

Economics of Esports

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Abstract

In this paper, esports market development is exhibited and analyzed through various data sources and literature review. Additionally, economic concepts are applied to the esports environment. Demand characteristics of this emerging market are analyzed by applying the concept of competitive balance as commonly used in economics of sport scrutiny. The elite esports demand is proxied by gathering data on total prize money in the elite esports tournaments and explaining the esports demand by testing various factors measuring the competitive market properties. The most commonly used measurement in economics of sport for measuring within-season competitive balance is calculated as the actual standard deviation of winning percentages to the hypothesized ideal standard deviation. Nevertheless, unique market properties of esports require novel methods and measurements. Therefore, alternative methods for measuring competitive environment properties in esports markets are developed and tested. Statistical moment methods enable the measuring of the distributional properties of prize money deviation. Distributional information is applied for constructing various index measures for testing the esports market competitive balance and that information is modeled in regression estimations for explaining the demand properties of elite esports markets. One of the main contributions of this paper is to underline the different characteristics of the esports market compared to the traditional sport environment. Finally, esports

market UOH testing results are contrasted with research findings from traditional elite sports markets. It appears that esports market demand is better modelled by applying "superstar" models by Rosen (1981) and Adler (1985) than traditional within-season variation UOH models.

Keywords: esports, Sport Economics, competitive balance, uncertainty of outcome hypothesis (UOH), superstars

Introduction

Esports has gained tremendous success in the global entertainment market and the prize money distributed in the elite esports tournaments has increased to respectable levels. In this paper, esports market characteristics are presented and examined from the viewpoint of economics. Market growth properties are illuminated by applying recent data sources and the special characteristics of the esports business model are analyzed. Following the literature review, market growth factors are investigated by applying the demand theory of sport economics. Empirical testing of the competitive balance hypothesis is conducted for the esports market. The results contribute to the existing economics of sport literature by revealing interesting unique characteristics of the esports market compared to traditional sports. In this paper, novel competitive balance indicators are presented for enabling efficient sports market scrutiny also in the following years.

An official definition of esports does not exist, as the collected literature has multiple definitions. Typically, the term esports (electronic sports) refers to organized competitive video gaming among professional players. It should be emphasized that all three criteria (organized, competitive, professional) must be met in order to fit the definition of esports. Gaming at home, as a hobby, is not considered to be esports. Esports is usually practiced in a league tournament format, with a specific goal or prize, such as winning a championship title or prize money. Thus, esports is another term for competitive video games. It simply refers to a computer game played in professional competitions, especially when it is watched by fans and broadcast on the Internet or on television. Although there are many games that can be included in this context, the most popular games are generally team-based multi-player games from the first-person shooter or multi-player online battle arena genre. Video games most commonly played in esports tournaments are real-time strategy, fighting, first-person shooter (FPS) and multi-player online battle arena (MOBA)-type games. A little less popular are the

video game versions of classic sports (such as FIFA football) or motor racing games.

The most actively researched topic in economics of sport is scrutiny on the properties of professional sport demand. Theoretical ground in economics of sport research is based on Rotenberg's (1956) seminal analysis of the uncertainty of outcome hypothesis (UOH). There exists a wide literature on empirical research on the validity of UOH in football, soccer and baseball, but those theoretical concepts are not yet applied to esports markets.

It has been estimated that currently, about 1 billion people around the world are following video game tournaments. For context, the global esports audience is already double the size of the global audience for Formula 1 motor racing, eight times bigger than the TV audience for the baseball World Series and 10 times bigger than the number of people who watched the 2019 Super Bowl. Most esports fans come from Asia. About 40 percent of internet users in China (more than 300 million people) already report watching esports, while one-third of internet users in Vietnam say they have recently watched a video game tournament. In Finland, esports is currently the most popular sport among 18–29-year-old males. Traditionally, ice hockey has been the favorite sport in Finland, but now, 53 percent of Finnish young males rank esports as the most interesting sport (Sponsor Insight, press release 19.03.2019).

The audience can watch esports competitions by either visiting the arena live or online through gaming broadcasters, such as Twitch. There were approximately 380 million esports viewers in 2018, and that number is expected to increase to about 557 million viewers by 2021, according to an analyst company, Newzoo. Of those 557 million projected viewers, 307 million will identify as "occasional viewers" and 250 million will label themselves "esports enthusiasts" (Newzoo 2019).

To understand how esports teams make money, it is easiest to contrast them with traditional sports teams. While traditional sports teams have massive stadiums and usually regional fan bases, esports are streamed online, so fan bases are not as localized. As a result, while traditional sports teams can generate revenue by selling tickets and concessions to fans coming to their home stadiums, esports teams generally cannot tap into that revenue stream. Spending by esports fans is lower than that of the fans of other sports. According to PricewaterhouseCoopers (PwC), in the US (year 2017), an average esports fan's spending on esports was 3.6 USD, while average spending on conventional sports was 54 USD (PwC 2019).

Similarly, traditional sports teams frequently own broadcasting rights to their games, while esports teams largely do not enjoy that luxury. In 2016, Riot Games (the developer of League of Legends) declined the petition of a number of esports teams for revenue sharing and broadcasting rights. Instead, esports teams generate the vast majority of their money through sponsorship deals, of which estimates vary from 40% to around 95% of team revenue. Newzoo estimates that in 2018, 353.3 MUSD was generated in the esports industry through sponsorship deals. One problem with such one-sided revenue is that esports is such a rapidly changing industry. Games and teams can easily fade from popularity, causing their value to sponsoring companies to decrease, along with any associated sponsorship deals.

One interesting point to note is that, like pharmaceutical companies, game developers have enormous research and development costs. Much like the few drugs that pass regulatory approval and make it to market, very few games actually explode in popularity. Game developers must create a number of games and hope that at least one can hit it big, bringing in enough

revenue to generate a profit after subtracting the costs for developing the others. Unfortunately, for developers, the cost of making these games is growing. Electronic Arts, for example, noted for fiscal year 2018 that research and development costs had risen to 1.3 BUSD, up 10% from the previous year.

Market growth

According to analysis by Newzoo, the esports global audience is estimated to be 454 million viewers, increasing to 645 million in 2022, and increasing about 15 percent on a year-to-year basis. The global esports market will generate 1.1 BUSD revenue in 2019 and is estimated to generate 1.65 BUSD in 2021 and 1.8 BUSD in 2022. The esports and games market combined will generate more global revenues in 2019 than the traditional sports market or the film industry (Kallinen-Kuisma & Auvinen 2018; Newzoo, 31.05.2019). Newzoo estimates that the whole global gaming market will generate 152.1 BUSD in 2019, implying 9.6% growth annually. GlobalWebIndex's latest data show that nearly 3 in every 10 internet users now watch live streams of other people playing video games, equating to a global audience of close to 1.25 billion people. For the past eight years, the video game industry has earned, every year, more revenue than the movie and music industries combined. According to Newzoo, global "brand investment revenues", including advertising and scholarships, will nearly double from 694 MUSD in 2018 to 1.39 BUSD by 2021. According to PwC, esports revenues totaled 805 MUSD in 2018, with the largest portion coming from sponsorships (277 MUSD), followed by media rights and streaming advertisements. PwC estimated that over the next three to five years, media rights revenue would grow to roughly 449 MUSD by 2022, implying an 11.5% growth rate (Koch 2019). During the same time period, sponsorship and advertising is estimated to grow by 5.5%. One of the most popular games, Fortnite, generated 2.4 BUSD in revenue during 2018 for its developer, Epic Games. Currently, it has over 200 million players worldwide.

When the Overwatch League debuted in January 2018, 415,000 viewers tuned in to watch. Participating gamers enjoy amazingly high salaries while competing for a prize pool totaling 3.5 MUSD. Asia-Pacific leads the global esports market and is projected to capture the largest market share, with 1.5 BUSD by 2022. Close behind, Europe and the US tie for second at 1.2 BUSD. Somewhat behind the curve due to the lack of fixed broadband, Latin America will account for just 100 MUSD of esports market share by 2022 (Newzoo, 31.05.2019). However, growth is expected in Brazil, Mexico and BRICS countries, where massive populations represent substantial, as-yet-unexploited growth potential.

The future for esports teams looks bright, as the rising trend of esports viewership has attracted millions on social media. There exist multiple paths to monetization of the esports market. Existing gaming mechanics allow multiple revenue streams, such as in-game betting. Merchandise such as branded shirts and mouse pads already bring in revenue for teams, and new opportunities keep opening up. Team-customized digital skins (different visual appearances for on-screen characters) pose a potential source of revenue. Also, esports-specific arenas could drive ticket sales, sponsorships, and ad revenue. Some of these arenas are already in the works. All this potential for future growth, on top of the sheer amount of capital already being invested in the industry, has given esports teams sky-high valuations. Many have estimated valuations of 100–200 MUSD.

An important difference compared to traditional sports is

that esports do not have a global governing body. Game companies often organize competitions, as they own the intellectual property rights in the case of every game. Nobody can organize a competition without permission from the game publisher. For example, Riot Games organizes the League of Legends Championship Series (LCS), and its rival, Valve (developer of Dota 2 and Counter-Strike), organizes The International. In addition to game producers, the oldest esports organization is ESL (Electronic Sports League), and another international organizer of competitions is the International e-Sports Federation (IeSF). The latter was founded in 2008 and has 50 member countries in five continents.

MVIS Global Video Gaming and eSports Index (MVE-SPO) measures the business performance of the global video gaming and esports segment companies. The index includes companies with at least 50% of their revenues from video gaming and esports. These companies include only those that develop video games and related software, hardware, and streaming services, and are involved in esports events. The MVIS Global Video Gaming and eSports Index covers at least 90% of the investable universe. As can be seen in Figure 1, the value of the MVESPO index has more than tripled during the last five years. This growth shows that the esports market is already able to generate continuing profits for the associated companies and investors.

Business model of esports

Many esports teams make a majority of their revenue, approximately 60-90%, from sponsorships and advertising. These revenue streams include sponsorships in exchange for advertisement on the player's jerseys, like those of traditional sports. For example, the energy drink brand, Red Bull, and the smartphone company, HTC, have jersey sponsorships for Cloud9, a famous esports team. Sponsorship and advertising are followed by media rights (20%), game publishers' royalties and merchandising and ticket sales (all with about equal shares of 10-15%). Sponsorships allow companies to gain potentially global recognition when the team qualifies for international tournaments. While

jersey sponsorships are not as effective as they would be in traditional sports, since the camera is not centered around the players, the main reason why they sponsor esports teams is due to the teams' strong social media presence.

Analogous to traditional sports, several international esports teams offer apparel and other related merchandise for the fans. These include, for example, jerseys and t-shirts, and other gaming related goods such as mouse pads, which target their unique audience. One issue stopping many teams from getting larger income from merchandise is that esports stadiums are still very small compared to traditional professional sports arenas. Since less fans can attend the actual games in person, incentive is lacking for fans to support teams at the stadium by wearing merchandise. Lee and Schoenstedt (2011) compare the fan behavior of esports and traditional sport fans. In their analysis, it is shown that, compared to traditional sports, esports consumers spend relatively little on sport merchandise and attendance. Therefore, it may be fair to assume that this is not yet an area of priority from the esports teams' perspective, but the situation in the fan market can change in the future.

In the digital age, esports teams allow sponsors to target demographics that have traditionally been difficult to reach through traditional marketing tactics. Millennials typically watch less television and listen to the radio less often than older demographics, increasing the importance of social media marketing. It is found that the average age of esports viewers is 29, with 39% of the total audience in the 25-34 age range, thus implying that esports is an effective marketing channel towards a young audience. Many teams have marketing specialists working with the social media accounts of the team, and graphic design personnel to make content such as posters of their players for advertising. The importance of content creation is almost equal to team performance, as it is how the team can attempt to build fan bases. Though players are the ones operating in the public spotlight, esports teams typically have dedicated teams operating behind-the-scenes to serve larger fan bases.

The majority of esports consumption occurs online. Several TV and internet companies have started to compete for the rights to broadcast events, as the industry is trying to attract

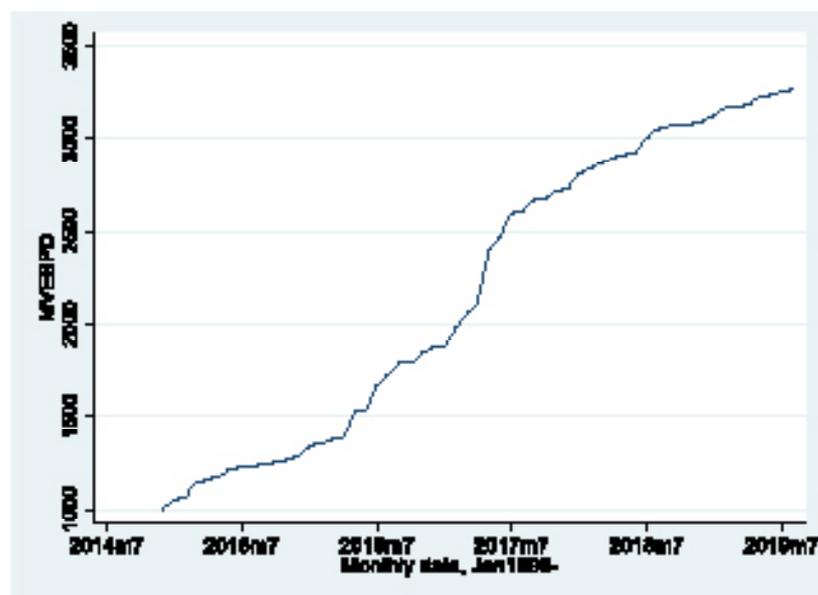


Figure 1. MVIS Global Video Gaming and eSports Index (MVESPO) values 2014-2019. Index of total returns. Data source: Thomson Reuters Eikon.

young audiences. Meanwhile, online streaming continues to see impressive growth and will also likely contribute to the growth in consumption. Esports teams also make money through content creation on platforms such as YouTube and Twitch. While YouTube Gaming and Twitch have lately enjoyed tremendous growth, the entry of other main players such as Facebook also increases the near-term growth prospects of the gaming industry. With advertisement revenues on each view, the teams can keep funding high quality videos. The income from this sector is relatively small, but its spillover effects are huge in terms of reaching new audiences and expanding their fan base, which is currently the number one priority in attracting sponsors.

Many new esports teams require significant investments on top of sponsorships in order to pay for the increasing costs. While raising cash for esports teams was very difficult in the past, this is becoming much easier with esports becoming more recognized. As esports becomes more popular and accepted worldwide, player wages have increased significantly. Many of the more established players have high wages, with some going up to seven figures. This is very similar to traditional sports, where the high competition rewards “superstar” players, giving them significant negotiating power for demanding high wages. Another factor for the bidding up of wages is the high international labor mobility of esports players, with many teams in the US having players from Europe or Korea. On the other hand, there are also other costs related with labor, such as coaches and other staff. While these are smaller costs individually, they are larger in number. The number of non-technical staff is increasing, but the wage growth for these non-player employees is unlikely to match the pace of superstar player salaries.

In order to increase productivity of the players, many teams have chosen to use a “gaming house” system, where players live in the same facility and train up to 12 hours a day, while other everyday chores are all sorted out by staff, including chefs and cleaners.

Violence in esports

Most top-selling video games contain violence (Dill, Gentile, Richter and Dill, 2005) and most children prefer to play violent video games (Buchman and Funk, 1996). Violent content in video games has been shown to have social consequences and to affect human behavior. Meta-analysis by Greitemeyer and Mügge (2014) of the 98 independent studies with 36,965 participants revealed that there were significant associations with social outcomes for both violent video games and prosocial video games. Their conclusion is that violent video game play should be regarded as a risk factor for aggressive behavior. Some studies have also shown the differences in esports and traditional sports’ consumption. Articles by Hamari & Sjöblom (2017) and Sjöblom & Hamari (2017) attempt to explain the reasons for viewing esports through the Motivation Scale for Sport Consumption (MSSC). They found that, from the components of MSSC, the four highest positively and statistically significantly associated factors with the frequency of watching esports were: Watching sports as a means to escape everyday life, knowledge acquisition related to the sport, novelty of new players and teams, and, finally, the enjoyment of aggression and the aggressive behaviors the athletes exhibit. What is particularly interesting is that this last factor, “the aggression enjoyed by viewers”, has become less visible in traditional sports during our modern times. For example, Major League Baseball has taken major steps to reduce injuries in the game, such as implementing the collision rule in 2014, which penalizes intentional physi-

cal contact at home base. Many sports are also implementing video replay systems in order to accurately penalize rough plays, this being emphasized most recently in the soccer World Cup. Several restrictive rules have lately been applied in ice hockey, as the game has tried to reduce its popular image as a violent sport. Nevertheless, aggression is automatically implemented in most video games in the form of kills or attacks.

Famous esports games that build around aggression include shooting games like Counter-Strike or more mild games like Fortnite. What this means from the viewpoint of economics is that esports and traditional sports are not, from a consumption perspective, strong substitutes for each other. Therefore, there will be no need for esports to attract new consumers amongst the fans of traditional sports. This reduces one of the huge potential obstacles of future esports expansion. However, this also means that esports needs to make conscious efforts to amass their own consumer base, as it will not be able to simply attract the same consumers as traditional sports.

Increase of prize money

Prize money in esports is increasing at an incredible rate. While prize pools amounted to a mere couple thousand dollars at most in the past, they now reach several million dollars for large competitions. League of Legends, for example, distributed a total of 4.9 MUSD of their 2018 World Championships revenue to teams according to their final standings. This money does not go directly to the players, and most of it is absorbed by the team’s organizations. The esports team, in this sense, acts like a company, with the players as employees on yearly contracts.

Players’ most high-profile sources of income are tournaments, in which they compete for a cash prize. For the 2018-19 season, video game maker Epic Games promised 100 MUSD in prize money for Fortnite tournaments alone. Many players have turned to an online platform, Twitch, to livestream their games. Viewers can subscribe to a stream for only 4.99 USD per month, and the streamer gets half of that. With only 4,000 subscribers, that is about 120,000 USD per year, and the top streamers make much more. Some are reported to earn over 100,000 USD per month. Streamers can upload their recorded streams to YouTube, generating more revenue through views on that platform. Many streamers also have loyal fans who are willing to donate money, which brings in up to 5,000 USD per day for the top streamers. On top of all that, streamers can also partner with various brands to promote their products on their channels, sharing links to certain products on Amazon, for example. The best esports players are signed to teams, much like professional football or basketball players, and that represents yet another source of income. According to Forbes, the average starting North America League of Legends Championship Series (NA LCS) player salary is now over 320,000 USD (Heitner 2018). Teams are even starting to offer other benefits, like health insurance and 401k’s.

Some of the biggest game developers hold tournaments for their games, with a cash prize paid to the winner. Though expensive to host, these tournaments generate publicity for the games, and at least some of the costs can be offset via ticket sales, sponsorships, and advertisements. Additionally, the game developers own broadcasting rights. For larger tournaments, these rights can be worth a significant amount of money. In 2016, BAMTech (a streaming company owned by Major League Baseball and Disney) signed a deal with Riot Games for streaming rights through 2023, worth at least 300 MUSD. Similarly, in 2018, Activision Blizzard (maker of Overwatch) sold broad-

casting and streaming rights for its second season of the Overwatch League to three well-established companies (ESPN, ABC, and Disney), indicating esports' growing mainstream appeal. Perhaps the most interesting feature of game revenue for these developers is the rise of microtransactions (small in-game purchases), such as skins. In Fortnite, as a free-to-play game, all its revenue is made through in-game transactions.

Theory and previous literature

In this empirical part of this paper, Rottenberg's (1956) uncertainty of outcome hypothesis (UOH) is applied to the esports market. UOH is the most commonly applied theoretical tool in economics of sport scrutiny and it is based on the assumption that sports fans prefer to see games where competitor abilities are more evenly matched. Close sports contests imply uncertainty surrounding the outcome and that leads to increasing fan interest and attendance. Seminal research on UOH by Szymanski (2003, 1156) notes that demand for game tickets is at maximum when a home team's probability of winning is about twice that of the visiting team, implying a probability of about 0.6 – 0.7. Nevertheless, the empirical evidence is far from unambiguous. Uncertainty evidently offers excitement, but it is reasonable to expect that for many fans a preference for the home team reaching the playoffs would dominate preferences for suspense and balance (Mills & Fort 2018, 928).

Accordingly, evenly matched esports contests would increase fans' interest for games and esports tournaments, leading ultimately to positive tournament prize money development. Currently, there exists no uniform measurement or statistics for competitive balance and various methods are applied in different markets. Competitive balance in esports is not previously well-defined, as the market is still pretty new and under a continuous development and reforming process.

Table 1 summarizes the results of selected previous economics of sport studies where the UOH hypothesis has been

tested. Most previous research seems to find some indication for UOH, but the relation is far from consistent. None of the existing literature contains esports as a field of research.

Data

Data is derived from the databank of the "esportsearnings.com" website, which is the most used historical data source in the esports market. It is a community-driven competitive gaming resource based on freely available public information. Therefore, it is not moderated by any commercial gaming company or business organization, which increases its reliability as a trusted source. Software companies would maybe have an incentive to exaggerate esports growth figures, as that would give the market positive signals. As a community-driven data source, "esportsearnings.com" is becoming the most trusted source for esports data. Data applied consists of monthly observations during the period 1998-2019 (n=254).

We define esports attendance proxied by the total prize money paid in the professional esports tournaments. In esports, box office ticket sales are not the main issue representing demand of sport commodity. We assume that the demand side of esports is best reflected in the amount of total prize money in gaming tournaments.

Descriptive analysis of the data reveals interesting properties. While the prize money, the number of professional players, the number of attended countries and the number of professional teams has been increasing rapidly, the number of tournaments has actually been on a decreasing trend during the past three years. Therefore, it seems that the average prize money in tournaments has been increasing, but the main tournaments have been dominating the market. The number of various games played in professional tournaments has been stabilizing to about the level of 40 different games played. That is understandable, as players have to specialize in one game in which they try to prosper and gain fame. Therefore, we can assume

| Author | Data | Country | Sport / League | UOH significance |
|---|--------------------------------------|-------------------|---------------------------------------|-------------------------------------|
| Szymanski (2003) | review of 22 studies | UK, US, Australia | football, baseball, ice hockey, rugby | (++) 10/22, (+) 7/22, (-) 5/22 |
| Mills & Fort (2018) | MLB 1903, NBA 1945, NHL 1952, - 2012 | US | MLB, NBA, NHL | (-) |
| Tainsky & Winfree (2010) | 1996-2009 | US | MLB | (+) |
| Jane (2014) | 2009-2012 | US | NBA | (+) league-level; (-) game-level |
| Coates & Humphreys (2012) | 2005-2010 | US | NHL | (+) |
| Pawlowski, Nalbantis & Coates (2018) | 2014-2015 | GER | Soccer | (+ / -) |
| Zimbalist (2002) | 1950-2000 | US, UK | MLB, NHL, NBA, NFL, PL | (+) |
| Notes: ++ clear support for UOH, + weak support for UOH, - negative or no support for UOH | | | | |

Table 1. Main results of previous UOH studies.

that the early phase of esports development has almost reached an end, and now the business is reaching a more stable market phase for continuing development.

Model

In order to test the UOH hypothesis, we formulate linear regression (OLS) models for the period 1998-2019 ($n=254$). In the models, the dependent variable is the change in total prize money, and the control variables include: the number of tournaments, the number of players in tournaments, the number of different games played, the number of teams in tournaments and the number of different countries from which the players originate. These are all important variables defining the esports markets and could all be argued to be significant explanatory variables for explaining the growth of elite tournament prize money and the demand of esports. UOH is tested by construct-

ing and utilizing alternative index measures for proxying competitive balance properties in esports markets. The estimated models are formulated as:

$$\Delta\% \text{ prize money } t = \alpha + \beta_1 \text{ tournaments } t + \beta_2 \text{ players } t + \beta_3 \text{ countries } t + \beta_4 \text{ games } t + \beta_5 \text{ teams } t + X_i \beta_i + \varepsilon_t$$

, where X_i is a vector of alternative UOH indicators and t is a time index.

There exists no uniform method for calculating and forming an index representing competitive balance in elite esports. The most commonly used measurement in economics of sport for measuring within-season competitive balance is "r ratio", which is calculated as the actual standard deviation of winning percentages to the hypothesized ideal standard deviation. Other alternative measurements include the Herfindahl-Hirschman Index and Gini coefficient. They are commonly applied when analyzing established football and baseball leagues, but they are not suitable in esports markets. Therefore, three alternative in-

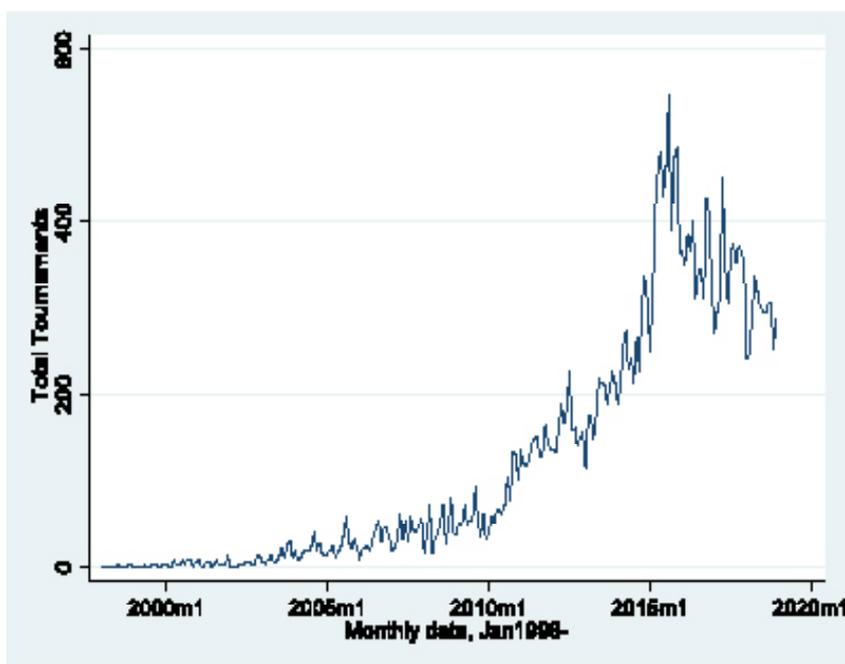


Figure 2. Development of the total number of professional esports tournaments. Data source: esportsearnings.com.

| Variable | Mean | St. dev. | Min – Max |
|-----------------------------|-----------|-----------|----------------|
| Prize money | 2 251 135 | 4 641 462 | 0 – 37 476 248 |
| # of tournaments | 119.0 | 137.5 | 0 – 546 |
| # of active players | 869.8 | 1113.5 | 0 – 4440 |
| # of countries | 33.8 | 27.2 | 0 – 93 |
| # of different games | 17.3 | 14.7 | 0 – 59 |
| # of teams | 53.5 | 60.0 | 0 – 226 |
| Mean earnings per player | 1793.7 | 1666.0 | 0 – 13235.3 |
| Median earnings per player | 455.7 | 540.5 | 0 – 6000 |
| Top player monthly earnings | 96 895.4 | 259 035.3 | 0 – 2 246 832 |
| UOH index 1 (κ) | 5.1 | 4.5 | 0.68 – 30.07 |
| UOH index 2 (υ) | 39.3 | 44.9 | 1 – 342.9 |
| UOH index 3 (λ) | 326.5 | 326.5 | 1 – 6219.9 |

Note: Model variables in levels. In a regression model, the variables are in first differences due to unit root properties. ($n=254$)

Table 2. Descriptive statistics of the model variables.

dex measures are constructed.

One potential earnings inequality measure is calculated by dividing the mean earnings per player by the median earnings per player. This indicator is labeled as "UOH index 1" and using Hebrew letter \aleph . Alternative methods include the ratio of top earnings in relation to mean ("UOH index 2", \beth) or median ("UOH index 3", λ) earnings per player. The larger value of constructed UOH indexes implies more competitive unbalance between the players of the tournament. If competitive balance is an important factor for prize money accumulation, negative sign is assumed for the regression coefficient estimator. Unity index value would imply perfect balance between competitors. In that case, all prize money would be distributed evenly between players.

Results

Table 2 presents (p. 37) the descriptive statistics of the variables used in analysis. Several variables were found being non-stationary and contained unit roots, which was tested using an Augmented Dickey-Fuller test procedure. Those variables were transformed into logarithmic first differences in the final regressions to ensure the robust statistical properties of the estimations.

Table 3 (below) presents the estimation results. Two of the tested coefficients for competitive balance (UOH index 1 and UOH index 3) are statistically significant, but positive. UOH index 2 is insignificant, implying that the mean of prize money earnings does not contain enough information to reflect competitive balance when related to top earnings figures. Fortunately, index measurements UOH index 1 and UOH index 3 succeed in gathering information on the competitive balance

situation and they are statistically significant. Nevertheless, the signs of both estimated coefficients are positive, signaling rejection of the UOH hypothesis. This implies that more competitive unbalance is related to more demand for esports. Fans love to see superstars and pay for the opportunity to see them playing. As Adler (1985) has shown, fans need superstars and even with no difference in talent, the market demand supports the creation of superstars in the sports arena.

Esports fans prefer to see famous megastars playing competitive games. Huge prize money and astronomical monthly earnings of the best esports professionals make the esports entertainment appealing and increase its popularity as it gets emerging media attention. Market of superstars is modeled by Rosen and Adler and their ideas seem to fit well in the esports markets. Rosen (1981) explains why large differences in earnings could exist where there are only small differences in talent, and Adler (1985) has shown why large differences in earnings could exist even where there are no differences in talent at all. Those models give an explanation for why the wage spread of elite players has grown enormously while, probably, the differences in talent are relatively small in the esports environment.

Conclusion

The empirical results of this paper contribute to the existing economics of sport literature by applying the esports market as a field of economic scrutiny for demand analysis. Esports has enjoyed tremendous success, measured by media interest, fan base, business revenue and tournament prize money. Competitive balance is the most commonly considered demand factor when explaining sport demand. Nevertheless, according to the empirical results of this paper, the esports market has unique

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|-----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| tournaments | 0.130 (0.148) | 0.013 (0.177) | 0.085 (0.164) | 0.096 (0.173) | 0.089 (0.175) | 0.050 (0.177) |
| players | 0.620 ** (0.130) | 0.603 ** (0.153) | 0.437 ** (0.141) | 0.414 ** (0.146) | 0.517 ** (0.154) | 0.423 ** (0.151) |
| countries | 0.115 (0.131) | 0.183 (0.167) | 0.142 (0.145) | 0.266 (0.163) | 0.151 (0.155) | 0.252 (0.167) |
| games | 0.300 ** (0.114) | 0.465 ** (0.133) | 0.457 ** (0.124) | 0.492 ** (0.129) | 0.491 ** (0.133) | 0.520 ** (0.133) |
| teams | 0.288 ** (0.104) | 0.363 ** (0.121) | 0.439 ** (0.113) | 0.429 ** (0.116) | 0.413 ** (0.123) | 0.453 ** (0.120) |
| Mean earnings per player | 0.544 ** (0.061) | | | | | |
| Median earnings per player | | 0.212 ** (0.076) | | | | |
| Top player monthly earnings | | | 0.176 ** (0.032) | | | |
| Index 1 (\aleph) | | | | 1.465 ** (0.335) | | |
| Index 2 (\beth) | | | | | -0.168 (0.376) | |
| Index 3 (λ) | | | | | | 0.394 ** (0.151) |
| Constant | -3.98 ** (0.443) | -1.252 ** (0.448) | -1.877 ** (0.345) | -1.858 ** (0.424) | 0.235 ** (0.550) | -0.741 ** (0.282) |
| R ² | 0.6829 | 0.5763 | 0.6145 | 0.5979 | 0.5596 | 0.5745 |
| F-test | F(6,207) 74.30 ** | F(6,204) 46.24 ** | F(6,207) 54.98 ** | F(6,204) 50.56 ** | F(6,207) 43.83 ** | F(6,204) 45.90 ** |

Table 3. Estimation results.

characteristics. Esports demand and elite tournament prize money increase are not dependent on competitive balance as implicated by the UOH hypothesis and previously found in the leagues of traditional sports. Esports fans seem to like to watch their favorite players succeed, and global superstars attract new players and new revenue to the market.

The esports market continues to expand strongly and it should be kept in mind that the video game market is already worth more than the music and movie industries combined. Gross video game sales have outweighed box office receipts for over two decades, and they surpassed home video and theatre earnings combined fifteen years ago. The video games industry has earned more revenue than the movie and music industries combined every year for the past eight years. In 2019, the global video game market is estimated to be 120-150 BUSD, up over 20 percent from the previous years, and surpassing the projected total global box office for the film industry of 41.7 BUSD or the global music industry of 19.1 BUSD (Statista 2019).

As e-sports is recognized as an official branch of sport by a growing number of countries, it is becoming increasingly attractive to major sponsors and investors. The surge in games that are optimized for mobile platforms, and the evolution of the internet, points to the likelihood of esports becoming even more widespread, as virtual and augmented reality (VR) will make it possible to enhance the gaming experience of the fans. In the future, an increasing number of sponsors, players and spectators will find esports to be their preferred entertainment and business environment. The growth requires some additional, strong international organizations and rules of conduct to en-

able fair market practices. It is essential to provide a reassuring answer to the prevention of doping and cheating, and to channel esports gambling and betting into a regulated and transparent framework.

The market of esports has exhibited a huge increase in volume, tournament prize money and fan interest. Traditional models for elite sport demand assume balanced competition to be a positive factor for enabling continuing demand, but in the esports market, fans appear to be demanding skillful performances, and the increasing growth of elite players' paychecks seems to persuade more fans to gather in sports arenas and Twitch channels to watch their favorite players dominate the esports mega-tournaments. The electronic sports market has only recently been approaching a mature state of development, and the unbiased competition has not yet reached a level that would disturb the huge increase of the esports market. At this current stage of market development, the paying public and fan base searches for megastars and leading champions to identify with. The media presents esports megastars and astronomically high prize money winners, which supports the storytelling of esports. This "from nerds to riches" storytelling gives a huge boost to the continuing expansion of the esports business.

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References

- Adler, M. (1985). Stardom and talent. *American Economic Review*, 75(1), 208-212.
- Buchman, D. D., & Funk, J. B. (1996). Video and computer games in the '90s: Children's time commitment and game preference. *Children Today*, 24, 12-16.
- Coates, D., & Humphreys, B. R. (2012). Game Attendance and Outcome Uncertainty in the National Hockey League. *Journal of Sports Economics*, 13(4), 364-377.
- Dill, K. E., Gentile, D. A., Richter, W. A., & Dill, J. C. (2005). Violence, sex, age and race in popular video games: A content analysis. In E. Cole & J. Henderson-Daniel (Eds.), *Featuring females: Feminist analyses of media* (pp. 115-130). Washington, DC: American Psychological Association.
- Greitemeyer, T., & Mügge, D. O. (2014). Video games do affect social outcomes: A meta-analytic review of the effects of violent and prosocial video game play. *Personality and Social Psychology Bulletin*, 40(5), 578-589.
- Hamari, J. (2013). Transforming homo economicus into homo ludens: A field experiment on gamification in a utilitarian peer-to-peer trading service. *Electronic Commerce Research and Applications*, 12, 236-245.
- Hamari, J., & Sjöblom, M. (2017). What is esports and why do people watch it? *Internet research*, 27(2).
- Hamari, J., Sjöklint, M., & Ukkonen, A. (2016). The sharing economy: Why people participate in collaborative consumption. *Journal of the Association for Information Science and Technology*, 67(9), 2047.
- Heitner, D. (2018). A Look Inside Riot Games, From \$320,000 Player Salaries To Using Esports As A Catalyst For Sales. *Forbes*. 02.05.2018. <https://www.forbes.com/sites/darrenheitner/2018/05/02/a-look-inside-riot-games-from-320000-player-salaries-to-using-esports-as-a-catalyst-for-sales/#71dd14362c6a>. Loaded: 03.09.2019.
- Hutchins, B. (2008). Signs of meta-change in second modernity: The growth of e-sport and the world cyber games. *New Media & Society*, 10(6), 851-869.
- Jane, W. (2014). The Relationship Between Outcome Uncertainties and Match Attendance: New Evidence in the National Basketball Association. *Review of Industrial Organization*, 45(2), 177-200.
- Jonasson, K., & Thiborg, J. (2010). Electronic sport and its impact on future sport. *Sport in Society*, 13(2), 287-299.
- Kallinen-Kuisma, M., & Auvinen, T. (2018). E-urheilun johtaminen : lähtölaukaus empiiriselle tutkimukselle suomalaisesta näkökulmasta. *Electronic Journal of Business Ethics and Organization Studies*, 23(2), 34-43.
- Koch, L. (2019). Esports Playing in the Big Leagues Now. *eMarketer*. <https://www.emarketer.com/content/esports-disrupts-digital-sports-streaming>. 03.09.2019.
- Lee, D., & Schoensted, L. J. (2011). Comparison of eSports and traditional sports consumption motives. *Journal of Research*, 6(2), 39-44.
- Macey, J., & Hamari, J. (2018). Investigating relationships between video gaming, spectating esports, and gambling. *Computers in Human Behavior*, 80, 344-353.
- Macey, J., & Hamari, J. (2019). Esports, skins and loot boxes: Participants, practices and problematic behaviour associated with emergent forms of gambling. *New Media & Society*, 21(1), 20-41.
- Mills, B. M., & Fort, R. (2018). Team-level time series analysis in MLB, the NBA, and the NHL: Attendance and outcome uncertainty. *Journal of Sports Economics*, 19(7), 911-933.
- Newzoo. 2019 Global esports market report. <https://newzoo.com/>

- solutions/standard/market-forecasts/global-esports-market-report/, 03.09.2019.
- Parshakov, P., & Zaveriaeva, M. (2018). Determinants of performance in esports: A country-level analysis. *International Journal of Sport Finance*, 13(1), 34-51.
- Pawlowski, T., Nalbantis, G., & Coates, D. (2018). Perceived game uncertainty, suspense and the demand for sport. *Economic Inquiry*, 56(1), 173-192.
- PwC (2019). E-sport's moving into the big leagues. A business study of the e-sport market in Hungary and the V4 countries. https://www.pwc.com/hu/en/kiadvanyok/assets/pdf/esport_en.pdf, 04.09.2019.
- Rosen, S. (1981). The economics of superstars. *American Economic Review* 71, 845–858
- Rottenberg, S. (1956). The baseball player's labour market. *American Economic Review*, 64(3), 242-258.
- Sjöblom, M., & Hamari, J. (2017). Why do people watch others play video games? An empirical study on the motivations of Twitch users. *Computers in Human Behavior*, 75, 985–996.
- Sponsor Insight, press release 19.03.2019. http://www.sponsorinsight.fi/uploads/1/1/1/0/11102604/sponsor_insight_lehdist%C3%B6tiedote_19_03_2019.pdf
- Statista (2019). Value of the global video games market 2012-2021. <https://www.statista.com/statistics/246888/value-of-the-global-video-game-market/>, 04.09.2019.
- Szymanski, S. (2003). The economic design of sporting contests. *Journal of Economic Literature*, 41(4), 1137-1187.
- Tainsky, S., & Winfree, J. A. (2010). Short-Run Demand and Uncertainty of Outcome in Major League Baseball. *Review of Industrial Organization*, 37(3), 197-214.
- Tainsky, S., Xu, J., Mills, B. M., & Salaga, S. (2016). How Success and Uncertainty Compel Interest in Related Goods: Playoff Probability and Out-of-Market Television Viewership in the National Football League. *Review of Industrial Organization*, 48(1), 29-43.
- Zimbalist, A. S. (2002). Competitive balance in sports leagues. *Journal of Sports Economics*, 3(2), 111-121.

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