Staking, Token Pricing, and Crypto Carry

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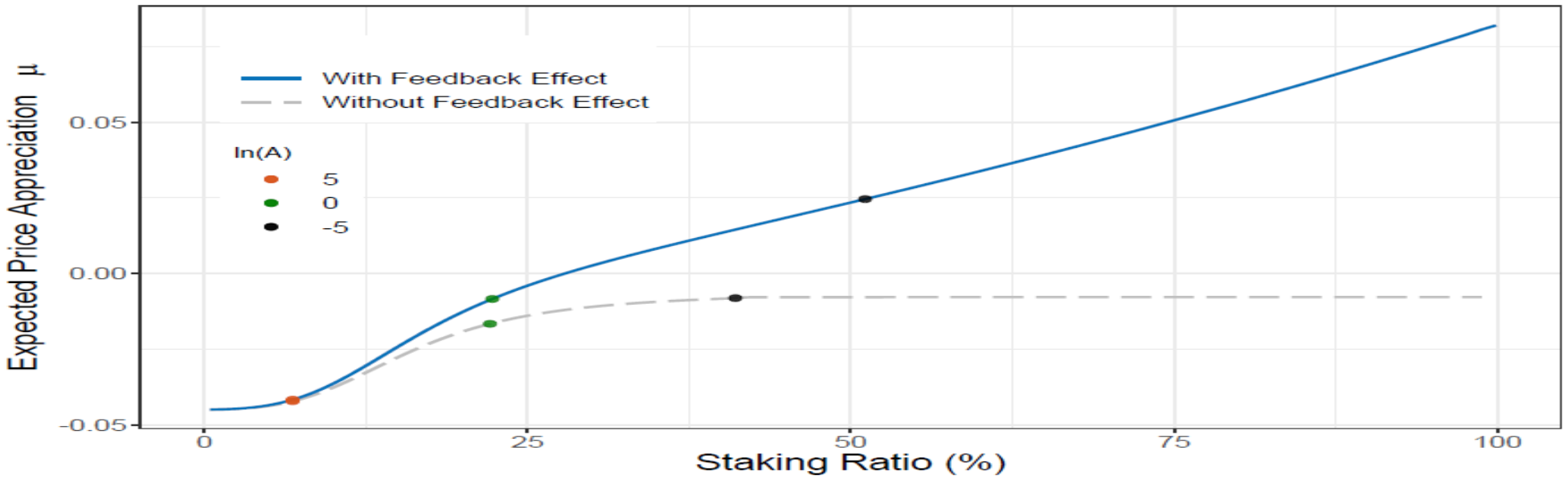
A summary of Cong, He, and Tang (2022)

- This paper studies the economics of token staking and its asset pricing implications.
- This paper has a theoretical model with the following features
  - Agents derive utilities from consumption and allocate/adjust their holdings of staked tokens, tradable tokens and numeraire.
  - Agents trade off staking rewards, transaction convenience, and offline consumption.
  - A higher staking ratio improves the platform productivity.
- The authors have three theorical results with empirical evidence
  1. The overall staking ratio is increasing with the aggregate staking reward ratio.
     - Intuition: more tokens as rewards increases the staking yield, which mechanically attracts more staking.
  2. The expected price appreciation is increasing with the aggregate staking ratio.
     - Agents stake more when the platform productivity is low but more wealth will be allocated onto the platform.
     - A higher staking increases the platform productivity growth, which will further increase the platform valuation.
  3. Higher carry (e.g., a higher reward ratio) attracts greater stakes and thus excess price appreciation, generating a higher excess return.

Comment I: the role of staking for the platform

- This paper assumes that a higher staking ratio improves the platform productivity.
- The role of staking ratio generates **a feedback effect**:
  - Higher reward ratio induces a higher staking ratio
  - A higher staking increases the platform productivity growth, which will further increase the platform valuation.
  - This role generates **Results 2 and 3.**



Comment I: the role of staking for the platform

- Given the importance of staking for the platform, the authors should conduct more cross-sectional studies along this direction.
  - Whether the relationship between reward ratio and staking is stronger when there is a stronger on the platforms.
  - Whether carry (e.g., reward ratio) can more strongly forecast excess returns when there is a stronger on the platforms.
- There are indeed some **heterogenous feedback effects** among tokens.
  - Particularly, some staking tokens have zero benefit on the platform functionality and also zero risk of losing. Examples include
    - **1inch, bifi, dodo, kyber, pancakeswap, sushi, and yearn** et al.
  - Some of these tokens (sushi/pancakeswap/dodo/1inch) are governance token for decentralized exchanges. Staking these tokens can earn more tokens or protocol fees but it is unclear how staking affect the functionality of decentralized exchanges.
  - Some staking (Bifi/yearn) collect reward from auto-yield farming but has no effects on the functionality of auto-yield farming
    - Example: yearn is a like the pool of fundings and it is different from collateral tokens (e.g., aave). Thus, victims of hacking events in yearn protocol receive no benefits

Comment I: the role of staking for the platform

- The comparison between **sushi (with staking)** and **uni (w/o staking options)** can show a suggestive effect of staking for the platform .

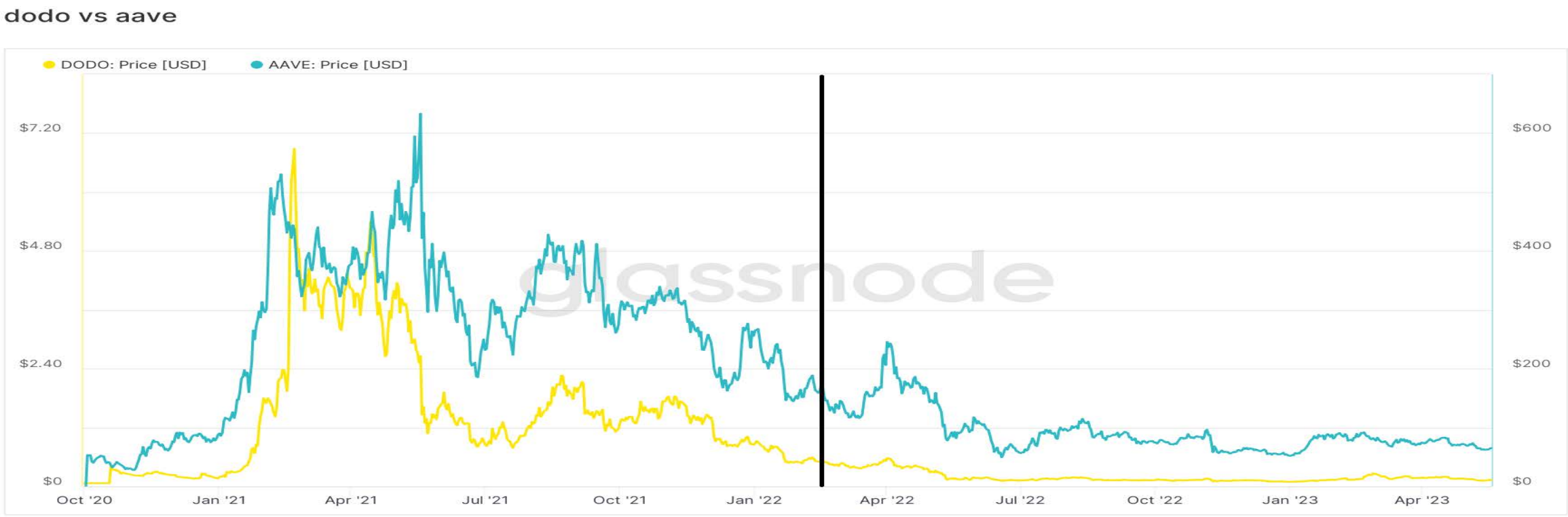
- While both **sushi and uni** are governance tokens, the token prices of **sushi** and **uni** are highly correlated, which suggests that staking does not affect sushi prices.
- I suggest the authors carefully measure the feedback of staking and conduct more cross-sectional studies.

Comment II: extending the sample periods

- This paper finds that a crypto carry strategy (going long high carry cryptos and short low carry cryptos) earn an extremely high annualized Sharpe ratio (**1.61**) but without any crash risks (with skewness of **-0.17**).
  - One natural question: are the results specific to the sample periods?
  - The sample period in this paper covers July 2018 through Feb 2022, which is corresponding the boom.

Comment II: extending the sample periods

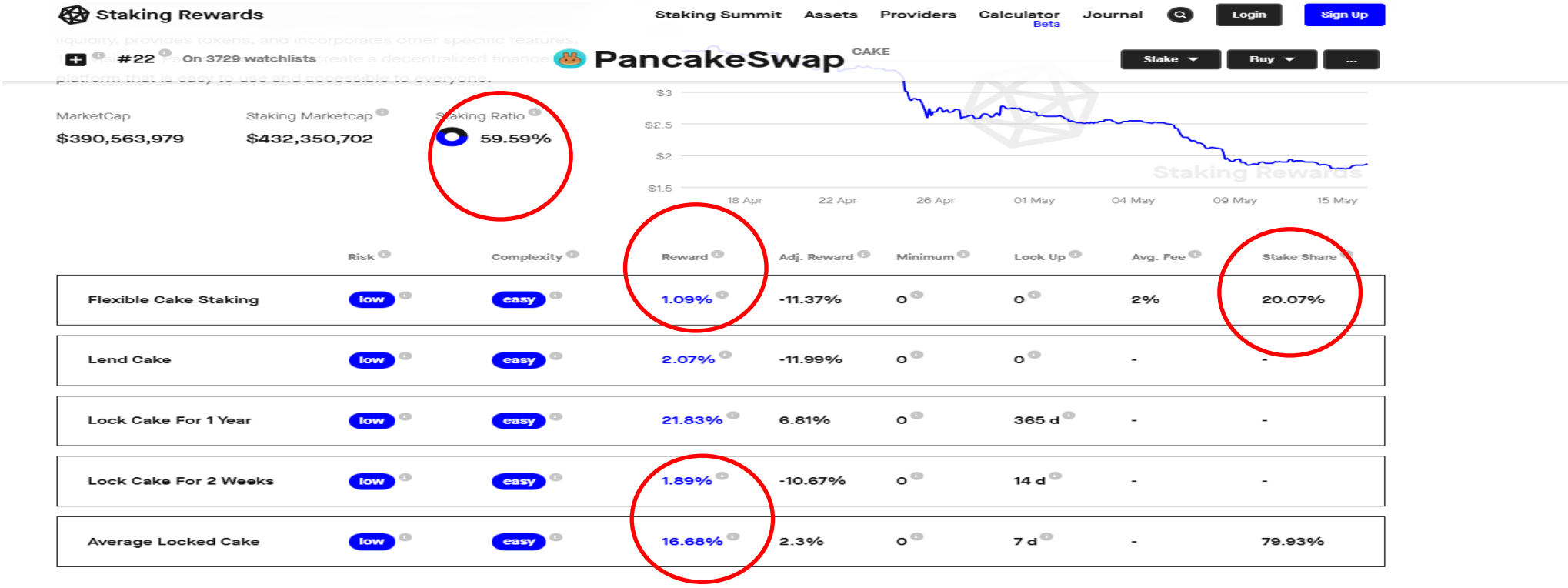
- Another question: are the results driven by the crypto betas?
  - A comparison between DoDo (with reward rate of 65.74%) and AAVE (with reward rate of 4.02%)
  - The following figure shows that DoDo (a high carry crypto) is more sensitive to the crypto market than AAVE (a low carry crypto).
  - The authors should examine the crypto betas across different carry groups.



glassnode

Comment III: how to measure reward ratios?

- This paper always choose the participation method with the lowest capital threshold and risk.
- **Potential issue 1**: how to match reward ratios to staking ratios?.
- In this paper, the stake is the easiest one with lowest requirement "flexible cake staking", with rewards of 1.09% and 20.07% of stake ratio. But the total average reward is 16.68% and staking ratio 59.59%.
- How to choose them or how to aggregate them is one important question, particularly when the authors calculate the total aggregate reward ratio as the total token award over the total number of tokens.



	Risk	Complexity	Reward	Adj. Reward	Minimum	Lock Up	Avg. Fee	Stake Share
Flexible Cake Staking	low	easy	1.09%	-11.37%	0	0	2%	20.07%
Lend Cake	low	easy	2.07%	-11.99%	0	0	-	-
Lock Cake For 1 Year	low	easy	21.83%	6.81%	0	365 d	-	-
Lock Cake For 2 Weeks	low	easy	1.89%	-10.67%	0	14 d	-	-
Average Locked Cake	low	easy	16.68%	2.3%	0	7 d	-	79.93%

Comment III: how to measure reward ratios?

- This paper collects the key variable—reward ratio —from Stakingrewards.com.
- **Potential issue 2**: Accuracy of "stakingrewards.com".
- Since "stakingrewards.com" is a third-party data provider, it is worth checking its data accuracy.
- Example: **pancakeswap**
  - On 15/5/2023 (when I prepared for the discussion), by checking through bscscan and **the official website of pancakeswap**, the total flexible staked in the smart contract is 46,665,083, total locked staking is 185,549,797, with a total circulating supply of 1,211,651,039
  - It means that a flexible staking ratio of **3.85%**, and locked staking ratio of **15.3%**.
  - However, it is neither the total staking ratio of **59.59%**, or flexible staking ratio of **20.07%** on the website.
  - Meanwhile, in the screenshot above, market cap 390,563,979 is lower than staking market cap 432,350,702, which seems very strange.

Comment III: how to measure reward ratios?

- **Potential issue 3**: underestimation of the reward ratios of layer-1 tokens?
- Layer-1 tokens ETH not only are staked in validating nodes but also on some defi protocols, including liquidity pools, lending platforms, and even single-stake reward yield farming protocols.
- Example: **ETH, bnb (binance-sc), cronos, sol**
- **Ethereum** has the protocoles as follow**:**
  - Yield farming protocols such as yearn finance, harvest finance, etc.
  - Leverage trading protocols such as synthetix, leverfi, etc.However, it is neither the total staking ratio of 59.59%, or flexible staking ratio of 20.07% on the website.
  - Stablecoin and lending protocols such as MakerDao, Compound, AAVE, etc.

Minor Comment I: how to explain the failure of UIP?

- The authors test the failure of UIP using the following regressions:

$$\lambda_{i,t+1} = \alpha_i + \beta(r_t^f - r_{i,t} + c_{i,t}) + \epsilon_{i,t+1},$$

$$\text{where} \quad \lambda_{i,t} = \log P_{i,t+1} - \log P_{i,t} + (r_{i,t} - c_{i,t}) - r_t^f,$$

- If UIP holds, $\beta = 0$. But the authors show $\beta < 0$, which suggests that higher interest rates are associated with higher excess returns.
- More importantly, all cryptos have β close to -1 (see Table 5). Why?
- The authors could attempt to use coefficients in Table 3 (reward rate —staking ratio) and Table 4 (staking ratio—price appreciation) to estimate β.
  - This exercise helps show the driving forces for the failure of UIP.

Minor Comment II: inconsistency between Tables 2 and 3

- In Table 2, the authors examine the relationship between staking ratios with respect to the staking reward ratio, which is defined as the total number of token awards divided by the total number of tokens.
- In Table 3, the authors examine how the reward predicts future staking ration changes.
- But in Table 3, the main independent variable is reward rate instead of reward ratio.
  - Reward rate is the total number of token reward divided by the total amount of staked tokens.

Conclusion

- Overall, this is a very interesting and important paper.
- This paper is the first one to study the economy with token staking and its asset pricing implications.
- This paper greatly improves our understanding how token staking affects investor portfolio choices and crypto price dynamics.
- The authors can improve the paper
  - by conducing more studies on the role of staking for the platform
  - by extending the sample periods
  - by carefully addressing the measure of reward ratios/staking ratios.