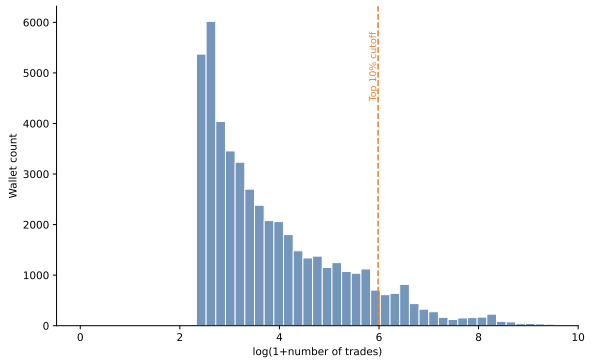
(b) Panel B. Savvy-wallet shares, all wallets



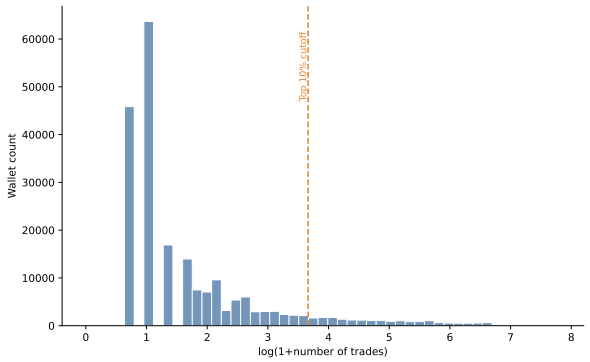
(c) Panel C. Wallet wealth, active wallets



(d) Panel D. Wallet wealth, all wallets



(e) Panel E. Trading intensity, active wallets



(f) Panel F. Trading intensity, all wallets

Figure 3. Savvy-investor participation and wallet characteristics. Panels A and B report the share of participating wallets classified as diversification-savvy or trading-savvy across regular market-hour trading, off-hour trading, five-calendar-day pre- and post-earnings-announcement windows, and top-decile geopolitical extreme-move days. Diversification-savvy and trading-savvy wallets are defined as wallets in the top decile of portfolio diversification and number of trades, respectively, with cutoffs computed separately for the active-investor sample and the all-investor sample. The active-investor sample requires at least ten lifetime trades. Panels C and D plot reconstructed tokenized-stock wallet wealth as of 2026-05-01 00:00 UTC. Panels E and F plot lifetime trading intensity. Investor wallets exclude non-investor infrastructure wallets, including CEX omnibus accounts, vaults, routers or programs, market makers or bots, and issuer or custodian wallets.

Table 7. Trading sophistication and pre-earnings direction accuracy. This table reports regressions of wallet pre-earnings positioning accuracy on investor sophistication proxies. Each observation is a wallet–earnings-event pair. The sample covers earnings announcements for the underlying stocks between June 2025 and May 2026, restricted to investor wallets with at least $10 in gross pre-window USD flow. Non-investor wallets (CEX omnibus accounts, AMM pools, routers, and issuer custodians) are excluded. The pre-window spans the five trading days before the announcement date. All sophistication proxies are computed from each wallet's on-chain trading history. Panel A uses direction correctness as the dependent variable: an indicator equal to one if the sign of the wallet's pre-window net USD flow matches the sign of the underlying stock's next-open return. Panel B uses the signed next-open return, defined as the sign of the net flow multiplied by the next-open return. Columns (1)–(4) test each sophistication proxy individually; column (5) includes all jointly. Control variables include weekend trading ratio and log pre-window gross USD. All specifications include stock fixed effects. Standard errors are clustered by the underlying stock ticker. *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

Panel A. Dependent variable: direction correct

	(1)	(2)	(3)	(4)	(5)
Off-hours ratio	0.0229***				0.0220***
	(2.761)				(2.790)
Trading intensity		-0.0172**			-0.0211***
		(-2.574)			(-2.701)
Portfolio diversity			-0.0182		0.0225
			(-0.648)		(0.778)
Trade size				0.0019	-0.0033
				(0.290)	(-0.471)
Weekend ratio	-0.0262	-0.0171	-0.0177	-0.0170	-0.0263
	(-1.123)	(-0.725)	(-0.774)	(-0.716)	(-1.052)
Pre-window gross	-0.0059	-0.0027	-0.0061	-0.0075	0.0005
	(-1.214)	(-0.546)	(-1.292)	(-1.009)	(0.062)
N	15,984	15,984	15,984	15,984	15,984
Stock FE	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.1079	0.1094	0.1078	0.1078	0.1096

Panel B. Dependent variable: signed next-open return

	(1)	(2)	(3)	(4)	(5)
Off-hours ratio	0.0024*				0.0024**
	(1.882)				(2.083)
Trading intensity		-0.0023***			-0.0021*
		(-2.715)			(-1.781)
Portfolio diversity			-0.0048		-0.0005
			(-1.460)		(-0.133)
Trade size				0.0007	0.0002
				(0.669)	(0.138)
Weekend ratio	-0.0052	-0.0042	-0.0043	-0.0040	-0.0050
	(-1.187)	(-0.935)	(-0.973)	(-0.927)	(-1.133)
Pre-window gross	-0.0007	-0.0003	-0.0008	-0.0013	-0.0004
	(-1.220)	(-0.540)	(-1.293)	(-1.223)	(-0.329)
N	15,984	15,984	15,984	15,984	15,984
Stock FE	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.0853	0.0868	0.0856	0.0854	0.0867

Table 8 reports robustness checks. Excluding bots and market-makers (column 2) increases both effects, consistent with non-directional wallets diluting the baseline signal. Results are qualitatively unchanged when the sample is restricted to post-market announcements (column 3).

Table 8. Robustness of sophistication proxies. This table repeats regression from column (5) of Table 7 under alternative specifications. Column (1) reproduces the baseline. Column (2) excludes wallets classified as bots or market-makers. Column (3) restricts the sample to post-market announcements. *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

Panel A. Dependent variable: direction correct

	(1) Baseline	(2) No bot/MM	(3) Post-market
Off-hours ratio	0.0220***	0.0274***	0.0205**
	(2.790)	(3.591)	(2.412)
Trading intensity	-0.0211***	-0.0296***	-0.0245***
	(-2.701)	(-3.530)	(-3.198)
Portfolio diversity	0.0225	0.0248	0.0240
	(0.778)	(1.132)	(0.753)
Trade size	-0.0033	-0.0040	-0.0062
	(-0.471)	(-0.389)	(-0.911)
Weekend ratio	-0.0263	-0.0231	-0.0236
	(-1.052)	(-0.924)	(-0.936)
Pre-window gross	0.0005	-0.0045	0.0019
	(0.062)	(-0.373)	(0.203)
N	15,984	13,379	14,681
Stock FE	Yes	Yes	Yes
Adj. R^2	0.1096	0.1275	0.1099

Panel B. Dependent variable: signed next-open return

	(1) Baseline	(2) No bot/MM	(3) Post-market
Off-hours ratio	0.0024**	0.0033***	0.0030***
	(2.083)	(3.356)	(2.923)
Trading intensity	-0.0021*	-0.0029**	-0.0025**
	(-1.781)	(-2.252)	(-2.429)
Portfolio diversity	-0.0005	0.0008	0.0014
	(-0.133)	(0.215)	(0.436)
Trade size	0.0002	0.0004	-0.0007
	(0.138)	(0.242)	(-0.879)
Weekend ratio	-0.0050	-0.0050	-0.0037
	(-1.133)	(-1.068)	(-0.940)
Pre-window gross	-0.0004	-0.0012	0.0002
	(-0.329)	(-0.691)	(0.161)
N	15,984	13,379	14,681
Stock FE	Yes	Yes	Yes
Adj. R^2	0.0867	0.1078	0.1194

4.6.1 Informed Trading

We then ask whether this earnings-window trading is directionally informative. A PIN-style exercise provides weak but directionally consistent evidence (Table 9): rolling Easley–O'Hara PIN estimates (Easley et al., 1996) have positive pre-announcement coefficients in the active-wallet sample and in the trading-savvy subsample, but the coefficients are not statistically significant. We therefore use transaction-level directional tests as the main evidence.

Table 9. PIN around earnings announcements. This table reports rolling Easley–O'Hara PIN regressions around earnings announcements. The unit of observation is a token–earnings-event–relative-day estimate from trailing 30-calendar-day PIN windows. Column (1) uses all active investor wallets, column (2) uses trading-savvy active wallets, and column (3) uses non-trading-savvy active wallets. Trading-savvy wallets are active wallets in the top decile of lifetime number of trades. All specifications include token and calendar-date fixed effects, with standard errors clustered by token. *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	(1) Full sample	(2) Trading-savvy subsample	(3) Non-savvy subsample
pre-EA	0.01195	0.00862	0.00619
	(1.324)	(0.988)	(0.566)
post-EA	0.00251	-0.00116	0.00554
	(0.329)	(-0.162)	(0.432)
N	2.27e+03	2.21e+03	1.36e+03
Adj. R^2	0.63423	0.61890	0.61591

For each wallet-side transaction, we define an informed-trade indicator equal to one when the trade direction matches the sign of the underlying stock's event-horizon return. For off-hour announcements, this return is measured from the previous regular-market close to the next regular-market open; for intraday announcements, it is measured from the same-day regular-market open to the same-day regular-market close. For post-announcement trades, the same return is attached to trades after the realized announcement. We also estimate a continuous version, the signed event return, which multiplies trade direction by the event-horizon stock return. The sample is restricted to active investor wallets with more than 10 trades. For each event window $h \in \{1, 3, 5\}$ calendar days, we estimate:

$$y^{(h)}_{wiset} = \beta_1 Pre^{(h)}_{et} + \beta_2 Post^{(h)}_{et} + \beta_3 Savvy_w + \beta_4 Pre^{(h)}_{et} \times Savvy_w + \beta_5 Post^{(h)}_{et} \times Savvy_w + \gamma \log |TradeSize_{wiset}| + \mu_i + \delta_{d(t)} + \phi_{o(t)} + \varepsilon_{wiset}, \tag{8}$$

where $y^{(h)}_{wiset}$ is either the informed-trade indicator or the signed event return for wallet w trading token i around earnings event e at time t. $Pre^{(h)}_{et}$ and $Post^{(h)}_{et}$ indicate transactions in the h-day pre- and post-announcement windows, $Savvy_w$ identifies trading-savvy active wallets, and fixed effects include token, target-date, and off-hour fixed effects. Standard errors are clustered by wallet.

Table 10 shows that trading-savvy wallets trade more directionally around earnings announcements. Within one calendar day before an announcement, trading-savvy wallets are 11.9 percentage points more likely than other active wallets to trade in the direction of the earnings-window stock return ($t = 2.09$). The corresponding signed-return specification is also positive, with a coefficient of 0.0084 ($t = 1.94$). The pre-announcement interaction remains positive but weakens as the window widens to three and five calendar days. Post-announcement interac-

Table 10. Transaction-level informed trading around earnings. This table reports transaction-level regressions using active investor wallet-side transfer rows with matched event-horizon stock returns. Columns (1), (3), and (5) use an indicator equal to one when trade direction matches the sign of the earnings-window stock return. Columns (2), (4), and (6) use signed event return, defined as trade direction multiplied by the winsorized earnings-window stock return. Pre- and post-announcement windows are measured in calendar days around the earnings announcement. Trading-savvy wallets are active wallets in the top decile of lifetime number of trades. All specifications include token, target-date, and off-hour fixed effects and control for log transaction size. Standard errors are clustered by wallet. *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	h = 1 Day		h = 3 Days		h = 5 Days	
	(1) Direction Match	(2) Signed Event Return	(3) Direction Match	(4) Signed Event Return	(5) Direction Match	(6) Signed Event Return
$\text{Pre}^{(1)} \times \text{Savvy}$	0.11928**	0.00844*				
	(2.090)	(1.935)				
$\text{Post}^{(1)} \times \text{Savvy}$	0.11129**	0.00845**				
	(2.423)	(2.429)				
$\text{Pre}^{(1)}$	-0.11410**	-0.00783**				
	(-2.118)	(-2.235)				
$\text{Post}^{(1)}$	-0.10780***	-0.00819***				
	(-2.678)	(-3.332)				
$\text{Pre}^{(3)} \times \text{Savvy}$			0.08043*	0.00439		
			(1.658)	(1.307)		
$\text{Post}^{(3)} \times \text{Savvy}$			0.12471***	0.00840***		
			(2.872)	(2.859)		
$\text{Pre}^{(3)}$			-0.07682	-0.00403		
			(-1.627)	(-1.378)		
$\text{Post}^{(3)}$			-0.11998***	-0.00801***		
			(-2.948)	(-3.639)		
$\text{Pre}^{(5)} \times \text{Savvy}$					0.06644	0.00436
					(1.488)	(1.291)
$\text{Post}^{(5)} \times \text{Savvy}$					0.16250***	0.01061***
					(3.585)	(3.151)
$\text{Pre}^{(5)}$					-0.06335	-0.00399
					(-1.389)	(-1.479)
$\text{Post}^{(5)}$					-0.15529***	-0.01006***
					(-3.560)	(-4.374)
Savvy	-0.07019*	-0.00008	-0.07163*	-0.00015	-0.07383*	-0.00031
	(-1.794)	(-0.140)	(-1.804)	(-0.249)	(-1.828)	(-0.470)
log |TradeSize|	0.00064	-0.00000	0.00064	-0.00000	0.00065	-0.00000
	(0.487)	(-0.025)	(0.493)	(-0.019)	(0.502)	(-0.008)
N	36,504,993	36,504,993	36,504,993	36,504,993	36,504,993	36,504,993
Adj. R^2	0.00134	0.00007	0.00137	0.00009	0.00147	0.00017

tions are positive and statistically significant across windows: for the five-day post window, trading-savvy wallets are 16.3 percentage points more likely to trade in the event-return direction ($t = 3.59$), with a signed-return coefficient of 0.0106 ($t = 3.15$). Taken together, the evidence suggests that the strongest pre-announcement evidence is concentrated in the day immediately before earnings, while post-announcement trading points to rapid reaction to newly released public information.

5 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 global trading and settlement, 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 (≈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.

5.1 TSLAx Market Activity

Figure 4 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 through the first quarter of 2026 to about $400 by March and a trough near $340 in early April 2026, then recovering to around $390 by 1 May 2026. Several price jumps coincide with major events, such as Tesla earnings and the debut of leverage on exchanges. Throughout the sample, TSLAx tracks the underlying TSLA share closely, with a median absolute price deviation of about 0.56% during U.S. market hours. 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 5). At its trading-volume peak in mid-September 2025, TSLAx recorded daily on-chain volume of about $4.5 million in Panel A, and trade counts peaked near 22,000 per day in early February 2026 in Panel B (median of roughly 6,700 trades



Figure 4. 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 2025 to 1 May 2026. TSLA prices on non-trading days are forward-filled to align with the continuous nature of token trading.

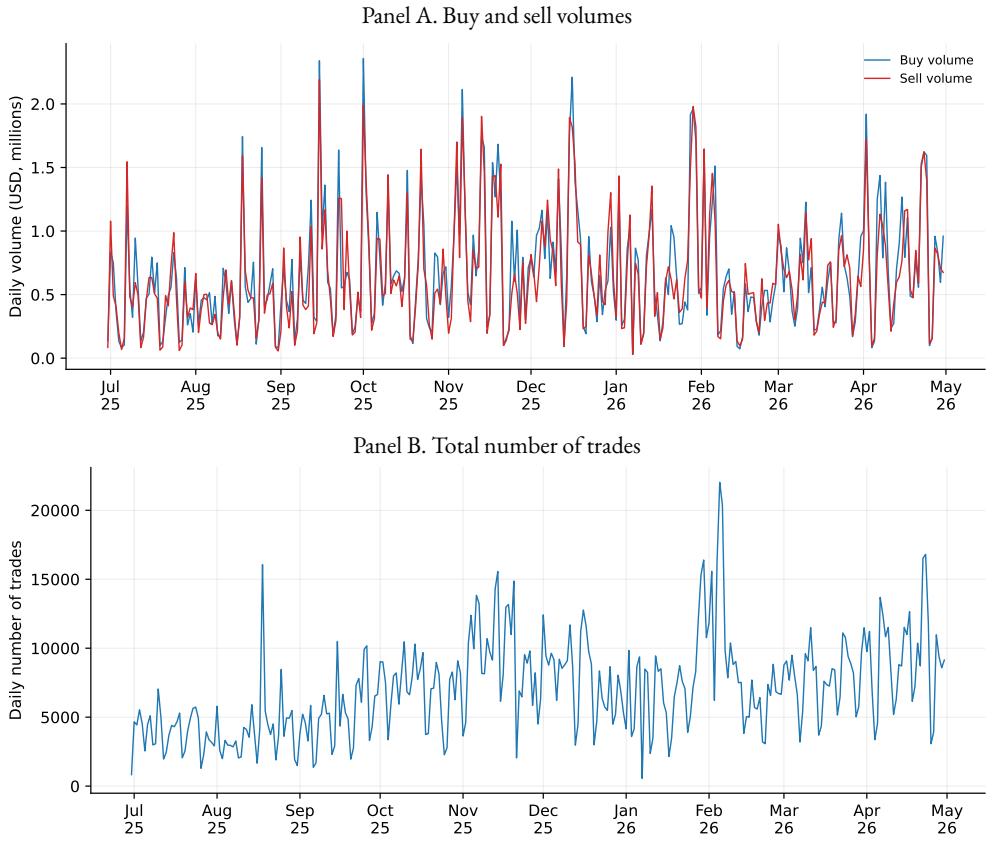


Figure 5. TSLAx DEX trading activity. Panel A shows the daily buy and sell volumes of TSLAx. Panel B plots the daily total number of trades.

per day over the window). In general, daily buy and sell volumes are roughly balanced: over the full sample (30 June 2025 to 1 May 2026), classified buy volume totals about $203.7 million against sell volume of about $194.9 million.

Overall, TSLAx DEX records weekly trading volumes in the millions of dollars, with tens of thousands of trades.

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 roughly 230K outstanding tokens by May 2026 (per the on-chain token mint). The number of distinct TSLAx holders has likewise continued to rise over the sample.[19] This reflects growing retail adoption, as each new wallet can hold fractional shares, thereby lowering the barrier to entry.

5.2 Transaction Size Distribution and Fractional Trading

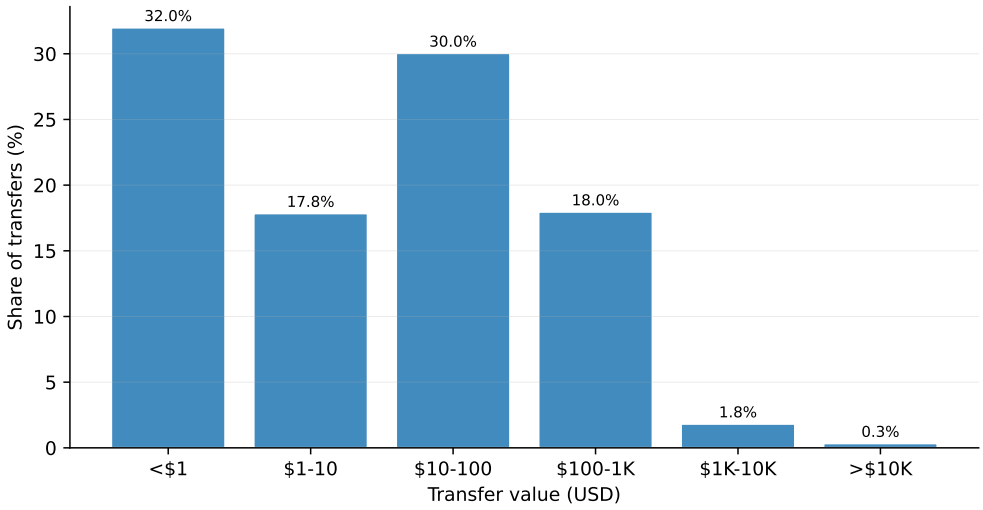


Figure 6. Distribution of TSLAx transfer values. The histogram reports the distribution of TSLAx on-chain transfers by transfer value over the sample window (30 June 2025 to 1 May 2026), based on 4.73 million transfers.

Most TSLAx on-chain transfers are very small, as illustrated in Figure 6. Nearly half of all TSLAx transfers in the full sample (about 50%) were under $10, and about 80% were under $100. Only a tiny fraction (≈0.3%) exceeded $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 offers accessible U.S. equity exposure for many retail investors.

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

[19] The current TSLAx supply (≈229.6K tokens) and holder count are verified from the live Solana token mint (snapshot late May 2026); the daily DEX volume and trade figures are computed over the full sample window (30 June 2025 to 1 May 2026) from on-chain Solscan transfer and DeFi-activity data.

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.

5.3 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 highlight this milestone[20]. 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. Daily TSLAx-related DeFi operations regularly numbered in the thousands to tens of thousands (a median of roughly 6,700 per day, peaking near 23,000 in early 2026), while the number of distinct daily traders was typically in the hundreds (a median of about 600, peaking near 2,400). Over the full sample, TSLAx saw about 2.1 million swap transactions, including direct and aggregated swaps, totaling roughly $421 million in volume. In addition, there were about 114,000 liquidity-add/remove events totaling roughly $108 million in volume. This level of activity indicates real engagement, as TSLAx has liquidity pools on major AMMs and is available through wallet-based swap interfaces such as Jupiter.

Table 11 shows that the types of DeFi actions are concentrated in trading: direct and aggregated token swaps account for the large majority of TSLAx DeFi volume (about $421 million, roughly two-thirds of the total). Liquidity provision and vault activity are also material: liquidity add/remove events total about $108 million, and vault deposits and withdrawals together about $74 million, with smaller amounts in orderbook orders and lending. Moreover, Table 12 indicates that most on-chain transfer volume passes through a small set of high-throughput infrastructure accounts—centralized-exchange deposit wallets and AMM pool/vault authorities. Notably, for AMM accounts, daily inflows and outflows roughly balance, resulting in small net flows, as tokens continuously circulate through DeFi liquidity channels.

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

[20] See https://www.gate.com/crypto-wiki/article/how-active-is-the-tslax-community-in-2025

Table 11. Distribution of TSLAx activity types. This table reports the number of activities and the total transaction volume for each activity type observed for TSLAx over the sample window (30 June 2025 to 1 May 2026). 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	2,132,321	419.51M
Add Liquidity	46,577	57.47M
Remove Liquidity / Fees	67,153	50.67M
Deposit Vault	8,368	39.46M
Withdraw / Claim	4,340	34.44M
Place Order	2,811	15.66M
Aggregated Token Swap	9,910	1.37M
Borrow / Repay	686	283.79K
Bridge In / Out	25	155.32K
Create Pool	116	–

Table 12. 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 the sample window (30 June 2025 to 1 May 2026). For each account, the table lists the number of transfers and the total U.S. dollar value transferred. Accounts are identified by their Solana address (truncated); third-party entity labels are not available under the data provider's API plan, so only the issuer/treasury distribution wallet and the largest investor wallet (profiled in Table 13) are named. The remaining accounts are high-throughput infrastructure wallets—AMM pool and vault authorities, routers, and exchange deposit accounts—as evidenced by their large transfer counts and near-balanced two-way flows.

Account	Number of Transfers	Total Value Transferred (USD)
Panel A. Top inflow		
HHQUnU...ogmvum	155,215	93,485,088.86
Issuer/treasury wallet	751	90,788,713.31
Largest investor wallet (Table 13)	8,189	38,949,650.50
u6PJ8D...ynXq2w	1,543	38,591,989.96
3LkGTj...njwL5R	54,611	38,459,182.11
AC5RDf...CWjtW2	3,748	38,208,554.17
6FQQyf...TJWmfs	132,002	34,884,449.05
6LY1Jz...kZzkzF	614	34,134,533.76
9p7abU...P9xokN	412,319	30,587,244.52
8aDaBQ...p1NpFF	97,318	26,687,049.59
Panel B. Top outflow		
HHQUnU...ogmvum	152,059	93,067,688.86
Issuer/treasury wallet	1,337	80,912,802.16
3LkGTj...njwL5R	54,901	38,462,247.24
AC5RDf...CWjtW2	4,919	35,808,357.05
u6PJ8D...ynXq2w	5,850	35,173,671.32
Largest investor wallet (Table 13)	4,562	34,512,442.52
6FQQyf...TJWmfs	128,980	34,497,093.64
6LY1Jz...kZzkzF	656	30,988,268.50
9p7abU...P9xokN	408,846	30,549,190.11
GaRFBF...hqohGa	2,894	26,115,440.23

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.

5.4 Top Holder Analysis: Portfolios and Influence

Despite the hype, TSLAx ownership is relatively concentrated. Figure 7 shows that the largest 10 TSLAx owners together hold about 71% of total supply, while the rest is spread across more than twenty-five thousand wallets (25,663 distinct owners as of the late-May 2026 snapshot). However, much of this concentration reflects infrastructure rather than investor hoarding: the two largest wallets are the issuer/treasury distribution account (about 21% of supply) and a market-maker wallet that holds the entire xStocks catalog (about 20%), rather than retail "whales." Excluding these two infrastructure wallets, the next-largest holders each control only single-digit percentages of supply.

In Table 13, we examine the largest investor wallet—that is, the largest TSLAx holder once the issuer/treasury and market-maker infrastructure wallets are excluded—to assess its participation in DeFi. This account holds a diversified, roughly $24.7 million on-chain portfolio spread across 29 token accounts. Rather than concentrating in a single name, the wallet is dominated by broad-market and mega-cap technology equity tokens: the SP500 token (SPYx, about 23% of portfolio value) and the Nasdaq-100 token (QQQx, about 18%), alongside TSLAx (about 22%), NVDAx (about 13%), GOOGLx (about 12%), and MSTRx (about 7%), with the small remainder in wrapped Bitcoin (cbBTC), stablecoins (USDC), and other xStocks such as AAPLx and HOODx. This composition indicates that the largest genuine TSLAx holder is not a pure Tesla speculator but a diversified equity-index investor for whom TSLAx is one position among many. Consistent with active portfolio management, Figure 8 plots the daily value of TSLAx inflows and outflows for this account and shows frequent two-way movement rather than passive buy-and-hold: over the sample the wallet received about $39 million of TSLAx (roughly 8,200 transfers) and sent about $34.5 million (roughly 4,600 transfers), a turnover of roughly fourteen times its current TSLAx balance.[21]

By comparison, several other top wallets also show heavy two-way flow consistent with market-making and active trading. Apart from the issuer/treasury and the catalog-wide market-maker wallet, the remaining large holders each own only single-digit percentages of supply: beyond the top two infrastructure wallets, individual investor balances drop quickly (the third- and fourth-largest owners hold roughly 10% and 5%, and most other top-50 wallets hold well under 1% each). Their influence, therefore, comes more from trading activity than from sheer token hoarding. In summary, the largest genuine TSLAx holders are diversified, actively engaged market participants for whom TSLAx is one position among many, while the very top of the distribution is dominated by issuer and

[21] Our first draft profiled the single largest TSLAx balance, which in the July–October 2025 extraction was an actively trading market-maker-like wallet. In the full-window (late-May 2026) snapshot, the two largest balances are the issuer/treasury distribution wallet and a market-maker wallet that holds the entire xStocks catalog at unreliable on-chain prices; we therefore profile the largest investor wallet instead. Portfolio values are a late-May 2026 snapshot from Solscan and use on-chain reference prices.

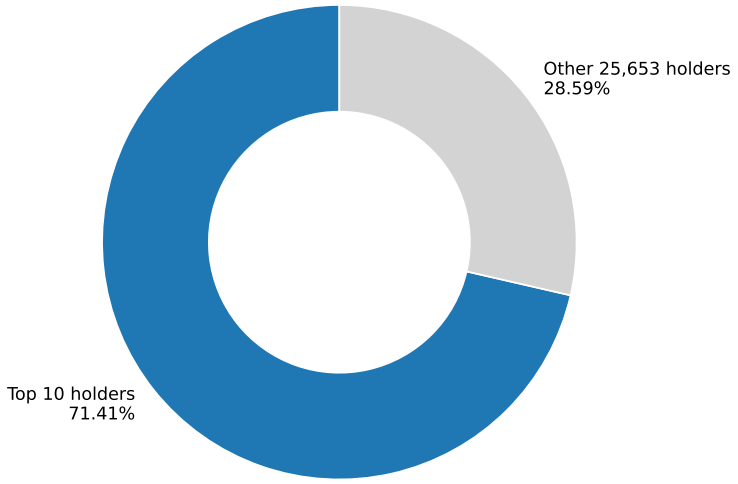


Figure 7. Token distribution by owner. The chart illustrates the distribution of 229,638.6 TSLAx tokens among 25,663 distinct owners (late-May 2026 snapshot from the Solana token mint). The top 10 owners hold 71.41% of supply, while the remaining 28.59% is distributed among all other accounts. The two largest owners are an issuer/treasury distribution wallet (≈21%) and a market-maker wallet holding the broader xStocks catalog (≈20%).

Table 13. Top token holdings of the largest TSLAx investor. This table reports the largest token holdings of the largest investor holder of TSLAx (excluding issuer/treasury and market-maker infrastructure wallets), from a late-May 2026 Solscan snapshot. The account controls 29 distinct token accounts in total; the ten material holdings below account for essentially all of its on-chain value.

Token name	Symbol	Token balance	Price (USD)	Value (USD)	Share (%)
SP500 xStock	SPYx	7,589.32	761.97	5,782,855	23.38
Tesla xStock	TSLAx	12,306.05	435.61	5,360,666	21.67
Nasdaq xStock	QQQx	6,023.54	745.43	4,490,125	18.15
NVIDIA xStock	NVDAx	14,935.92	216.70	3,236,668	13.09
Alphabet xStock	GOOGLx	7,700.87	381.59	2,938,546	11.88
MicroStrategy xStock	MSTRx	10,166.36	158.74	1,613,782	6.52
Coinbase Wrapped BTC	cbBTC	6.68	73,512.13	491,158	1.99
USD Coin	USDC	403,460.88	1.00	403,654	1.63
Apple xStock	AAPLx	923.92	311.63	287,919	1.16
Robinhood xStock	HOODx	1,247.28	101.89	127,085	0.51

market-maker infrastructure rather than concentrated investor ownership.

5.5 Price Comparisons

Figure 9 overlays XStock and Ondo tokenized Tesla prices with the underlying equity price from Yahoo Finance over the study period (30 June 2025 to 1 May 2026). The top panel shows the 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

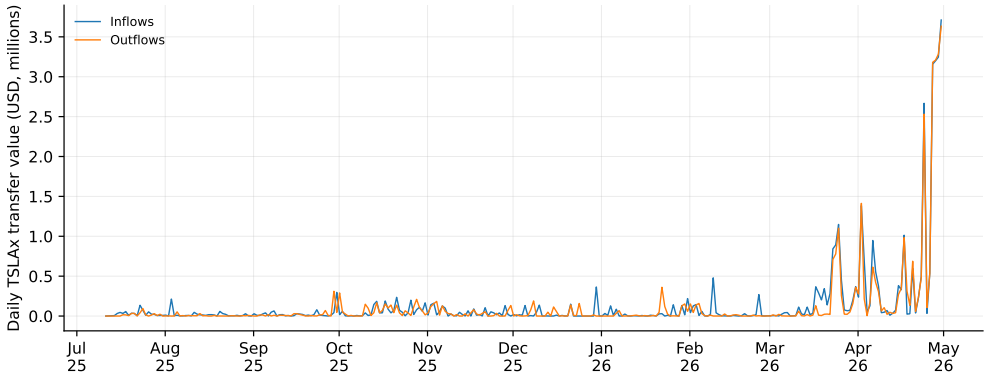


Figure 8. Inflow and outflow values of the largest TSLAx investor. This figure plots the daily value of TSLAx token transfers into and out of the wallet of the largest TSLAx holder (the wallet profiled in Table 13) from 30 June 2025 to 1 May 2026. The black line represents inflows and the orange line represents outflows.

prices (colored lines) trade continuously throughout the day. Differential lines above zero indicate the token traded at a premium to the underlying stock, while lines below zero indicate a discount. For brevity we plot only Tesla—the most volatile and news-sensitive name—and describe Nvidia and Alphabet, whose tokens track the underlying even more tightly, in the text.

We observe that Tesla's token prices closely track its official price during market hours but diverge outside market hours. Notably, in mid-September, Tesla tokens traded at a premium of up to $49, or roughly 12.5%, relative to the last closing price ahead of a Monday opening. Specifically, TSLAx rose from $401.34 at 6:00 a.m. ET on Monday, September 15, to a pre-market peak of about $445.34 near 9:00 a.m., against Tesla's prior Friday close of $395.94. This premium is consistent with positive pre-market news[22], 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.

Alphabet's tokenized stock prices show very small differentials from the official GOOGL stock price. The bottom panel shows that deviations rarely exceed ± $5 (≈ 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.

[22] See https://www.cnbc.com/2025/09/15/tesla-shares-gain-after-elon-musk-discloses-purchase.html

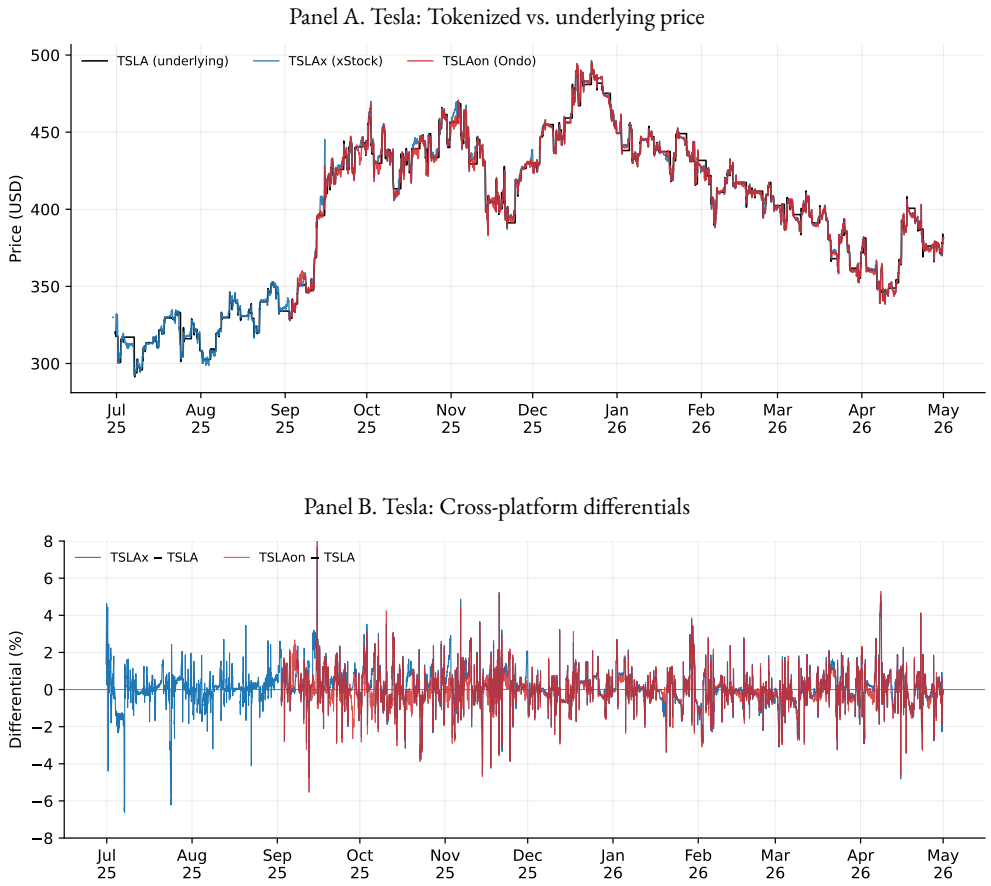


Figure 9. Tesla (TSLA) tokenized stock prices versus underlying equity. Panel A plots Tesla tokenized prices against the underlying stock price. The underlying stock prices are forward-filled to align with continuous token trading. Panel B presents cross-platform and token-versus-underlying price differentials,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

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 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."

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

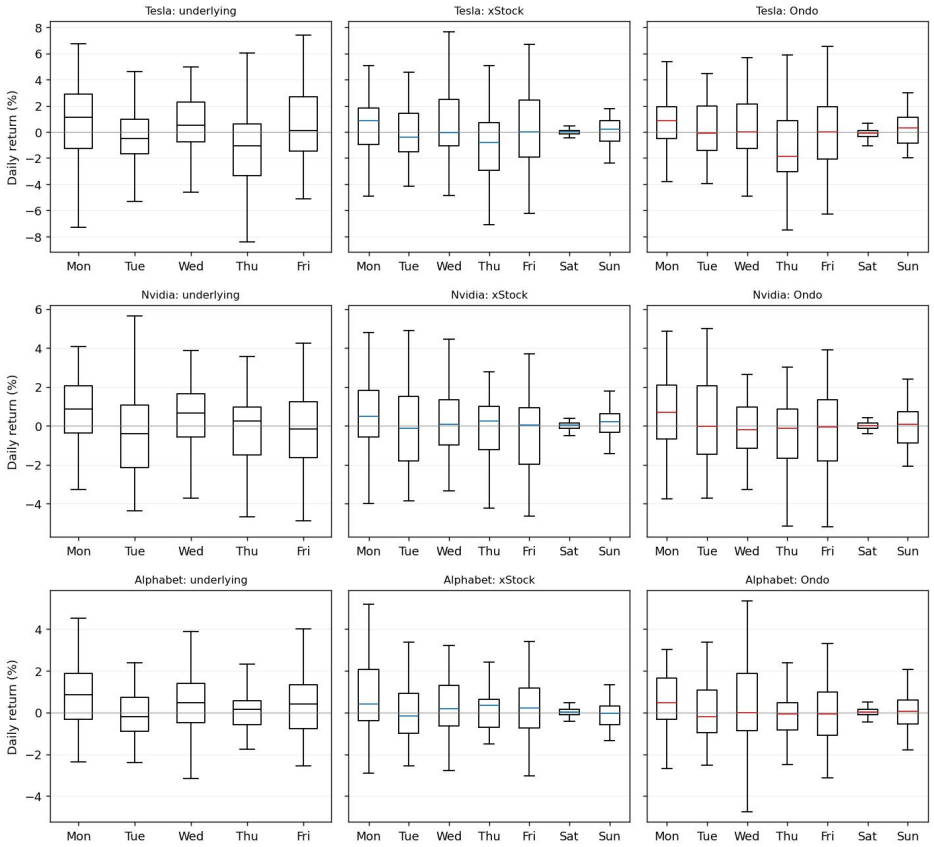


Figure 10. Daily return distributions by day-of-week for tokenized stocks and the underlying stock. This figure plots boxplots of close-to-close daily returns by day of the week for Tesla (top row), Nvidia (middle row), and Alphabet (bottom row). The left column shows underlying stock returns from Yahoo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

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.

5.7 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.

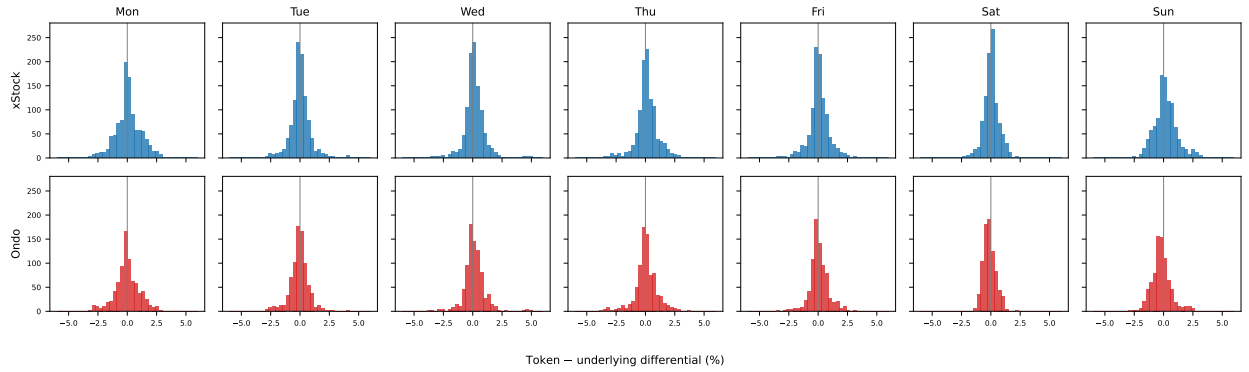


Figure 11. Token-underlying price differentials for Tesla. This figure plots histograms of the percentage price differential between Tesla's tokenized price and its Yahoo Finance reference price by weekday. The top panel reports differentials for xStock, and the bottom panel reports differentials for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

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 (≈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.

5.8 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 when news or order imbalances occur. For instance, Tesla's pre-market price spike on September 15 (a peak deviation of roughly 12.5%), driven by positive overnight news, is attributed to the September 12–15 weekend interval. By contrast, overnight slippage from Mon-

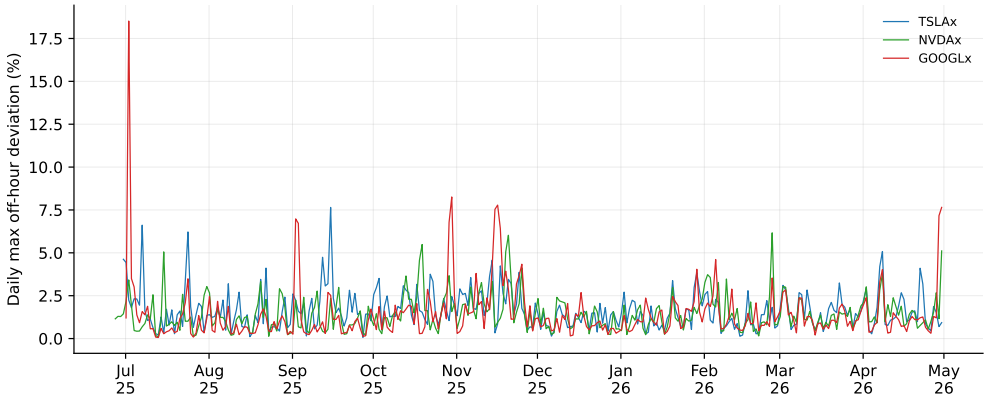


Figure 12. Daily maximum slippage (xStocks vs. underlying stocks). The figure presents the daily maximum absolute percentage deviations of xStock tokenized stock prices from Yahoo closing prices of Tesla, NVIDIA, and Alphabet.

day to Thursday is generally minor. Overall, slippage is modest in most cases, with extreme divergences tied to material news events, and any larger gaps are quickly arbitraged away by the next trading session.

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 black-chip stocks, tokenized markets generally stay in sync with underlying prices, with slippage on the order of a few percent or less. Larger deviations arise only in exceptional circumstances, such as major off-hours news, and are corrected when markets reopen.

5.9 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 14 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 14. Frequency of large price differentials for Tesla's tokenized stocks (30 June 2025 to 1 May 2026). 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%	18% of hours	24% of hours	17% of hours	19% of hours
2%	6%	5%	5%	4%
5%	0.3%	0.3%	0.1%	0.1%

From Table 14, we see that over the full sample, small price gaps (exceeding 1%) are somewhat more frequent over weekends than on weekday overnights—24% versus 18% of hours for the xStock token, and 19% versus 17% for the Ondo token. This is consistent with the longer weekend closure (roughly 65 hours from Friday's close to Monday's open), allowing more drift to accumulate between the continuously-trading token and the stale Friday reference price. Larger gaps exceeding 2% are, by contrast, of similar frequency across the two off-hour types (about 5–6% of weekday-overnight hours and 4–5% of weekend hours), reflecting episodic weekday-evening news such as earnings releases that move the token while the underlying remains at its prior close. Significant mispricings exceeding 5% are rare in both regimes (about 0.3% of hours for the xStock token and 0.1% for Ondo), concentrated in the few major off-hours news events such as the pre-market move on 15 September—arbitrageurs otherwise 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.

5.10 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. Figure 13 displays, for Tesla, 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. We summarize the analogous Alphabet and Nvidia event windows in the text rather than as separate figures.

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, consistent with the information-response evidence in Section 4. 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.

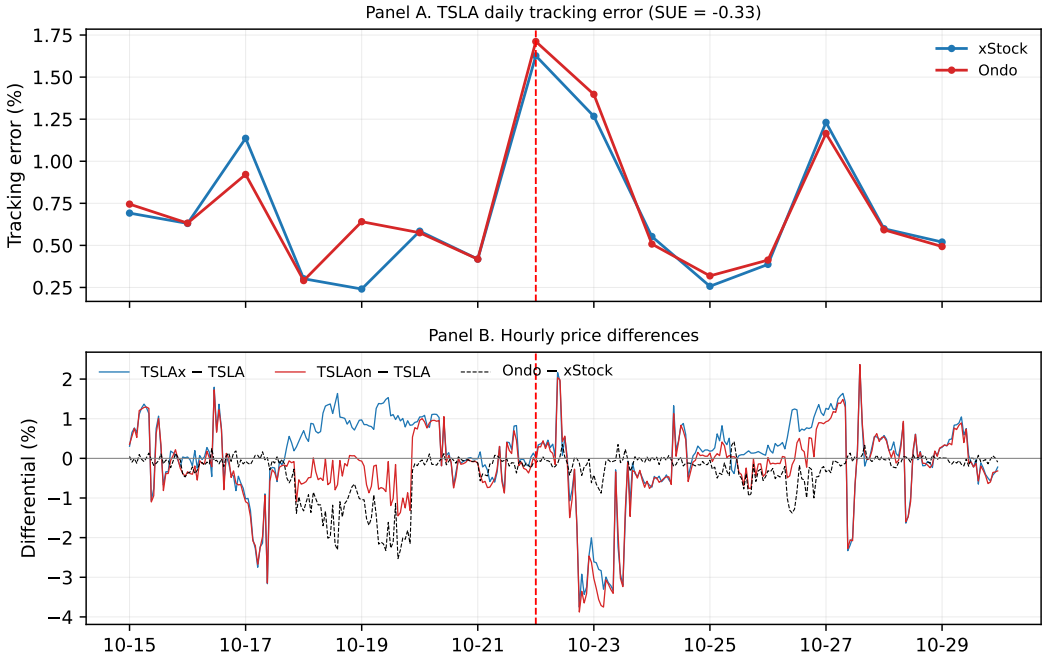


Figure 13. Tesla (TSLA) tracking error and price difference around earnings announcement. Panel A plots the daily tracking error (standard deviation of hourly token−underlying price deviations) for TSLAX (XStocks, orange) and TSLAON (Ondo, black) over a ±1-week window around Tesla's off-hours earnings announcement on October 22, 2025 (red dashed line). 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.

5.11 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. As indicative evidence of this global reach, web-traffic data for the Backed Finance and Ondo Finance websites (July–October 2025) show that, while the United States remains an important source of visits, a substantial share of user interest originates outside the U.S.—particularly from emerging markets such as Vietnam, Malaysia, Turkey, India, and Saudi Arabia, where access to U.S. equity infrastructure is more limited. We report the full country breakdown in Appendix Table 15. Although web traffic does not directly measure trading activity, it suggests that tokenized stock platforms attract broad international interest.

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.

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.[23] Our observation of certain tokens having erratic overnight swings supports the notion

[23] See https://www.nasdaq.com/articles/24-7-trading-coming-it-good-thing.

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 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 act as a catalyst for traditional market innovation.

6.2 Liquidity and Market Quality

Our results discussed in section 5.4 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"[24] – means that large trades ultimately rely on the 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.[25] 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 SpaceX[26] 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:

[24] See https://ondo.finance/blog/the-growing-role-of-tokenized-securities
[25] See https://www.starcompliance.com/tokenized-stocks-raise-big-questions-for-compliance-teams/.
[26] See https://www.cnbc.com/2025/07/07/robinhood-stock-tokens-face-scrutiny-in-the-eu-after-openai-warning.html

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.

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,[27] as well as players like Securitize[28] and Dinari[29] 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

[27] See https://crypto.news/tokenized-stock-market-dominated-by-only-two-players/

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

[29] See https://www.channelnewsasia.com/business/dinari-granted-first-broker-dealer-registration-offer-tokenized-stocks-5205791

to its customers,[30] 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 pressure[31]. If a major exchange with millions of users reintroduces such products, adoption could increase rapidly.

Interestingly, Robinhood (the company) in EU launched 24/5 trading via tokens for over 200 stocks. [32] 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 whether tokenized stocks exhibit different overnight volatility or opening-gap behavior than non-tokenized stocks, 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 token holders' holding periods and trading patterns, 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 light on diversification strategies or sector rotations on-chain.

[30] See https://blog.kraken.com/news/tokenized-equities-coming-soon
[31] https://cryptonary.com/binance-stops-selling-tokenized-stocks-like-apple-and-tesla/
[32] https://insights4vc.substack.com/p/robinhood-aims-at-400m-24-hour-equities

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 split 4-for-1 as well. These operational details 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 whether these on-chain RWA markets begin to correlate with crypto markets or remain siloed. For example, does Bitcoin ever crash and 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 – affect 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, allowing 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 issuing firm's accounting, 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. These questions connect to a fast-growing accounting literature on the measurement, reporting, and assurance of on-chain assets: recent work studies the financial reporting of cryptocurrencies (Luo and Yu, 2024; Anderson et al., 2025), the assurance of decentralized protocols and the auditing of smart contracts (Bourveau et al., 2024; Landsman et al., 2025), and the tax treatment of on-chain positions (Cong et al., 2023a; De Simone et al., 2024). Tokenized equities raise analogous but as yet unresolved recognition and disclosure questions and represent a natural next setting for this literature.

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 the Ethereum and Solana blockchains, we provide the first empirical study of this market and ask whether tokenized stocks serve as a complementary platform for price discovery in the traded equities market. Three findings indicate that they do so: token prices respond to value-relevant news arriving while exchanges are closed, off-hours token returns predict the direction of the next opening, and firms with tokenized stocks exhibit weaker post-earnings announcement drift. Three further tests – a variance decomposition that isolates idiosyncratic earnings news, an analysis of sophisticated investor participation, and PIN-based and transaction-level evidence – indicate that this price discovery is driven by informed trading rather than mechanical price following or liquidity noise. Alongside these results, our stylized facts characterize a nascent market in which fractional micro-trading is pervasive, platform design shapes off-hour liquidity, and arbitrage keeps token prices closely tethered to fundamentals.

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 used AI tools for copyediting, specifically to enhance readability and clarity, as well as to code LaTeX-based tables and figures, and to cross-check the bibliography. 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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A Additional Tables

Table 15. 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