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Vidal-Tomás, David

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# The new crypto niche: NFTs, play-to-earn, and metaverse tokens

David Vidal-Tomás<sup>a</sup>

<sup>a</sup>*Department of Economics, Universitat Jaume I, Campus del Riu Sec, 12071 - Castellón, Spain.*

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## Abstract

The combination of blockchain technologies and the gaming industry has given rise to metaverses and play-to-earn games, which incorporate their own economy, commerce, and currencies, namely, metaverse and play-to-earn tokens. In this paper, we analysed the performance and dynamics of 174 tokens, the results of which show that this new crypto niche is characterised by a positive performance in the long run and the absence of dependences on the cryptocurrency market, which could attract more gamers, traders, and companies. However, all these groups should be cautious due to the possible onset of a new crypto bubble.

**JEL codes:** G10 · G11 · G40

*Keywords:* Metaverse · Play-to-earn · NFT · Cryptocurrency · Gaming industry · Diversification ·

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\*Corresponding author

*Email address:* [dvidal@uji.es](mailto:dvidal@uji.es) (David Vidal-Tomás)

## 1. Introduction

Non-fungible tokens (NFTs) have become the new centre of attention for both the industrial and scientific community in the cryptocurrency market since early 2021. Compared to traditional cryptocurrencies, such as Bitcoin or Ethereum, whose coins are all equivalent, indistinguishable, and “fungible”, NFTs are defined as digital pure assets that cannot be exchanged like-for-like; consequently, they are unique and “non-fungible” (Wang et al., 2021). This intrinsic feature allows NFTs to demonstrate the authenticity and ownership of different kinds of items in distinct fields, which explains its fast expansion on virtual events, digital collectibles (e.g. trading cards, digital images, videos, virtual real estate, domain names, and crypto stamps), play-to-earn games, and metaverses (see, Wang et al. (2021) and Nadini et al. (2021)).

In this paper, we focus on the gaming industry, specifically play-to-earn games and metaverses. Play-to-earn games are based on a business model where users play a game and earn some rewards while doing it. The key element of these games is that users mainly obtain two types of in-game assets as rewards: (i) NFT items with variable scarcity (e.g. weapons, skins, and monsters), which can be purchased and sold on the open market (e.g. OpenSea), and (ii) a certain type of cryptocurrency or play-to-earn token, which is generally created by the game developers.<sup>1</sup> A metaverse is defined as an immersive and shared virtual world that allows different activities for its users, which are represented by avatars. One of its main features is economic governance and metaverse commerce, since this virtual world has its own economy and currencies with which users can trade any item (Lee et al., 2021). Specifically, a crypto metaverse is a metaverse that incorporates blockchain into its underlying technology and crypto assets, such as metaverse tokens, into its economy. Interestingly, as stated by Wang et al. (2021), metaverses can include all the available NFT applications; consequently, its ecosystem could also include play-to-earn games and marketplaces to trade assets or virtual properties (e.g. land parcels and arts).<sup>2</sup>

Some recent studies have shed some light on NFTs and the gaming industry. Dowling (2021a) analysed the pricing of parcels of virtual real estate in Decentraland, showing that the price series of these NFTs are characterised by inefficiency and a rise in value. In a follow-up study, Dowling (2021b) demonstrated the existence of limited volatility transmission effects between NFT pricing (Decentraland, Cryptopunks and Axie Infinity) and cryptocurrencies (Bitcoin and Ethereum). Nadini et al. (2021) analysed data related to 6.1 million trades of 4.7 million NFTs, distinguishing between art, collectible, games, metaverse and utility categories. Their results showed that, since July 2020, the most exchanged NFTs belong to the gaming industry. Further, users seem to be specialised by category. From a more general perspective, Aharon and Demir (2021) analysed the connectedness between the entire NFT market and other financial assets (equities, bonds, currencies, gold, oil, and Ethereum) using the TVP-VAR approach. Their main results showed that NFTs are independent of shocks from common asset classes. Moreover, NFTs seem to have diversification benefits during turbulent times.

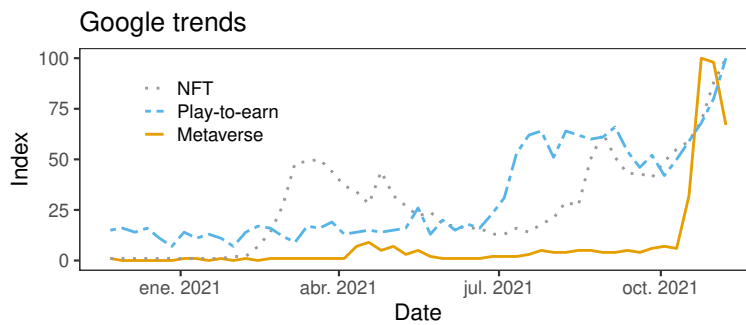
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<sup>1</sup>Some examples are Splinterlands, Axie Infinity and Alien worlds.

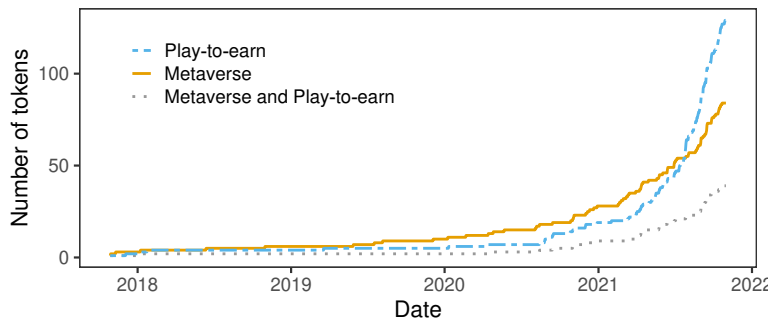
<sup>2</sup>The best examples in this case are Decentraland and Sandbox.

Unlike these papers, we did not focus on the properties of specific NFT trades (e.g. virtual lands, weapons, or any in-game item) but on the performance and dynamics of all the existing play-to-earn and metaverse tokens, which are the cornerstone of the economy on these blockchain applications.<sup>3</sup> Indeed, the increasing interest in NFTs, play-to-earn games, and metaverses (see Fig. (1)) has given rise to a remarkable increase in initial coin offerings (ICO) focused on the gaming industry (i.e., Initial Game Offering, IGO), whose tendency is similar to the one observed during the ICO bubble in the entire cryptocurrency market in 2017 (Momtaz, 2019, Vidal-Tomás, 2021). Specifically, on 01 January 2020, there were 5 play-to-earn and 10 metaverse tokens; one year later, on 01 January 2021, the market included 19 play-to-earn and 28 metaverse tokens; and at the time of the writing of this article (31 October 2021), we observed 129 play-to-earn and 84 metaverse tokens, which demonstrates the growth of a new niche in the cryptocurrency market (see Fig. (2)).

**Figure. 1:** Worldwide Google searches for “NFT”, “Play-to-earn” and “Metaverse”. An index equal to 100 indicates the maximum popularity during the analysed period.



**Figure. 2:** Number of tokens created over time: a) Play-to-earn, b) Metaverse, c) Metaverse & Play-to-earn.



In this paper, we contribute to the cryptocurrency literature by analysing the performance and dynamics of this new crypto niche based on the gaming industry, which is of paramount importance for investors, gamers, and blockchain companies. First, the existence of in-game tokens allows traders to invest in gaming and metaverse projects without

<sup>3</sup>Instead of using existing cryptocurrencies, such as Ethereum (e.g. Cryptopunks), some play-to-earn games and metaverses create their own in-game/metaverse token, which can be obtained as rewards, staking, or purchasing with fiat currencies. The main in-game and metaverse tokens can be traded in centralised exchange platforms, even though most of these tokens are traded in decentralised exchange platforms.

the need to play games, interact in the metaverse, or purchase particular NFTs. Thus, it is important to examine whether (i) these tokens are profitable and (ii) can be used as diversifiers for cryptocurrency portfolios. Second, from the gamers’ perspective, we assessed whether the effort of playing continuously to obtain tokens as rewards is compensated with positive returns in the long run. Finally, from a business approach, a positive performance of these tokens could attract to this niche more blockchain companies interested in creating new gaming and metaverse projects.

## 2. Data

For the purpose of this study, we used price series of 174 tokens from the CoinGecko database (CG, 2021) in daily frequency. More specifically, based on CoinGecko and Coinmarketcap categories, we analysed 129 play-to-earn tokens and 84 metaverse tokens between 28 October 2017 and 31 October 2021, given that the first metaverse token, MANA from Decentraland, was introduced on 28 October 2017.<sup>4</sup> We also individually analysed metaverse projects that included play-to-earn games (i.e. tokens are classified in both categories), whose sub-sample includes 39 tokens. Moreover, we used the CCI30 index as the cryptocurrency market capitalization-weighted benchmark from 28 October 2017 to 31 October 2021 (see, e.g., Manahov, 2020 and Vidal-Tomás, 2021). Thus, we were able to examine the performance and dynamics of play-to-earn/metaverse tokens in relation to the evolution of the entire cryptocurrency market.

For all the price time series, we computed daily log returns; the descriptive statistics are shown in Table 1 and Fig. (3). For play-to-earn and metaverse tokens, we report box plots with the entire sample of tokens in Fig. (3), showing the corresponding median in Table 1. As can be observed, the novelty of these projects is highlighted by their short life, given the low number of observations in median: play-to-earn (89), metaverse (174) and metaverse & play-to-earn (123). Moreover, considering mean and skewness values, the performance of these tokens is positive, on average, even though they are also characterised by a high volatility and heterogeneity.<sup>5</sup>

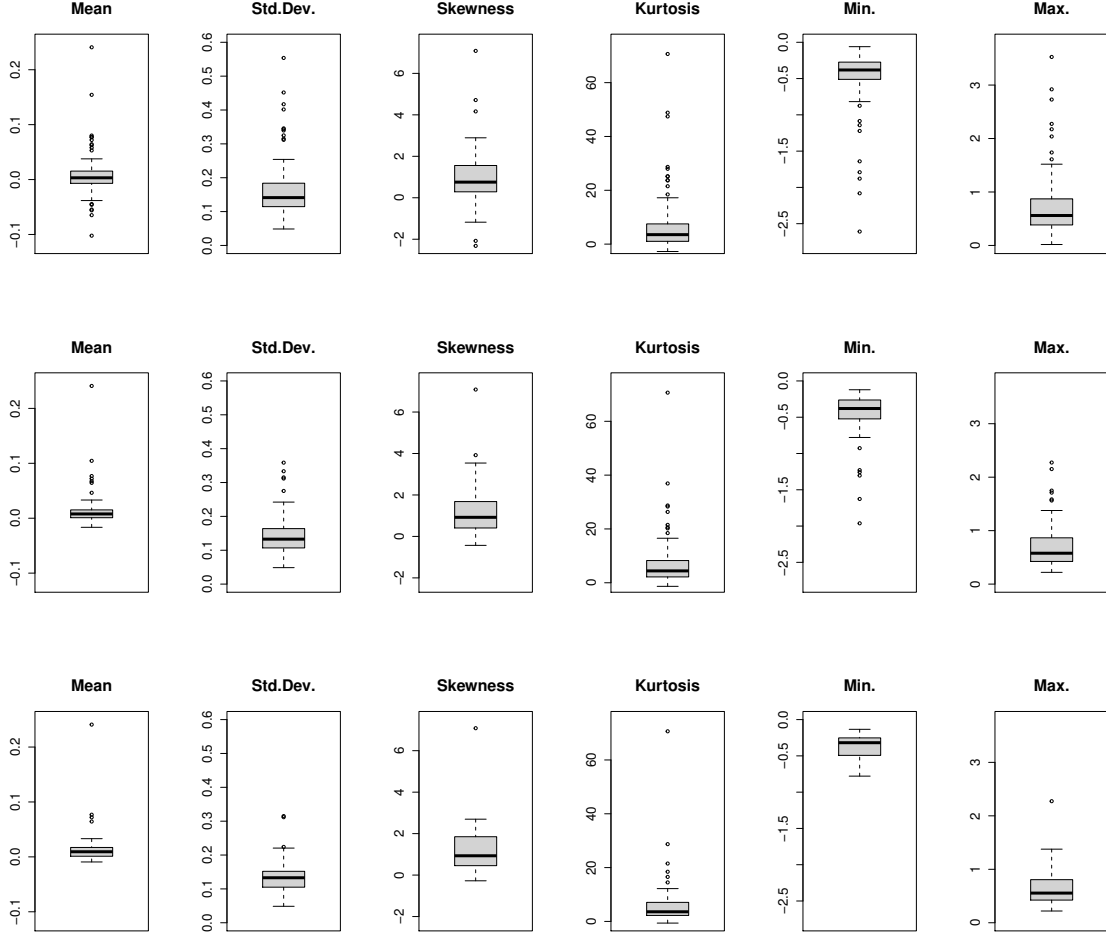
**Table 1:** Descriptive statistics of daily log-returns for all the tokens, in median, and the CCI30 index.

Category (Median)	Tokens	Observations	Mean	Std.Dev.	Skewness	Kurtosis	Min.	Max.
Play-to-earn	129	89	0.0032	0.1413	0.7547	3.5159	-0.3817	0.5600
Metaverse	84	174	0.0077	0.1328	0.9211	4.4136	-0.3800	0.5778
Metaverse & Play-to-earn	39	123	0.0093	0.1329	0.9314	3.5810	-0.3185	0.5549
Crypto benchmark		Observations	Mean	Std.Dev.	Skewness	Kurtosis	Min.	Max.
CCI30		1464	0.0013	0.0476	-1.3994	11.0560	-0.4845	0.1957

<sup>4</sup>The list of tokens used in this paper, with names and symbols, is available in the supplementary material.

<sup>5</sup>We report the descriptive statistics of each token, distinguishing by category, in the supplementary material.

**Figure. 3:** Descriptive statistics of daily log-returns: a) Play-to-earn b) Metaverse, c) Metaverse & Play-to-earn.



### 3. Methodology

#### 3.1. Performance: first-day and buy-and-hold (abnormal) returns

To analyse the short- and long-run performance of play-to-earn and metaverse tokens, we used average first-day and average buy-and-hold returns, respectively. Following [Momtaz \(2019\)](#), the former were calculated as the sum over all tokens  $i$  of the closing and opening price difference over the opening price of the first day of trading, divided by the number of tokens  $n$  in each category:

$$\bar{R} = \frac{1}{n} \sum_{i=1}^n \frac{P_{i,1} - P_{i,0}}{P_{i,0}}, \quad (1)$$

where  $\bar{R}$  is the average first-day returns,  $P_{i,1}$  denotes closing prices and  $P_{i,0}$  represents opening prices.

To analyse the long-term performance, we computed average buy-and-hold returns ( $\overline{BHR}$ ), which are defined as Eq. (1) but we replaced  $P_{i,1}$  with the closing price after the focal holding period ( $P_{i,\tau}$ ):

$$\overline{BHR}_\tau = \frac{1}{n} \sum_{i=1}^n \frac{P_{i,\tau} - P_{i,0}}{P_{i,0}}, \quad (2)$$

where the holding period is denoted by  $\tau$ . For the purpose of this study, and considering the short life of most of the tokens, we considered the following holding periods: (i) 1 week, (ii) 1 month, (iii), 3 months, (iv) 6 months, (v) 9 months, (vi) 1 year, and (vii) all the sample periods at our disposal.

To examine the performance of these tokens compared to the entire cryptocurrency market, we calculated first-day abnormal returns and buy-and-hold abnormal returns by adjusting  $\overline{R}$  and  $\overline{BHR}_\tau$  with a market capitalization-weighted benchmark. In other words, average first-day abnormal returns,  $\overline{AR}$  and average buy-and-hold abnormal returns,  $\overline{BHAR}_\tau$  are defined as  $\overline{R}$  and  $\overline{BHR}_\tau$  less the market return, which is represented by the CCI30 market capitalisation index:

$$\overline{AR} = \frac{1}{n} \sum_{i=1}^n \left[ \frac{P_{i,1} - P_{i,0}}{P_{i,0}} - \frac{P_{CCI30,1} - P_{CCI30,0}}{P_{CCI30,0}} \right], \quad (3)$$

$$\overline{BHAR}_\tau = \frac{1}{n} \sum_{i=1}^n \left[ \frac{P_{i,\tau} - P_{i,0}}{P_{i,0}} - \frac{P_{CCI30,\tau} - P_{CCI30,0}}{P_{CCI30,0}} \right], \quad (4)$$

where  $P_{CCI30,0}$  is the same day as  $P_{i,0}$ .

### 3.2. Dynamics: Pearson and Kendall correlations

To analyse the dependences between the cryptocurrency market (CCI30) and play-to-earn/metaverse tokens, we computed the Pearson correlation, which is the most common measure for studying the similarity between assets' dynamics. We also computed the Kendall correlation (Kendall, 1938), as it is appropriate for time series that are short and non-normal (Aste, 2019), which is a generalised characteristic of our dataset, given the novelty of these assets. The correlation coefficient ranges from -1 to 1, that is, from a negative perfect correlation to a positive perfect correlation, while a value of 0 implies that there is no correlation between the time series.

## 4. Empirical results

### 4.1. Performance: first-day and buy-and-hold (abnormal) returns

We show the main results of this sub-section in Table 2 and Fig. (4), for play-to-earn tokens, Table 3 and Fig. (5), for metaverse tokens, and Table 4 and Fig. (6), for metaverse & play-to-earn tokens.<sup>6</sup>

First, short-run performance,  $\overline{R}$  and  $\overline{AR}$ , are positive when computing the mean but negative when calculating the median. Consequently, we observe a heterogeneous market whose positive mean results in the short run are driven by some large outperformers, which is in line with the behaviour of the cryptocurrency market (Momtaz, 2019). This outcome is supported by the low percentage of tokens with positive average (abnormal) first-day returns: 40.31%

<sup>6</sup>The short- and long-run performance of all the tokens individually is reported in the supplementary material.

(44.19%) for play-to-earn tokens, 41.67% (42.86%) for metaverse tokens, and 35.90% (43.59%) for metaverse & play-to-earn tokens. Therefore, traders and gamers should consider the risk of obtaining negative returns on the first trading day.

Second, focusing on the long-run performance, specifically  $\overline{BHR}$ , we record positive mean and median after the second month for all the categories. The percentage of tokens with positive results tends to improve over time, given that more than 65% of tokens exhibited positive results after the first year. In particular, considering the entire sample period, metaverse projects (also including play-to-earn games) seem to be characterised by a high performance, since more than 80% of tokens obtained positive results. This outcome supports the increasing interest of gamers and blockchain companies in play-to-earn and metaverse projects. Thus, in the near future, we could observe more blockchain companies starting new gaming projects and more gamers playing these games with the expectation of obtaining tokens as in-game rewards.

Third, from the trader perspective, we observe that the metaverse and play-to-earn niche do not guarantee a better performance than the entire cryptocurrency market, represented by the CCI30 index, given the jumps observed with the median of  $\overline{BHAR}$  for different holding periods.<sup>7</sup> However, traders focus on this market could find “new winners” that replicate the positive behaviour of past famous projects, such as AXS, MANA, GALA, UFO, SMI, ENJ, JADE, STARL, WEMIX and ILV.<sup>8</sup> Interestingly enough, even though some of these projects are well-known by the gaming industry and the scientific community (e.g. AXS and MANA, see [Dowling, 2021a](#) and [Dowling, 2021b](#)), some of them, such as ILV, are still projects in progress<sup>9</sup>, which demonstrates the increasing interest in this blockchain niche.

Last, gamers and traders must consider that the high positive performance and the fast increase in IGOs, observed in Fig. (2), seem to indicate the beginning of a new crypto bubble in the gaming industry, which could also give rise to scams, such as Squid game crypto tokens ([Britton, 2021](#)), and overvalue projects, with the consequent losses. Indeed, in our study, we observe tokens that have lost more than 50% of their value: 28 play-to-earn tokens (21% of the sample), 6 metaverse tokens (7% of the sample), and 2 metaverse & play-to-earn tokens (5% of the sample). Therefore, users interested in the crypto gaming industry should also consider the negative side of this market segment, given that, regardless of the positive performance of this niche, “all that glitters is not gold”.

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<sup>7</sup>We observe again for  $\overline{BHAR}$  the effect of large outperformers, given the positive mean and variant median. Thus, the mean cannot be considered as a proper representation of the market.

<sup>8</sup>Specifically, considering the entire sample period, the outperformers for play-to-earn tokens are: AXS (94245.24%), MANA (27523.53%), GALA (5603.64%), UFO (4336.69%) and SMI (4150.32%); for metaverse tokens are: AXS (94245.24%), JADE (44957.78%), STARL (28224.33%), MANA (27523.53%) and ENJ (11891.09%); and for metaverse & play-to-earn tokens are: AXS (94245.24%), MANA (27523.53%), UFO (4336.69%), WEMIX (2396.89%) and ILV (2006.4%). These outperformers are easily identified in Figs. (4), (5) and (6).

<sup>9</sup>According to ILV website, the Open Beta is scheduled for Q1 2022.



**Table 2:** Short- and long-run performance of play-to-earn tokens.

Play-to-earn	$\overline{R}$	$\overline{BHR}_\tau$						
		1 week	1 month	3 months	6 months	9 months	1 year	Entire sample
Mean	0.1213	0.2724	0.4737	1.1789	4.3144	17.2893	65.8121	13.3339
Median	-0.0203	-0.0970	-0.2271	0.0193	1.0211	0.6391	3.3735	0.4049
% of tokens: $R/BHR > 0$	40.31%	38.58%	40.54%	51.56%	60.00%	60.00%	68.75%	61.24%

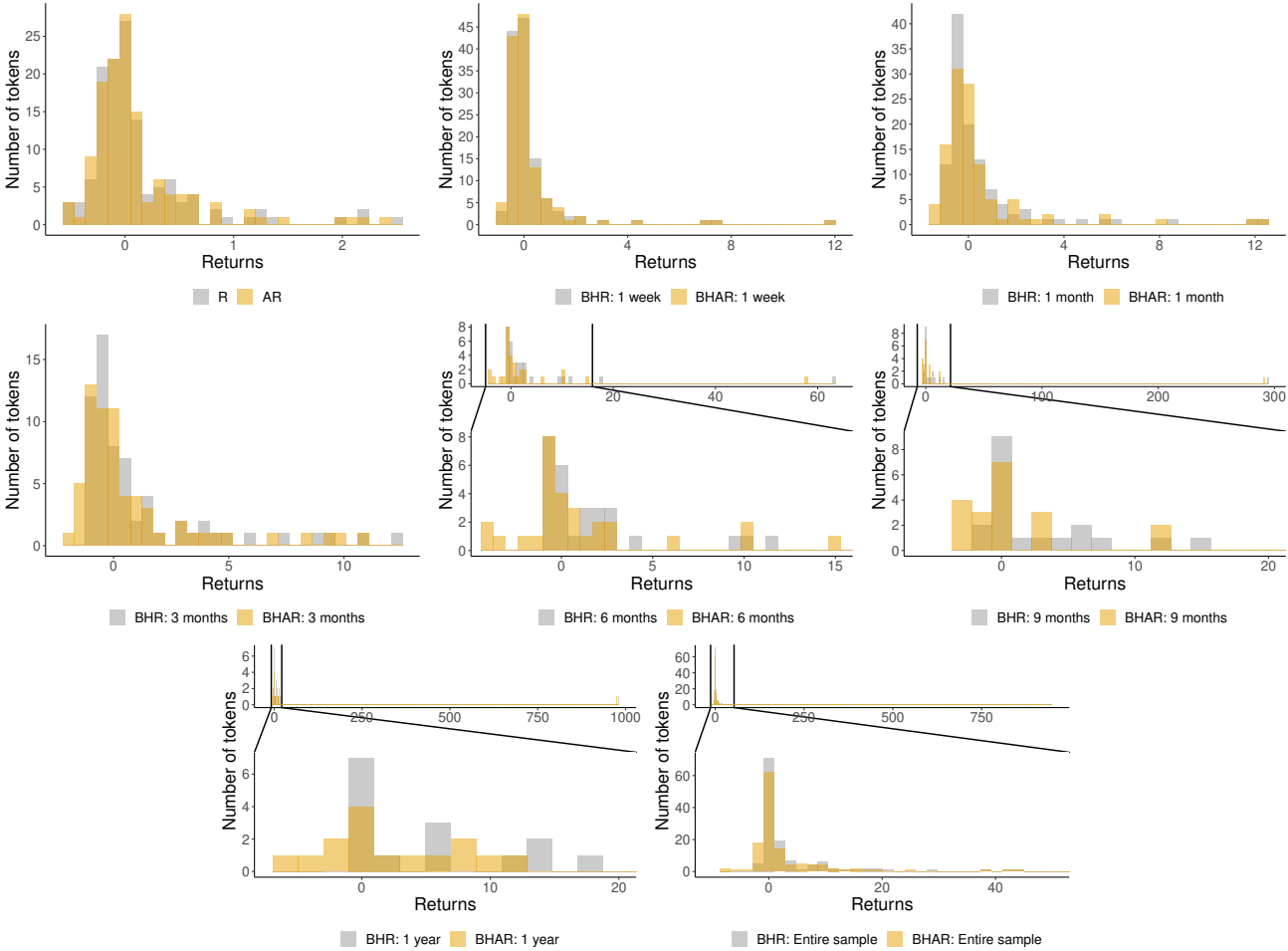
  

Play-to-earn	$\overline{AR}$	$\overline{BHAR}_\tau$						
		1 week	1 month	3 months	6 months	9 months	1 year	Entire sample
Mean	0.1187	0.2597	0.3569	0.7970	3.0327	15.3615	63.0613	12.4515
Median	-0.0319	-0.1120	-0.1933	-0.1526	-0.0365	-0.1715	0.9414	0.0573
% of tokens: $AR/BHAR > 0$	44.19%	36.22%	35.14%	39.06%	50.00%	45.00%	62.50%	51.16%

Tokens	129	127	111	64	30	20	16	129
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**Figure 4:** Histogram of first-day (abnormal) returns (R & AR), and buy-and-hold (abnormal) returns (BHR & BHAR) for play-to-earn tokens.



**Table 3:** Short- and long-run performance of metaverse tokens.

Metaverse	$\bar{R}$	$\overline{BHR}_\tau$						
		1 week	1 month	3 months	6 months	9 months	1 year	Entire sample
Mean	0.1813	0.4397	1.4387	3.2029	4.7285	13.2354	46.7799	33.8304
Median	-0.0175	0.0013	0.1173	0.3417	1.0756	0.9292	1.6124	2.4612
% of tokens: $R/BHR > 0$	41.67%	50.00%	55.26%	60.00%	64.29%	57.14%	65.22%	80.95%

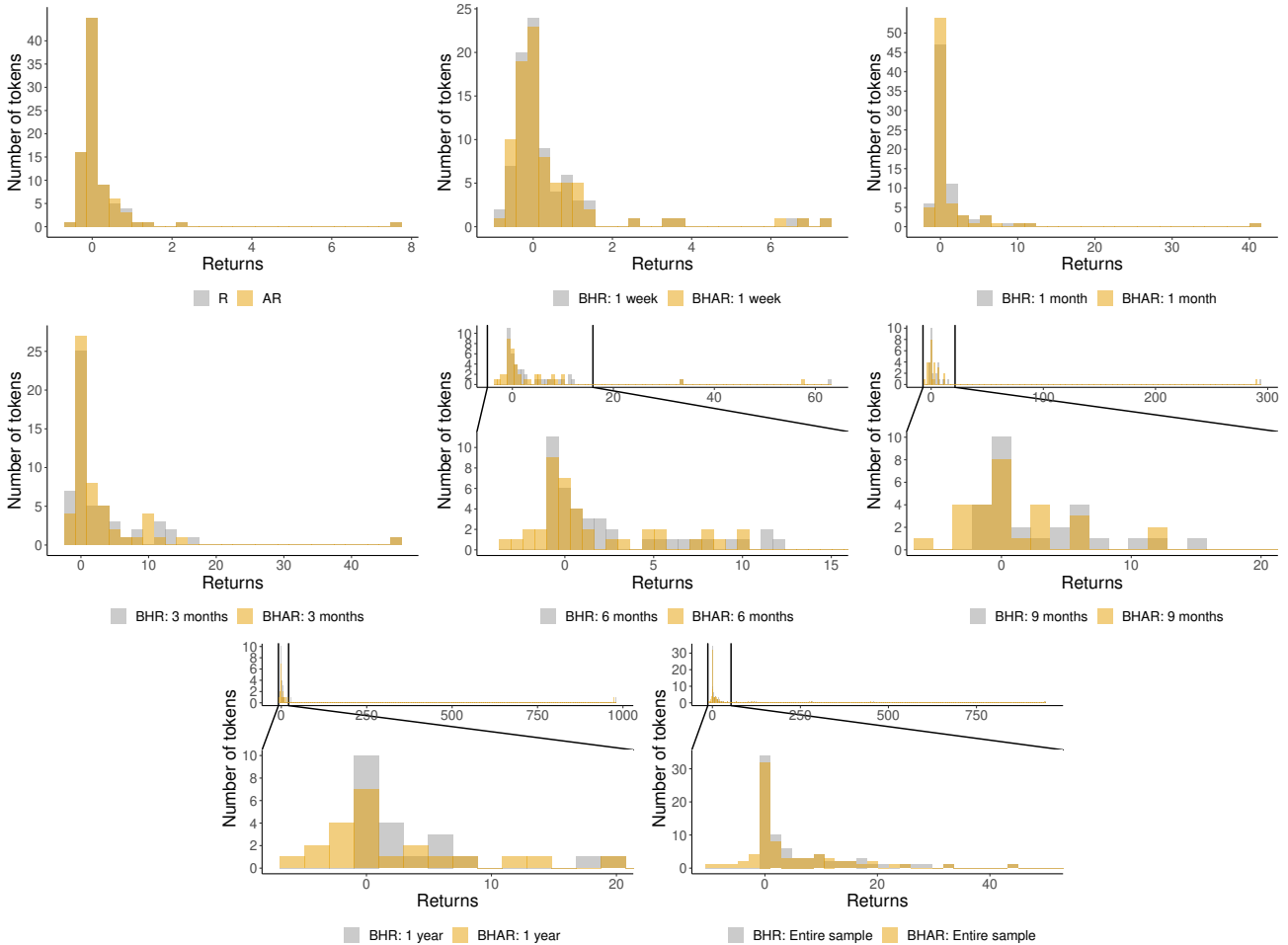
  

Metaverse	$\overline{AR}$	$\overline{BHAR}_\tau$						
		1 week	1 month	3 months	6 months	9 months	1 year	Entire sample
Mean	0.1797	0.4203	1.3376	2.8176	3.6941	11.3513	44.2077	31.9991
Median	-0.0208	-0.0271	-0.0029	0.2119	0.2371	-0.2752	-0.2419	1.2219
% of tokens: $AR/BHAR > 0$	42.86%	44.05%	50.00%	54.55%	54.76%	42.86%	43.48%	69.05%

Tokens	84	84	76	55	42	28	23	84
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**Figure 5:** Histogram of first-day (abnormal) returns (R & AR), and buy-and-hold (abnormal) returns (BHR & BHAR) for metaverse tokens.



**Table 4:** Short- and long-run performance of metaverse & play-to-earn tokens.

Metaverse & Play-to-earn	$\overline{R}$	$\overline{BHR}_\tau$						
		1 week	1 month	3 months	6 months	9 months	1 year	Entire sample
Mean	0.1194	0.4372	0.7254	2.2707	6.0990	36.6660	144.3757	37.1050
Median	-0.0195	-0.0177	-0.0663	0.1344	0.8525	4.7509	6.2049	1.2909
% of tokens: $R/BHR > 0$	35.90%	48.72%	48.57%	59.09%	60.00%	66.67%	85.71%	82.05%

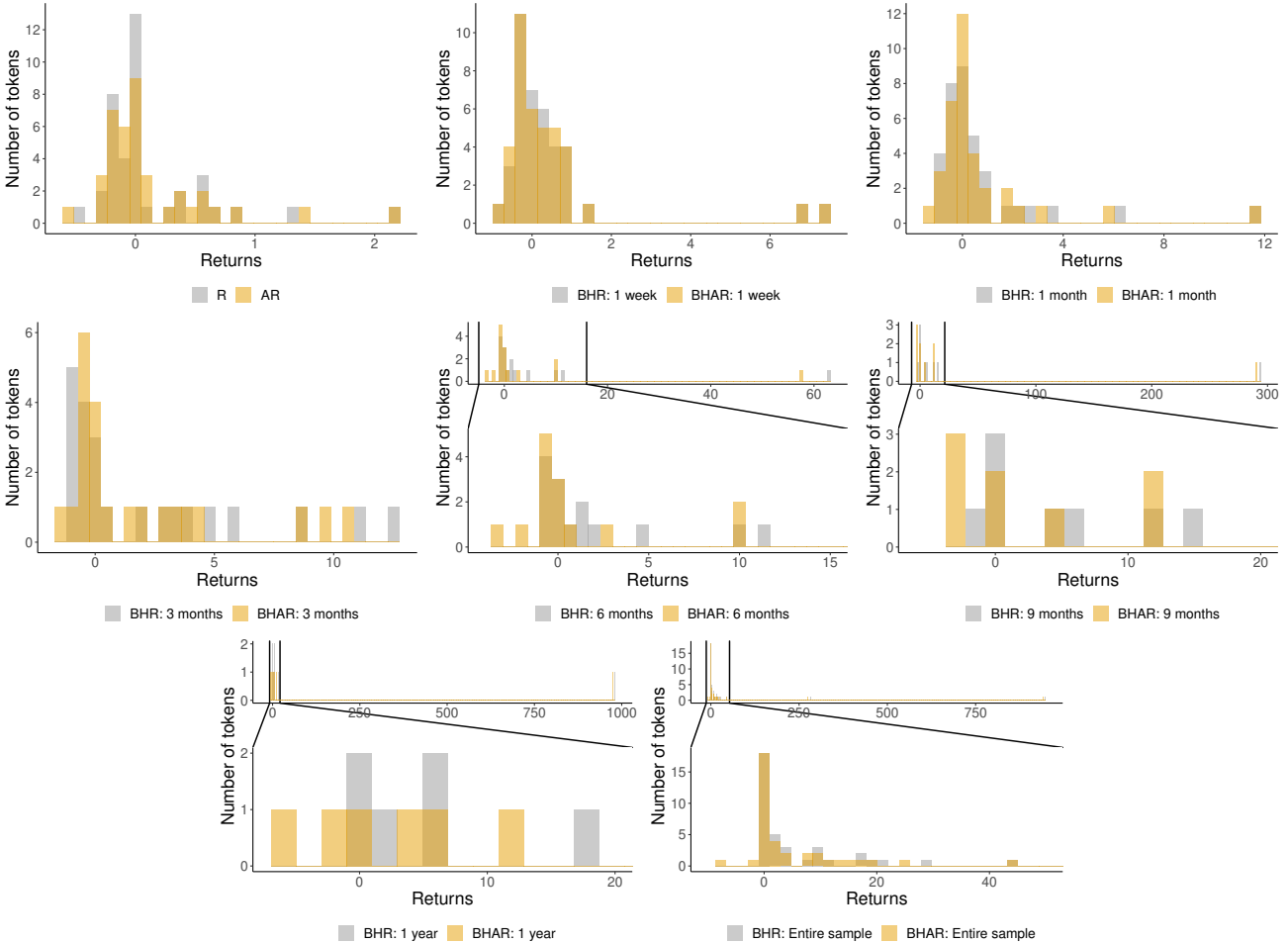
  

Metaverse & Play-to-earn	$\overline{AR}$	$\overline{BHAR}_\tau$						
		1 week	1 month	3 months	6 months	9 months	1 year	Entire sample
Mean	0.1181	0.4331	0.6416	1.8864	4.7933	34.3591	141.0722	35.9645
Median	-0.0139	-0.0147	-0.0978	0.0713	-0.1773	-0.1426	3.9798	0.9033
% of tokens: $AR/BHAR > 0$	43.59%	48.72%	40.00%	50.00%	46.67%	44.44%	57.14%	71.79%

Tokens	39	39	35	22	15	9	7	39
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**Figure. 6:** Histogram of first-day (abnormal) returns (R & AR), and buy-and-hold (abnormal) returns (BHR & BHAR) for metaverse & play-to-earn tokens.



#### 4.2. Dynamics: Pearson and Kendall correlations

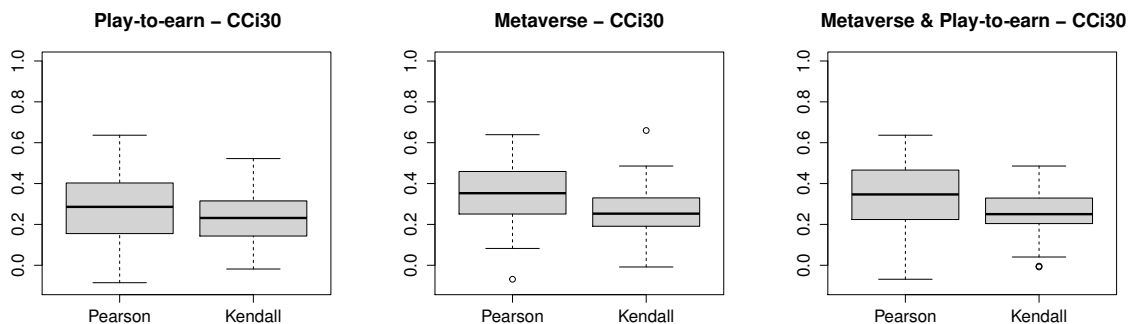
Table 5, and Fig. (7) report Pearson and Kendall correlations between play-to-earn/metaverse tokens and the cryptocurrency market, represented by the CCI30 index. As can be observed, the results show a low co-movement with coefficients around 0.3; that is, the relation is practically non-existent. Thus, metaverse and play-to-earn tokens are not connected with the behaviour of the cryptocurrency market, which allows traders to use these tokens as diversifiers in cryptocurrency portfolios.<sup>10</sup> The absence of co-movement with the general cryptocurrency behaviour is also interesting for blockchain companies, given that they could also diversify their blockchain product portfolio with metaverse and play-to-earn projects.

This result is in line with Dowling (2021b), who observed limited volatility transmissions effects between cryptocurrencies and NFT trades from the Axie infinity, Decentraland and Cryptopunks markets; and Aharon and Demir (2021), who reported that NFTs are mainly independent of shocks from Ethereum. However, compared to these authors, who analysed NFT trades (i.e., in-game items), we analysed the metaverse and play-to-earn tokens related to these markets (e.g. AXS from Axie infinity). Therefore, as observed with NFTs trades, in-game tokens are also not related to the cryptocurrency market.<sup>11</sup>

**Table 5:** Median of Pearson and Kendall correlations: Play-to-earn - CCI30, Metaverse - CCI30, Metaverse & Play-to-earn - CCI30.

	Pearson	Kendall
Play-to-earn - CCI30	0.29	0.23
Metaverse - CCI30	0.35	0.25
Metaverse & Play-to-earn - CCI30	0.35	0.25

**Figure. 7:** Box plots of Pearson and Kendall correlations: Play-to-earn - CCI30, Metaverse - CCI30, Metaverse & Play-to-earn - CCI30.



<sup>10</sup>We should consider that, even though these tokens do not outperform continuously the cryptocurrency market (see *BHAR* in Sec. (4.1)), they do obtain positive results (see *BHR* in Sec. (4.1)) in median. Thus, they could be proper investments, specially considering the diversifiers benefits observed in this section.

<sup>11</sup>The list of individual Pearson and Kendall correlations is available in the supplementary material.

## 5. Conclusion

Since Bitcoin was created by Nakamoto in 2008, blockchain technologies have opened a range of new possibilities in many sectors, such as health care, logistics, and education. In 2021, the gaming industry seized its opportunity with the prominent emergence of play-to-earn games and metaverses.

In this paper, we presented an analysis of the performance and dynamics of this new crypto niche, which is characterised by continuous growth driven by the interest of gamers, traders and companies. On the one hand, our results showed that play-to-earn and metaverse tokens are characterised by positive performance in the long run, on average. Thus, (i) the gaming activity is compensated by the tokens that users receive while playing, and (ii) blockchain companies could find in this niche an alternative market segment in which to invest, given the positive returns. However, when comparing the performance of these tokens to the cryptocurrency market, we observed inconclusive results due to the volatility of this market. Thus, traders could not outperform the cryptocurrency market indices with this group of tokens, even though they could find new “golden eggs” that easily outperform the CCI30 index. On the other hand, in relation to the dynamics of this market segment, we reported that metaverse and play-to-earn tokens are not connected with the cryptocurrency market. As a result, (i) traders could diversify their cryptocurrency portfolio with these tokens, and (ii) blockchain companies could consider new blockchain gaming projects to diversify their product portfolios.

With this study, we contribute to the cryptocurrency literature by providing the first insights into this crypto niche. Notably, it is relevant to highlight that the increase of IGOs, and the extreme positive performance of some tokens, seem to indicate the beginning of a new crypto bubble. Thus, researchers and policymakers should continue analysing the behaviour of this market segment.

## References

- Aharon, D. Y. and Demir, E. (2021). Nfts and asset class spillovers: Lessons from the period around the covid-19 pandemic. *Finance Research Letters*, page 102515.
- Aste, T. (2019). Cryptocurrency market structure: connecting emotions and economics. *Digital Finance*, 1(1):5–21.
- Britton, B. (2021). Investors call scam after collapse of new cryptocurrency squid. *NBC News*. August 21.
- CG (2021). Data from CoinGecko, <http://coingecko.com/>.
- Dowling, M. (2021a). Fertile land: Pricing non-fungible tokens. *Finance Research Letters*, page 102096.
- Dowling, M. (2021b). Is non-fungible token pricing driven by cryptocurrencies? *Finance Research Letters*, page 102097.
- Kendall, M. G. (1938). A new measure of rank correlation. *Biometrika*, 30(1/2):81–93.

- Lee, L.-H., Braud, T., Zhou, P., Wang, L., Xu, D., Lin, Z., Kumar, A., Bermejo, C., and Hui, P. (2021). All one needs to know about metaverse: A complete survey on technological singularity, virtual ecosystem, and research agenda. *arXiv preprint arXiv:2110.05352*.
- Manahov, V. (2020). Cryptocurrency liquidity during extreme price movements: is there a problem with virtual money? *Quantitative Finance*, pages 1–20.
- Momtaz, P. P. (2019). The pricing and performance of cryptocurrency. *The European Journal of Finance*, pages 1–14.
- Nadini, M., Alessandretti, L., Di Giacinto, F., Martino, M., Aiello, L. M., and Baronchelli, A. (2021). Mapping the nft revolution: market trends, trade networks and visual features. *arXiv preprint arXiv:2106.00647*.
- Vidal-Tomás, D. (2021). The entry and exit dynamics of the cryptocurrency market. *Research in International Business and Finance*, 58:101504.
- Wang, Q., Li, R., Wang, Q., and Chen, S. (2021). Non-fungible token (nft): Overview, evaluation, opportunities and challenges. *arXiv preprint arXiv:2105.07447*.

**Supplement to: “The new crypto niche: NFTs,  
play-to-earn, and metaverse tokens”**

David Vidal-Tomás

*dvidal@uji.es*

# 1 List of tokens

**Table 1:** List of tokens distinguishing by category.

Number	Symbol	Name	Category 1	Category 2	Number	Symbol	Name	Category 1	Category 2
1	ADS	Adshares	-	Metaverse	91	MAT	My Master War	Play-to-earn	-
2	AI	Multiverse	-	Metaverse	92	MBOX	Mobox	Play-to-earn	Metaverse
3	ALICE	My Neighbor Alice	Play-to-earn	Metaverse	93	MC	Margin Call	Play-to-earn	-
4	ALIX	AlinX	Play-to-earn	-	94	MEDA	Medacoin	Play-to-earn	Metaverse
5	ALU	Altura	-	Metaverse	95	MIST	Mist	Play-to-earn	Metaverse
6	ARATA	Arata	Play-to-earn	-	96	MLT	Media Licensing Token	-	Metaverse
7	ARENA	Arena Token	Play-to-earn	-	97	MNG	Moon Nation Game	Play-to-earn	Metaverse
8	ATLAS	Star Atlas	Play-to-earn	Metaverse	98	MNY	MoonieNFT	Play-to-earn	-
9	AVXT	Avaxtars Token	Play-to-earn	Metaverse	99	MONA	Monavale	-	Metaverse
10	AXS	Axie Infinity	Play-to-earn	Metaverse	100	MONI	Monsta Infinite	Play-to-earn	Metaverse
11	BCMC	Blockchain Monster Hunt	Play-to-earn	Metaverse	101	MOOLAH	Block Creatures	Play-to-earn	-
12	BETU	Betu	Play-to-earn	-	102	MOOV	dotmoovs	Play-to-earn	Metaverse
13	BIN	Binemon	Play-to-earn	-	103	MWAR	Moon Warriors	Play-to-earn	-
14	BLADE	BladeWarrior	Play-to-earn	-	104	NAKA	Nakamoto Games	Play-to-earn	-
15	BLOK	Bloktopia	-	Metaverse	105	NCR	Neos Credits	-	Metaverse
16	BMARS	Binamars	Play-to-earn	-	106	OASIS	ProjectOasis	-	Metaverse
17	BMON	Binamon	Play-to-earn	-	107	OOKS	Onooks	-	Metaverse
18	BOA	BOSAGORA	-	Metaverse	108	OVL	Overlord Game	Play-to-earn	-
19	BOSON	Boson Protocol	Play-to-earn	Metaverse	109	OVR	Ovr	-	Metaverse
20	BPET	Binapet	Play-to-earn	-	110	PEARL	Crypto Bay	Play-to-earn	-
21	BUNI	Bunicorn	Play-to-earn	-	111	PET	Battle Pets	-	Metaverse
22	BYG	Black Eye Galaxy	Play-to-earn	Metaverse	112	PETG	Pet Games	Play-to-earn	-
23	CCAR	CryptoCars	Play-to-earn	Metaverse	113	PKR	Polker	Play-to-earn	-
24	CEEK	CEEK Smart VR Token	-	Metaverse	114	POLC	Polkacity	-	Metaverse
25	CGG	Chain Guardians	Play-to-earn	-	115	POLIS	Star Atlas DAO	Play-to-earn	Metaverse
26	CGS	Crypto Gladiator Shards	Play-to-earn	-	116	PROT	ProStarter	Play-to-earn	-
27	CHAIN	Chain Games	Play-to-earn	-	117	PWAR	PolkaWar	-	Metaverse
28	CHAINCADE	ChainCade	Play-to-earn	-	118	PYR	Vulcan Forged	-	Metaverse
29	CHR	Chromia	-	Metaverse	119	PYRAM	Pyram Token	Play-to-earn	-
30	CHT	Chronic Token	Play-to-earn	-	120	RACA	Radio Caca	Play-to-earn	Metaverse
31	CMC	Community Coin	Play-to-earn	-	121	REALM	Realm	Play-to-earn	Metaverse
32	CPAN	CryptoPlanes	Play-to-earn	Metaverse	122	RENA	Warena	Play-to-earn	-
33	CPO	Cryptopolis	Play-to-earn	-	123	REVO	Revomon	Play-to-earn	Metaverse
34	CRBN	Carbon	Play-to-earn	-	124	REVV	REVV	Play-to-earn	-
35	CRUSADER	Crusaders of Crypto	Play-to-earn	-	125	RFOX	RedFOX Labs	-	Metaverse
36	CUBE	Somnium Space CUBEs	-	Metaverse	126	RMRK	RMRK	-	Metaverse
37	CWS	Seascape Crowns	Play-to-earn	-	127	RONINGMZ	Ronin Gamez	Play-to-earn	-
38	DEC	Dark Energy Crystals	Play-to-earn	-	128	RPG	Revolve Games	Play-to-earn	Metaverse
39	DEP	DEAPCOIN	Play-to-earn	Metaverse	129	RSUN	RisingSun	Play-to-earn	-
40	DERC	DeRace	Play-to-earn	Metaverse	130	RUNE	Rune	Play-to-earn	-
41	DG	Decentral Games	Play-to-earn	Metaverse	131	SAND	The Sandbox	Play-to-earn	Metaverse
42	DKT	Duelist King	Play-to-earn	-	132	SENSO	SENSO	-	Metaverse
43	DNXC	DinoX	Play-to-earn	-	133	SFUND	Seedify.fund	Play-to-earn	-
44	DOGEDASH	Doge Dash	Play-to-earn	-	134	SHOE	ShoeFY	-	Metaverse
45	DOGIRA	Dogira	Play-to-earn	-	135	SIN	SINOVATE	-	Metaverse
46	DOGO	DogemonGo	Play-to-earn	-	136	SKILL	CryptoBlades	Play-to-earn	-
47	DVI	Dvision Network	-	Metaverse	137	SLP	Smooth Love Potion	Play-to-earn	-
48	DXO	DeepSpace Token	Play-to-earn	-	138	SMI	SafeMoon Inu	Play-to-earn	-
49	EFI	Efinity	-	Metaverse	139	SMON	StarMon Token	Play-to-earn	Metaverse
50	EGG	Waves Ducks	Play-to-earn	-	140	SPH	Spheroid Universe	-	Metaverse
51	EGG.1	LoserChick EGG	Play-to-earn	-	141	SPS	Splinterlands	Play-to-earn	-
52	EJS	Enjinstarter	Play-to-earn	Metaverse	142	SPU	SpacePort Universe	Play-to-earn	-
53	ENJ	Enjin Coin	-	Metaverse	143	STARL	StarLink	-	Metaverse
54	EPIK	Epik Prime	-	Metaverse	144	STEP	Step Hero Soul	Play-to-earn	-
55	EQ	Equilibrium	Play-to-earn	-	145	STT	StarTerra	Play-to-earn	-
56	ERN	Ethernity Chain	-	Metaverse	146	SURE	inSure DeFi	-	Metaverse
57	ETERNAL	CryptoMines Eternal	Play-to-earn	-	147	TAU	Lamden	Play-to-earn	-
58	ETHV	Ethverse	-	Metaverse	148	TOP	Tokenplay	Play-to-earn	-
59	EUT	Eutaria	Play-to-earn	-	149	TOWER	Tower	-	Metaverse
60	FARA	FaraLand	Play-to-earn	Metaverse	150	TRIAS	Trias Token	-	Metaverse
61	FEAR	Fear	Play-to-earn	Metaverse	151	TVK	Terra Virtua Kollect	-	Metaverse
62	FINA	Defina Finance	Play-to-earn	-	152	UFO	UFO Gaming	Play-to-earn	Metaverse
63	FIWA	Defi Warrior	Play-to-earn	Metaverse	153	UJENNY	Jenny Metaverse DAO Token	Play-to-earn	-
64	FOXY	Foxy Equilibrium	Play-to-earn	-	154	ULTGG	UltimoGG	Play-to-earn	-
65	GAFI	GameFi	Play-to-earn	Metaverse	155	UOS	Ultra	-	Metaverse
66	GALA	Gala	Play-to-earn	-	156	VEMP	vEmpire DDAO	-	Metaverse
67	GHST	Aavegotchi	Play-to-earn	Metaverse	157	VIBE	VIBE	Play-to-earn	-
68	GMR	GMR Finance	Play-to-earn	-	158	VIDT	VIDT Datalink	Play-to-earn	-
69	GODS	Gods Unchained	Play-to-earn	-	159	VRA	Verasity	-	Metaverse
70	GON+	Dragon Warrior	Play-to-earn	-	160	WANA	Wanaka Farm	Play-to-earn	-
71	HER	HeroVerse	Play-to-earn	-	161	WAR	Robot Wars	Play-to-earn	-
72	HERA	Hero Arena	Play-to-earn	-	162	WAXE	WAXE	Play-to-earn	Metaverse
73	HERO	Metahero	-	Metaverse	163	WAXP	WAX	Play-to-earn	Metaverse
74	HERO	Step Hero	Play-to-earn	-	164	WEMIX	WEMIX Token	Play-to-earn	Metaverse
75	HIFI	HiFi Gaming Society	Play-to-earn	-	165	WIZARD	Wizard Token	Play-to-earn	-
76	HIGH	Highstreet	-	Metaverse	166	WSG	Wall Street Games	Play-to-earn	-
77	HYPER	HyperChain X	Play-to-earn	-	167	XNL	Chronicle	-	Metaverse
78	ICE	Decentral Games ICE	Play-to-earn	Metaverse	168	XTM	Torum	-	Metaverse
79	ILV	Illuvium	Play-to-earn	Metaverse	169	XWG	X World Games	Play-to-earn	-
80	INARI	Inari	Play-to-earn	-	170	YGG	Yield Guild Games	Play-to-earn	Metaverse
81	JADE	Jade Currency	-	Metaverse	171	ZDC	Zodiac	Play-to-earn	-
82	KAINET	KAINET	Play-to-earn	-	172	ZOO	ZooKeeper	Play-to-earn	-
83	KILL	MemeKiller	Play-to-earn	-	173	ZOO.1	ZOO - Crypto World	Play-to-earn	-
84	KLO	Kalao	-	Metaverse	174	ZOON	CryptoZoon	Play-to-earn	-
85	KMON	Kryptomon	Play-to-earn	-					
86	KNIGHT	Forest Knight	Play-to-earn	-					
87	KOL	Kollect	Play-to-earn	-					
88	KOMBAT	Crypto Kombat	Play-to-earn	-					
89	LYXE	LUKSO Token	-	Metaverse					
90	MANA	Decentraland	Play-to-earn	Metaverse					





**Table 3:** Descriptive statistics of daily log-returns for each token: Metaverse.

Metaverse	N	Mean	Std.Dev.	Skewness	Kurtosis	Min.	Max.
ADS	1458	0.0018	0.1141	0.0642	20.6085	-1.2293	1.1875
AI	138	-0.0100	0.1396	-0.4315	4.3545	-0.6385	0.4708
ALICE	230	-0.0018	0.1110	0.0224	2.3153	-0.5174	0.3547
ALU	184	0.0229	0.2225	1.4254	6.3520	-0.6249	1.2687
ATLAS	59	0.0072	0.1363	1.9682	6.3179	-0.2597	0.6227
AVXT	47	0.0082	0.1413	0.7194	1.5106	-0.3185	0.4589
AXS	361	0.0190	0.1146	0.8088	2.8427	-0.4865	0.5268
BCMC	17	0.0721	0.3118	2.2531	5.6181	-0.2965	1.1504
BLOK	24	0.1045	0.1806	-0.0780	-1.3281	-0.1898	0.4011
BOA	816	0.0040	0.0859	1.4971	13.1748	-0.4558	0.7156
BOSON	205	-0.0026	0.1064	0.4104	2.8421	-0.4707	0.3950
BYG	119	0.0120	0.2029	2.6966	16.5402	-0.5699	1.3766
CCAR	69	0.0094	0.1370	0.4470	2.1275	-0.3507	0.4858
CEEK	1206	0.0009	0.1393	1.7718	20.2086	-0.6800	1.5847
CHR	886	0.0017	0.0979	0.2462	8.3443	-0.6931	0.5968
CPAN	14	0.0768	0.1401	0.1897	-0.2736	-0.1877	0.3809
CUBE	578	0.0082	0.1601	1.8353	15.3942	-0.6705	1.3558
DEP	565	0.0005	0.0486	1.8666	14.4899	-0.1779	0.4446
DERC	89	0.0174	0.1351	0.4610	3.4931	-0.5108	0.4834
DG	333	0.0089	0.1069	0.3199	1.0054	-0.3784	0.3542
DVI	362	0.0093	0.0995	0.7899	5.1635	-0.4487	0.5405
EFI	88	-0.0006	0.0822	0.6405	2.0114	-0.2190	0.2804
EJS	28	0.0129	0.1377	1.1808	2.5634	-0.2282	0.4751
ENJ	1451	0.0033	0.0873	1.3184	14.5949	-0.6445	0.7512
EPIK	65	-0.0166	0.1442	-0.3991	2.3689	-0.5263	0.3798
ERN	237	0.0027	0.1342	0.8770	2.8792	-0.3946	0.6250
ETHV	450	0.0009	0.2292	0.4160	8.0976	-1.3039	1.3713
FARA	139	0.0175	0.1389	2.3202	9.9649	-0.2613	0.8568
FEAR	158	0.0014	0.1171	0.9983	3.5810	-0.3891	0.5549
FIWA	54	-0.0093	0.0740	1.1669	1.7635	-0.1339	0.2198
GAFI	50	0.0109	0.0966	1.8340	5.6446	-0.1745	0.4291
GHST	412	0.0031	0.0518	1.5566	12.1921	-0.2418	0.3965
HERO	116	0.0227	0.1208	0.7747	1.0273	-0.2781	0.3908
HIGH	16	0.0674	0.1772	1.2212	0.6796	-0.1215	0.5429
ICE	9	0.2409	0.3151	0.4045	-0.6237	-0.2468	0.8605
ILV	214	0.0143	0.0961	0.7626	3.5309	-0.2734	0.5152
JADE	659	0.0089	0.3333	1.0368	6.7325	-1.2574	1.7112
KLO	34	0.0310	0.1164	-0.0078	-0.7250	-0.2129	0.2633
LYXE	527	0.0090	0.1110	3.5394	36.9026	-0.2637	1.3185
MANA	1461	0.0040	0.0873	2.2092	28.7130	-0.6536	1.0688
MBOX	201	0.0009	0.1329	1.9651	9.7980	-0.2737	0.8708
MEDA	45	0.0644	0.2240	1.7991	3.7871	-0.2821	0.9322
MIST	197	0.0023	0.1636	1.2724	2.8623	-0.3448	0.6257
MLT	164	0.0027	0.1501	1.4093	4.8383	-0.4216	0.6928
MNG	150	0.0169	0.2205	7.0849	70.6516	-0.5001	2.2739
MONA	329	0.0003	0.1327	1.3339	7.9050	-0.5342	0.7515
MONI	45	-0.0019	0.1317	0.0579	0.4851	-0.3817	0.3352
MOOV	159	0.0002	0.1534	0.6298	3.0261	-0.5198	0.6911
NCR	67	0.0128	0.0771	1.6301	6.6488	-0.1424	0.3885
OASIS	18	-0.0063	0.2077	1.8601	4.4727	-0.2877	0.6931
OOKS	139	0.0038	0.2422	0.0500	28.3227	-1.6266	1.5635
OVR	314	0.0091	0.1072	1.7475	12.0261	-0.4118	0.6874
PET	233	0.0018	0.1593	1.7022	8.1743	-0.4169	0.9812
POLC	249	0.0090	0.1627	1.8812	7.2582	-0.3878	1.0029
POLIS	59	-0.0017	0.0871	0.9130	2.8042	-0.2154	0.3346
PWAR	123	0.0160	0.1940	1.7119	4.6849	-0.3679	0.7644
PYR	200	0.0119	0.1176	1.4182	4.2014	-0.2838	0.5705
RACA	72	0.0331	0.1825	1.5588	4.7172	-0.2978	0.8750
REALM	46	0.0136	0.1186	0.3840	0.2350	-0.2190	0.3486
REVO	202	-0.0042	0.1767	0.7321	5.5335	-0.6954	0.8709
RFOX	369	0.0054	0.1102	0.7038	3.6570	-0.4266	0.6240
RMRK	33	0.0187	0.1108	0.4466	-0.4970	-0.1686	0.2558
RPG	34	0.0230	0.1504	2.0518	3.9483	-0.1617	0.5323
SAND	443	0.0071	0.1037	0.9314	7.8372	-0.4674	0.7131
SENSO	553	0.0039	0.0667	1.6613	10.0781	-0.2551	0.4285
SHOE	12	-0.0013	0.2203	0.9603	-0.7297	-0.2096	0.4487
SIN	1096	-0.0012	0.0893	-0.0053	3.5978	-0.5785	0.4574
SMON	59	0.0140	0.1491	0.8583	4.7063	-0.4996	0.5600
SPH	453	0.0034	0.1817	0.7947	8.3822	-0.9263	1.0065
STARL	122	0.0463	0.2751	3.9203	26.3254	-0.4580	2.1518
SURE	661	-0.0040	0.3587	-0.3066	7.8497	-1.9621	1.7487
TOWER	244	0.0077	0.1257	0.8972	2.2161	-0.3477	0.5828
TRIAS	256	0.0110	0.1504	0.6824	3.3812	-0.5067	0.7382
TVK	324	0.0049	0.1177	0.3997	2.2760	-0.4603	0.5586
UFO	123	0.0309	0.1921	0.0625	0.3737	-0.6440	0.5817
UOS	836	0.0036	0.0774	-0.1381	5.3588	-0.5786	0.4076
VEMP	60	0.0270	0.1642	1.2535	2.0781	-0.3075	0.5500
VRA	253	0.0139	0.1083	0.4274	0.7568	-0.3604	0.3684
WAXE	306	0.0078	0.0802	1.9678	21.5104	-0.2573	0.7332
WAXP	1392	-0.0014	0.0846	-0.2756	18.4568	-0.7792	0.7550
WEMIX	364	0.0093	0.1113	1.1930	4.8109	-0.3722	0.5739
XNL	44	-0.0099	0.1068	-0.2247	1.5210	-0.3608	0.2389
XTM	45	-0.0101	0.1174	-0.2042	1.2405	-0.3149	0.3344
YGG	95	0.0163	0.1260	0.9293	1.4257	-0.2863	0.4193
Median	174	0.0077	0.1328	0.9211	4.4136	-0.3800	0.5778

**Table 4:** Descriptive statistics of daily log-returns for each token: Metaverse & Play-to-earn.

Metaverse & Play-to-earn	N	Mean	Std.Dev.	Skewness	Kurtosis	Min.	Max.
ALICE	230	-0.0018	0.1110	0.0224	2.3153	-0.5174	0.3547
ATLAS	59	0.0072	0.1363	1.9682	6.3179	-0.2597	0.6227
AVXT	47	0.0082	0.1413	0.7194	1.5106	-0.3185	0.4589
AXS	361	0.0190	0.1146	0.8088	2.8427	-0.4865	0.5268
BCMC	17	0.0721	0.3118	2.2531	5.6181	-0.2965	1.1504
BOSON	205	-0.0026	0.1064	0.4104	2.8421	-0.4707	0.3950
BYG	119	0.0120	0.2029	2.6966	16.5402	-0.5699	1.3766
CCAR	69	0.0094	0.1370	0.4470	2.1275	-0.3507	0.4858
CPAN	14	0.0768	0.1401	0.1897	-0.2736	-0.1877	0.3809
DEP	565	0.0005	0.0486	1.8666	14.4899	-0.1779	0.4446
DERC	89	0.0174	0.1351	0.4610	3.4931	-0.5108	0.4834
DG	333	0.0089	0.1069	0.3199	1.0054	-0.3784	0.3542
EJS	28	0.0129	0.1377	1.1808	2.5634	-0.2282	0.4751
FARA	139	0.0175	0.1389	2.3202	9.9649	-0.2613	0.8568
FEAR	158	0.0014	0.1171	0.9983	3.5810	-0.3891	0.5549
FIWA	54	-0.0093	0.0740	1.1669	1.7635	-0.1339	0.2198
GAFI	50	0.0109	0.0966	1.8340	5.6446	-0.1745	0.4291
GHST	412	0.0031	0.0518	1.5566	12.1921	-0.2418	0.3965
ICE	9	0.2409	0.3151	0.4045	-0.6237	-0.2468	0.8605
ILV	214	0.0143	0.0961	0.7626	3.5309	-0.2734	0.5152
MANA	1461	0.0040	0.0873	2.2092	28.7130	-0.6536	1.0688
MBOX	201	0.0009	0.1329	1.9651	9.7980	-0.2737	0.8708
MEDA	45	0.0644	0.2240	1.7991	3.7871	-0.2821	0.9322
MIST	197	0.0023	0.1636	1.2724	2.8623	-0.3448	0.6257
MNG	150	0.0169	0.2205	7.0849	70.6516	-0.5001	2.2739
MONI	45	-0.0019	0.1317	0.0579	0.4851	-0.3817	0.3352
MOOV	159	0.0002	0.1534	0.6298	3.0261	-0.5198	0.6911
POLIS	59	-0.0017	0.0871	0.9130	2.8042	-0.2154	0.3346
RACA	72	0.0331	0.1825	1.5588	4.7172	-0.2978	0.8750
REALM	46	0.0136	0.1186	0.3840	0.2350	-0.2190	0.3486
REVO	202	-0.0042	0.1767	0.7321	5.5335	-0.6954	0.8709
RPG	34	0.0230	0.1504	2.0518	3.9483	-0.1617	0.5323
SAND	443	0.0071	0.1037	0.9314	7.8372	-0.4674	0.7131
SMON	59	0.0140	0.1491	0.8583	4.7063	-0.4996	0.5600
UFO	123	0.0309	0.1921	0.0625	0.3737	-0.6440	0.5817
WAXE	306	0.0078	0.0802	1.9678	21.5104	-0.2573	0.7332
WAXP	1392	-0.0014	0.0846	-0.2756	18.4568	-0.7792	0.7550
WEMIX	364	0.0093	0.1113	1.1930	4.8109	-0.3722	0.5739
YGG	95	0.0163	0.1260	0.9293	1.4257	-0.2863	0.4193
Median	123	0.0093	0.1329	0.9314	3.5810	-0.3185	0.5549





**Table 6:** *R*, *AR*, *BHR* and *BHAR* for each token: Metaverse.

Token	R		BHR						AR		BHAR					
Metaverse	1d	1w	1m	3m	6m	9m	1y	E.S.	1d	1w	1m	3m	6m	9m	1y	E.S.
ADS	-0.0074	0.0943	0.7319	4.8531	0.9589	-0.0499	0.4832	12.7913	-0.0497	-0.1040	0.0924	2.2009	-0.7291	-0.7026	0.4056	6.6496
AI	-0.3071	-0.7390	-0.8525	-0.9190	-	-	-	-0.7481	-0.2601	-0.4499	-0.5832	-1.0873	-	-	-	-1.0345
ALICE	-0.1918	-0.3271	-0.3893	-0.7437	-0.4060	-	-	-0.3386	-0.2220	-0.3612	-0.8219	-0.7138	-0.5958	-	-	-0.7192
ALU	0.7480	6.5356	0.2882	0.6202	33.1777	-	-	66.5134	0.7234	6.3578	0.6281	1.0239	33.2349	-	-	66.5696
ATLAS	0.8640	0.7685	0.1763	-	-	-	-	0.5309	0.8345	0.8186	0.2670	-	-	-	-	0.4707
AVXT	-0.0203	-0.1269	0.3477	-	-	-	-	0.4670	-0.0515	-0.0147	0.2924	-	-	-	-	0.3180
AXS	-0.0742	0.8131	2.5144	5.8634	63.0357	293.5093	979.0961	947.2498	-0.1303	0.7119	2.0361	4.5350	57.5820	290.6076	974.2172	942.4524
BCMC	2.1596	1.4104	-	-	-	-	-	2.4039	2.1276	1.3143	-	-	-	-	-	2.3146
BLOK	-0.1381	1.2122	-	-	-	-	-	11.2870	-0.1319	1.2039	-	-	-	-	-	11.1891
BOA	-0.0315	0.9562	0.3239	2.7238	8.3426	5.4792	7.6067	24.7184	-0.0443	1.0075	0.4966	2.8967	8.3888	5.6021	7.4536	19.0814
BOSON	-0.1102	-0.2539	-0.3091	-0.8963	-0.7913	-	-	-0.4134	-0.1625	-0.4941	-0.7382	-0.5960	-0.7985	-	-	-0.5315
BYG	-0.0156	-0.4924	2.0175	2.0886	-	-	-	3.1475	0.0275	-0.4469	1.9725	1.7126	-	-	-	2.5431
CCAR	-0.0002	0.4902	-0.2041	-	-	-	-	0.9131	0.0648	0.4976	-0.0122	-	-	-	-	0.8091
CEEK	-0.0927	-0.0238	-0.2964	-0.8816	-0.9135	-0.9210	-0.9412	1.2756	-0.0497	-0.0461	-0.1141	-0.4685	-0.2214	-0.2984	-0.6287	-1.9046
CHR	-0.1070	-0.3999	-0.4482	-0.5554	-0.8407	-0.7721	-0.8351	2.8552	-0.1290	-0.3189	-0.4998	-0.3299	-0.4013	-0.6981	-0.5853	-1.9692
CPAN	-0.1711	0.5582	-	-	-	-	-	1.9296	-0.1665	0.5124	-	-	-	-	-	1.8785
CUBE	0.0255	-0.0372	-0.3602	0.4024	3.7365	2.8698	14.5048	118.3280	0.0109	0.0862	0.0576	0.5750	3.4562	2.6127	11.5180	113.0010
DEP	0.0256	0.0479	-0.1246	0.6216	-0.1476	-0.0553	0.8576	0.3478	0.0251	0.0278	-0.3420	0.2106	-0.8261	-2.8020	-6.7418	-8.2676
DERC	-0.1627	-0.2067	3.4502	-	-	-	-	3.6881	-0.2067	-0.3746	3.0004	-	-	-	-	3.1520
DG	-0.2010	-0.1050	-0.2271	4.9273	4.3856	14.9428	-	18.0825	-0.2151	-0.0597	-0.3996	3.2784	2.3940	12.2662	-	14.9979
DVI	-0.0312	0.0436	0.3720	2.3957	11.1418	5.2732	19.4586	27.4840	-0.0360	-0.0501	-0.0858	1.1269	5.5829	2.4134	14.7362	22.6849
EFI	-0.1967	0.0734	0.1560	-	-	-	-	-0.0550	-0.2208	-0.1328	-0.3334	-	-	-	-	-0.6229
EJS	0.0942	0.5501	-	-	-	-	-	0.4362	0.1012	0.4870	-	-	-	-	-	0.2818
ENJ	0.0412	-0.0101	1.1154	5.5419	6.3708	1.3031	1.3573	124.0036	0.1043	-0.1132	0.2014	4.5575	4.9681	1.1343	1.4352	118.9109
EPIK	0.4621	-0.1618	-0.5302	-	-	-	-	-0.6594	0.4713	-0.2868	-0.4472	-	-	-	-	-0.8437
ERN	0.8683	2.6381	4.8159	0.0397	1.8159	-	-	0.8921	0.8186	2.5636	4.4699	-0.1146	1.3675	-	-	0.4098
ETHV	0.7222	1.2885	0.1968	-0.7441	-0.7037	-0.6128	-0.7534	0.5192	0.6925	1.2319	0.3325	-0.6642	-1.9301	-5.8130	-3.2100	-3.7899
FARA	-0.0307	0.1174	1.5884	8.7055	-	-	-	10.4475	-0.0350	0.2101	1.8340	8.5377	-	-	-	10.1181
FEAR	-0.3223	-0.4478	-0.7289	0.1172	-	-	-	0.2422	-0.2796	-0.4410	-0.5156	-0.0681	-	-	-	-0.0309
FIWA	-0.1016	-0.3324	-0.2926	-	-	-	-	-0.3937	-0.1120	-0.1722	-0.1725	-	-	-	-	-0.3592
GAFI	0.0000	-0.0290	0.9948	-	-	-	-	0.7210	-0.0333	-0.0571	0.9680	-	-	-	-	0.5601
GHST	0.3329	-0.1722	-0.0663	0.0055	1.1896	0.5554	1.6124	2.5185	0.3554	-0.1626	-0.0978	-0.3612	-1.9076	-2.7268	-2.5732	-2.2691
HERO	-0.0899	-0.2582	3.0395	10.8557	-	-	-	12.9264	-0.0335	-0.1601	2.9554	10.4687	-	-	-	12.3371
HIGH	-0.1144	-0.0546	-	-	-	-	-	1.9419	-0.1079	-0.1062	-	-	-	-	-	1.8634
ICE	0.0158	6.8817	-	-	-	-	-	7.7400	-0.0051	6.8701	-	-	-	-	-	7.7149
ILV	0.6740	0.9182	0.3325	0.1517	10.0990	-	-	20.3293	0.6545	0.7691	-0.0081	0.3726	10.1146	-	-	20.0640
JADE	0.3663	3.6832	0.3532	-0.3075	-0.1362	-0.0426	-0.4581	458.7925	0.3413	3.6775	0.3586	-0.7414	-0.6082	-1.0915	-1.9155	449.5778
KLO	-0.1918	0.3065	0.9238	-	-	-	-	1.8685	-0.1598	0.1789	0.6418	-	-	-	-	1.5850

**Table 6:**  $R$ ,  $AR$ ,  $BHR$  and  $BHAR$  for each token: Metaverse.

Token	R		BHR						AR		BHAR					
Metaverse	1d	1w	1m	3m	6m	9m	1y	E.S.	1d	1w	1m	3m	6m	9m	1y	E.S.
LYXE	-0.0207	0.1121	-0.2506	2.3488	1.3254	10.2320	27.3022	109.5118	-0.0505	0.0507	-0.3176	1.7919	0.6541	6.2843	19.0982	102.5157
MANA	0.0029	0.1432	0.7448	12.4936	11.4842	11.9794	6.2049	281.3459	0.0064	-0.0243	0.1838	9.8192	10.0076	11.3209	6.1356	275.2353
MBOX	-0.0195	-0.2674	-0.6435	-0.7691	0.2033	-	-	0.1950	-0.0498	-0.3412	-0.7721	-0.3926	0.2534	-	-	0.1634
MEDA	0.5350	7.2606	11.8380	-	-	-	-	17.1254	0.5653	7.3825	11.8081	-	-	-	-	17.0492
MIST	-0.0072	0.1710	0.3082	-0.6695	-0.1012	-	-	0.5870	0.0475	0.3488	0.3124	-0.1422	0.1042	-	-	0.7219
MLT	-0.3440	-0.4820	-0.7336	-0.6660	-	-	-	0.5517	-0.2176	-0.5871	-0.6325	-0.7223	-	-	-	0.2470
MNG	-0.2285	-0.3698	-0.4848	10.9045	-	-	-	11.6401	-0.1583	-0.3180	-0.2288	10.7967	-	-	-	11.4164
MONA	0.0898	-0.5873	-0.4591	-0.0054	-0.3984	-0.3265	-	0.0871	0.1015	-0.5348	-0.7689	-1.5786	-2.8473	-3.1135	-	-2.9253
MONI	-0.3173	-0.3462	-0.1635	-	-	-	-	-0.0801	-0.2870	-0.2243	-0.1933	-	-	-	-	-0.1563
MOOV	-0.1942	-0.6249	-0.8579	-0.6347	-	-	-	0.0296	-0.2725	-0.6392	-0.6066	-0.7797	-	-	-	-0.2338
NCR	0.1485	0.1807	0.2851	-	-	-	-	1.3600	0.2046	0.1423	0.3282	-	-	-	-	1.2130
OASIS	1.0000	0.0127	-	-	-	-	-	-0.1076	0.9911	-0.0663	-	-	-	-	-	-0.2316
OOKS	0.0235	-0.1171	-0.2434	0.2919	-	-	-	0.6924	0.0192	-0.0245	0.0022	0.1241	-	-	-	0.3631
OVR	-0.0082	-0.1950	-0.2353	16.2230	9.2782	8.0780	-	16.4573	-0.0324	-0.1919	-0.7074	14.4864	7.7730	5.7561	-	13.8215
PET	-0.0699	1.1078	3.7453	3.8555	0.9616	-	-	0.5162	-0.1284	1.0929	3.4528	3.7907	0.7441	-	-	0.1422
POLC	-0.0670	-0.1636	0.6250	0.6801	-0.1609	-	-	8.4684	-0.0057	-0.1724	5.9348	0.4324	-0.5924	-	-	7.8889
POLIS	0.3975	0.3326	-0.1437	-	-	-	-	-0.0962	0.3679	0.3826	-0.0530	-	-	-	-	-0.1564
PWAR	-0.0844	0.0179	10.1086	1.1387	-	-	-	6.1843	-0.0304	0.0415	10.1124	0.9656	-	-	-	5.6332
PYR	0.0100	0.0750	1.0500	-0.2250	2.8850	-	-	9.8850	-0.0277	0.0544	0.9405	0.2119	3.0331	-	-	9.9218
RACA	0.2912	0.8558	0.6083	-	-	-	-	9.8595	0.3088	0.8874	0.5709	-	-	-	-	9.7138
REALM	-0.0268	-0.0863	0.0704	-	-	-	-	0.8670	-0.0100	0.1019	0.0430	-	-	-	-	0.7578
REVO	-0.5011	-0.7573	-0.8041	-0.9475	-0.8622	-	-	-0.5682	-0.5715	-0.8539	-1.1339	-0.5673	-0.8030	-	-	-0.6100
RFOX	-0.0421	-0.0251	0.4942	0.3417	11.9190	1.3980	2.6170	6.3779	-0.0080	-0.0087	0.0885	-0.8088	7.8865	-0.7387	-1.7779	1.8449
RMRK	0.1353	0.8985	0.8245	-	-	-	-	0.8541	0.1100	0.7434	0.5984	-	-	-	-	0.5305
RPG	-0.1493	-0.2731	-0.3080	-	-	-	-	1.1868	-0.1173	-0.4007	-0.5899	-	-	-	-	0.9033
SAND	-0.1794	-0.3372	-0.3911	-0.4722	0.8525	4.7509	6.6009	18.2783	-0.1808	-0.3439	-0.2834	-0.4366	-0.9087	-0.2520	3.9798	14.2528
SENSO	0.0017	-0.0158	0.0412	-0.0509	0.2769	0.4591	3.6749	7.4331	-0.0103	-0.1352	-0.0288	-0.3275	-0.2869	-1.9763	-4.3006	-0.0377
SHOE	-0.0851	-0.4789	-	-	-	-	-	-0.0151	-0.1337	-0.5544	-	-	-	-	-	-0.0757
SIN	0.0553	-0.1032	-0.3028	-0.8522	-0.6258	-0.4783	-0.8032	-0.7200	0.0553	-0.2129	0.0452	-0.3665	-0.3947	-0.4643	-0.6095	-6.6917
SMON	0.6045	0.5682	-0.2227	-	-	-	-	1.2909	0.5750	0.6183	-0.1320	-	-	-	-	1.2307
SPH	-0.3036	-0.4235	-0.5326	-0.8862	-0.3755	4.0449	1.9230	3.5978	-0.3289	-0.4984	-0.6158	-0.8665	-1.6354	-1.1578	-0.6183	-0.9163
STARL	7.6004	3.2887	41.1019	46.6521	-	-	-	282.8128	7.5899	3.3066	41.0573	46.5043	-	-	-	282.2433
SURE	0.1656	0.2304	0.4761	-0.5549	-0.8813	-0.9674	-0.9658	-0.9153	0.1791	-0.0136	-0.0174	-0.5780	-1.2135	-1.5620	-2.8240	-9.4055
TOWER	-0.0700	1.5280	8.0431	1.1035	5.8708	-	-	5.5900	-0.0549	1.3952	7.7165	0.9295	5.3467	-	-	4.9113
TRIAS	-0.0847	-0.3628	-0.2596	12.8051	5.3390	-	-	15.8136	-0.1065	-0.3749	-0.4411	12.0933	4.9403	-	-	15.2140
TVK	0.2327	0.1332	0.8841	12.1892	2.5864	6.1509	-	3.8147	0.1972	-0.0298	0.1273	10.1116	0.4575	2.6992	-	0.5161
UFO	-0.0206	0.3396	1.0335	3.9774	-	-	-	43.9180	0.0334	0.3632	1.0373	3.8043	-	-	-	43.3669
UOS	-0.2016	-0.4075	-0.4808	-0.3833	0.0146	-0.2239	-0.1992	15.3497	-0.2898	-0.4605	-0.4277	-0.1691	0.2208	0.0146	-0.2419	9.1785
VEMP	0.2900	1.1149	0.0787	-	-	-	-	4.0611	0.2828	1.1204	0.1878	-	-	-	-	3.9387
VRA	0.2831	0.0564	5.2480	7.6549	7.6537	-	-	32.9870	0.2462	0.2449	5.2572	7.4801	7.5674	-	-	32.6641
WAXE	0.0000	-0.0177	0.0463	2.8450	1.5692	5.4408	-	9.7840	-0.0139	-0.1554	-0.2028	1.2446	0.5851	3.7244	-	7.2989
WAXP	1.3083	0.3417	-0.7491	-0.8623	-0.9005	-0.9429	-0.9668	-0.6731	1.4197	0.4779	-0.1785	-0.1444	-0.1773	-0.1426	-0.0803	-0.9287
WEMIX	-0.1259	-0.1823	0.3512	-0.2518	1.8751	-0.1862	17.2246	28.6321	-0.1327	-0.2248	-0.1117	-1.4862	-3.1250	-2.7637	12.5681	23.9689
XNL	0.0967	-0.1427	-0.4629	-	-	-	-	-0.3544	0.0743	-0.0562	-0.5047	-	-	-	-	-0.4493
XTM	-0.1041	-0.5162	-0.3242	-	-	-	-	-0.3659	-0.0738	-0.3943	-0.3540	-	-	-	-	-0.4421
YGG	0.5208	0.2361	6.0764	3.5000	-	-	-	3.7222	0.5057	0.2180	5.7241	2.8777	-	-	-	3.1224

**Table 7:**  $R$ ,  $AR$ ,  $BHR$  and  $BHAR$  for each token: Metaverse and Play-to-earn.

Token	R		BHR						AR		BHAR					
M. \& P2E	1d	1w	1m	3m	6m	9m	1y	E.S.	1d	1w	1m	3m	6m	9m	1y	E.S.
ALICE	-0.1918	-0.3271	-0.3893	-0.7437	-0.4060	-	-	-0.3386	-0.2220	-0.3612	-0.8219	-0.7138	-0.5958	-	-	-0.7192
ATLAS	0.8640	0.7685	0.1763	-	-	-	-	0.5309	0.8345	0.8186	0.2670	-	-	-	-	0.4707
AVXT	-0.0203	-0.1269	0.3477	-	-	-	-	0.4670	-0.0515	-0.0147	0.2924	-	-	-	-	0.3180
AXS	-0.0742	0.8131	2.5144	5.8634	63.0357	293.5093	979.0961	947.2498	-0.1303	0.7119	2.0361	4.5350	57.5820	290.6076	974.2172	942.4524
BCMC	2.1596	1.4104	-	-	-	-	-	2.4039	2.1276	1.3143	-	-	-	-	-	2.3146
BOSON	-0.1102	-0.2539	-0.3091	-0.8963	-0.7913	-	-	-0.4134	-0.1625	-0.4941	-0.7382	-0.5960	-0.7985	-	-	-0.5315
BYG	-0.0156	-0.4924	2.0175	2.0886	-	-	-	3.1475	0.0275	-0.4469	1.9725	1.7126	-	-	-	2.5431
CCAR	-0.0002	0.4902	-0.2041	-	-	-	-	0.9131	0.0648	0.4976	-0.0122	-	-	-	-	0.8091
CPAN	-0.1711	0.5582	-	-	-	-	-	1.9296	-0.1665	0.5124	-	-	-	-	-	1.8785
DEP	0.0256	0.0479	-0.1246	0.6216	-0.1476	-0.0553	0.8576	0.3478	0.0251	0.0278	-0.3420	0.2106	-0.8261	-2.8020	-6.7418	-8.2676
DERC	-0.1627	-0.2067	3.4502	-	-	-	-	3.6881	-0.2067	-0.3746	3.0004	-	-	-	-	3.1520
DG	-0.2010	-0.1050	-0.2271	4.9273	4.3856	14.9428	-	18.0825	-0.2151	-0.0597	-0.3996	3.2784	2.3940	12.2662	-	14.9979
EJS	0.0942	0.5501	-	-	-	-	-	0.4362	0.1012	0.4870	-	-	-	-	-	0.2818
FARA	-0.0307	0.1174	1.5884	8.7055	-	-	-	10.4475	-0.0350	0.2101	1.8340	8.5377	-	-	-	10.1181
FEAR	-0.3223	-0.4478	-0.7289	0.1172	-	-	-	0.2422	-0.2796	-0.4410	-0.5156	-0.0681	-	-	-	-0.0309
FIWA	-0.1016	-0.3324	-0.2926	-	-	-	-	-0.3937	-0.1120	-0.1722	-0.1725	-	-	-	-	-0.3592
GAFI	0.0000	-0.0290	0.9948	-	-	-	-	0.7210	-0.0333	-0.0571	0.9680	-	-	-	-	0.5601
GHST	0.3329	-0.1722	-0.0663	0.0055	1.1896	0.5554	1.6124	2.5185	0.3554	-0.1626	-0.0978	-0.3612	-1.9076	-2.7268	-2.5732	-2.2691
ICE	0.0158	6.8817	-	-	-	-	-	7.7400	-0.0051	6.8701	-	-	-	-	-	7.7149
ILV	0.6740	0.9182	0.3325	0.1517	10.0990	-	-	20.3293	0.6545	0.7691	-0.0081	0.3726	10.1146	-	-	20.0640
MANA	0.0029	0.1432	0.7448	12.4936	11.4842	11.9794	6.2049	281.3459	0.0064	-0.0243	0.1838	9.8192	10.0076	11.3209	6.1356	275.2353
MBOX	-0.0195	-0.2674	-0.6435	-0.7691	0.2033	-	-	0.1950	-0.0498	-0.3412	-0.7721	-0.3926	0.2534	-	-	0.1634
MEDA	0.5350	7.2606	11.8380	-	-	-	-	17.1254	0.5653	7.3825	11.8081	-	-	-	-	17.0492
MIST	-0.0072	0.1710	0.3082	-0.6695	-0.1012	-	-	0.5870	0.0475	0.3488	0.3124	-0.1422	0.1042	-	-	0.7219
MNG	-0.2285	-0.3698	-0.4848	10.9045	-	-	-	11.6401	-0.1583	-0.3180	-0.2288	10.7967	-	-	-	11.4164
MONI	-0.3173	-0.3462	-0.1635	-	-	-	-	-0.0801	-0.2870	-0.2243	-0.1933	-	-	-	-	-0.1563
MOOV	-0.1942	-0.6249	-0.8579	-0.6347	-	-	-	0.0296	-0.2725	-0.6392	-0.6066	-0.7797	-	-	-	-0.2338
POLIS	0.3975	0.3326	-0.1437	-	-	-	-	-0.0962	0.3679	0.3826	-0.0530	-	-	-	-	-0.1564
RACA	0.2912	0.8558	0.6083	-	-	-	-	9.8595	0.3088	0.8874	0.5709	-	-	-	-	9.7138
REALM	-0.0268	-0.0863	0.0704	-	-	-	-	0.8670	-0.0100	0.1019	0.0430	-	-	-	-	0.7578
REVO	-0.5011	-0.7573	-0.8041	-0.9475	-0.8622	-	-	-0.5682	-0.5715	-0.8539	-1.1339	-0.5673	-0.8030	-	-	-0.6100
RPG	-0.1493	-0.2731	-0.3080	-	-	-	-	1.1868	-0.1173	-0.4007	-0.5899	-	-	-	-	0.9033
SAND	-0.1794	-0.3372	-0.3911	-0.4722	0.8525	4.7509	6.6009	18.2783	-0.1808	-0.3439	-0.2834	-0.4366	-0.9087	-0.2520	3.9798	14.2528
SMON	0.6045	0.5682	-0.2227	-	-	-	-	1.2909	0.5750	0.6183	-0.1320	-	-	-	-	1.2307
UFO	-0.0206	0.3396	1.0335	3.9774	-	-	-	43.9180	0.0334	0.3632	1.0373	3.8043	-	-	-	43.3669
WAXE	0.0000	-0.0177	0.0463	2.8450	1.5692	5.4408	-	9.7840	-0.0139	-0.1554	-0.2028	1.2446	0.5851	3.7244	-	7.2989
WAXP	1.3083	0.3417	-0.7491	-0.8623	-0.9005	-0.9429	-0.9668	-0.6731	1.4197	0.4779	-0.1785	-0.1444	-0.1773	-0.1426	-0.0803	-0.9287
WEMIX	-0.1259	-0.1823	0.3512	-0.2518	1.8751	-0.1862	17.2246	28.6321	-0.1327	-0.2248	-0.1117	-1.4862	-3.1250	-2.7637	12.5681	23.9689
YGG	0.5208	0.2361	6.0764	3.5000	-	-	-	3.7222	0.5057	0.2180	5.7241	2.8777	-	-	-	3.1224



## 4 Pearson and Kendall correlations

**Table 8:** Pearson and Kendall correlations between each token and the CCi30 index.

Play-to-earn	Pearson	Kendall	Play-to-earn	Pearson	Kendall	Metaverse	Pearson	Kendall	M. & P2E	Pearson	Kendall
ALICE	0.61	0.40	KILL	0.50	0.43	ADS	0.36	0.31	ALICE	0.61	0.40
ALIX	0.18	0.07	KMON	0.35	0.18	AI	0.44	0.27	ATLAS	0.44	0.39
ARATA	0.12	0.10	KNIGHT	0.29	0.33	ALICE	0.61	0.40	AVXT	0.16	-0.01
ARENA	0.27	0.20	KOL	-0.02	0.00	ALU	0.28	0.19	AXS	0.49	0.31
ATLAS	0.44	0.39	KOMBAT	0.11	0.11	ATLAS	0.44	0.39	BCMC	-	-
AVXT	0.16	-0.01	MANA	0.50	0.43	AVXT	0.16	-0.01	BOSON	0.47	0.32
AXS	0.49	0.31	MAT	-	-	AXS	0.49	0.31	BYG	0.26	0.20
BCMC	-	-	MBOX	0.46	0.34	BCMC	-	-	CCAR	-0.07	0.00
BETU	0.32	0.24	MC	-0.04	-0.01	BLOK	-	-	CPAN	-	-
BIN	0.23	0.19	MEDA	0.12	0.04	BOA	0.25	0.17	DEP	0.35	0.21
BLADE	0.03	0.03	MIST	0.35	0.23	BOSON	0.47	0.32	DERC	0.27	0.21
BMARS	0.04	0.13	MNG	0.11	0.29	BYG	0.26	0.20	DG	0.49	0.32
BMON	0.15	0.11	MNY	0.21	0.12	CCAR	-0.07	0.00	EJS	-	-
BOSON	0.47	0.32	MONI	0.36	0.19	CEEK	0.27	0.24	FARA	0.24	0.24
BPET	0.06	0.16	MOOLAH	0.15	0.15	CHR	0.46	0.31	FEAR	0.21	0.14
BUNI	0.29	0.17	MOOV	0.39	0.29	CPAN	-	-	FIWA	0.10	0.11
BYG	0.26	0.20	MWAR	0.21	0.23	CUBE	0.26	0.19	GAFI	0.21	0.12
CCAR	-0.07	0.00	NAKA	-	-	DEP	0.35	0.21	GHST	0.25	0.20
CGG	0.40	0.30	OVL	-0.05	-0.02	DERC	0.27	0.21	ICE	-	-
CGS	0.33	0.21	PEARL	0.36	0.28	DG	0.49	0.32	ILV	0.64	0.49
CHAIN	0.48	0.44	PETG	0.31	0.18	DVI	0.29	0.17	MANA	0.50	0.43
CHAINCADE	0.23	0.23	PKR	0.27	0.22	EFI	0.49	0.33	MBOX	0.46	0.34
CHT	0.32	0.33	POLIS	0.51	0.34	EJS	-	-	MEDA	0.12	0.04
CMC	-0.03	0.04	PROT	0.51	0.32	ENJ	0.50	0.39	MIST	0.35	0.23
CPAN	-	-	PYRAM	0.21	0.30	EPIK	0.31	0.27	MNG	0.11	0.29
CPO	-	-	RACA	0.25	0.24	ERN	0.57	0.44	MONI	0.36	0.19
CRBN	0.41	0.33	REALM	0.31	0.25	ETHV	0.16	0.17	MOOV	0.39	0.29
CRUSADER	0.26	0.24	RENA	-	-	FARA	0.24	0.24	POLIS	0.51	0.34
CWS	0.44	0.31	REVO	0.30	0.30	FEAR	0.21	0.14	RACA	0.25	0.24
DEC	0.29	0.20	REVV	0.47	0.32	FIWA	0.10	0.11	REALM	0.31	0.25
DEP	0.35	0.21	RONINGMZ	-	-	GAFI	0.21	0.12	REVO	0.30	0.30
DERC	0.27	0.21	RPG	0.08	0.07	GHST	0.25	0.20	RPG	0.08	0.07
DG	0.49	0.32	RSUN	0.47	0.43	HERO	0.28	0.19	SAND	0.45	0.39
DKT	-	-	RUNE	0.00	0.01	HIGH	-	-	SMON	0.15	0.25
DNXC	0.12	0.04	SAND	0.45	0.39	ICE	-	-	UFO	0.44	0.31
DOGEDASH	-	-	SFUND	0.44	0.35	ILV	0.64	0.49	WAXE	0.59	0.46
DOGIRA	0.29	0.29	SKILL	0.24	0.13	JADE	0.09	0.18	WAXP	0.53	0.41
DOGO	0.38	0.35	SLP	0.29	0.23	KLO	0.36	0.21	WEMIX	0.32	0.25
DXO	0.29	0.25	SMI	0.20	0.23	LYXE	0.42	0.32	YGG	0.45	0.31
EGG	0.11	0.24	SMON	0.15	0.25	MANA	0.50	0.43	Median	0.35	0.25
EGG.1	0.05	0.02	SPS	0.31	0.25	MBOX	0.46	0.34			
EJS	-	-	SPU	-	-	MEDA	0.12	0.04			
EQ	-	-	STEP	0.09	0.06	MIST	0.35	0.23			
ETERNAL	-0.09	0.00	STT	0.41	0.26	MLT	0.40	0.25			
EUT	-	-	TAU	0.38	0.28	MNG	0.11	0.29			
FARA	0.24	0.24	TOP	0.20	0.17	MONA	0.43	0.36			
FEAR	0.21	0.14	UFO	0.44	0.31	MONI	0.36	0.19			
FINA	-	-	UJENNY	0.62	0.42	MOOV	0.39	0.29			
FIWA	0.10	0.11	ULTGG	0.55	0.52	NCR	0.14	0.14			
FOXY	0.27	0.16	VIBE	0.38	0.35	OASIS	-	-			
GAFI	0.21	0.12	VIDT	0.53	0.33	OOKS	0.17	0.66			
GALA	0.24	0.19	WANA	0.28	0.15	OVR	0.20	0.16			
GHST	0.25	0.20	WAR	0.34	0.33	PET	0.42	0.33			
GMR	0.43	0.35	WAXE	0.59	0.46	POLC	0.33	0.28			
GODS	-	-	WAXP	0.53	0.41	POLIS	0.51	0.34			
GON+	0.11	0.20	WEMIX	0.32	0.25	PWAR	0.21	0.19			
HER	0.09	0.06	WIZARD	0.07	0.09	PYR	0.43	0.29			
HERA	-	-	WSG	0.35	0.28	RACA	0.25	0.24			
HERO	0.36	0.23	XWG	0.07	0.13	REALM	0.31	0.25			
HIFI	0.32	0.29	YGG	0.45	0.31	REVO	0.30	0.30			
HYPER	0.22	0.23	ZDC	-0.05	0.01	RFOX	0.54	0.37			
ICE	-	-	ZOO	0.63	0.45	RMRK	0.27	0.23			
ILV	0.64	0.49	ZOO.1	0.19	0.18	RPG	0.08	0.07			
INARI	0.21	0.18	ZOON	0.22	0.18	SAND	0.45	0.39			
KAINET	-	-	Median	0.29	0.23	SENSO	0.26	0.16			
						SHOE	-	-			
						SIN	0.39	0.26			
						SMON	0.15	0.25			
						SPH	0.16	0.16			
						STARL	0.27	0.25			
						SURE	0.17	0.16			
						TOWER	0.47	0.32			
						TRIAS	0.57	0.44			
						TVK	0.56	0.39			
						UFO	0.44	0.31			
						UOS	0.44	0.24			
						VEMP	0.44	0.31			
						VRA	0.64	0.46			
						WAXE	0.59	0.46			
						WAXP	0.53	0.41			
						WEMIX	0.32	0.25			
						XNL	0.45	0.23			
						XTM	0.54	0.34			
						YGG	0.45	0.31			
						Median	0.35	0.25			