ZiroDelta: Conditional Funding Rate Tokens for Multiverse Finance

June 22th, 2025.

Abstract

The proliferation of perpetual futures has established the funding rate—a mechanism designed to tether contract prices to spot markets—as a significant, albeit volatile, source of yield. However, strategies to capitalize on or hedge against funding rate fluctuations remain largely inaccessible to the average market participant and expose even sophisticated traders to unmitigated risks. This paper addresses this gap by introducing ZiroDelta, a decentralized finance (DeFi) protocol that adapts the emerging "Multiverse Finance" paradigm to funding rate mechanisms. **We argue that by algorithmically minting conditional tokens tied to discrete funding rate outcomes, it is possible to create a novel class of financial primitives that isolate sentiment-driven risk from underlying asset volatility, thereby democratizing access to sophisticated risk management and speculative strategies.**

ZiroDelta's architecture centers on the minting of paired, mutually exclusive tokens: Positive Funding Rate Tokens (PFRT) and Negative Funding Rate Tokens (NFRT). The value of these tokens is contingent upon the state of the funding rate over a predetermined epoch, effectively creating parallel financial universes where value is conserved across outcomes. This mechanism allows market participants to speculate on or hedge against funding rate movements without direct exposure to the price of the underlying asset. This paper details the protocol's technical foundations, including its modular smart contract design, multi-source oracle integration for data veracity, and a unique economic model that utilizes a native token (ZDLT) as the exclusive pairing asset to foster a self-contained economy. Through this systemic approach, ZiroDelta serves as a robust case study for how conditional tokenization can extend the capabilities of DeFi

beyond traditional yield-bearing assets into the domain of dynamic market sentiment indicators.

1. Introduction

1.1. The Rise of Perpetual Futures and Funding Rates

The digital asset landscape has been fundamentally reshaped by the emergence of cryptocurrency derivatives, among which perpetual futures contracts have become the dominant instrument (Wang, Chen, & Zhang, 2021). Unlike traditional futures, these contracts have no expiration date, making them a capital-efficient and flexible tool for speculation and hedging (Alexander, 2022). To ensure that the contract's price remains tethered to the underlying asset's spot price, these instruments employ a crucial mechanism known as the funding rate. This rate facilitates periodic payments between long and short position holders, with the direction and magnitude of the payment determined by the premium or discount of the perpetual price relative to the spot index (dYdX Foundation, n.d.). Consequently, the funding rate has evolved beyond a simple price anchor; it serves as a powerful real-time indicator of market sentiment and has itself become a significant, though highly volatile, source of yield for market participants.

1.2. The Problem of Accessibility and Risk

While funding rates present lucrative opportunities, accessing them through traditional arbitrage strategies is fraught with complexity and risk. These strategies, commonly known as "funding rate farming," typically involve holding a position in the perpetuals market while taking an opposing position in the spot market to remain delta-neutral. Such operations demand significant capital, low-latency execution capabilities, and constant monitoring, creating substantial barriers to entry for most retail participants (Amberdata, 2023). Furthermore, these strategies are not without risk; participants are exposed to basis risk, where the perpetual and spot prices diverge, and counterparty risk on centralized platforms. Existing decentralized solutions have yet to offer a targeted instrument for speculating on or hedging against funding rate volatility itself.

1.3. Thesis Statement and Contribution

This paper addresses these limitations by proposing a novel framework for tokenizing funding rate outcomes. We argue that **by algorithmically minting conditional tokens tied to discrete funding rate outcomes, it is possible to create a novel class of financial primitives that isolate sentiment-driven risk from underlying asset volatility, thereby democratizing access to sophisticated risk management and speculative strategies.** To validate this thesis, we introduce ZiroDelta, a decentralized finance (DeFi) protocol designed as a case study to demonstrate the viability and architecture of such a system. The primary contribution of this research is the design of a system that transforms a dynamic market indicator (the funding rate) into a tradable, conditional asset class, a concept we situate within the emerging paradigm of "Multiverse Finance" (Paradigm, 2021).

1.4. Paper Structure

The remainder of this paper is organized as follows. Section 2 provides a review of the relevant literature on decentralized derivatives, automated market makers, the oracle problem, and existing yield tokenization protocols, identifying the research gap that ZiroDelta aims to fill. Section 3 details the methodology, which combines system design with economic modeling. Section 4 presents the ZiroDelta protocol architecture as a detailed case study. Section 5 analyzes its unique tokenomic model. Section 6 provides a formal risk analysis. Section 7 discusses the broader implications of this work, and Section 8 concludes with a summary and directions for future research.

2. Literature Review

2.1. Foundations of Decentralized Derivatives

The concept of decentralized perpetual futures was pioneered by protocols such as dYdX and Perpetual Protocol, which successfully translated the mechanics of centralized derivatives to an on-chain environment (Wang et al., 2021). The core innovation lies in the on-chain settlement of funding rate payments, which algorithmically incentivizes traders to maintain the price peg to the spot market (dYdX Foundation, n.d.). Scholarly analysis of these systems has focused on their efficiency, security, and economic stability (Lehar & Parlour, 2024). While this body of work provides a robust understanding of the funding rate *mechanism*, it primarily treats the rate as an internal stabilization tool rather than as an external, tradable asset class in its own right.

2.2. Automated Market Makers (AMMs) and Liquidity Dynamics

The rise of DeFi is inextricably linked to the invention of the Automated Market Maker (AMM), first popularized by Uniswap (Adams, Zinsmeister, & Robinson, 2020). AMMs replace traditional order books with on-chain liquidity pools governed by a deterministic algorithm, such as the constant product formula $x \times y = k$ (Lo & Medda, 2020). While revolutionary for enabling permissionless liquidity, these early AMMs introduced a novel risk for liquidity providers known as impermanent loss (Gudgeon et al., 2020). Subsequent research has led to more sophisticated AMM designs featuring concentrated liquidity and dynamic fees to improve capital efficiency and mitigate this risk. Our work builds on this research, as a specialized AMM is required to facilitate the trading of conditional, time-decaying tokens like those proposed by ZiroDelta.

2.3. The Oracle Problem in DeFi

Any DeFi protocol that relies on external data is subject to the oracle problem—the challenge of ensuring that off-chain data brought on-chain is accurate, reliable, and resistant to manipulation (Chainlink, n.d.). A malicious or faulty oracle can trigger catastrophic failures within a protocol, from incorrect liquidations to false outcome resolutions. The severity of this problem has been demonstrated in numerous high-profile exploits (Qin, Zhou, & Gervais, 2021). Research in this area focuses on developing robust decentralized oracle networks (DONs) that use crypto-economic incentives, data aggregation from multiple sources, and cryptographic attestations to guarantee data veracity. For a protocol like ZiroDelta, whose core function depends on accurate funding rate data from multiple exchanges, a robust and redundant oracle solution is not merely a feature but a prerequisite for its existence.

2.4. Yield Tokenization and Financial Primitives

The concept of separating a yield-bearing asset from its future yield is a powerful financial primitive that has gained significant traction in DeFi. The most prominent protocol in this domain is Pendle Finance, which allows users to deposit yield-bearing assets (e.g., staked ETH) and mint two distinct tokens: a Principal Token (PT), redeemable for the underlying asset at maturity, and a Yield Token (YT), which grants its holder the asset's future yield until maturity (Chen & bellsc, 2023). This model effectively creates markets for fixed and variable yields. While innovative, Pendle's model is designed for predictable, positive-accruing yield streams generated by staking or lending. It does not provide a framework for handling a volatile, bi-directional, and sentiment-driven data stream like the perpetual futures funding rate.

2.5. Identifying the Research Gap

The existing literature provides the foundational building blocks for ZiroDelta: decentralized derivative mechanics, AMM designs, oracle security principles, and yield tokenization models. However, a distinct gap remains. While prior work has successfully tokenized *predictable yield* (Pendle Finance), it has not addressed the tokenization of *unpredictable market sentiment* as embodied by the funding rate. There is currently no financial primitive that allows for direct, isolated exposure to funding rate volatility. Market participants cannot hedge against adverse funding rate movements or speculate on market sentiment without also taking on the complexity and risks of traditional delta-neutral arbitrage strategies. ZiroDelta is designed specifically to fill this gap, proposing a novel application of conditional tokens to create a new market for a previously untradable aspect of DeFi.

3. Methodology

To validate the thesis that conditional tokens can effectively isolate and democratize access to funding rate risk, this paper employs a design science research methodology (Hevner, March, Park, & Ram, 2004). This approach is appropriate as the core contribution is the creation of a novel artifact—the ZiroDelta protocol—to solve a previously identified problem. Our methodology is composed of three primary components:

- **3.1. System Design and Architecture:** The primary method involves the formal specification of the ZiroDelta protocol. We adopt a descriptive case study approach, where the protocol's architecture, smart contract logic, and operational flows serve as the central piece of evidence. The design is constructed from first principles, integrating established DeFi concepts (AMMs, oracles) in a novel configuration to demonstrate a viable solution to the problem of funding rate tokenization.
- **3.2. Economic Modeling:** We employ economic modeling to analyze the protocol's internal mechanics and incentive structures. This includes a formal definition of the value conservation principle between the paired conditional tokens (PFRT and NFRT), ensuring the system is mathematically sound. Furthermore, we model the tokenomics of the native ZDLT token to assess its role in creating a sustainable, self-contained economy and its capacity for value accrual through protocol-generated fees.
- **3.3. Risk Vector Analysis:** A systematic risk analysis framework is applied to evaluate the robustness and security of the proposed system. Drawing from established models of smart contract and DeFi security, we analyze potential vulnerabilities across three distinct vectors: technical risks (e.g., smart contract

exploits, oracle manipulation), market risks (e.g., liquidity crises, impermanent loss), and regulatory risks. For each identified risk, we propose and analyze specific mitigation strategies embedded within the protocol's design.

4. The ZiroDelta Protocol: A Case Study in Conditional Tokenization

The ZiroDelta protocol is a decentralized system designed to transform perpetual futures funding rates into a set of tradable, conditional tokens. Its architecture is modular, comprising several interconnected components that together enable the minting, trading, and resolution of these novel assets.

4.1. Core Primitives: Conditional Funding Rate Tokens (PFRT & NFRT)

The foundational innovation of ZiroDelta is the creation of conditional tokens, which are financial instruments whose value is contingent on a future event outcome. For a given underlying asset's perpetual contract (e.g., BTC-PERP) and a defined time period, or "epoch," the protocol mints two distinct and complementary ERC-20 tokens:

- **Positive Funding Rate Token (PFRT):** This token represents a claim on the collateral if the time-weighted average funding rate over the epoch is positive.
- **Negative Funding Rate Token (NFRT):** This token represents a claim on the same collateral if the time-weighted average funding rate is zero or negative.

Users mint these tokens by depositing a unit of collateral (e.g., a stablecoin like USDC) into a smart contract. For each unit of collateral deposited, the user receives one PFRT and one NFRT. These tokens can then be traded freely on a secondary market within the protocol. At the end of the epoch, the oracle system reports the final funding rate outcome. If the rate was positive, all PFRT tokens become redeemable for one unit of the underlying collateral, and NFRT tokens expire worthless. If the rate was negative or zero, NFRT tokens become redeemable, and PFRT tokens expire. This binary, mutually exclusive outcome ensures the conservation of value: Value(PFRT) + Value(NFRT) =

Value(Collateral).

4.2. Smart Contract Architecture

The protocol is implemented as a system of modular smart contracts on a compatible blockchain (e.g., Ethereum). The key contracts include:

- **Minting Contract:** Manages the creation and redemption of PFRT/NFRT pairs. It accepts collateral, mints the corresponding tokens, and processes redemptions after an epoch concludes.
- **Epoch Manager Contract:** Governs the lifecycle of each market, including the start time, end time, and resolution state.
- **Oracle Integration Contract:** Serves as a secure interface between the ZiroDelta protocol and its designated oracle network. It receives, validates, and stores the final funding rate data used for settlement.

4.3. Oracle Integration Layer

The protocol's integrity is critically dependent on the accuracy and reliability of funding rate data. To mitigate the oracle problem, ZiroDelta employs a multi-layered approach:

- **Decentralized Oracle Network (DON):** The primary data feed is sourced from a reputable DON like Chainlink, which aggregates data from numerous independent, Sybil-resistant nodes.
- **Multi-Source Aggregation:** The DON is configured to pull funding rate data from multiple high-volume centralized and decentralized exchanges (e.g., Binance, Bybit, dYdX) to prevent a single point of failure or manipulation.
- **Time-Weighted Average Price (TWAP):** To smooth out short-term volatility and manipulation attempts, the oracle reports the time-weighted average funding rate over the entire epoch, not a single spot value.
- **Dispute Resolution:** The protocol includes a fail-safe mechanism, such as an optimistic oracle or a governance-led dispute period, to resolve any challenges to the

reported outcome before settlement is finalized.

4.4. AMM and Liquidity Pool Design

Secondary market trading for PFRT and NFRT is facilitated by a purpose-built Automated Market Maker (AMM). Given the conditional and time-decaying nature of these tokens, a standard $x \times y = k$ AMM is suboptimal. The ZiroDelta AMM must account for the fact that as an epoch progresses and new information becomes available, the probability of one token expiring worthless increases, causing its price to trend towards zero. The design draws inspiration from prediction market AMMs, such as Logarithmic Market Scoring Rules (LMSR) used by Gnosis, or dynamic models that can adjust pool weights based on oracle-reported probabilities (Hanson, 2003). This ensures a more capital-efficient and stable trading environment compared to a naive implementation.

4.5. Collateral and Lending in Conditional Universes

ZiroDelta introduces a novel lending mechanism that leverages the "Multiverse Finance" concept. Within the protocol's lending market, a PFRT token can be used as collateral to borrow an NFRT token for the *same epoch and market*. This is inherently safe from liquidation risk based on the assets' relative value, because a price increase in PFRT necessarily implies a price decrease in NFRT, and vice-versa. The value of the collateral and the debt are perfectly negatively correlated. This allows users to construct leveraged positions or sophisticated hedging strategies without the liquidation risk that plagues traditional DeFi lending markets where collateral and debt values can move independently.

5. Economic Model and Tokenomics of the ZDLT Token

While the PFRT and NFRT tokens form the functional core of ZiroDelta, the protocol's long-term economic sustainability is anchored by its native utility and governance token, ZDLT. The tokenomics are designed to create a positive feedback loop, or "flywheel effect," where protocol usage directly drives value to ZDLT holders. This is achieved through a distinct economic architecture that diverges from many standard DeFi models.

5.1. The ZDLT-Exclusive Pairing Model

A key architectural decision within the ZiroDelta ecosystem is the mandated use of ZDLT as the base trading pair for all conditional token markets. Unlike typical AMMs where users provide liquidity in pairs such as Asset A and a stablecoin (e.g., PFRT/USDC), ZiroDelta's liquidity pools are structured exclusively as PFRT/ZDLT and NFRT/ZDLT. This design creates a closed-loop economy wherein any participant wishing to speculate on funding rates—either by trading conditional tokens or by providing liquidity—must first acquire and use ZDLT. This model embeds the native token directly into the protocol's primary function, creating intrinsic demand and utility that extends beyond simple governance rights (Anatha, 2021).

5.2. Value Accrual Mechanisms

The protocol is designed to direct a portion of all generated fees to the ZDLT token ecosystem, creating multiple streams of value accrual:

- **Trading Fees:** A percentage of the fees from every PFRT/ZDLT and NFRT/ZDLT trade is collected by the protocol treasury, which is governed by ZDLT holders.
- **Minting Fees:** A small fee charged upon the minting of new PFRT/NFRT pairs contributes directly to protocol revenue.
- **Treasury Deployment:** The ZDLT-denominated treasury can be used for strategic initiatives, including "buyback and burn" programs. In such programs, the protocol utilizes accumulated revenue to purchase ZDLT from the open market and permanently remove it from circulation, creating deflationary pressure intended to benefit long-term holders.

5.3. Governance and Utility

Beyond its central economic role, ZDLT functions as the governance token for the ZiroDelta protocol. Holders can propose and vote on key parameter changes, including fee structures, oracle provider selection, the addition of new markets, and the allocation of treasury funds. This aligns with the established vote-escrowed (ve) models prominent in DeFi, where long-term token lockers receive amplified voting power and a larger share of protocol revenue, thereby incentivizing commitment to the ecosystem's long-term health (Nansen, 2023).

6. Risk Analysis and Mitigation

The ZiroDelta protocol, like any DeFi system, is subject to a range of potential risks. Our methodology includes a formal analysis of these risks and the integration of specific mitigation strategies into the protocol's design.

6.1. Technical Risks

- **Smart Contract Vulnerabilities:** The primary technical risk involves potential bugs or exploits in the smart contract code, such as reentrancy attacks or integer overflows (OWASP Foundation, n.d.).
  - **Mitigation:** The protocol is designed to undergo multiple independent security audits from reputable firms. Critical components of the economic model will be subject to formal verification to mathematically prove their correctness. A bug bounty program will be maintained post-launch to incentivize continuous community-led security reviews.
- **Oracle Manipulation:** As the protocol's settlement process is entirely dependent on oracle data, an attack on the oracle network is a critical threat (Chainlink, n.d.).
  - **Mitigation:** As detailed in Section 4.3, ZiroDelta employs a multi-layered defense, including a decentralized oracle network, aggregation from numerous primary sources, the use of time-weighted average prices (TWAP) to deter flash manipulation, and a final dispute resolution mechanism.

6.2. Market Risks

- **Liquidity Risk:** Insufficient liquidity in the PFRT/NFRT trading pools would lead to high slippage and a poor user experience, hindering protocol adoption.
  - **Mitigation:** The protocol will implement a liquidity mining program to bootstrap initial liquidity by rewarding early liquidity providers with ZDLT emissions. The ZDLT-exclusive pairing model is also designed to concentrate liquidity, rather than fragmenting it across multiple stablecoin pairs.
- **Impermanent Loss:** Liquidity providers in the AMM are exposed to impermanent loss, a risk amplified by the volatile, trend-to-zero nature of the conditional tokens.
  - **Mitigation:** The purpose-built AMM (Section 4.4) will incorporate dynamic fees that increase with market volatility, partially compensating LPs for impermanent loss. Furthermore, a portion of the ZDLT rewards for liquidity providers can be structured as IL protection, an insurance-like mechanism that compensates for significant impermanent loss.

6.3. Regulatory Considerations

The novel nature of conditional tokens may place them in a complex regulatory landscape, where they could be classified as securities or event contracts depending on the jurisdiction.

- **Mitigation:** The protocol is designed for progressive decentralization, ultimately transitioning control to a global, distributed community of ZDLT holders. This architecture reduces central points of failure and regulatory capture. The protocol will operate with clear disclaimers to users regarding the risks, and legal counsel will be sought in key jurisdictions to navigate the evolving regulatory environment.

7. Discussion

The design of the ZiroDelta protocol carries significant implications for the evolution of decentralized finance, extending beyond its immediate use case.

7.1. Implications for Risk Management

ZiroDelta introduces a financial primitive for a previously unhedgeable risk: funding rate volatility. For traders with large perpetual futures positions, the funding rate can represent a substantial and unpredictable element of their profit and loss. The protocol allows these traders to directly hedge this exposure. For instance, a trader holding a large long position who expects to pay significant positive funding can purchase NFRT to offset these costs. This ability to isolate and manage sentiment-driven risk marks a significant step forward in the sophistication of DeFi risk management tools.

7.2. The Future of Financial Primitives: From Yield to Sentiment

The analysis of ZiroDelta in comparison to a protocol like Pendle Finance highlights a key evolutionary trend in DeFi. Pendle tokenizes *yield*, a relatively predictable stream of revenue from an underlying asset. ZiroDelta tokenizes *sentiment*, a volatile and unpredictable market indicator. This represents a higher level of abstraction and a move toward creating markets for more complex and ephemeral data. This paradigm, which could be extended to other metrics such as social media sentiment, developer activity, or network hash rates, opens the door for a new generation of prediction markets and derivatives based on a far broader set of on-chain and off-chain data.

7.3. Limitations and Future Research

The proposed model is not without its limitations. Its profound reliance on oracle security remains the most significant challenge, as no oracle system is infallible. Future research could explore cryptographic alternatives or oracle designs that are even more resistant to collusion and manipulation. Secondly, the model's success hinges on bootstrapping sufficient liquidity; the ZDLT-exclusive pairing creates strong tokenomics but may initially raise the barrier for liquidity providers accustomed to stablecoin pairs. Future work could involve agent-based simulations of the AMM's performance under various liquidity scenarios. Finally, this paper has focused on a binary outcome (positive/negative); more complex conditional tokens could be designed with multiple discrete outcome tranches (e.g., funding rate between 0% and 0.01%), creating more granular markets for advanced strategies.

8. Conclusion

This paper introduced ZiroDelta, a novel DeFi protocol designed to validate the thesis that conditional tokens can effectively isolate, tokenize, and democratize access to perpetual futures funding rates. By presenting the protocol's architecture—from its binary PFRT/NFRT token model to its multi-layered oracle system and unique ZDLT-based economy—we have provided a comprehensive blueprint for a system that addresses a clear gap in the existing DeFi landscape. The ZiroDelta model demonstrates a viable method for transforming a volatile market sentiment indicator into a tradable financial primitive, allowing for sophisticated hedging and speculation without direct exposure to underlying asset volatility.

The work contributes to the field by proposing a concrete system design that moves beyond the tokenization of predictable yield streams, as seen in prior protocols, into the more complex domain of tokenizing market sentiment. As the DeFi ecosystem continues to mature, the development of such sophisticated financial instruments will be crucial for attracting institutional capital and enabling more nuanced risk management. ZiroDelta serves as both a practical solution and a conceptual framework, paving the way for future research into new forms of conditional assets and the broader vision of a "Multiverse Finance" ecosystem.

References

- Adams, H., Zinsmeister, N., & Robinson, D. (2020). *Uniswap v2 Core*. Uniswap. https://uniswap.org/whitepaper.pdf
- Alexander, C. (2022). *Perpetual Futures: A Beginner's Guide*. SSRN. https://dx.doi.org/10.2139/ssrn.4301150
- Amberdata. (2023). *The Ultimate Guide to Funding Rate Arbitrage*. Amberdata Blog. https://blog.amberdata.io/the-ultimate-guide-to-funding-rate-arbitrage-amberdata
- Anatha. (2021). *Understanding Token Economics (Tokenomics 101)*. Anatha Blog. https://anatha.io/blog/understanding-token-economics-tokenomics-101
- Chainlink. (n.d.). *The Oracle Problem*. Chainlink Education Hub. Retrieved June 22, 2025, from https://chain.link/education-hub/oracle-problem
- Chen, Y., & bellsc. (2023). *Pendle V2*. [Whitepaper]. Pendle Finance. https://github.com/pendle-finance/pendle-v2-resources/blob/main/whitepapers/Pendle_V2_Whitepaper.pdf
- dYdX Foundation. (n.d.). *Understanding Perpetual Market Funding*. dYdX Integral. Retrieved June 22, 2025, from https://integral.dydx.exchange/understanding-perpetual-market-funding/
- Gudgeon, L., Werner, S., Perez, D., & Knottenbelt, W. J. (2020). DeFi Protocols for Loanable Funds: A-Constant Function Market Makers. In *Proceedings of the 2nd ACM Conference on Advances in Financial Technologies* (pp. 92–104). Association for Computing Machinery. https://doi.org/10.1145/3385412.3385990
- Hanson, R. (2003). Logarithmic market scoring rules for modular combinatorial information aggregation. *Journal of Prediction Markets*, *1*(1), 3-15.
- Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design Science in Information Systems Research. *MIS Quarterly*, *28*(1), 75–105.
- Lehar, A., & Parlour, C. A. (2024). Decentralized Exchanges. *The Journal of*

Finance, *79*(3), 1601–1651. https://doi.org/10.1111/jofi.13405

- Lo, Y. C., & Medda, F. (2020). Uniswap and the rise of the decentralized exchange. *The Journal of the British Blockchain Association*, *3*(1), 1-8. https://doi.org/10.31585/jbba-3-1-(8)2020
- Nansen. (2023). *What Is Pendle Finance? Yield-Tokenization Explained*. Nansen Blog. https://www.nansen.ai/post/what-is-pendle-finance-yield-tokenization-explained-how-to-earn
- OWASP Foundation. (n.d.). *OWASP Smart Contract Top 10*. Retrieved June 22, 2025, from https://owasp.org/www-project-smart-contract-top-10/
- Paradigm. (2021, May). *Multiverse Finance*. Paradigm. https://www.paradigm.xyz/2021/05/multiverse-finance
- Qin, K., Zhou, L., & Gervais, A. (2021). CeFi vs. DeFi: Comparing Centralized to Decentralized Finance. In *Financial Cryptography and Data Security* (pp. 377-397). Springer.
- Wang, C., Chen, S., & Zhang, Y. (2021). Perpetual Contracts in the Cryptocurrency Market: A-Review and Future Directions. In *2021 International Conference on Financial Technology* (pp. 1-6). IEEE.