A Comprehensive Asset Scoring Model for Evaluating Token Risk in Decentralized Finance Lending Protocols

Abstract

The rapid expansion of the decentralized finance (DeFi) ecosystem has highlighted the need for robust and comprehensive asset scoring models to evaluate token risk before adding them to lending protocols.

This paper presents a multi-factor asset scoring model that considers market capitalization, trading volume, price volatility, project fundamentals, token utility, and token distribution to assess the risk of tokens. By assigning weights to each factor, the model provides a comprehensive risk score to rank tokens according to their risk profiles.

This scoring model aims to promote stability and security within Inverse Finance Firm protocol by ensuring only lower-risk tokens are added as collateral.

Introduction

The DeFi landscape has experienced exponential growth, necessitating the development of robust tools and models to assess and manage risks effectively. In this context, Inverse DAO must evaluate the risk associated with tokens before adding them to Firm to protect users' funds and ensure its stability.

This short paper proposes a comprehensive yet simple asset scoring model to evaluate the risk of new tokens by considering six essential factors:

- market capitalization,
- trading volume,
- price volatility,
- token holders distribution,
- project fundamentals,
- token utility.

The simplicity of the model ensures its applicability to the broadest range of tokens, taking into account the diverse types of tokens available in the market. The model assigns a weighted score for each factor, producing an overall risk score that can be used to rank tokens according to their risk profiles.

Methodology

We derive the Total Asset Score (TAS) to evaluates the risk of tokens by using the following formula :

$$TAS = MCS * 0.2 + TVS * 0.15 + PVS * 0.15 + TDS * 0.1 + PFS * 0.2 + TUS * 0.2$$

where:

- **MCS :** Market Capitalization Score

$$MCS = min(10, (Token\ Supply * Token\ Price * 200) / (wETH\ Supply * wETH\ price) * 10)$$

- **TVS :** Trading Volume Score

$$TVS = min(10, (30\ Day\ Avg\ Token\ Trading\ Volume / 30\ Day\ Avg\ wETH\ Trading\ Volume) * 10)$$

- **PVS :** Price Volatility Score

$$PVS = min(10, 10 - (Token\ Log\ Price\ Volatility / wETH\ Log\ Price\ Volatility) * 9)$$

- **TDS :** Token Distribution Score

$$TDS = min((1 - Token\ Gini\ Index) * 10 / (1 - wETH\ Gini\ Index); 10)$$

- **PFS :** Project Fundamentals Score

  Subjective evaluation (1-10) based on team experience, technology, and roadmap

- **TUS :** Token Utility Score

  Subjective evaluation (1-10) based on token use cases and functionality

The weights were determined based on the relative importance of each factor in evaluating token risk.

1. Market Capitalization Score

- **Indicator:** Token Market Cap * 200
- **Reference:** Wrapped Ether (wETH) Market Cap
- **Weight:** 20%
- **Formula:**

$$MCS = min(10, (Token\ Supply * Token\ Price * 200) / (wETH\ Supply * wETH\ price) * 10)$$

Fully diluted market capitalization serves as a measure of an asset's size and stability. Tokens with larger market capitalization have a more extensive investor base, leading to increased liquidity and reduced price volatility. Wrapped Ether (wETH) is used as the reference for the maximum market cap due to its widespread adoption in the DeFi ecosystem and its strong correlation to the native Ethereum asset, Ether (ETH).

To establish a score out of 10, we set a threshold of 0.5% of the total wETH market capitalization, which provides a standardized framework for evaluating token size and stability.

We use Dune as a data source to derive the supply from transactions and the price of both the considered token and wrapped Ether using DEX trades, allowing us to assess the supply across multiple chains and tokens. The exhaustive list of DEX used is available in Annex 1.

2. Trading Volume Score

- **Indicator:** 30-days Average USD Dex Daily Trading Volume
- **Reference:** Wrapped Ether (wETH) Average Daily Trading Volume
- **Weight:** 15%
- **Formula:**

$$TVS = min(10, (30\ Day\ Avg\ Token\ Trading\ Volume / 30\ Day\ Avg\ wETH\ Trading\ Volume) * 10)$$

Trading volume is an essential indicator of a token's liquidity and overall market interest. Higher trading volumes suggest that a token is more actively traded, reducing spreads and price manipulation risk. Wrapped Ether is chosen as the reference for maximum daily trading volume due to its role as a liquidity provider and trading pair in numerous decentralized exchanges, making it an appropriate benchmark for trading activity.

We are choosing to restrict the data to decentralized exchanges volume since this framework is focusing on on-chain risks.

Similarly to the Market Capitalization, we use Dune as a data source to collect prices and DEX trading volumes, the exhaustive list of DEX used is available in Annex 1.

3. Price Volatility

- **Indicator:** 30-days Price Log Return Volatility
- **Reference:** Wrapped Ether (wETH) 30-day Price Log Return Volatility
- **Weight:** 15%

- **Formula:**

$$PVS = min(10,\ 10 - (Token\ Log\ Price\ Volatility\ /\ wETH\ Log\ Price\ Volatility) * 9)$$

In order to calculate the PVS we first need to derive the price log daily returns and assess its variance (squared standard deviation) over the previous 30 days.

$$Log\ Price\ Volatility = VAR30(daily\ log\ return)$$
$$Log\ Price\ Volatility = VAR30(ln(Price[t]/Price[t-1]))$$

Price volatility measures the fluctuation of an asset's price over a given period. Higher price volatility often signals increased risk, as it can lead to potential losses for lenders and borrowers, hence having a deeper effect on prices.

To derive the token price we retrieve and derive the median daily price using the trades settled on the DEX listed in Annex 1.

To better account for the effects of compounding, the model uses the standard deviation of daily log returns instead of daily price returns. Log returns are more suitable for assets with continuous compounding, such as cryptocurrencies, and provide a more accurate statistical measure of volatility. Wrapped Ether (wETH) is used as the reference for maximum price volatility due to its close relationship with Ether (ETH), which is a widely traded and relatively stable asset in the cryptocurrency market.

Again, we use Dune as a data source to collect prices derived from DEX trades, the exhaustive list of DEX used being available in Annex 1.

4. Token Distribution

- **Indicator:** Gini Coefficient for the top 50 holders
- **Reference:** Wrapped Ether (wETH) Gini Coefficient
- **Weight:** 10%
- **Formula:**

$$Token\ Distribution\ Score = min((1 - Token\ Gini\ Index) * 10\ /\ (1 - wETH\ Gini\ Index); 10)$$

Token distribution examines the allocation of token supply among its holders. A more equitable distribution of tokens reduces the risk of price manipulation or large sell-offs, which can negatively impact the token's value. Wrapped Ether (wETH) is chosen as the reference for

maximum Gini coefficient due to its close link with Ether (ETH) and its widespread use in DeFi platforms, providing a reasonable benchmark for token distribution.

We calculate the Gini coefficient while restricting the scope to the balances of the top 50 token holders, allowing us to focus on the risk component inherent to large smart contract addresses. This approach helps to better assess the token distribution among the largest holders, which can have a more significant impact on the token's value and stability.

The details and results of the calculations are shown in Annex 4 for a few selected tokens.

5. Project Fundamentals

- **Indicator:** Team & Technology Score
- **Reference:** Subjective Evaluation (1-10) based on team experience, technology, and roadmap
- **Weight:** 20%

For project fundamentals, we use a combination of objective and subjective criteria, including team experience, whitepaper and technical documentation review, analysis of the project's roadmap and development milestones, and consideration of partnerships, collaborations, and endorsements.

Criteria	Weight
Org Structure: • Is the Protocol a DAO? How is it governed eg. delegates , snapshot • Does Protocol publish analytics / transparency via Dune or similar? • What is the working group structure ? • Are core contributors compensated / Doxed ? • Any known controversies in the crypto space ? • Do they have a security or risk management team ?	1/13 1/13 1/13 1/13 1/13 1/13
Audits & Bug Bounties: • Are there any existing Audits and/or Bounties ? • Are Rewards paid ? Were vulnerabilities found with severity level ?	1/13 1/13

Multisig Structure: ● Is protocol transparent of multisigs and signers ? ● Can multisigs interfere with collateral options? EOA minting available ?	1/13 1/13
Influence, Reputation, and Partnerships: ● How long has the protocol been around , have they endured long bear markets? ● Have they been exploited and how was it handled ? was value restored to users if affected ? ● Current and notable past partnerships ? Are they a net positive on the DEFI space ?	1/13 1/13 1/13

All criterias are weighed equally and scored out of 10, the project fundamental score is then calculated as the average of the 13 questions.

6. Token Utility

- **Indicator:** Utility Score
- **Reference:** Subjective Evaluation (1-10) based on token use cases and functionality
- **Weight:** 20%

Token utility assessment involves examining the token's primary use cases and functionality, investigating unique features or mechanisms (staking, yield farming, etc.), evaluating the project's network effect and growth potential, and analyzing the token's integration with other projects.

Criteria	Weight
Utility & Use Case: ● Does the Token have utility ? Can it retain the utility while supplied to FiRM? ● What is the goal of the token ? Where is value derived from?	1/4 1/4

• Is there any existing liquid or locking feature?	1/4
Emissions: • Emissions Policy, what are emissions used for?	1/4

All criterias are weighted equally and scored out of 10, the token utility score is then calculated as the average of the 4 questions.

Conclusion

In conclusion, the comprehensive asset scoring model presented in this paper aims to assess token risk in decentralized finance lending protocols effectively. By considering market capitalization, trading volume, price volatility, project fundamentals, token utility, and token distribution, and using Wrapped Ether (wETH) as a reference for maximum values, the model calculates the Total Asset Score (TAS) to rank tokens according to their risk profiles.

The simplicity of the model ensures its applicability to a wide range of tokens, considering the diverse types of tokens available in the market (wrapped, staked, pool tokens etc.). The adoption of this asset scoring model will contribute to the long-term success and growth of Inverse while promoting transparency and trust within the ecosystem.

Annex 1 : List of DEX used in the volume and price scoring

0x API	LINKSWAP	mistX
0x Native	Loopring	swapr
1inch	LuaSwap	xSigma
1inch LP	Matcha	
1inch Limit Order Protocol	Mooniswap	
Balancer	Oasis	
Bancor Network	Paraswap	
Clipper	PowerIndex	
CoW Protocol	S.finance	
Cofix	Saddle	
Convergence	Sakeswap	
Curve	Shell	
DDEX	Shibaswap	
DFX Finance	Smoothy Finance	
DODO	Sushiswap	
Defi Swap	Synthetix	
DefiPlaza	Tokenlon	
Futureswap	Unifi	
Gnosis Protocol	Uniswap	
IDEX	airswap	
Indexed Finance	dYdX	
Integral	hashflow	
Kyber	mStable	

Annex 2 - Gini and Token Distribution Score examples

In the example below we benchmark the ideal Gini index as 0.987. So a token will have at worst an index of 1 and at best an index of 0.987.

Gini coefficient for a selected Firm Related tokens (25/04/2023)

	INV	DOLA	DBR	cvxCRV	CRV	DAI	MKR	wETH
Top 50	0.992	0.995	0.994	0.997	0.991	0.977	0.981	0.987
Top 100	0.997	0.998	0.998	0.999	0.997	0.990	0.992	0.995
Top 200	0.999	0.999	0.998	0.999	0.999	0.996	0.997	0.998
Top 500	0.999	0.999	0.999	0.999	0.999	0.998	0.999	0.999
All holders	**0.999**	**0.999**	**0.999**	**0.999**	**0.999**	**0.999**	**0.999**	**0.999**
Formula	**6.2**	**3.8**	**4.6**	**2.3**	**6.9**	**17.7**	**14.6**	**10.0**
Score	**6.2**	**3.8**	**4.6**	**2.3**	**6.9**	**10**	**10**	**10**

We evaluate the score based on the Gini Coefficient for each asset according to the formula :

$$Token\ Distribution\ Score\ =\ min((1\ -\ Token\ Gini\ Index)\ *\ 10\ /\ (1\ -\ wETH\ Gini\ Index);10)$$

The quotation for each of the aforementioned asset would be the following :

- **INV** : 6.2 / 10
- **DOLA :** 3.8 / 10
- **DBR :** 4.6/ 10
- **cvxCRV :** 2.3 / 10
- **CRV :** 6.9 / 10
- **DAI :** 10 / 10
- **MAKER :** 10 / 10

Annex 3 : cvxCRV Token Score

Token Contract Address : 0x62b9c7356a2dc64a1969e19c23e4f579f9810aa7
Assessment date : May 11th, 2023

Component	Link	Score
Market Capitalization	https://dune.com/queries/2356777?token_address_t6c1ea=0x62b9c7356a2dc64a1969e19c23e4f579f9810aa7	6.98
DEX Trading Volume	https://dune.com/queries/2356672/3860322?token_address_t6c1ea=0x62b9c7356a2dc64a1969e19c23e4f579f9810aa7	0.66
Price Volatility	https://dune.com/queries/2356606/3860242?token_address_t6c1ea=0x62b9c7356a2dc64a1969e19c23e4f579f9810aa7	2.32
Token Distribution	https://dune.com/queries/2392823?d=4&q=erc20.+balance&token_address_t6c1ea=0xc02aaa39b223fe8d0a0e5c4f27ead9083c756cc2	1.81
Project Fundamentals	https://docs.google.com/document/d/12yTTzr2DcTBMYbA5NcMl97LlXYNKdGR1-kDLmQCXKV0/edit#	6.91
Token Utility	https://docs.google.com/document/d/12yTTzr2DcTBMYbA5NcMl97LlXYNKdGR1-kDLmQCXKV0/edit#	9.00

Total Asset Score

$$TAS = 6.98 * 0.2 + 0.66 * 0.15 + 2.32 * 0.15 + 1.81 * 0.1 + 6.91 * 0.2 + 9 * 0.2$$

$$TAS = 5.20 / 10$$

Annex 4 : stETH Token Score

Token Contract Address : 0xae7ab96520DE3A18E5e111B5EaAb095312D7fE84
Assessment date : May 11th, 2023

Component	Link	Score
Market Capitalization	https://dune.com/queries/2356777?token_address_t6c1ea=0xae7ab96520DE3A18E5e111B5EaAb095312D7fE84	10.00
DEX Trading Volume	https://dune.com/queries/2356672/3860322?token_address_t6c1ea=0xae7ab96520DE3A18E5e111B5EaAb095312D7fE8	10.00
Price Volatility	https://dune.com/queries/2356606/3860242?token_address_t6c1ea=0xae7ab96520DE3A18E5e111B5EaAb095312D7fE84	9.02
Token Distribution	https://dune.com/queries/2392823?d=4&q=erc20.+balance&token_address_t6c1ea=0xae7ab96520DE3A18E5e111B5EaAb095312D7fE84	7.06
Project Fundamentals	Risk Assessment stETH Collateral on FiRM	8.42
Token Utility	Risk Assessment stETH Collateral on FiRM	9.50

Total Asset Score

$$TAS = 10 * 0.2 + 10 * 0.15 + 9.02 * 0.15 + 7.06 * 0.1 + 8.42 * 0.2 + 9.5 * 0.2$$

$$TAS = 9.14 / 10$$

Annex 5 : gOHM Token Score

Token Contract Address : 0x0ab87046fbb341d058f17cbc4c1133f25a20a52f
Assessment date : May 11th, 2023

Component	Link	Score
Market Capitalization	https://dune.com/queries/2356777?token_address_t6c1ea=0x0ab87046fbb341d058f17cbc4c1133f25a20a52f	4.58
DEX Trading Volume	https://dune.com/queries/2356672/3860322?token_address_t6c1ea=0x0ab87046fbb341d058f17cbc4c1133f25a20a52f	0.28
Price Volatility	https://dune.com/queries/2356606/3860242?token_address_t6c1ea=0x0ab87046fbb341d058f17cbc4c1133f25a20a52f	10.00
Token Distribution	https://dune.com/queries/2392823?d=4&q=erc20.+balance&token_address_t6c1ea=0x0ab87046fbb341d058f17cbc4c1133f25a20a52f	10.00
Project Fundamentals	Risk Assessment gOHM Collateral on FiRM	7.47
Token Utility	Risk Assessment gOHM Collateral on FiRM	10.00

Total cvxCRV Asset Score

$$TAS = 4.58 * 0.2 + 0.28 * 0.15 + 10 * 0.15 + 10 * 0.1 + 7.47 * 0.2 + 10 * 0.2$$

$$TAS = 6.95 / 10$$

Annex 6 : CRV Token Score

Token Contract Address : 0xD533a949740bb3306d119CC777fa900bA034cd52
Assessment date : May 11th, 2023

Component	Link	Score
Market Capitalization	https://dune.com/queries/2356777?token_address_t6c1ea=0xD533a949740bb3306d119CC777fa900bA034cd52	10.00
DEX Trading Volume	https://dune.com/queries/2356672/3860322?token_address_t6c1ea=0xD533a949740bb3306d119CC777fa900bA034cd52	8.13
Price Volatility	https://dune.com/queries/2356606/3860242?token_address_t6c1ea=0xD533a949740bb3306d119CC777fa900bA034cd52	1.56
Token Distribution	https://dune.com/queries/2392823?d=4&q=erc20.+balance&token_address_t6c1ea=0xD533a949740bb3306d119CC777fa900bA034cd52	6.37
Project Fundamentals	Risk Assessment CRV Collateral on FiRM	9.21
Token Utility	Risk Assessment CRV Collateral on FiRM	9.25

Total Asset Score

$$TAS = 10 * 0.2 + 8.13 * 0.15 + 1.56 * 0.15 + 6.37 * 0.1 + 9.21 * 0.2 + 9.25 * 0.2$$

$$TAS = 7.78 / 10$$