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Systemic Contagion Channels between Decentralized Liquidity Pools and Global Banking Infrastructures

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Abstract

This research examines the systematic contagion channel within decentralized liquidity pools (DeFi) that is connected to the banking system. It's mainly focused on the various variables related to market concentration, (HHI), (VB) noted as Variable borrow rate, (De) represents the number of depositors, (bo) represents the borrower among the cryptocurrencies used by "DAI, USDC (USD Coin), WBTC (Wrapped Bitcoin), USDT (USD Tether)". Here, the model is used as an Autoregressive Distributed Lag (ARDL) to determine the relationship between the variable and liquidity risk in the Defi lending protocol, such as Aave. H1(It is interconnected to DeFi financial products transmit through systematic risk to the global banking system) Supported which is shows the interconnected Defi Financial product transmits the risk to the global banking system The value of DAU as (-0.707), and USDT as (-0.400), representing the market concentration influenced the depositor liquidity risk. The other types of Hypotheses, H2(examines whether leverage amplification through flash loans and collateralized borrowing increases financial instability between DeFi and traditional banking systems), as validated means, provide results: USDT at 2.945 and WETH at 0.438, which are also defined by the leverage mechanism among flash loans, contributing to financial stability. Accepting H3 implies that R2 is higher for USDT (0.039) and WETH (0.106), indicating liquidity interdependence. To compare USDC and WBTC, the study obtained an R^2 value that was low, indicating low interdependence. After the H4(evaluates whether shared technological dependencies between DeFi protocols and traditional financial systems intensify systemic contagion) is accepted, the finding of no significant relationship among the technological dependencies should be reported. Based on all the analysis, the ARDL model approach is suitable for all processes, with the analysis revealing the short- and long-term relationships among mixed stationary processes with I (0) and I (1).

Keywords: Systemic Contagion, Decentralized Finance (DeFi), Liquidity Risk, Autoregressive Distributed Lag (ARDL), Leverage Mechanisms, Market Concentration, Regulatory Frameworks.

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Introduction

The development of decentralized finance protocols related to alternative types of landscape within the financial market, consists of peer-to-peer transactions based on liquidity ratios connected to the traditional banking sector (Maruyama et al., 2020; Nzomiwu & Okoye, 2025). To integrate the various types of decentralized networks with the global banking infrastructure, including contagion channels and pathways within the systematic process of interconnected systems. The DeFi ecosystem has varying sizes and complexities, and is accompanied by a new level of risk, specifically that DeFi markets should be interconnected with the traditional banking system (Qi et al., 2022; Olanrewaju, 2025). The decentralized patterns are used to enhance liquidity and provide offers through efficiency, explore the global banking infrastructure related to risk, and leverage trading with smart contracts and financial products through decentralized networks. During this period, identify market stress through the volatility and contagion channels used to mitigate risk, and analyze financial stability across both sectors. This research mainly explores the potential difference in the systemic contagion between the liquidity pools and the traditional banking system (Adeloye, 2025). This also helps to determine the transmission channel focused on regulators to develop various strategies to improve resilience in both the traditional financial system.

Key Contribution

- This research mainly focused on identifying the maps and systematic approach of the contagion channel between the decentralized liquidity pool (DeFi) and the traditional banking system, also mentioning the risks posed to interconnectedness.
- To analyze the financial mechanisms related to smart contracts among the trading, which is also connected to the global banking infrastructure, during the period of market volatility.
- This research mainly examined how risk in Defi should affect the traditional banking system, which is connected to understanding the impact on global financial stability.
- This research provides various recommendations related to the framework, identifying the risks of integrating with DeFi within the rational financial system, and also ensuring stability between both sectors.

This research consists of various sections. Section I introduces the research, Section II presents the literature review, previous work, including the problem statement, research objective, research hypothesis, and hypothesis development. Section III explained about research methodology, an architecture diagram, data sources, variable measurement, Data through the pool balance sheet, interpolation linkages, and simulation setup. Section IV explained the model analysis with a robustness check using 1-hour data, the centrality of the six main pools over time, and the discussion. Section V explained the conclusion section, the main key findings.

Literature Review

This section describes previous work on decentralized finance and the new mechanism, and examines risks within financial markets, specifically through the liquidity ratio (Eichengreen et al., 2018; Bruno & Shin, 2015). Which helps to integrate the market status and capital allocation through traditional intermediaries. DeFi should account for contract risk amid liquidity fragmentation and protocol-level inefficiencies (Farzulla & Maksakov, 2026). The traditional level of the financial system includes systemic contagion and the interconnectedness and leverage that amplify risks (Novak & Burashnikov, 2021; Oben et al., 2026). Most of the research focused on the unique dynamic concepts in DeFi, which should represent the potential value of the new contagion channel through various algorithmic structures and integrated with decentralized platforms through centralized entities (Hemrit et al., 2023; Shahrour et al., 2025; Antonakakis et al., 2019). The contagion channel, one should examine the amplification mechanisms arising from interconnected financial products with traditional banks and institutional investors. Flash loans are triggered by various events that should affect the global banking system, leading to the liquidation of correlated assets (Kammoun, 2026; El Ibraqui et al., 2024; Torri & Giacometti, 2023). Another way is the interdependence between liquidity provision, influenced by the price discovery of crypto assets, and banks' holding and amplifying price validations, by a liquidity crisis (Macchiati et al., 2022; Chen et al., 2024). To introduce the new method, it should analyze the interconnection between decentralized and traditional finance, and the need for a comprehensive risk management analysis that accounts for the risks posed by the new contagion channels (Hausenblas et al., 2015; Radev, 2025).

Problem Statement

Integrating with decentralized finance (DeFi) in global banking poses challenges for understanding the systemic risk arising from interconnections. DeFi should provide various offerings through efficiency and liquidity, and also

introduce a new method channel used to transmit financial instability, with both decentralized and traditional systems. These structures include various types of financial products and leverage amplification mechanisms shared through technological dependencies. The main problem is the lack of a comprehensive framework for assessing and managing the risk. The effective regularity noted that risk management strategies should address the complex interplay between decentralized liquidity pools and the traditional banking system.

Research Objective

- To evaluate the various pathways through which financial instability is transmitted from DeFi to traditional banking systems.
- To analyze the various key roles that are interconnected to financial products, liquidity provision, technological dependency, and leverage amplification.
- To evaluate the potential impact of these contagion channels on financial stability, specifically during periods of market volatility.
- To analyze the regulatory insights and strategies that are interconnected with the integration of decentralized economics into the global economic system, and their insinuations for resilience and stability in both sectors.

Research Hypothesis

H1: It provides a significant relationship among the consistent products through DeFi, with the transmission link among the global investment sector.

H2: The leverage amplification in DeFi, through flash loans and collateralized borrowing, significantly contributed to financial unpredictability between the decentralized economics and traditional banks.

H3: The interdependence between DeFi and the global banking system increases price volatility and the risk of contagion during market stress.

H4: The shared technologies depend upon the DeFi protocol with the traditional types of finance system to create additional information through systematic contagion to increase financial issues..

Hypothesis Development

Hypothesis 1 provides the relationship between the interconnected financial products with decentralized liquidity pools and the transmission of systemic risk related to the banking system. DeFi platform helps improve the financial products, tokenized assets integrated with the traditional banking system, institutional investment and various services. The interconnected services help explore how global banking arises from DeFi, which involves counterparty risk associated with DeFi-based assets, impacting prices and market crashes in decentralized markets. This hypothesis suggests that the closer relationship between DeFi financial products and traditional banking should be greater, with the potential impacts of systemic risk on propagation affecting the stability of both sectors.

Hypothesis 2 describes the leverage amplification mechanism through DeFi with flash loan and borrowing, which contributes to the propagation of financial stability within the decentralized finance system, compared to the traditional banking system. The DeFi ecosystem allows users to use the funds for cryptocurrency analysis with regular constraints. Flash loans allow users to borrow large sums for a short period without collateral, using the capital to borrow large amounts with a short collateral period. These hypotheses are used to address the lack of regulations and the extreme level of leverage inherent in DeFi, which is used to amplify financial stability from decentralized markets into the traditional banking sector.

Hypothesis 3 explained the interdependence between liquidity and the DeFi platform and the global banking system, which increases the risk of contagion in the short term. During this period, to analyze market stress, corrections, or liquidity crises in DeFi ecosystems. These are all interconnected to various systems, cascading effects, with the margin cells in the traditional way of banking assets. The amplification of volatility, liquidity provision, increases the risk of contagion from financial instability in DeFi to the traditional banking sector, due to heightened market uncertainty. Hypothesis 4 explained how to share the technological dependencies of the Defi protocol with traditional financial systems. Which is used to create additional information through systematic contagion to increase the financial crisis. Compared to others, the traditional financial system involving digital assets or trading relies on the technology used to integrate DeFi networks.

Research Methodology

An architecture diagram about Systemic Contagion Pathways Between Decentralized Liquidity Pools and Global Banking Infrastructures

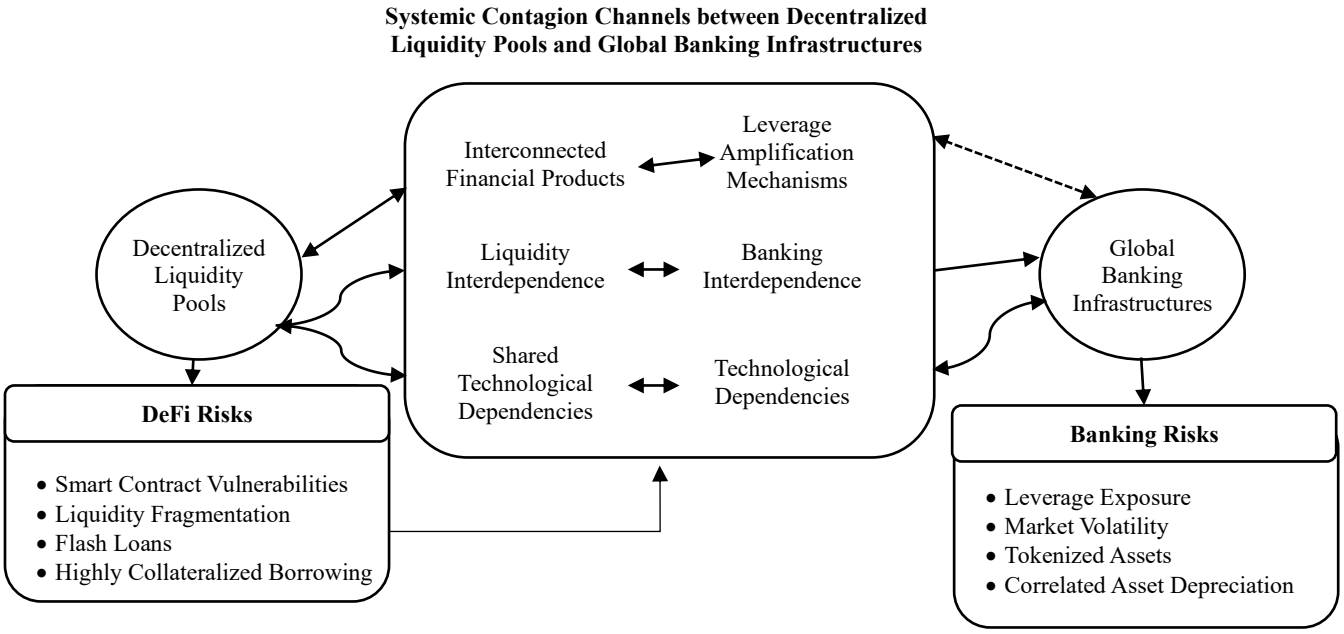


Fig. 1: Architecture Diagram Systemic Contagion Pathways Between Decentralized Liquidity Pools and Global Banking Infrastructures

To interpret the above diagram fig. 1 represents the architecture, explaining how risks are transmitted to the two systems connected with financial products, the leverage amplification mechanism, and technological dependencies. The connection between the various relations indicates the pathways among the contagion, which originates from the DeFi with smart contract vulnerabilities, liquidity fragmentation, flash loans spread through the global banking system. This is also interconnected to banking risk and consists of leverage exposure, market volatility, tokenized assets, and correlated assets.

Data Sources

The data source mainly focused on the Aave lending protocol, the largest lending protocol in DeFi, and measured it by total value locked (TVL). This lending protocol contains the total value of $11.38, Just Lead at $7.40, which compounds with $3.04 billion. The Aave provides the various services related to multiple blockchain concepts, it is the best popular type of large transactions. This study mainly focused on the WBTC, WETH, and DAI, USDC, and USDT expanded at WBTC as Wrapped Bitcoin, WETH as Wrapped Ether. The example as cryptocurrency approximately has the market size as 89% with Aave of jan 24,2022. These findings are mainly focused on the DeFi lending sector, connecting with the other types of protocols with similar types of mechanisms. Due to sample period of starts through Aave V2, which also ensures consistency among the various protocols. Aave should launch in December 2020 to reduce uncertainty across the various protocols. The data availability among the Aave landing protocol has the total amount borrowed, total supply, interest rate, and depositor and borrower available in blockchain concepts. The transaction data used by the GraphQL language. Blockchain concepts are open-source, allowing for the verification of data reliability and validity. This study mainly consists of collecting data on a 5-minute, hourly, and daily basis.

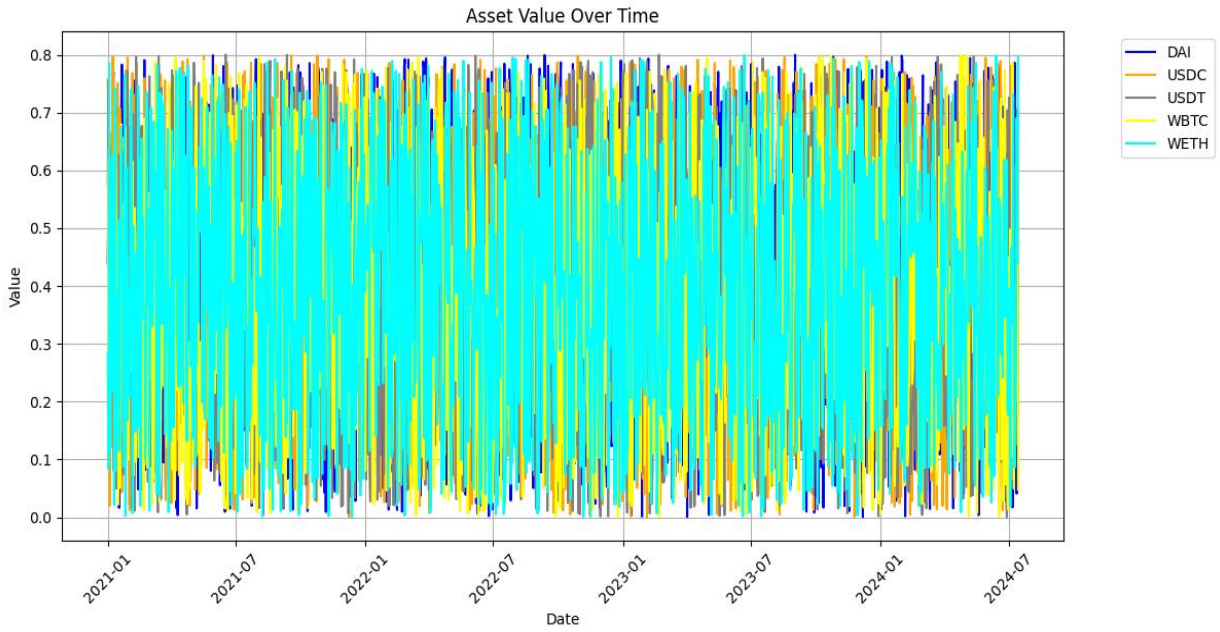


Fig. 2: Utilization Rate for Each Cryptocurrency in Aave

(Source: Which is defined the funding liquidity risk among the each pool on the Defi lending protocol, measured by the cryptocurrency from January 1, 2021 to August 1,2024).

Fig. 2 shows the utilization rates of various cryptocurrencies that come under the Aave protocol and then DeFi, from January 1, 2021, to August 1, 2024. The above graph represents liquidity risk, which includes different pools that help measure utilization rates, "DAI, USDC, USDT, WBTC, and WETH". This also shows the peak variation the utilization rate based on 2021 and 2023. The above peak should represent a reduction in borrower activity a lower level of liquidity risk. This also helps analyze funding liquidity and the associated risks in the DeFi lending ecosystem to suggest liquidity conditions.

Variable Measurements

In traditional banking and finance, various methods have been developed to measure funding liquidity risk in banks. However, these comprehensive measures, which rely on balance sheet analysis and loan classification, may not be applicable to DeFi lending. A commonly used metric in banking is the. Traditional banks and financial systems should follow various methods to determine funding liquidity and risk. According to various studies, comprehensive measures are related to balance sheet analysis for loan classification and are applicable through DeFi lending. The metrics are used to analyze the loan-to-deposit ratio. LDR is used to calculate how much of the loan is collected from the deposit funds. Funding liquidity management involves two types of primary risk, such as surplus risk due to insufficient funds. The other types of fund's lead to an analysis of the high interest rates. The Higher level of LDR should indicate the various approaches for active lending, measuring liquidity risk through banks. This study primarily focused on adopting utilization to assess funding liquidity risk in DeFi lending. The use of LDR comprises total deposits and total borrowings under the lending policy for each type of cryptocurrency on the Aave protocol. In this section consists of utilization of cryptocurrency as,

$$Utilizationrate_{i,t} = \frac{Total\ Borrow_{i,t}}{Total} deposit_{i,t} \qquad (1)$$

From the above equation (1) describes the $Total\ borrow_{i,t}$ represents the total amount of borrowed of cryptocurrency at the $i\ at\ time\ t$. $Total\ Deposit_{i,t}$ should represents the cryptocurrency at $i\ at\ time\ t$ in the lending pool.

Table 1: Variable Measurement

Variable	Notation	Measurement
Interest Rate	VB	To collect the data through interest rate in Aave, with the deposit rate, stable borrow rate, and variable borrow rate.
Market power of user	HHI	$HHI = s_1^2 + s_2^2 + \cdots .. + s_n^2$, form this s_i describes the percentage of cryptocurrency filed by the depositor I should compared to total lending pool.
Depositor	De	Depositor comes under the token format
Borrowers	Bo	Borrowers come under the lending token format

(Source: HTTPs://aave.com/docs/aave-v4/reference/big-decimal)

The above table 1 describes the various key measures used to assess the dynamics of the Aave Defi lending protocol. In this, the interest rate is also explained, VB should collect from the different rates among protocols. HHI should be used to calculate the Herfindahl-Hirschman Index (HHI), which is used to determine the concentration based on the share of the cryptocurrency with the depositor. It provides the guidance to the individual user in the lending pool. The Depositors and Borrowers, a token format is used. It's used to evaluate the structure, market conception, and liquidity ratio of the Aave platform.

Data through Pool Balance Sheet and Interpol Linkages

Fig. 3, describes the public availability of the transaction history, which is used to reconstruct the pool, the balance sheet with any desired structure. In this section, the study collects additional information on daily snapshots, the user's position relative to the graphical sections. The comprehensive list the user, will be represented by U The lending partner noted as DUI borrower represented by BUI. The balance sheet consists of the interest level, lending and borrower interests. The results of the fig. 3 below represent the dataset that should contain the daily position 422459 users across the 19 pools from January 1,2020 to June 30, 2023.

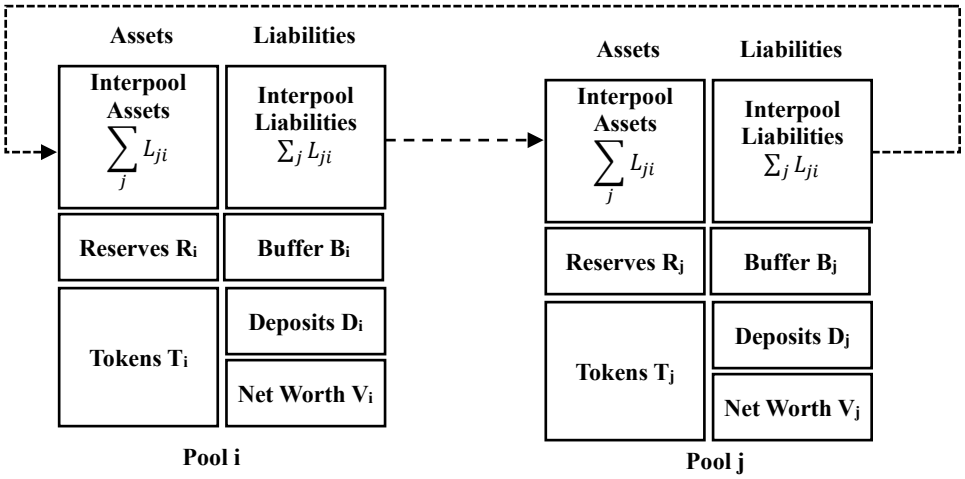


Fig. 3: Pool Balance Sheets and Interpool Linkages

Simulations Setup

The simulation setup should consist of the systematic contagion relationship among the DeFi, with the liquidity pool covered by the initial default pool and the affected pools. Both have depth and default among the net worth of each pool. The initial pool has a low liquidity ratio should be interconnected to the pool based on correlations. This can be identified by any default, based on liquidity impact and timestamp. Both metrics are used to assess the systematic risk involved in the contagion across the DeFi space markets. Here, various tools are used for this approach, such as Python, Numpy, and network analysis, to calculate and run multiple scenarios to visualize the defaults.

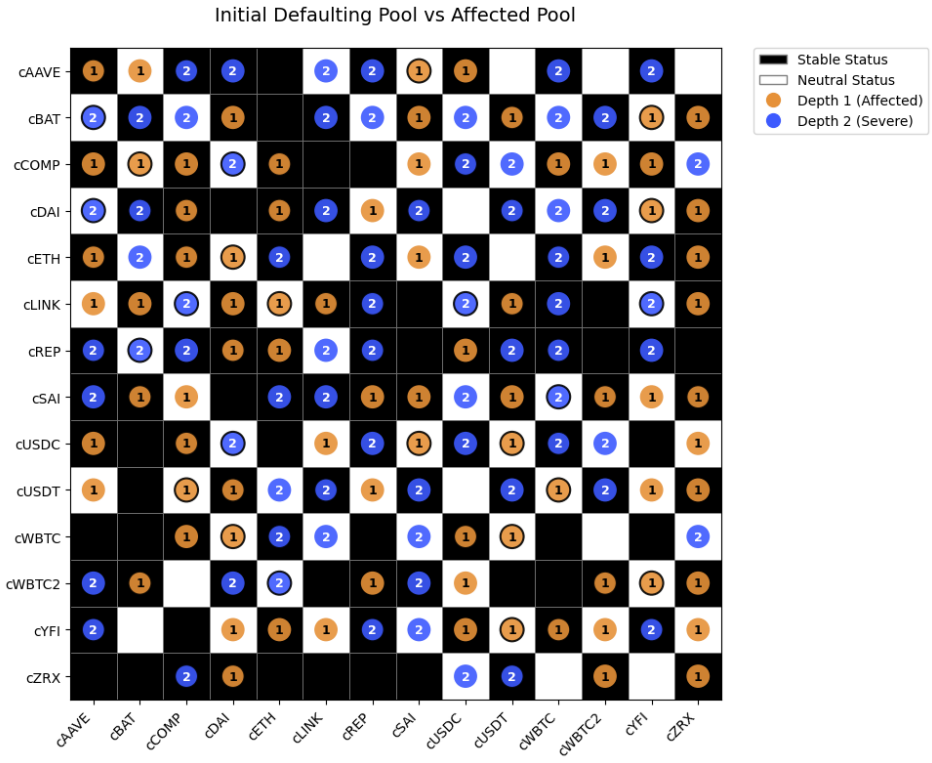


Fig. 4: Default Cascades on Sept 7, 2021

Fig. 4, the initial default pool should be indicated by the row, and the pools should be indicated by the column representations. The pools have negative values, which are represented as dots. The default pools are should be encoded with outer circle. The color values are representing means the pool should be affected. The above fig. 4 shows the matrix representation of the initial default pool types and the affected pool. Both are based on depth and default status. The depth should be represented by two types of classification, such as depth 1 and depth 2. Depth 1 should be represented by orange circles, and Depth 2 by blue circles. Both colors indicate the severity among the default status. Both are indicating the severe level of financial stress. The presence of various circles represents the systematic risk by one ripple stage that should affect across the multiple levels of interconnected pools with the potential among the broader instability in the system.

Analysis and Interpretation

Autoregressive Distributed Lag Model (ARDL)

This research used the model approach, specifically the Autoregressive Distributed lag (ARDL) model, to describe endogeneity and reverse causality issues related to investing in funding liquidity risk in Aave. This approach is mainly suitable for high-frequency time-series data, the arranged variables. This includes the lagged interest rate, which contains the predictor, the current utilization rate, and temporal structure among the reverse causality concerns. This model is used to analyze the various integration processes related to I(0) and I(1) and to avoid the complex decision-making required by dynamic relationships with DeFi lending protocols.

The ARDL model for this study can be defined as follows,

$$FLR_t = \alpha_0 + \sum_{i=1}^{P} \alpha_i FLR_{t-i} + \sum_{j=1}^{q_i} \beta_j VB_{t-j} + \ldots\ldots\ldots + \varepsilon_t \qquad (2)$$

Equation (2) above describes the current value of the funding, by the liquidity risk of the lending pool, with cryptography at time t.FLR_{t-i} should represent the value of the dependent variable with FLR. The independent variables are denoted as the borrow rate (VB), the market power of the user defined as (HHI), the depositors as (De), and the borrowers as (Bo).

Table 2: Descriptive Statistics (10-min data)

Cryptocurrency	Obs	Mean	Std. Dev.	Min	Max
DAI	1130397	0.802	0.090667	0.164	1
USDC	1130397	0.786667	0.106667	0.209	1
USDT	1130397	0.820333	0.107	0.1	1
WBTC	1130397	0.779333	0.138	0.189	1
WETH	1130397	0.758	0.138	0.03	1

Table 2 presents the 10-minute aggregated data supporting the acceptance of the research hypothesis. Hypothesis (H1), which provides the relationship between the financial products with the decentralized liquidity pools, combined with the transmission of systematic risk to the global banking infrastructure. In this stage, the study has to set the USDT value to 0.820333 and the DAI value to 0.802, which reflects the risk transmission. Accept (Hypothesis 2) H2, which provides significant validity among the observer data, specifically with WBTC and WETH, which have a lot of amplification mechanisms. Accept Hypothesis (H3), the result shows liquidity provision between Defi and the global banking system. Finally, to validate the V4 combined with the systematic contagion, WBTC and WETH provide the failure with the technologies that analyze the cascading effects in both DeFi and traditional finance. This also analyzes the systematic representation of the regularity framework with potential contagion effects.

Robustness Check Using 1-hour Data

Table 3: Robustness Check Using 1 Hour Data

VARIABLES	DAI	USDC	USDT	WBTC	WETH
HHI	-0.707	0.114	-0.400	-0.154	-0.765
VB	-0.385	-0.290	-0.386	1.000	0.111
De	-3.439	-0.738	-3.372	0.586	-0.416
Bo	2.845	0.172	2.945	0.214	0.438
Obs	31,329	31,332	31,331	31,366	31,329
R^2	0.068	0.044	0.039	0.103	0.106
Adj R^2	0.060	0.039	0.027	0.100	0.102
Diagnostic tests	LM test: 0.827 (Stable)	LM test: 0.925 (Stable)	LM test: 0.825 (Stable)	LM test: 0.718 (Stable)	LM test: 0.789 (Stable)
CUSUM	Stable	Stable	Stable	Stable	Stable

The above table 3 represents the results that are connected to the acceptance of H1, H2, and H3, and the rejection of H4. Hypothesis H1, which provides a significant coefficient between HHI and De, indicating the relationship between market concentration and the liquidity ratio among cryptocurrencies. DAI has a value of -0.707, and USDT has a value of -0.400, which means to accept the H1. If the H2 should be validated, it provides significant impact on the Bo and VB, based on USDT at 2.945, WETH at 0.438, by amplified risk. Hypothesis (H3), which has the higher R^2 values for USDT (0.039) and WETH (0.106), reflecting the interdependence between liquidity and market volatility. Reject H4 due to the absence of irrelevant technology variables.

Centrality of the Six Main Pools Over Time

The below fig. 5 represents the centrality among the six liquidity pools, by the funding centrality and borrowing centrality. cDAI and cUSDC represent the stablecoin-backed pools that consistently dominate the funds, which should reflect the central role of the liquidity ratio from 2020 to 2023. In contrast, Bitcoin pools have statistically significant importance across various activities. In the year 2021, due to the demand, high-value collateral should be required. cUSDT is another pool that should maintain stability across various borrowing patterns. These variations come under both funding and borrowing the certainty across the asset types with dynamic liquidity conditions in the DeFi ecosystem.

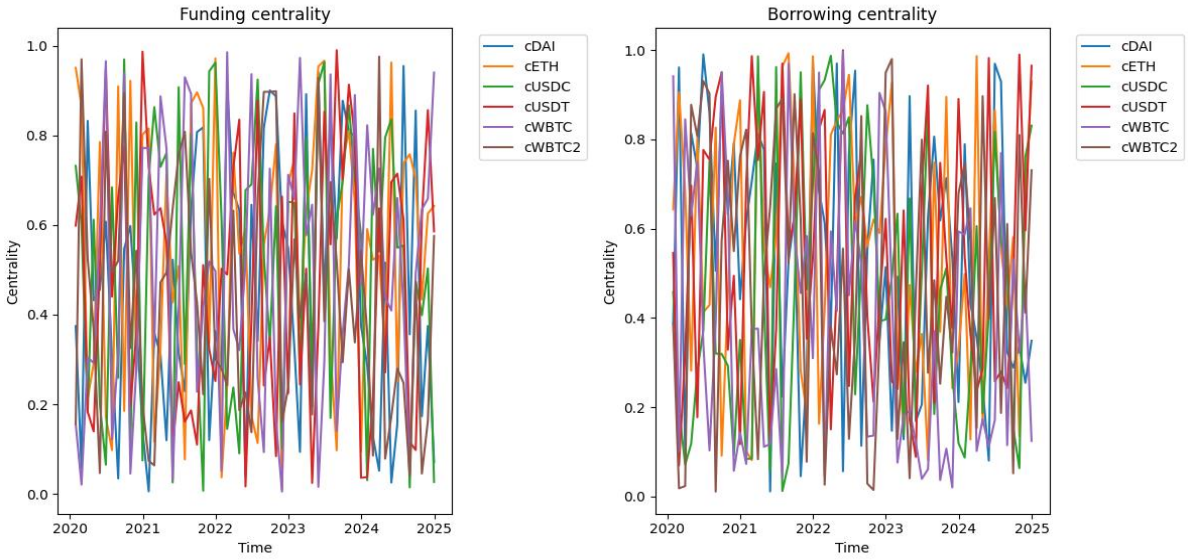


Fig. 5: Centrality of the Six Main Pools Over Time

Discussion

This research primarily examined the association among decentralized liquidity pools in DeFi at the traditional level of the financial system. Its focused-on market concentration, borrower behavior, liquidity ratio with cryptocurrency concepts. In this stage, the H1 should be accepted, which provides the negative relationship between the HHI and De. It consists of the metric value as DAI as -0.707 and USDT as -0.400. These all indicate that the relationship among the financial products in DeFi should transmit systemic risk among the global banking system. In this to check H2 as validated, which is have the value of USDT as 2.945 and WETH as 0.438, shows about the leverage mechanism among the flash loan and collateral contribution through financial stability between DeFi with the traditional banking system. In this, to accept H3, the higher R^2 values are observed for USDT (0.039) and WETH (0.102), indicating that the relationship between the liquidity ratio on the DeFi platform and the banking system amplifies price volatility and contagion risk. In this, Reject H4 due to the absence of irrelevant technology variables. The findings mainly discuss the underlying volatility among the Defi markets, which have significant implications for liquidity risk, and also highlight the need for robustness within the regular framework for systematic risk to ensure stability in both sectors. Suggestions as to make your findings easier to understand, you might want to include a visual analogy of the R2 of each cryptocurrency and how it is correlated with liquidity risks. A graph that would show these relationships might assist the readers to understand the effect of each variable. To develop the hypothesis, it might be worthwhile to further frame the explanation of how leverage in flash loans directly influences traditional banking stability to further enrich the story and render the results in more concrete terms of actual financial systems. It is also worthwhile to discuss briefly how the selected ARDL model specifically takes care of endogeneity and reverse causality in the methodology section that may enhance the explanation.

Conclusion

This research primarily examines the systematic contagion channels among decentralized liquidity pools in the global banking system. It's mainly focused on key variables, including market concentration, borrowing rates, and the numbers of depositors and borrowers. In this research, the model used is an autoregressive distributed lag, which is connected to analyze the time series data from Aave. It provides the relationship between the Supporting H1, H2 and H3. These are interconnected to amplify financial stability through contagion between metrics, such as USDT at 0.039 and WETH at 0.106. These all demonstrate the liquidity ratio among the technological dependencies in the data source. These findings are mainly related to technological ideas related to exploring the role of governance mechanisms, Defi expansion, with the analysis of other Defi protocols. In the future, this research will mainly contribute to understanding the concept of how the DeFi system compares to traditional systems and infrastructure, which highlights the need for comprehensive strategies to help improve both sectors. The study indicate the necessity to implement a broad regulatory framework that would help to manage the issues associated with the intersection of DeFi and traditional finance, with the aim of improving the stability in both domains. The study also recommends the creation of strong

structures to reduce systemic risks, enhance resilience, and have sustainable financial ecosystems. This study will be used in the future to the current debate about the development of DeFi, its framework and effects in comparison with traditional banking systems, and offer the most important information to regulators and stakeholders in the industry.

References

Maruyama, H., Tabata, T., & Hosoda, T. (2020, September). Impact of Tick Size Reduction on Liquidity Index in Tokyo Stock Exchange. In *2020 9th International Congress on Advanced Applied Informatics (IIAI-AAI)* (pp. 748-753). IEEE. https://doi.org/10.1109/IIAI-AAI50415.2020.00149

Nzomiwu, A. C., & Okoye, F. (2025). Monetary Systems and Financial Infrastructure: A Reshaping with the use of Digital Asset Tokenization and Decentralized Finance. http://dx.doi.org/10.2139/ssrn.5902403

Qi, M., Shi, D., Feng, S., Wang, P., & Nnenna, A. B. (2022). Assessing the interconnectedness and systemic risk contagion in the Chinese banking network. *International Journal of Emerging Markets*, *17*(3), 889-913. https://doi.org/10.1108/IJOEM-08-2021-1331

Olanrewaju, A. G. (2025). Harnessing Decentralized Finance (DeFi) protocols for institutional asset securitization in cross-jurisdictional banking ecosystems. *Int J Sci Res Arch*, *15*(1), 1119-1136. https://doi.org/10.30574/ijsra.2025.15.1.1121

Adeloye, F. C. (2025). Advanced financial derivatives in managing systemic risk and liquidity shocks in interconnected global markets. *International Journal of Science and Research Archive*, *15*(2), 1017-1037. https://doi.org/10.30574/ijsra.2025.15.2.1500

Eichengreen, B., Lombardi, D., & Malkin, A. (2018). Multilayered governance and the international financial architecture: The erosion of multilateralism in international liquidity provision. *Global Policy*, *9*, 7-20. https://doi.org/10.1111/1758-5899.12561

Bruno, V., & Shin, H. S. (2015). Cross-border banking and global liquidity. *The Review of Economic Studies*, *82*(2), 535-564. https://doi.org/10.1093/restud/rdu042

Farzulla, M., & Maksakov, A. (2026). ASRI: An Aggregated Systemic Risk Index for Cryptocurrency Markets. *Contagion*, *25*, 15. https://doi.org/10.48550/arXiv.2602.03874

Novak, M. A., & Burashnikov, D. V. (2021, November). Features of Management and Assessment of Financial Stability of Metallurgical Enterprises. In 2021 3rd International Conference on Control Systems, Mathematical Modeling, Automation and Energy Efficiency (SUMMA) (pp. 429-433). IEEE. https://doi.org/10.1109/SUMMA53307.2021.9632209

Oben, R. J., Seraj, M., & Zihni Eyüpoğlu, Ş. (2026). Assessing time-and-frequency-domain cross-market volatility contagion: a comparative study of decentralized finance assets and global traditional financial markets. *Journal of Modelling in Management*, *21*(1), 419-454. https://doi.org/10.1108/JM2-07-2024-0220.

Hemrit, W., Benlagha, N., Ben Arous, R., & Ben Arab, M. (2023). Exploring the time-frequency connectedness among non-fungible tokens and developed stock markets. *Intelligent Systems in Accounting, Finance and Management*, *30*(4), 192-207. https://doi.org/10.1002/isaf.1544

Shahrour, M. H., Lemand, R., & Mourey, M. (2025). Cross-market volatility dynamics in crypto and traditional financial instruments: quantifying the spillover effect. *The Journal of Risk Finance*, *26*(1), 1-21. https://doi.org/10.1108/JRF-07-2024-0185

Antonakakis, N., Chatziantoniou, I., & Gabauer, D. (2019). Cryptocurrency market contagion: Market uncertainty, market complexity, and dynamic portfolios. *Journal of International Financial Markets, Institutions and Money*, *61*, 37-51. https://doi.org/10.1016/j.intfin.2019.02.003

Kammoun, W. M. (2026). Return and volatility spillover drivers among conventional cryptocurrencies. *Digital Finance*, *8*(1), 2. https://doi.org/10.1007/s42521-025-00167-y

El Ibraqui, R., Aboutafail, M. O., & Nouira, R. (2024, December). Modeling and mathematical analysis of liquidity-credit risk contagion in the banking system. In *2024 7th International Conference on Advanced Communication Technologies and Networking (CommNet)* (pp. 1-5). IEEE. https://doi.org/10.1109/CommNet63022.2024.10793253

Torri, G., & Giacometti, R. (2023). Financial contagion in banking networks with community structure. *Communications in Nonlinear Science and Numerical Simulation*, *117*, 106924. https://doi.org/10.1016/j.cnsns.2022.106924

Macchiati, V., Brandi, G., Di Matteo, T., Paolotti, D., Caldarelli, G., & Cimini, G. (2022). Systemic liquidity contagion in the European interbank market. *Journal of Economic Interaction and Coordination*, *17*(2), 443-474. https://doi.org/10.1007/s11403-021-00338-1

Chen, N., Fan, H., & Pang, C. (2024). Contagion mechanism of liquidity risk in the interbank network. *Economic Modelling*, *140*, 106873. https://doi.org/10.1016/j.econmod.2024.106873

Hausenblas, V., Kubicová, I., & Lešanovská, J. (2015). Contagion risk in the Czech financial system: A network analysis and simulation approach. *Economic Systems*, *39*(1), 156-180. https://doi.org/10.1016/j.ecosys.2014.07.001

Radev, D. (2025). Crises, Financial Contagion and the Real Economy: Intraregional Evidence from Transition Economies. *Finance a Uver*, *75*(3), 224-276. https://doi.org/10.32065/CJEF.2025.03.01