

Volmex Prime Rate Index (VPR Index): A Comprehensive Benchmark for Crypto Finance

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Introduction

The Volmex Prime Rate Index (VPR) is a groundbreaking initiative designed to establish a comprehensive benchmark rate for the crypto finance ecosystem. As the DeFi landscape continues to evolve and mature, there is a growing need for a reliable reference point to price loans and financial products in crypto markets. The VPR Index aims to fill this gap by providing a robust, transparent, and market-driven rate that reflects the true cost of capital in the DeFi space.

This paper outlines the key components, methodology, and implementation of the following indices:

- Volmex Prime Rate Index (VPR Index)
- Volmex DeFi Lending Rate Index (DLR Index)
- Volmex Funding Rate Index (FR Index)

Components and Weighting

The VPR Index is composed of two components, each contributing to a holistic representation of the DeFi ecosystem:

a. DeFi Lending Rates (DLR)

This component captures the average of the major stablecoins (USDT, USDC) lending rates across major DeFi protocols on the Ethereum including:

Protocols

- Aave V3
- Aave V2
- Compound V3
- Morpho

- Kamino
- Drift
- Save

Chains

- Ethereum mainnet
- Arbitrum One
- Fantom
- Optimism
- Polygon
- Scroll
- Zksync
- Solana

DLR is weighted by the total amount of stablecoins lent.

By incorporating these rates, the Volmex Prime Rate Index (VPR Index) reflects the current state of lending and borrowing activity within the DeFi ecosystem.

i. Selection Criteria

The listed protocols adhere to a strict inclusion criteria:

1. Protocol Eligibility and Relevance

- Minimum Time in Market: At least 12 consecutive months of operation (increased from 6 months in earlier iterations for added maturity).
- DeFi Focus: Primarily centered on lending/borrowing within the DeFi ecosystem.
- Supported Cryptocurrencies: Must support at least two of the top 10 cryptocurrencies by market capitalization.
- Smart Contract Security: Independent third-party audits conducted within the last six months, with no unresolved critical vulnerabilities.

2. Enhanced Counterparty Risk Management

- Overcollateralization: Minimum collateralization ratio of 120% for ETH, BTC, and SOL deposits as the default lending standard.
- Emergency Fund/Insurance: A protocol-managed insurance fund or emergency reserve is required.
- Liquidation Mechanisms: Transparent, automated, and proven liquidation frameworks.
- Decentralization Index: Governance tokens must be sufficiently distributed to indicate decentralization.

3. Market Representation, Liquidity, and Stability

- Total Value Locked (TVL): Minimum TVL of \$500 million USD.
- 24H Trading Volume: Average daily trading volume of at least \$1 million across lending pairs for the past 30 days.
- Historical Volume Consistency: Preference for steady activity, avoiding unsustainable growth or sharp declines.
- Active Markets: Lending activity across at least three distinct crypto assets.

4. Transparency, Community, and Operational Integrity

- Open-Source Smart Contracts: Fully open-sourced contracts are preferred.
- Regular Updates and Community Engagement: Active communication and updates through official channels.
- Uptime and Maintenance History: Consistent uptime exceeding 99%, along with transparent maintenance records.

5. Data Integrity and Compliance

- On-Chain Data Access: Real-time, verifiable on-chain data via APIs or oracles.
- Historical Data Availability: Public repository of lending rate history spanning the past 24 months.

b. Funding Rate Index (FR)

This aggregates funding rates across leading crypto derivatives exchanges and calculates the APY from the funding rate.

Exchanges

- Deribit, OKX

Assets to short

- ETH, BTC, SOL

FR is weighted by the total amount of capital requirement required to hold the open interest.

Calculation Methodology

The VPR Index is calculated every 10 seconds using a weighted average between FR and DLR as described above. The following is multiplied by 100 so that VPR can be expressed as a percent. The formula for the FR Index is as follows:

$$xFR = \frac{\sum_{AX} \left[\left(1 + FR_{AX,8Hr} \right)^{3 * 365} - 1 \right] \times OI_{AX}}{\sum_{AX} OI_{AX,8Hr}} \times 100 \quad (1)$$

where AX is a set of supported exchanges and asset combinations, FR_{8Hr} is the 8 hour funding rate, and OI is the open interest for a given crypto asset.

$$xDLR = \left[\frac{\sum_{AD} BR_{AD} \times B_{AD}}{\sum_{AD} B_{AD}} - \frac{\sum_{AD} LR_{AD} \times L_{AD}}{\sum_{AD} L_{AD}} \right] \times 100 \quad (2)$$

where AD is a set of all supported Defi exchanges and asset combinations, BR is the borrowing APY for borrowing stablecoins, and B is the total stablecoins borrowed. LR is the lending APY for lending for a given crypto asset, x , and L is the total assets lending for a given crypto asset, x .

$$xVPR = 0.5 \times xDLR + 0.5 \times xFR \quad (3)$$

Smoothing

Raw prime rate variance could suffer from noise since it is calculated when a new data set is available and it might be over-sensitive to sudden changes.

Exponentially-weighted moving average (EWMA)

To eliminate the noise in raw prime rate variance and capture the fundamental trends in the market, an EWMA of raw prime rate variance is employed as shown below:

$$VPR_{SMOOTH,t} = \lambda VPR_{SMOOTH,t-1} + (1 - \lambda) VPR_{RAW,t} \quad (4)$$

where $VPR_{SMOOTH,t-1}$ is the previous value of the smoothed prime rate variance and its weight is the smoothing parameter λ .

Half-life: Choosing the smoothing parameter

The degree of smoothing is adjusted by the smoothing parameter λ . Equation 4 could be defined recursively, as below:

$$VPR_{SMOOTH,t} = \lambda^\tau VPR_{SMOOTH,t-\tau} + (1 - \lambda) \sum_{i=0}^{\tau-1} \lambda^i VPR_{RAW,t-i}$$

and we can find the smoothing parameter value that implies a specific half-life τ using the derivation below,

$$\lambda^\tau = \frac{1}{2} \Rightarrow \lambda = e^{-\ln(2)/\tau}$$

Above equation gives $\lambda = 0.97716$ when we set the half-life to 30 seconds and prime rate variance calculation is performed every second,

$$0.97716^{30 \text{ sec} \times 1 \text{ calculation/sec}} = 0.97716^{30} \approx 0.5$$

which simply means that the weight of current prime rate variance will be halved every 30 seconds (i.e., 30 calculations given that calculations are performed every second) if we choose λ as 0.97716.

Benefits and Use Cases

The VPR Index offers numerous benefits to the DeFi ecosystem:

1. **Standardization:** Provides a unified benchmark for pricing loans and financial products across different protocols and platforms.
2. **Risk Management:** Enables more accurate assessment of risk and return in DeFi investments.
3. **Market Efficiency:** Facilitates more efficient price discovery and capital allocation within the DeFi space.
4. **Innovation:** Serves as a foundation for developing new financial instruments and derivatives in the DeFi ecosystem.

Naming Convention

The Volmex DLR, FR and VPR of a crypto asset x , are given the following names: x DLR, x FR and x VPR, respectively. For Ethereum, Bitcoin, and Solana, the crypto asset is abbreviated as E, B, and S, respectively.

EDLR = Ethereum Volmex DeFi Lending Rate

EFR = Ethereum Volmex Funding Rate

EVPR = Ethereum Volmex Prime Rate

BDLR = Bitcoin Volmex DeFi Lending Rate

BFR = Bitcoin Volmex Funding Rate

BVPR = Bitcoin Volmex Prime Rate

SDLR = Solana Volmex DeFi Lending Rate

SFR = Solana Volmex Funding Rate

SVPR = Solana Volmex Prime Rate

Conclusion

The VPR Index represents a significant step forward in the maturation of the decentralized finance ecosystem. By providing a comprehensive, transparent, and reliable benchmark, the VPR Index will enable more sophisticated financial products and risk management tools within the DeFi space.

Volmex is well-positioned to drive the adoption and integration of the VPR Index across the ecosystem. Through ongoing development, refinement, and collaboration with other DeFi protocols, the VPR Index has the potential to become the standard reference rate for the entire DeFi ecosystem, fostering greater stability, efficiency, and innovation in the years to come.