



Effect of Pistol Round and First Kill on Match Outcome in the Counter-Strike: Global Offensive Major Esports Championships

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Abstract. *The purpose of this study was to determine the importance of winning the pistol round and getting the first kill in the Counter-Strike: Global Offensive (CS: GO) Major Championship competitions. In this study, 334 competitions in six CS: GO Major Championships held in 2018, 2019, 2021, and 2022, were included. This paper examines these championships and the effects of the pistol round and the first kill factors on the first half and the match outcome, since it is the first round of the match and the first score at the beginning of each round. The results show that players who win pistol rounds and achieve the first kills in the CS: GO Major Championship matches are significantly more likely to ultimately win the match. In line with the results of the study, it is thought that winning the pistol round and getting the first kill is a factor to be considered in CS: GO Major Championship competitions. These findings will be beneficial for coaches and players, develop strategies for pistol rounds and first kills to gain an advantage in competition.*

Keywords: *esports; counter-strike; global offensive; pistol round; first kill.*

Efecto de la ronda de pistola y el primer asesinato en el resultado del partido en Counter-Strike: Global Offensive Major Esports Championships

Resumen. *El propósito de este estudio fue determinar la importancia de ganar la ronda de pistolas y obtener la primera muerte en las competencias del Campeonato Mayor de Counter-Strike: Global Offensive (CS: GO). En este estudio, se incluyeron 334 competencias en seis campeonatos importantes de CS:GO celebrados en 2018, 2019, 2021 y 2022. En estos campeonatos, se examinaron los efectos de la ronda de pistola y los factores de primera muerte en la primera mitad y el resultado del partido, ya que es la primera ronda del partido y la primera puntuación al comienzo de cada ronda. Como resultado; Se ha determinado que ganar rondas de pistolas y obtener las primeras muertes en los partidos del Major Championship de CS:GO están significativamente asociados con ser el ganador del partido. De acuerdo con los resultados del estudio, se cree que ganar la ronda de pistolas y obtener el primer asesinato es un factor a considerar en las competencias de CS:GO Major Championship. Además, será beneficioso para entrenadores y jugadores desarrollar estrategias para rondas de pistolas y primeros asesinatos para obtener una ventaja en la competencia.*

Palabras clave: *deportes electrónicos; Counter Strike ofensiva global; ronda de pistola; primer asesinato.*

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Introduction

In the 1990s, the creation of Local Area Networks (LAN) paved the way for the emergence of esports (Irwin & Naweed, 2020). While LANs allow different players in the same place to compete in the same game, the spread of the internet has made it possible for people from different parts of the world to compete with one another at the same time. Nowadays, in other words, distances are not an obstacle to competition. The massive growth in consumption (playing, watching, etc.) of these competitive games played in virtual environments has, over time, led them to be seen as a type of sport performed in electronic environments. As Keiper et al. (2017) state, it is not surprising that there is a shift in participation in sports and consumption, as technology constantly affects society. This effect of technology on the field has led to the emergence of new branches of sports (Akgöl, 2019). The emergence of video streaming allowed esports to achieve numbers of viewers that rival those of popular sporting events such as the FIFA World Cup or the College Football National Championship. In response, there has been increasing interest in esports from investors who want to form teams and media companies that are chasing new audiences (Xenopoulos et al., 2020), and the number of esports clubs and organizations has increased. Esports are organized around competitive video games and played by professional or amateur teams (Hamari & Sjöblom, 2017). Championships with very large prize pools that are attended by professional teams are generally considered esports. Although there are many different video games that are played in the context of esports, one of the most popular is *Counter-Strike: Global Offensive* (CS: GO) (Yamamoto & McArthur, 2015). The championships with the largest prize pools are called “Major”, and the world’s most successful teams compete to win the “Major” prizes.

CS: GO (Valve Corporation & Hidden Path Entertainment, 2012) is the leading game in the esports team-play category (Behnke et al., 2020). It is one of the most popular games, having been played by more than 500,000 people simultaneously (Steam, 2021). CS: GO is a first-person shooter (FPS) video game where two teams of five players compete to achieve a variety of objectives (Xenopoulos et al., 2020). Players take part in the game by controlling the characters. The main aim in the competitive mode (de_map) of CS: GO is to win the match by winning 16 rounds. Teams aim to prevent their opponents from performing their duties (Kindermann et al., 2016). Teams consist of Terrorists (T) and Counter-Terrorists (C-T) sides, and after 15 rounds the teams change sides. Each round is limited to 1 minute 55 seconds and can be further extended if a bomb is planted (up to 40 seconds). The T side aims to plant the bomb (onto one of the two bombsites), protect it until it explodes, and/or eliminate all opposing players. The C-T side aims to eliminate all opposing players and/or defuse the bomb if planted (Irwin & Naweed, 2020) and tries to win the round.

Winning professional CS: GO competitions is highly dependent on the communication and cooperation among team members. The teams also use a range of different offensive, defensive and economic tactics throughout the match. Especially during the competition, it is very important for the whole team to establish a balanced economy and to be able to purchase the weapons and equipment they need in each round to win. Some ways to earn money in the game include getting a win/loss bonus, planting the bomb, defusing the bomb, eliminating one’s opponent, etc. However, things are a little different in the pistol rounds.

In the first round of the match and in the first round of after changing of sides, the teams cannot buy any weapons other than pistols, and they must go into combat with these pistols. These two rounds are called “pistol rounds”. It is thought that winning the pistol round gives the team an advantage, both economically and mentally. Winning the pistol round enables a team to purchase more the losing team and dominate the next round than. This means that the winner of the pistol round starts the second round at a great economic advantage and “possibly” as the winner. Thanks to having more in-game money, the winning team can gain an advantage over its opponent by purchasing weapons with higher firepower, a kevlar-helmet that reduces damage and other utilities (High Explosive Grenade, Smoke Grenade, Flashbang, etc.) in the second round. Moreover, winning the pistol round and the second round can also pave the way for winning the third round, depending on the economic tactics applied by the opposing team (saving the economy, force buy, etc.). This factor is thought to give a team an advantage at the beginning of the match and to affect the outcome of the match.

Besides winning pistol rounds, another factor that can lead to victory is being the first to kill a player from the opponent team (called “first kill or entry” in the game). This may change the course of the round and match outcome. The team that gets the first kill starts the round in an advantageous position over the opponent. This is because the team with the first kill has one more player than the opposing team, which gives the former a chance to apply a better tactical strategy against an outnumbered opponent. In other words, the team that gets the first kill starts the round ahead. The effect of these variables on success in CS: GO Major Championships is a matter of curiosity.

Accordingly, the aim of this study is to contribute to filling the gap in esports and CS: GO literature by examining the effects of winning pistol rounds and getting the first kill in CS: GO Major Championships on halves and match outcomes.

Method

Data Collection

The data set consists of the outcomes of matches in six Major Championships (each with a prize pool of at

least 1 million dollars) in 2018, 2019, 2021, and 2022. The data on the championships were collected from December 5 to 22, 2020 and from June 20 to 25, 2022 from the world's leading CS: GO statistics website, "www.hltv.org", which is open to the public. A total of 376 matches played in these six Major Championships (FACEIT Major 2018, ELEAGUE Major 2018, Intel Extreme Masters Katowice 2019, Starladder Major Berlin 2019, PGL Major Stockholm 2021, and PGL Major Antwerp 2022) were included in the study, while 42 of them were excluded from the evaluation because they were ended in a draw in normal time and they went to overtime. The data on "match outcome (winner/loser)", "pistol rounds of both halves (winner/loser)" and "first kill percentage" of the remaining 334 matches were processed into the data set.

Data Analysis

The software programs SPSS (Statistical Package for the Social Sciences) and Microsoft Excel were used to process the dataset. Teams' status as winners or losers of the matches, and winners or losers of the first and second pistol rounds, were classified as categorical variables. The number of rounds won in the first and second halves and the total number of first kills were calculated as percentages for the winning and losing teams. Before the independent samples t-tests, it was determined that all data showed normal distribution according to skewness and kurtosis (± 1) values (Hair et al., 2009). Before the review of the independent samples t-test results, the homogeneity of variances was tested by Levene's test, and it was determined that variances were homogenous ($p > .05$). Additionally, based on a hypothesis, a chi-square test was carried out. This test is used in many situations where experimental frequencies are compared with theoretical frequencies (Tallarida & Murray, 1987). Finally, a logistic regression analysis was conducted in order to classify categorical dependent variable groups and perform a predictive test (Çokluk et al., 2012) were used.

Results

Effect of winning the pistol rounds on half results

For both the first and second pistol rounds, the percentage of rounds won by the winning and losing teams in the halves was tested using the independent samples t-test. The performed t-test results are presented in Table 1.

Table 1 shows that the mean percentages of the winning teams of pistol rounds were significantly higher than the losing teams of the pistol rounds for both halves ($p < .001$).

Effect of getting the first kills on the match result

The significance of the difference between the mean percentages of first kills of the winning and losing teams of the matches is shown in Table 2.

As seen in Table 2, it was determined that the mean percentages of the first kills of the winning teams were significantly higher than the losing teams of the match ($p < .001$).

Effect of winning the pistol rounds on match result

Chi-square analyses were used to test the significance of the dependence of categories (McHugh, 2013) between winning and losing the first and second pistol rounds and winning and losing the match (Table 3). There are 0 cells (.0%) that have an expected count of less than five, and the minimum expected counts are 167 for both 2x2 tables. In this direction, the Pearson χ^2 value was evaluated (Chan, 2003).

As shown in Table 3, it was determined that winning the match is significantly related to winning both pistol rounds ($p < .001$).

Predictive value of winning first and second pistol rounds for ultimately winning the match

Logistic regression analysis was conducted to test the significance of the relationship between victory in the

Table 1. Independent samples t-test result of the mean percentage of won rounds in both halves according to winning and losing the pistol rounds

	Pistol Round Outcome	N	Mean Percentages of Won Rounds	SD	t	df	p
1 st Half	Winner	334	58.08%	19.1	10.937	666	<.001***
	Loser	334	41.92%	19.1			
2 nd Half	Winner	334	62.80%	24.4	13.545	666	<.001***
	Loser	334	37.20%	24.4			

***: $p < .001$.

Table 2. Independent samples t-test result of mean percentage of first kills according to winner and loser teams of the match

Match Outcome	N	Mean Percentages of First Kills	SD	t	df	p
Winner	334	57.92%	10.61	19.315	666	<.001***
Loser	334	42.07%	10.61			

***: $p < .001$.

Table 3. Chi-square independence test results of 1st and 2nd pistol rounds and match outcomes

		Match Outcome				Total		χ^2	df	p
		Winner		Loser		f	%			
		f	%	f	%					
1 st Pistol Round	Winner	209	62.6	125	37.4	334	100	42.251	1	<.001***
	Loser	125	37.4	209	62.6					
2 nd Pistol Round	Winner	202	60.5	132	39.5	334	100	29.341	1	<.001***
	Loser	132	39.5	202	60.5					

***: p <.001.

Table 4. Logistic regression result for prediction of winning the match by pistol round outcomes

Predictor Variables	Winning the match (Predicted Variable)		
	B (SE)	Odds Ratio (OR)	CI 95%
1 st Pistol Round Winner (1)	1.081 (.21)***	2.95	2.134-4.074
2 nd Pistol Round Winner (1)	.913 (.21)***	2.493	1.804-3.444

***: p<.001.

first and second pistol rounds (0=loser, 1=winner) and winning the match (Table 4). The losing teams were selected as the reference group. This method is used to examine the predictability of categorical variables (Tatlıdil, 1992).

The data in Table 4 shows that the winners of the first pistol round were 2.95 times more likely to win the match (OR= 2.95; 95% CI=2.134-4.074). Meanwhile, the teams that won the second pistol round were 2.49 times more likely to win the match (OR=2.493; CI=1.804- 3.444).

Discussion

The findings of this study confirm the importance of winning the pistol rounds and getting more first kills in the CS: GO Major Championships. When the CS: GO literature was examined, it was seen that the effects of these variables on the match outcome were not emphasized. Therefore, the effect of the pistol round and the first kill on the match outcome will be discussed in terms of the in-game economy and similarity to traditional sports. It was found that winning the pistol rounds had a great deal of impact on the likelihood of winning the match. This result is perhaps to be expected due to certain game-specific dynamics. The team that wins the pistol round gains an advantage in terms of in-game economy and has more purchasing power and more effective equipment than their opponents. Thus, the team that wins the pistol round has the chance to become the favorite in the next round. The other team is put at an economic disadvantage by losing the pistol round, and must try to disrupt the advantage gained by their opponents by applying various economic tactics to change the course of the match. At this point, although winning the pistol round largely predicts winning the match as a whole, it is thought that the outcomes of the round, in which both teams buy powerful equipment (full buy round), are among the biggest factors that change the course of the match. It is possible to make

up for the lost advantage in the pistol round in the later rounds of the match by applying effective attack/defense tactics in these rounds. In other words, success in the competition also depends on the skills and attack/defense tactics of the teams. Additionally, it was found that teams that achieved more first kills were much more likely to win the match. If a team member dies in a round, the team's firepower decreases, making it more difficult to attack/defend the bombsites. This weakened attack/defense affects the course of the round.

In terms of literature on traditional sports literature, studies have found that the teams that score first are more likely to win the match in soccer (Liu et al., 2021; Armatas et al., 2009; Molinuevo & Bermejo, 2012; Pratas et al., 2016; Armatas et al., 2009; Leite, 2013) billiards (Adams, 1995) and bicycle racing (Perreault, 1998). While getting the first score in CS: GO directly affects the in-game economy, there is no concept of in-game economy in traditional sports. Accordingly, teams competing in the CS: GO Major Championships were more likely to earn the next success as a result of early success in the match in the form of winning the pistol round and getting the first kill, similar to what happens in traditional sports. Excluding the rare surprise comebacks, it is expected that the odds of winning will increase as a result of gaining an advantage, given the fact that teams playing in CS: GO Major Championships have top-level gaming and communication skills and professionalism.

Suggestions

In future studies, researchers could examine the economic tactics that teams apply throughout the match and conduct a detailed analysis of how these decision affect match outcome. Additionally, studies could be conducted on the effect of the getting first kill with separate observations for each round.

Professional CS: GO teams would do well to pay more attention to winning the pistol rounds. By in-

creasing their pistol round winning percentages and first kill percentages, they would increase their chances of winning matches.

Author Disclosure Statement

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