

Inclusion and Democratization Through Web3 and DeFi? Initial Evidence from the Ethereum Ecosystem

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Cryptocurrency and DeFi

- Some of the main functions of a **financial system** (Merton, 1995):

- allocation of resources to their best use
- inter-temporal consumption smoothing
- risk-sharing

↪ **TradFi**: intermediaries are the centralized nodes and perform many core functions more or less efficiently in exchange of significant power and rents.

↪ **DeFi**: based on the blockchain → record keeping is decentralized, intermediation is built on top of it, with the primary goal of replacing TradFi with a *better* financial system.

This paper

- **Is DeFi associated with more “inclusion and democratization”?**
 - a crucial question, often overshadowed by DeFi’s emphasis on security and scaling
- **Main contributions:**
 1. assemble (and disseminate!) a comprehensive and granular database of the Ethereum network up to 2/2022 (prior to the “Merge”, i.e., the transition from PoW to PoS),
 2. highlight the high degree of concentration in both mining income and ETH ownership, and high share of *large* transactions,
 3. reveal the shift from peer-to-peer to user DApps/DeFi interactions,
 4. point out the disproportionate impact of fee structures on smaller users and highlight the move towards inclusion and equality with the introduction of the EIP-1559 base-fee system in August 2021.

↔ **Overall, the paper casts some doubts on the inclusivity and democratization of DeFi which should be taken very seriously in the next iterations of the DeFi ecosystem(s).**

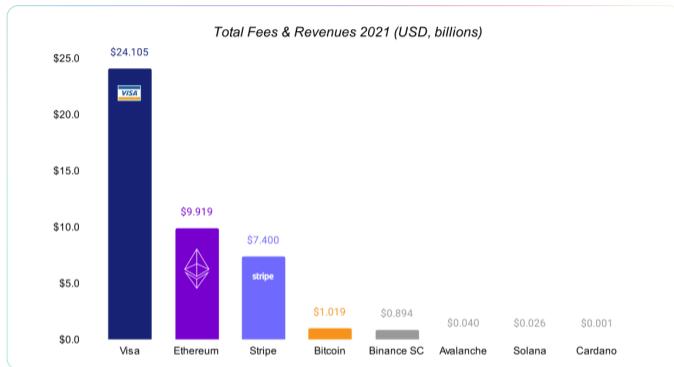
Comment #1: Transaction Fees

Fee structure and DeFi evolve rapidly over time

- The fee structure evolved over time, as also explained by the authors (see, e.g., EIP-1559).
- Since the end of period analyzed, Ethereum moved from PoW to PoS.
- L2-system rollups are like off-chain aggregators and perform individual transaction execution outside the main blockchain and send bundles of transaction data back to the main Ethereum network to save on transaction costs (see, e.g., Arbitrum One, OP Mainnet).

↪ **It would be super valuable and interesting if the authors could update their findings to the more recent time.**

Ethereum fees and transactions (2021)



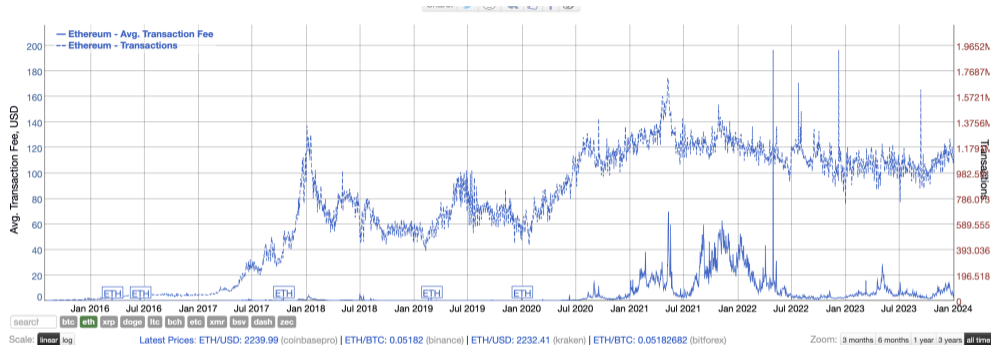
Year in Ethereum 2021 - stark.mirror.xyz

↪ # transactions: Ethereum \approx 460 million, Visa \approx 165 billion

↪ average Ethereum fee per transaction 100X Visa (\approx 54 USD)

See: [Stark & Van Ness blog](#) and Makarov and Schoar (2022).

Ethereum fees and transactions (2023)














↪ Average ETH transaction fee < 10 USD, but still 20X Visa

↪ Evolution of fees reveals the continuous improvement and difficult challenges of technology (with PoS, fees determine the value of network and implicitly its security)

↪ Effect of EIP-1559 significant but quantitatively second order?

Fees much lower using some L2 rollups

Name	Send ETH	Swap tokens
 Loopring	\$0.02	\$0.39 ▾
 ZKSync	\$0.05	\$0.13 ▾
 Boba Network 	\$0.10	\$0.25 ▾
 Optimism 	\$0.21	\$0.31 ▾
 Polygon Hermez	\$0.25	- ▾
 Arbitrum One 	\$0.25	\$0.41 ▾
 Aztec Network	\$0.39	- ▾
 Ethereum	\$1.30	\$6.49 ▾

See mirror.xyz

Comment #2: The benchmarks

What are the relevant benchmarks?

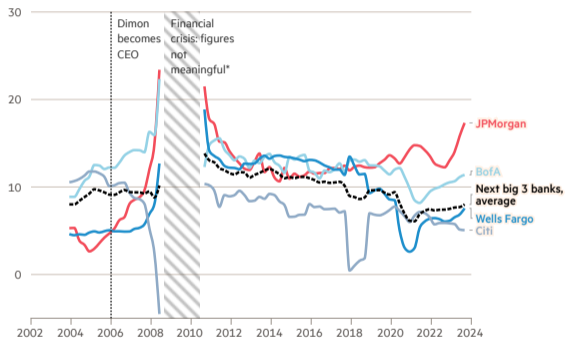
- The authors necessarily make claims and observations that require benchmarks.
- Examples:
 - ETH income and ownership is compared to income and wealth shares in the US (Saez and Zucman, 2020)
 - Transaction fees are compared to fees in SWIFT or PayPal

↪ **Are these the most appropriate benchmarks?**

Profits in the US financial system are very concentrated

JPMorgan Chase captures almost a fifth of all US bank profits

Trailing 12-month net income as % of total

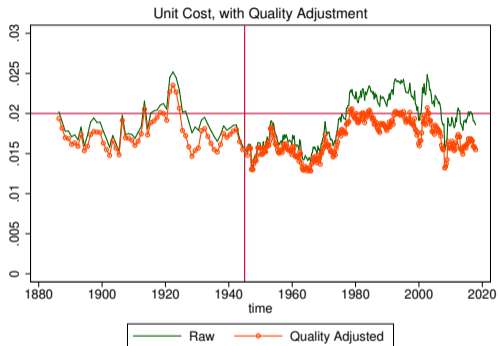


FINANCIAL TIMES

Source: BankRegData • *Because industry as a whole was making net losses

Source: FT, December 27 2023

Figure 3: Unit Cost and Quality Adjustment



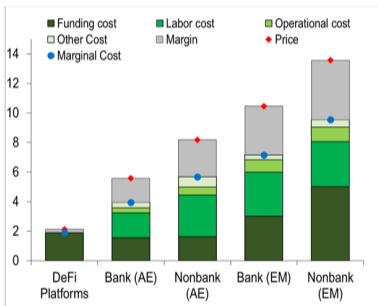
↪ cost of financial intermediation (i.e., the ratio of income finance industry and quantity of intermediated assets) $\approx 200bp$ for a very long time, with a recent decline since 2015

↪ importance of quality adjustment (e.g., DeFi might be much faster than TradFi, L2 rollups might be not as safe as L1 transactions, etc.)

DeFi cost efficiency vs TradFi

DeFi is cost-efficient in lending compared to incumbents, having lower marginal costs.

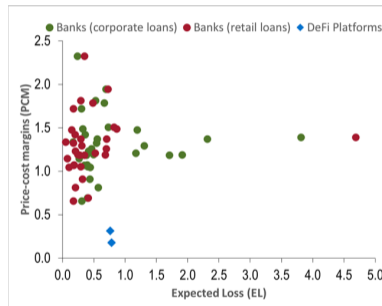
Estimated Marginal Costs and Margins
(in percent)



Source: FitchConnect, Aave, Compound, IMF Staff

However, DeFi has riskier borrowers than banks with thinner margins.

Estimated Margins and Expected Loss
(in percent)



Note: Each dot represents the average margin and expected loss of banks in a country.
Source: EBA Risk Dashboard, Aave, Compound, CoinGecko, IMF Staff

↪ DeFi marginal costs are very low vs TradFi, but so are margins (Adrian, 2022)

Comment #3: Mining income and network control

Liquid Staking and DeFi

- Staking requires locking valuable assets into Ethereum deposit contract
- Need a minimum of 32 ETH (economic friction)
- Not everyone wants to run their own validator (UX friction)
- Capital inefficient (less yield, also high variance)

Enter liquid staking

- Deposit 1 ETH with a staking service provider (SSP)
- Get 1 lsETH, a liquid staking token collateralized by ETH 1:1
- SSP pools and stakes on user behalf, distributes rewards, collects a fee

Liquid Staking Market Players

Filtered by All | Sort by Staked Tokens | Timeframe 7d

Show Verified Providers First | Show All Providers & Validators

List view | Items per Page 20

		Reward Rate	Fee	Validators	Staked Tokens	Net Staking Flow 7d	Network Control	Self-Staked
1	Lido Finance Liquid Staking	3.84%	10%	278.4k -0.44%	8.91m (\$18.56b) -0.44%	-\$82.79m	31.4%	-
2	Coinbase Liquid Staking	3.26%	25%	131.78k +8.89%	4.22m (\$8.78b) +8.89%	+\$716.82m	14.9%	-
3	Binance Staking Liquid Staking	3.79%	10%	39.95k -0.03%	1.28m (\$2.66b) -0.03%	-\$866.53k	4.51%	-
4	Rocket Pool Liquid Staking	3.27%	14%	25.57k +1.56%	820.86k (\$1.71b) +1.56%	+\$26.61m	4.27%	-
5	Frax Finance Liquid Staking	3.81%	10%	713k +0.73%	228.13k (\$475.19m) +0.73%	+\$3.47m	0.805%	-

↪ Liquid staking improves inclusion but at the cost of high concentration (see, e.g., Stake ETH)

Comment #4: Further thoughts

Something I did not find in the paper and would like to see discussed

- Smart contracts (and DeFi) replace ex-post protection by contractual law with ex-ante contract completeness (see, e.g., Makarov and Schoar (2022)). This might increase the complexity of transactions, especially for less educated individuals, and require **new trusted intermediaries**.
- Big data, combined with smart contracts and AI, “is likely to reduce the impact of negative prejudice in the credit market but it could reduce the effectiveness of existing policies aimed at **protecting minorities**” (Philippon, 2019).
- Permissionless and pseudonymous DeFi might facilitate tax avoidance and money laundering activities. How does this reconcile with **democratization**?