

Information Shocks and Real-Time Market Reactions: Evidence from Blockchain-Based Fan Tokens During the FIFA World Cup

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Fan Tokens

Fan tokens are crypto assets that give holders access to exclusive perks and engagement opportunities with a sports team, club, or brand. Typically issued by sports organizations on blockchain platforms like Chiliz (via Socios.com).


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A NEW DIGITAL ASSET FOR FANS

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Top Fan Token Coins by Market Cap

Show Stats

The Fan Token market cap today is \$227 Million, a 1.2% change in the last 24 hours.

Fan Token

Show Fully Diluted

#	Coin	Price	1h	24h	7d	24h Volume	Mkt Cap	Last 7
☆ 596	Paris Saint-Germain Fan Token PSG	\$5.86	0.3%	-0.9%	7.5%	\$3,021,957	\$22,570,330	
☆ 614	Santos FC Fan Token SANTOS	\$4.94	0.9%	-6.3%	13.5%	\$19,408,538	\$21,188,578	
☆ 615	Lazio Fan Token LAZIO	\$3.27	1.1%	-3.1%	9.9%	\$6,655,940	\$21,186,263	
☆ 625	FC Barcelona Fan Token BAR	\$3.84	-0.1%	-1.1%	8.3%	\$2,096,795	\$20,749,252	
☆ 655	Manchester City Fan Token CITY	\$4.38	0.1%	-0.5%	5.7%	\$1,973,486	\$18,906,494	
☆ 746	Arsenal Fan Token AFC	\$2.63	-0.3%	2.6%	20.5%	\$2,162,218	\$13,829,039	

Lionel Messi Joins Socios.com As Global Brand Ambassador

Sources: <https://www.socios.com/> and <https://www.coingecko.com/en/categories/fan-token>

Why Fan Token Research?

Academic exploration of fan tokens: Utility, Financialization, Technology, etc.

Blockchain and Sports



What are fan tokens?



How are fan tokens used?



Fan token markets



Anticipatory gains and event-driven losses in blockchain-based fan tokens: Evidence from the FIFA World Cup

- Tournament (N=1) and match-level (N=21) analysis
- Reviewer comment: „Why not analyze intra-game events? That would increase sample size.“

Event-level Analysis of World Cup Matches

- 21 World Cup matches in which “fan token teams” participated:
 - Argentine Football Association (ARG); Brazil National Football Team (BFT); Portugal National Team (POR) and Spain National Team (SNFT)

Data collection

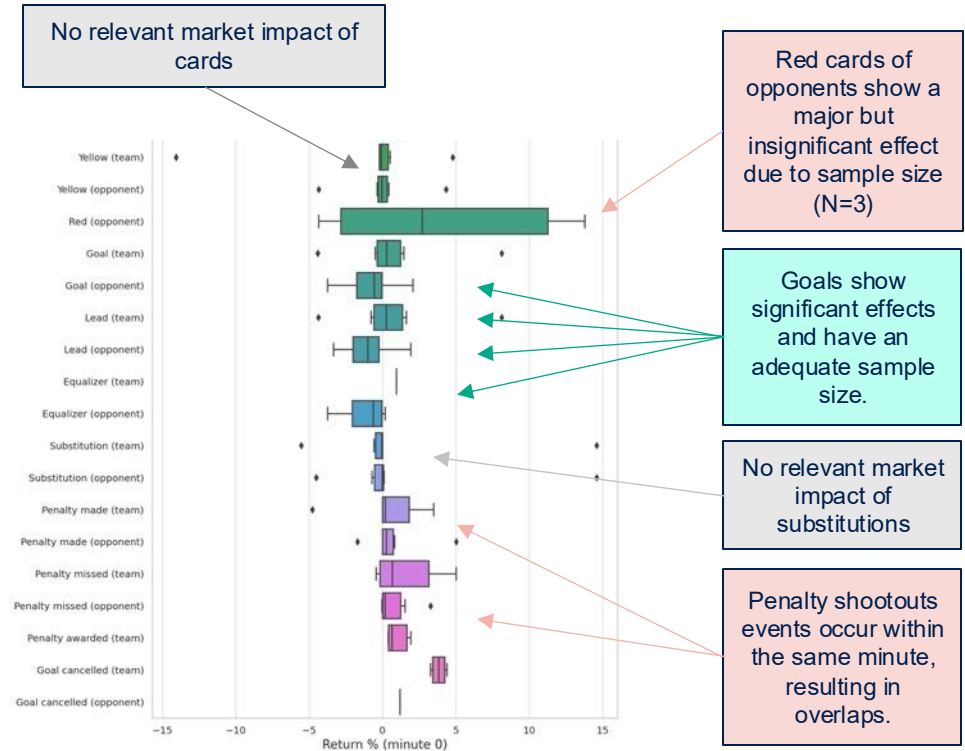
- Log the precise minute of every significant in-game event (N=508)
- Collect minute-level price data for each token
- Contextual data (spectators, player value, player network, match time)

ID	Date	Match	Match Stage	Outcome	Score	Card	Goal	Period	Event type			Sum
									Substitute	Other		
1	Nov 22, 2022	Argentina vs. Saudi Arabia	Group stage 1	Defeat	1:2	6	3	4	8	2	23	
2	Nov 23, 2022	Spain vs. Costa Rica	Group stage 1	Victory	7:0	2	7	4	9	0	22	
3	Nov 24, 2022	Brazil vs. Serbia	Group stage 1	Victory	2:0	3	2	4	10	0	19	
4	Nov 24, 2022	Portugal vs. Ghana	Group stage 1	Victory	3:2	6	5	4	10	0	25	
5	Nov 26, 2022	Argentina vs. Mexico	Group stage 2	Victory	2:0	5	2	4	9	0	20	
6	Nov 27, 2022	Spain vs. Germany	Group stage 2	Draw	1:1	4	2	4	9	1	20	
7	Nov 28, 2022	Brazil vs. Switzerland	Group stage 2	Victory	1:0	2	1	4	10	1	18	
8	Nov 28, 2022	Portugal vs. Uruguay	Group stage 2	Victory	2:0	5	2	4	10	1	22	
9	Nov 30, 2022	Argentina vs. Poland	Group stage 3	Victory	2:0	2	2	4	10	2	20	
10	Dec 1, 2022	Spain vs. Japan	Group stage 3	Defeat	1:2	3	3	4	10	1	21	
11	Dec 2, 2022	Brazil vs. Cameroon	Group stage 3	Defeat	0:1	7	1	4	8	0	20	
12	Dec 2, 2022	Portugal vs. South Korea	Group stage 3	Defeat	1:2	2	3	4	9	0	18	
13	Dec 3, 2022	Argentina vs. Australia	Round of 16	Victory	2:1	2	3	4	10	0	19	
14	Dec 5, 2022	Brazil vs. South Korea	Round of 16	Victory	4:1	1	5	4	10	0	20	
15	Dec 6, 2022	Spain vs. Morocco	Round of 16	Defeat	0:0 (0:3)	2	0	10	11	7	30	
16	Dec 6, 2022	Portugal vs. Switzerland	Round of 16	Victory	6:1	2	7	4	10	0	23	
17	Dec 9, 2022	Brazil vs. Croatia	Quarter-finals	Defeat	1:1 (2:4)	5	2	10	10	8	35	
18	Dec 9, 2022	Argentina vs. Netherlands	Quarter-finals	Victory	2:2 (4:3)	16	4	10	11	10	51	
19	Dec 10, 2022	Portugal vs. Morocco	Quarter-finals	Loss	0:1	4	1	4	10	0	19	
20	Dec 13, 2022	Argentina vs. Croatia	Semi-finals	Victory	3:0	4	3	4	10	0	21	
21	Dec 18, 2022	Argentina vs. France	Final	Victory	3:3 (4:2)	7	6	10	13	8	44	

Identifying Relevant In-Game Events

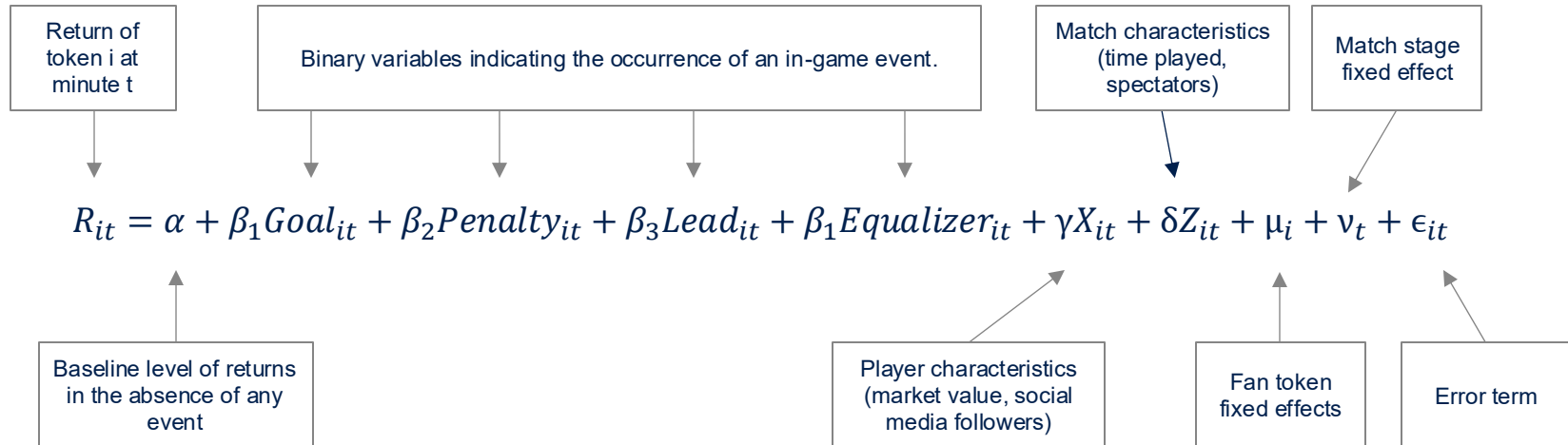
Step 1: Identify which in-game events have a significant impact on fan token prices

- Various challenges with data, both in terms of sample size and logic.
- Focus on goals as “significant” events for more detailed analysis.



Regression model

Step 2: Baseline regression model is specified as follows:



Results

- Goals scored by the fan token team can increase returns.
- Penalties are relevant but inconclusive due to overlaps during the penalty shootout.
- Opponent equalizer significantly reduces returns.
- Effects for player value, social media are inconclusive
- Model fits the data well

Table 3. Regression analysis of goal-scoring events from and against fan token teams.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Goal characteristics</i>									
Goal (team)	-0.127 (1.106)	2.870* (1.701)	5.034** (2.452)	-	-	-	-	-	-
Penalty (team)	-2.470** (1.055)	-0.411 (1.622)	0.104 (2.376)	-2.573* (1.283)	1.686 (1.238)	-1.202 (1.713)	-	-	-
Lead (team)	-1.144 (0.732)	-0.509 (1.127)	1.624 (1.650)	-0.588 (1.682)	0.095 (1.623)	1.613 (2.245)	-	-	-
Equalizer (team)	1.114 (2.386)	3.218 (3.670)	4.464 (5.375)	1.196 (3.022)	3.217 (2.917)	6.765* (3.803)	-	-	-
Penalty (opp)	1.998 (2.413)	8.529 (3.713)	-3.623 (5.438)	-	-	-	3.098 (1.656)	18.720** (6.67)	7.776 (9.737)
Lead (opp)	-1.665 (1.358)	-2.656 (2.088)	-2.708 (3.059)	-	-	-	-1.691 (1.332)	-2.243 (5.376)	-3.216 (7.837)
Equalizer (opp)	-0.875 (1.204)	-5.410*** (1.851)	-7.132** (2.711)	-	-	-	-0.620 (1.172)	-0.372 (4.729)	-4.022 (6.895)
<i>Player characteristics</i>									
Transfer value	0.384 (0.276)	-0.684 (0.424)	-1.381** (0.621)	0.164 (0.549)	0.008 (0.529)	0.024 (0.733)	-0.143 (0.404)	-0.013 (1.631)	-2.033 (2.378)
Social network	0.291* (0.148)	0.066 (0.227)	0.169 (0.333)	0.202 (0.186)	0.131 (0.179)	0.093 (0.248)	0.036 (0.609)	-2.937 (2.456)	1.687 (3.581)
<i>Match characteristics</i>									
Time played	-0.007 (0.009)	0.007 (0.014)	0.027 (0.020)	-0.012 (0.013)	0.003 (0.012)	0.027* (0.013)	0.023 (0.016)	-0.005 (0.065)	0.075 (0.094)
Attendance	-0.022 (0.016)	-0.032 (0.024)	-0.048 (0.036)	-0.037 (0.025)	-0.031 (0.024)	-0.062* (0.033)	-0.002 (0.019)	0.021 (0.075)	-0.036 (0.110)
Token FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Match FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	64	64	64	44	44	44	20	20	20
Sample	All goals	All goals	All goals	Team goals	Team goals	Team goals	Opp. goals	Opp. goals	Opp. goals
R-squared (adj.)	0.46 (0.21)	0.67 (0.51)	0.72 (0.59)	0.43 (0.05)	0.45 (0.09)	0.59 (0.32)	0.71 (0.59)	0.74 (0.52)	0.78 (0.59)
Dep. variable	Return [0]	Return [0,1]	Return [0,2]	Return [0]	Return [0,1]	Return [0,2]	Return [0]	Return [0,1]	Return [0,2]

Notes: Table 3 shows different regression model results. Models 1-3 predict fan token returns following goals scored in general, models 4-6 predict returns for events where a goal was scored by a fan token team (Argentina, Brazil, Portugal, and Spain), while models 7-9 predict fan token returns of the team when their opponent scores a goal against them. The transfer value represents the player's market value in a million Euros, and the social network variable represents the log-transformed Instagram follower count on the day before the goal was scored. Coefficients and robust standard errors (in parentheses) are scaled by a factor of 100 to provide better readability and interpretability. Statistical significance is denoted by *, **, and ***, corresponding to 10%, 5%, and 1% levels, respectively.

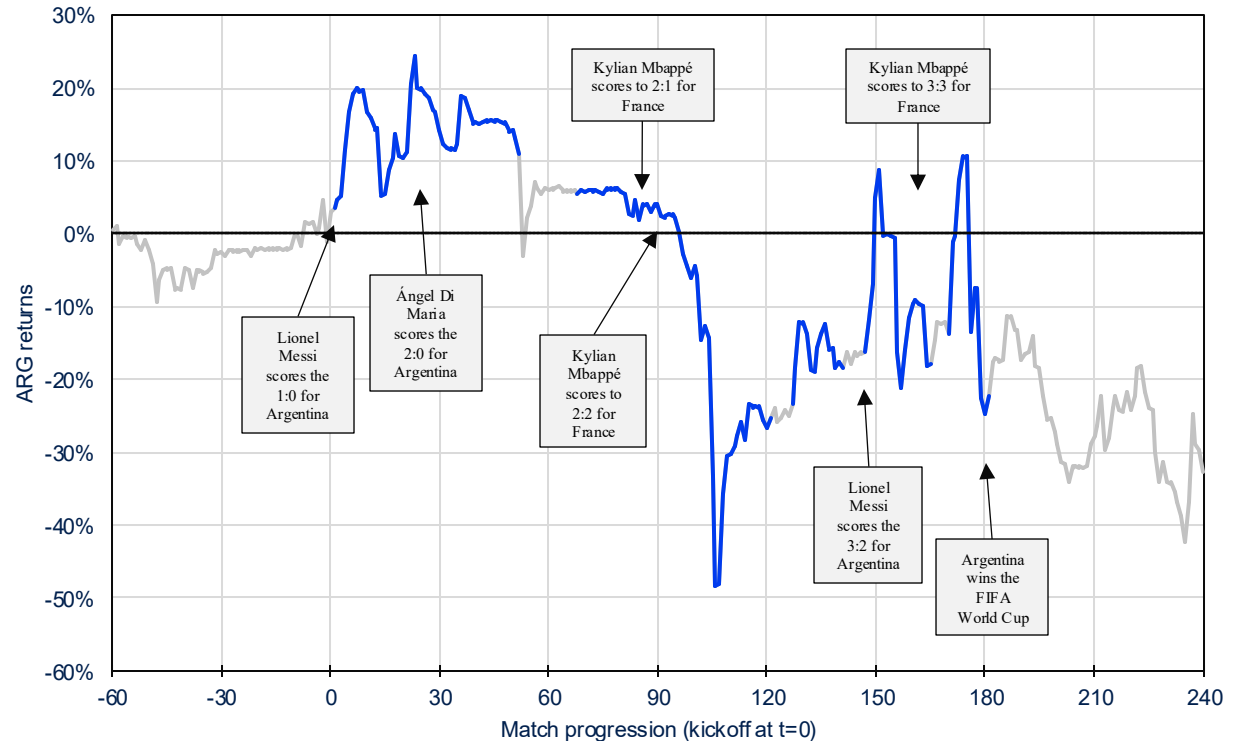
Goals scored by the fan token-associated team generally lead to positive abnormal returns.

Results for penalties are not logical, likely results are blurred due to overlap during penalty phase (multiple goals/misses in one minute)

Equalizing goals scored by the opponent show the most substantial negative effect, - 7.13% ($p < 0.05$) within two minutes.

Conclusion

- Fan tokens exhibit systematic, behavior-driven price reactions to events during matches of the World Cup.
- Negative game outcomes trigger larger price moves than positive ones ("loss effect").
- Results may be explained by loss aversion and mood effects.
- Crowd psychology and game context are relevant when assessing fan tokens.



Thank you!

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