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# Survival of professional CS:GO teams: What matters? A Research Note

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## Abstract

We analyse Esport data of professional CS:GO teams to shed light on the question of whether diverse teams survive longer. We also control for the prize money as a time dependent covariate. Another focus is on the liability of newness hypothesis.

**Keywords:** Diversity, survival, gaming, e-Sports, liability of newness

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# 1 Introduction

A common perception is that diversity is beneficial. Diverse team members can complement each other's skill and knowledge. However, diversity might increase the cost of coordination. For example, communication between team members under pressure might fail if the team members have different cultural backgrounds and languages.

Mannix/Neale (2005, p. 32) perform a meta-analysis of the last 50 years of diversity research. They conclude *"that surface-level social-category differences, such as those of race/ethnicity, gender, or age, tend to be more likely to have negative effects on the ability of groups to function effectively."* Only underlying differences in functional background, education, or personality are positively related to performance. They conclude that *"organizations have a long way to go to reap the benefits of the diverse teams"* (Mannix/Neale 2005, p. 49).

In this paper, we shed light on this question by performing a survival analysis of professional Esports teams in the field of Counter Strike: Global Offensive (CS:GO). We find no significant impact of diversity—measured in the form of nationality—on team survival.

This paper is structured as follows. Section 2 reviews the literature and illustrates the game. Section 3 describes the data set, methodology and empirical results. Section 4 concludes.

## 2 Background

### 2.1 Survival analysis in sport economics

Table 1 contains an overview of survival analyses conducted in the sports literature. With respect to the diversity topic, Celik (2020) examines the relationship between the nationality of a Formula 1 driver and the nationality of their racing team. The hypothesis states that when a driver and a team stem from the same nation, then the career of the driver will last longer.

However, this hypothesis is not supported by the empirical results.

— Insert Table 1 here —

Oberhofer et al. (2015, p. 72f) examine the survival of teams within the first German football league. The coefficient of a variable that measures the share of foreign players is estimated to be predominantly negative, in some specifications it is even significant. Hence, teams *”with a larger share of non-German players tend to be relegated more quickly”*.

Oberhofer et al. (2015) also examine the *liability of newness* hypothesis from the organizational ecology literature. According to this theory, younger firms are systematically exposed to higher risks of market exit. Several measures can be used to measure this effect (e.g., club age or newcomer dummy). While clubs with a larger tradition (club age) survive longer, the evidence of the newcomers is not clear cut because positive and negative signs alternate between specifications. Therefore, they conclude that there is only minor evidence for learning effects in professional football.

Frick/Scheel (2016) examine the career duration of professional ski jumpers. Their study adds interesting insights to the literature in several aspects. First, they consequently split their cross-section and allow for time dependent covariates. This was not the case in, for example, the study of Celik (2020), who simply summed up the prize money over the overall career. Second, Frick/Scheel (2016) also measure the competitive pressure of outsiders on the insiders. Because the number of slots per nation is restricted, some jumpers from ‘ski nations’ such as Norway face stiff competitive pressure, leading to shorter survival times.

## 2.2 Game description

Released in August 2012, *Counter-Strike: Global Offensive* is the latest installment of the Counter-Strike series, which first appeared as a modification of the *Half-Life* game in 1999. In CS:GO, two teams—the terrorists and the counter-terrorists—face each other. The goal of the terrorists is to place an explosive device in one of two potential locations and to let it detonate.

The goal of the counter-terrorists is to prevent this from happening by eliminating the terrorists and defusing the bomb. A team wins if it has completely eliminated the opposing team. In addition, the counter-terrorists win if at least one counter-terrorist is alive, the explosive device has not been planted, and the time runs out. One round lasts a maximum of 1:55 minutes (plus a few seconds overtime until the explosive device is detonated or defused). After 15 rounds, the teams switch sides so that each team has played in the role of terrorists and counter-terrorists. The team that wins 16 rounds also wins the map (map point).<sup>1</sup> Most contests are played in a best-of-3 mode, so a team has to win two maps to win the overall game.

A team consists of five players, who take on very specific roles (i.e., in-game leader, sniper, entry fragger, support, rifle) and are equipped with special weapons. The team’s composition (roster) can change during a season, due to illness, poor performance, undesirable behavior, or other reasons. Our object of study is the team, not the roster. During the match, it is of highest importance that the team members communicate quickly and precisely to exchange information about the opponent, or to adapt the strategy or tactics.

Professional CS:GO Esports events are not organized as a closed or open league, such as in traditional US or European sports. Instead, many competitions, be it leagues or tournaments, work as a mixture of seedings and qualifiers. For example, in the *DreamHack Masters Spring 2021*, five teams were invited as partner teams, five more were determined via *ESL’s World Rankings*, two teams qualified as winners in the regional *DreamHack Open January 2021* tournaments, and four teams were able to qualify via qualification rounds.

### 3 Empirics

The data availability in the field of Esport is very extensive. Several websites track the events and teams closely. The birthday, death day, as well as the

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<sup>1</sup>The term *map* refers to the virtual location in which the teams operate. After one team wins a map, the map is changed to a new location. The current pool for the *big events* consists of seven maps, such as Inferno, Dust2, and Mirage (see HLTV 2021).

composition of the team are taken from `liquipedia.net`. The same holds for the prize money data. Because CS:GO was released in 2012, we collect prize money data from 2012 onwards on a yearly basis. Liquipedia covers the best 50 teams per year.

— Insert Table 2 here —

In the first step, we identified 263 teams. However, 45 teams dropped out because we were unable to identify a birthday, death day, or nationality. These teams were especially female teams (e.g., *Imaginary Gaming Female*) or national teams, who only participate occasionally (e.g., *Poland*). We will make the data set available to the public so that our study can be replicated, updated, or augmented.

Table 2 contains the summary statistics: 46 % of the teams are mononational. The mean of the prize money per team over time is 410,000 USD with a maximum of about mill. 9 USD (Team: Astralis). The average duration of survival is 1336.7 days, with a minimum of 34 days and a maximum of 3326 days. About 66 % of all teams fail at one point in time.

Figure 1 highlights that the number of active teams has increased sharply following the introduction of CS:GO in August 2012. It reached a maximum of 121 teams in Nov. 2017 and decreased thereafter. We use this variable to measure the competitive pressure within the market.

— Insert Figure 1 here —

— Insert Figure 2 here —

Figure 2 displays a Kaplan-Meyer survival estimate. It highlights that 50 % of the teams survive more than 3 years. The graph also indicates that mononational teams seem to be somewhat more stable, but it is questionable whether this difference is pronounced enough to be statistically significant. One disadvantage of such a graphical examination is that it does not control for covariates, such as the sum of prize money. Therefore, in the following,

we run exponential regressions.

In CS:GO, we have anecdotal evidence that international teams face problems. For example, the Ukrainian player called (**S1mple**) became homesick when joining the team *Liquid* in the US, leading in the end to turbulence and a major restructuring of the team.<sup>2</sup>

Specification 1 includes a nationality dummy (inter=0 if mononational & inter = 1 if multinational) and the prize money generated over the life time (prize\_sum). The results are displayed in Table 3. The prize money coefficient is significantly smaller than 1, indicating that more prize money reduces the failure probability. The coefficient for the diversity dummy is larger than one, so that there is a tendency for international teams to break down earlier. However, this effect is not significant. Hence, these results are in line with Oberhofer et al. (2015) and Celik (2020).

— Insert Table 3 here —

One may criticize that the prize money is generated over time, and so this covariate is time-dependent (Blossfeld et al. 2019, p. 137ff). Therefore, we split each episode into spells of 365 days. Since the prize money data is available for the calendar year, we sorted the information into survival time (e.g., prize money generated in the first or second year after the birth of a team). Model 2 confirms the results of Model 1.

To test for the reliability of newness hypothesis, we generated a newness dummy, taking the value of one in the first year and zero otherwise. In Model 3, newness is significantly smaller than 1. In the first year, new founded teams are safe and survive.

Frick/Scheel (2016) point out that the degree of competitiveness might influence the survival probability. Given that CS:GO teams do not operate in

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<sup>2</sup>”Liquid said the player felt homesick and would prefer to return in Europe and stay close to his family. S1mple added some context to this, saying that he felt alone in the Liquid League of Legends residence where he lived, and had little interaction with his teammates who lived at their own homes” (Nordmark 2016).

a closed or open league, the number of teams alive varies over time. This is a main difference compared to the study of Oberhofer et al. (2015), where in the German football league the number of competing teams is always equal to 18 and we observe two or three entries and exits each year. Hence, we use the number of teams operating in the market as a level for the degree of competitiveness. However, this effect turns out to be insignificant (Models 4 and 5).

## 4 Conclusion and discussion

We perform a survival analysis for CS:GO teams in the time period 2012–2021. We shed light on the question of whether diversity in terms of nationality impacts the survival duration. We do not find a systematic impact of this variable. We also used the prize money—generated over time—as a time depended covariate.

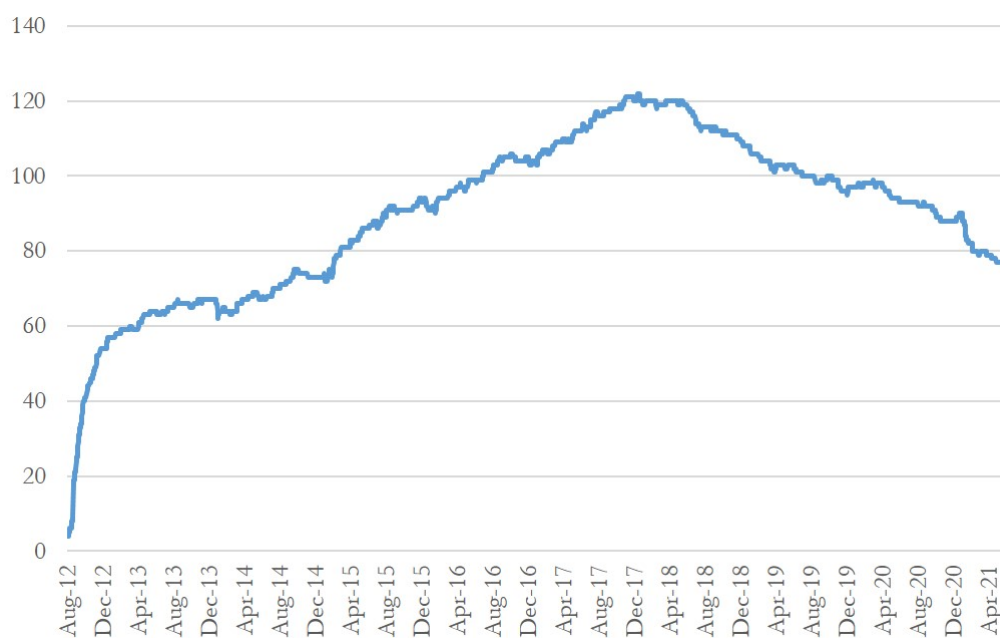
We would also highlight one important limitation of our analysis: we focus on prize money alone. Revenue streams from marketing are excluded in our study. One important question is whether a team that consists of players from one nation, such as the Danish team *Astralis* or the team *Made in Brazil (mibr)* can be marketed better to generate sponsoring and advertising revenues. In addition, the cost structure of a team might be affected by diversity. Therefore, it becomes clear that prize money is only one financial actor that influences the profitability and hence the survival of a team.



## References

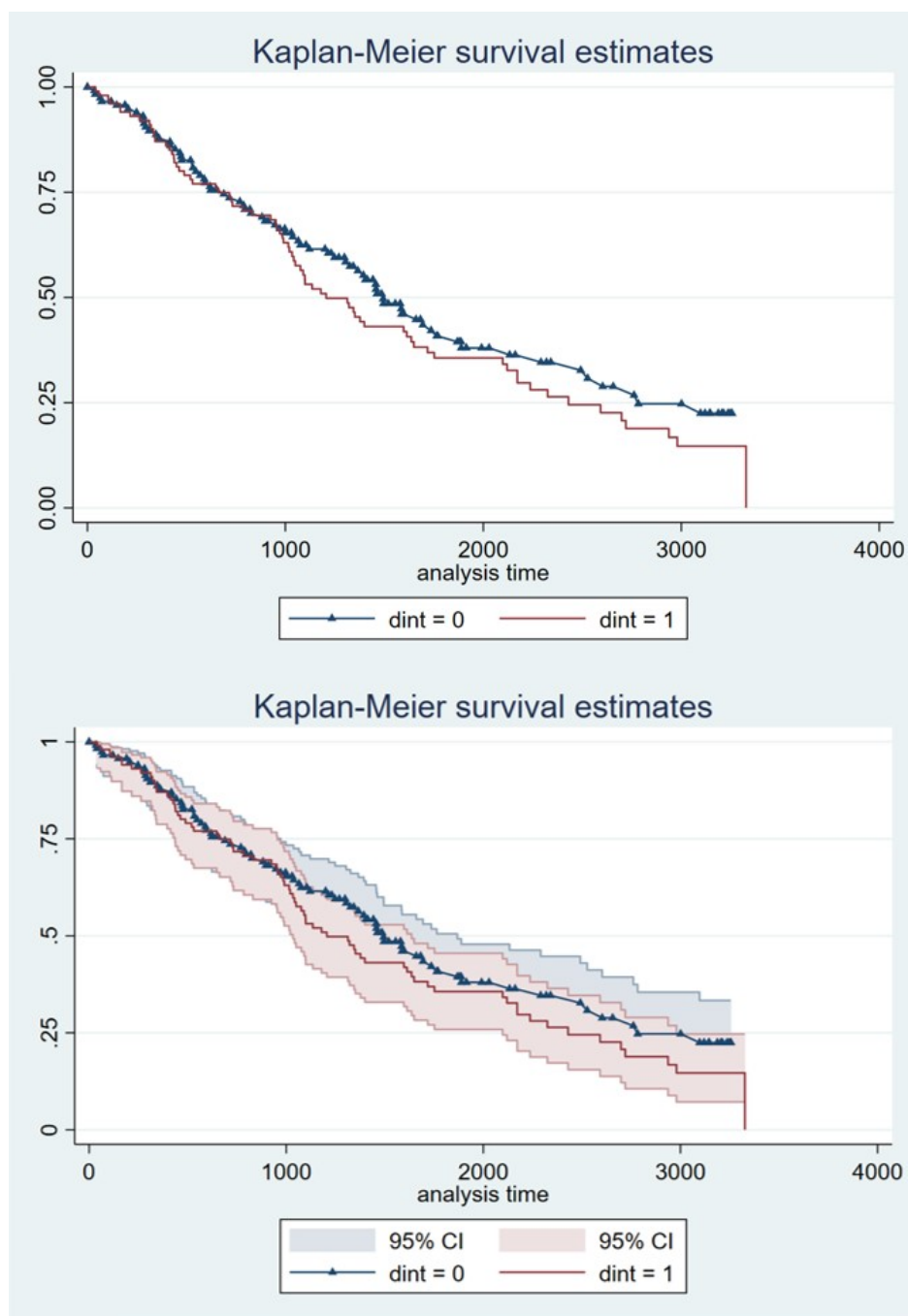
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Figure 1: Number of teams in the market



Note: The number of active teams increased sharply since the introduction of CS:GO in August 2012. It reached a maximum of 121 teams in Nov. 2017 and decreased thereafter.

Figure 2: Survival estimates without and with a 95 % confidence band



Note: The two lines symbolizes mononational (dint=0) or multinational teams (dint=1). The team which survived the longest is **SapphireKelownaDotCom** (multinational, survival time: 3326 days, birth: 25apr2012, death: 03jun2021). **eNergyeSports** is the mononational team which survived the longest (survival time: 3096 days, birth: 01aug2012, death: 22jan2021)

Table 1: Literature survey

Study	Sport	Time period	Obs.
Celik (2020)	Formula 1 drivers	1981 – 2017	255 drivers
Frick/Scheel (2016)	Ski Jumper	1979 – 2011	698 ski jumpers
Oberhofer et al. (2015)	Firm German football	1981 – 2010	38 teams
Radoman (2017)	Player in European football	1992 – 2000	861 players
Reis Mourao (2018)	Formula 1 drivers	1950 – 2014	816 drivers
Volz (2017)	Quarterback NFL	2001 – 2009	522 quarterbacks

Table 2: Descriptive statistic

Variable	Obs	Mean	Std. Dev.	Min.	Max
inter	218	0.46	0.50	0	1
prize_sum	218	410.6	1011.9	3.247	9002.9
survival days	218	1336.7	903.9	34	3326
dum_fail	218	0.66	0.47	0	1

Note: 46 % of all teams classify as mononational and 54 % as multinational. The average team survives about 3.5 years (=1336.7 days). The average team earns USD 410.6 thousand over its lifetime. 66 % of all teams fail, 34 % are still alive at the end of the observation period (June 30th, 2021).

Table 3: Empirical results

	Model 1	Model 2	Model 3	Model 4	Model 5
constant	.00057*** (-60.25)	.00051*** (-62.24)	.00054*** (-60.91)	.00047*** (-20.59)	.00064*** (-17.98)
inter	1.2891 (1.50)	1.2701 (1.43)	1.2838 (1.50)	1.2708 (1.44)	1.2828 (1.49)
prize_sum	.99906*** (-3.95)	—	—	—	—
prize	—	.9943*** (-3.78)	.9944*** (-3.80)	.9943*** (-3.78)	.9944*** (-3.76)
newness	—	—	.5520* (-1.89)		.5322* (-1.93)
num_comp	—	—		1.0007 (-0.18)	0.9982 (-0.43)
#observations	218	1026	1026	1026	1026
#subjects	218	218	218	218	218
#failures	144	144	144	144	144

Note: Model 1: Cross section of 218 teams. Models 2 – 5: Each episode is split into spells of 365 days in order to control for the time dimension of the prize money earned.