

Tokenomics: Dynamic Adoption and Valuation

A Brief Summary

Link to the full paper: <https://yeli-macrofinance.com/tokenomics.pdf>

Economic activities are increasingly shifting to the digital space, as evidenced by the rise of e-commerce. On e-commerce platforms, transactions are settled using fiat currencies, with payment still relying on the traditional payment systems that rely on fiat currencies in various forms such as debit and credit cards. In theory, platforms—much like countries—could develop their own payment systems and introduce their own currency as the settlement asset. All the classic forces driving money demand would apply.

Then what prevents a platform from introducing its currency? The issuance can be excessive as the marginal cost of producing more digital currency units is zero. Countries face the same problem and solve it through commitment, for example, to an inflation target, and they set up institutional arrangements (e.g., central bank independence) to enable such a commitment.

Blockchain technology makes commitment feasible for digital platforms. Any changes made to the rules of money supply must receive decentralized consensus. In recent years, many platforms have introduced cryptocurrencies. Some aim to become a universal payment system that supports trade of all products and services, including financial services, while others serve niche markets.

In this paper, we develop a dynamic model of money demand on a platform to answer two questions. First, how to value a platform's native currency (the "token") based on users' transactional demand? Second, how does introducing a platform currency affect the growth of the platform's user base? Agents hold tokens in anticipation of transaction opportunities. If the user base grows, the transactional benefit from holding tokens becomes greater, which reflects the adoption network effect. Therefore, a key input of token valuation is user-base dynamics. In equilibrium, the ratio of token market capitalization to the size of user base becomes a key valuation metric. Moreover, the dynamics of token price in turn affect user adoption through users' belief on price appreciation/depreciation. Therefore, these two key endogenous variables must be jointly determined in equilibrium.

The trade-off in theories of money demand is between transaction needs and the carry cost for holding money. Means of payment (e.g., bank deposits) often deliver inferior returns relative to other financial assets. This is also true for tokens as they do not generate a stream of dividends. However, the expected token price appreciation can compensate the carry cost and thereby stimulates user adoption of the platform and its currency. Our analysis focuses on a promising platform with growing productivity. Productivity represents the quality of the platform and the variety of trade it supports. The prospective growth of user base driven by productivity growth leads agents to expect more users in the future and a stronger demand for tokens. Given a fixed token supply, which is a commitment enabled by blockchain technology, the expected user growth translates into expected token price appreciation. Therefore, user growth exhibits intertemporal complementarity: the expected growth of future user adoption makes holding tokens now more attractive, stimulating the current user adoption.

Introducing tokens also stabilizes user adoption. A negative productivity shock reduces users' transactional benefit from holding tokens and thus discourages user adoption, lowering the user base. This negative effect is mitigated by an increase in the expected token price appreciation (which encourages adoption), because a lower level of current adoption implies more users can be brought onto the platform

in the future, which is associated with a greater expected token price appreciation. Admittedly, these beneficial effects can only be achieved when the stochastic process of platform productivity has a positive drift (i.e., an upward expected trajectory).

Our paper is the first to clarify the role of tokens in capitalizing endogenous platform growth and thereby reducing agents' effective carry cost of holding means of payment. In our model, the prominent adoption problem in the literature on platform economics (e.g., Rochet and Tirole 2003) is connected with the trade-off between transactional benefit of money and its carry cost in the literature on monetary economics (e.g., Baumol 1952; Tobin 1956).

References

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