

Counter Strike: Global Offensive Rio Major

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Overview of Counter Strike

Counter Strike: Global Offensive (CSGO) is a video game of the shooter genre. The rules of the game are simple: there are five players per team, one side defense and the other offense. A round ends when all players on one team are eliminated, the offense breaks through the defense and achieves their objective, or the timer on the round runs out awarding the defense a point. The first team to 16 rounds wins.

CSGO is played competitively across the globe and there are numerous tournaments offering prize pools worth millions of dollars. The most prestigious of these tournaments is known as the major—most recently held in Rio de Janeiro last month. Curiously, all the tournament favorites were knocked out before the semi-finals had began; this led to a new team—named Outsiders—hoisting the trophy for the first time. We will be looking at how Outsiders played the numbers game to survive the tournament and come out on top. We will also examine how underdog teams managed to overcome the best of the best.

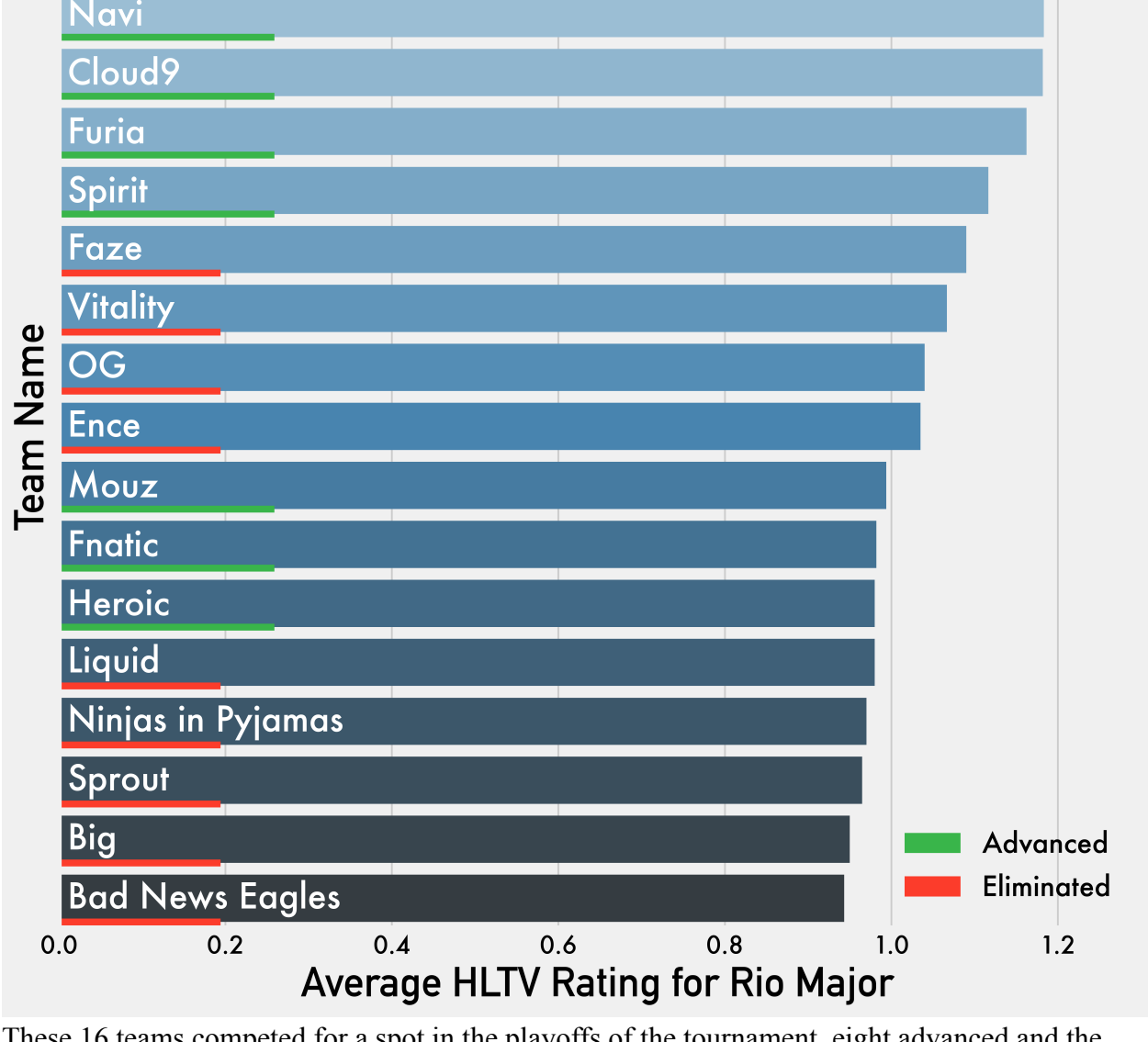
Data Provenance

All data used in this report is sourced from [hltv.org](http://hltv.org) and aggregated into a consumable dataset by myself. The web crawler and datasets can be found on my [GitHub](#).

HLTV Rating

The team at HLTV uses their own rating system to determine the output of every player in every match. It is capable of measuring many important stats and combining them into one number. Often, the team with a greater HLTV rating will win the match at the end of the day. This is not always the case, however, as sometimes other factors can make the difference.

Figure 1 | Graph showing average tournament rating and advancement status for each team.



These 16 teams competed for a spot in the playoffs of the tournament, eight advanced and the others were eliminated. Outsiders had an extremely strong showing sporting a team average of above 1.2 for the whole tournament. However, there were three teams who advanced with a team rating of below 1.0: Mouz, Fnatic, and Heroic. In terms of HLTV rating, a rating of 1.0 is the average and rating becomes progressively more difficult to gain/lose the higher/lower it goes. For context, outstanding performances from players often come with a rating between 1.4 and 1.8 and sometimes can breach 2.0. These three snuffed out the likes of Faze and Vitality, two teams that were thought to be contenders for the title, even with below average ratings.

Map Choice

Previously, I explained that the first team to 16 rounds wins—in professional play this is often not the case as the first team to 16 rounds wins the map, not the match. A match generally consists of three maps, the first to win two wins the matchup. There are seven possible maps and teams get to choose one each, generally the teams “home map.”

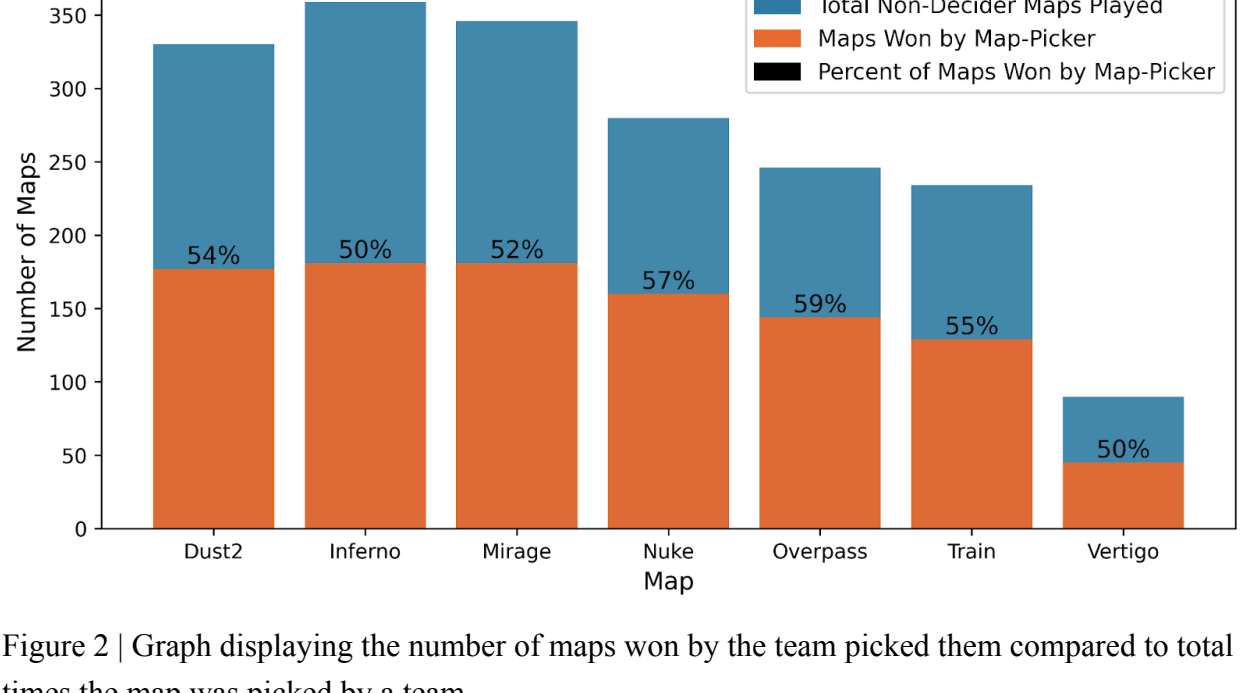


Figure 2 | Graph displaying the number of maps won by the team picked them compared to total times the map was picked by a team

Outsiders played and picked Overpass the most of all maps this tournament (33% of the maps they played were Overpass). Looking at the graph, over a sample of 250 maps, the team that picked Overpass won 59% of the time on the map—much better than the other maps. This is because Overpass is won more often through tactics and decision making than having the fastest reflexes and physical differences in gameplay. Outsiders is already a very disciplined team and they have put a lot of time into understanding how to play Overpass. Picking it gives them a major advantage over teams who may be more skilled but also unprepared on Overpass.

Key Situations

Some outputs are more important than others, this is true with many things from machine learning to soccer. For example, let us say you as a player eliminate three opponents but still end up losing the round. This is akin to shooting on your opponents net and missing three times in soccer. The next round you are the last person alive and eliminate one opponents to win the round and go to overtime, this could be seen as scoring a goal for your team in the 90th minute of the game.

Figure 3 | Table showing the ratio of rounds where a team won their opening duel or a clutch.

	Opening Duels	Clutches
Vitality	0.571375	0.066007
Sprout	0.501887	0.093291
Spirit	0.602097	0.072362
Outsiders	0.637616	0.073613
OG	0.557143	0.057143
Ninjas in Pyjamas	0.471698	0.094340
Navi	0.615772	0.041185
Mouz	0.511821	0.059356
Liquid	0.528139	0.025974
Heroic	0.531205	0.073710
Furia	0.569589	0.067995
Fnatic	0.536296	0.051260
Faze	0.705128	0.051282
Ence	0.618924	0.076100
Cloud9	0.609432	0.084743
Big	0.531666	0.053242
Bad News Eagles	0.519308	0.105944

On the right is a table of two important situations that are very advantageous for teams. The first is opening duels, this is the first elimination in a round. The winner of the duel often plays a man up. This is important because overall, 70% of rounds are won when a man up across the entire professional scene. This can be leveraged even more with the right protocols with some teams, like Outsiders, have a 5v4 percentage in the 80s.

The other situation is known as a clutch. A clutch is when the last person on a team wins the round by themselves. This is more often due to an individuals ability rather than the team.

Outsiders have a very middle of the pack opening percentage but they are still coming out with a man advantage more than half the time. A true outlier would be Faze with 70% of opening duels won. This is most likely because they are a hyper aggressive team while Outsiders plays more slowly and cautiously. In terms of clutches, Outsiders does not attempt many—we will get into more detail on why in the next section—but they still have a 7% win rate which is much better than many other teams between a 2% - 5% win rate.

Economy

Economy is one of the more technical aspects of CSGO. At the start of each round there are two situations: a player survives the previous round and carries their equipment into the next round or the player died in the previous round. In the latter case, the player must purchase new equipment. Money is granted every round, more for a win and less for a loss. A round where every player on the team has proper equipment is known as a “Full-Buy Round.”

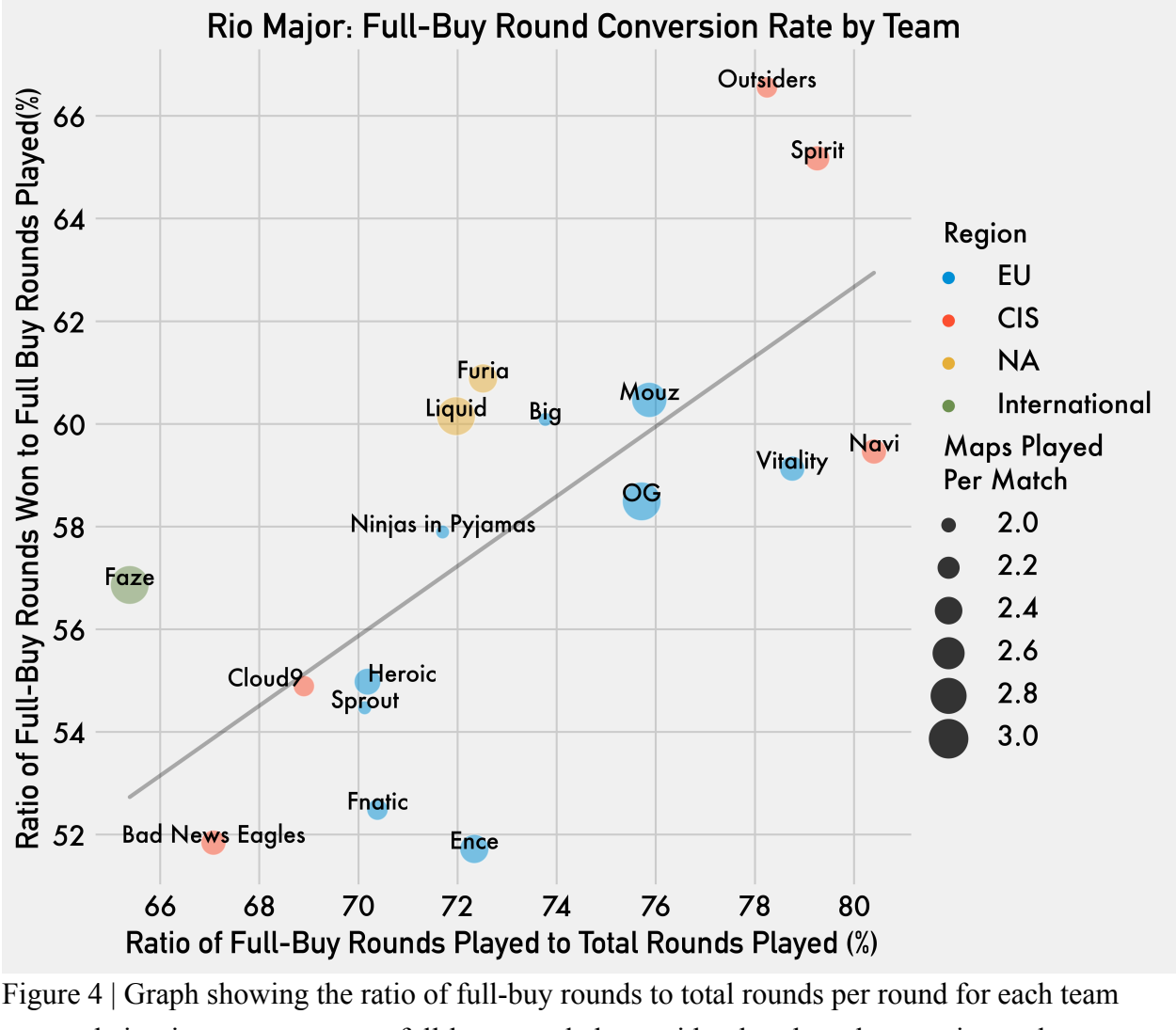


Figure 4 | Graph showing the ratio of full-buy rounds to total rounds per round for each team versus their win percentage on a full-buy round along with other data about region and maps per match.

Outsiders is infamous for their discipline in maintaining a healthy economy which allows them to have full-buys in a majority of rounds played. Outsiders had a 66.5% win percentage on full-buy rounds and 78% of their rounds were full-buy rounds. Outsiders strictly employs, particularly on the defense, a tactic known as “saving” which means that the defending players will allow the offense to win while holding on to their remaining equipment. As soon as the round is disadvantageous for Outsiders they sink away allowing them to repeatedly have the most powerful equipment round after round. An interesting trend to note is that teams from the CIS region (Russia, Ukraine, Kosovo, etc.) have a full-buy in a large proportion of their rounds compared to the rest of the field. The CIS region is known for having this very technical, planned out style of play and Outsiders is no exception. Four of the five CIS teams competing went to the playoffs and much of their success is due to this strategy.

Conclusion

Outsiders did not win the Rio de Janeiro major because of any single reason. CSGO is a game of extremely thing margins, however, and Outsiders play style usually lands them near the top finishers in every tournament they participate in. They have had 7 top four finishes this year at prestigious tournaments. Their great performance and discipline gave them the opportunity to go all the way and take the trophy this time.

Critique (Cameron Murphy)

The first figure is well shown and very pleasing to look at, on the other hand, the figure about full-buy round conversion feels a little cluttered. It does have a lot of information but maybe try leaving some off to improve clarity. The report seems well structured but I also have played CSGO before so maybe some elements of the game would be harder to understand for someone who has never seen it before. The economy section particularly seems short on explanation.