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**Relationship Between Success and Competition: The Analysis of
Selected European Football Leagues**

Rekabet ve Başarı İlişkisi: Seçilmiş Avrupa Futbol Liglerinin Analizi

Serkan DİLEK

Doç.Dr., Kastamonu Üniversitesi İİBF İktisat
Associate Prof.Dr., Kastamonu University Economics
serkan.dilek@gmail.com
0000-0002-0393-4509

Hayrettin KESGİNGÖZ

Doç. Dr., Karabük Üniversitesi İİBF İktisat
Associate Prof.Dr., Karabuk University Economics
hayrettinkesgingoz@karabuk.edu.tr
0000-0002-5143-4891

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Öz

Yapı-Davranış-Performans Analizi, piyasa yapısının firma davranışını ve piyasa performansını etkilediğini savunmaktadır. Diğer bir ifadeyle rekabetçi piyasa yapısı, firma ve piyasa performansını da olumlu etkilemektedir. Piyasa yapısının bir unsuru olan yoğunlaşma oranları da piyasa performansını etkilemektedir. Futbol takımları arasındaki rekabet ile firmaların piyasalardaki rekabeti arasında farklılıkların yanı sıra benzerlikler de bulunmaktadır. Bu benzerlikler ise futbol takımlarının uluslararası karşılaşmalardaki başarısını etkileyebileceğini düşündürmektedir. Bu çalışmanın amacı Avrupa ulusal lig yapısının futbol takımlarının Şampiyonlar Ligi ve Avrupa Ligi performansını etkileyip etkilemediğini araştırmaktır. Bu amaçla seçilmiş Avrupa ulusal liglerindeki yoğunlaşma oranları Herfindahl- Hirschman indeksi ile hesaplanmıştır. Firmaların rekabeti ile futbol takımlarının rekabeti arasındaki farklılıklar dikkate alınarak yoğunlaşma oranları yorumlanmıştır. 2000-2001 sezonundan itibaren Şampiyonlar Ligi ve Avrupa Liginde şampiyonluklar kazanan, başarılı olan futbol takımlarının rekabet ettiği ulusal ligler (İspanya, İngiltere, Almanya, İtalya, Fransa, Hollanda, Portekiz, Belçika, Rusya, Türkiye) ligleri ele alınmıştır. İngiltere haricindeki liglerin ortalama yoğunlaşma oranlarının düşük olduğu ancak son yıllarda artış gösterdiği sonucu ortaya çıkmıştır. Ayrıca yoğunlaşma oranları azaldıkça takımların uluslararası alanda başarılarının arttığı hipotezi doğrulanamamıştır.

Özet

İktisatçılar arasında rekabetin piyasalarda olumlu sonuçlara neden olduğu inancı yaygındır. Harvard Okulu tarafından geliştirilen Yapı-Davranış-Performans Analizi piyasa yapısının firma davranışlarını; firma davranışlarının ise piyasa performansını etkilediğini ileri sürmektedir. Rekabetçi piyasa yapısı firmaların davranışlarını etkilemekte ve piyasa performansını artırmaktadır. Piyasa yapısının önemli unsurlarından biri firmaların sayısı ve yoğunlaşma oranlarıdır. Yoğunlaşma oranlarının artması piyasanın tekel piyasasına benzediğini göstermektedir. Piyasada yoğunlaşma oranları yükseldikçe firmaların aralarında anlaşma yapmaları kolay ve düşük maliyetli olmaktadır. Firmaların daha az rekabetçi davranışları ise firma kârlarını artırmaktadır. Bu nedenle yoğunlaşma oranları sanayi ekonomisinde önemli yere sahiptir. Yoğunlaşma oranları ölçülürken çeşitli endekslerden faydalanılmaktadır. Bu endekslerin en önemlilerinden biri de Herfindahl-Hirschman endeksidir. Politika yapıcılar, piyasalardaki yoğunlaşma oranlarına bakarak piyasa performansını artırmak amacıyla çeşitli düzenlemeler yapmaktadırlar.



Dünya’da futbola olan ilgi giderek artmaktadır. Futbol takımları arasında geçen rekabete olan ilgi de artmaktadır. Futbol takımları aynı anda kendi ulusal liglerinde ve uluslararası turnuvalarda karşılaşmaktadırlar. Yapı-Davranış-Performans Analizine göre yoğunlaşma oranlarının firma karlılıklarını etkilediği görüşünün futbol rekabeti için de geçerli olma ihtimali vardır. Yani ulusal futbol ligi yapısı futbol takımlarının davranışlarını etkileyebilir ve bu da futbol takımlarının uluslararası turnuvalardaki başarısını etkileyebilir.

Çalışmanın amacı ulusal futbol ligindeki yoğunlaşmanın takımların uluslararası turnuvalardaki başarısına etkisini araştırmaktır. Bu amaçla milli futbol liglerindeki yoğunlaşma Herfindahl-Hirschman endeksi ile hesaplanmıştır. Ulusal futbol ligleri seçilirken Şampiyonlar Ligi ve Avrupa Liginde en başarılı olan takımların ulusal ligleri (İspanya, İngiltere, İtalya, Almanya, Fransa, Türkiye, Hollanda, Belçika, Portekiz, Rusya) seçilmiştir.

Yoğunlaşma ölçümü esnasında piyasa payları yerine milli liglerde toplanan puanlar ele alınmıştır. 2000-2001 sezonu ile 2018-2019 sezonu arasındaki dönemler çalışılmıştır. Bu nedenle de Herfindahl-Hirschman endeksi sonuçlarının yorumlamaları piyasa yoğunlaşması ölçümündeki yorumlardan farklıdır. Yoğunlaşma sonuçları ulusal ligdeki takım sayılarına göre farklı sınıflandırılmıştır.

İspanya, İngiltere, İtalya, Almanya ve Fransa ulusal liglerinde 20 takım oynamaktadır. Bu liglerden gelen takımlar aynı zamanda Şampiyonlar Ligi ve Avrupa Ligi maçlarında en başarılı olan takımlardır. Almanya liginde bu dönemler arasında orta dereceli yoğunlaşma tespit edilmiştir. Diğer dört ligde (İspanya, İngiltere, İtalya ve Fransa) ise düşük yoğunlaşma ortalaması bulunmuştur. 20 takımlı liglerde yapılan analizde “Ulusal liglerdeki yoğunlaşma azaldıkça takımların uluslararası başarısı artar” hipotezi doğrulanmamıştır. Yoğunlaşma seviyesi en düşük ortalamaya sahip olan Fransız ligi, uluslararası turnuvalarda diğer dört ligden daha az başarılıdır. Bununla beraber yoğunlaşma seviyesi en düşük ikinci sıradaki İspanya ise uluslararası alanda en başarılı ligdir. Yoğunlaşma oranı diğer ülkelere göre daha yüksek olan Almanya ise iki kez Şampiyonlar Ligi kazanarak Fransa’dan daha başarılı olmuştur. Şampiyonlar Liginin kazanan Alman takımı Bayern Münih’tir ve bu takım aynı zamanda Almanya Ligi (Bundesliga) yoğunlaşma oranlarının yükselmesine neden olmuştur. 2013-2014, 2014-2015, 2015-2016 ve 2016-2017 sezonlarında İspanya liginde yoğunlaşma oranları 248.88 kritik eşikten fazladır ve bu sezonlarda İspanyol takımları 4 Şampiyonlar Ligi kupası kazanmışlardır. Bir diğer sonuç ise son yıllarda milli liglerde yoğunlaşma oranlarının yükseliş kaydetmesidir.

18 takımlı Hollanda ve Türkiye ligleri de çalışılmıştır. Her iki ülke liglerinde yoğunlaşma ortalaması düşüktür. Ancak Hollanda liginin yoğunlaşma



oranı, Türkiye’den yüksektir. Buna karşılık Hollanda ligi takımları uluslararası turnuvalardan daha başarılıdır. Bu da “ulusal liglerde yoğunlaşma azaldıkça takımların uluslararası başarısı artar” hipotezinin doğrulanamamasına neden olmaktadır. Hollanda liginde de yoğunlaşma oranlarının son yıllarda yükseldiği gözlenmiştir. Bunun nedeni olarak Ajax ve PSV Eindhoven takımlarının yüksek performansı görülmektedir. Ajax ve PSV Eindhoven takımları Hollanda Liginde başarılı olmalarına karşın 2000-2001 sezonu ile 2018-2019 sezonu arasındaki dönemde Şampiyonlar Ligi ve Avrupa Ligi kupalarını kazanamamışlardır.

Belçika ve Portekiz Ligleri bu dönemde bazen 16 takımla bazen de 18 takımla oynanmıştır. Portekiz liginde yoğunlaşma daha yüksek olmasına rağmen Porto’nun 2 UEFA ve 1 Şampiyonlar Ligi kupası kazandığı görülmektedir. Ayrıca Portekiz Liginde son senelerde yoğunlaşmanın yükseldiği gözlenmektedir. Yoğunlaşma oranının yükselmesinin nedeni olarak SL Benfica ve Porto takımlarının başarısı göze çarpmaktadır. Belçika liginde yoğunlaşmanın düşük olduğu görülmektedir ancak bunda oynanan Play-off sisteminin rolü bilinmemektedir. Ancak Belçika liginde yoğunlaşmanın düşük olmasına rağmen Şampiyonlar Ligi ve Avrupa liginde Belçika takımlarının çok başarılı olmadıkları görülmektedir. 16 takımla oynanan Rusya liginde de yoğunlaşmanın düşük olduğu görülmektedir. Rus takımları bu dönemde 2 Avrupa Ligi şampiyonluğu kazanmışlardır.

Kısaca yoğunlaşmanın az olduğu milli liglerde oynayan takımların uluslararası turnuvalarda daha başarılı olduğu hipotezi kabul edilememiştir. Örneğin; oldukça düşük yoğunlaşmanın olduğu Fransa liginde hiçbir takım 2000-2001 sezonundan 2018-2019 sezonuna kadarki süreçte Şampiyonlar Ligi veya Avrupa Ligi şampiyonluğu yaşamamıştır. Yoğunlaşma oranının diğer 20 takımlı liglere göre daha yüksek olduğu Almanya ise bu dönemde Bayern Münih ile 2 Şampiyonlar Ligi şampiyonluğu kazanmıştır. Almanya Ligindeki yoğunlaşmanın da nedeni Bayern Münih’in Almanya Ligindeki başarısıdır. Yani ulusal liglerde yoğunlaşmanın yüksek olmasının nedeni olan takımlar uluslararası turnuvalarda da başarılı olabilmektedir.

Bununla beraber liglerden çoğunda 2013-2014 sezonundan sonra yoğunlaşmanın yükseldiği görülmüştür. İspanya, İngiltere, Almanya ve Portekiz liglerinde bu eğilim oldukça belirgindir. Yoğunlaşmanın artması yöneticilerin üzerinde dikkatle düşünmesi gereken bir konudur. Çünkü yoğunlaşma arttığında ligde çekişme ve heyecan azalmaktadır. Bu da stadyum ve yayın gelirlerini etkileyebileceği düşünülmektedir.

Anahtar Kelimeler: Yoğunlaşma Oranları, Rekabet, Futbol Ekonomisi, Herfindahl-Hirschman Endeksi, Yapı-Davranış-Performans Analizi.



Relationship Between Success and Competition: The Analysis of Selected European Football Leagues

Abstract

Structure-Conduct-Performance Analysis states that market structure has an impact on firm behaviour and market performance. In other words competitive market structure affects firms' and market performance in positive manner. Concentration ratios which are element of market structure, also affects market performance. There is both difference as well as similarities between competition of football teams and of firms. It is thought that these similarities affect the success of football teams in international arena. The aim of this research is to discuss whether European national league structure affects the performance of teams in Champions League and European League. To this aim, concentration ratios in European national leagues are calculated by using Herfindahl-Hirschman index. These results are interpreted by considering the differences between competition of football teams and of firms. National leagues (Spain, England, Germany, Italy, France, Netherland, Portugal, Belgium, Russia and Turkey) in which football teams are successful in Champions league and European League are studied. It is revealed that concentration ratios are low except England Premier League and have increased at last years. Additionally, the hypothesis which says that as concentration in national leagues decreases the success of teams in international arena increases couldn't be confirmed.

Summary

It is widely believed that competition causes positive results in the markets. The Structure-Behavior-Performance (SCP) Analysis claims that market structure affects firm behavior and firm behavior affects market performance. Competitive market structure affects companies' behavior and increases market performance. One of the important elements of the market structure is the concentration ratios. The increase in concentration ratios shows that the market is similar to the monopoly market. As the concentration rates in the market increase, collusion is easy and low cost for companies. Firms' less competitive behavior increases their profits. Therefore, concentration ratios have an important place in the industrial organization. Various indices are used when measuring concentration ratios. One of the most important of these indices is Herfindahl-Hirschman index. Policy makers make various arrangements to increase market performance by looking at the concentration rates in the markets.

The interest in football and also competition between teams are also increasing. Football teams meet simultaneously in their national leagues and



international tournaments. According to the SCP Analysis, the view that concentration rates affect the profitability of the company is likely to be valid for football competition. That is, the national football league structure can affect the behavior of football teams, which can affect their success in international tournaments.

The aim of the study is to investigate whether the effect of concentration in the national football league have an effect on their success in international tournaments. For this purpose, the concentration in the national football leagues was calculated with the Herfindahl-Hirschman index (HHI). National football leagues are chosen by considering the most successful teams in the Champions League and European League.

During the concentration measurement, the points collected in national leagues were handled instead of market shares. The periods between 2000-2001 and 2018-2019 seasons were studied. Therefore, the interpretations of the results of the HHI are different from those in the measurement of market concentration. Concentration results were made differently according to the number of teams in the national league.

20 teams play in Spain, England, Italy, Germany and France national leagues. Teams from these leagues are also the most successful in the Champions League and Europa League matches. A moderate concentration was detected between these periods in the German league. A low concentration average was found in the other four leagues (Spain, England, Italy and France). In the analysis made in 20-team leagues, the hypothesis of “the international success of the teams increases as the concentration in the national leagues decreases” could not be accepted. The French league, which has the lowest concentration level, is less successful than the other four leagues in international tournaments. However, Spain, which has the second lowest concentration level, is the most successful league in the international arena. Germany, which has a higher concentration rate than other countries, won the Champions League twice. Germany became more successful than France. Another result is the increase in concentration ratios in national leagues in recent years.

18-team league in the Netherlands and Turkey were also studied. Concentration average is low in the leagues of both countries. However, the concentration ratio of the Dutch league, is higher than in Turkey. In contrast, Dutch league teams are more successful than international tournaments. This causes the hypothesis that “the international success of the teams increases as the concentration decreases in the national leagues” cannot be confirmed. In the Dutch league, it has been observed that concentration rates have increased in recent years. The reason for this is the high performance of Ajax and PSV Eindhoven teams. Although Ajax and PSV Eindhoven teams were successful in the Dutch League, they did not win the Champions League and Europa League trophies in the period.



Belgian and Portuguese Leagues were played in this period with 16 and sometimes 18 teams. Although the concentration is higher in Portuguese, it is seen that Porto won 3 cups in the period. The success of SL Benfica and Porto stands out as the reason for the increase in the concentration rate. Concentration is low in the Belgian league, but the role of the Play-off system played in this is unknown. However, despite the low concentration in the Belgian league, Belgian teams are not very successful in international arena. It is seen that the concentration in the Russian league played with 16 teams is low. Russian teams won 2 European League titles in this period.

Shortly, the hypothesis that teams playing in low concentrated national leagues are more successful in international tournaments can't be accepted. For example; no team from the French league, which has a very low concentration, did not win the Champions or Europa League championship.

However, in most leagues, concentration has increased after the 2013-2014 season. This trend is quite evident in the leagues of Spain, England, Germany and Portugal. Increasing concentration is an issue that managers should think carefully because this can affect stadium and broadcast revenues.

Keywords: Concentration Ratios, Competition, Football Economics, Herfindahl-Hirshman Index, Structure-Conduct-Performance Analysis

Introduction

In the field of industrial organization, the relationship between the profits (success) of firms and market structure has given rise. Structure-Conduct-Performance (SCP) analysis claims that concentration leads monopoly rents and increase profits of firms. However efficiency hypothesis states that some firms gain in market share and increase their profits because of their efficient production techniques. In literature there is a struggle between these two different hypotheses. Many articles claim SCP analysis while many others reject. Generally higher concentration ratios are the reason of regulations made by governments according to SCP paradigm (Dilek, 2017:30-32).

The competition between football teams has similarities with the competition between firms as well as differences. National league structures



can increase performance of teams in both national and international arena such as Champions League and European League. Hard and competitive national leagues can force teams to increase their performance and by this way teams can be more successful in Champions and European Leagues.

Our aim is to investigate relationship between the success in international cups and concentration of national leagues. To this aim we chose the national leagues in which the most successful teams in Champions and European League compete and then studied these leagues. After SCP paradigm is introduced we calculated concentration ratios in these leagues by using Herfindahl-Hirschman Index. We interpreted results differently because of the differences between economic markets and football leagues.

2. Structure-Conduct-Performance (SCP) Analysis

Structure-Conduct-Performance (SCP) analysis was developed by members of Harvard School including E.Mason, J.S. Bain and Chamberlin (Dilek and Konak, 2016:160; Shaik, 2012:5; Anh, 2014:1-2). SCP claims that economic performance of an industry and profits of firms depend on conduct of consumers and firms which, in turn depends on market structure (McWilliams and Smart, 1993:64; Dilek, 2017:30; Türkkkan, 2001:17; Dilek and Konak, 2016:160). In other words, there is a causal relationship between market structure and industry performance. Number and size of consumers and firms, technology, product differentiation, vertical integration, barriers to entry are included in industry structure. Determining production capacity, Research and Development, pricing policies, agreements with other firms are included by firms' conduct. Firms pursue strategies by considering elements of market structure (Ralston et.al. 2015:49; McWilliams and Smart, 1993:64). So, market structure also affects profits of firms. For instance, the presence of barriers to entry increase profits of firms in market (Dilek et.al. 2018:131; Dilek and Top, 2012:775; Barca and Esen, 2010:304). According to SCP, profit or market power of a firm can be defined with equation below (Church and Ware, 2000:426).

$$\Pi_i = \alpha + \beta_1 \text{CON}_i + \beta_2 \text{BE}_i^1 + \dots + \beta_{N+1} \text{BE}_i^N$$

In the function CON_i denotes the concentration of market I while BE_i denotes barriers to entry in market i. The most important elements of market structure are concentration and barriers to entry. Higher concentration ratios encourage firms to mitigate competition and behaving cooperatively in market (Church and Ware, 2000:428; Dilek, 2017:51). Increases in firm concentration make collusion easier and therefore prices increase,



production decreases (Smirlock, 1985:70). At the end, higher prices increase profits of firms which are competing in market (Güenalp and Çelik, 2004:32; Dayı, 2020, p.62-64) and these firms can't be motivated to use efficient production techniques. Because of higher profits, firms do not decrease their production costs. This is called as collusion theory in industrial organization literature (Çelik and Kaplan, 2007:70; Demirel and Hatırlı, 2014:95). According to SCP, concentration ratio is a structural element which determines competition degree.

When concentration ratio is less, collusion becomes hard and costly. In perfect competition markets, hard market conditions force firms to use efficient production techniques and to decrease production costs (Hatırlı, 2017:266-267). Because prices are lower in perfect competition markets and so profits of firms. If firms do not use low-cost production techniques they can't survive in perfect competition markets (Dilek, 2017:111-112). Shortly, lower concentration ratio leads to lower profits and higher concentration ratio leads to higher profits for firms (Samad, 2008:181). In other words there is an inverse relationship between concentration and market performance (Çelik and Ürünveren, 2009:46). To increase market performance, policy makers should regulate markets. SCP paradigm has led to the implementation of anti-trust legislations (Shaik, 2012:5).

3. Football, Competition and Herfindahl-Hirshman Index

As interest on football increases academic researches about football-economy relationship increases (Karamatov et.al. 2019; Ulusoy et.al. 2019; Dayı, 2019). Football teams can earn millions of dollar by participating championships such as Champions League, European League etc. (Taşkın ve Eren, 2016:82; Karamatov et.al. 2019:240). These incomes make competition in football more important. However competition in football has both difference and similarity with competition of firms. These differences make necessity to analyse football competition differently.

Erkan (2019a) and Erkan (2019b) are interesting researches that are done to analyse competition in Turkish Super League. In these researches, points are used instead of market share. Erkan (2019a) used Herfindahl-Hirschman; Gini-Hirschman and Entropy indexes and found that the competitive structure of Turkish Super league is instable. Erkan (2019b) found that concentration level of Turkish super League is low by using concentration index and Herfindahl-Hirshman Index. Erkan (2019c) used the similar techniques to benchmark six European Football league according to



competitiveness and found that French, Italian, English, Spanish, Turkish and German Leagues are competitive.

Competition generally is measured by methods such as concentration ratios, Herfindahl- Hirshman index, Hannah and Key index, Hall-Hideman index etc. (Dilek, 2017:56-58). One of the most popular index is Herfindahl-Hirschman which was studied to measure concentration of markets in researches (Dilek and Konak, 2016:161; Carlton and Perloff, 2000:247). It is calculated by the sum of market share's squares (Yıldırım et.al. 2005:42; Dilek, 2017:56). HHI formula is given below.

$$HHI = \sum_{i=1}^M S_i^2$$

HHI is generally used to measure concentration of first 4 or 8 firms in market. As the score of HHI decreases competition pressure felt by firm increases. Herfindahl-Hirschman index can be used to measure concentration in football leagues however results should be interpreted differently because of football league structure. While interpreting HHI index results we have to care some issues. Firstly, the number of teams in league is stable. It does not change in the middle of season. Secondly, share in total points are used in calculations instead of market shares. Thirdly, all teams take some of total points. It is not possible that other teams (teams except the first four) have zero points. One of firms can produce all goods in market but one or several teams can't get all points.

While researching HHI for 4 teams, the maximum and minimum values differ from HHI for 4 firms. In monopoly markets HHI ratio will be 10000. The maximum value can be valid in these five conditions.

- i) The first team wins all games.
- ii) Second team wins all games except games against the first team.
- iii) Third team wins all games except games against the first and second team.
- iv) Fourth team wins all games except games against the first, second and third team.
- v) All games between other teams are drawn.

Assume that league has played with 20 teams. In these conditions first team will get 114, second will get 108, third will get 102 and fourth will get 96. All other teams will get 30 point. In league total points of teams are equal to 900.



$$HHI_4 = \sum_{i=1}^4 P_i^2 = \left(\frac{114}{900} * 100\right)^2 + \left(\frac{108}{900} * 100\right)^2 + \left(\frac{102}{900} * 100\right)^2 + \left(\frac{96}{900} * 100\right)^2 = 546.65$$

If all games are drawn in league with 20 teams, HHI₄ score will be 100 which is the minimum value. The same logic is used to calculate leagues with 16, 18 and 20 teams and reached results in Table 1. Also HHI₂ scores are shown in Table 1. As it can be seen in Table 1, HHI₄ and HHI₂ scores can't reached to amount of scores in market competition.

Table 1. HHI₄ and HHI₂ Results For Football Leagues

HHI ₄ Results					
Team Number	Minimum HHI ₄	Maximum HHI ₄	Low Concentration	Medium Concentration	High Concentration
20	100	546.65	(100-248.88)	(248.88-397.76)	(397.77-546.65)
18	123.46	641.98	(123.46-296.3)	(296.31-469.15)	(469.16-641.98)
16	156.25	764.26	(156.25-358.92)	(358.93-561.6)	(561.61-764.26)
HHI ₂ Results					
Team Number	Minimum HHI ₂	Maximum HHI ₂	Low Concentration	Medium Concentration	High Concentration
20	50	354.53	(50.00-151.51)	(151.52-253.03)	(253.03-354.53)
18	61.72	426.82	(61.72-183.42)	(183.43-305.12)	(305.13-426.82)
16	78.12	523.63	(78.12-226.62)	(226.63-375.12)	(375.13-523.63)

Source: Calculated by authors

HHI₄ and HHI₂ scores are used to investigate the relationship between success of teams in international competitions (Champions League and European League) and concentration of national league. Competitive league structure can motivate teams to perform better and this will be reason for the success in both national and international arena.

4. Method

After season of 2000-2001, national leagues in which winners of Champions League and European League played are Spain, England, Italy, Germany, Portugal, Russia, Ukraine and Netherlands. Political problems of Ukraine caused instability in Ukraine national league and therefore Ukraine League is not studied. Though French, Belgium and Turkish teams was not successful in Champions League and European League, they are in first 10 countries UEFA standings in 2018-2019 (<https://www.uefa.com/memberassociations/uefarankings/country/#/yr/2019>). Therefore it is decided to analyse these three leagues. Data are obtained from the website <https://www.worldfootball.net/>. Concentration is measured



by Herfindahl-Hirschman index between 2000-2001 and 2018-2019 seasons. Countries whose teams win Champions league and European League are given in Table 2. As it can be seen the most successful country is Spain followed by England and Italy.

Table 2. Successful Teams and Countries in Champions League and European League

Country	Champions League		European League	
	No	Teams	No	Teams
Spain	9	Real Madrid (2001-2002), (2013-2014), (2015-2016), (2016-2017), (2017-2018) Barcelona (2005-2006), (2008-2009), (2010-2011), (2014-2015)	9	Sevilla (2005-2006), (2006-2007), (2013-2014), (2014-2015), (2015-2016) Atletico Madrid (2009-2010), (2011-2012), (2017-2018), Valencia (2003-2004)
England	4	Liverpool (2004-2005), (2018-2019) Manchester United (2007-2008) Chelsea (2011-2012)	4	Liverpool (2000-2001), Chelsea (2012-2013), (2018-2019), Manchester United (2016-2017)
Italy	3	AC Milan (2002-2003), (2006-2007), Inter (2009-2010)	0	
Germany	2	Bayern Mühnh (2000-2001), (2012-2013)	0	
Portugal	1	Porto (2003-2004)	2	FC Porto (2002-2003), (2010-2011)
Russia	0		2	CSKA Moskva (2004-2005), Zenith (2007-2008)
Ukraine	0		1	Shakhtar Donetsk (2008-2009)
Netherland	0		1	Feyenoord (2001-2002)

Source: <https://www.worldfootball.net/>

5. Findings

National Leagues with 20 teams

National leagues of Spain, Germany, England, Italy and France play with 20 teams. It is noteworthy that the most successful leagues (Spain, England, Italy, Germany) are played with 20 teams. Netherland and Turkish league are played with 18 teams while Russia league is played with 16 teams. Portuguese and Belgium league changed their number of teams in the period studied. In some seasons they play with 18 teams and in other seasons they play with 16 teams.



HHI₄ scores in leagues with 20 teams are calculated and shared in Table 3.

Table 3. HHI₄ Scores of Leagues With 20 Teams

Season	Spain	England	Italy	Germany	France
2000-2001	191.38	231.02	273.64	200.14	221.59
2001-2002	173.23	210.29	256.70	249.22	220.98
2002-2003	193.84	201.57	245.21	220.65	163.06
2003-2004	193.17	221.27	291.82	259.21	201.78
2004-2005	199.01	240.97	220.00	230.11	174.44
2005-2006	196.12	233.48	249.98	279.27	184.41
2006-2007	192.94	221.58	231.51	248.32	164.70
2007-2008	196.06	253.87	222.27	242.97	184.15
2008-2009	206.24	253.43	207.25	243.07	203.13
2009-2010	256.65	234.74	208.95	235.52	194.96
2010-2011	235.98	199.33	201.15	253.52	177.39
2011-2012	231.84	232.65	204.45	278.24	211.61
2012-2013	245.32	234.35	222.02	281.85	193.37
2013-2014	253.29	243.09	253.41	287.37	226.50
2014-2015	266.38	221.99	207.82	272.99	201.64
2015-2016	256.95	195.47	237.12	285.10	203.14
2016-2017	253.64	250.24	253.03	268.88	248.30
2017-2018	234.00	259.44	254.37	244.90	248.29
2018-2019	204.45	255.85	225.37	274.22	221.00
Mean	220.03	230.31	231.87	255.57	202.34

Source: Calculated by authors

When HHI₄ score is between 100.00 and 248.88 the league is low concentrated as it is said in Table 1.

Spanish League (La Liga) is generally low concentrated except seasons in 2009-2010, 2013-2014, 2014-2015, 2015-2016, 2016-2017 and 2017-2018. It is seen that in concentration ratio was increased after 2009-2010. This is caused due to high performance of Barcelona and Real Madrid. Barcelona has won 7 and Real Madrid has 2 championships since 2009-2010. Though the high concentration scores in last years, mean is only 220.03 which is low concentrated. Also in 2013-2014, 2014-2015, 2015-2016 and 2016-2017 seasons Spanish teams won 4 Champions league cup while concentration ratio is higher than 248.88.

Premier League (English League) has also averagely performed low concentration since 2000-2001. Only 5 seasons (2007-2008, 2008-2009, 2016-2017, 2017-2018, 2018-2019) have medium concentration rates. It is remarkable that three of them are last three seasons. This shows that concentration was increased in last 3 seasons. Especially the success of Manchester City (2 championship) and Chelsea is remarkable. Also it can be seen that concentration mean is higher than La Liga. In 2007-2008 season



concentration ratio is higher than 248.88 and Manchester United both won Premier League and Champions league cups.

İtalian League (Serie A) has a slightly higher concentration rate than Premier League. 7 seasons have higher concentration rate than 248.88 so that these seasons have medium concentration rate. After 2013-2014, Juventus won championships by more than 90 points in a season.

The highest concentration rate is due to German League (Bundesliga) which has averagely ratio of 255.57. Also this can be interpreted that Bundesliga has medium concentration rate. After 2010-2011, approximately all seasons (only 2017-2018) have medium concentration rate. The great performance of Bayern Munich (7 championships) and Borussia Dortmund (2 Championships) has a role on this result. Bayern Munich won Champions League in 2012-2013 season in which concentration ratio is 281.85.

French league (Ligue 1) has the lowest concentration ratio and has never passed 248.88 after 2000-2001. Though Olympique Lyon and Paris Saint Germain had successful performances, concentration was low in Ligue 1.

We are testing whether there is negative correlation between concentration ratio and success in international arena. From Table 1, it seems like working except French League. Average concentration ratios of these four leagues can be shown as $C_{\text{Spain}} < C_{\text{England}} < C_{\text{Italia}} < C_{\text{Germany}}$. Addition to this, Spain is the most successful, England is the second and Italia is the third.

HHI₂ scores in leagues with 20 teams are calculated and shared in Table 4.

Table 4. HHI₂ Scores of Leagues with 20 Teams

Season	Spain	Germany	England	Italy	France
2000-2001	108.23	108.39	104.68	159.01	125.07
2001-2002	94.94	133.72	129.40	143.96	122.10
2002-2003	110.71	128.74	117.67	137.90	85.24
2003-2004	101.96	142.12	134.65	171.61	110.89
2004-2005	124.40	136.03	150.00	132.37	105.60
2005-2006	108.51	155.77	134.25	158.41	113.14
2006-2007	106.39	135.30	136.40	154.01	101.63
2007-2008	118.63	143.59	136.78	131.99	113.16
2008-2009	122.20	129.85	142.45	114.76	116.66
2009-2010	174.14	131.82	136.49	121.81	103.58
2010-2011	157.05	146.48	108.05	115.57	101.95
2011-2012	167.08	168.91	144.52	128.57	121.73
2012-2013	154.47	179.10	131.50	127.70	112.45
2013-2014	141.05	180.18	128.14	159.90	134.46
2014-2015	157.22	157.42	125.98	121.51	113.07



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2015-2016	149.15	211.28	108.73	137.41	126.20
2016-2017	151.63	157.41	143.88	141.06	151.66
2017-2018	134.03	158.13	152.82	154.90	138.07
2018-2019	125.79	166.10	166.38	135.44	131.08
Mean	131.98	151.07	133.30	139.36	117.25

Source: Calculated by authors

When HHI₂ score is between 50.00 and 151.51 the league is low concentrated in Table 1.

As it can be seen from Table 4, The highest concentration mean is due to Germany and the lowest concentration ratio is due to France. The ranks of leagues are same with the rank of HHI₄ rank. However Bundesliga is slightly below the threshold point and therefore it is accepted as low concentrated according to HHI₂ scores. Also the results of HHI₂ scores confirmed that concentration in national leagues was increased in last seasons. Again it seems that there is negative correlation with concentration ratios and success except French league. The rank between four league is as $C_{Spain} < C_{England} < C_{Italia} < C_{Germany}$ as HHI₄ results.

According to HHI₄ and HHI₂ results of leagues with 20 teams we can't confirm that as concentration decreases in national leagues the success of teams in Champions League and European League increases because of French league. The most successful country Spain is located on 4th rank in concentration ratio and the least successful country French is located in the end. The most competitive league is due to Ligue 1 (French league), however French teams couldn't win Champions League or European League. Oppositely, Spanish teams which won 9 Champions League and 9 European League has the second competitive league.

National Leagues with 18 teams

Turkish (Super Lig) and Dutch Leagues (Eredivisie) are played with 18 teams. HHI₄ and HHI₂ results of Turkish and Dutch leagues are shared in Table 5. According to Table 1, if HHI₄ concentration rate is between 123.46 and 296.3 this league with 18 teams is low concentrated league. As it can be seen from the Table 5, only two seasons in Turkish league has higher HHI₄ ratio than 296.3. The HHI₄ mean of Super Lig is 265.92 so that Super Lig is competitive. Though HHI₄ score of Eredivisie is higher than Super Lig, the ratio of Eredivisie is below threshold point (296.3). Shortly, both leagues are competitive and low concentrated. The same results are valid for HHI₂ scores. Addition to this, it is shown that last 4 seasons Eredivisie is medium



concentrated. So, concentration in Eredivisie is increasing in last seasons. These results do not confirm that as concentration in national leagues decreases, the success in Champions League and European League increases. Though Holland teams are more successful in Champions League and European League, Turkish league is more competitive and less concentrated. According to UEFA country rankings in 2019, Holland teams are more successful (<https://www.uefa.com/memberassociations/uefarankings/country/#/yr/2019>) and Feyenoord became champion in 2001-2002 European League. So the results do not confirm that as concentration decreases the success in international trophies increases.

Table 5. HHI₄ and HHI₂ Scores of Leagues with 18 Teams

Season	HHI ₄ Scores		HHI ₂ Scores	
	Turkey	Netherland	Turkey	Netherland
2000-2001	273.75	259.58	153.34	158.24
2001-2002	257.77	250.13	164.37	141.06
2002-2003	292.81	322.04	185.53	194.84
2003-2004	248.70	278.20	150.98	166.32
2004-2005	318.73	290.53	171.85	182.93
2005-2006	271.56	287.61	191.53	170.23
2006-2007	210.42	289.11	125.44	156.44
2007-2008	309.11	246.95	160.89	138.30
2008-2009	242.32	282.24	131.30	157.43
2009-2010	274.73	336.74	158.08	199.54
2010-2011	291.27	260.05	189.69	144.89
2011-2012	235.75	268.96	148.85	146.04
2012-2013	218.35	274.86	126.27	149.33
2013-2014	233.44	244.12	138.47	137.01
2014-2015	282.46	285.69	163.97	181.63
2015-2016	277.13	300.16	166.06	194.83
2016-2017	268.57	320.79	155.45	186.06
2017-2018	291.81	315.49	149.96	183.89
2018-2019	253.83	297.13	134.60	194.05
Mean	265.92	284.76	156.14	167.53

Source: Calculated by authors

National Leagues with 16 and 18 teams

In some countries Football Federations decided to change number of teams in leagues. For instance; Portuguese league is played with 18 teams between 2000-2001 and 2005-2006. Then the numbers of teams are decreased and the same league is played with 16 teams between 2006-2007 and 2014-2015. Again in 2015-2016, Portuguese league is started to play with 18 teams. Similar history is lived in Belgium league. After 2009-2010, Belgium league



(Eerste Klasse) is started to play with 16 teams and also playoff system is started. In playoff system, after rankings in League successful teams are played with each other to be champion. In 2002-2003, Belgium league is played with 17 teams and therefore this season is excluded.

The HHI₄ scores of Belgium and Portuguese league are shared in Table 6. It is seen that concentration of Portugal is greater than Belgium. Playoff system can have a role on concentration ratios of Belgium. Teams can give more importance on their performance in Playoff games and therefore concentration ratios can be affected. Addition to this, the mean of Portugal league in seasons with 16 teams are higher than threshold point (358.92). Mean of seasons with 18 teams are slightly lower than threshold point (296.30). We can say that Portuguese league is medium concentrated and this mean that Portuguese league is more concentrated than leagues with 20 teams. The mean of Belgium leagues show that Belgium league is low concentrated without excluding Playoff effects. Also Table 6 shows that after 2009-2010 Portuguese is medium concentrated due to high performances of Porto and SL Benfica. This is harmonious with concentration ratios of other leagues. Concentration ratios are increasing day by day. Though Portugal won three trophies with Porto, the concentration ratio of Belgium is smaller. This results do not confirm that as concentration decreases the international success increases.

Table 6. HHI₄ Scores of Leagues with 16 and 18 Team

Season	Portugal		Belgium	
	HHI ₄	Team	HHI ₄	Team
2000-2001	263.27	18	276.95	18
2001-2002	269.02	18	252.93	18
2002-2003	273.85	18	306.28	17
2003-2004	290.10	18	285.09	18
2004-2005	219.97	18	295.67	18
2005-2006	271.92	18	240.68	18
2006-2007	382.82	16	269.77	18
2007-2008	331.90	16	269.39	18
2008-2009	358.81	16	259.87	18
2009-2010	417.43	16	370.96	16
2010-2011	361.10	16	332.11	16
2011-2012	398.10	16	325.09	16
2012-2013	406.03	16	329.56	16
2013-2014	381.13	16	330.23	16
2014-2015	332.75	16	299.08	16
2015-2016	336.17	18	300.33	16
2016-2017	302.52	18	292.32	16
2017-2018	354.20	18	294.94	16



2018-2019	337.90	18	286.44	16
Means of seasons with 16 teams	379.67		316.10	
Means of seasons with 18 teams	295.60		268.79	

Source: Calculated by authors

HHI₂ concentration ratios of Belgium and Portugal are shared in Table 7. We obtained the same results with HHI₄ scores. Firstly concentration of Portuguese league is higher. Secondly, Portuguese league is medium concentrated with 16 team seasons. Thirdly, Portuguese league is medium concentrated due to ultimate performances of Porto and Benfica. Fourthly, Belgium league is low concentrated most probably because of Playoff system. In Belgium league, there is not any team who dominated league. KRC Genk, Club Brugge KV, RSC Anderlecht, Standard Liege and KAA Gent are teams who won championships between 2000-2001 and 2018-2019. Though high concentration ratios, Porto obtained a championship in Champions League and 2 cups in European League. So these results do not confirm as inverse relationship between concentration in national leagues and the success in Champions League and European League. Belgium which has lower concentration ratios, could not win any international cups.

Table 7. HHI₂ Scores of Leagues with 16 and 18 Team

Season	Portugal		Belgium	
	HHI ₂	Team	HHI ₂	Team
2000-2001	163.93	18	181.26	18
2001-2002	148.10	18	143.26	18
2002-2003	187.65	18	191.78	17
2003-2004	171.27	18	172.44	18
2004-2005	117.13	18	162.86	18
2005-2006	161.15	18	129.63	18
2006-2007	219.42	16	159.39	18
2007-2008	194.32	16	154.21	18
2008-2009	215.09	16	163.74	18
2009-2010	254.46	16	238.93	16
2010-2011	257.76	16	192.19	16
2011-2012	233.45	16	191.36	16
2012-2013	276.62	16	193.58	16
2013-2014	228.76	16	192.42	16
2014-2015	201.03	16	160.01	16
2015-2016	213.55	18	176.14	16
2016-2017	178.00	18	166.85	16
2017-2018	194.77	18	175.68	16
2018-2019	201.90	18	162.62	16



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Means of seasons with 16 teams	234.98		184.98	
Means of seasons with 18 teams	176.23		158.31	

Source: Calculated by authors

National Russia League with 16 teams

Russian national league is playing with 16 teams. HHI₄ and HHI₂ concentration ratios are given in Table 8. It is seen that Russia League is low concentrated because of low HHI₄ scores below 352.92 and HHI₂ scores below 226.62. So Russia league can be accepted as competitive league. Also there is not any season which higher than threshold points. In all seasons Russia league has ended with high struggle. Zenit St Petersburg, Lokomotiv Moskva, Spartak Moskva, CSKA Moskva and Rubin Kazan are teams which become champions at the end of league between 2000-2001 and 2018-2019. Though low concentration rates and competitive national league structure, Russian teams only win 2 European League cups (CSKA Moskva and Zenith).

Table 8. HHI₄ and HHI₂ Scores of Russia League

Season	HHI ₄	HHI ₂
2000-2001	335.30	202.57
2001-2002	292.24	156.53
2002-2003	327.83	200.61
2003-2004	281.02	153.30
2004-2005	320.74	172.75
2005-2006	300.07	164.70
2006-2007	290.23	162.22
2007-2008	303.74	172.05
2008-2009	294.53	161.91
2009-2010	293.55	160.07
2010-2011	335.84	199.81
2011-2012	304.78	168.38
2012-2013	300.98	179.01
2013-2014	328.13	185.71
2014-2015	326.72	186.26
2015-2016	347.34	192.16
2016-2017	343.27	200.57
2017-2018	305.25	163.32
2018-2019	306.96	171.17
Mean	312.55	176.48

Source: Calculated by authors

Conclusions

Structure-Conduct-Performance (SCP) paradigm claims that there is a causal relationship between market structure and market performances. In other



words, market structure affects firms' conduct and conduct affects firm profits. By considering this relationship we try to investigate whether there is a relationship between national league structure and international success of teams. Because low concentrated competitive national league can encourage teams to play better and efficiently. So their performance can be ended with championships in international competitions such as Champions League and European League. To investigate this relationship we firstly used Herfindahl-Hirschman Index to measure concentration in national leagues. Then we searched whether successful teams are competing in low concentration national leagues.

We couldn't confirm that as concentration in national leagues decrease, teams become more successful in international arena. We generally benchmark leagues with the same number of teams. Spain, England, Italian, German and French leagues are playing with 20 teams. Therefore we benchmark these leagues and found insufficient evidence about inverse relationship between concentration ratios and success in international success. French league obstruct this relationship. French league is low concentrated but French teams could not win Champions league and European League trophies. On the other hand Spanish teams which compete in higher concentrated in national league than French league won 9 cups in Champions League and 9 cups European League. Though Germany, England and Italy have higher HHI₄ and HHI₂ scores than French league, their teams are more successful in Champions league and European league. While studying Spain, England, Italian and German leagues we reached that inverse relationship between concentration and success in international trophies, but this is very limited analysis that is not enough to confirm our hypothesis.

Both Turkey and Netherland league plays with 18 teams. While benchmarking these leagues, it is seen that Turkey which has lower concentration ratios is less successful than Netherland in international trophies. So this result rejected the inverse relationship between concentration ratios and success in international trophies.

Portugal and Belgium played some seasons with 16 teams and some seasons with 18 teams. Belgium league is more competitive due to lower concentration ratios. However, Portugal is more successful in Champions league and European League because of Porto's three victories. This also rejected the inverse relationship between concentration ratios and success in international trophies.



Russia which plays with 16 teams in national league has very low concentration ratios. Though competitive structure of Russian league, Russian teams only won 2 European league cups and this is poor performance of Russian teams. Also it is seen that concentrations of most national leagues were increased in last seasons.

Shortly, we could not find enough evidence that confirms inverse relationship between concentration ratios of national leagues and success in international trophies. This makes us wonder if higher concentration ratios are the result of efficient plays of teams. If this is true, this will be strong support to efficiency hypothesis of some economists. According to efficiency hypothesis, high concentration ratios are caused by efficient production techniques of firms. However the results of this research are not enough to confirm this. Further researches can investigate the results and reasons of this trend by different methods. We need new researches which investigate relationships between league structure and performances.

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