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THE MARKET VALUE OF DECENTRALISATION

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Abstract

A prominent motivation for the use of cryptocurrencies as a medium of exchange is that they do not require a central trusted authority. However, when exchanging one cryptocurrency for another, there are two classes of exchange. First is the centralised exchange, which requires trust in the exchange operator. Second, there are decentralised exchanges where participants can exchange cryptocurrencies using a protocol. This analysis uses the failure of the centralised FTX exchange to estimate the change in value the market assigns to decentralised versus centralised exchanges. We find evidence consistent with market participants assigning a significant value to decentralisation.

JEL Codes: G14; G23

Keywords: Decentralised Finance; Event Study

1. Introduction

The FTX exchange was founded in 2019 and grew rapidly to over one million users by 2021. FTX was a centralised exchange, meaning users created an account and deposited money with FTX, and trading took place on order books on FTX servers. In early November 2022, the FTX exchange suspended trading and filed for Chapter 11 bankruptcy. The proximate cause of the bankruptcy was the rapid withdrawals of money by customers which could not be met by FTX[1]. The withdrawals were fueled by speculation that FTX had fraudulently handled customer funds.

Specifically, the alleged fraud by FTX was to use customer assets to trade and as collateral for the FTX exchange. This particular type of fraud, however, could not occur when using decentralised exchanges such as Uniswap. The reason being, on decentralised exchanges, the assets are exchanged directly between the buyer and seller using a protocol as the transfer mechanism. In such a fashion, the transfer of assets does not require trust in any participant. It does require trust in the protocol; however, the protocols used are publicly available and can be audited by knowledgeable participants.

The goal of this analysis is to use the collapse of the FTX exchange to determine if market participants assign a significant value to decentralisation. If not, the tokens of decentralised and centralised

1 Wilson, Tom; Berwick, Angus (8 November 2022). "Crypto exchange FTX saw $6 bln in withdrawals in 72 hours". Reuters. Retrieved 18 November 2022. https://www.reuters.com/business/finance/crypto-exchange-ftx-saw-6-bln-withdrawals-72-hours-ceo-message-staff-2022-11-08/

exchanges should react similarly to the FTX collapse. However, if participants meaningfully value decentralisation, then the tokens of decentralised exchanges should outperform the tokens of centralised exchanges. The market capitalisation of decentralised exchanges should increase relative to centralised exchanges. Thus, in this analysis, we use an event study to test for significantly different abnormal returns during windows around the collapse of FTX.

In this analysis, we use the value of tokens issued by various centralised and decentralised exchanges. These tokens represent a vote in the governance of the exchange. Tokens may not presently receive fees from trading on the exchange; however, since they are governance tokens, they may enact fees in the future. For example, see the discussion[2] of turning off fees (known as the "fee switch") on the governance board of the Uniswap decentralised exchange.

Decentralised finance (also known as DeFi) is presently a focus of US regulatory bodies and researchers on market regulation. Zetzsche, Arner, and Buckley 2020 discuss DeFi and how regulatory oversight and risk control are important to realise the benefits of DeFi. DeFi and its implications are a prominent topic of interest for regulators. The US Treasury released a report in April 2023 (Treasury 2023) which highlighted the effects of DeFi on illicit financial transactions. Much of the regulatory scrutiny is on organisations enabling DeFi protocols, which includes organisations which offer DeFi tokens.

Recent research on the FTX collapse has focused on the contagion effect across markets. Yousaf and Goodell 2023 find evidence for reputational contagion during the collapse of the FTX exchange. Yousaf and Goodell 2023 find little evidence of contagion from the crypto to other asset markets during the collapse of FTX. Lastly, Jalan and Matkovskyy 2023 investigated the effect of the FTX collapse on systemic risk and found that it had little effect.

Tables 1 and 2 contain lists of the Centralised and Decentralised tokens in this analysis, as well as each token's ticker. Note, Apollo had a CEX until January 16th 2023, by which time all assets should be transferred to the DEX.

Table 1: Centralised Exchanges

Exchange	Token
FTX	FTT
Binance	BNB
iFinex	LEO
Cronos	CRO

Table 2: Decentralised Exchanges

Exchange	Token
Uniswap	UNI
PancakeSwap	CAKE
Apollo DEX	APX
1inch	1INCH

Previous analyses of cryptocurrencies focus on their potential function as a safe-haven asset (Mariana, Ekaputra, and Husodo 2021). Others have specifically investigated bubbles in DeFi assets (Maouchi, Charfeddine, and El Montasser, 2022, Geuder, Kinateder, and Wagner, 2019) and herding behaviour (Bashir, Kumar, and Shiljas, 2021). Additionally, there is a substantial amount of research on the macroeconomic factors which affect the returns on cryptocurrencies (Nakagawa and Sakemoto 2021, Bianchi 2020, Wang and Chong 2021, Jiang, Rodríguez Jr, and Zhang 2023) and how returns are affected by major events (Tang and Liu 2022).

[2] https://gov.uniswap.org/t/fee-switch-pilot-update-vote/19514

2. Data and Methods

Daily price data were gathered via the CoinMarketCap website and the Coinbase Application Programming Interface. The event date is November 9th, 2022, and the event window ranges from 10 days before the event to 10 days after (denoted CAR(-10, 10)). Our estimation window is six months prior to the start of the event window.

Our sample thus ranges from May 5th, 2022, through November 19th, 2022, for a total of 178 days. Note, since crypto assets trade continuously, daily prices are seven days per week.

Table 3: DEX Full Period Return Summary Statistics

	CAKE	UNI	APX	INCH
count	332.0000	332.0000	332.0000	332.0000
mean	-0.0022	-0.0018	-0.0023	-0.0036
std	0.0486	0.0573	0.0588	0.0477
min	-0.2710	-0.1974	-0.2046	-0.2150
25%	-0.0271	-0.0347	-0.0236	-0.0308
50%	0.0000	-0.0005	-0.0003	-0.0029
75%	0.0239	0.0296	0.0142	0.0248
max	0.1971	0.2142	0.5490	0.1822

Tables 3 through 8 provide return summary statistics over the full sample, as well as over the estimation and event windows. Token returns exhibit substantial volatility, with daily return standard deviations typically around 5% (and somewhat higher during the event window). Further, maximum token returns in absolute value are often over 15%, consistent with kurtosis in the return distributions.

Table 4: DEX Estimation Period Return Summary Statistics

	CAKE	UNI	APX	INCH
count	168.0000	168.0000	168.0000	168.0000
mean	0.0012	0.0035	-0.0026	-0.0015
std	0.0386	0.0578	0.0323	0.0447
min	-0.1649	-0.1295	-0.1486	-0.1106
25%	-0.0210	-0.0285	-0.0127	-0.0300
50%	0.0044	0.0021	-0.0012	-0.0032
75%	0.0222	0.0291	0.0090	0.0265
max	0.1273	0.2142	0.1090	0.1822

Table 5: DEX Event Period Return Summary Statistics

	CAKE	UNI	APX	INCH
count	21.0000	21.0000	21.0000	21.0000
mean	-0.0078	-0.0066	0.0059	-0.0060
std	0.0528	0.0782	0.0888	0.0463
min	-0.1608	-0.1914	-0.1707	-0.1244
25%	-0.0228	-0.0385	-0.0072	-0.0168
50%	-0.0083	-0.0056	0.0045	-0.0077
75%	0.0042	0.0380	0.0107	0.0242
max	0.1339	0.1755	0.3090	0.0779

Table 6: CEX Full Period Return Summary Statistics

	BNB	CRO	LEO	FTT
count	332.0000	332.0000	332.0000	332.0000
mean	-0.0010	-0.0054	0.0009	-0.0060
std	0.0388	0.0494	0.0460	0.0766
min	-0.1857	-0.2087	-0.1344	-0.7507
25%	-0.0200	-0.0262	-0.0132	-0.0236
50%	-0.0015	-0.0006	0.0000	0.0004
75%	0.0198	0.0212	0.0147	0.0234
max	0.1395	0.1806	0.5560	0.5304

Table 7: CEX Estimation Period Return Summary Statistics

	BNB	CRO	LEO	FTT
count	168.0000	168.0000	168.0000	168.0000
mean	0.0007	-0.0023	-0.0003	-0.0006
std	0.0331	0.0409	0.0283	0.0365
min	-0.1307	-0.1767	-0.1344	-0.1296
25%	-0.0128	-0.0189	-0.0104	-0.0180
50%	-0.0006	0.0000	0.0000	0.0006
75%	0.0158	0.0204	0.0147	0.0228
max	0.0907	0.1244	0.1366	0.0964

Table 8: CEX Event Period Return Summary Statistics

	BNB	CRO	LEO	FTT
count	21.0000	21.0000	21.0000	21.0000
mean	-0.0035	-0.0168	-0.0023	-0.0805
std	0.0588	0.0926	0.0318	0.2584
min	-0.1857	-0.2087	-0.0874	-0.7507
25%	-0.0204	-0.0413	-0.0096	-0.1196
50%	-0.0070	-0.0079	0.0022	-0.0325
75%	0.0224	0.0367	0.0155	-0.0058
max	0.1395	0.1806	0.0446	0.5304

We use an event-study methodology to calculate cumulative abnormal returns for both decentralised and decentralised exchange tokens around the collapse of FTX. We then group the returns into CEX and DEX portfolios, and test for significantly different cumulative abnormal returns between the portfolios.

We use a market model to estimate expected returns in the abnormal return calculation. Specifically, we have:

$$AR_{i,t} = r_{i,t} - E(r_{i,t}) = r_{i,t} - (\alpha_i + \beta_i r_{m,t})$$

where $AR_{i,t}$ and $r_{i,t}$ denote the abnormal return, and log return, on asset i at time t respectively. Abnormal returns are calculated for each day over the event window ranging from 10/30/2022 to

11/19/2022. Cumulative abnormal returns are the cumulative sum of abnormal returns over the event window.

The term $r_{m,t}$ denotes the return on the market at time t. We define the market as a market-weighted index of Bitcoin and Ethereum prices. Attempting to use equity market indexes (such as the CRSP value-weighted index or the S&P 500) is problematic for several reasons. Since equity markets are closed over the weekend, though crypto markets are not, we would lose observations matching equity and crypto returns. Also, the weekended effect may be different between markets. Additionally, there is a higher correlation between the token returns and Bitcoin and Ethereum returns relative to equity market returns. The α_i and β_i terms are coefficients from the regression $r_{i,t} = \alpha_i + \beta_i r_{m,t} + e_t$ estimated over the estimation period ranging from 5/15/2022 to 10/29/2022.

We then test for significantly different group cumulative abnormal returns with the following t-test:

$$t = \frac{CAR_{DEX} - CAR_{CEX}}{\sqrt{\frac{\hat{\sigma}^2_{DEX} + \hat{\sigma}^2_{CEX}}{2}}\sqrt{\frac{2}{n}}}$$

where *CAR* denotes the cumulative abnormal return over the event window, $\hat{\sigma}^2$ denotes the variance of abnormal returns, and *n* is the length of the event window.

Note results of any event study are going to be affected by the choice of event window. To wide a window risks including the effect of unrelated events, and too narrow a window may omit leading and lagged effects of the event. We use a standard window length (10 days before and after the event date, CAR(-10, 10)) commonly employed in event studies in equity markets. We also check for robustness with a CAR(-5, 5) window length.

4. Results and Conclusion

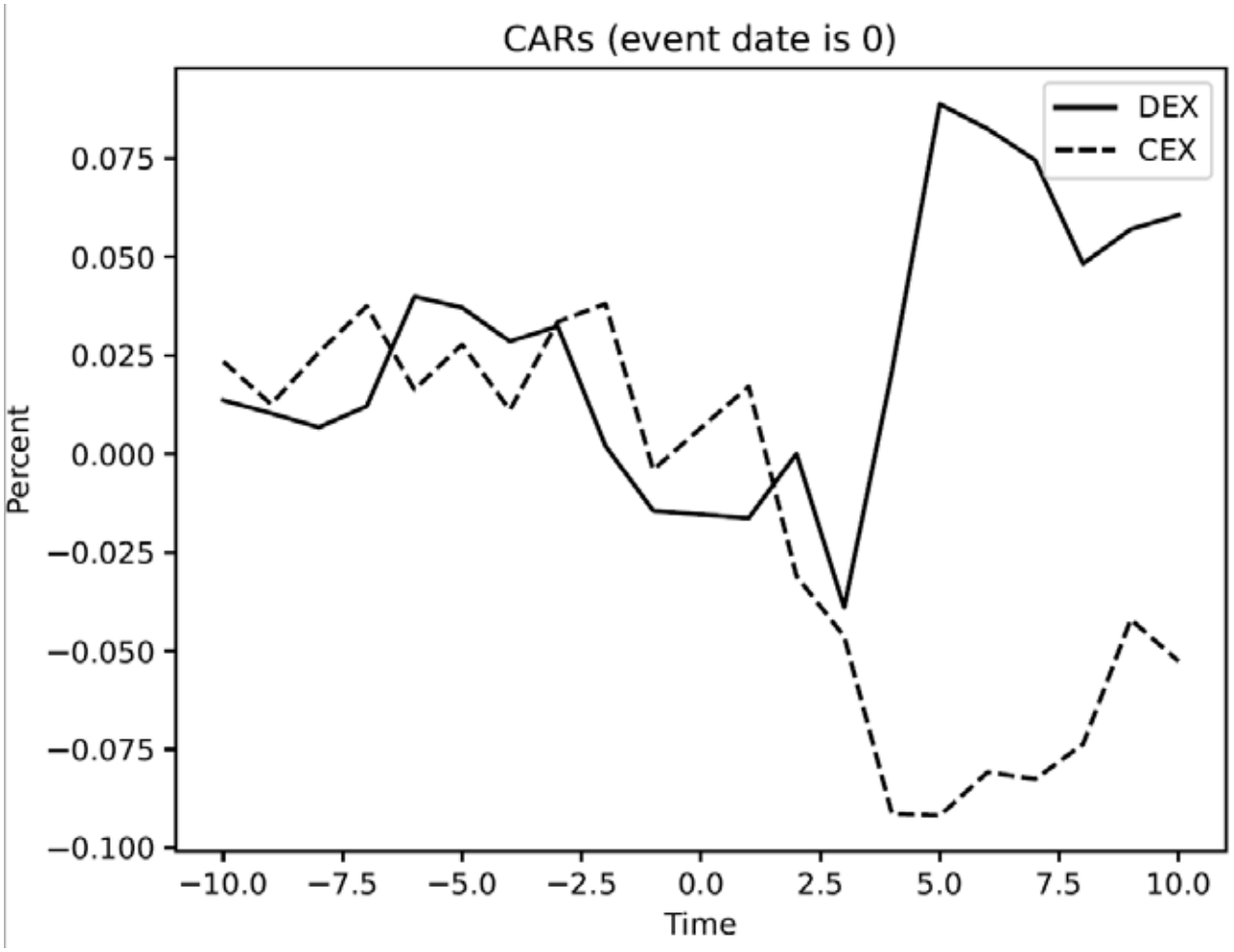
The mean DEX CAR(-10, 10) was 6.06%, and the mean CEX (excluding FTT) CAR(-10, 10) was -5.62%. A t-test on the difference of the CARs yields a t-statistic of 3.59, and so we conclude DEXs performed significantly better than CEXs around the collapse of the FTX exchange. This is evidence that market participants assign a significant value to decentralisation. Further, the relative value of decentralisation versus centralisation increased during the FTX collapse.

Using the more narrow CAR(-5, 5) window we find mean DEX CAR was 4.75%, and the mean CEX (excluding FTT) CAR(-5, 5) was -11.35%. A t-test on the difference of the CARs yields a t-statistic of 3.27. This evidence further supports the conclusion that decentralisation was valued around the collapse of the FTX exchange.

Previous research on the FTX collapse has found that it negatively affected crypto assets (Yousaf and Goodell 2023), however it generally did not affect other asset classes (Yousaf, Riaz, and Goodell 2023, Jalan and Matkovskyy 2023). Our analysis has found evidence that the FTX collapse increased the relative value of decentralisation compared to traditional centralised exchange.

Decentralised exchanges are recent financial innovations, and this analysis supports their value to market participants relative to centralised exchanges. These decentralised exchanges are also increasingly under regulatory scrutiny. This analysis is thus informative for regulators considering whether to attempt to regulate the core innovation of decentralised exchange.

Figure 1:



Mean Cumulative Abnormal returns for DEX and CEX tokens around the failure of the FTX exchange (CEX CARs do not include the FTT token).

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