Ph.D. Dissertation of Global Sport Management

Broadcasters' Selection and Audience Demand for Chinese Super League Games in Media: An Examination of Television and Streaming Platforms

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ABSTRACT

There has been a lot of research on sports demand since the 1950s. However, unfortunately, there are few studies on the demand for the Chinese Super League (CSL). With this problem in mind, this dissertation explores broadcasters' selection and audience demand for CSL games in the media. Specifically, two studies are presented to understand the viewing demand of CSL television viewers and streaming platform viewers, as well as the factors influencing the choice of broadcasters.

A series of study was performed in Study 1 to examine the factors affecting broadcasters' choice of matches and audience viewership of live CSL matches. Data were collected from 2017 to 2021, amounting to a total of 1056 matches. Among these matches, 208 were televised on CCTV5 and received national coverage. Broadcasters' match selections and TV ratings were regressed on a series of antecedent factors of the demand for broadcasted CSL matches. The findings showed that both broadcasters and TV audiences display a preference for matches between teams with larger fan bases, higher rankings, and higher salaries.

Furthermore, Study 1 also analyzing the demand for live CSL matches among TV viewers in different city tiers. The results indicate that viewers in all three city tiers have a preference for games that feature more star players and are broadcasted on weekends and during nighttime. Additionally, it was found that matches involving older teams have a negative impact on television ratings.

Study 2 analyzes the demand for CSL matches on streaming platforms, specifically focusing on highlight videos and full game replays. The study covers both

the Tencent Sports CSL channel and the CCTV streaming media CSL channel, with data collected from the 2022 CSL season, comprising 18 teams and 306 games. On Tencent Sports, certain variables such as goals scored, total current points, red cards, team age, star players, and upload time significantly influence highlight video view counts, suggesting viewers' preference for exciting and high-scoring games.

Distinct viewer preferences were observed on the CCTV streaming media platform. Viewers showed a strong preference for games with result uncertainty, indicating a liking for unpredictable outcomes. Matches that deviated from the predicted outcome generated greater fan interest. Regarding full game replays on the CCTV streaming media platform, there was significant demand among fans. Viewers tended to choose games featuring teams with higher current rankings and strong historical performances. The presence of star players and higher current points attracted more viewers to full game replays. However, the demand decreased for derby matches, older teams, and teams with higher average wages, which impacted the appeal of full game replay viewing.

The results of this dissertation provide valuable insights into the distinct preferences and benefits associated with TV viewing demand and online streaming media viewing demand in the current sports market. Implications and contributions, limitations and directions for future research are discussed.

Keyword: football spectatorship, viewership, Chinese football, TV audience, highlights viewership, Heckman selection model

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CHAPTER 1: INTRODUCTION

1.1. Study Background

The world football industry, commonly known as the soccer industry, is widely acknowledged as one of the largest and most profitable sports sectors globally. With an annual gross output value of 500 billion dollars, it holds the distinction of being the "17th largest economy in the world". Football alone contributes 43% to the total output value of the sports industry, surpassing other sports like rugby, basketball, volleyball, and more. Football leagues and clubs occupy a prominent position in global sports events and rank high in terms of commercial value. It boasts a staggering fanbase of over 1.6 billion worldwide.

The vast scale of the world football industry has attracted significant investments and garnered attention from a diverse range of stakeholders, including media organizations, corporations, and governments. The industry's sustained growth and enduring popularity indicate that it will continue to be a major contributor to the global economy for many years to come.

Football is an archetypal competitive sport, renowned for its captivating spectacle, intense rivalry, and widespread popularity, which positions it as the epitome of profitability in the realm of competitive sports. The football industry boasts an expansive profit model that spans various sectors, making it a prime example of a high-value-added industry. Its global scale is a result of a comprehensive industrial

chain and a high level of marketization. The industry's value chain encompasses media rights, sponsorship revenue, ticket sales, advertising, marketing, customized sports apparel, game equipment such as balls, and even extends to derivative sectors like sports betting and fan culture, all of which contribute to its overall profitability. The different sectors within the global football industry have reached significant levels of maturity in their development, showcasing the industry's growth and diversification.

The evolution of football leagues worldwide has played a pivotal role in the development of the sport and its industry. These leagues have experienced significant transformations over time, introducing new formats, rules, and competitions to cater to the evolving demands and interests of fans, players, and stakeholders. In terms of global market-oriented development, the major focus lies on the five prominent European leagues and the UEFA Champions League, which possess high-quality international football resources. These five leagues, namely the English Premier League, La Liga, Italian Serie A, Bundesliga, and French Ligue 1, are recognized as the top-tier leagues in European football, representing the pinnacle of the sport and attracting numerous star players. They serve as benchmarks for the development of football worldwide.

Statistics demonstrate a consistent increase in the total revenue of these five European football leagues since 2006. In 2013, their combined revenue exceeded 10 billion euros, reaching 11.3 billion euros. By 2019, the total revenue had further climbed to 17.95 billion euros. As the football industry continues to thrive and

economic standards improve, it is expected that the total revenue of the top five European football leagues will continue to grow. This positive trend is a testament to the sustained development and financial success of these leagues (iiMedia Research, 2020).

Sports play a vital role in promoting economic and social development. Sports-related industries, such as tourism, the media, and sponsorship, can create jobs and generate significant revenue. Aside from generating investment, boosting businesses, and creating new opportunities for entrepreneurs, sports can also stimulate local economies. Furthermore, sports can also promote the development of infrastructure, such as stadiums and training facilities, which can have positive economic impacts on communities. Sport also encourages social interaction and cohesion by fostering a sense of community.

Sports can bring people from diverse backgrounds together, encouraging them to work together towards a common goal. Not only does it enrich people's intellectual and cultural life, but it can also demonstrate a country's soft power. Football popularity has been a major factor in shaping the development of national sports, with football influencing the creation of new sports and the growth of existing ones. In many countries, football has become a key part of national identity and culture, reflecting the values and beliefs of the people, and contributing to a sense of community and pride. Since hosting the 2008 Summer Olympics, China has announced a series of national plans aspiring to become a strong sports nation by 2025.

In Nielsen’s survey of the population of Chinese cities, the proportion of people interested in football is 32%. Although it is not as high as the global average, the huge population base has brought a large number of football fans to Chinese football, only among the urban population. The number of fans reached 187 million, which is more than the total number of fans in the five major leagues Germany, the United Kingdom, France, Italy, and Spain. Chinese football fans are a growing and passionate group of supporters who are increasingly becoming a major force in the world of football.

Over the past few decades, the sport has seen a surge in popularity in China, with more and more people tuning in to watch matches and supporting their favorite teams. The Chinese football fan base is diverse and includes fans of all ages, genders, and backgrounds, with a strong emphasis on youth and family participation. An important event that highlights the enthusiasm of Chinese football fans occurred on January 28, 2019, when the Espanyol Club officially announced the signing of Chinese forward Wu Lei. Subsequently, in the 22nd round of La Liga on February 3, Beijing time, Wu Lei made his debut for Espanyol as a substitute against Villarreal, marking his first appearance in La Liga. According to official data released by Espanyol, more than 40 million people in China watched Wu Lei's debut, underscoring the immense fan base in China and their passion for football.

With the transfer of political and economic power in the past few decades, the sports industry in emerging markets has made considerable progress. In 2014, the Chinese State Council issued the "Opinions on Accelerating the Development of the Sports Industry and Promoting Sports Consumption", which set a target of reaching a

total scale of 800 billion US dollars China's sports industry by 2025 (Xinhua News, 2019). Additionally, in the same year, Chinese President Xi Jinping's central reform team approved the Chinese football development plan, marking a significant step forward for the Chinese football industry.

These political initiatives have had a particularly positive impact on the development of the Chinese football industry. Since then, there has been a growing involvement and investment from various sectors, including private enterprises, public institutions, and the government, in the development of Chinese football (Boyall, 2017).

Indeed, the Chinese government has recognized the strategic importance of football and has made substantial investments to foster its development. The goal of building a strong domestic league and positioning China as a prominent player in global football has driven these efforts. As part of this initiative, the government has established football academies and training centers across the country, providing young talents with opportunities to develop their skills and pursue professional careers in the sport.

Furthermore, the creation of a professional football league in China has significantly contributed to the growth of football's popularity and prestige in the country. The league has attracted renowned international players and coaches, bringing high-quality football to Chinese audiences, and raising the overall competitiveness of the domestic league.

Through these initiatives, the Chinese government has not only increased the

visibility of football but has also made the sport more accessible to the general public. The focus on grassroots development and the promotion of football in schools and communities have encouraged a new generation of fans to engage with the sport, fostering a sense of passion and enthusiasm for football across the nation.

The Chinese football industry has indeed emerged as a vibrant and rapidly evolving sector. It has witnessed significant growth in recent years, primarily due to substantial investments from both the government and the private sector. These investments have played a crucial role in promoting the sport, improving infrastructure, and nurturing talent.

The commercial potential of the Chinese football industry is substantial, and it is currently at a turning point where new avenues for growth and expansion are emerging. The rising popularity of football among fans and players has contributed to the industry's upward trajectory. Additionally, the growth of the Chinese economy and the increasing disposable income of the population have created a favorable environment for the development of the football industry.

The Chinese football industry has tapped into the evolving preferences of consumers, who are actively seeking new forms of entertainment and leisure. This has opened up opportunities for the industry to capitalize on various segments, such as the live events market, where fans can experience the excitement of watching matches in person. Moreover, the advent of streaming media and e-commerce platforms has facilitated the accessibility of football content, enabling fans to engage with the sport through digital channels. These platforms have also created avenues for revenue

generation, including advertising and sponsorship opportunities.

Furthermore, the growth of the Chinese football industry has led to an increase in the demand for football merchandise and the development of the sponsorship market. As more fans align themselves with their favorite teams and players, there is a growing market for football-related merchandise, ranging from jerseys and accessories to collectibles. This, coupled with the rising popularity of the sport, has attracted the attention of sponsors who seek to associate their brands with the football industry.

The Chinese football industry is well-positioned to capitalize on its growth potential. With continued investments, strategic partnerships, and the support of an enthusiastic fan base, the industry is poised for further expansion and success in the coming years.

The Chinese football industry has made significant strides in recent years, and its commercial potential is poised for further growth and acceleration. The total scale of the domestic football industry reached 19.73 billion dollars in 2016, demonstrating its economic significance. In terms of sponsorship market, football events in China ranked first in 2017 with sponsorship amounting to 290 million dollars, followed by basketball with 170 million dollars. Other sports such as table tennis, volleyball, billiards, and track and field had comparatively smaller sponsorship amounts, around 15.5 million dollars, highlighting the dominance of football and basketball.

Deloitte's forecast suggests that by 2022, domestic sponsorship for domestic events in China will reach 664 million US dollars. Football matches will continue to

lead the sponsorship market, reaching 356 million dollars, accounting for 54% of the sports sponsorship scale. Considering that football represents around 40% of the international sports industry, if the total output value of China's sports industry surpasses 783.4 billion dollars by 2025, the total output value of the football industry is estimated to exceed 313.3 billion dollars. This indicates a compound annual growth rate of 36% from 2016 to 2025. These projections illustrate that football holds the largest share in the Chinese sports market and is a significant intellectual property (IP) asset.

The increasing commercial realization of the Chinese football industry demonstrates its growing maturity and potential for further development. With continued investment, strategic partnerships, and the support of fans and sponsors, the industry is well-positioned to tap into the vast market opportunities in China and contribute to the overall growth of the sports industry in the country.

The Chinese football industry has experienced rapid growth in recent years, and one of the key factors driving this expansion is the availability of high-quality football event resources. These resources are essential for the industry's success. In terms of event resources, China hosts a significant number of domestic football competitions each year, including the Chinese Super League (CSL), Chinese Football Association China League, Chinese Football Association Division Two League and other leagues, totaling more than 700 events. Additionally, there are over 20,000 amateur events and 2,000 youth events. Copyright distribution reflects a hierarchical chain and the subdivision of rights, highlighting the diverse characteristics of the platform.

On June 4, 2019, the Asian Football Federation held a special meeting in Paris. At the meeting, China was confirmed to have won the right to host the 2023 Asian Cup. Benefiting from the success of applying for the Asian Cup and the expansion of the World Cup, the Chinese football industry will enter a golden period of development. Du Caizhao, deputy director of the State Sports General Administration and secretary of the Party Committee of the Chinese Football Association, said that four years after the implementation of the "China Football Reform and Development Master Plan", the successful application for the Asian Cup has played an active role in promoting the reform and development of Chinese football (Xinhua News, 2019).

On June 13, 2018, Beijing time, the 68th National Football Association Council announced the expansion of the 2026 World Cup to 48 teams. The possibility of the Chinese team entering the World Cup will greatly increase, which will also promote the development of China’s domestic football industry.

With the changes and development of the times, now football has not only represented a sport, mergers and acquisitions, equity investment, financing, sponsorship, player transfers and other businesses have turned the football industry into a multi-billion-dollar economy. In this process, Chinese capital has also continued to move towards the international football industry.

Chinese investors have purchased stakes in several high-profile football clubs around the world, including English Premier League (EPL) clubs such as Aston Villa and West Bromwich Albion. In 2016, the Chinese company Suning acquired a 68.5% stake in the Italian Inter Milan Club for 263 million euros. Chinese companies have

also become major sponsors of football clubs and events.

For example, the Wanda Group, one of China's largest companies, has become a sponsor of Spanish La Liga club Atletico Madrid, while other Chinese companies have signed sponsorship deals with top European clubs and national teams. In November 2018, Alipay and the European Football Association announced an 8-year global partnership for UEFA national team matches. It can be seen that economic globalization has also prompted China's football industry to go to the world.

Chinese capital has become an increasingly important player in the world football industry, bringing new investment, ownership, and sponsorship opportunities to the sport. With continued growth and development, Chinese capital is poised to play an even larger role in the future of football.

The CSL is the top professional football league in China and has been growing rapidly in recent years. The CSL was founded in 2004 and has since expanded from its original 12 teams to 16 teams, featuring some of the best Chinese and international football players. The CSL did not initially have much of a presence in the global sports industry, but the government of President Xi Jinping declared its interest in developing the Chinese football industry in 2013, and it has grown exponentially. Recently, the European-centered international football market has been expanding into Asia, and the evolution of the CSL has played a significant role. The CSL is now clearly visible in the global football market.

As the highest level of professional football league in China, the CSL has very high popularity and huge commercial value. The commercial value of the CSL ranks

first in Asia, and it only takes 4 years to climb to the 14th place in the world. The high investment promoted by the strong financial strength has also promoted the improvement of the overall competitive level of the league, thereby further promoting the management level of the league and clubs comprehensive upgrade of management system and operation mechanism (Deloitte, 2017).

The CSL reached the top of the AFC technical standings for the first time in 2019, becoming the first football league in Asia. Specifically, The CSL has been working to improve the quality of play and increase its competitiveness with other top football leagues around the world. The league has implemented strict regulations on player salaries and transfer fees and has been working to attract top international referees to improve the standard of officiating. These efforts have helped to improve the quality of play and increase the competitiveness of the league.

There has also been a huge influx of foreign investment and players. Chinese clubs have been signing high-profile international players and coaches, including former Chelsea manager André Villas-Boas, who now coaches Shanghai SIPG, and former Brazil national team player Oscar, who now plays for Shanghai SIPG. These international signings have helped to raise the profile of the league and attract new fans and investors. At the same time, the CSL has also been working to expand its reach and build a larger, more global fan base. The CSL has signed broadcasting deals with several international networks and has been working to improve the quality of its broadcasts and digital content. Additionally, the CSL has also been working to build new partnerships and collaborations with other football leagues and organizations

around the world.

As one of the top leagues in Asia, the CSL ranks among the world's best in terms of average attendance. In 2019, the CSL had an average attendance of 23,336, with a seat rate of 64%. This attendance rate is second only to the four major European leagues: English Premier League (96.1%), Bundesliga (91.4%), La Liga (70.5%), and French Ligue 1 (69.3%). It ranks fifth among the world's top football leagues, surpassing Serie A (62.3%) (Deloitte, 2020).

The CSL is the highest-level professional football league in China and one of the most competitive and well-attended professional competitions in Asia. It has witnessed significant development in recent years. In 2019, the total number of broadcasts on all platforms reached 700 million (Deloitte, 2019). Regarding the copyright income of the CSL, China Sports Media Co., Ltd. acquired the full media rights of the CSL for the next five years (2016-2020) at a staggering price of 1.2 billion dollars in 2015. In 2018, the price of the copyright was further increased to 1.7 billion dollars for a ten-year period (Statista, 2021). While there is still a gap compared to the top European football leagues, the CSL shows great potential.

In recent years, the CSL has attracted worldwide attention due to its high-profile signings of international players, including stars such as Oscar, Hulk, and Carlos Tevez. These signings have been made possible due to the league's financial backing from Chinese investors and the Chinese government.

The CSL has been successful in attracting international players and managers, but it has also faced some challenges. In 2017, the Chinese government implemented

new regulations to restrict the amount of money that Chinese clubs can spend on foreign players, which led to a decline in high-profile signings. Despite these challenges, the CSL continues to be a major player in the world of football. The CSL has been successful in attracting international sponsors and broadcasting deals, and it is seen as an important market for the growth of football globally.

Since CSL was launched in 2004, it has received more than 300 million yuan in sponsorship from companies such as Shell, DHL, and Nike each year. CSL sponsorship revenue has grown at a compound annual growth rate of more than 30% over the past 15 years.

In terms of local brands sponsorship, Wanda Group is one of the largest real estate developers in China, has been a sponsor of the CSL since 2016. As leading electronics manufacturer in China, Hisense also has been a sponsor of the CSL since 2016 and has provided sponsorship support for the league's television broadcasts and marketing initiatives. Vivo has been a sponsor of the CSL since 2017. A subsidiary of PPLive, one of China's largest streaming companies, PP Sports has been a sponsor of the CSL since 2019 and has helped to increase the league's exposure through its digital platforms. One of China's largest commercial banks, China Construction Bank has been a sponsor of the CSL since 2020.

In 2018, the total sponsorship amount reached 465 million yuan, and the number of sponsors reached 11. Among them, including 1 title sponsor, 6 official partners and 4 official suppliers (Deloitte, 2019). In 2019, the CSL sponsorship covers 13 different industry categories, with a total sponsorship amount of 96 million US dollars; the

sponsorship of the CSL has increased by an average of 35% in the past 13 years (Deloitte, 2020).

The team values of some CSL clubs have exceeded 43.8 million dollars, close to the value of professional football teams in the EPL and Spain's La Liga (TransperMarket, 2020). In recent years, the CSL has paid record-breaking transfer fees for top players. The recent trade of the Chelsea Football Club's Ramirez to the Jiangsu Suning team for 36.5 million dollars and of Brazilian football star Hulk to Shanghai SIPG Football Club for about 59.4 million dollars demonstrate the growth of the Chinese football market (TransferMarket, 2020).

1.2. Research Rationale

Academic interest in the economics of professional team sports can be traced back to the mid-1950s. Since then, many books and journal articles on this subject have been published. Rottenberg (1956) is widely regarded as the author of the first academic analysis of the economics of professional team sports. He believes that in baseball, unless its competitors can also survive and fully prosper, so that the difference in the quality of the game between the teams is not too great, otherwise no team can succeed. Rotenberg's contribution is to prove that professional team sports and sports leagues are fundamentally different from other industries. It is pointed out that free agency in the player labor market does not necessarily lead to the concentration of the best players in the richest teams.

Neale (1964) distinguished between sports competition and economic

competition, and proposed that sports competition is more profitable than sports monopoly, but sports competition is not the same as economic competition. A single team cannot supply the entire market, and teams must cooperate with each other to produce individual matches and viable league competition. In terms of demand, Neale believes that professional sport is a natural monopoly, with clear characteristics in terms of structure and market operation. In professional team sports, the relevant company (or decision-making unit) is an alliance, not a single team or club.

Sloane (1971) questioned Neale's conclusions. Sloane believed that Neale's arguments tended to emphasize interdependence too much. Sloan believes that the club is the relevant economic decision maker. Sloane uses the English Professional Football League to refute Neale's view that the sport governing body is just setting the rules for the club to operate freely. Most economic decisions are made by the club, such as how much money to spend on stadium construction and how many players to hire. Rotenberg and Neal’s reasoning implies the assumption of profit maximization, but Sloan said this may not be universally applicable.

Throughout the history of English football, profitable clubs have always been the exception rather than the general phenomenon. Most of the chairmen and directors of football clubs are people who have achieved success in other fields. The motivation for their investment may include a desire for power or prestige, or simply a passion for sports: the desire to see local clubs succeed on the court. In many cases, profit or monetary gain seems unlikely to be an important motivating factor.

Since the seminal work of Rottenberg, Neale, and Sloane emerged, academic

research on the economics of team sports has been published extensively in journal articles and books. The research on the demand of professional sports events has always been an important part of sports economics.

Sport demand studies are based mostly on attendance research, which examines the factors that determine stadium attendance across a wide range of professional sports, such as Major League Baseball (Coates et al., 2012; Lemke et al., 2010; Meehan et al., 2007; Rascher, 1999; Tainsky & Winfree, 2010); EPL (Cox, 2018; Buraimo & Simmons, 2008; Buraimo, 2008; Forrest et al., 2005); European football leagues (Benz et al., 2009; Buraimo & Simmons, 2009; Czarnitzki & Stadtmann, 2002; Forrest & Simmons, 2002; Falter et al., 2008; Peel & Thomas, 1992).

Despite attendance and related revenues being a significant component of a company's revenue stream, television revenue is also substantial and increasing (Fittipaldo, 2015). Hence, most viewership demand studies rely on television ratings as a proxy for broadcasting sport demand (Alavy et al., 2010; Schreyer et al., 2016; Tainsky et al., 2014; Tainsky & McEvoy, 2012; Wang et al., 2018).

Research on streaming media sports viewing demand has become increasingly important in recent years, as more and more people consume sports content through streaming media platforms. Streaming media sports viewing demand studies focus on understanding the factors that drive consumers to watch live sports events on digital platforms (Bae & Kim, 2020; Dietl et al., 2003, Han et al., 2021; Pyun et al., 2023; Salaga et al., 2021).

1.3. Purpose of the Study

Although there has been a lot of research on sports demand since the 1950s, but unfortunately, there are few studies on the demand for the CSL (Feng et al., 2018; Li et al., 2019; Watanabe & Soebbing, 2017; Watanabe et al., 2019). The growth potential of CSL is obvious. A clear understanding of fan behaviors, especially the demands for the CSL matches, either directly at the stadium or via media, is of great importance for marketers to promote CSL matches to football fans and to leverage CSL as a marketing vehicle.

Hence, building on previous works in the literatures, the purpose of this study is to study the factors that affect the demand of CSL broadcasting viewers and the factors that affect the choice of broadcasters. At the same time, we will study the viewing needs of the audience on the streaming media platform to fill this gap.

Specifically, the current research also fills the insufficiency of the academic research on the Asian Football Professional League. Although the professional football leagues with better development are mainly concentrated in Europe and North America, it cannot be ignored that there are traditional football powers such as Japan, South Korea, and Iran in Asia, which have also achieved outstanding achievement in the World Cup. And in recent years, the Asian Football Professional League has gradually developed and matured. This study can provide a basis for the academic community to better understand the Asian Football Professional League.

This study not only analyzes the national TV viewing demand in China, but also further analyzes the demand for watching sports professional leagues at different city

levels. This is also an important contribution to the existing literature, because due to economic development and other reasons, there will also be different demand within a country. This research can provide marketers and league managers with reference evidence that has important Inspirational meaning.

In the existing sports demand research, there are very few research on the influencing factors of sports events streaming media viewing demand. This research can fill this gap. The development trend of new media is unstoppable, and a better understanding of the demand of streaming media viewing can provide important reference opinions for league managers, sports marketers, and network platform operators.

In general, the current study is based on the concept of sports demand and professional team sports economics. It covers various types of consumer groups of CSL, including sports fans, viewers watching the game on TV, and viewers using streaming media platforms. The aim is to provide empirical evidence for CSL demand factors. This study not only provides evidence for scholars to understand the Asian professional football market, but also clarifies media demand and offers valuable insights for sports marketers to understand the dynamics of CSL consumer behavior.

CHAPTER 2: LITERATURE REVIEW

The demand for sports is one of the key topics discussed throughout this paper. Therefore, we examined the demand for attendance, the demand for broadcast viewing and the demand for streaming media platform. Next, we have outlined five categories of determinants of demand: 1) consumer preferences; 2) sporting contests; 3) expected quality; 4) quality of viewing; and 5) boundary conditions.

2.1. Sport Demand Studies

2.1.1. Basic Concept and Theories

Sports economics is the study of the economic aspects of sports and the interactions between the sports industry and the broader economy. It is a subfield of economics that utilizes microeconomic and macroeconomic principles to analyze various topics in the sports industry. Consumer behavior plays a crucial role in the fundamental theory of sports demand as it helps explain why consumers make specific decisions and what influences their preferences for different sports, teams, and players. According to the law of demand, as consumers' income increases, their demand for sports-related products and services also increases. Additionally, consumer preferences, influenced by personal experiences, cultural background, and social status, significantly impact sports demand.

The basic theory of sports demand is a fundamental concept in the field of sports

economics that aims to comprehend the factors influencing consumer demand for sports and how these factors interact to determine the overall level of sports demand. The basic theory of sports demand is founded on the principles of microeconomics and rooted in the concept of consumer behavior.

In conclusion, the relationship between sports demand, sports economics, and consumer behavior is complex and dynamic. Consumer behavior, influenced by personal preferences and consumer income, serves as a key driver of sports demand. Additionally, factors such as the availability and accessibility of sports events and products, the quality of the sports experience, and technological advancements play significant roles in influencing consumer demand for sports. Understanding the interplay between these factors is crucial for sports organizations and businesses as it allows them to gain better insights into consumer demand and preferences, ultimately aiding in enhancing their offerings and marketing strategies.

Oxford English Dictionary's defines **sport** as "activity that you do for pleasure and that needs physical effort or skill, usually done in a special area and according to fixed rules". Sports are considered to be a form of entertainment.

However, an important aspect that distinguishes sports from other forms of entertainment is that sport is spontaneous (Shank & Lyberger, 2015). When choosing to watch a sporting event, unlike general entertainment, it is difficult for us to predict what emotions we will feel during and after the game before watching the game. Because our emotions will change with the development and results of sports events. Due to the spontaneity of watching sports events, event providers such as sports

leagues or sports clubs face multiple challenges (Shank & Lyberger, 2015).

The sports industry has been a veritable sunrise industry since the 20th century. Sports is one of the most important links in social life. With the deepening of globalization, the sports industry continues to develop. The most developed country in the world's sports industry is the United States. In the 1980s, the total output value of the United States sports industry accounted for about 1% of its gross domestic product (GDP), ranking 22nd in the ranking of the total output value of major industries. In the mid-1990s, the total output value of the United States sports industry exceeded 300 billion dollars. In North America, Western Europe, and Japan where the sports industry is developed, the annual output value of the sports industry has entered the list of the top ten domestic pillar industries. As early as 2000, the total output value of the global sports industry was as high as 400 billion dollars, and it was growing at an average annual rate of 20%.

This huge sports industry value is very important for sports marketers (large global sports events, sports leagues, sports teams, etc.) to understand the consumer demand of sports events and how to attract sports event consumers.

Before discussing the demand of sports, we must first answer a question, what is a "sports product"-as Shank and Lyberger (2015):

A sports product is a good, a service, or any combination of the two that is designed to provide benefits to a sports spectator, participant, or sponsor.

Sports products can be classified into four categories. These include sporting events, sporting goods, sports training, and sports information. The main or core

product of the sports industry is sporting events.

Academic interest in the economics of professional team sports dates back to the mid-1950s, and since then, numerous books and journal articles have been published on the subject. Rottenberg's (1956) analysis is widely regarded as the first academic examination of the economics of professional team sports. He argues that in baseball, no team can succeed unless its competitors can also survive and fully prosper, ensuring that the difference in the quality of the game between the teams is not too great. Rottenberg's contribution is to demonstrate that professional team sports and sports leagues are fundamentally different from other industries. He highlights that free agency in the player labor market does not necessarily lead to the concentration of the best players in the wealthiest teams.

Neale (1964) differentiates between sports competition and economic competition and suggests that while sports competition is more profitable than sports monopoly, it is not equivalent to economic competition. A single team cannot supply the entire market, and teams must collaborate with one another to produce individual matches and maintain a viable league competition. Neale believes that professional sports represent a natural monopoly with distinct characteristics in terms of structure and market operation. In professional team sports, the relevant decision-making unit is an alliance, rather than a single team or club.

Sloane (1971) challenges Neale's conclusions and argues that Neale's arguments tend to overemphasize interdependence. Sloane suggests that the club serves as the relevant economic decision-maker. He utilizes the English Professional Football

League as evidence to refute Neale's perspective that the sport governing body merely sets rules for the club's independent operation. According to Sloane, most economic decisions, such as stadium construction expenses and player recruitment, are made by the club itself.

While Rotenberg and Neale's reasoning assumes profit maximization, Sloane argues that this may not be universally applicable. In the history of English football, profitable clubs have been the exception rather than the norm. Many chairmen and directors of football clubs are successful individuals in other fields, and their motivations for investment may encompass a desire for power, prestige, or simply a passion for sports. In numerous cases, profit or monetary gain appears unlikely to be a significant motivating factor.

Historically, the sports industry and sports marketers have primarily focused on spectators participating in sports activities. The initial priority has been to cater to consumers' demand for engaging in sports activities. Therefore, the primary focus of this study is the demand for sporting events among spectators. Over time, this demand has evolved from the needs of stadium-goers to encompass TV and internet viewers as well. Hence, the main objective of this study is to examine the demand of TV and digital network viewers for sports events and identify various types of audience consumption demand.

2.1.2. Demand for Attendance

While our study primarily focuses on the demand of TV and digital network viewers for sports events, it is important to note that these demands are built upon the demand of stadium spectators. Therefore, it is necessary to provide a comprehensive analysis of attendance demand as well.

Modern sports emerged in the UK during the Industrial Revolution and experienced significant growth from the late 19th century, eventually becoming a popular activity in the 20th century. Today, no country seems to be able to escape the strong demand for sports from the public (Gouguet, 2006). For managers in the professional sports field, maximizing the demand for stadium spectators is of utmost importance. On one hand, ticket sales and associated additional income form a significant portion of the club's revenue. On the other hand, higher stadium attendance fulfills the direct demand of various external stakeholders in sports clubs, including broadcasters and corporate sponsorships. As a result, clubs can benefit from an enhanced stadium atmosphere (Borland & Macdonald, 2003). Consequently, for sports economists and researchers in sports management, gaining a better understanding of the underlying factors driving stadium attendance demand has become a top priority in recent decades (Schreyer & Ansari, 2022).

With the continuous development and growth of sports, numerous studies have attempted to explain the variations in the number of people participating in sports events. The first research on this topic was published in the early 1970s. Demmert (1973) proposed an econometric model of attendance at American baseball games,

and Noll (1974) studied the determinants of attendance at four major league sports. Hart et al. (1975) conducted the first statistical survey on the attendance rate of the English Football League. Since then, a substantial amount of literature has emerged, with various studies focusing on the determinants of stadium demand.

In the realm of sports demand research, a considerable amount of attention has been directed towards soccer, particularly in the United Kingdom, which is a global leader in the sport. particularly in the United Kingdom and the EPL, has received significant attention in sports demand research. Buraimo and Simmons (2008, 2009) found that attendance is influenced by outcome uncertainty and market size. Cox (2018) discovered a U-shaped relationship between home win rate and attendance, indicating higher attendance when the home team is more likely to win.

The impact of live broadcasting on attendance has also been studied. Baimbridge, Cameron, and Dawson (1996) observed that Monday night football broadcasts negatively affected attendance by over 15%, while Sunday afternoon broadcasts had no significant impact. Kuypers (1996) did not find a significant impact of live broadcasting on attendance. Allan (2004) analyzed Aston Villa's home games and revealed a significant, negative impact of live broadcasting on attendance by 7.75%. The performance of the England national team also influenced EPL attendance.

Research has also examined other football leagues in the UK. Allan and Roy (2008) focused on the Scottish Premier League, finding that live TV broadcasts reduced attendance for the home team by 30%. Buraimo (2008) studied tier-two

English league football and identified factors such as the combined salary of the teams and public holidays that positively affected attendance.

European football leagues, apart from the English league, have also attracted the attention of researchers. Pawlowski and Anders (2012) analyzed 306 Bundesliga games and found that mid-term uncertainty, where the home or away team still has a chance to win the championship, positively influenced attendance. The presence of a strong away team brand also increased attendance in Bundesliga matches.

Schreyer and Däuper (2018) studied spectator no-show behavior in the German Bundesliga, examining 704 matches. They discovered that factors such as game characteristics and weather conditions affected absenteeism, with rainy days and matches on working days leading to higher chances of empty seats. Schreyer (2019) further investigated absenteeism in the Bundesliga, finding that outcome uncertainty, derby matches, midweek games, and weather conditions all impacted attendance. Season ticket holders were more likely to be absent compared to match day and free ticket owners.

Bond and Addesa (2020) focused on the Italian Football Serie A and explored the effect of competitive intensity on stadium attendance during the seasons from 2012-2013 to 2014-2015. They found that competitive intensity significantly influenced match day attendance, except for Europa League qualification. Additionally, evidence supported the existence of reference dependence preference, where attendance increased when the home team exceeded pre-season expectations.

Other European national football leagues have also been studied. García and

Rodríguez (2002) analyzed data from Liga Nacional de Fútbol Professional, finding that team quality, weather conditions, and prices influenced attendance. Kringstad, Solberg, and Jakobsen (2018) examined the impact of live broadcasts from Norwegian domestic leagues and major football leagues on attendance in the Norwegian top football leagues. They found a positive correlation between domestic game broadcasts and stadium attendance, while an increase in games from major leagues served as an alternative. Attendance rates were lower for weekday games compared to weekend games.

Martins and Cró (2018) investigated attendance factors in Portuguese stadiums, identifying team performance, cost, habit persistence, and outcome uncertainty as significant variables. Pawlowski and Nalbantis (2015) studied the relationship between game format, championship uncertainty, and attendance demand in Swiss and Austrian football leagues. Results indicated that teams competing for the championship positively affected attendance, and the game format itself did not reduce championship uncertainty. Average attendance and team quality from the previous season were also positively correlated with attendance. Besters, Ours, and Tuijl (2019) focused on Dutch professional football and found that attendance rates were influenced by audience preference, loss aversion, and team quality. Uncertainty about final rankings became particularly important towards the end of the season.

Brazil's Professional Football League, a prominent league in South America, has been the focus of several studies. Madalozzo and Villar (2009) examined the variables influencing attendance at Brazilian football matches, finding that factors such as

ticket prices, local games, promotional strategies, classic rivalries, home-field advantage, team ranking, relegation possibilities, and recent team performance significantly affected attendance. Barajas, Shakina, and Gasparetto (2019) analyzed the impact of uncertainty in price and match results on stadium attendance, observing higher attendance rates for weekend games and considering the influence of home and away games on spectators' decisions.

In terms of developing countries' leagues, Buraimo, Tena, and de la Piedra (2018) modeled the factors affecting attendance in the Peruvian first division, highlighting the influence of market size, timing, distance between teams, and recent performance.

Moreover, Sung and Mills (2018) focused on the Major League Soccer (MLS) and found a U-shaped relationship between attendance and the probability of winning at home, as well as the influence of fans' aversion to losses and their interest in high-quality teams with a higher chance of winning.

The COVID-19 pandemic, declared a global pandemic by the World Health Organization on March 11, 2020, has significantly impacted sports event attendance. Reade, Schreyer, and Singleton (2021) focused on European professional football and analyzed the attendance rates of top football matches in countries such as England, Italy, France, Spain, and Germany. The study revealed that the number of spectators in these countries was negatively affected by the daily count of new COVID-19 cases or deaths. Additionally, Reade and Singleton (2021) examined the attendance of the Belarusian Premier League, which continued to operate during the pandemic. Initially,

stadium demand in Belarus decreased, but it gradually recovered despite the associated risks.

Research on sports demand has explored various factors that influence stadium attendance, focusing on different leagues and countries worldwide. Understanding these factors is essential for sports managers and economists to optimize attendance and enhance the overall sports experience for fans.

2.1.3. Demand for Broadcast Viewing

Since the 1980s, the broadcasting market has undergone significant development, driven by technological advancements and the widespread adoption of satellite television. The continuous progress of technology, particularly the emergence of digital technology, has further revolutionized the broadcasting industry. Consumers now have a range of options for viewing programs, including terrestrial, digital satellite, cable, pay-per-view, and digital terrestrial television (DTT) (Buraimo, 2006).

According to economic theory, viewers who watch television broadcasts are considered more rational than those attending live sports events. However, the demand of television viewers is influenced by factors similar to those affecting live viewers. Despite the importance of stadium attendance, many leagues and clubs have increasingly focused on alternative revenue sources, shifting their attention towards broadcasting. This shift is reflected to some extent in the existing literature, with most studies on viewership demand employing television ratings as a proxy for live sport

demand (Alavy et al., 2010; Schreyer et al., 2016; Tainsky et al., 2014; Tainsky & McEvoy, 2012; Wang et al., 2018).

The demand of TV viewers is closely connected to the demand for stadium attendance. Following numerous studies on stadium attendance demand, researchers have shifted their focus to the demand of TV audiences. They are now more inclined to understand the specific factors that impact the demand of TV viewers.

Previous studies on the demand for sports events primarily focused on professional baseball and European football, using viewership as a measure of demand. Tainsky (2010) used television ratings to estimate demand for the National Football League and found that factors affecting attendance also influenced TV ratings, such as team quality, market share, and prime time competition. Mongeon and Winfree (2012) explored the economic demand of TV viewers and attendance determinants, discovering that income, team quality, and direct and indirect substitutes were important factors. They found that live game attendees had lower income but were more sensitive to victory compared to TV viewers. Demand for direct substitutes declined more for TV viewers, and through indirect substitutes like attendance, the demand further decreased.

Ryu, Kim, Paik, and Cheong (2019) analyzed Korean Professional Baseball League playoff data, finding that higher TV ratings and viewership were associated with important matches, result uncertainty, total scores, broadcasting platforms, night games, full-seat games, and team values. Finally, Johnsen and Solvoll (2007) examined Norwegian and Danish television ratings for football matches, revealing

that TV ratings depended more on game schedule factors than audience interest in football.

Previous studies have examined the impact of outcome uncertainty on the demand for sports events, particularly in relation to TV viewers. Forrest, Simmons, and Buraimo (2005) developed a method to measure outcome uncertainty and found that both broadcasters and audiences are interested in competitive balance.

Buraimo and Simmons (2009) investigated the impact of result uncertainty in Spanish football matches on TV viewers and discovered a preference for evenly matched competition. Tainsky, Xu, and Zhou (2014) examined the TV ratings of the NFL playoffs and found that fans outside the local market prefer teams with comparable strength.

However, Buraimo and Simmons (2015) found mixed results regarding the impact of outcome uncertainty on TV viewership in the EPL with varying effects across seasons. Caruso, Addesa, and Di Domizio (2019) studied Italian football TV audiences and found that outcome uncertainty had no effect, but the presence of star players and top-ranked teams attracted viewers. Schreyer, Schmidt, and Torgler (2018) supported the outcome uncertainty hypothesis in the domestic league but not in knockout tournament games in German football.

Other studies, such as Alavy, Gaskell, Leach, and Szymanski (2010) and Schreyer and Torgler (2018), provided evidence supporting the impact of outcome uncertainty on TV demand in English football and Formula One races, respectively. Furthermore, Schreyer, Schmidt, and Torgler (2016) examined cross-border football

matches and found a positive correlation between German demand and outcome uncertainty, although this varied among male and female audiences.

The star effect, which examines the influence of prominent athletes, has an impact on TV ratings. Reams and Shapiro (2017) found that the performance of star players in Ultimate Fighting Championship (UFC) significantly affects demand, while star popularity has a lesser impact. Bond and Addesa (2019) studied Serie A football matches and observed that the intensity of competition positively influences TV demand, while the uncertainty of the outcome has a negative effect.

Buraimo (2008) and Barajas, Shakina, and Gasparetto (2019) examined the relationship between stadium attendance and TV ratings. Buraimo (2008) found that increased stadium attendance positively affects TV viewership, suggesting that the excitement and atmosphere generated in the stadium contribute to higher TV ratings. Barajas, Shakina, and Gasparetto (2019) analyzed Brazilian League matches and found that higher ticket prices attract more TV audiences, and weekend games have fewer TV viewers despite higher stadium attendance. The uncertainty of the match result also has an impact on TV audiences.

Additionally, several studies focused on specific factors. Tainsky and McEvoy (2012) analyzed NFL TV ratings and identified factors such as team quality, proximity to the market, mid-season games, and simultaneous broadcasts that influence viewership. Feddersen and Rott (2011) investigated German national team broadcasts and determined that demand depends on the type and importance of the competition, with preferences for star players and high-level opponents.

Wang, Goossens, and Vandebroek (2018) examined the influence of the schedule on TV viewership in the Belgium Pro League, showing that viewers prefer January games on TV and weekdays over stadium attendance. Reeth and Osokin (2019) analyzed Russian TV viewership for international football matches and observed an increase in viewership as the game progresses and a clear patriotic effect during Russian national team games.

The number of spectators for sports events is influenced by expectations of game quality before the match, but it can also be affected by the actual progress of the game since viewers can easily change the TV channel. Chung, Lee, and Kang (2016) examined the dynamic relationship between the demand for televised baseball games and the uncertainty of result assumptions. They found that the demand of TV viewers in sports events exhibits significant dynamic changes, and the factors influencing TV viewership have varying marginal effects as the number of matches increases.

The uncertainty of the outcome hypothesis is statistically and economically significant, with ex-ante expectations of outcome uncertainty continuing to impact viewership even in later stages of the game. Rodríguez-Gutiérrez and Fernández-Blanco (2017) analyzed TV demand for road bike events using minute-by-minute TV viewership data for all stages of Vuelta a España in 2015. They found that the number of TV viewers increases when the race leader climbs a mountain or when the top ten riders participate in an escape.

The appearance of advertisements on TV, even if shown on separate screens, significantly reduces the TV audience. Buraimo, Forrest, Mchale, and Tena (2020)

simulated the number of TV viewers per minute in the EPL and observed nearly 50,000 minutes of games to understand the factors attracting TV audiences. Surprisingly, the expected suspense and surprises did not have a significant impact on TV viewership. Instead, traditional measures of uncertainty, such as suspense, surprise, and shock, still play a role in determining viewership.

Various studies have examined specific factors that influence TV viewership, including team quality, proximity to the market, mid-season games, simultaneous broadcasts, competition type, star players, high-level opponents, scheduling, game progress, and advertising. These studies have shed light on the dynamic nature of TV viewership for sports events and the significant role played by factors such as outcome uncertainty, game quality, and viewer expectations.

Overall, the demand of TV viewers for sports events is closely connected to stadium attendance, with numerous factors influencing viewership. Understanding these factors is crucial for leagues, clubs, and broadcasters in optimizing their strategies to attract and retain TV audiences.

2.1.4. Demand for Streaming Sports

The advancement of technology has revolutionized the way people watch sports events, shifting from stadium attendance to television viewing. With the rapid development of digital technology and the widespread accessibility of the internet, the way sports events are watched has undergone significant changes.

Online refers to the digital realm or the internet-based environment where individuals can access and interact with various forms of content, services, and activities through connected devices such as computers, smartphones, and tablets. It encompasses the virtual space where users can communicate, share information, consume media, and engage in transactions or interactions.

In the context of sports viewership, "online" refers to the use of internet-based platforms and technologies to access and consume sports content. This includes live streaming of sports events, on-demand replays, highlights, analysis, news articles, social media discussions, and other related digital offerings. Online platforms for sports viewership can range from official websites and applications provided by sports leagues, broadcasters, and media companies to third-party streaming services, social media platforms, and user-generated content platforms.

Traditional media such as radio, cable, and satellite TV have long provided sports programs, but they have limitations in terms of broadcast time, rights agreements, and potential disruptions like power outages. In contrast, the internet offers high-definition streaming, fast access, rich content, on-demand viewing, and strong interactivity, overcoming the shortcomings of traditional media.

The introduction of online streaming services by MLB and the National Basketball Association (NBA) has significantly impacted the sports industry. MLB's MLB.tv Premium service, launched in 2012, generated revenues of 250 million dollars from subscription fees alone, surpassing 30% of their national TV broadcasting revenue. Similarly, the NBA started offering live online streaming

services from the 2015-2016 season, catering to the growing popularity of webcasting. This trend has extended to sports fans worldwide, particularly in countries like Korea, where online webcasting has become a primary channel for spectating.

The convenience and flexibility offered by online platforms allow users to access sports content at any time and from anywhere, enhancing the viewing experience. Moreover, online platforms have expanded the reach of sports viewership, enabling fans to engage with a variety of leagues, teams, and sports globally. The interactive features and social media integration of online platforms have also fostered greater fan engagement and community interaction among sports enthusiasts.

The increasing availability of information and events through the internet has had a transformative impact on the commercial sports industry. This shift is evident in the rise of network broadcasting, a new form of media service that has gained significant popularity. Live streaming, in particular, stands out among traditional media like television and radio, as well as other social networking platforms such as Twitter and Facebook. Live streaming offers enhanced personalization, connectivity, and interactivity, creating synergies between various stakeholders and multiple media modalities. This evolution in media technology has reshaped the dynamics of the sports business, enabling fans to have greater access and engagement with sports events. Studies by Qian, Wang, and Zhang (2020), and Kim and Kim (2020) highlight the profound influence of live streaming and its unique features on the sports industry.

Sports marketers are aware of the opportunity to expand their audience by

incorporating sports media products into network broadcast services. For instance, Amazon's Twitch, a leading live video game platform with an average of over 1 million daily viewers, has caught the attention of sports organizations. With the National Football League (NFL) and NBA taking the lead, an increasing number of sports leagues and teams are broadcasting games on Twitch as a complement to traditional television networks. Despite the growing interest in online platforms as new media services for sports (Hamari & Sjöblom, 2017), there remains a lack of substantive research examining the viewers' needs when opting to watch sporting events on online platforms.

A subset of studies has explored the behavioral motivations of sports fans who use smartphones or tablets to watch sporting events. According to a recent report by YouTube, 30% of sports fans engage in live streaming of sports on their smartphones or tablets. Additionally, there has been a significant increase in the amount of time spent watching sports interviews and highlight videos on YouTube, with a majority of the viewers accessing these contents through mobile platforms.

Kang, Ha, and Hambrick (2015) and Ha, Kang, and Kim (2021) examined the factors driving sports consumption via smartphones and identified fan engagement, convenience, and access to information as the primary motivations for using sports mobile apps. In a study by Chan-Olmsted and Xiao (2019) investigating the factors influencing smartphone sports consumption, it was found that motivations such as acquiring information on the move, engaging in behaviors related to sports fandom, social participation in sports, and utilizing various media platforms (websites,

streaming video, social media, radio, newspapers, and fantasy sports) all play a role in influencing sports consumption on smartphones.

The diverse role of social media in sports marketing has become a subject of increasing research (Filo et al., 2015). Sports managers have come to understand social media as a means to achieve goals such as selling tickets (Boatwright, 2013), building fan recognition and engagement (Hopkins, 2013), and understanding fan affinity with brands and athletes (Clavio & Kian, 2010; Pegoraro et al., 2017). More recently, scholars have increasingly connected communicative usages of sport SNSs (Social Networking Sites) to patterns of economic consumption (Feddersen et al., 2017; Watanabe et al., 2015, 2016).

From a business perspective, online sports viewership has disrupted traditional broadcast models and posed challenges for stakeholders such as broadcasters, rights holders, and advertisers. The shift in audience behavior towards online platforms necessitates new strategies for content distribution, monetization, and audience engagement. This includes considerations such as optimizing streaming quality, developing user-friendly interfaces, securing digital rights, exploring advertising opportunities, and adapting business models to incorporate online platforms alongside traditional broadcasting channels.

From a manager's perspective, online spectating channels are viewed as a significant source of new business opportunities. These channels contribute to increased team revenues through subscription fees for live broadcasting, expanded advertising spots during games, and the introduction of new online services associated

with the sport, such as Video on Demand (VOD) offerings and online virtual games. Bud Selig, the commissioner of Major League Baseball (MLB), has acknowledged that online spectating services represent not only a remarkable narrative within the Americano sports business over the past 12 years but also a noteworthy story in American business as a whole.

This shift to online platforms has transformed the production, distribution, and consumption of sports media, providing a global multimedia platform that is interactive and personalized, appealing to users and influencing the business operations of various industries. The internet's tremendous development has had a profound impact on the advancement of sports events and the role of modern media in promoting their growth.

Despite the growth in research, there is still a lack of understanding regarding the needs of sports fans to watch sports-related events or highlights on online platforms, highlighting the need for further research in this area to bridge the gap.

2.2. Determinants of Sport Demand

Borland and Macdonald (2003) categorized the determinants of demand for attendance at sporting events into five sectors: consumer preferences, economic factors, quality of viewing, sporting content, and supply capacity. They emphasized that consumer preferences form the foundation for attending sports competitions. Economic factors, such as opportunity costs, potential market population, and alternative options, also play a significant role in determining demand. The quality of

the viewing experience depends on stadium facilities and game arrangements. Additionally, the characteristics of the sports content, such as the success of competing teams, the balance of competition, the uncertainty of outcome, and the importance of qualitative competition, impact attendance requirements. Lastly, the stadium's capacity is identified as another factor influencing attendance.

Villar and Guerrero (2009) identified four categories of factors influencing attendance: economic aspects, expected quality, uncertainty of outcome, opportunity cost, and other factors. They highlighted that economic aspects include variables related to consumption (ticket prices, prices of alternative and supplementary goods, income), as well as factors related to the potential market size, such as the population of the geographical area and stadium capacity. Product quality is another crucial consideration, as each competition is unique and different competing teams can alter the situation through their performance, reflecting the product's heterogeneity. From a sports economics perspective, games with higher levels of uncertainty tend to attract more spectators. Lastly, attending live sports events incurs expenses for fans, and the cost factor influences their decision to attend.

In general, while there have been variations in the classification of attendance demand in different studies, these factors can be broadly categorized into five main groups: 1) consumer preferences, 2) sporting contests, 3) expected quality, 4) quality of viewing, and 5) boundary conditions.

Consumer preferences are considered a crucial category as they form the foundation of sports demand. The match itself is treated as a "commodity," and the

economic factors that influence the consumption of this "commodity" are also significant. For stadium attendance demand, the quality of viewing, which includes stadium quality and factors like match date, time, and weather that impact the viewing experience, cannot be overlooked. Lastly, we return to the core aspect, the game itself. The concept of sporting content proposed by Borland and Macdonald (2003) aligns with the notion of expected quality put forth by Villar and Guerrero (2009). Both perspectives examine the quality of the "commodity" (the match). Therefore, the final category in this article refers to the quality of the game.

Most studies on viewership rely on television ratings as a measure of live sport demand, drawing upon research on attendance (Alavy et al., 2010; Kim et al., 2021; Pérez et al., 2017; Tainsky & Jasielec, 2014; Wang et al., 2018). The determinants of television ratings for sporting events are rooted in attendance research (Buraimo, 2006, 2008; Forrest et al., 2004; García & Rodríguez, 2002; Kuypers, 1996). Similarly, research on audience demand for online events also builds on the foundations of stadium attendance demand. Therefore, we will examine the following five categories: consumer preferences, sporting contests, expected quality, quality of viewing, and boundary conditions to examine the factors influencing sports demand.

2.2.1. Consumer Preferences

The concept of habit persistence has been widely studied in relation to understanding the factors influencing attendance demand in sports. Researchers have

used various metrics to capture the persistence of audience habits, such as the average attendance of the home and away teams in the previous season. Studies by Peel and Thomas (1992, 1996) and Borland and Lye (1992) have employed this approach to examine the impact of habit persistence on sports attendance.

Buraimo (2008) conducted a study focusing on the demand of spectators in the second division of English football and found that habit persistence played a significant role. The research revealed that the average attendance of the current home team in the previous season did not differ significantly from the current season. This indicates that the loyalty of fans in attending games remained unchanged over time, showcasing the influence of habit persistence on their attendance behavior.

Further supporting the influence of habitual persistence, Pawlowski and Anders (2012) conducted a study specifically examining the Bundesliga. Their findings indicated a significant positive relationship between attendance and the previous season's attendance of both the home and away teams. This suggests that fans' attendance behavior is influenced by their past attendance patterns and the overall familiarity and attachment to the teams and the league.

These studies collectively highlight the importance of habit persistence in shaping attendance demand in sports. The consistent attendance of loyal fans, demonstrated by the similarities in average attendance from one season to another, showcases the enduring nature of their commitment to watching games.

In a similar vein, Pawlowski and Nalbantis (2015) conducted research that utilized previous average attendances to investigate the persistence of audience habits.

Their study focused on Swiss and Austrian 1st division football and revealed a significant habitual persistence effect among both home and away team audiences. Interestingly, the habit persistence effect was found to be stronger for the home team compared to the visiting team. This suggests that fans of the home team exhibit a higher level of loyalty and consistency in attending matches than fans of the visiting team.

Further supporting the influence of habit persistence, Martins and Cró (2018) analyzed the audience demand for the Portuguese First Division Football League. Their findings indicated that teams with higher average attendance rates at home in the previous season also experienced higher attendance rates in the current season. This suggests that the habit of attending home matches carries over from one season to another, reflecting the enduring loyalty of fans. Similarly, the away teams that had higher average attendance at their home matches in the previous season attracted more spectators to the matches of the home teams in the current season. This highlights the interplay between the popularity of the away team and its impact on the home team's attendance.

Furthermore, Besters, Ours, and Tuijl (2019) discovered that the average number of opponents in the previous season had a positive influence on the attendance of Dutch professional football. Specifically, a 1% increase in the attendance rate at home games in the previous season led to a 0.25% increase in attendance during the current season. This suggests that the quality of the opponents and the overall competitiveness of the league play a role in attracting spectators to matches.

Collectively, these studies emphasize the persistent nature of audience habits in sports attendance. The findings highlight that previous attendance patterns, both for home and away teams, significantly impact the current season's attendance. The loyalty and familiarity established through habitual attendance contribute to the overall demand for live sporting events.

Furthermore, the age of the club has been identified as another important indicator of fan loyalty (Borland & Macdonald, 2003). Teams with long-established clubs tend to enjoy higher levels of fan loyalty. While this may seem like a straightforward notion, the actual impact of club age on attendance warrants further investigation.

For instance, Buraimo, Tena, and de la Piedra (2018) conducted a study on the audience demand for the Peruvian first division and found that the age of the home team had a significant impact. The longer a team's club history, the stronger the loyalty of its fanbase, leading to increased attendance. This suggests that the historical legacy and traditions associated with well-established clubs play a role in cultivating a loyal fan following. On the other hand, Ferreira and Bravo (2007) examined the attendance patterns in Chilean professional football and included club age as a factor in their study. Surprisingly, they found that club age did not have a significant effect on attendance. This indicates that in the context of Chilean football, other factors may overshadow the influence of club age when it comes to attracting spectators.

These contrasting findings highlight the need for context-specific analysis when considering the impact of club age on attendance. Factors such as local culture,

competition, marketing efforts, and team success may interact with club age to shape fan loyalty and ultimately influence attendance patterns. Therefore, further research is required to explore the nuanced relationship between club age and attendance in different sporting contexts.

Understanding the influence of club age on attendance can provide valuable insights for sports organizations and policymakers in managing and cultivating fan loyalty. It underscores the importance of building a strong historical foundation and fostering a sense of tradition to engage fans and enhance the overall attendance experience. Additionally, these findings suggest that club age alone may not be a definitive determinant of attendance, and a comprehensive understanding of the broader factors at play is necessary for a holistic assessment of fan behavior.

2.2.2. Sporting Contests

Many previous studies on sports demand commonly incorporate economic factors. As mentioned earlier, a sports match is essentially treated as a "commodity." Therefore, the demand for attending a sporting event is influenced by various economic considerations, such as the price of the event, prices of related goods (complementary or substitute), consumer purchasing power, and more. In this regard, macroeconomic factors, market size, population, revenue, gross domestic product, and others are expected to have an impact on attendance (Borland & Macdonald, 2003; Villar & Guerrero, 2009).

The concept of opportunity cost is also relevant, encompassing expenses like ticket prices, parking fees, food and beverages at the venue, and travel costs. Additionally, there are two primary types of substitution effects: direct and indirect. The direct effect pertains to alternative means of watching the game, such as through television, radio, or the internet. The indirect effect encompasses activities or events that can serve as substitutes for attending the sports game, such as attending other sporting events or engaging in alternative entertainment options. Undoubtedly, economic factors play a crucial and intuitive role in influencing attendance.

It should be noted that market size, population, and other macroeconomic factors influence the overall demand for sports, while factors like ticket prices, parking costs, and availability of substitutes impact individual attendance decisions. By understanding these economic factors, sports organizations and policymakers can make informed decisions regarding pricing strategies, marketing efforts, and the provision of amenities to optimize attendance and enhance the overall fan experience.

Attendance at sporting events can serve as a social outlet for the unemployed, potentially leading to higher attendance rates. Therefore, an increase in the unemployment rate may also result in increased attendance. Borland and MacDonald (2003) pointed out the positive correlation between the unemployment rate and attendance. Research by Bond and Addesa (2020) demonstrated that the annual unemployment rate of the city where a game is held is a macroeconomic factor that can potentially influence attendance rates.

Regarding income, most studies have shown a positive relationship with

attendance. An increase in income is generally associated with higher attendance at matches (Bradbury, 2020; Watanabe et al., 2019). García and Rodríguez (2002) found a significant positive relationship between income and attendance in their study of attendance in the Liga Nacional de Fútbol Profesional.

However, in a study on attendance demand in the first division of the Brazilian Football League, Madalozzo and Villar (2009) found a negative correlation between per capita income and attendance. This indicates that football, as a commodity, has higher demand among low-income individuals who allocate a smaller portion of their income towards leisure goods.

In a study of Australian Rules football attendance demand during the 1981-1986 season, Borland and Lye (1992) also noted an inverse relationship between football attendance and actual income. Additionally, Buraimo, Tena, and de la Piedra (2018) found that the impact of per capita income on attendance demand in the Peruvian first division was not significantly different from zero, while the proportion of the population below the poverty threshold had a significant positive effect on stadium attendance rates.

Most studies on sports demand treat the potential market size as an explanatory variable. However, accurately defining the potential market is challenging, so population is used to measure the market's size (Donihue et al., 2007; Rivers & Deschriver, 2002).

Anthony, Kahn, Madison, Paul, and Weinbach (2011) conducted a study on three minor league baseball leagues in the southeastern United States. They examined the

individual game attendance rate and game characteristics of the Florida State League, Southern League, and South Atlantic League. Despite varying levels of competition (from A to AA) in these leagues, the determinants of attendance were found to be similar. The study revealed that local population has an impact on attendance.

Buraimo, Tena, and de la Piedra (2018) found in their study on audience demand in the Peruvian first division that a one million increase in population is expected to result in a 20% increase in the number of visitors. Like other professional sports and football leagues, the Peruvian league is positively influenced by the market's size, with teams in larger cities expected to attract more attendance. In a study on audience demand in Nippon Professional Baseball (NPB) by Leeds and Sakata (2012), different results were found. The population of the area where the home team is located was found to have a negative impact on the attendance rate. This observation may indicate that larger cities with larger populations have more leisure activities and intense competition.

Empirical studies have shown that price-related variables, such as ticket prices, have a significantly negative relationship with attendance (Bird, 1982; Coates & Humphreys, 2007; Lewis & Yoon, 2018; Siegfried & Eisenberg, 1980; Watanabe & Soebbing, 2017). Martins and Cró (2018) found that both the average ticket price and cost index of the Portuguese First Division Football League have a significantly negative impact, indicating that an increase in price leads to a decrease in attendance.

Similarly, Madalozzo, and Villar (2009) also found in their study on audience demand in the first division of the Brazilian Football League that an increase in price

has an adverse effect on attendance. However, there are also differing opinions. For example, García and Rodríguez (2002) found a positive and significant relationship between ticket price and attendance in their study of the Liga Nacional de Fútbol Professional. Feehan (2002) pointed out that this relationship is often ambiguous, indicating a need for further confirmation.

The distance between the home stadiums of two teams is considered an important indicator of opportunity cost. Pawlowski and Nalbantis (2015) conducted a study on the Swiss and Austrian 1st division football leagues and found that stadium demand decreases as the distance between the two teams increases. Similarly, Buraimo, Tena, and de la Piedra (2018) discovered in their study on the Peruvian first division that an increase in distance between the two teams leads to a decrease in attendance demand. García and Rodríguez (2002) also identified this negative effect of the distance variable in their study on the Liga Nacional de Fútbol Profesional. Cox (2018) found that for every additional mile between the stadiums of competing teams, the stadium's attendance rate decreases. This reflects the competition between local teams and the increase in travel costs.

There are primarily two types of substitution effects: direct and indirect. The direct effect refers to watching the game through other media such as TV, radio, the internet, and so on. García and Rodríguez (2002) found in a study on Liga Nacional de Fútbol Profesional that the TV broadcast of the match significantly reduced attendance. Similarly, a study by Carmicheal, Millington, and Simmons (1999) on the attendance requirements of the English Rugby League in 1994-1995 found that the

attendance rate of Friday games broadcast by BSkyB decreased by 20.7%.

Indirect effects refer to any actions that can replace the sports game, such as attending other types of sporting events or entertainment alternatives. Gitter and Rhoads (2010) found in a study of minor leagues that both minor leagues and major leagues are substitutes. If the nearest major league team is within 100 miles, the increase in ticket prices will increase the attendance of the minor leagues. The minor leagues themselves are also very competitive, and there are alternatives within the league.

Additionally, there is a compound substitution effect where direct substitution and indirect substitution exist simultaneously. Forrest and Simmons (2006) found in a study on the English Football League that the TV broadcast of the Champions League game with the participation of EPL clubs in the week has a significant negative impact on the number of low-level football leagues. Storm, Nielsen, and Jakobsen (2018) found that in the men's handball league, when other leagues are broadcast live on TV at the same time, it negatively impacts audience demand.

2.2.3. Expected Quality

The quality of a game is determined by the strength of the team, the players, and the overall performance. It is important to note that the quality of sports events also has absolute quality and relative quality. Absolute quality measures the overall strength of the team, such as the total value of star players or excellent past performance, etc. Relative quality investigates the difference in team performance and

the characteristics of the match, such as team performance, derby games, and the uncertainty of outcome.

Gwartney and Haworth (1974) highlighted the phenomenon of "superstars" in their research. They stated, "Outstanding players are believed to have an additional impact on attendance because fans enjoy watching players with exceptional abilities, even if they play for a 'losing team'". Rosen (1981) also discussed the phenomenon of superstars in his research, emphasizing that a small number of individuals earn substantial amounts of money and dominate the activities they participate in. Minor differences in talent are magnified, resulting in significant variations in earnings. Numerous scholars have examined the effects of star players on attendance (Bond & Addesa, 2019; Buraimo & Simmons, 2008; Yamamura, 2011; Forrest et al., 2005; Noll, 1974; Schurr et al., 1993; Scully, 1974).

Jane (2016) conducted a study on NBA game attendance during the 2010-2011 and 2011-2012 seasons, examining the relationship between star players and attendance. The research, using five different definitions of star players, found that the presence of stars increased attendance for both home and away games. On average, among the top 12 All-Star players, one player could attract an additional 1,408 attendees to an NBA game. Additionally, a star player receiving 1 million All-Star votes would bring approximately 1,042 fans to the stadium. The study concluded that the popularity of star players, rather than their live performance or salary, attracted fans to NBA games.

Rascher and Solmes (2007) observed that games featuring superstars like

Michael Jordan consistently sold out tickets in the NBA. In Major League Soccer, the presence of David Beckham significantly impacted the number of spectators. Sung and Mills (2018) also found a positive and statistically significant relationship between the number of superstar players in the home team and attendance. Similarly, Lewis and Yoon (2018) analyzed data from MLB and determined that star power had a positive impact on attendance.

While previous research has highlighted the significance of super teams and superstars for the development and popularity of MLS in terms of attendance, Leeds and Sakata (2012) found that the presence of a single star player did not have a significant effect on attendance in Nippon Professional Baseball (NPB).

Another important indicator of team strength is their previous outstanding performance. García and Rodríguez (2002) found in Liga Nacional de Fútbol Profesional that the number of international games played by the away team had a positive effect on attendance. Madalozzo and Villar (2009) discovered that if the visiting team had recently won the championship in the Brazilian Football League, their attendance would increase. Besters, Ours, and Tuijl (2019) also obtained similar results in their research on Dutch professional football, indicating that championship and world championship titles consistently had a positive impact on attendance.

Kinnard, Geckler, and Delottie (1997) conducted a study on MLB attendance and emphasized that a team's on-field performance was a crucial factor in influencing attendance. Additionally, Borland and Macdonald (2003) suggested that fans were attracted to competitions that showcased high-quality skills. Recent studies have

examined the demand for various sports events and analyzed the impact of team performance on attendance. These studies consistently demonstrate that strong team performance positively influences attendance (Solow & Krautman, 2007; Gitter & Rhoads, 2010; Denaux et al., 2011; Cebula, 2013; Andreff & Scelles, 2015; Watanabe & Soebbing, 2017).

Teams' scores can indicate the relative quality of a sports event. Research by Paul and Weinbach (2007) examined audience demand for American football games over multiple NFL seasons and confirmed that fans prefer high-scoring games. They found that games with more scoring had higher TV ratings, indicating a positive impact on audience demand for televised football. García and Rodríguez (2002) conducted research on Liga Nacional de Fútbol Profesional and highlighted that the number of goals scored in previous games or home games, as well as the number of victories in the past three games, have a significant impact on attendance.

Coates and Humphreys (2012) studied the National Hockey League (NHL) from 2005-2006 to 2009-2010 and discovered that higher scoring by the away team was associated with increased attendance. Jane (2016) also found that fans value teams' scoring ability. Alavy, Gaskell, Leach, and Szymanski (2010) noted that TV viewers tend to switch channels or turn off the TV during boring or low-scoring matches, particularly when the game ends in a 0-0 draw.

Previous research has used points scores and rankings as measures of team performance. In the Brazilian Football League's First Division, Madalozzo, and Villar (2009) found a significant positive correlation between the home team's points score

in the past three games and attendance. Martins and Cro´ (2018) examined the Portuguese First Division Football League and determined that the number of points scored in the previous five matches by teams was a significant and positive indicator of team performance. Pawlowski and Anders (2012) also established a significant positive correlation between the total number of points scored in the five preceding match days and attendance.

The ranking of teams has also been explored as a measure of team quality. Bond and Addesa (2020) used home rank and away rank as proxies for team performance, indicating the positions of the two teams in the standings before the game. Madalozzo and Villar (2009) highlighted the impact of recent performance and rankings on attendance in the first division of the Brazilian Football League. In Nippon Professional Baseball (NPB), Leeds and Sakata (2012) found a different pattern, where an increase in the number of matches the home team was behind the first team led to a decrease in attendance by 180-280.

Derby matches have been recognized as significant factors in the demand for sports events. Barajas, Shakina, and Gasparetto (2019) found that derby matches in the Brazilian football league positively influenced audience and attendance. Gasparetto and Barajas (2018), Buraimo and Simmons (2009), and Madalozzo and Villar (2009) also supported this finding in the context of broadcast demand. Buraimo (2008) demonstrated that increased TV broadcasting of German games indirectly raised television ratings by generating greater fan interest and subsequently increasing stadium attendance. Schreyer (2019) highlighted the impact of derby matches on

Bundesliga attendance. Besters, Ours, and Tuijl (2019) discovered similar results in Dutch professional football, indicating that matches against local opponents attracted more spectators. Morley and Thomas (2007) found a significant positive correlation between derby matches and attendance in the cricket league.

The uncertainty of outcome is a variable often used to represent the relative quality of a sporting event and has been a central focus in studies on sport demand. However, empirical research has yielded inconsistent results regarding the uncertainty of outcome hypothesis. While traditional studies provide supportive evidence for a positive relationship between outcome uncertainty and attendance (Coates & Humphreys, 2010; Forrest et al., 2005; Owen & Weatherston, 2004; Paul et al., 2012; Pawlowski & Anders, 2012; Rascher & Solmes, 2007; Schreyer et al., 2018).

Some of recent studies found that attendance was higher when more certain the result of the game was expected (Coates et al., 2014). In Schreyer, Schmidt, and Torgler (2018) study, the results revealed a significant and positive relation between EPL demand and outcome uncertainty. However, in Mills, Salaga, and Tainsky (2015) study, they found evidence that uncertainty of outcome hypothesis only works when marginal utility generated by an unexpected win beats the marginal utility generated by an unexpected loss. It means that people prefer to watch game that is expected to win rather than the game expected to lose.

Many previous studies on outcome uncertainty have used the current team's winning or losing record or league ranking to determine the uncertainty of the outcome. However, Peel and Thomas (1992) employed betting odds data in their

study, demonstrating that betting odds can enhance the estimation of outcome uncertainty. Subsequent studies have also utilized betting odds to capture outcome uncertainty in attendance demand research.

Although the research results are not consistently aligned, they provide substantial evidence supporting the use of betting odds as a basis for measuring the uncertainty of outcome in sports events (Benz et al., 2009; Buraimo & Simmons, 2008; Coates & Humphreys, 2012; Cox, 2018; Czarnitzki & Stadtmann, 2002; Forres et al., 2005; Forrest & Simmons, 2002; Hogan et al., 2017; Lemke et al., 2010; Owen & Weatherston, 2004; Sung & Mills, 2018). Although the research results are not consistent, it provides a lot of evidence for the use of betting odds as the basis for measuring the uncertainty of outcome.

2.2.4. Quality of Viewing

The quality of the viewing experience plays a significant role in determining sport demand. Various factors influence the overall quality of watching a game. These factors encompass elements like the condition of the stadium, weather conditions, and the scheduling of the sporting event.

Previous studies have examined various weather-related variables, including temperature, precipitation, wind speed, and humidity, to understand their impact on stadium attendance at sporting events (Butler, 2002; Paul et al., 2020; Watanabe et al., 2019). Among these variables, rain has consistently been identified as the strongest

negative factor affecting attendance (García & Rodríguez, 2002; Watanabe et al., 2019).

Borland and Lye (1992) highlighted that unfavorable weather conditions lead to reduced attendance, while García and Rodríguez (2002) found that better weather conditions result in higher attendance rates for outdoor football games. Owen and Weatherston (2004) studied attendance determinants in New Zealand Super 12 Rugby League games and found that rainfall significantly influenced attendance. Pawlowski and Nalbantis (2015) observed a negative impact of precipitation on attendance in the Swiss and Austrian 1st division football leagues. Schreyer and Däuper (2018) suggested that factors related to match characteristics and weather conditions increase the opportunity cost of attending Bundesliga matches, leading to higher chances of empty seats in the stadium during rainy weather.

However, there are some divergent findings as well. Besters, Ours, and Tuijl (2019) found no effect of precipitation on attendance in Dutch professional football, while Morley and Thomas (2007) noted that regardless of weather conditions, event interruptions, duration, and final results, fans are generally more willing to participate in games.

The condition of the stadium is another aspect that affects the quality of viewing. Research indicates that people are more likely to attend games at new stadiums compared to older ones (Clapp & Hakes, 2005; Coates & Humphreys, 2005; Depken, 2000). However, the "new stadium effect" tends to diminish gradually over time (Clapp & Hakes, 2005). Sung and Mills (2018) found a negative correlation between

attendance and the age of the stadium, with each year of age leading to a roughly 4% decrease in the number of attendees. On the contrary, Leeds and Sakata (2012) suggested that the age of a stadium does not impact attendance.

The capacity of sports content suppliers plays a crucial role in determining the viewing situation and, subsequently, the demand for sporting events (Cox, 2018). Borland and Lye (1992) found a positive correlation between stadium size and attendance. A study by Madalozzo and Villar (2009) in the Brazilian Football League's first division revealed that stadium capacity also increases attendance since smaller stadiums lack the capacity to accommodate a large number of spectators.

Leeds and Sakata (2012) believed that stadium capacity consistently has a positive effect, resulting in an additional 0.6 to 0.9 fans per additional seat. Besters, Ours, and Tuijl (2019) found that stadium capacity has a positive impact on attendance but not on a one-to-one basis. Considering capacity limitations, an average increase of 1% in stadium capacity attracts approximately 0.64% more spectators.

The schedule of a match is also a significant factor affecting attendance. Weekend games consistently show a positive correlation with attendance. Cox (2018) found that weekday games in the English Premier League attract fewer spectators compared to Saturday games. Schreyer and Däuper (2018) observed an increase in the absence of spectators at Bundesliga matches on weekdays. Similarly, Buraimo, Tena, and de la Piedra (2018) discovered that attendance rates are significantly lower on weekdays than on weekends in the Peruvian first division.

Martins and Cró (2018) found lower attendance in the Portuguese First Division

Football League for games scheduled outside the weekend, highlighting the importance of leisure time. Besters, Ours, and Tuijl (2019) noted that Dutch professional football spectators are unlikely to attend weekday games, indicating that opportunity cost plays a role in their decision. Gasparetto and Barajas (2018) confirmed smaller audiences for weekday games compared to weekends. Leeds and Sakata (2012) indicated that weekend games in Nippon Professional Baseball (NPB) attract over 5,000 more fans. However, Storm, Nielsen, and Jakobsen (2018) found no significant preference for weekend games among Danish Men's Handball League audiences.

Regarding the timing of the season, Buraimo (2008) found that January and February have the highest TV viewership. Besters, Ours, and Tuijl (2019) noted that attendance is initially low during the early months of the season, with attendance peaking in April during the final stages of the games in a study on Dutch professional football. Cox (2018) also observed that matches played in April and May, towards the end of the season, attract more spectators compared to August when the season begins. This suggests that people are more interested in the team's final league ranking. Additionally, games starting in October tend to have higher TV viewership compared to August.

Findings from the NBA, NFL, MLB, and EPL indicate that attendance is higher when matches are scheduled during prime time or on public holidays (Forrest & Simmons, 2006; Mills et al., 2016; Tainsky & Winfree, 2010).

2.2.5. Boundary Conditions of Sport Demand

The concept of boundary conditions of sport demand encompasses a wide range of external factors that influence the level of demand for sports events or products. These boundary conditions can vary across different contexts and play a crucial role in shaping the overall dynamics of sports consumption.

One important aspect of boundary conditions is the economic environment. Factors such as disposable income, economic stability, and overall wealth distribution within a population can significantly impact the affordability and willingness of individuals to engage in sports consumption. For example, during periods of economic downturn, individuals may be more inclined to reduce discretionary spending, leading to a decrease in demand for sports events or products. On the other hand, during periods of economic growth, individuals may have more disposable income, resulting in increased demand for sports-related experiences.

The relationship between income and attendance in professional football varies across different contexts. While García and Rodríguez (2002) found a significant positive relationship between income and attendance in the Liga Nacional de Fútbol Professional, Buraimo, Tena, and de la Piedra (2018) discovered that the impact of per capita income on seating demand in the Peruvian first division was not significantly different from zero. Meanwhile, Leeds and Sakata (2012) conducted a study on NPB and found that the population of the home team's area had a negative effect on attendance.

Societal norms and cultural preferences also play a significant role in shaping the

demand for sports. Cultural traditions, values, and preferences related to specific sports or types of sporting events can influence the level of interest and participation. For instance, in some countries, football (soccer) may be deeply ingrained in the cultural fabric, leading to a higher demand for football events compared to other sports. Similarly, societal norms regarding gender, race, and inclusivity can affect the accessibility and appeal of sports events, ultimately impacting demand.

One notable aspect is the strong cultural attachment and widespread popularity of certain sports in specific countries or regions. Football, also known as soccer, serves as a prime example of a sport deeply ingrained in the cultural fabric of numerous nations. The passion and enthusiasm for football exhibited by fans in countries like Brazil, Argentina, and England, among others, exemplify how cultural traditions can shape the demand for specific sports.

Derby matches, which are highly anticipated local rivalries in traditional football countries, have been found to have a significant impact on league football. Studies conducted in English and Spanish football by Buraimo, Paramio, and Paramio (2010) and Buraimo and Simmons (2009) showed a notable increase of 13% in attendance at Derby matches. However, the research by Li, Ryu, and Kim (2022) indicated that the influence of the Derby on seat demand was not significant in the context of Chinese football. The cultural significance attributed to football in these regions creates a higher demand for football events, which often translates into increased attendance and viewership.

Previous studies have provided general findings on the demand for sports

broadcasting; however, it is important to consider the specific determinants within different regions of the same country. Gasparetto and Barajas (2017) conducted a study analyzing the demand for football broadcasts in Brazil using all 228 matches of the Brazilian Football League in the 2013-2015 season. They emphasized the impact of the uncertainty of outcome on the two largest markets in Brazil: Rio de Janeiro and São Paulo. The study revealed similarities, such as the significance of higher audiences during working days and derby games in attracting viewers. However, a difference was observed, with Rio de Janeiro fans displaying loss aversion while São Paulo fans showed a preference for certain games.

In the context of the Peruvian first division, Buraimo, Tena, and de la Piedra (2018) found that a one million increase in population led to a 20% rise in visitor numbers. This observation aligns with the trend observed in other professional sports and football leagues, where a larger market size has a positive impact on attendance. Teams located in larger cities are expected to attract more attendees, providing them with an advantage in terms of revenue generation compared to teams in smaller cities.

Similarly, racial and ethnic diversity within a society can influence sports preferences and demand. Cultural backgrounds and ethnic identities can foster a sense of connection to particular sports, leading to higher demand within specific communities. For example, sports such as basketball have gained immense popularity among African American communities in the United States, highlighting the influence of cultural preferences on sports demand.

In summary, the concept of boundary conditions of sport demand recognizes the

multifaceted nature of factors that shape sports consumption. Economic conditions, societal norms, and cultural preferences all contribute to the level of demand for sports events or products. Understanding these boundary conditions within specific contexts is essential for sports organizations and policymakers to effectively cater to the preferences and demand of their target audience, thereby fostering greater engagement and participation in sports.

CHAPTER 3: CONTEXT AND RESEARCH QUESTIONS

3.1. Chinese Super League and Related Studies

The Chinese Jia-A league is the first Chinese professional football league established by the Chinese Football Association (CFA) in 1994. After great early success, the Chinese Jia-A league reformed integrity issues, including gambling, game manipulation, and corruption. The new version of the professional football league, the CSL, was formed after the CFA and the CSL Committee established high standards to ensure professional management and management.

The first season of the CSL was in 2004, when 12 teams transferred from the Jia-A team. In 2006, after accepting two teams promoted from the lower leagues, the league expanded to 14 teams. After the club withdrew and the team merged, the CSL finally had 16 clubs participating for the first time in the 2009 season. Like most Asian football leagues, the CSL draws on the league structure and model of the European professional football leagues, including the use of a relegation system to strengthen the balance of competition, and the use of transfers to buy and sell players.

The CSL is the highest level professional football league in the mainland China. Its subordinate leagues include the Chinese Football Association China League (CCL), Chinese Football Association Division Two League (China League Two) and the Chinese Football Association Member Association Champions League (CMCL). In the past 16 years, the CSL has developed in terms of popularity and brand power, is

the fastest growing top-level football tournament. The CSL currently has 16 teams playing in a home and away double round-robin format, with 30 rounds and 240 games across the season.

In addition, implement the promotion system of "promote two and drop two" which means that the bottom two teams of CSL are relegated to the CCL, and the top two teams of CCL are promoted to the CSL each season. The ranks are determined by the total points earned in each season, with three points awarded to a win, one to a tie, and zero to a loss.

The CSL prizes are composed of various components, including sponsor bonuses, league bonuses, and club rewards. Sponsor bonuses are awarded by the club sponsors. League bonuses are distributed from the bonus pool of the CSL, with the bonuses in the pool being allocated to each participating club based on a structure of copyright fee (90%) and ranking (10%). Finally, club rewards are internal rewards issued by each club.

On March 11, 2020, the World Health Organization announced that the COVID-19 novel coronavirus has become a global pandemic. The new crown pneumonia epidemic has a huge impact on watching sports events. The CSL has also been affected. The 2020 season was also postponed starting on July 25, and there were only 20 rounds of competition.

In response to the epidemic, the CSL has implemented strict "safety bubble" measures in terms of player accommodation, transportation and competitions at the beginning of the 2020 season. Simply put, it is to limit players to a fixed small area,

isolate contact and contact with the outside world, thereby minimizing the risk of players contracting the new crown virus. As a result, the CSL has changed the previous home and away double round-robin system and adopted a tournament system. Divided into two groups, A and B, they will compete in Dalian and Suzhou respectively. The first stage adopts a group game system: the first stage of the CSL is changed to a game system. The game is played in empty field, and the concept of home and away is still retained. Each team will have a double loop game. In the second stage, the home and away cross-elimination games, the top four in each group cross-match to determine the top four, and the bottom four in each group will determine the bottom four. Then through the knockout rounds to determine the championship and runner-up, the last four teams also rely on the knockout to determine the last two relegation places, in addition, the final ranking of all CSL teams are also determined by the final knockout.

There have been three streams of research on the CSL. One is centered on studying athlete skills and team performance (Gai et al, 2019; Lago-Peñas et al., 2017; Yang et al., 2018). In this stream of research, Yang, Leicht, Lago, and Gómez (2018) identified the key physical and technical performance variables related to team quality. Gai, Volossovitch, Leicht, and Gómez (2019) researched the technical and physical performance of players in different positions in the starting, bench and full court.

The other stream of research is the studies on the match assist technology, economic market and policy (Han et al., 2020; Mao et al., 2020; Ma & Kurscheidt,

2019). Such as, Han, Chen, Lago, Wang, and Liu (2020) explored the impact of the introduction of VAR on CSL matches and on referees' performance. Mao, Soebbing, and Watanabe (2021) examined the relationship between the performance of the team on the field and the stock price and provided opinions and suggestions on the management of CSL. The last stream is sports demand. Sport demand studies comprises attendance and TV spectatorship studies.

The growth potential of CSL is evident. A clear understanding of fan behaviors, especially the demands for the CSL matches, either directly at the stadium or via media, is of great importance for marketers to promote CSL matches to football fans and to leverage CSL as a marketing vehicle. Despite merits, not much is known for the demands for CSL matches.

There are very few studies on the demand for the CSL. Watanabe and Soebbing (2017) examined the effect of team performance, price dispersion (multiple ticket prices for a single match), and market characteristics on attendance. Used economic demand theory to study consumer interest in sports events related to pricing. The results showed that in this case, the use of multi-tier pricing for sports events will not significantly increase demand. In addition, it was also found that fans reacted to strong matches against their opponents.

The experience of high-quality matches between top sports teams will affect sports fans' decisions to watch domestic events. Fans may be disappointed with domestic league teams after watching matches between the best national teams in the World Cup. After the World Cup, more people may be attracted to watch football

matches because they have increased their interest in football matches. Feng, Lu, and Yoon (2018) studied how international sports events (the World Cup) affect the demand for domestic sports leagues in non-host countries. The CSL data from 2004 to 2011 are used. The results showed that international events had a negative impact on the viewing of domestic events. Specifically, it highlights the competitive quality of the game and helps to increase the influence of star players. The impact of international events on the demand for domestic sports leagues is not limited to the development of facilities or the dramatic performance of international events but is based on the impact on people's behavior.

Watanabe, Yan, Soebbing, and Fu (2019) were studied the relationship between air pollution and the number of spectators in the CSL In recent years, the air quality of the CSL has been deteriorating, which has brought daily challenges to urban activities. This study used actual air quality data from various parts of China to perform regression analysis on the factors affecting air quality. The results showed that despite the air pollution, the habit of fans going to the stadium to watch games has not changed.

Li, Liu, Wang, Scott, and Stokowski (2019) were researched the influence of celebrities' influence on the attendance rate of the CSL. All attendance data of the CSL in the three seasons of 2015, 2016 and 2017 were used. It turns out that both home and away games, traditional rivalries or German games, as well as famous foreign players have a positive impact on the appearance rate, while the Chinese national team players have a negative impact on the appearance rate.

3.2. Chinese Super League Broadcasting Setting

Study1 examined the TV demand for CSL matches. Both the broadcasters' match selections for live telecast and the audience's demand for the broadcasted football matches were examined. Especially in terms of the audience's demand for TV football games, we have conducted a comprehensive investigation on the demand for televised football games, focusing on nationwide audiences, 1-tier city audiences, 2-tier city audiences, and 3-tier city audiences in the context of the CSL for the 2017–2021 seasons.

CSL matches are televised on CCTV5, the free sports channel of China Central Television (CCTV). CCTV is the national television station of the People's Republic of China and comprises a total of 59 free and pay-channels of which two channels mainly broadcast sport: the free CCTV5 and the pay-channel CCTV5+. In 2016, China Sports Media Co. Ltd. bought the full media rights to the CSL for 2016–2020 and distributed the media rights to various channels including CCTV5, the most influential channel because it is the only free channel accessible from all parts of China. CCTV5 and China Sports Media Co. Ltd. reached an agreement that CCTV5 can flexibly choose to broadcast from among 240.

In 1994, CCTV invested to buy the national broadcasting rights of the 1994-1998 five years China Jia-A League. In 1999, the first five years broadcast agreement expired, and after negotiation, CCTV bought the rights to broadcast the China A-League for another three years (1999-2003). After A decade of cultivation by CCTV, the China A-League has become one of the most influential professional leagues in

China and even in Asia.

At the end of the 2003 season, the China Jia-A League was transformed into the CSL, and Shanghai Media Group bought the TV rights to develop the CSL for the next three years (2004-2007). Shanghai Media Group then broadcast the CSL live nationwide through its own satellite TV channel--Dragon TV, while also selling cable rights to local satellite channels in each club's hometown. meanwhile, CCTV still retains the right to broadcast some games. In 2007, Shanghai Media Group continued to purchase the broadcasting rights of CSL for the next five years (2007-2011) and implemented dual satellite channels (Dragon TV; CCTV5) Broadcast Form.

In 2008, due to the retirement of Wuhan FC withdrew from the game and the reorganization of Shanghai Shenhua, anti-corruption and anti-crime have touched the top officials of the CFA, and stadium violence and fan riots also frequently appeared in the stadium. Faced with various problems, CCTV5 Channel had to announce that it would stop broadcasting the CSL matches from November 10, 2008. With the rectification of the "fake, gambling, and black" of Chinese professional football, and various clubs have increased their investment in the team, in 2012, CCTV resumed the broadcast of the CSL until 2015.

Starting from the 2016 season, the copyright of the CSL in the next 5 years will be open to the public for bidding. Since 2016, streaming broadcasting has become the main position. In the end, China Sports Media Co. Ltd. bought the full media copyright of the CSL for the next five years (2016-2020) at a price of 126 million dollar and distributes the streaming media copyright of the CSL. On the satellite

channel broadcast, CCTV and China Sports Media Co. Ltd. reached an agreement that CCTV can flexibly choose to broadcast the game. In addition to CCTV, the CSL will also broadcast on the local TV stations where the home teams are located.

Study1 examines the viewing demand for televised CSL football matches among TV viewers in the context of the CSL for the 2017–2021 seasons. Formally stated, the research question are as follows:

RQ 1: In traditional TV channels, what is the audience's demand for watching the CSL?

RQ 2: How do broadcasters select the games to be televised?

3.3. Chinese City Classification

Chinese cities are classified into different tiers based on several criteria, including population size, economic development, infrastructure, and administrative status. The classification of Chinese cities is primarily based on the National Bureau of Statistics of China's urban classification system.

The classification system divides cities into different tiers or levels, commonly referred to as "first-tier," "second-tier," "third-tier," and so on. However, it is important to note that the specific criteria and thresholds used for classification may vary over time and can be subject to adjustment by the government.

The level of economic development, including GDP, per capita income, industrial output, and employment opportunities, is a crucial factor. 1-tier cities are typically the most economically developed with higher GDP and stronger economic

activities. The population of a city also is an important criterion for classification. 1-tier cities usually have larger populations compared to lower-tier cities.

The administrative importance and function of a city, such as serving as a provincial capital or being directly controlled by the central government, play a role in its classification. 1-tier cities often have higher administrative status. The quality and availability of infrastructure, including transportation networks, airports, railways, highways, and other urban amenities, are considered. 1-tier cities generally have more advanced infrastructure.

It's important to note that the specific thresholds and criteria for each level may be adjusted over time based on the government's urban development plans and policies. The classification of cities into 1-tier, 2-tier, and 3-tier is aimed at guiding regional development, resource allocation, and policy implementation across different parts of China.

To be specific, 1-tier cities are the largest and most economically developed urban centers in China. They are typically major provincial capitals, centrally administered municipalities, or important economic and political hubs. Examples of 1-tier cities include Beijing, Shanghai, Guangzhou, and Shenzhen. These cities have high population densities, significant economic activities, advanced infrastructure, and serve as regional and international centers for commerce, finance, and culture.

2-tier cities are smaller than 1-tier cities but still possess considerable economic and administrative importance. They often serve as regional economic centers, transportation hubs, and cultural centers within their respective provinces or regions.

2-tier cities include cities like Ningbo, Suzhou, Zhengzhou, and Kunming. These cities generally have a growing population, developing industries, and improving infrastructure.

3-tier cities are typically smaller in size and economic significance compared to 1-tier and 2-tier cities. They serve as administrative centers for counties or districts within a province and play a role in the regional economy. 3-tier cities may have varying levels of economic development and infrastructure, with some experiencing rapid growth and urbanization. Examples of 3-tier cities include cities like Sanya, Yiwu, Xiangyang, and Wuhu.

In addition to these main levels, there are also lower-tier cities, county-level cities, and towns, which represent smaller administrative units within the Chinese urban hierarchy. Study1 examines the viewing demand for televised CSL football matches among TV viewers in the context of the CSL for the 2017–2021 seasons. Formally stated, the research question are as follows:

RQ 3: What is the viewing demand of the CSL at different city tiers? What is the discrepancy in the viewing demand for the CSL among different city tier levels?

3.4. Chinese Super League Streaming Media Platforms

Study2 examined the streaming platform demand for the CSL matches in the context of the 2021 season. Both the Tencent Sports CSL channel and the CCTV streaming platform CSL channel were examined.

Tencent Sports is a Chinese sports media platform owned by Tencent Holdings, one of the largest technology companies in China. The platform provides sports fans with a variety of services, including live and on-demand streaming of sporting events, news coverage, analysis, and social media engagement. It can be accessed through the webpage or mobile APP application. Tencent Sports was launched in 2016, and since then has become one of the leading sports platforms in China, with over 100 million monthly active users. The platform covers a wide range of sports, including football, basketball, tennis, esports, and more.

One of the key features of Tencent Sports is its live streaming service, which allows users to watch live sports events in real-time. The platform has secured broadcasting rights for many high-profile sports events, including the NBA, the EPL, the UEFA Champions League, and the CSL. In addition to live streaming, Tencent Sports also provides users with news and analysis of sporting events, as well as social media engagement through its community features. Users can follow their favorite teams and players, interact with other fans, and participate in streaming media discussions.

Tencent Sports has a strong partnership with the CSL, which is the top professional football league in China. The partnership between Tencent Sports and the CSL dates back to 2015, when the two parties signed a five-year agreement for Tencent Sports to become the exclusive digital media partner of the CSL. On April 14, 2021, the CSL announced an official cooperation with Tencent Sports. In the next three seasons, Tencent Sports will act as the official new media partner of the CSL.

Under the partnership, Tencent Sports has exclusive rights to live stream all CSL matches streaming media and on mobile devices.

The platform also provides coverage of the CSL news and analysis, as well as social media engagement for fans. The platform provides high-quality live broadcasts, highlight videos, and full game replays for fans to enjoy. Tencent Sports has also collaborated with the CSL to promote the league and enhance its brand value.

The CCTV streaming media platform is a digital media platform operated by CCTV, the state television broadcaster in China. It offers a variety of news and entertainment content, including live streaming of major sports events such as the CSL. The platform includes multiple channels that cater to different audiences, and its sports channel, CCTV5, is one of the most popular channels in the country. In addition to live sports coverage, the CCTV streaming media platform also provides news and analysis of sporting events, as well as highlights and replays of previous matches. It is an important platform for sports fans in China to follow their favorite teams and athletes.

CCTV5 has a long-term partnership with the CSL and has exclusive rights to broadcast CSL matches in China. This partnership includes broadcasting both live matches and highlight videos on the CCTV network platform. CCTV5 also collaborates with the CSL to produce special programs and coverage of CSL events, such as pre-match analysis and post-match interviews with players and coaches. the CCTV streaming media platform plays an important role in the broadcasting and promotion of the CSL and provides a significant platform for Chinese football fans to

follow and engage with the league.

It should be noted, Tencent Sports holds the exclusive rights to broadcast the new media of the CSL, which means they have the exclusive rights to broadcast streaming media and on mobile devices. This includes live streaming, highlight videos, and full game replays. However, CCTV streaming media platform belongs to CCTV. CCTV has been a long-term partner of the CSL. The CSL matches that can be watched on the CCTV traditional TV channel can also be watched on the CCTV streaming media platform. Therefore, both Tencent Sports and CCTV streaming media platform can broadcast the CSL, but they have different broadcasting rights depending on the platform.

Study2 examines the streaming media platform demand for the CSL matches in the context of the 2021 season. Formally stated, the research question are as follows:

RQ 4: On the streaming media platforms, what are the audience's demand for watching the highlights videos and the full-game replay of the CSL?

RQ 5: Are there any differences in the audience's viewing demand for CSL matches on different streaming media platforms?

CHAPTER 4: STUDY 1 DEMAND FOR CSL BROADCAST

4.1. Method

4.1.1. Data and Variables

The CSL match records were collected for the seasons spanning from 2017 to 2021, amounting to a total of 1056 matches. Among these matches, 208 were televised on CCTV5 and received national coverage. All data were collected at the individual match level.

The variables were constructed in two stages of regression using the Heckman selection model. In the first stage, the variables used in the selection model were applied, while in the second stage, the variables used in the outcome model were utilized. Table 1 provides an overview of the variables along with their operational definitions.

In the first stage of the analysis using the probit model, the binary dependent variable CCTV5 was coded by assigning a value of "1" if the broadcaster selected a match and "0" otherwise. For the second stage, the bias-corrected linear model employed log-transformed television ratings as the dependent variables for each televised match in national and Tier 1, 2, and 3 cities (TVNR, TV1R, TV2R, and TV3R).

Table 1. List of variables and operational definitions in study 1

Variable	Model		Description
Dependent Variables	Selection	Outcome	
CCTV5	O		Whether the game was selected by CCTV5 for telecasts (yes = 1 vs. no = 0)
TVNR/TV1R/TV2R/TV3R		O	Log transformed national/Tier1 city/Tier2 city/Tier3 city TV ratings of live CSL matches on
Independent Variables			
Fandom			
WEIBO	O	O	Log transformed the sum of both team's number of Weibo followers
Competition Attributes			
DERBY	O	O	Whether the matchup is between two teams from the same city (derby = 1 vs. otherwise = 0)
THEIL	O	O	Measure of uncertainty of outcome by Theil (1967) times 100
FLU		O	The number of times the score moved from draw to one team leading / one team leading to draw.
SPOINT	O		Sum of both teams' points until the previous game
DPOINT		O	The absolute difference in the teams' points until the previous game.
Team Attributes			
AFC	O	O	Sum of both teams' number of AFC (Asian Football Confederation Champions League)
SSALARY	O		Log transformed sum of the average salary of two teams' players in million USD
DSALARY		O	The absolute difference in the two teams' average salary in million USD
STARP		O	Sum of the number of both two teams' star players (international and local)
AGE	O	O	Sum of both two teams' age until the current season
Match Schedule			
WEEKEND	O	O	Whether the game was held on a weekend (Fri through Sun = 1 vs. Mon through Thurs = 0)
NIGHT	O	O	Whether the game was held after 6 p.m. (yes = 1 vs. no = 0)
Substitution			

CBA	O	O	Whether the Chinese Basketball Association game had play in the same time (yes = 1 vs. no = 0).
Last Season Interaction			
LRANK*3ROUNDS	O		Sum of home and away team's last season final rank * 3ROUNDS1
LGOALS*3ROUNDS	O		Sum of home and away team's last season total goals * 3ROUNDS1
LDWIN*3ROUNDS	O		Different between home and away teams' last season winning percentage * 3ROUNDS1

Note: [1]a value of "1" was assigned to 3ROUNDS if a game was held in the first three rounds of a season, and a value of "0" otherwise.

The TV ratings data were collected from the KUYUN real-time data collection system (http://pro.eye.kuyun.com), a leading multimedia big data service company specializing in real-time TV ratings monitoring in China. KUYUN gathers data from various sources, including live data returns from terminals such as smart TVs and set-top boxes, which cover a wide range of TV-related devices in Chinese households. As smart TVs make up a significant portion of newly shipped TVs in the domestic market and set-top boxes include both traditional and IPTV options, KUYUN's real-time TV viewership monitoring is considered to provide reliable data that accurately reflects the current status of TV viewership in China. The credibility of KUYUN's data has been widely recognized by TV agencies, television content production companies, advertisers, and TV viewers themselves. The TV ratings reported represent the average ratings over the duration of a game.

The explanatory variables listed in Table 1 were utilized in distinct ways within the first- and second-stage regression models, adhering to the exclusion restriction principle of the sequential regression model (Huber & Mellace, 2014; Morrissey et al., 2016). With the exception of one variable associated with the number of followers

a team has on Weibo, China's primary social network service, all the explanatory variables pertaining to CSL matches were sourced from CSL (www.thecfa.cn). The number of Weibo followers was directly obtained from Weibo's website (https://m.weibo.cn).

In the selection stage of the Heckman model, the independent variables encompassed various factors. These factors included variables related to fandom (WEIBO), competition attributes (DERBY, THEIL, and SPOINT), team attributes (AFC, SSALARY, and AGE), substitution (CBA), and match schedule (WEEKEND and NIGHT).

Furthermore, three interaction terms were introduced into the independent variables of the selection model to capture the impact of previous season's fandom and on-field performance during the first three rounds of matches. This was necessary due to the limited information available to broadcasters in the early stages of each season, leading them to rely on past season records. To be specific, the variable 3ROUNDS was assigned a value of "1" if a game took place in the first three rounds of a season, and "0" otherwise. Then, four interaction terms were created by multiplying 3ROUNDS by each of the three variables reflecting the on-field team performances from the previous season (LRANK, LGOALS, and LDWIN).

At the outcome stage, the independent variables included a set of factors that were likely to impact TV ratings. These factors encompassed variables related to fandom (WEIBO), competition attributes (DERBY, THEIL, FLUCTUATION, and DPOINT), team attributes (AFC, DSALARY, STARP, and AGE), substitute (CBA),

and match schedule (WEEKEND and NIGHT). These variables were considered influential in determining the TV ratings of the matches.

Although Table 1 provides details of each variable, we would like to provide additional explanations for certain explanatory variables. Specifically, in the selection model and outcome model, there are two variables related to "points": SPOINT and DPOINT.

SPOINT represents the cumulative points accumulated by both teams up to the previous game. This variable is used in the selection model to assess the ranking of the two teams. Previous research (Forrest et al., 2005; 2006) has shown that broadcasters tend to choose matches featuring higher-ranked teams. Matches between the top two high-level teams are particularly prioritized, as they are considered to be the most compelling and attract greater viewer interest.

On the other hand, DPOINT captures the absolute difference in points per game between the teams prior to the match. In the outcome model, this variable is employed to measure the current competitive level of the two teams participating in the match. By examining the audience's viewing demand, the absolute difference in points per game helps analyze the perceived competitiveness of the match. This information provides insights into how viewers respond to matches based on the point difference between the teams.

It is important to note that different estimators are used for these two models. In the selection model, points are utilized to gauge team rankings and influence the selection of matches by broadcasters. Conversely, the outcome model uses the

absolute difference in points per game to examine the current competitive level of the participating teams and its impact on viewers' viewing demand.

Moreover, in this study, distinct estimators are used for salary in the selection and outcome models: SSALARY and DSALARY, respectively. Previous research (Buraimo & Simmons, 2015) has indicated that broadcasters tend to prioritize matches featuring teams with higher average salaries. Therefore, to examine broadcasters' selection preferences, the selection model includes a variable representing the sum of the average salaries of the players from both teams.

In contrast, the outcome model focuses on TV viewers' demand and employs the absolute difference in the average salary between the two teams. This is because TV viewers generally lose interest in matches where there is a significant discrepancy in the strength of the competing teams. Such matches are often perceived as dull, leading viewers to switch to other channels. By considering the absolute difference in average salary, the outcome model captures the impact of team strength on viewers' interest in the match.

Additionally, the variable FLUCTUATION is included in the analysis to measure the number of times the score moves from a draw to one team leading and vice versa. This variable represents the intra-match Competitive Intensity (CI). While this variable has not been formally tested in previous literature, it serves as an important factor to consider in understanding the dynamics of viewership within a match. It provides insights into how changes in the score during a match influence viewers' engagement and overall interest.

4.1.2. Model and Analysis

The consumption of televised sporting matches involves two sequential decisions. First, rights-holding broadcasters need to select specific matches to televise, and then audiences need to tune into the TV channel broadcasting those matches. As a result, there is an interdependence between broadcasters' match selections and audience TV ratings within a sequential decision-making process. This interdependence gives rise to two similar, but slightly different issues related to selection bias. The first issue pertains to the selectivity of available matches by rights-holding broadcasters, while the second issue involves the influence of match selection and related factors on audience demand for televised matches as a latent variable. Due to the nature of selection-based sampling, there is a potential for bias to exist.

CCTV5 selectively televises a subset of available football matches each season. If there are differences in the characteristics between televised and non-televised matches, it can lead to an endogeneity problem. Heckman (1976) has established that if a dependent variable is estimated solely from a non-random set of observations, the estimated model may be biased. The Heckman correction for sample selection addresses this issue of sample-induced endogeneity (Certo et al., 2016; Heckman, 1976; Hwang & Lee, 2016; Kennedy, 2003). Therefore, this study utilized the Heckman selection model to examine the determinants of broadcasters' match selections and TV ratings for televised matches.

Using the Heckman selection model, the first stage estimated broadcasters' match selection decisions, while the second stage estimated the determinants of TV

ratings. Therefore, the Heckman selection model (Heckman, 1976; 1979) was a two-stage model that consisted of the selection model (i.e., broadcaster selection model) and the outcome model (i.e., viewership model).

The first stage identified the propensity of broadcasters' match selections, employing a probit regression model, as follows:

$$CCTV5_i^* = \alpha_i w_i + u_i, u_i \sim N(0, \sigma_u^2)$$
$$\begin{cases} CCTV5_i = 1 \; if \; CCTV5_i^* > 0 \\ CCTV5_i = 0 \; if \; CCTV5_i^* \leq 0 \end{cases} \quad (1)$$

where $CCTV5_i^*$ denotes the latent variable regarding broadcasters' choice $CCTV5_i$, the observed counterpart of $CCTV5_i^*$; α_i denotes the vector of coefficients; w_i denotes the independent variables; and u_i denotes the error term.

Heckman controlled selection bias by constructing the inverse Mills ratio (IMR) in Equation (1). As a correction factor, IMR, λ_i, is expressed as follows:

$$\lambda_i = \phi(\alpha_i w_i)/\Phi(\alpha_i w_i) \quad (2)$$

where the ratio represents the standard normal density by the standard normal cumulative distribution.

The second stage identified the determinants of TV ratings; the estimation model is as follows:

$$TVR_i = \beta_i x_i + \varepsilon_i, \varepsilon_i \sim N(0, \sigma_\varepsilon^2) \quad (3)$$

where TVR_i represents the observed log transformed TV ratings when $CCTV5$ of the selection model equals 1, β_i represents the coefficients, x_i represents the explanatory variables, and ε_i represents the error term with normal distribution. Because u_i in Equation (1) and ε_i in Equation (3) are systemically correlated upon

the selection bias, the conditional expectation of TVR_i is given by the following:

$$E[TVR_i \mid x_i, CCTV5_i = 1] = E[TVrating_i \mid x_i, CCTV5_i^* > 0] \quad (4)$$

$$= \beta_i x_i + E[\varepsilon_i \mid u_i > -\alpha_i w_i]$$

$$= \beta_i x_i + (\rho\sigma_\varepsilon\sigma_u)\left\{\frac{\phi(\alpha_i w_i)}{\Phi(\alpha_i w_i)}\right\}$$

where ρ indicates the correlation coefficient, σ_ε indicates the adjusted standard error, and λ_i indicates the estimated coefficient of selection bias. This IMR, λ_i, is incorporated as an exogeneous independent variable in the second phase so that the estimates can be interpreted directly, free of selection bias.

In this study, we will use the aforementioned estimation model to examine the ratings of the national (TVNR); the ratings of 1-tier city (TV1R); the ratings of 2-tier city (TV2R); and the ratings of 3-tier city (TV3R), respectively.

When using the Heckman selection model, if the IMR is nonsignificant in the second-stage linear regression model, it indicates that there is no selection bias. This in turn suggests that the estimates from the outcome model are not significantly different from those that would otherwise be derived from Ordinary Least Squares (OLS) regression.

The outcome model employed an OLS regression model, as follows:

The outcome model of 1-tier city (TV1R):

$$ln(TV1R)_{ij} = \beta_0 + \beta_1 WEIBO_{ij} + \beta_2 DERBY_{ij} + \beta_3 THEIL_{ij} + \beta_4 FLUCTUATION_{ij}$$
$$+ \beta_5 DPOINT_{ij} + \beta_6 AFC_{ij} + \beta_7 DSALARY_{ij} + \beta_8 STARP_{ij} + \beta_9 AGE_{ij}$$
$$+ \beta_{10} WEEKEND_{ij} + \beta_{11} NIGHT_{ij} + \beta_{12} CBA_{ij} + \varepsilon_{ij}$$

The outcome model of 2-tier city (TV2R):

$$ln(TV2R)_{ij} = \beta_0 + \beta_1 WEIBO_{ij} + \beta_2 DERBY_{ij} + \beta_3 THEIL_{ij} + \beta_4 FLUCTUATION_{ij} + \beta_5 DPOINT_{ij} + \beta_6 AFC_{ij} + \beta_7 DSALARY_{ij} + \beta_8 STARP_{ij} + \beta_9 AGE_{ij} + \beta_{10} WEEKEND_{ij} + \beta_{11} NIGHT_{ij} + \beta_{12} CBA_{ij} + \varepsilon_{ij}$$

The outcome model of 3-tier city (TV3R):

$$ln(TV3R)_{ij} = \beta_0 + \beta_1 WEIBO_{ij} + \beta_2 DERBY_{ij} + \beta_3 THEIL_{ij} + \beta_4 FLUCTUATION_{ij} + \beta_5 DPOINT_{ij} + \beta_6 AFC_{ij} + \beta_7 DSALARY_{ij} + \beta_8 STARP_{ij} + \beta_9 AGE_{ij} + \beta_{10} WEEKEND_{ij} + \beta_{11} NIGHT_{ij} + \beta_{12} CBA_{ij} + \varepsilon_{ij}$$

where $TV1R\ \ ij$; $TV2R\ \ ij$; $TV3R\ \ ij$ is view count of CSL for team i and j.

In the current study, besides the results of Heckman selection model, we also report the estimates derived from the OLS regression.

4.2. Findings

4.2.1. Descriptive Statistics

Table 2 presents the descriptive statistics of the key variables. The TV ratings of CSL matches ranged from 0.09% to 1.09%, which translates to an audience size of 1.25 to 24.36 million based on 96.4% TV households among China's population of 1.39 billion in 2019 (Ding, 2019). Among the three city tiers, 1-tier cities had the highest median rating at 0.902%. Additionally, the highest audience rating for a single game, recorded at 1.747%, was also observed in a 1-tier city. There doesn't appear to be a decreasing trend in the overall TV ratings as the city level decreases.

Table 2. Descriptive statistics of study 1

Variables	Mean (%)[a]	SD	Min	Max	N	Type
TVNR [b]	0.464	0.204	0.092	1.088	208	Continuous
TV1R [b]	0.902	0.454	0.114	1.747	208	Continuous
TV2R [b]	0.604	0.327	0.132	1.365	208	Continuous
TV3R [b]	0.418	0.232	0.075	1.438	208	Continuous
CCTV5	0.197	0.398	0.000	1.000	1056	Dummy
WEIBO [b]	478.345	295.348	4.2	1355.5	1056	Continuous
DERBY	0.077	0.266	0	1	1056	Dummy
THEIL	3.733	0.185	2.764	6.098	1056	Continuous
FLUCTUATION	1.755	1.268	0	7	208	Continuous
SPOINT	38.878	25.959	0	125	1056	Continuous
DPOINT	8.332	8.120	0	57	1056	Continuous
AFC	4.960	3.922	0	16	1056	Continuous
SSALARY [b]	1.996	0.933	0.363	4.570	1056	Continuous
DSALARY	0.674	0.539	0.001	2.281	1056	Continuous
STARP	2.597	2.425	0	11	1056	Dummy
AGE	35.927	9.987	10	55	1056	Continuous
WEEKEND	0.729	0.445	0	1	1056	Dummy
NIGHT	0.769	0.422	0	1	1056	Dummy
CBA	0.131	0.337	0	1	1056	Dummy

Note: [a]percentage for dummy variables; [b]raw data before log transformation.

There is a significant disparity in the number of Weibo followers among the teams participating in the CSL, with the maximum value reaching 1355.5 and the minimum value being only 4.2. This indicates a substantial difference in the fan base of these teams. The participation of teams in the AFC also exhibited a significant disparity, with a total of 17 participations between the two teams. The total age of the participating teams in a match can vary significantly. In the case of two experienced teams, the combined age may reach up to 55 years.

4.2.2. Broadcaster Selection and National Viewership Analysis

Table 3 reports the results of the analysis of national TV ratings and broadcaster selection. The estimate of IMR (λ), the correction variable for selection bias, reached a statistically significant level (λ = .264, p < .05), reject the null hypothesis, that the Heckman selection model should be used. The IMR estimate indicated that there were discerning features between matches that were broadcast and those that were not; these findings suggested that there was selection bias in the sample. Obviously, if the sample data is directly estimated by OLS, the non-linear term $(\rho\sigma_\varepsilon\sigma_u)\left\{\frac{\phi(\alpha_i w_i)}{\Phi(\alpha_i w_i)}\right\}$ will be missed. Thus, the findings obtained from the Heckman selection model are expected to differ from those of the OLS regression analysis.

Accordingly, we also employed OLS for analysis simultaneously to validate the accuracy of using the Heckman selection model. Table 4 presents the results of the analysis. Before conducting OLS data analysis, a Breusch-Pagan test for heteroskedasticity was performed, which showed no significant signs of variability in the residuals, $\chi 2(12) = 14.97$ ($p = 0.243$), this indicates that the disturbance term is distributed with equal variance, fulfilling the assumption of OLS regression. Because the number of observations in the TV ratings models was rather limited (N = 208), OLS was applied followed by wild bootstrap standard errors (SEs) with 100,000 replications (Scelles, 2017). Nevertheless, the analysis outcomes of the Heckman selection model will be utilized in the specific analysis of the findings.

Table 3. Results of Heckman selection model

Variables	Heckman Selection Model			
	Selection Model		Outcome Model	
	Coefficient	SE.	Coefficient	SE.
WEIBO	0.221	0.439	0.621***	0.175
DERBY	-0.296	0.497	0.011	0.159
THEIL	0.684*	0.512	0.360	0.389
AFC	0.072	0.067	-0.051*	0.028
AGE	-0.023	0.021	-0.018**	0.007
WEEKEND	0.162	0.422	0.078	0.141
NIGHT	0.093	0.393	0.892***	0.136
CBA	-0.151	0.357	0.068	0.139
LRANK*3ROUNDS	-0.023**	0.028	-	-
LGOALS*3ROUNDS	-0.016	0.008	-	-
LDWIN*3ROUNDS	0.450**	0.150	-	-
SSALARY	0.344*	0.203		
SPOINT	0.008*	0.004		
STARP	-	-	0.064**	0.025
DSALARY	-	-	-0.143	0.098
DPOINT	-	-	0.005	0.005
FLUCTUATION	-	-	0.083*	0.046
_cons	-7.247***	4.400	-6.409***	1.788
IMR (λ)	-	-	0.264**	0.131
Rho	-	-	0.752	
N	1056		208	

Note: *p < .10, **p < .05, ***p < .01; dependent variable in the selection model was *CCTV5*, and the dependent variables of the outcome was *TVNR*.

THEIL (β = .684, p < .10), SSALARY (β = .344, p < .10), SPOINT (β = .008, p < .10), and LDWIN*3ROUNDS (β = .450, p < .05) had a positive impact on broadcasters' match selection.

These findings indicate that broadcasters were more likely to select games with greater outcome uncertainty and a greater sum of athlete salaries played. Further, it appears that broadcasters exhibit a preference for selecting games featuring two teams with a greater disparity in their respective winning percentages from the previous season. As the season progresses, broadcasters tend to prefer games between two

teams with higher points in the current season, or in other words, games involving the currently better-performing team.

LRANK*3ROUNDS (β = -.023, $p < .05$) appeared to have a negative impact on broadcasters' match selection; that is, the broadcaster is more likely broadcasters were to select the games early in the current season if the two competing teams had a higher the combined rank (i.e., smaller rank scores) in the previous season. All other independent variables were not significant.

The outcome model in Table 3 displays the determinants of TV ratings after correcting the selection bias caused by the broadcasters' match selection. Six explanatory variables (i.e., WEIBO, AFC, AGE, STARP, FLUCTUATION, and NIGHT) controlled by the model had significant influences on TV ratings. WEIBO (β = .621 $p < .01$), STARP (β = .064, $p < .05$), FLUCTUATION (β = .083, $p < .10$), and NIGHT (β = .892, $p < .01$) had positive impacts on TV ratings. The results indicate that games featuring teams with a greater number of WEIBO followers, star athletes, elevated levels of intra-match competitive intensity, and those held during nighttime hours exhibit a positive correlation with increased television viewership ratings. AFC (β = -.051, $p < .10$) appeared to have a negative impact on TV ratings. AGE (β = -.018, $p < .05$) also appeared to have a negative impact on TV ratings.

Table 4 shows the results of OLS regression, followed by wild bootstrap SEs with 100,000 replications. TV ratings were regressed on the same set of independent variables as the outcome model using the OLS method.

Table 4. Results of OLS model followed by national audience demand

Variables	National	
	Coefficient	Bootstrap SE.
WEIBO	0.163**	0.073
DERBY	0.005	0.052
THEIL	0.127	0.127
AFC	-0.014	0.009
AGE	-0.008**	0.003
WEEKEND	0.272***	0.043
NIGHT	0.832***	0.059
CBA	0.017	0.067
STARP	0.061***	0.009
DSALARY	0.065	0.044
DPOINT	0.005**	0.002
FLUCTUATION	0.026	0.017
_cons	-3.214***	0.638
R^2	0.710	
Adj R^2	0.692	
N	208	

Note: *p < .10, **p < .05, ***p < .01; the dependent variables of the outcome was *TVNR*. OLS models followed by wild bootstrap SEs.

The results obtained from the OLS regression revealed a different pattern of results to the outcome model. The six independent variables found significant in the outcome model (i.e., WEIBO, AGE, WEEKEND, NIGHT, STARP, and DPOINT) were statistically significant in the OLS regression. This confirms the results of the model test reported earlier, namely, that the selection bias was statistically significant. Furthermore, it emphasizes the critical necessity of using the Heckman selection model.

4.2.3. Analysis by City Tier

As CCTV5 is a nationwide free-to-air television channel, the scope of our investigation is limited to broadcaster selection at the national level. However, at the city level, our attention is primarily directed towards the viewing demand of TV viewers. The application of the Heckman selection model in this context serves to detect the presence or absence of selection bias in the data.

The estimate of IMR (λ), the correction variable for selection bias, in each of the three city-tier did not reach a statistically significant level (1-tier city: $\lambda = .060$, $p > .10$; 2-tier city: $\lambda = .011$, $p > .10$; 3-tier city: $\lambda = .205$, $p > .10$), failing to reject the null hypothesis that the correlation between the error terms from the selection and outcome equations was not significantly different from zero. The IMR estimate indicated that there were no discerning features between matches that were broadcast and those that were not; these findings suggested that there was no selection bias in the sample. Thus, the results of the Heckman selection model should reveal a similar pattern to the results of the OLS regression.

Accordingly, we will employ OLS regression analysis to examine the data, and subsequently evaluate the results of our OLS analysis. Table 6 reports the analyses results. Before using OLS for data analysis, Breusch–Pagan test for heteroskedasticity was performed. The result of the test showed 1-tier city OLS model: $\chi2(12) = 21.76$ ($p = 0.040$); 2-tier city OLS model: $\chi2(12) = 18.07$ ($p = 0.114$); 3-tier city OLS model: $\chi2(12) = 14.83$ ($p = 0.251$). The outcomes of the Breusch-Pagan test reveal the presence of heteroscedasticity in the OLS model analysis of 1-tier city. Nonetheless,

no heteroscedasticity is observed in the analysis of 2-tier city and 3-tier city. This indicates that the disturbance term is distributed with equal variance, fulfilling the assumption of OLS regression.

The regression analysis of 1-tier city detected the presence of heteroscedasticity. One feasible solution for addressing the issue of heteroscedasticity in the regression analysis is to continue using OLS regression, while employing robust standard errors. In this study, Because the number of observations in the TV ratings models was rather limited (N = 208), we can use the bootstrap method, that is, the method of sampling the sample with replacement. This involves another method to solve heteroscedasticity, that is, wild bootstrap (Liu, 1988; Wu, 1986).

This method is capable of satisfying the requisite sampling from the disturbance items of heteroscedasticity, which enables it to perform effectively in the presence of heteroscedasticity (Horowitz, 1998; 2001). Thereby providing a viable solution. Therefore, we applied OLS to the ratings of the three levels of cities, respectively, and applied wild bootstrap standard errors (SEs), repeated 100,000 times (Scelles, 2017). The result of applying the OLS model with wild bootstrapped standard errors to the three city-tier are presented in Table 5. Subsequently, we shall conduct an analysis of the OLS results for each level of the city individually.

Table 6 shows the OLS model outcomes for the factors affecting TV ratings in 1-tier city. The model reveals that five explanatory variables, namely WEIBO, AGE, WEEKEND, NIGHT, and STARP, exerted significant influences on TV ratings in 1-tier city.

Table 5. Results of OLS models by city tier audience demand

Variables	1-Tier City		2-Tier City		3-Tier City	
	Coefficient	Bootstrap SE.	Coefficient	Bootstrap SE.	Coefficient	Bootstrap SE.
WEIBO	0.171**	0.084	0.187**	0.082	0.096	0.065
DERBY	0.090	0.071	-0.022	0.053	-0.009	0.048
THEIL	0.114	0.172	0.156	0.106	0.147*	0.105
AFC	-0.001	0.011	-0.016*	0.009	-0.008	0.008
AGE	-0.009**	0.003	-0.007**	0.003	-0.007**	0.003
WEEKEND	0.164**	0.062	0.280***	0.043	0.230***	0.043
NIGHT	0.779***	0.076	0.797***	0.057	0.760***	0.056
CBA	0.146	0.105	0.120	0.090	0.028	0.071
STARP	0.054***	0.010	0.058***	0.009	0.058***	0.009
DSALARY	0.072	0.063	0.112*	0.060	0.059	0.041
DPOINT	0.001	0.003	0.003	0.002	0.005**	0.002
FLUCTUATION	-0.006	0.022	0.015	0.016	0.016	0.014
_cons	-2.469***	0.801	-3.218***	0.639	-2.589***	0.564
R^2	0.577		0.670		0.690	
Adj R^2	0.551		0.650		0.671	
N	208		208		208	

Note: *p < .10, **p < .05, ***p < .01 dependent variable in the three model were *TV1R*; *TV2R; TV3R.* OLS models followed by wild bootstrap SEs.

WEIBO (β = .171 p < .05), STARP (β = .054, p < .01), WEEKEND (β = .164, p < .05), and NIGHT (β = .779, p < .01) had positive impacts on TV ratings.

These findings indicated that games played by teams with greater numbers of WEIBO followers and star athlete, and games held on weekends and nights, were associated with higher TV ratings. AGE (β = -.009, p < .05) also appeared to have a negative impact on broadcasters' match selection.

Table 6 shows the OLS model outcomes for the factors affecting TV ratings in 2-tier city. The model reveals that seven explanatory variables, namely WEIBO, AFC

AGE, WEEKEND, NIGHT, STARP, and DSALARY exerted significant influences on TV ratings in 2-tier city. WEIBO ($\beta = .187$ $p < .05$), STARP ($\beta = .058$, $p < .01$), DSALARY ($\beta = .112$, $p < .01$), WEEKEND ($\beta = .280$, $p < .01$), and NIGHT ($\beta = .797$, $p < .01$) had positive impacts on TV ratings. These findings indicated that games played by teams with greater numbers of WEIBO followers and star athlete, a greater difference of athlete salaries, and games held on weekends and nights, were associated with higher TV ratings. AFC ($\beta = -.016$, $p < .10$) appeared to have a negative impact on TV ratings; AGE ($\beta = -.007$, $p < .05$) also appeared to have a negative impact on broadcasters' match selection.

Table 6 shows the OLS model outcomes for the factors affecting TV ratings in 3-tier city. The model reveals that six explanatory variables, namely THEIL, AGE, WEEKEND, NIGHT, STARP, and DPOINT exerted significant influences on TV ratings in 3-tier city. THEIL ($\beta = .147$, $p < .05$), STARP ($\beta = .058$, $p < .01$), DPOINT ($\beta = .005$, $p < .05$), WEEKEND ($\beta = .230$, $p < .01$), and NIGHT ($\beta = .760$, $p < .01$) had positive impacts on TV ratings. These findings indicated that games played by teams with uncertain outcome, star athletes, a higher difference in points between the two teams before the current game, and games played on weekends and evenings are significantly associated with higher TV ratings. AGE ($\beta = -.007$, $p < .05$) appeared to have a negative impact on broadcasters' match selection.

4.3. Discussion

This study examined the TV demand for CSL matches. Considering both the

broadcasters' match selections for live telecasts (i.e., broadcaster selection model) and the audience's demand for televised football matches (i.e., viewership model). Specifically, we conducted a comprehensive investigation into the demand for televised football games, focusing on nationwide audiences as well as audiences from 1-tier, 2-tier, and 3-tier cities. The findings for each audience segment will be discussed separately below.

Broadcaster Selection and National Viewership Analysis

The initial segment of this study employed a Heckman selection model to examine broadcasters' selection of live televised football matches and the nationwide audience's demand for these matches. The findings indicated that both broadcasters and TV audiences showed a preference for matches featuring teams with a larger fan base, higher rankings, star players, and higher salaries. These results are in line with previous studies on audience demand for televised football matches (Mongeon & Winfree, 2012; Tainsky, 2010; Wills et al., 2020).

The viewership model, on the other hand, revealed that the audience's demand for televised CSL matches was higher for night games, which are matches starting after 6 p.m. This finding aligns with previous research suggesting that prime-time matches tend to attract higher TV ratings (Schreyer et al., 2018; Tainsky, 2010; Wang et al., 2018). These results are consistent with the findings of the current study.

However, the existing literature does not provide consistent findings regarding the association between weekday games and higher TV audiences compared to weekend games, or vice versa. The results vary across studies. Barajas et al. (2019)

and Gasparetto and Barajas (2018) reported higher TV ratings for matches held on weekdays compared to weekends, while Buraimo and Simmons (2015), Scelles (2017) noted that matches on a Wednesday are to be avoided at all costs. It's important to interpret the TV rating differences between weekday and weekend matches within the specific context of each study.

In the present study, the results indicated that weekend game ratings did not show any statistically significant difference. This suggests that weekend games do not significantly enhance TV ratings. One possible explanation for this finding is the state of weekend TV broadcasting in China. During weekends, TV viewers have a wide range of options, such as entertainment programs and TV dramas, in addition to sports competitions. Another plausible explanation is the prevailing labor market conditions in China, where the workweek is often demanding, and overtime work is common. As a result, individuals tend to engage in various activities to relax and unwind over the weekends and watching TV may not be their primary choice.

It's important to consider these factors and the specific circumstances of the Chinese TV broadcasting and labor market when interpreting the results of this study regarding the lack of significant differences in TV ratings between weekend and weekday matches.

Unlike the TV audiences, the findings of this study revealed that broadcasters did not show a preference for night and weekend games, which is surprising considering that broadcasters typically aim for the highest possible TV ratings. This finding can be attributed to the position of the CSL in the Chinese sports broadcasting market. In

China, prime-time and weekend TV programs tend to attract the largest audiences in the daily TV schedule. As the dominant sports channel in China, CCTV5 broadcasts numerous popular sports events from overseas, such as NBA games from the United States, as basketball has long been the most popular sport among the Chinese population. Therefore, broadcasters at CCTV5 often choose sports events, other than CSL matches, that are expected to generate higher TV ratings during prime-time and weekends.

Furthermore, the results indicated that outcome uncertainty, as measured by the Theil index, influenced broadcasters' match selection decisions but did not have a significant impact on TV ratings. This finding aligns with previous studies by Forrest et al. (2005; 2006), which demonstrated broadcasters' preferences for selecting matches with greater outcome uncertainty. However, it contradicts recent research on football TV demand (Caruso et al., 2019; Schreyer et al., 2018; Sung et al., 2019), which found no apparent demand among TV viewers for matches with higher outcome uncertainty.

The findings of this study indicated that the status of a derby match did not have an impact on broadcasters' match selection or TV ratings. The literature on the effects of derby matches has provided mixed results, with some studies showing no influence (Buraimo & Simmons, 2015) and others demonstrating a significant positive impact (Buraimo & Simmons, 2015; Scelles, 2017). Therefore, it is important to interpret the results related to derby match status within the context of the CSL.

In this study, matches between two teams from the same city were considered

derby matches. However, these teams differed significantly in terms of their fan bases and on-field performance levels. As a result, the derby matches in the CSL may not be as attractive as traditional derby matches in European football, such as the Liverpool vs. Everton match in England or the Juventus vs. Torino match in Italy. In those cases, derby matches involve two rival teams with similar levels of fandom and performance.

To illustrate this point, let's consider the example of Beijing, where there are two teams: Beijing Guoan FC and Beijing Renhe FC. Beijing Guoan FC, established in 1992, is the oldest professional football club in China. It has won multiple CSL championships and has a large fan base. On the other hand, Beijing Renhe FC relocated from Xian to Beijing in 2016 and is a relatively new club with a smaller number of supporters and lower on-field performance compared to Beijing Guoan FC. Consequently, matches between the two Beijing teams have not been successful in attracting significant numbers of spectators due to the disparity in fan base and team performance.

The viewership model revealed that audiences have specific preferences regarding team attributes. The historical participation frequency of a team in the Asian Football Confederation Champions League, often considered an indicator of quality, does not attract viewers of the Chinese Super League. Contrary to previous research (Bond & Addesa, 2019; Pawlowski & Nalbantis, 2015), teams with a high past shortlisting frequency for the AFC have a negative impact on TV ratings. One possible explanation for this phenomenon is that viewers' expectations of game

quality prior to the event strongly influence sports event ratings.

However, since changing TV channels carries little cost, actual viewership numbers are also influenced by the game's progression. As the game unfolds, even teams with extensive AFC participation history may lose viewers if their performance fails to meet expectations, resulting in a decline in TV ratings.

Furthermore, unlike previous studies (Buraimo et al., 2018; Tainsky & McEvoy, 2012), the age of the team negatively affects television viewership. To fully interpret these findings, it is necessary to consider the context of the CSL. In recent years, the CSL has witnessed the emergence of many new teams such as Chengdu Rongcheng FC and Wuhan Three Towns FC. The appeal of veteran teams has diminished, possibly due to mismanagement of certain older clubs, leading to a decline in the overall competitiveness of many teams. Consequently, these factors make the games less appealing to viewers.

Finally, we would like to highlight a factor that has not been formally examined in previous literature, namely the intra-match CI. This index measures the number of times the score transitions from a draw to one team leading and from one team leading back to a draw.

The fluctuation of the game score has a significant impact on the improvement of TV ratings. This phenomenon is related to the viewing habits of the audience. Even viewers who typically watch only the latter part of a game may be more inclined to do so if there are multiple goals scored by different teams, indicating a sense of outcome uncertainty. Conversely, if there is no goal difference (resulting in low outcome

uncertainty), or if one team has a large lead (which may suggest a less exciting game), viewers may find it less engaging (Alavy et al., 2010). However, a competitive game where the lead alternates between the teams will captivate and retain the TV audience in front of their screens.

Analysis by City Tier

The second part of this study focuses on analyzing the demand for live CSL matches among TV viewers in different city tiers using OLS models with wild bootstrap SEs. The results indicate that viewers in all three city tiers have a preference for games that feature more star players and are broadcasted on weekends and during nighttime. Additionally, it was found that matches involving older teams have a negative impact on television ratings.

What is interesting is the differential demand for TV viewing observed across the three city tiers. In 1-tier and 2-tier cities, the number of Weibo followers a team has positively affects TV ratings, while in 3-tier cities, it has no impact. This finding can be attributed to the concentration of participating teams in 1-tier and 2-tier cities throughout the history of CSL, which has resulted in a more dedicated and loyal fan base in these areas. On the other hand, audiences in 3-tier cities may not have a team they strongly identify with, leading to more sporadic viewership and consequently no significant impact on ratings.

Secondly, audiences in 2-tier cities demonstrate a preference for matches that feature a substantial difference in the absolute salary between the participating teams. In other words, viewers in 2-tier cities show a preference for matches where there is a

significant contrast in the objective strength of the teams. This suggests that audiences in 2-tier cities enjoy watching games that are more one-sided or where one team is significantly stronger than the other.

The findings of this study indicate that 3-tier cities have distinctive preferences that differ from those of 1-tier and 2-tier cities. The audience in 3-tier cities exhibits a unique preference for games with a higher degree of uncertainty in their outcomes, which is not observed among audiences in 1-tier and 2-tier cities. However, empirical research on the uncertainty of outcome hypothesis has produced inconsistent results (Coates et al., 2014; Forrest & Simmons, 2002; Peel & Thomas, 1996). Therefore, it is important to consider the distinctive geographical coverage of the CSL in this analysis.

The present study found that viewers in 3-tier cities have a documented preference for games with uncertain outcomes. As mentioned earlier, a majority of CSL teams are concentrated in 1-tier and 2-tier cities, leading viewers in those regions to be more selective in their game choices. On the other hand, viewers in 3-tier cities may place greater emphasis on the intrinsic qualities of the game itself, prioritizing competitive and thrilling encounters over other factors related to team attributes. Another factor related to the competitive aspect is the absolute difference in points between the teams leading up to the previous game, which positively impacts ratings only in 3-tier cities. When combined with the previous analysis, it becomes evident that audiences in 3-tier cities prioritize the game itself and demand thrilling and closely contested matches in the CSL.

CHAPTER 5: STUDY 2 DEMAND FOR CSL STREAMING

5.1. Method

5.1.1. Data and Variables

This study investigates the viewership of highlights from the CSL. The data for this study was collected from streaming media viewing records of the 2022 CSL games. The 2022 season consisted of 18 teams and a total of 34 rounds with 306 games played. The first stage of the season followed a tournament system and took place in Dalian City, Liaoning Province, Haikou City, Hainan Province, and Meizhou City, Guangdong Province. In the second stage, starting from the 11th round, the tournament resumed with the home and away regular season.

The CSL has two official partners on the streaming media platform: Tencent Sports and CCTV streaming media. These partners have dedicated channels where a series of exciting videos are released after each game. For this study, the view counts of each set of highlight video clips from the Tencent Sports CSL channel were collected, totaling 300 sets from the CSL 2022 season. Additionally, the view counts of each set of highlight video clips and the full game replay from the CCTV streaming media CSL channel were obtained, with 123 sets of highlight video view counts and 164 sets of full game replay view counts collected from the same season. All data were collected at the individual match level.

For the three models, a total of 17 independent variables were regressed against

the dependent variables. These independent variables were grouped into four categories: fandom, competition attributes, team attributes, and match schedule. The selection of these categories was based on the limited existing literature on streaming media demand research (Han et al., 2021; Pyun et al., 2023), as well as relevant studies on sports broadcasting demand (Buraimo, 2006, 2008; Tainsky & McEvoy, 2012; Tainsky, 2010). Table 6 shows the list of variables and their operational definitions.

Except for one variable related to teams' number of followers on Weibo, which was collected from China's leading social streaming media service, all other explanatory variables related to CSL matches were obtained from the CSL website (www.thecfa.cn). The number of Weibo followers was directly recorded from the Weibo website (https://m.weibo.cn).

The explanatory variables related to competition attributes in the study included DERBY, THEIL, SGOAL, DGOAL, SPOINT, YCARD, RCARD, and BETRO. DERBY is a dummy variable that indicates matches between teams from the same city, where derby = 1 if it is a derby match and 0 otherwise. In this study, derby matches specifically refer to matches between two teams from the same local town.

THEIL is a measure of uncertainty of outcome introduced by Theil (1967) and has been widely used in previous studies on attendance and viewership (Buraimo et al., 2018; Cox, 2018; Pawlowski & Nalbantis, 2015; Schreyer et al., 2016; Sung et al., 2019).

Table 6. List of variables and operational definitions in study 2

Variable	Description
Dependent Variables	
TENCENT	Tencent Sport platform highlight view count of CSL matches
CCTVN	CCTV streaming media platform highlight view count of CSL matches
CCTVNR	CCTV streaming media platform full game replay view count of CSL matches
Independent Variables	
Fandom	
WEIBO	Log transformed the sum of both team's number of Weibo followers
Competition Attributes	
DERBY	Whether the matchup is between two teams from the same city (derby = 1 vs. otherwise = 0)
THEIL	Measure of uncertainty of outcome by Theil (1967) times 100
SGOAL	Sum of both team's goals in the current game.
DGOAL	The absolute difference between home and away teams' goals in the current game
SPOINT	Sum of both teams' points until the previous game
YCARD	The total number of yellow cards received by both teams during matches.
RCARD	The total number of red cards received by both teams during matches.
BETRO	A team who had a lower probability based on betting odds eventually winning the game (yes = 1 vs. no = 0)
Team Attributes	
CHA	Sum of both teams' number of previous CSL championships won
AGE	Sum of both two teams' age until the current season
SSALARY	Log transformed sum of the average salary of two teams' players in million USD
STARP	Sum of the number of both two teams' star players (international and local)
Match Schedule	
WEEKEND	Whether the game was held on a weekend (Fri through Sun = 1 vs. Mon through Thurs = 0)
NIGHT	Whether the game was held after 6 p.m. (yes = 1 vs. no = 0)
VTIME	Time elapsed from video release to data collection.

We would like to provide additional explanations about the two variables related to goals in the outcome model: SGOAL (sum of goals) and DGOAL (difference in

goals scored at the end of the game). One may argue that streaming media viewers do not find out this information until the end of the game, so it should not affect highlight or full game replay view demand. However, a significant discrepancy in goals or a game with a higher number of goals can exert a particular appeal on the audience, prompting them to click on the highlight video or full game replay after the game. Therefore, utilizing these two targeting variables could influence viewers to watch either the highlights or the full game replay.

SPOINT is calculated as the sum of both teams' points until the previous game in the current season. This measure is commonly used to assess the current performance of the two teams involved in the match. Two variables related to the number of cards received during the game are included: YCARD and RCARD. These variables are used to measure the intensity of the game, as a match that has received a high number of cards, regardless of the reason, tends to pique the curiosity of the audience and entice them to click on the video after the game is over.

BETRO is a variable representing the reverse bet outcome, which refers to matches where the actual outcome is contrary to the priori information or predictions. In other words, it captures situations where a team with a lower probability of winning, as indicated by the betting odds, ends up winning the game. BETRO is a binary variable, with a value of 1 indicating such matches. The betting odds data used for this variable were obtained from the "betexplore" website (www.betexplorer.com). The inclusion of BETRO in the analysis allows us to examine whether unexpected or surprising outcomes in the matches can attract more fans and viewership.

The explanatory variables related to team attributes include CHA, AGE, SSALARY, and STARP. CHA represents the cumulative number of times both teams have won the CSL championship. It serves as an indicator of the historical success and prestige of the teams. AGE is the sum of the ages of players from both teams. It provides an overall measure of the collective experience and maturity of the players on the field.

SSALARY represents the sum of the average salaries of players from both teams. It reflects the financial resources and investment in player talent by the teams. STARP is the sum of the number of star players from both teams. Star players are identified based on the top 10 player lists provided by Transfer Market (www.transfermarket.com). These players are recognized for their exceptional skills and reputation. By incorporating these team attributes, the analysis aims to explore how factors such as team success, player experience, financial investment, and the presence of star players influence viewership and demand for CSL matches.

Finally, we have explanatory variables related to the schedule, including WEEKEND, NIGHT, and VTIME. WEEKEND is a dummy variable that indicates whether a match was played on the weekend (WEEKEND = 1) and 0 otherwise. It captures the influence of match timing on viewership, as weekends are typically associated with higher availability and leisure time for viewers. NIGHT is also a dummy variable that indicates whether a match was played during the evening or night (NIGHT = 1) and 0 otherwise. It captures the potential preference of viewers for matches that are held during prime-time hours when they are more likely to be

available to watch.

VTIME is a variable that measures the time elapsed between the video upload and the data collection for view counts. It controls for the effect of video upload time on view count. Since streaming media video viewing is influenced by the availability and accessibility of the content, the longer it takes for a video to be uploaded, the longer viewers have had to watch it, potentially resulting in higher view counts. By including VTIME in the analysis, we aim to account for this temporal factor and ensure more accurate interpretations of the relationship between the other variables and view counts. Overall, these schedule-related variables help capture the influence of match timing and video upload time on viewership and demand for CSL matches.

5.1.2. Model and Analysis

This study investigates the demand for CSL matches on streaming media platforms, specifically focusing on highlight view counts and full game replay view counts. Three regression models were employed to analyze the factors influencing streaming media demand.

The first two models examine the factors affecting highlight demand using data from two different platforms: Tencent Sports CSL channel and CCTV streaming media platform CSL channel. The dependent variables in these models are the log-transformed highlight view counts on Tencent Sports ((i.e., TENCRNT) and CCTV streaming media (i.e., CCTVN), respectively. These variables represent the streaming

media demand for CSL match highlights on the respective platforms.

The third model focuses on the factors influencing full game replay demand using data from the CCTV streaming media platform. The dependent variable in this model is the log-transformed full game replay view count on CCTV streaming media (i.e., CCTVNR). This variable represents the streaming media demand for full game replays of CSL matches on the CCTV streaming media platform.

By analyzing these three models, the study aims to uncover the factors that influence the streaming media demand for CSL matches on streaming media platforms and provide insights into viewer preferences and behaviors.

To explore the determinants of CSL streaming media highlight view count and full game replay view count, following empirical model is formed.

Highlight view counts on Tencent Sports streaming platform:

$$\begin{aligned} ln(TENCENT)_{ij} = {} & \beta_0 + \beta_1 WEIBO_{ij} + \beta_2 DERBY_{ij} + \beta_3 THEIL_{ij} + \beta_4 SGOAL_{ij} \\ & + \beta_5 DGOAL_{ij} + \beta_6 SPOINT_{ij} + \beta_7 YCARD_{ij} + \beta_8 RCARD_{ij} \\ & + \beta_9 BETRO_{ij} + \beta_{10} CHA_{ij} + \beta_{11} AGE_{ij} + \beta_{12} SSALARY_{ij} \\ & + \beta_{13} STARP_{ij} + \beta_{14} WEEKEND_{ij} + \beta_{15} NIGHT_{ij} + \beta_{16} ROUND_{ij} \\ & + \beta_{17} VTIME_{ij} + + \varepsilon_{ij} \end{aligned}$$

Highlight view counts on CCTV streaming platform:

$$ln(CCTVN)_{ij} = \beta_0 + \beta_1 WEIBO_{ij} + \beta_2 DERBY_{ij} + \beta_3 THEIL_{ij} + \beta_4 SGOAL_{ij}$$
$$+ \beta_5 DGOAL_{ij} + \beta_6 SPOINT_{ij} + \beta_7 YCARD_{ij} + \beta_8 RCARD_{ij}$$
$$+ \beta_9 BETRO_{ij} + \beta_{10} CHA_{ij} + \beta_{11} AGE_{ij} + \beta_{12} SSALARY_{ij}$$
$$+ \beta_{13} STARP_{ij} + \beta_{14} WEEKEND_{ij} + \beta_{15} NIGHT_{ij} + \beta_{16} ROUND_{ij}$$
$$+ \beta_{17} VTIME_{ij} + + \varepsilon_{ij}$$

Full game replay view count on CCTV streaming platform:

$$ln(CCTVNR)_{ij} = \beta_0 + \beta_1 WEIBO_{ij} + \beta_2 DERBY_{ij} + \beta_3 THEIL_{ij} + \beta_4 SGOAL_{ij}$$
$$+ \beta_5 DGOAL_{ij} + \beta_6 SPOINT_{ij} + \beta_7 YCARD_{ij} + \beta_8 RCARD_{ij}$$
$$+ \beta_9 BETRO_{ij} + \beta_{10} CHA_{ij} + \beta_{11} AGE_{ij} + \beta_{12} SSALARY_{ij}$$
$$+ \beta_{13} STARP_{ij} + \beta_{14} WEEKEND_{ij} + \beta_{15} NIGHT_{ij} + \beta_{16} ROUND_{ij}$$
$$+ \beta_{17} VTIME_{ij} + + \varepsilon_{ij}$$

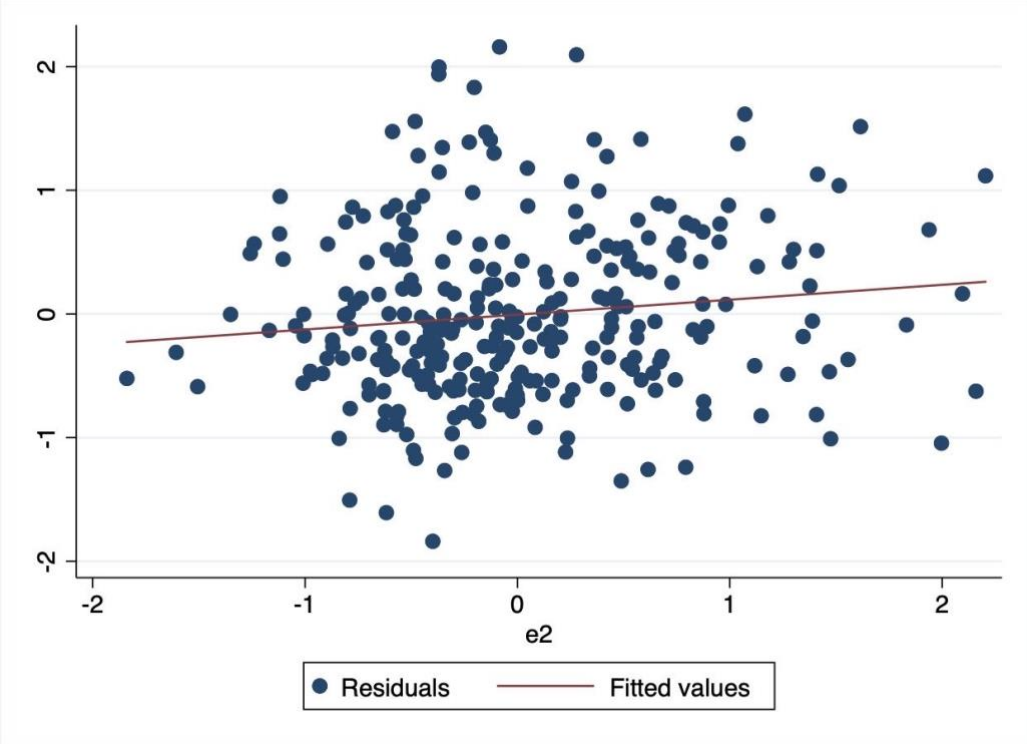
where TENCENT ij; CCTVN ij; CCTVNR ij; is view count of CSL for team i and j.

To analyze the demand for Tencent Sports CSL channel highlight view counts, the data from the 2022 season was pooled and examined using OLS regression. However, when using pooled cross-sectional data, it is important to consider potential issues such as heteroskedasticity and autocorrelation.

To examine this possibility, the Breusch–Pagan test and Breusch–Godfrey test for serial correlation were performed. The results of the Breusch–Pagan test were not statistically significant, $\chi 2$ (16) = 21.69 (p = 0.197), which indicates that the disturbance term is distributed with equal variance. Also, the result of the Breusch–

Godfrey test was statistically significant (p = 0.035), reject the null hypothesis of no serial correlation. Indicates that there is an autocorrelation problem. Furthermore, the variance inflation factor (VIF) was examined to detect multicollinearity in the data. The results revealed that none of the VIF values exceeded 10, indicating that there is no severe multicollinearity among the independent variables in the dataset.

Figure 1. Scatter plot of residuals versus residual lags of Tencent Sports highlight view counts model

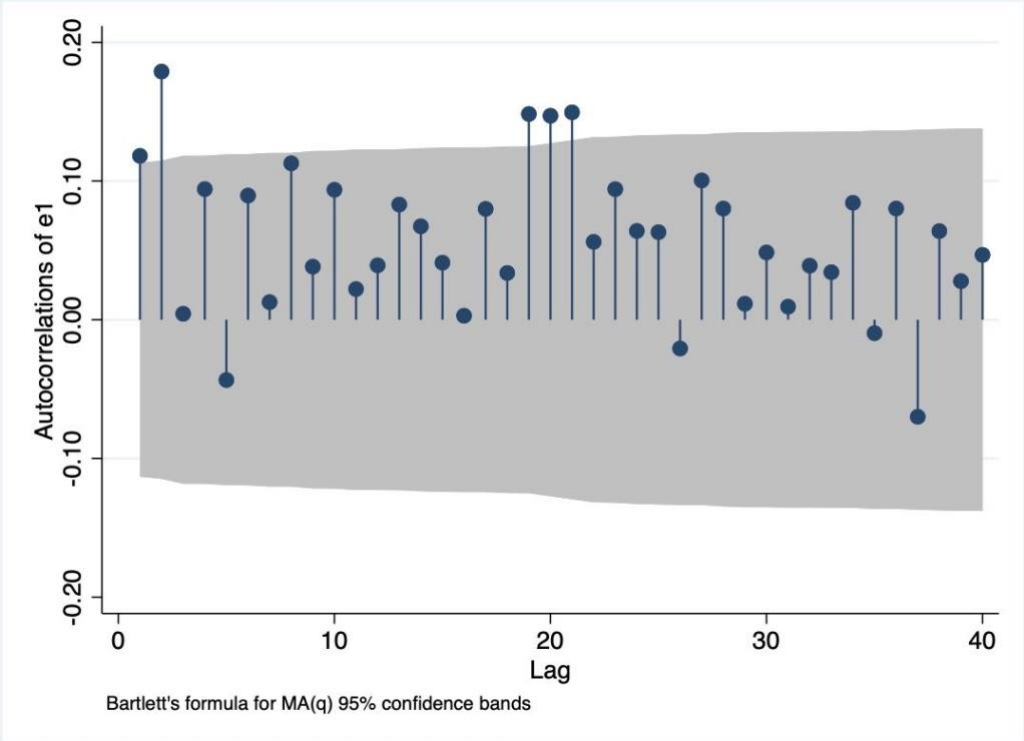


As previously mentioned, autocorrelation was detected during the analysis, indicating the need to address this issue. To address autocorrelation, the first step involves calculating the residuals and their corresponding lags. Subsequently, a scatterplot of the residuals against their lag values is created (Figure 1).

The scatterplot analysis reveals the presence of positive autocorrelation in the disturbance term, suggesting that a positive disturbance term is more likely to be

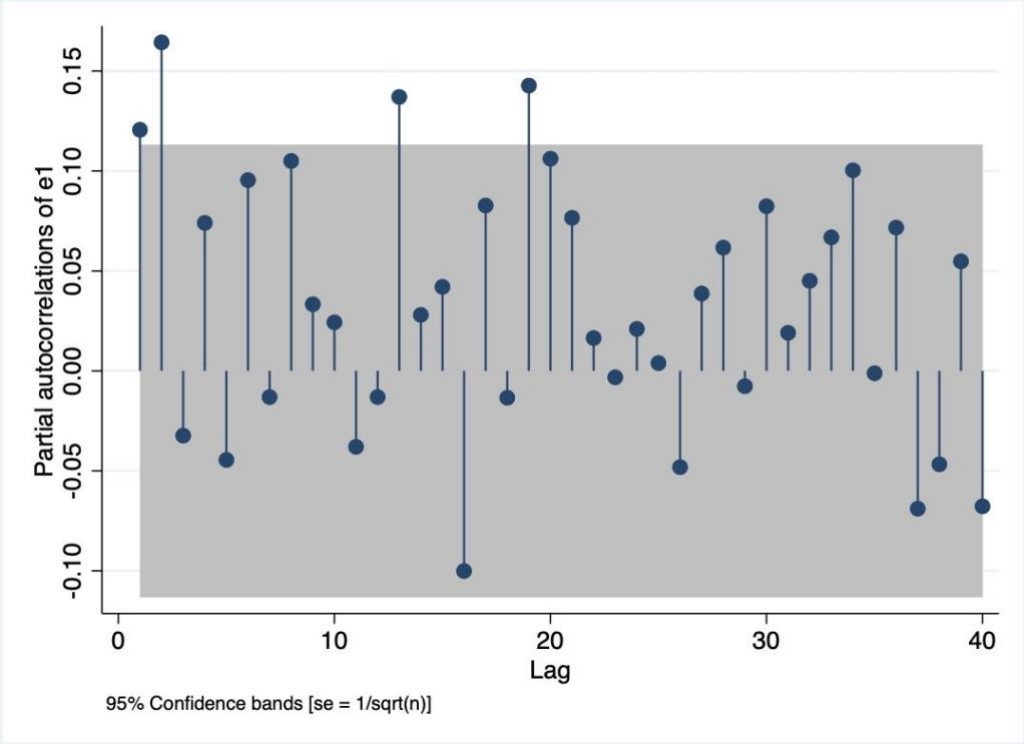
followed by another positive disturbance term, while a negative disturbance term is more likely to be followed by a negative disturbance term. Additionally, the autocorrelation plot (Figure 2) and the partial autocorrelation plot (Figure 3) further support the identification of first-order autocorrelation as the primary form of autocorrelation plot.

Figure 2. Autocorrelation plot of Tencent Sports highlight view counts model



To address this autocorrelation issue, we consider employing the feasible generalized least squares (FGLS) method. The FGLS method is a technique that accounts for autocorrelation in the regression analysis, allowing for more accurate estimation of the regression coefficients. By incorporating the FGLS method, we can mitigate the impact of autocorrelation and obtain more reliable results in our analysis.

Figure 3. Partial autocorrelation plot of Tencent Sports highlight view counts model

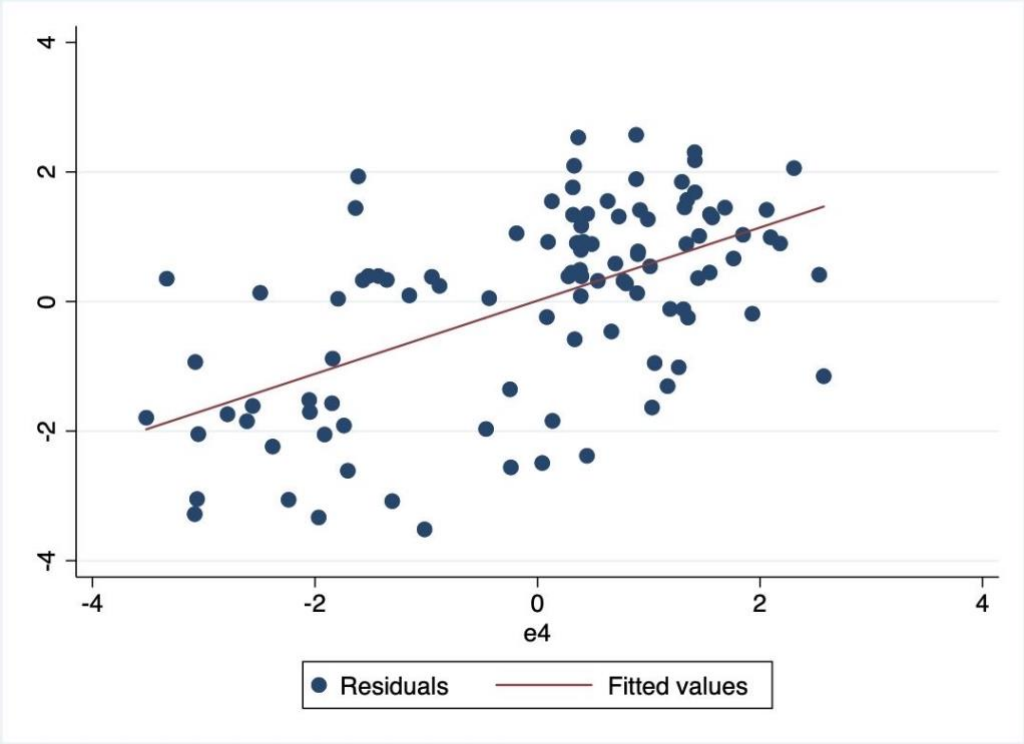


As with the previous research on the demand for the Tencent Sports CSL channel highlight view count, we conducted an initial OLS regression analysis on the data for the CCTV streaming media platform CSL channel highlight view count model. We also performed the Breusch-Pagan test and the Breusch-Godfrey test for serial correlation. The results of the Breusch-Pagan test were not statistically significant, $\chi 2$ (16) = 12.39 ($p = 0.716$), indicating that the disturbance term is distributed with equal variance. However, the result of the Breusch-Godfrey test was statistically significant ($p = 0.011$), leading us to reject the null hypothesis of no serial correlation. This indicates the presence of an autocorrelation problem in the model.

In addition to the tests for homoskedasticity and serial correlation, we examined the VIF. The results showed that none of the VIF values exceeded 10, indicating the

absence of multicollinearity in the dataset.

Figure 4. Scatter plot of residuals versus residual lags of CCTV streaming highlight view count model



As previously mentioned, after conducting an analysis, the presence of autocorrelation was identified. Therefore, it is necessary to address the issue of autocorrelation. To do so, we first calculated the residuals and their lags. Next, we created a scatterplot of the residuals against their lag, as shown in Figure 4.

The scatterplot indicates the presence of positive autocorrelation in the disturbance term. Additionally, we examined the autocorrelation plot (Figure 5) and the partial autocorrelation plot (Figure 6), both of which indicate that first-order autocorrelation is the predominant form of autocorrelation. To address this issue, we will consider utilizing the FGLS method.

Figure 5. Autocorrelation plot of CCTV streaming highlight view count model

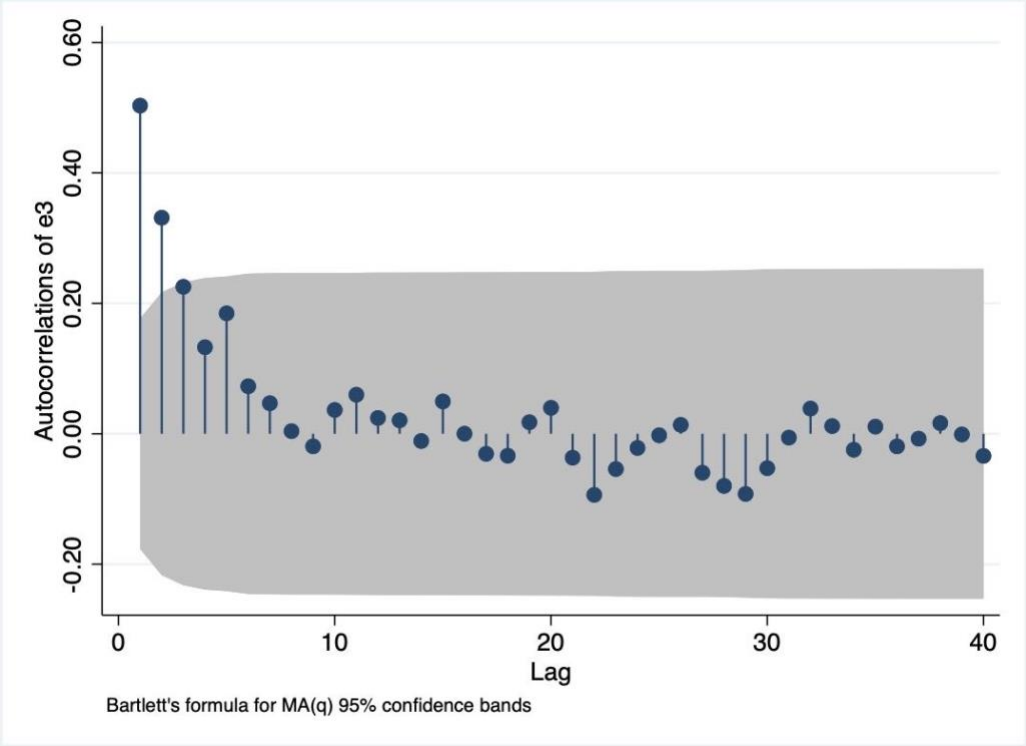
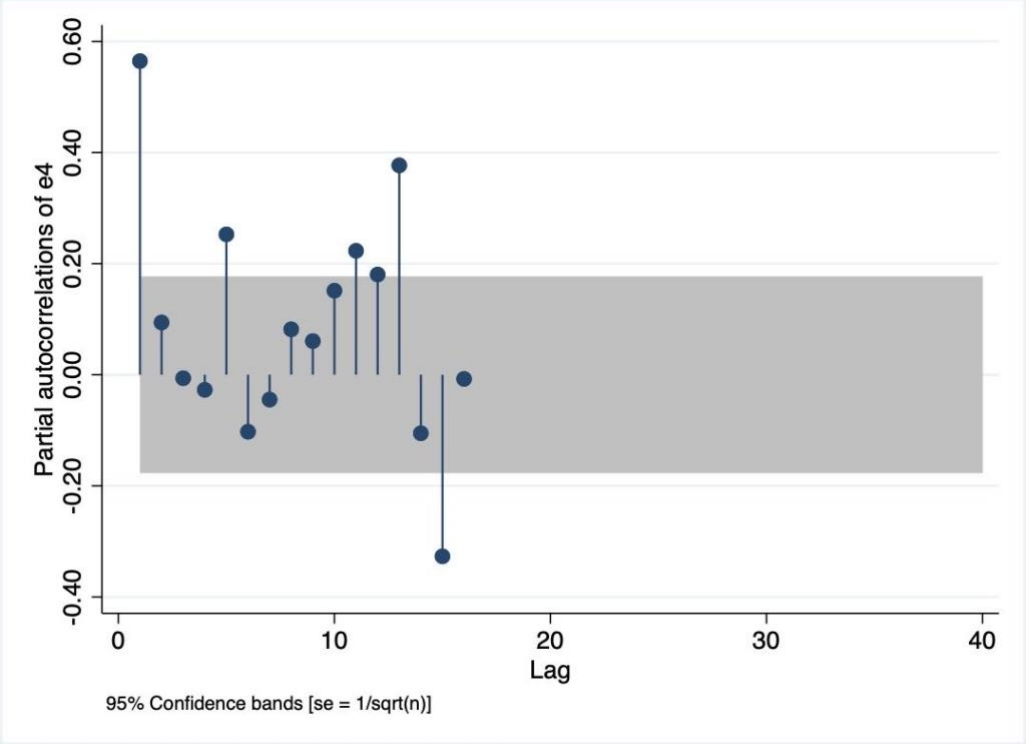
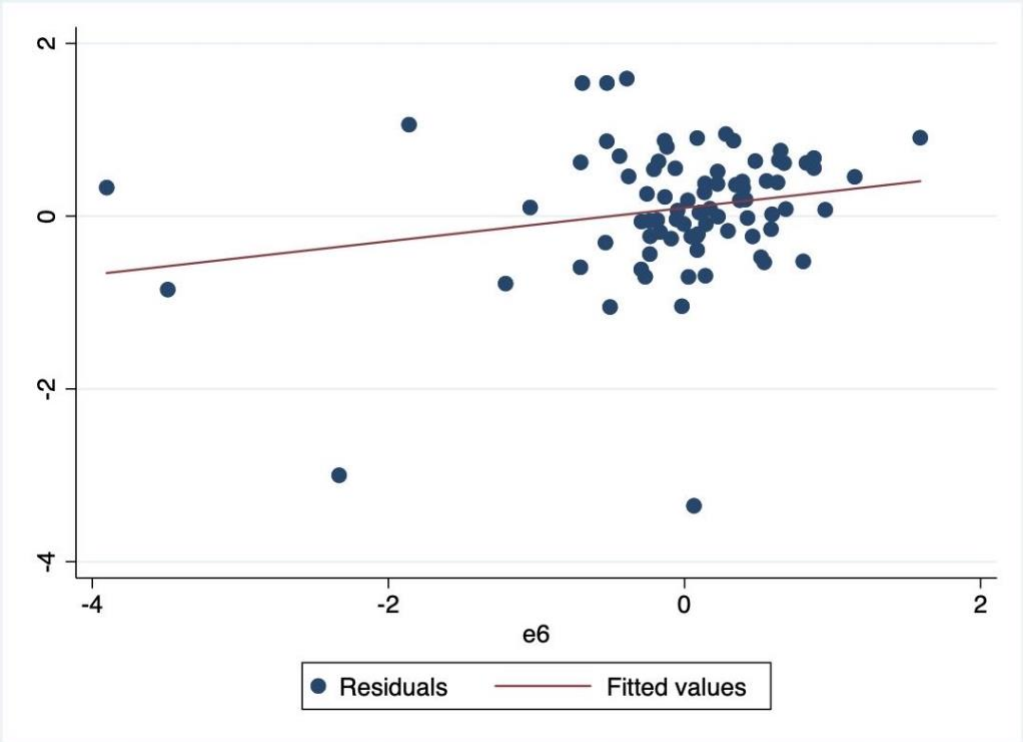


Figure 6. Partial autocorrelation plot of CCTV streaming highlight view count model



As with the previous research on the demand for the CCTV streaming media platform CSL channel full game replay view counts, we initially conducted OLS regression analysis on the data. Additionally, the Breusch–Pagan test and Breusch–Godfrey test for serial correlation were performed. The results of the Breusch–Pagan test were not statistically significant, χ^2 (16) = 22.30 (p = 0.134), indicating that the disturbance term is distributed with equal variance. However, the result of the Breusch–Godfrey test was statistically significant (p = 0.095), rejecting the null hypothesis of no serial correlation. This suggests the presence of an autocorrelation problem.

Figure 7. Scatter plot of residuals versus residual lags of CCTV streaming full game replay view count model



Furthermore, in addition to the tests for homoskedasticity and serial correlation,

we examined the VIF, and the results showed that no VIF values exceeded 10, indicating no multicollinearity in the dataset.

As previously mentioned, after conducting an analysis, the presence of autocorrelation was identified. Therefore, we need to address the issue of autocorrelation. To do so, we first calculate the residuals and their lags, and then create a scatterplot of the residuals against their lag (Figure 7).

The scatterplot suggests the presence of positive autocorrelation in the disturbance term. Additionally, we examined the autocorrelation plot (Figure 8) and the partial autocorrelation plot (Figure 9), which indicate that first-order autocorrelation is the main form of autocorrelation. To address this issue, we will consider using the FGLS method.

Figure 8. Autocorrelation plot of CCTV streaming full game replay view count model

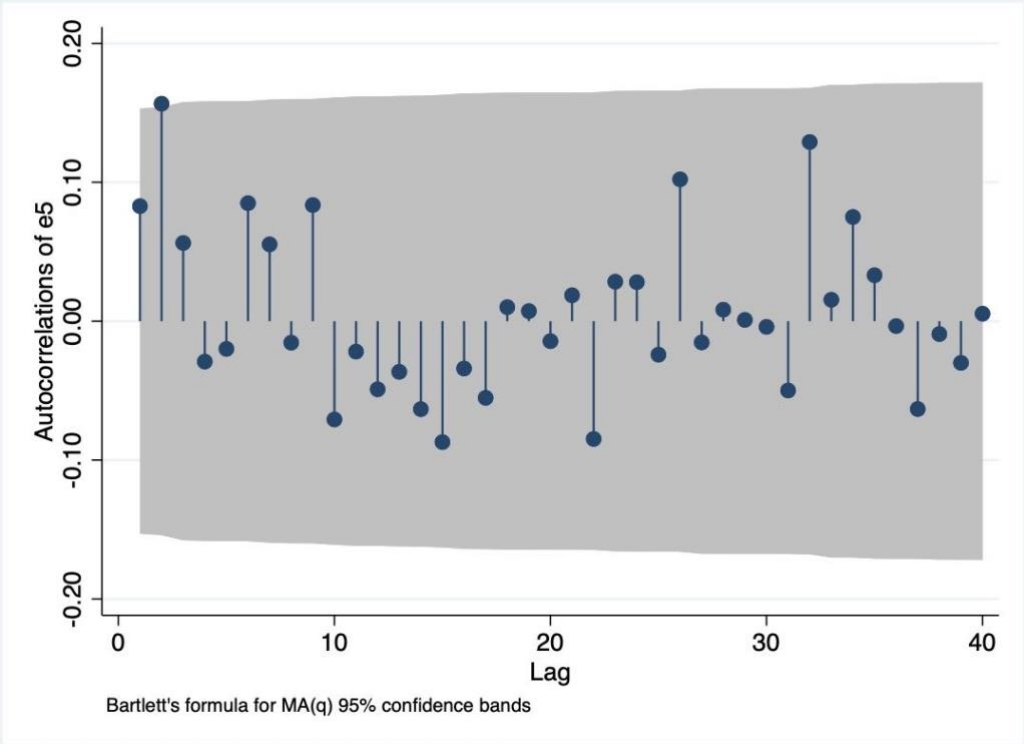
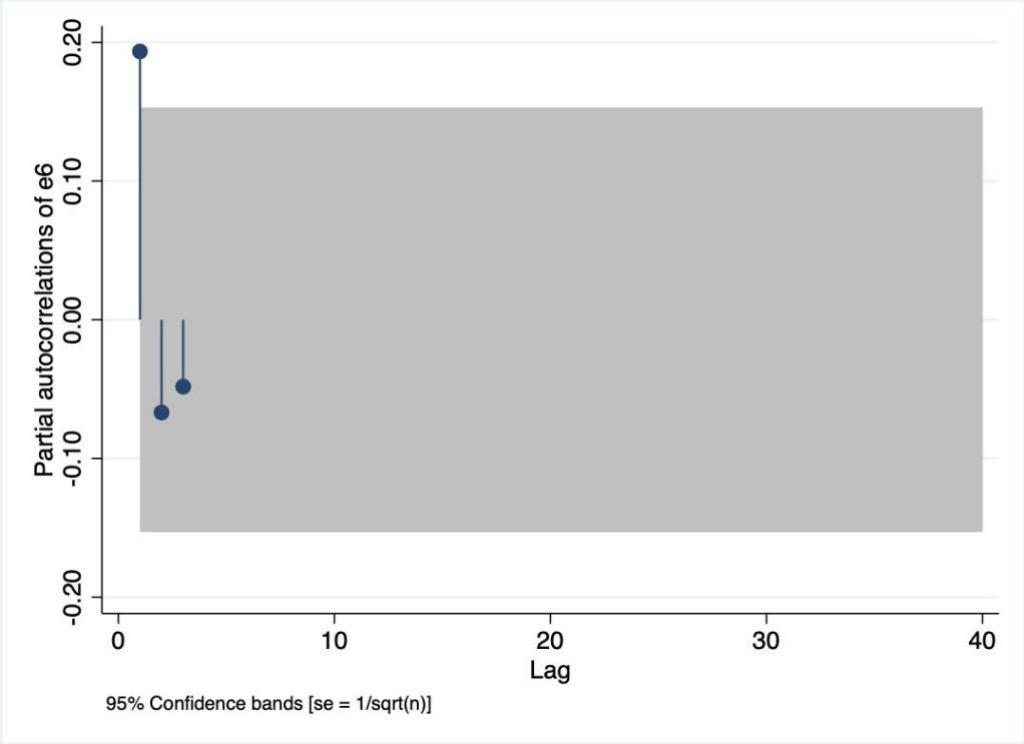


Figure 9. Partial autocorrelation plot of CCTV streaming full game replay view count model



5.2. Findings

5.2.1. Descriptive Statistics

Table 7 presents the descriptive statistics of the key variables. The view count of highlights of CSL games on the two platforms varies from 2,000 to 418,000 hits, indicating significant disparities in viewership. On the CCTV streaming media platform, the full game replay view count for the entire game ranged from 1,136 hits to 495,000 hits, demonstrating notable differences in viewership as well. It is worth noting that the highest viewership count for a single game is observed in the full game replay. Across the entire platform, there is a substantial gap between the minimum and maximum viewership count, highlighting the variability in overall view counts.

Table 7. Descriptive statistics of study 2

Variables	Mean (%)[a]	SD	Min	Max	N	Type
TENCENT [b]	25455	30371	2554	231000	300	Continuous
CCTVN [b]	64454	76583.58	981	418000	123	Continuous
CCTVNR [b]	105447	79098	1136	495000	164	Continuous
WEIBO [b]	468.122	315.115	4.1	1355.5	300	Continuous
DERBY	0.029	00.169	0	1	300	Dummy
THEIL	3.609	0.337	2.214	3.864	300	Continuous
SGOAL	2.859	1.672	0	8	300	Continuous
DGOAL	1.703	1.471	0	8	300	Dummy
SPOINT	46..235	32.401	0	137	300	Continuous
YCARD	3.248	2.014	0	10	300	Continuous
RCARD	0.157	0.445	0	3	300	Continuous
BETRO	0.310	0.463	0	1	300	Dummy
CHA	1.889	2.689	0	12	300	Continuous
AGE	37.333	11.193	12	58	300	Continuous
SSALARY	22.758	11.191	6.65	58.786	300	Continuous
STARP	2.444	2.361	0	10	300	Dummy
WEEKEND	0.444	0.498	0	1	300	Dummy
NIGHT	0.663	0.473	0	1	300	Dummy
VTIME	164.209	68.695	60	271	300	Continuous

Note: [a]percentage for dummy variables; [b]raw data before log transformation.

The number of followers on Weibo for teams participating in the Chinese Super League exhibits significant variation. The maximum value is 1,355.5, while the minimum value is only 4.1, indicating a substantial difference in the fan bases of the two teams. Moreover, there is a notable disparity in the number of CSL titles won in the past, with the top two teams having a combined total of 12 titles. The age of participating teams in a competition can vary significantly, and if it involves two experienced teams, their combined age can reach up to 58 years old. Additionally, the number of star players in a game can reach as high as 10 for certain teams, while other teams might not have any star players. Moving on to the competitive attributes, it is worth mentioning that a single game in the CSL can result in up to 10 yellow

cards being awarded. Furthermore, the maximum goal difference in a single game has reached as high as 8 goals.

5.2.2. Highlight View Analysis

To examine the demand for Tencent Sports CSL channel highlight view counts, a FGLS model was used to regress the view counts on a predetermined set of independent variables. Data from 300 matches were analyzed, as view counts for the highlights of the remaining games were not available on Tencent Sports' CSL channel. The FGLS method was employed to address the issue of first-order autocorrelation, and the PW estimation method improved the Durbin-Watson (DW) statistic to 1.98. The results of the FGLS regression for the Tencent Sports CSL channel highlight view counts demand can be found in Table 8.

To examine the demand for CCTV streaming media platform CSL channel highlight view counts, a predetermined set of independent variables was regressed using an FGLS model. Data from 123 matches' highlight view counts on the CCTV streaming media platform were analyzed. It should be noted that the highlights of the remaining games were not uploaded to the CCTV streaming media platform CSL channel, resulting in the unavailability of data on their view counts.

We used FGLS to address the issue of first-order autocorrelation, and the use of the PW estimator improved the DW statistic from 0.751 to 1.98. The results of the FGLS regression for the demand of Tencent Sports CSL channel highlight view counts are presented in Table 8.

Table 8. Results with FGLS Regression for the Highlight View Analysis

Variables	Tencent Sports Platform		CCTV streaming media Platform	
	Coefficient	SE.	Coefficient	SE.
WEIBO	0.048	0.078	0.032	0.233
DERBY	0.196	0.270	0.558	0.555
THEIL	-0.001	0.167	0.760*	0.438
SGOAL	0.066**	0.032	0.095	0.077
DGOAL	-0.097**	0.042	0.036	0.102
SPOINT	0.012***	0.003	-0.010	0.011
YCARD	-0.038	0.024	-0.122*	0.064
RCARD	0.248**	0.098	-0.380	0.312
BETRO	-0.023	0.101	0.910**	0.253
CHA	0.082***	0.019	-0.150**	0.054
AGE	-0.007	0.006	0.023	0.015
SSALARY	-0.001	0.007	-0.005	0.017
STARP	0.067*	0.039	0.064	0.092
WEEKEND	0.064	0.087	0.571	0.367
NIGHT	-0.073	0.095	-0.476*	0.251
VTIME	0.005**	0.002	-0.005	0.006
_cons	8.226***	0.696	8.392***	2.114
R2	0.548		0.676	
Adj R2	0.505		0.627	
N	300		123	

Note: *p < .10, **p < .05, ***p < .01 Tencent Sports Platform's dependent variable in the model was TENCENT. CCTV streaming media Platform's dependent variable in the three model was CCTV.

The results of the Tencent Sports CSL channel highlight view counts demand model in Table 9 indicate that seven variables (i.e., SGOAL, DGOAL, SPOINT, RCARD, CHA, STARP, and VTIME) controlled by the model had significant influences on Tencent Sports CSL channel highlight view counts. SGOAL (β = .066, p < .05), SPOINT (β = .012, p < .01), RCARD (β = .248, p < .05), CHA (β = .082, p < .01), STARP (β = .067, p < .10) and VTIME (β = .005, p < .05) had a positive impact on Tencent Sports CSL channel highlight view counts. These results suggest that on the Tencent Sports streaming media platform, viewers show a preference for highlight videos of CSL matches that involve teams with higher current points,

indicating a preference for competitive matchups. This implies that viewers are more interested in games where both teams have a strong performance in the current season.

Furthermore, the view counts for highlight videos tend to be higher for games with more goals scored and more red cards. This indicates that viewers are attracted to games that are intense, action-packed, and potentially more eventful in terms of gameplay.

Regarding team attributes, viewers demonstrate a preference for highlight videos of games played by teams with better historical performances and a larger number of star players. This suggests that the reputation and success of the teams, as well as the presence of popular and talented players, contribute to the appeal of the highlight videos.

Furthermore, the timing of the upload of the highlight video also appears to play a role in the view count on the Tencent Sports streaming media platform. Specifically, there is a positive correlation between the length of time a video has been uploaded and its view count. This suggests that as the video remains available for a longer duration, more viewers have the opportunity to watch it, leading to higher view counts.

Additionally, the variable DGOAL ($\beta = -.097$, $p < 0.05$) was found to have a negative impact on Tencent Sports CSL channel highlight view counts. This means that when there is a significant goal difference between the two teams, the number of video views tends to decrease. This suggests that games where one team wins by a

large margin may be perceived as less engaging by the audience, leading to lower view counts for the corresponding highlight videos. All other independent variables were not significant.

The results of the CCTV streaming media platform CSL channel highlight view counts demand model, as presented in Table 10, indicate that five variables (THEIL, YCARD, BETRO, CHA, and NIGHT) included in the model have significant influences on Tencent Sports CSL channel highlight view counts demand.

THEIL ($\beta = .760$, $p < 0.10$) and BETRO ($\beta = .910$, $p < 0.05$) were found to have a positive impact on CCTV streaming media platform CSL channel highlight view counts. These findings suggest that on the CCTV streaming media platform, game uncertainty positively correlates with view counts. Games with outcomes that deviate from the anticipated results tend to generate more fan interest in the highlight videos, thereby increasing the views of those videos.

On the other hand, YCARD ($\beta = -.122$, $p < 0.10$), CHA ($\beta = -.150$, $p < 0.05$), and NIGHT ($\beta = -.476$, $p < 0.10$) appear to have a negative impact on CCTV streaming media platform CSL channel highlight view counts. Excessive yellow cards during a match may adversely affect the view counts of the corresponding highlight videos. Additionally, the greater the age of the two participating teams, the more adverse the impact on the view counts. Furthermore, games scheduled to take place during the evening hours result in a reduction in views on the highlight videos. All other independent variables were not significant.

5.2.3. Full Game Replay View Analysis

To examine the demand for CCTV streaming media platform CSL channel full game replay view counts, a FGLS model was applied. The analysis included data collected for 64 matches' full game replay view counts on the CCTV streaming media platform CSL channel. It should be noted that the full game replays of the remaining games were not uploaded to the platform, resulting in a lack of available data on their view counts. The results of the FGLS regression analysis for the Tencent Sports CSL channel highlight view counts demand are presented in Table 9.

The results of the CCTV streaming media platform CSL channel full game replay view counts demand model, as presented in Table 11, indicate that nine variables (WEIBO, DERBY, THEIL, SPOINT, CHA, AGE, SSALARY, STARP, and VTIME) included in the model have significant influences on the demand for full game replay view counts on the platform.

These findings suggest that the audience demand for full game replays on the CCTV streaming media platform differs from the demand for highlight videos on Tencent Sports.

WEIBO ($\beta = .221$, $p < .10$), THEIL ($\beta = .641$, $p < .01$), SPOINT ($\beta = .011$, $p < .05$), CHA ($\beta = .087$, $p < .01$), STARP ($\beta = .218$, $p < .05$), and VTIME ($\beta = .009$, $p < .10$) had a positive impact on the CCTV streaming media platform CSL channel full game replay view counts. These results indicate that on the CCTV streaming media platform CSL channel, there is a large fan base, and the uncertainty of the game is positively associated with the number of views for full game replays.

Table 9. Results with FGLS Regression for the Full Game Replay View Analysis

Variables	CCTV streaming media Platform	
	Coefficient	SE.
WEIBO	0.221*	0.130
DERBY	-0.911***	0.492
THEIL	0.641***	0.312
SGOAL	-0.052	0.054
DGOAL	0.111	0.075
SPOINT	0.011**	0.006
YCARD	-0.036	0.041
RCARD	-0.128	0.165
BETRO	-0.187	0.177
CHA	0.087***	0.039
AGE	-0.030**	0.010
SSALARY	-0.028**	0.013
STARP	0.128**	0.068
WEEKEND	0.065	0.161
NIGHT	0.138	0.176
VTIME	0.009*	0.003
_cons	7.011	1.183
R^2	0.627	
Adj R^2	0.586	
N	164	

Note: *p < .10, **p < .05, ***p < .01 dependent variable in the three model was *CCTVR*.

Additionally, games featuring teams with higher current points tend to attract viewers to watch the full replay video. Moreover, the audience shows greater interest in games involving teams with a strong performance history and multiple star players, leading to an increase in the view count for full game replays. Furthermore, the timing of the upload of the full game replay video seems to influence the view count, as there is a positive correlation between the duration of video upload and the number of views it receives.

DERBY (β = -.911, p < .01), AGE (β = -.030, p < .05), and SSALARY (β = -.028, p < .05) appeared to have a negative impact on CCTV streaming media

platform CSL channel full game replay view counts. Specifically, city derby matches were found to have a negative correlation with view counts, indicating that they are less attractive to viewers. Additionally, the age and average salary of the two participating teams were negatively correlated with view count. Games played by teams with older seniority and higher average salaries did not generate significant interest in terms of full game replay view count. All other independent variables were not found to be significant.

5.3. Discussion

This study aimed to investigate the demand for CSL matches on streaming media platforms. Specifically, it focused on the demand for both highlight videos, analyzed through the Tencent Sports CSL channel highlight view counts model and the CCTV streaming media platform CSL channel highlight view counts model, as well as the demand for full game replay videos, analyzed through the CCTV streaming media platform CSL channel full game replay view counts model. Extensive surveys were conducted to understand the audience's preferences and needs regarding streaming media football games, with a particular focus on Tencent Sports Platform and CCTV streaming media platform. In the following sections, we will discuss the findings of each platform separately.

Tencent Sports platform and CCTV streaming media platform highlight video

This study aims to identify the factors influencing CSL highlight view counts. By analyzing the view count data for CSL channels on Tencent Sports and CCTV

streaming media platforms, we have observed distinct viewer preferences between these two platforms. Specifically, on the Tencent Sports platform, several variables were found to have a significant impact on the number of video views. These variables include the number of goals scored, total current points, number of red cards received, team age, presence of star players, and upload time of the video. However, there is a negative relationship between the difference in the number of goals and the highlight view count.

Based on the pre-determined categories of influential factor variables, it is evident that the factors affecting view counts on the Tencent Sports platform are primarily related to competition attributes. Firstly, an increase in the number of goals scored in a single game leads to a higher view count, indicating that viewers prefer games with more exciting and scoring opportunities. Conversely, a larger goal differential in a game result in a decrease in the view count. This suggests that viewers are less interested in games with a significant score difference and an early winner. Additionally, there is a positive correlation between the number of red cards awarded and the highlight view count. This implies that matches with higher intensity and more intense gameplay tend to attract more viewers for highlight videos. It is worth noting that highlight videos are typically watched after the game has ended, and viewers are more likely to choose videos that offer excitement and intensity.

Furthermore, the outstanding performance of one or both teams participating in the game also influences viewer preferences for highlight videos. Teams with a strong track record and the presence of star players tend to attract more viewers, indicating

that historical performance and individual player popularity contribute to the highlight view count.

Team attributes play a crucial role in determining viewer preferences for highlight videos. Teams with a strong historical record and a greater number of prominent players tend to attract a higher number of viewers to select the highlight video. There are plausible explanations for this phenomenon. Firstly, impressive past performances leave a lasting impact on the audience, making them more inclined to choose games involving teams with a successful track record when watching highlight videos. The reputation and brand image of traditionally strong teams can contribute to their popularity among viewers.

Moreover, the presence of star players is a significant factor that influences viewer choices. These star players can be both local Chinese athletes and international players. Since the CSL has a policy allowing a maximum of three foreign players per game, it is evident that local Chinese players are also highly appealing to the audience when it comes to watching highlight videos. The individual skills, performances, and popularity of star players contribute to the overall appeal of the game and can significantly influence viewer engagement.

On the CCTV streaming media platform, we observed some interesting findings that differ from the Tencent Sports platform. Notably, the variables that were statistically significant in our analysis tended to have a negative correlation with view counts. This indicates distinct viewer preferences and behaviors on the CCTV streaming media platform.

One significant finding relates to the Competition Attributes category. We found that the presence of result uncertainty was favored by viewers on the CCTV streaming media platform. This suggests that viewers on this platform show a preference for games with uncertain outcomes. In line with this, we also observed that matches with results that diverged from the predicted outcome generated greater fan interest. This implies that viewers on the CCTV streaming media platform are more engaged and interested in games that have unexpected and surprising results.

These findings highlight the unique characteristics and preferences of viewers on the CCTV streaming media platform. While viewers on Tencent Sports platform may prioritize high-scoring games and dominant performances, viewers on the CCTV platform show a preference for games that offer uncertainty and unpredictability. Understanding these platform-specific preferences can help content providers and broadcasters tailor their offerings and enhance the viewer experience on each platform.

On the Tencent Sports platform, we observed a positive correlation between the number of red cards received and the view count, indicating that viewers on this platform find games with more red cards to be more engaging. However, on the CCTV streaming media platform, we found a negative correlation between the number of yellow cards received and the view count. This discrepancy can be attributed to the context of football matches and viewer perceptions.

In football matches, tactical fouls are often committed by teams to disrupt the flow of the game and impede the opposing team's progress. These fouls can result in

yellow cards being awarded. The frequent occurrence of such fouls and yellow cards can interrupt the natural rhythm of the game, leading to a decrease in viewer interest. Chinese football audiences may also associate yellow cards with poor player conduct, which could further reduce their interest in matches featuring multiple yellow cards.

Furthermore, on the CCTV streaming media platform, we found that matches between teams with the highest number of historical championships showed a negative correlation with view counts for highlight videos. This suggests that viewers on this platform may have a preference for underdog stories or matches with more competitive balance, rather than games involving historically dominant teams.

Additionally, matches played in the evening displayed a negative correlation with the view count for highlight videos on the CCTV platform. One possible explanation for this observation is that viewers who watch games in the evening may prefer to watch the live broadcast of the match instead of highlight videos. This could lead to a decreased interest in highlight videos for games played during evening hours.

These platform-specific findings highlight the importance of understanding the unique preferences and perceptions of viewers on different streaming media platforms. By considering these factors, content providers and broadcasters can better cater to the preferences of their target audiences and enhance the viewer experience.

CCTV streaming media platform highlight video and full game replay video

In this section, we will explore the demand for full game replays on the CCTV streaming media platform and compare it with the demand for highlight videos. The

findings indicate that there is a high demand for full game replay viewing among a large fan base. The audience tends to select games featuring teams with higher current rankings and strong historical performances. Teams with higher current points, which are indicative of higher rankings, as well as teams with more star players, attract more viewers to the full game replay videos. Moreover, a longer duration of video uploading is positively correlated with the demand for full game replay viewing.

On the other hand, derby matches, the age of participating teams, and average wages have a negative impact on the demand for full game replay viewing. Derby matches, despite their significance and rivalry, do not seem to attract as many viewers to watch the full game replay. Additionally, games played by older teams or teams with higher average wages do not show particular appeal in terms of full game replay view count.

Analyzing the demand for full game replay view counts reveals some similarities to the demand for highlight videos. Both types of content benefit from games with uncertain outcomes, as viewers on the CCTV streaming media platform show a preference for such games. However, there are also significant differences between the two. The number of Weibo followers has a positive effect on the demand for full game replays, indicating that committed supporters prefer to watch the complete game and show support for the team. In contrast, the number of followers on the official social media account does not have a significant impact on the demand for highlight video viewership.

Furthermore, in terms of competition attributes, variables such as historical

performance and the presence of star players have an impact on the demand for full game replays. Games involving teams with a better historical performance and more star players are more attractive to viewers. Interestingly, the impact of historical performance on full game replay demand shows the opposite trend compared to the demand for highlight videos on the same platform. This suggests that viewers who choose to watch the full game replay believe that a good historical performance guarantees an exciting match. However, team age and average salary have a negative effect on the demand for full game replays. Younger teams with impressive performances in recent years tend to attract more viewers, while older teams or teams with higher average salaries may not capture as much attention in terms of full game replay view count.

Lastly, the timing of video uploads also plays a role in the number of views. The longer the time since video upload, the more opportunities for the audience to choose to watch the video, leading to an increase in views.

Overall, these findings provide insights into the factors influencing the demand for full game replays on the CCTV streaming media platform and highlight the differences compared to the demand for highlight videos. Understanding these preferences can help content providers and broadcasters tailor their offerings to better meet the expectations of their audience and enhance the viewer experience.

CHAPTER6. GENERAL DISCUSSION

TV viewing demand and online streaming viewing demand cater to different preferences and offer unique benefits to sports fans. While TV provides a traditional and communal viewing experience, online streaming platforms offer greater flexibility, personalization, and access to diverse content, catering to the evolving needs and preferences of modern audiences. This research separate examination of TV viewing demand and streaming media demand.

6.1. Summary of Key Findings

The study1 focuses on TV viewing demand for sports events, aiming to understand the factors that influence viewers' preferences and behaviors when it comes to watching sports on traditional television platforms. It investigates the determinants that drive audiences to tune in to televised sports events, providing insights into the characteristics of viewers who prefer the TV viewing experience. In addition, the research also delves into the match selections by broadcasters for live telecasts.

The findings showed that both broadcasters and TV audiences display a preference for matches between teams with larger fan bases, higher rankings, and higher salaries. These results align with previous studies investigating audience demand for televised football matches, confirming the significance of these factors in

influencing viewers' choices (Mongeon & Winfree, 2012; Tainsky, 2010; Wills et al., 2022).

Specifically, both broadcasters and TV audiences showed a preference for matches featuring teams with larger fan bases, higher rankings, star players, and higher salaries. Night games were found to attract higher TV ratings, consistent with prime time matches tending to have higher viewership. The association between weekday and weekend games and TV audiences yielded inconsistent findings across studies, and the present study found no significant difference in TV ratings between weekend and weekday matches in the CSL.

Broadcasters did not show a preference for night and weekend games in their match selection, possibly due to the dominance of other popular sports events during prime-time and weekends. The influence of outcome uncertainty on TV ratings was not significant, contradicting previous research. The status of derby matches did not impact broadcasters' match selection or TV ratings, attributed to differences in fan base and team performance levels. Factors such as historical participation frequency in the Asian Football Confederation Champions League and the age of the team negatively affected television viewership.

The intra-match CI, which measures score fluctuations during a game, significantly impacts TV ratings. Fluctuations in the game score, especially when the lead alternates between teams, engage the TV audience, and indicate a sense of outcome uncertainty.

The second part of Study 1 focused on analyzing the demand for live CSL

matches among TV viewers in different city tiers. The analysis utilized OLS models with wild bootstrap standard errors. The findings indicated that viewers in all three city tiers had a preference for matches featuring more star players and broadcasted on weekends and during nighttime. On the other hand, matches involving older teams had a negative impact on television ratings.

A significant finding was the differential demand for TV viewing observed across the three city tiers. In 1-tier and 2-tier cities, the number of Weibo followers a team had positively influenced TV ratings, suggesting a dedicated and loyal fan base in these areas. However, in 3-tier cities, the number of Weibo followers had no impact, indicating a weaker identification with a specific team and more sporadic viewership.

Furthermore, audiences in 2-tier cities showed a preference for matches with a substantial difference in the absolute salary between the participating teams, indicating a preference for more one-sided or unbalanced encounters.

The study 1 also revealed that viewers in 3-tier cities had a unique preference for games with a higher degree of uncertainty in their outcomes, which was not observed in 1-tier and 2-tier cities. This preference aligns with the competitive and thrilling nature of the matches, indicating that audiences in 3-tier cities prioritize the intrinsic qualities and excitement of the games.

The study 2 focuses on analyzing the demand for CSL matches on streaming media platforms, particularly for highlight videos and full game replays. The research collected data from the Tencent Sports CSL channel and the CCTV streaming media

CSL channel to examine viewer preferences and behaviors on each platform.

On the Tencent Sports platform, several variables were found to have a significant impact on highlight video view counts. These variables included the number of goals scored, total current points, number of red cards received, team age, presence of star players, and upload time of the video. An increase in the number of goals scored in a game led to a higher view count, indicating viewer preference for games with more excitement and scoring opportunities.

Conversely, a larger goal differential in a game resulted in a decrease in view count, suggesting less interest in games with significant score differences. The number of red cards awarded showed a positive correlation with the highlight view count, indicating that matches with higher intensity and more intense gameplay tended to attract more viewers for highlight videos. Furthermore, teams with a strong track record and the presence of star players tended to attract more viewers for highlight videos, demonstrating the influence of historical performance and player popularity.

On the CCTV streaming media platform, distinct viewer preferences were observed. Viewers on this platform favored games with result uncertainty, showing a preference for games with unpredictable outcomes. Matches with results that diverged from the predicted outcome generated greater fan interest. These findings highlighted the unique characteristics and preferences of viewers on the CCTV platform, where uncertainty and unpredictability were valued.

The number of red cards received positively impacted the view count on Tencent

Sports but, interestingly, the number of yellow cards received showed a negative correlation with the view count on CCTV. This difference could be attributed to viewer perceptions and associations with yellow cards and poor player conduct. Matches between teams with the highest number of historical championships also showed a negative correlation with view counts for highlight videos on CCTV, indicating a preference for underdog stories or matches with more competitive balance. Additionally, highlight videos uploaded in the evening had a negative correlation with view count on CCTV, potentially due to viewers preferring live broadcasts during that time.

Regarding full game replays on the CCTV streaming media platform, there was a high demand among fans. Viewers tended to select games featuring teams with higher current rankings and strong historical performances. Teams with higher current points and more star players attracted more viewers to full game replays. Derby matches, older teams, and teams with higher average wages had a negative impact on the demand for full game replay viewing.

The demand for full game replays shared similarities with highlight videos in terms of favoring games with uncertain outcomes. The number of Weibo followers had a positive effect on the demand for full game replays, indicating that committed supporters preferred to watch complete games and show support for their team. Historical performance and the presence of star players also influenced the demand for full game replays, with viewers finding games involving teams with better historical performance and more star players more attractive. The timing of video

uploads also played a role, with longer durations since upload leading to increased views.

6.2. Implications

Understanding the factors that influence TV viewing demand and online streaming media viewing demand can provide valuable insights for marketers and league managers. By identifying the determinants of audience preferences, marketers can tailor their promotional strategies to attract more viewers and increase viewership ratings. This knowledge can help in developing targeted marketing campaigns, scheduling matches at optimal times, and leveraging popular players or teams to attract larger audiences.

This research fills the insufficiency of the academic research on the Asian Football Professional League. Although the professional football leagues with better development are mainly concentrated in Europe and North America, it cannot be ignored that there are traditional football powers such as Japan, South Korea, and Iran in Asia, which have also achieved outstanding achievement in the World Cup. And in recent years, the Asian Football Professional League has gradually developed and matured. This study can provide a basis for the academic community to better understand the Asian Football Professional League.

This study not only analyzes the national TV viewing demand in China, but also further analyzes the demand for watching sports professional leagues at different city levels. This is also an important contribution to the existing literature, because due to

economic development and other reasons, there will also be different needs within a country. This research can provide marketers and league managers with reference evidence that has important Inspirational meaning.

TV ratings play a crucial role in the revenue generation of sports events. Higher viewership ratings attract more advertisers, leading to increased advertising revenues. By studying the factors that impact TV ratings, sports organizations can make informed decisions about sponsorship deals and advertising strategies. Understanding the preferences and viewing habits of sports fans is crucial for fostering fan engagement. By delivering matches at preferred times and on preferred platforms, sports organizations can enhance the overall fan experience. This, in turn, can lead to increased fan loyalty, higher attendance at matches, and greater overall interest in the league, benefiting the sport's popularity and long-term sustainability.

Broadcasters and rights-holding organizations often engage in negotiations for broadcasting rights. Knowledge about the factors influencing TV ratings and streaming media demand can provide leverage in these negotiations. For example, if certain teams, players, or match characteristics consistently drive higher ratings, broadcasters can prioritize securing the rights to broadcast those matches, potentially leading to more lucrative broadcasting deals.

The rise of streaming media platforms has transformed the sports media landscape. Researching the demand for online streaming media viewing can provide insights into consumer behavior and preferences in the digital space. This study can help sports organizations and media platforms optimize their streaming services,

improve user experiences, and explore innovative ways to engage with fans through digital channels.

In the existing sports demand research, there are very few researches on the influencing factors of sports events online viewing demand. This research can fill this gap. The development trend of new media is unstoppable, and a better understanding of the demand of online viewing can provide important reference opinions for league managers, sports marketers, and network platform operators.

The findings of research on TV viewing demand and online streaming media viewing demand can inform policy decisions and governance of sports events. Regulatory bodies and sports organizations can utilize this knowledge to establish guidelines, regulations, and standards that promote fair competition, maximize audience reach, and ensure optimal broadcasting experiences for viewers.

In summary, studying TV viewing demand and online streaming media viewing demand for sports events has practical significance in various areas, including marketing, revenue generation, broadcasting rights negotiations, fan engagement, digital media strategies, and policy making. The insights gained from this research can inform decision-making processes, enhance the overall viewing experience, and contribute to the growth and success of sports leagues and events.

6.3. Limitations and Future Research

While researching TV viewing demand and online streaming media viewing demand for sports events provides valuable insights, it is essential to acknowledge the

limitations of such studies and consider potential areas for future research.

Many studies in this area focus on specific leagues or events. This study also focuses on the CSL, which may limit the generalizability of findings to other contexts. Future research could aim for more diverse samples that encompass a wider range of sports, leagues, and regions to enhance the representativeness of findings.

The demand for TV viewing and online streaming media can be influenced by various contextual factors, such as cultural differences, media market characteristics, and technological advancements. Future studies could explore how these factors interact with audience preferences and behaviors to provide a more comprehensive understanding of the dynamics of TV and streaming media demand.

This study adopted a cross-sectional approach, capturing a snapshot of audience preferences at a specific time. Especially the research on streaming media demand, focusing on CSL's one season. Conducting longitudinal analyses can help identify trends and changes in TV viewing demand and online streaming media viewing demand over time. This longitudinal perspective can provide valuable insights into the evolving nature of audience behavior and preferences.

With the proliferation of digital platforms, audiences now have various options to consume sports content, including traditional TV broadcasts, online streaming, social media, and mobile apps. Future research could investigate how audiences engage with multiple platforms simultaneously or sequentially and explore the synergistic effects of different platforms on overall viewership and engagement.

The emergence of interactive features in streaming platforms has transformed the

viewer experience. Future research could explore the impact of interactive elements, such as live chat, real-time statistics, and personalized recommendations, on audience engagement, satisfaction, and loyalty. Understanding how these interactive features influence TV and streaming media demand can guide the development of enhanced viewer experiences.

Factors Beyond Match Characteristics: While previous research has focused on match characteristics, future studies could examine additional factors that may influence TV and streaming media demand, such as commentary quality, production value, pre-game and post-game analysis, and the role of influencers and social media engagement. These factors can provide deeper insights into the drivers of audience preferences and the overall viewing experience.

Comparative studies across different countries and regions can offer insights into the cultural, economic, and institutional factors that shape TV viewing demand and online streaming media viewing demand. By examining variations in audience behavior and preferences across contexts, researchers can gain a more nuanced understanding of the factors influencing sports media consumption.

In conclusion, considering the limitations of existing research, future studies on TV viewing demand and online streaming media viewing demand can focus on improving sample representativeness, examining contextual factors, adopting longitudinal analyses, exploring multi-platform consumption, studying viewer engagement and interactivity, considering factors beyond match characteristics, conducting international comparisons, and employing advanced methodologies. By

addressing these areas, researchers can advance our understanding of audience behavior and preferences in the rapidly evolving sports media landscape.

6.4. Conclusion

This research provides valuable insights into the distinct preferences and benefits associated with TV viewing demand and online streaming media viewing demand in the current sports market. With the proliferation of digital platforms and the increasing accessibility of sports content, the way audiences consume sports has undergone significant changes. Traditional TV viewing still offers a communal experience, where fans gather together to watch games and engage in shared excitement. On the other hand, online streaming platforms have gained popularity due to their flexibility and personalization features. Fans now have the freedom to choose when and where they watch sports, with the ability to access a wide range of content beyond live broadcasts, such as highlight videos and full game replays.

The research findings showed the factors that significantly influence TV ratings, shedding light on the preferences of sports viewers. Team popularity, rankings, star players, salaries, and the scheduling of night games play vital roles in attracting audiences to television broadcasts. These factors reflect the viewers' desire to watch highly competitive and star-studded matchups, as well as their interest in supporting successful and popular teams. The study also uncovers differential demand across different city tiers, indicating that viewer preferences can vary depending on the economic development and fan culture of specific regions. Preferences for star

players, game uncertainty, and one-sided encounters differ among cities, suggesting that localized marketing strategies and targeted broadcasts can enhance viewership in specific regions.

In the realm of streaming media platforms, the study reveals the significant impact of various factors on highlight video view counts. Goals scored, red cards, team age, historical performance, and player popularity all contribute to the attractiveness of highlight videos. Fans gravitate towards games with high-scoring excitement, intense gameplay resulting in red cards, and the involvement of star players. Furthermore, viewer preferences on the CCTV platform show a particular inclination towards uncertain outcomes and matches that deviate from predictions. This preference for unpredictability indicates that fans appreciate the thrilling and surprising nature of sports contests.

Marketers can tailor their strategies to leverage the identified preferences, focusing on team popularity, star players, and game uncertainty to attract larger audiences. League managers can use this knowledge to optimize scheduling and promote matchups that resonate with viewers. Policy makers can establish guidelines and regulations that ensure fair competition and enhance broadcasting experiences. Additionally, broadcasters can negotiate rights to broadcast high-demand matches, leading to more lucrative deals and increased revenue generation.

Looking ahead, future research should address the evolving dynamics of the sports media landscape. Improving sample diversity and conducting comparative studies across different countries and regions will provide a more comprehensive

understanding of audience behavior and preferences. Longitudinal analyses can capture trends and changes over time, while exploring multi-platform consumption will shed light on how audiences engage with multiple channels simultaneously. The impact of interactive features, such as live chat and personalized recommendations, can be investigated to enhance viewer engagement and satisfaction. Considering factors beyond match characteristics, such as commentary quality and social media engagement, can deepen insights into the drivers of audience preferences. International comparisons can provide valuable insights into the cultural and economic factors that shape TV and streaming media demand.

In conclusion, understanding audience behavior and preferences within the rapidly evolving sports media landscape is paramount in today's social reality. This research provides crucial insights into TV viewing demand and online streaming media viewing demand, allowing marketers, league managers, policy-makers, and broadcasters to make informed decisions, optimize strategies, and deliver enhanced experiences to sports fans. By continuously studying and adapting to the changing preferences of audiences, sports leagues and events can achieve sustained growth and success in the dynamic sports market.

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