Revised Risk Assessment of CRV FiRM Market (September '23)

TL;DR

Market	Total Asset Score	Collateral Factor	Liquidation Factor	Supply Ceiling	Daily Borrow Limit
CRV	8.31	**60%**	20%	10M DOLA	Borrow Paused

The RWG recommends a reduction in Collateral Factor in FiRM's CRV market, from 65% to 60%. We recommend all other market parameters to remain the same. See *CRV Market* section for more information.

Background

The CRV market is FiRM's most utilized market, with $23.54M in deposits and $7.69M in borrows, all coming from one user. This user currently has a borrow limit % of 50.24%, and has been actively managing their position during recent market turmoil. Since its inception, the CRV market has undergone several parameter adjustments via governance proposals detailed in the table below. This approach allows the Risk Working Group to propose periodic parameter adjustments to existing markets based on a variety of factors including utilization of the market, changes in risk profile of the underlying asset, etc. Proposed changes might include adjustments in collateral factors, daily borrow limits, liquidation factors, and market supply ceilings and are made to encourage a behavior for existing and new users in the interest of maintaining stability and security for the platform.

CRV Market-related proposals passed through Inverse Finance Governance are presented in the table below. Liquidity figures are from DeFiLlama.

Proposal #	Date	Action	On-Chain Liquidity*
95	March 15	CRV Market Launch	$25M
108	May 14	CRV Market Parameter Increases	$32.9M
110	May 27	CRV Market Parameter Increases	$35.5M
124	August 9	CRV CF Reduction	$33M
127	August 23	CRV Market Pause	$27M
Present Day	October 2	CRV CF Reduction	$26.3M

Methodologies

Asset Scoring Model

The Analytics Working Group, in close collaboration with the Risk Working Group, has devised a comprehensive, in-house [asset scoring model](#). This framework evaluates the relative "risk" of any asset, using wETH as a benchmark, by considering six essential factors:

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

We derive the Total Asset Score (TAS) by using the following formula :

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

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. As we build out a registry of TAS for a variety of collateral options and match them with findings from other risk profiling frameworks and methodologies, the RWG will be able to rely more and more on the Asset Scoring Model.

RWG Risk Assessments

Risk Assessments conducted by the Risk Working Group (RWG) serve to identify, evaluate, and prioritize risks associated with a specific entity, protocol, collateral, or initiative. The purpose of these assessments is to provide a comprehensive and objective analysis of potential risks and their potential impact on Inverse Finance. This information can then be used to inform risk management strategies and decision-making processes, helping to mitigate or minimize the identified risks. Past assessments include:

- 📄 Risk Assessment CRV Collateral on FiRM
- 📄 Revised Risk Assessment of CRV and cvxCRV FiRM Markets (May '23)

Parameter Recommendations

Parameter recommendations for new markets and changes to existing markets on FiRM are the end result of RWG Risk Assessments and include suggested values for various risk parameters such as the supply ceiling, the collateral factor, daily borrow limit, the liquidation factor, etc. These recommendations serve as a starting point for an informed conversation amongst core contributors and community members alike of Inverse Finance DAO. By providing clear parameter recommendations, the RWG helps to ensure that new markets added to the FiRM protocol are appropriately risk-managed and able to operate in a safe and sustainable manner. This helps to protect the protocol and its users from potential losses and enables the protocol to continue to provide innovative and valuable fixed-rate lending services to the DeFi community.

CRV Market

Asset Scoring Model

September 15th, 2023: The RWG evaluated CRV making use of our in-house comprehensive asset scoring model. The TAS came out to be 8.31, an 0.15 increase from when CRV was last assessed on May 19th, 2023 and scored 8.16. Notably, there has been an increase in Token Distribution score, from 6.33 to 7.95. A breakdown of the Total Asset Score (TAS) follows:

Component	Link/Rationale	Score
Market Capitalization	MCS=min(10, (CRV Supply * CRV Price * 200) /(wETH Supply * wETH price)	10
DEX Trading Volume	TVS =min(10, (30 Day Avg Token Trading Volume * 200 / 30 Day Avg wETH Trading Volume)	8.42
Price Volatility	PVS =min(10, 10 - (Token Log Price Volatility / wETH Log Price Volatility) * 9)	3.73
Token Distribution	Token Distribution Score = min((1- Token Gini Index) * 10 / (1 - wETH Gini Index);10)	7.95
Project Fundamentals	📄 Risk Assessment CRV Collateral on FiRM - See Protocol Analysis, and Audits & Bug Bounties Sections	9.21
Token Utility	📄 Risk Assessment CRV Collateral on FiRM - See Collateral Analysis Section	9.25

Total Asset Score

$$TAS\ =\ 10 * 0.2\ +\ 8.42 * 0.15\ +\ 3.73\ * 0.15 + 7.95 * 0.1 + 9.21 * 0.2 + 9.25 * 0.2$$
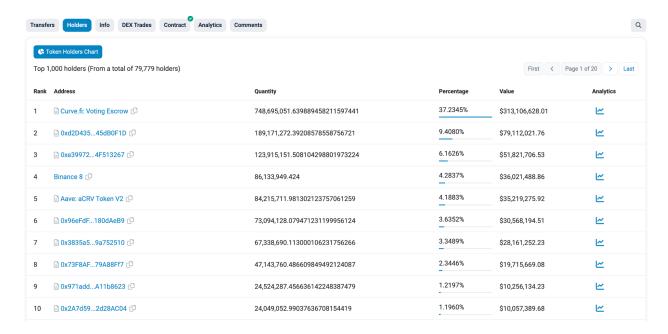
$$TAS\ =\ 8.31/\ 10$$

CRV scores poorly in *Price Volatility.* A low score in price volatility suggests that CRV price experiences significant fluctuations or instability compared to the benchmark (wETH). This

volatility indicates a higher level of risk associated with CRV's price movements, which is studied below.

Holders

CRV Contract Address:
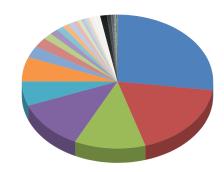https://etherscan.io/token/0xD533a949740bb3306d119CC777fa900bA034cd52

From the holders table on Etherscan, we notice deep Curve liquidity on CEXs. Binance is the 4th largest holder with 86M CRV. Outside the top 10, OKX ranks 14th with 23M CRV.

Liquidity

The Curve CRV/ETH LP was the deepest on-chain liquidity source for CRV prior to the July exploit. The LP was vulnerable to the bug discovered to be present in older versions of the Vyper compile and was drained alongside other Curve pools. It has since been deprecated and replaced with the triCRV LP, composed of crvUSD, wETH, and CRV. As of September 21st, 2023, the triCRV has TVL of $18.1M and is by far the deepest on-chain pool. Data collected of triCRV stakers on Convex Finance can be accessed here: ☒ triCRV_ LP_Stakers_Convex.xlsx

Total LP Balance	651323.6702
LP Token Value ($)	27.09
TVL	$17,644,358.23
Top 3 Addresses (%)	57.30%
Top 10 Addresses (%)	89.10%
Top 50 Addresses (%)	99.67%

# Addresses above $100,000	15
# Addresses above $50,000	22
# Addresses above $10,000	42

Analysis suggests CRV liquidity distribution is poor and is thus an additional cause for concern. The triCRV LP is less than 2 months old so one could suggest more time be given before drawing such a conclusion.

Slippage Sims

CRV FiRM Market Liquidation Factor is 20% and user's current position is 47,143,760 CRV, hence 9,428,752 CRV would be liquidatable if position goes underwater. Even utilizing the optimal route (CRV->crvUSD->DOLA), slippage for liquidators is estimated to be ~38% (shown in last entry of the table below).

Trade	CRV	crvUSD	DOLA	Slippage
$100,000	238993	99737	100006	0.01%
$200,000	477987	199466	199980	-0.01%
$400,000	955974	378852	379762	-5.06%
$600,000	1433962	551940	553188	-7.80%
$800,000	1911949	714758	716288	-10.46%
$1,000,000	2389937	869723	871482	-12.85%
$2,000,000	4779874	1526020	1528398	-23.58%
$3,945,187	**9428752***	**2452508**	**2454843**	**-37.78%**

The ensuing price impact for a liquidation event incurring a 38% would be significant enough to cause a liquidation cascade and leave lending protocols such as FiRM with high odds of incurring bad debt.

Parameter Recommendations

Based on the findings of our research presented above, the RWG recommends the CRV market's collateral factor be reduced from 65% to 60% via a governance proposal. The present day liquidity picture is still a cause for concern as on-chain liquidity remains shallow and in the hands of few liquidity providers. If one or more were to remove their funds from the triCRV LP, the situation could deteriorate rapidly. Because of this, we recommend any future increase in market parameters or new liquidity in the market be carefully evaluated. Were the liquidity

situation to worsen, RWG may recommend additional parameter changes to further bolster the security of the market.

Assuming user does not add collateral to their position or repay their loan, the change in CF will have the following affect on their active position (assuming CRV price of:):

Wallet	Collateral		Borrowed (DOLA)	65% CF		60% CF	
	CRV	$		Borrow Health	Liquidation Price	Borrow Health	Liquidation Price
0x7...5428	47,143,760	23,548,308	7,689,209	50.24%	0.251	54.42%	0.272

Regular monitoring of market dynamics, liquidity, and price stability is essential to identify any emerging risks or potential disruptions. Ongoing surveillance and analysis will allow prompt actions to address any issues that may arise. Periodic stress testing of the market under different scenarios should be conducted to assess the resilience of the system and evaluate the impact of increased borrowing activities. Stress testing helps identify vulnerabilities and potential risks that may not be evident in normal market conditions.

Please note that this document serves as a risk assessment and does not constitute final decisions or policy changes. The recommendations should be reviewed and approved by the appropriate stakeholders before implementation.