



Tender.f

Undercollateralized Leverage for DeFi



TABLE OF CONTENTS

Introduction	3
Problem Statement	4
Solution	6
Implementing Leverage	8
Liquidation	10
Use Cases	14
Market Analysis	16
Revenue Model	17
Token and DAO Details	18
Team and Vision	19
Roadmap	20
Website and Contact Information	22



INTRODUCTION

DeFi money markets such as Compound, Aave, and others have developed into fundamental platforms for the decentralized economy, handling billions of dollars in TVL (Total Value Locked) and hundreds of millions in daily transaction volume. However, the anonymous and permissionless nature of DeFi money markets has thus far necessitated the use of “overcollateralization” throughout the ecosystem: Users who wish to borrow a value amount of Asset A must first supply the protocol with an equal or greater value amount of Asset B. This collateralization requirement ensures liquidity providers remain whole in the case of default or rapid asset devaluation through automatic and trustless liquidation of the collateral assets.

While asset overcollateralization is currently necessary for the sustainable and secure operation of existing DeFi money markets, it is also a significant stumbling block in the development of mature capital markets in the decentralized economy. Without the ability to access true leverage (borrowed capital that may be obtained without providing an equal amount of capital to be used as collateral) market actors are limited to only the amount of capital they can supply. Therefore millions of users, and potentially billions of dollars in capital value, remain off-chain in accounts at banks, centralized exchanges, and broker-dealers, firmly locked in the world of traditional finance where users can access fairly basic offerings like simple leverage, derivatives, and borrowed capital that are simply not available in the current DeFi paradigm.

In summary, sustainably providing undercollateralized leverage in a decentralized paradigm of permissionless access to capital, without creditworthiness checks, a real-world identity, or other methods of risk management, is challenging - however, such a service is clearly necessary for the development of the decentralized economy into a mature financial services industry able to challenge centralized financial operators like banks and CEXes. This litepaper will demonstrate the solution Tender.fi has developed in response to the undercollateralization problem, how that solution works, and the new and compelling use cases such a solution unlocks for DeFi users.



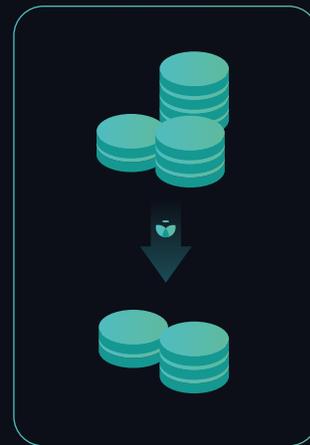
PROBLEM STATEMENT

Undercollateralized loans and leverage, or the ability to borrow capital without first providing an equal amount of capital to secure the loan, is the major missing piece from traditional finance that has yet to be implemented in DeFi.

Collateral
Deposited Assets



BORROWING / LENDING
PLATFORM



Borrowed Assets

- Less than 100% of the collateral value
- In custody of the user

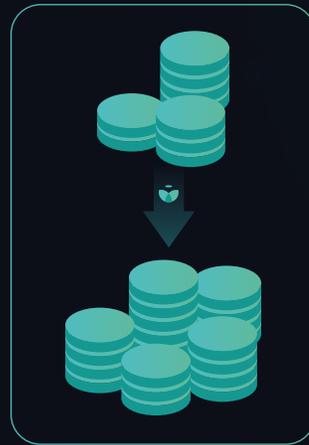
Presently, major DeFi money markets like Compound, Maker, and Aave rely on over-collateralization to secure their loans and CDPs (collateralized debt positions). While these money markets provide a valuable service by allowing users to transfer their capital into different assets without requiring the sale of their original holdings, the inability to borrow without collateral restricts their ability to provide basic financial services.



Collateral
Deposited Assets



BORROWING / LENDING PLATFORM



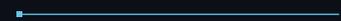
Borrowed Assets

- More than 1x of the collateral value

Default Risk

- Assets must remain in shared custody with the protocol to allow liquidation

Undercollateralized borrowing in DeFi is currently inhibited by the inability to account for default risk. For instance, the risk of a Sybil attack prevents decentralized money markets from assessing the creditworthiness of an anonymous user; there is currently no way to reclaim or liquidate assets provided to the user once such assets have been transferred to the user's wallet. So what can be done to provide users access to undercollateralized capital while managing default risk without sacrificing DeFi fundamentals such as anonymity and permissionless access?





SOLUTION

Collateral
Deposited Assets



DEFI MARGIN ACCOUNT



TENDER FINANCE



The undercollateralization problem will be resolved through the creation of smart contract margin accounts. Users are provided assets controlled by a wallet-like smart contract.



DEFI MARGIN ACCOUNT



WHITELISTED DEF PROTOCOLS BY



NFTs, Trade, Stake, Options, etc.

The smart contract holds those assets in custody and acts as a margin account for the users, enabling them to execute whitelisted transactions across a variety of existing DeFi protocols, including DEXes, NFT markets and liquidity pools, while maintaining control of the assets, enabling liquidation should a loan become unhealthy – as determined by the immutable code of the smart contract. By enforcing strict limits on what can be done with loaned assets in the smart contract, default risk is mitigated and assets may be safely loaned to users without requiring 100%+ collateralization levels.



Implementing Leverage

Before taking out a loan, a user must deposit collateral into the protocol's liquidity pools. When the user (originator) initiates a loan for the first time, a new smart contract is created on the blockchain corresponding to the user's originating wallet address. This contract will contain functions for each whitelisted transaction and store asset balances within the contract.

The originator of this smart contract may call the `borrow()` function to borrow tokens from the protocol. Interest is charged on the amount borrowed at each block. The originator may borrow more funds in the contract margin account than originally deposited in the protocol, but no funds may leave the contract margin account except through a supported transaction.

Funds within the contract margin account may be used for staking, liquidity provisioning, swapping to whitelisted tokens, NFTs, derivatives, and so on. Every whitelisted asset must be liquid and have a market price available at every block. This allows the protocol to determine if the loan is healthy, and liquidate assets if necessary.

The loaned funds must be repaid to the protocol before the investor may realize a profit. Once all funds are repaid, the investor may send the remaining assets in the contract margin account to their originating wallet address.

Collateral Quality

Not all collateral is equal. The quality of a collateral asset is a function of its price, liquidity, price volatility, and liquidity volatility. Collateral quality will be quantified by assigning a dynamic Collateral Asset Ratio (CAR) to the value of each collateral asset. For example, a stablecoin may have a CAR of 1.00 because its price and liquidity are stable. By contrast, WBTC may have a CAR of 0.95 because its price and liquidity are less stable. This approach allows us to accept more volatile assets as collateral by discounting their collateral value (e.g., UNI, MKR, and APE).

If a collateral asset's price or liquidity becomes more volatile, the CAR may decrease to reflect the greater risk the asset poses to the protocol. This protects the protocol during periods of market stress. Conversely, a collateral asset's price and liquidity may become less volatile over time, thus increasing its CAR.

Collateral Value

The collateral value is a function of each collateral asset's price and collateral ratio.

$$\text{assetQuantity} \times \text{assetPrice} \times \text{collateralAssetRatio} = \text{collateralValue}$$

The collateral value is a key parameter in the leverage system.

Loan Value

The loan value is a product of the borrowed asset's price and quantity.

$$\text{borrowedAssetQuantity} \times \text{borrowedAssetPrice} = \text{loanValue}$$

Borrowed assets are used to open a margin position.

Margin Position Value

The margin position value is a product of the margin position's asset price and quantity.

$$\text{marginPositionAssetQuantity} \times \text{marginPositionAssetPrice} = \text{marginPositionValue}$$

If the margin position value decreases enough, the margin position will be (partially) liquidated to maintain protocol solvency.

Margin Fraction

The margin fraction indicates the health of a margin position. The margin fraction is a function of the collateral value, margin position value, and loan value.

$$([\text{collateralValue} + \text{marginPositionValue}] / \text{loanValue}) = \text{marginFraction}$$

When the margin fraction falls below 0.15, partial liquidation begins; if it falls below 0.10, then full liquidation begins.



Liquidation

Each contract contains a liquidate() function. This function may be called by anyone. It checks if the liquidation condition is met before proceeding with the liquidation. If the liquidation condition is met, liquidate() sells the assets in the contract margin account and distributes the remaining funds according to the distribution algorithm.

DEFI MARGIN ACCOUNT



The distribution algorithm will repay funds loaned from the protocol's pools. The contract will contain logic to sell each token in the margin account at market price and repurchase the loaned tokens. The caller of the liquidate() function will be awarded 2% of the transaction value of each liquidation transaction, 2% will be distributed to the stakers of the \$TENDIE token, 2% will be sent to the protocol DAO treasury to fund future development, and, finally, any assets remaining after full liquidation will be sent to the protocol insurance fund.



Partial Liquidation System

The protocol's partial liquidation criteria is met when the margin fraction falls below 0.15. When `liquidate()` is called the protocol will proceed as follows, for every block and for each future block:

- Set order value to 10% of margin position value
- Bound order value from below by $\min(2000 \text{ USD}, \text{margin position value})$
- Bound order value from above by the maximum of the liquidation value remaining
- Multiply order value by $\text{uniform}(0.5, 1.5)$
- Bound order value from above by margin position value
- Decrease maximum liquidation value remaining by order value

Full Liquidation System

The protocol's full liquidation criteria is met when the margin fraction falls below 0.10. When `liquidate()` is called the protocol will proceed as follows, for every block and for each future block:

- Set order value to 100% of margin position value
- Decrease max liquidation value remaining by order value

Example: Partial Liquidation

Bob deposits 10,000 USDC as collateral and borrows 50,000 USDC to buy 1 WBTC @ \$50,000. Bob is now 5x leveraged. The price of WBTC suddenly falls to \$47,000. Bob's margin position value has decreased by \$3,000. His margin fraction is now 0.14, below the partial liquidation threshold of 0.15. A liquidator bot calls `liquidate()` on Bob's margin account smart contract. Bob's margin position WBTC is partially liquidated every block by ~10% notional until his margin fraction is above 0.15:

Block #1, Transaction #1:

Collateral: 10,000 USDC; **Loan:** 50,000 USDC; **Margin Position:** 1.0 WBTC

Margin Fraction: 0.14

Liquidation Order: 0.10 WBTC @ \$47,000 = 4,700 USDC

Liquidation Fee = 6% * 4,700 USDC = 282 USDC

Loan Repayment = 4,700 USDC - 282 USDC = 4,418 USDC

Block #2, Transaction #2:

Collateral: 10,000 USDC; Loan: 45,582 USDC; Margin Position: 0.9 WBTC

Margin Fraction: 1.147

Liquidation Order #2: 0.09 WBTC @ \$47,000 = 4,230 USDC

Liquidation Fee = 6% * 4,230 USDC = 253.8 USDC

Loan Repayment = 4,230 USDC - 253.8 USDC = 3976.2 USDC

Block #3:

Collateral: 10,000 USDC; Loan: 41605.8 USDC; Margin Position: 0.81 WBTC

Margin Fraction: 1.155

After 2 blocks the partial liquidation is complete. The margin fraction is no longer below the liquidation threshold.

Example: Full Liquidation

Bob deposits 10,000 USDC as collateral and borrows 50,000 USDC to buy 1 WBTC @ \$50,000. Bob is now 5x leveraged. The price of WBTC suddenly falls to \$44,000. Bob's margin position value has decreased by \$6,000. His margin fraction is now 0.08, below the full liquidation threshold of 0.10. A liquidator bot calls liquidate() on Bob's margin account smart contract. Bob's margin position WBTC is fully liquidated.

Block #1, Transaction #1:

Collateral: 10,000 USDC; Loan: 50,000 USDC; Margin Position: 1.0 WBTC

Margin Fraction: 0.08

Liquidation Order: 1.00 WBTC @ \$44,000 = 44,000 USDC

Liquidation Fee = 6% * 44,000 USDC = 2,640 USDC

Loan Repayment = 44,000 USDC - 2,640 USDC = 41360 USDC

Block #1, Transaction #2:

Collateral: 10,000 USDC; Loan: 8,640 USDC; Margin Position: 0.0 WBTC

Collateral Liquidation Order: 10,000 USDC = 10,000 USDC

Liquidation Fee = 6% * 10,000 USDC = 600 USDC

Loan Repayment = 10,000 USDC - 600 USDC = 9,400 USDC

Remaining Collateral = 9,400 USDC - 8,640 USDC = 760 USDC

After 1 block and 2 transactions, the full liquidation is complete. The remaining collateral is added to the protocol insurance fund.



Insurance Fund & Insolvency

Our protocol prevents the insolvency of margin positions in several ways. First, through a strict selection of collateral assets, battle-tested financial modeling, and the dynamic re-assessment of collateral quality. Second, through a partial and full liquidation system. And lastly, through the insurance fund. As long as the other systems prevent insolvency the insurance fund will grow. If those systems fail, the insurance fund will act as a backstop and make liquidity providers whole. If the insurance fund is depleted then losses will be socialized proportionally to depositors.



Use Cases

Tender.fi uses smart contract margin accounts to provide users secure and decentralized leverage for audited investments across DeFi. Tender.fi will enable leverage for a variety of whitelisted protocol interactions, including liquidity mining, yield farming, staking, swapping, and lending, while ensuring leveraged assets can be liquidated at any time according to the transparent terms of the smart contract margin account - thus eliminating default risk. Some example use cases for Tender.fi are:

Some example use cases for Tender Finance are:

Leveraged Staking - 5x

Deposit \$1M USDC into a smart contract wallet. Borrow \$5M ETH and stake on Lido.fi to yield farm with a 5x higher return.

Leveraged NFT Swap - 3x

Deposit 50 ETH into a smart wallet. Borrow 150 ETH. Buy a Bored Ape NFT at 33% down to gain access to exclusive events and airdrops, or to speculate on price appreciation.

Leveraged Yield Farming - 2x

Deposit 2 WBTC into a smart wallet. Borrow 15 ETH and \$45k USDC. Deposit these tokens into an ETH-USDC liquidity pool on a DEX to earn yield. Stake LP tokens on approved yield farm to boost yield.

Collateralizing NFTs

NFTs are an integral part of the decentralized economy but they are not instantaneously liquid in the same way as fungible tokens. This presents a problem in case of imminent insolvency. How can an NFT be liquidated? Here are a few possible solutions:

- Require a third party to be a buyer of last resort and collateralize the NFT in case of liquidation. In return, the buyer of last resort will receive the NFT at the collateralization value during liquidation, which will be at a steep discount to the market value, say, 70% market value.
- Require an independent NFT lending protocol to be the buyer of last resort.
- Require an independent NFT perpetual swap market with sufficient liquidity. When liquidating, the Tender.fi protocol will list the NFT for sale at a discount to floor value and open a short position on the NFT's perpetual swap market. When the NFT is sold the short position will be closed.

There are several approaches for collateralizing NFTs and other exotic asset types. That said, there are nuances and for this reason, exotic asset types will be part of the last phase of our development roadmap.



MARKET ANALYSIS

While the frontier of undercollateralized loans is beginning to be explored in DeFi by the likes of Alpha Homora and DyDx, each platform only addresses a small portion of what's possible in the decentralized economy: Alpha Homora for leveraged yield farming, DyDx for leveraged long and short positions. CEXes offer traditional leverage and margin accounts but at the expense of privacy and centralization, and do not integrate with the booming decentralized economy. Only Tender.fi provides multi-protocol decentralized margin accounts (i.e. leverage obtained on Tender.fi can be used on many different protocols and platforms throughout DeFi), facilitating leveraged yield farming, long/short positions, swapping, NFTs, derivatives, options, staking and more. The invention of decentralized margin accounts which can be used throughout DeFi positions Tender.fi as a leader in the growing segment of undercollateralized DeFi protocols.

Undercollateralized leverage currently makes up about \$1.6B out of the entire estimated \$80B total value locked in DeFi⁽¹⁾. This means undercollateralized leverage is only about 2% of the TVL in DeFi. Comparatively, FINRA estimates that margin trading and leverage accounts represent 80-90% of traditional financial account values⁽²⁾. What does this mean? DeFi's undercollateralized leverage volume is severely underdeveloped compared to traditional finance and Tender.fi is uniquely positioned to grow and capture this value as the volume of undercollateralized leverage reaches parity with the traditional financial industry.

(1) <https://www.defipulse.com/>

(2) <https://www.finra.org/investors/learn-to-invest/advanced-investing/margin-statistics>



REVENUE MODEL

Tender.fi will have revenue generation built into the protocol. All proceeds from the protocol will be distributed to holders of the protocol's utility and governance token.

A list of revenues sources is described below:

- Interest on margin loans.
- Liquidation fees.
- B2B deals to whitelist assets.
- B2B deals to provide leverage for institutional partners.
- Fees on certain types of transactions, e.g., flash loans, swapping, staking, liquidity pools



TOKEN AND DAO DETAILS

Tender.fi will use an advanced utility token called \$TENDIE, which will grant benefits to amplify returns when using the protocol, including:

- Higher loan-to-value ratios (LTVs) and deposit rates
- Lower fees across the protocol
- 100% of staking fees distributed to token holders as well as gamified liquidity pools
- Additional leverage for certain whitelisted assets

Furthermore, holders of the utility token will have the opportunity to participate in protocol governance once the platform has matured into a community-operated DAO.

The token holders will vote on policy decisions, including:

- Selecting whitelisted assets.
 - Setting and paying bug bounties.
 - Selecting supported chains.
 - Seeking security audits.
 - Seeking independent risk audits.
-



TEAM AND VISION

We are a team of entrepreneurs, seasoned technology professionals, DeFi investors, and crypto natives who envision a future of frictionless, interconnected decentralized finance. We believe that undercollateralized leverage is the last major component of traditional finance that has yet to be implemented in DeFi, and creating it will catalyze an enormous boom in the decentralized economy. A world of opportunity is waiting for efficient DeFi capital markets. Undercollateralized leverage is the next step in building the new economy, decentralized and powered by math, code, and community.



ROADMAP

Tender.fi has a 3-stage roadmap beginning with launching a simple DeFi lending market, deploying undercollateralized leverage protocol, adding multi-chain and cross-chain functionality, aggregating existing money markets, and finally building advanced financial products that do not yet exist, such as interest rate swaps and other financial derivatives.

Phase 1: Lending Market

- Pre-planning and Formation
 - Team Building
 - Technical Architecture
 - Design and Marketing
- Protocol Architecture
 - Front-End Development
 - Preliminary Work on Compound Fork
- Shipping the MVP on Testnet. Testing.
- Deploy on METIS as their primary money market - May 2022

Phase 2: Margin Account

- Research & Development
 - Smart Contract Margin Account Development
 - Further Front-End Development
 - Smart Contract Auditing
- Soft Launch
 - Alpha Launch - Invite Only
 - Beta Launch - Limited TVL & Borrow
 - Bug Bounty Program
- Public Launch
 - Issue Utility Token
 - Launch Community Governance DAO
 - Launch Token Staking
 - Launch insurance Fund



ROADMAP

Phase 3: Expansion

- Expand Community
 - Launch Trading Competition
 - Launch Referral Program
 - Engage Community in Governance
- Expand Supported Assets
 - Additional Assets, Investments, and Transaction Types
 - ▾ e.g., NFTs, Staking, Options, Derivatives, Insurance
 - Support Derivatives and Advanced Financial Products
- Expand Supported Chains
 - Deposit and Borrow on Multiple Chains
 - Deposit and Borrow Across Chains
 - Aggregate Lending Markets Across Chains
- Expand to Institutional Audience
 - Launch Institutional Incentive Program



WEBSITE AND CONTACT INFORMATION

- ✉ Contact: investors@tender.fi
- 🌐 MVP: app.tender.fi
- 🐦 Twitter: [@Tender_fi](https://twitter.com/Tender_fi)
- 📩 Telegram: t.me/tender_fi
- 📄 Docs: <https://docs.tender.fi>