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Comparison of Average Minutes Played and Usage Rates of Domestic and Foreign Players in Turkish Basketball Super League: A Descriptive Research

Türkiye Basketbol Süper Ligi'ndeki Yerli ve Yabancı Oyuncuların Ortalama Oyun Sürelerinin ve Top Kullanma Oranlarının Karşılaştırılması: Tanımlayıcı Araştırma

Eyüp Anıl DUMAN[a]

[a]Marmara University Faculty of Engineering, Department of Metallurgical and Materials Engineering, İstanbul, Türkiye

ABSTRACT Objective: This research aims to examine the differences between domestic and foreign players in the Turkish Basketball Super League in terms of average playing time and usage rates. **Material and Methods:** For this analysis, the 6 most recent seasons under the 5+1 foreign player rule were examined. The 2019-2020 season was excluded due to its incompleteness caused by the coronavirus disease-2019 pandemic. Consequently, 5 seasons (2018/2019-2023/2024) were analyzed. Data on average usage rates and playing time were collected from realgm.com. The distribution of each season's statistics was tested for normality using the Shapiro-Wilk test. The comparison was conducted using the independent samples t-test for normally distributed variables and the Mann-Whitney U test for the variables that did not follow a normal distribution in the R programming environment. **Results:** Despite variations in the ratio of domestic and foreign players each season, no statistically significant difference was found in the average number of games played. Conversely, statistically significant differences were found in both average playing time and average usage rates between domestic and foreign players in each analyzed season ($p<0.01$). **Conclusion:** In each investigated season, foreign players demonstrated significantly higher average playing time and usage rates compared to domestic players. These results suggest that further analysis is necessary to assess their impact on club performance and national team success.

Keywords: Basketball; basketball player analysis; player performance; recruiting athletes; usage rate

ÖZET Amaç: Bu çalışmanın amacı, Türkiye Basketbol Süper Ligi'nde mücadele eden yerli ve yabancı oyuncuların aldıkları sürelerin ve top kullanma oranlarının karşılaştırılmasının yapılmasıdır. **Gereç ve Yöntemler:** Bunun için çalışmada 5+1 yabancı kuralının uygulandığı son 6 sezondan koronavirüs hastalığı-2019 pandemisi nedeniyle tamamlanmayan 2019-2020 sezonu çıkartılarak, toplamda 5 sezon (2018/2019-2023/2024) analiz edilmiştir. Çalışmada kullanılan istatistikler realgm.com web sitesinden alınmıştır. Her bir sezon istatistiğinin dağılımının normal dağılıma uyup uymadığı Shapiro-Wilk testi ile incelenmiştir. Karşılaştırma, normal dağılım gösteren değişkenler için bağımsız örneklem t-testi, normal dağılım göstermeyen değişkenler için ise Mann-Whitney U testi kullanılarak R programlama dilinde gerçekleştirilmiştir. **Bulgular:** Her bir sezonda yerli ve yabancı oyuncu dengesinde değişimler olmasına rağmen, oynadıkları ortalama maç sayılarında istatistiksel olarak anlamlı bir fark olmadığı tespit edilmiştir. Buna karşın incelenen her sezonda yerli ve yabancı oyuncular arasında hem ortalama oyun sürelerinde hem de ortalama top kullanma oranında istatistiksel olarak anlamlı farklılık tespit edilmiştir ($p<0,01$). **Sonuç:** İncelenen her sezonda ortalama oyun sürelerinde ve top kullanma oranlarında yabancı oyuncuların yerli oyunculara üstünlük kurduğu tespit edilmiştir. Bu sonuçların, kulüp performansları ve milli takım başarıları üzerindeki etkilerini değerlendirmek için daha kapsamlı analizler yapılması önerilmektedir.

Anahtar Kelimeler: Basketbol; basketbol oyuncu analizi; oyuncu performansı; devşirme oyuncular; top kullanma oranı

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Correspondence: Eyüp Anıl DUMAN
Marmara University Faculty of Engineering, Department of Metallurgical and Materials Engineering, İstanbul, Türkiye
E-mail: anil.duman@marmara.edu.tr

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The rise of globalization has significantly accelerated the import and export of athletes. The primary motivations for employing foreign players in domestic leagues across various team sports include the promotion of the sport and the advantages derived from competition and diversity. Allowing foreign players enhances spectator interest and the sport's popularity.[1]

In 1932, 2 years after the International Olympic Committee acknowledged basketball as an Olympic sport, the International Basketball Federation, originally named Fédération Internationale de Basketball Association (FIBA), was established in Geneva. FIBA founded the Euroleague, Europe's most significant league, in 1958.[2] Research by Chiba shows that the Euroleague's budget consists of television revenues (61%), sponsorship (22%) and events and other revenues (17%) highlighting the importance of popularity for sports organizations' budgets.[3]

FIBA oversees international basketball competitions, while each member nation can create its own leagues.[2] Turkish Basketball Super League (TBSL) is one of the most significant leagues in Europe. In Türkiye, the regulation of foreign players is determined by individual sports federations. In alignment with global trends, sports clubs have been the leading force for advocating the liberalization of the athletics labour market amidst the sport's commercialization. Consequently, in Türkiye's 2 most prominent sports, football and basketball, characterized by significant sports clubs, the presence of foreign players has peaked. Permitting foreign talent may enhance a sport's popularity while simultaneously hindering the development of domestic players by limiting their playing time.[1] To control this situation; the federation enforces a foreign player quotas. The Turkish Basketball Federation (TBF) implements this rule in 2 distinct forms: limiting the number of foreign players in the squad and restricting the number allowed on the court simultaneously. In the post-2000s period, the rule initially implemented as 2+1 was modified to 2+2 for 2002-2003 season and 3+2 for the 2007-2008. Starting in the 2014-2015 season, it was set at 5 foreign players for 4 years. For the past 6 seasons, it has been 5+1. with the TBF announcing a change to 4+3 for the 2024-2025 season.[4]

The Association of Professional Basketball Players aims to protect the rights of current and former athletes in the TBSL and contribute to the advancement of basketball in the nation. The organization also conducts statistical analyses on the effects of foreign player regulation on national basketball and Turkish players.[5] This also shows how important this issue is for national basketball. Academic studies have also proposed examining the impact of foreign player quotas on the development of domestic players and the success of national teams.[1]

The literature contains numerous studies comparing the performance of domestic and foreign players. These studies mainly focus on the performance comparison of players. Guimarãe et al. divided the players competing in the Portuguese Basketball League into 3 groups: domestic, European Union citizens and others and conducted performance comparisons.[6] They based their comparisons on 17 match-related statistics and found that non-domestic players outperformed domestic players in nearly all statistical. Wang et al. clustered domestic and foreign players in the Chinese Basketball League using 20 variables, identifying 9 domestic and 6 foreign player clusters in playoff teams.[7]

In Türkiye, literature also contains studies on player statuses. Harbili et al. conducted a study comparing domestic and foreign players in the Turkish league over 3 seasons from 2005 to 2008, categorizing them into 3 groups: guard, forward, and center.[8] While comparing the productivity of these players, they also examined the statistics used in the productivity formula. Yalçın et al. used the same formula and analyzed basketball players who played in the 2015-2016 season in 3 groups: domestic, American and others.[9] As a result, they concluded that domestic players had lower productivity values than foreign players. Özmen conducted a comparative analysis of domestic and foreign players in Türkiye from the 1997-1998 season to the 2009-2010 season.[10] He categorized 10 of the 35 clubs in his study as top and examined the quantity and productivity of domestic and foreign players within these teams. Özmen also examined the effect of the foreign player quota in Türkiye on the performance of domestic and foreign players.[1] He employed the efficiency index formula to evaluate player productivity.

In the literature, there are also studies comparing the performance of European and non-European players playing in European leagues other than domestic leagues. These studies focus on the Euroleague, regarded as one of the best leagues in Europe. Çene et al. classified the players who participated in the Euroleague during the 2020-2021 season into 3 groups: guard, forward, and center, utilizing cluster analysis methodology.[11] Subsequently, they statistically compared European and non-European players within these groups. Ciğerci et al. analyzed the performances of European and non-European players in the final 4 matches since the 2000-2001 season.[12] In this study, the players' performance were also analyzed using the official Euroleague player index rating as a metric under 3 groups. Another study related to the Euroleague focused on women's basketball. Gasperi et al. conducted a performance comparison of European and non-European players for the 2016-2017 season, again under 3 position groups.[13] Additionally, they divided the teams into 4 groups based on their levels. They examined the performance comparison according to team levels.

While existing literature focuses on efficiency comparisons of domestic and international players, their usage rates have not been extensively examined. This study aims to highlight the distinction between the 2 groups, which might be summarized as responsibility in the field. Unlike previous studies, the analysis in this research focuses on the responsibilities of domestic and foreign players rather than their performances. In this context, the average minutes played by the players and their usage rates, which give the number of positions a player finishes per game, were compared. To the best of the author's knowledge, this is the first study to compare the usage rates of domestic and foreign players.

MATERIAL AND METHODS

PARTICIPANTS

This study analyzed 5 seasons (2018/2019-2023/2024) during which the 5+1 foreign player rule was implemented in the TBSL. Although this rule has been applied over the past 6 seasons, the 2019-2020 season was excluded from the analysis due to its cancellation caused by the coronavirus disease-2019 pandemic. As using data from an incomplete season could result in inaccurate results, this exclusion was deemed reasonable, and the reduction in the dataset was considered justified. Players for each season were categorized as domestic or foreign. Recruited players (Ali Muhammed, Scottie Wilbekin and Shane Larkin) and players with dual citizenship (Turkish and other) were considered as per the federation's regulations. Additional inclusion criteria are provided in the "Procedures" section. Table 1 presents the number of players who met these criteria and were analyzed in the study. The research was conducted in accordance with the principles of the Declaration of Helsinki. The 'Higher Education Institutions Scientific Research and Publication Ethics Directive' was adhered to during the current research.

PROCEDURES

This study employed a cross-sectional research design to compare the average games played, average minutes played and usage rate statistics of domestic and foreign players in the TBSL across 5 seasons. The usage rate statistic indicates the number of positions a player finishes per game, calculated using Formula 1 as described by Sarlis and Tjortjis.[14]

$$\frac{\{[FGA + (FTA \times 0.44) + (AST \times 0.33) + TO] \times TMIN \times LPOSS\}}{(MIN \times TPOSS)} \quad 1$$

TABLE 1: Number of domestic and foreign players in TBSL

Season	Domestic	Foreign	Total number of player	Percentage of domestic players
2018-2019	98	89	187	52%
2020-2021	106	97	203	52%
2021-2022	95	100	195	49%
2022-2023	88	104	192	46%
2023-2024	97	105	202	48%

The number of shot attempts (FGA), free throw attempts (FTA), assists (AST), and turnovers (TO) in the formula were player averages like other statistics and were taken from the realgm.com website. This website is considered one of the primary providers of statistics in European basketball and is used as a source in many academic publications.[15-18] The statistics of 15 randomly selected players were verified with those listed in the leagues section of the official TBF website. In the formula, team minutes (TMIN) is the average time of the team the player played for, league possesion (LPOSS) is the average number of team possesion in the league, and team possesion (TPOSS) is the average number of possesion of the team the player played for. The LPOSS statistic was calculated by averaging the TPOSS statistics of the teams playing that season. The TPOSS statistic was calculated using Formula 2 from Sarlis and Tjortjis.[14] All of the statistics in this formula are team statistics. For example, the offensive rebounds (OREB) statistic shows the team's average OREB.

$$(0.96\times FGA)+TO+(0.44\times FTA)-OREB \quad (2)$$

This study defined a minimum match participation and an average playing time constraint to ensure data reliability.[19] Upon reviewing the literature, it was observed that these limitations differ among studies.[20] In this study, the constraints of players playing at least 5 minutes on average, as in the studies of Casals and Martinez, Jakovljevic et al. and Sampaio et al. and participating in at least 10 matches during a season, as in the study of Blanco et al. and Çene et al., were applied.[11,21-24] For players who played for 2 teams in 1 season, the statistics of the team for which they played more matches were taken into account. In case of equality in the number of matches, the statistics of the team with more playing time were taken into consideration.

DATA ANALYSIS

The mean and standard deviation of the analyzed statistics for domestic and foreign players over the 5 examined years are provided. The distribution of each year's statistics is tested using the Shapiro-Wilk test to identify deviations from normality of the data because it is known to be a highly powerful method for detecting deviations from normal distribution, particularly with small to moderate sample sizes.[25,26] Since the dataset in this study comprises player groups separated by season, each with very limited sample sizes, the Shapiro-Wilk test was used for its reliability in evaluating the assumptions required for subsequent parametric tests. Differences between groups were tested using an independent sample t-test for normally distributed variables and the Mann-Whitney U test for the variables that did not distribute normally, with p values below 0.01 considered significant. Cohen's d effect sizes are also reported to indicate the magnitude of the differences. As stated in the study by Cohen, effect sizes in absolute values are labelled as negligible for the value range [0, 0.2], small for the value range [0.2, 0.5], moderate for the value range [0.5, 0.8] and large for values above 0.8.[27] All these studies were executed using the R programming environment (R Core Team; Vienna, Austria).

RESULTS

The average number of matches played by domestic and foreign players was initially compared. Analysis of the average number of matches played by domestic and foreign players each season reveals no significant difference at the 0.01 significance level. The analytical data are displayed in Table 2. Table 1 indicates that, despite changes in the distribution of domestic and foreign players across seasons, there is no significant variation in the average number of matches played. This data further supported the utilization of player statistical averages throughout the study.

Secondly, a comparison was made between the average playing time of domestic and foreign players. The data analysis in Table 3 reveals a statistically significant difference in the average playing time between domestic and foreign players for each season ($p<0.01$). Table 3 also indicates that the effect size values for each season are large. Figure 1 also presents the distribution of the average playing time for domestic and foreign players across each season using box plots.

The study compared the average usage rates of domestic and foreign players. Table 4 shows a statistically significant difference in the average usage rates

TABLE 2: Means, standard deviations and comparisons of the number of matches played by domestic and foreign players

	Domestic		Foreign		t/MW-U test	
Season	$\bar{X}$	SD	$\bar{X}$	SD	statistics	p value
2018-2019	23.67	7.36	22.01	7.61	4813.5	0.221
2020-2021	24.44	7.22	22.63	7.22	-1.788	0.075
2021-2022	25.33	8.13	22.97	8.03	-2.035	0.043
2022-2023	25.14	6.94	23.02	8.05	-1.958	0.052
2023-2024	24.21	7.74	22.19	7.27	-1.903	0.058

SD: Standard deviation; MW-U: Mann-Whitney U

TABLE 3: Means, standard deviations and comparisons of minutes played by domestic and foreign players

	Domestic		Foreign		t/MW-U test		Cohen d	
Season	$\bar{X}$	SD	$\bar{X}$	SD	statistics	p value	effect size	Magnitude
2018-2019	15.04	6.52	26.76	4.73	788	<0.001	2.04	Large
2020-2021	14.87	6.22	25.75	4.52	905.5	<0.001	1.99	Large
2021-2022	15.01	5.74	26.86	4.22	573.5	<0.001	2.36	Large
2022-2023	14.62	6.48	27.37	4.63	15.421	<0.001	2.30	Large
2023-2024	14.39	5.91	26.60	4.04	554	<0.001	2.43	Large

SD: Standard deviation; MW-U: Mann-Whitney U

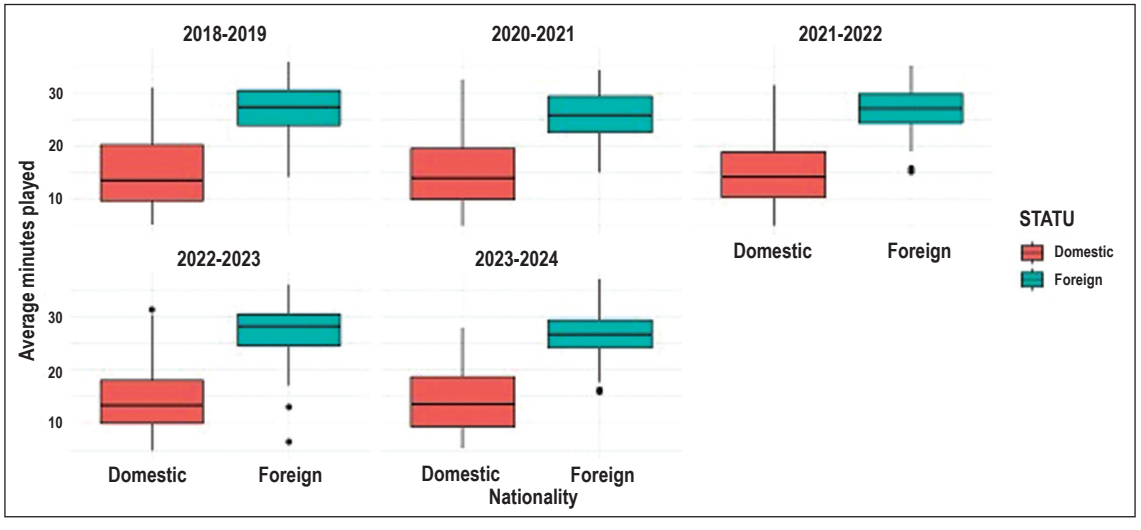

FIGURE 1: Box plot of the distribution of the average minutes played by domestic and foreign players for each season

TABLE 4: Means, standard deviations and comparisons of usage rates of domestic and foreign players

	Domestic		Foreign		t/MW-U test		Cohen d	
Season	$\bar{X}$	SD	$\bar{X}$	SD	statistics	p value	effect size	Magnitude
2018-2019	15.81	2.96	18.14	3.09	2479	<0.001	0.77	Moderate
2020-2021	15.17	3.43	19.17	3.41	2069	<0.001	1.17	Large
2021-2022	14.97	3.62	18.88	3.92	2254.5	<0.001	1.04	Large
2022-2023	14.96	3.72	18.58	3.75	2239.5	<0.001	0.97	Large
2023-2024	14.82	3.42	19.12	3.75	1981	<0.001	1.20	Large

SD: Standard deviation; MW-U: Mann-Whitney U

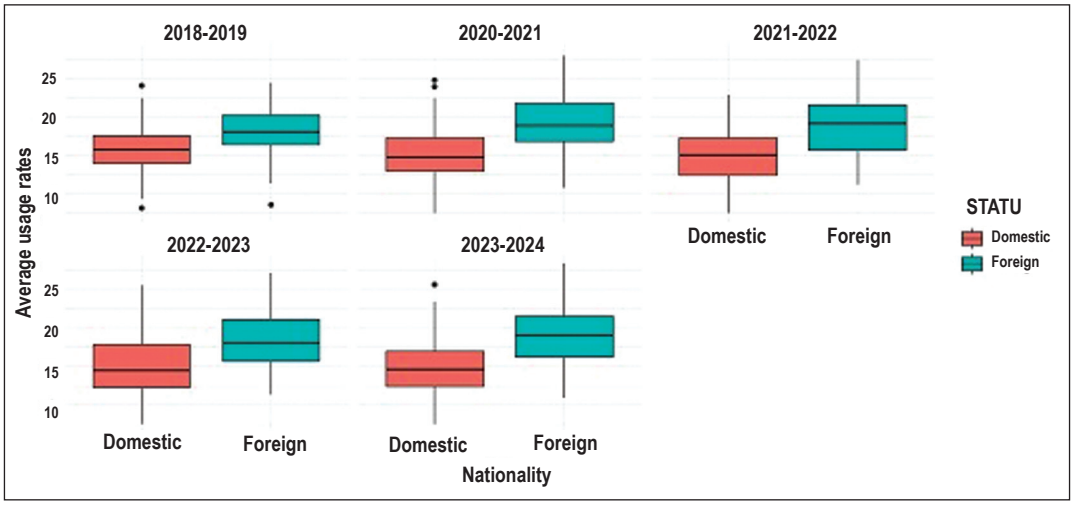

FIGURE 2: Box plot of the distribution of the average usage rates by domestic and foreign players for each season

between domestic and foreign players across each season ($p<0.01$). The effect size values indicate a medium magnitude during the 2018-2019 season, in the 1st year of the rule change, whereas this value is large in the subsequent 4 seasons. Figure 2 also presents the distribution of average usage rates for domestic and foreign players across each season via box plots.

DISCUSSION

First, an examination of Table 1 reveals that in the 2 seasons following the rule change, the proportion of domestic players who satisfied the eligibility criteria (playing in at least 10 games and averaging over 5 minutes) exceeded that of foreign players. The percentage has shifted in favor of foreign players over the last 3 seasons. The transition from the 5 foreigners' rule to the 5+1 rule has predictably increased the number of foreign players in the league, thereby creating a numerical advantage over domestic players. Following the 2013-2014 season, the regulation on foreign players was modified from 3+2 to allow 5 foreign players on the field at the same. This aligns with Özmen's study which reported a decline in domestic players' share of total playing time from 44-27% post-regulation changes.[1]

The comparison of average minutes played indicated a statistically significant difference between domestic and foreign players. Moreover, the effect sizes for each season were determined to be large (Cohen's $d>0.8$). An effect size classified as "large" signifies that the difference is not only statistically significant but also practically significant. This consistent tendency highlights that teams in the league prioritize foreign players more prominently on the court. The results of this study support Özmen's findings; as illustrated in Table 3 and Figure 1, foreign players outperformed domestic players in average playing time.[1] Although there is limited scholarly research on playing time comparisons, Gasperi et al. demonstrated in their study that a comparable superiority was observed in the women's European league.[13]

The study also analyzed the average usage rates of domestic and foreign players. Analysis of the data in Table 4 and Figure 2 revealed a statistically significant difference in the average usage rates between domestic and foreign players. This statistic shows that foreign players' average usage rates are also higher than domestic players. To the best of the author's knowledge, this is the 1st study to compare the usage rates of domestic and foreign players, so a comparison with the literature cannot be made. However, typical statistics such as FGA, FTA, AST, and TO are incorporated into the usage rate formula in the studies comparing efficiency. After analyzing the data presented in these studies, it is apparent that the conclusions discovered are supported. Harbili et al. demonstrated through 3 seasons of the TBSL that for-

eign players surpassed domestic players in average values across these 4 variables.[8] Yalçın et al. compared Turkish players against American players and athletes from other nations.[9] Their study, done over a single season, revealed that Turkish players remained behind other players again in these 4 variables.

While this study did not explicitly analyze the causal relationship between the 5+1 foreign player rule and variations in usage rates; however, the smaller gap in usage rates during the rule's initial season (2018-2019) implies changes, with effect sizes reflecting moderate differences (Cohen's d: 0.5-0.8). Subsequent seasons, however, demonstrated large effect sizes (Cohen's d>0.8) reflecting a systemic transition toward greater on-court responsibilities for foreign players. This aligns with Özmen's findings, which associated increased foreign quotas to domestic players being relegated to secondary roles, reducing their involvement in key gameplay.[1] Özmen further asserted that such policy changes, such as allowing 5 foreign players, negatively affected the performance of domestic players in the short term.[1] These findings highlight the necessity for future research to explore long-term consequences of foreign player policies across leagues and their implications for national player development.

The dominance of foreign players in the TBSL, evidenced by their higher average playing time and usage rates, reveals a complex duality. While studies suggest foreign player quotas improve club success by elevating competitiveness and tactical diversity some contend that over dependence on foreign talent undermines team cohesion and marginalizes domestic players.[12,28-30] Similarly, The effect on national team performance is still debated. Özmen directly links increased foreign quotas to Türkiye's decline in international competitions (e.g., EuroBasket 2017), contrasting earlier successes (EuroBasket 2001, World Championship 2010), whereas Guimarãe et al. argue that strategic integration of foreign players can elevate domestic talent through competitive exposure.[1,6] This conflict extends to broader research; Shlonska et al. mentioned that legionnaire players also influence national team success, Ermiş et al. relate restricted club playing time with poor national team performance, Wang emphasizes that success stems not from foreign player quantity but from diverse, adaptable rosters.[31-33] Federations must therefore balance quotas to prevent hindering domestic development while leveraging foreign expertise. Future studies should quantify long-term policy impacts and analyze how domestic players' usage rates in leagues influence national team dynamics, ensuring regulations prioritize both club excellence and sustainable national growth.

This study presents several strengths. First, it is the first to analyze usage rates, a critical metric of on-court responsibility, between domestic and foreign players in the TBSL, filling a gap in the literature. Second, both statistical significance testing (Shapiro-Wilk, t-tests) and effect-size measures (Cohen's d) were applied, ensuring that the results represent not just mathematical differences but also practical significance. However, some limits must be recognized. Dependence on aggregated player averages, as opposed to match-level statistics, may obscure game-specific dynamics. Additionally, positional analysis was excluded due to the mismatch between traditional classifications and modern versatile player roles.[34,35] This gap could be addressed by cluster analysis based on performance statistics or physical attributes, though such an approach requires expanded datasets and distinct methodologies beyond this study's scope.

CONCLUSION

An examination of five seasons (2018/2019-2023/2024) in the TBSL under the 5+1 foreign player regulation uncovers notable trends in player deployment. Initially, domestic players surpassed foreign players in the first 2 seasons; however, foreign players subsequently achieved numerical dominance in the following three seasons. Although average number of games played by these players was similar (no significant difference in average games played), foreign players demonstrated statistically significant superiority in both average minutes played ($p<0.01$, Cohen's $d>0.8$) and usage rates ($p<0.01$, moderate-to-large effect sizes) throughout all seasons. These results highlight a systemic prioritization of foreign players in critical on-court roles, reflecting their increased responsibilities in game play relative to do-

mestic players. The consistency of these disparities underscores structural patterns in roster management strategies within the TBSL.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

This study is entirely author's own work and no other author contribution.

REFERENCES

1. Özmen MU. Short-term impact of a foreign player quota liberalisation policy on domestic player performance: evidence from a regression discontinuity design. International Journal of Sport Policy and Politics. 2019;11(1):39-55. [Crossref]
2. Koba TH, Nagel MS, Watanabe NM, Yan G, Southall RM, Kidd VK. An exploration of professional US-based basketball players competing in Turkey. Journal of Global Sport Management. 2023;8(1):161-82. [Crossref]
3. Chiba N. The glocalization and management of professional basketball leagues: the Euroleague, National Basketball League of Australia and bj-league of Japan. Asia Pacific Journal of Sport and Social Science. 2015;4(2):134-43. [Crossref]
4. Türkiye Basketbol Federasyonu [İnternet]. TBF Başkanı Türkoğlu, Türkiye Sigorta Basketbol Süper Ligi Fikstür Kura Çekimi Sonrasında Açıklamalarda Bulundu [Erişim tarihi: 9 Mayıs 2024]. Erişim linki: [Link]
5. BASKED [İnternet]. Yabancı Kuralları ve Yerli Sporculara Dair İstatistik Çalışmamız [Erişim tarihi: 9 Mayıs 2024]. Erişim linki: [Link]
6. Guimarãe E, Santos A, Santos E, Tavares F, Janeira MA. National players vs. foreign players: what distinguishes their game performances? A study in the portuguese basketball league. RICYDE Revista Internacional de Ciencias del Deporte. 2018;14(54):374-81. [Link]
7. Wang X, Han B, Zhang S, Zhang L, Calvo AL, Gomez MÁ. The differences in the performance profiles between native and foreign players in the Chinese basketball association. Frontiers in Psychology. 2022;12(2021):788498. [Crossref]
8. Harbili E, Harbili S, Yalçın CG. Comparison of efficiency ratings of Turkish and international basketball players playing in the Turkish Basketball League according to their positions. World Applied Science Journal. 2011;14(5):745-9. [Link]
9. Yalçın YG, Altın M, Demir H. Comparison of basketball performance and efficiency scores between Turkish basketball league players who are Turkish, American and other nations origin. European Journal of Physical Education and Sport Science. 2016;2(4). [Crossref]
10. Özmen MU. Foreign player quota, experience and efficiency of basketball players. Journal of Quantitative Analysis in Sports. 2012;8(1):7-7. [Crossref]
11. Çene E, Özdalyan F, Parim C, Mancı E, İnan T. How do European and non-European players differ: evidence from EuroLeague basketball with multivariate statistical analysis. Proceedings of the Institution of Mechanical Engineers, Part P: Journal of Sports Engineering and Technology. 2024;0(0):1-20. [Crossref]
12. Ciğerci AE, Genç H, Sever O. EuroLeague dörtlü final oynayan takımlardaki yerli ve yabancı oyuncuların karşılaştırılması [The comparison of domestic and foreign players in the teams playing the final four in Euroleague]. Beden Eğitimi ve Spor Bilimleri Dergisi. 2020;22(2):44-54. [Link]
13. Gasperi L, Conte D, Leicht A, Gómez-Ruano MÁ. Game related statistics discriminate national and foreign players according to playing position and team ability in the Women's Basketball EuroLeague. Int J Environ Res Public Health. 2020;17(15):5507. [PubMed] [PMC]
14. Sarlis V, Tjortjis C. Sports analytics-evaluation of basketball players and team performance. Information Systems. 2020;93:101562. [Crossref]
15. Facchinetti T, Metulini R, Zuccolotto P. Filtering active moments in basketball games using data from players tracking systems. Annals of Operations Research. 2023;325(1):521-38. [Crossref]
16. Evans BA. From college to the NBA: what determines a player's success and what characteristics are NBA franchises overlooking? Applied Economics Letters. 2018;25(5):300-4. [Crossref]
17. Wang Y, Liu W, Liu X. Explainable AI techniques with application to NBA gameplay prediction. Neurocomputing. 2022;483:59-71. [Link]
18. Lorenzo J, Lorenzo A, Conte D, Giménez M. Long-term analysis of Elite Basketball Players' game-related statistics throughout their careers. Front Psychol. 2019;10:421. [Crossref] [PubMed] [PMC]
19. Kubatko J, Oliver D, Pelton K, Rosenbaum DT. A starting point for analyzing basketball statistics. Journal of quantitative analysis in sports. 2007;3(3):1-1. [Crossref]
20. Assani S, Mansoor MS, Asghar F, Li Y, Yang F. Efficiency, RTS, and marginal returns from salary on the performance of the NBA players: a parallel DEA network with shared inputs. Journal of Industrial and Management Optimization. 2022;18(3):2001-16. [Crossref]
21. Casals M, Martinez AJ. Modelling player performance in basketball through mixed models. International Journal of performance analysis in sport. 2013;13(1):64-82. [Crossref]
22. Jakovljevic S, Pajic Z, Gardasevic B. The influence of certain cognitive abilities on situation efficiency of basketball players. Facta Universitatis, Series: Physical Education and Sport. 2016;13(2):283-90. [Link]
23. Sampaio J, Drinkwater EJ, Leite NM. Effects of season period, team quality, and playing time on basketball players' game-related statistics. European Journal of Sport Science. 2010;10(2):141-9. [Crossref]
24. Blanco V, Salmerón R, Gómez-Haro S. A multicriteria selection system based on player performance: case study-the spanish acb basketball league. Group Decision and Negotiation. 2018;27(1):1029-46. [Crossref]
25. Keskin S. Comparison of several univariate normality tests regarding Type I error rate and power of the test in simulation based small samples. Journal of Applied Science Research. 2006;2(5):296-300. [Link]
26. Razali NM, Wah YB. Power comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, Lilliefors and Anderson-Darling tests. Journal of Statistical Modeling and Analytics. 2011;2(1):21-33. [Link]

27. Cohen J. A power primer. Psychol Bull. 1992;112(1):155-9. [Crossref] [PubMed]

28. Alvarez J, Forrest D, Sanz I, Tena JdD. Impact of importing foreign talent on performance levels of local co-workers. Labour Economics. 2011;18(3):287-96. [Crossref]

29. Wang GY. Cultural group diversity and team performance: The importance of international employees. Scottish Journal of Political Economy. 2024: e12411. [Crossref]

30. Brox E, Krieger T. Birthplace diversity and team performance. Labour Economics. 2022;79:102288. [Crossref]

31. Shlonska O, Borysova O, Kostyukevich V, Yakusheva Y, Adamchuk V, Strelnykova Y. Formation of national volleyball teams: the impact of player migration. Journal of Physical Education and Sport. 2024;24(8):1843-952. [Crossref]

32. Ermiş E, Ermiş A, Erilli NA, Konca E. The association between basketball players' times in the game and their performance: a comparison of Euroleague-Eurobasket. Spor ve Performans Araştırmaları Dergisi. 2019;10(2):114-22. [Crossref]

33. Wang GY. The role of diversity in determining team efficiency: an empirical sports team analysis. Journal of Data, Information and Management. 2024;6(1):85-98. [Crossref]

34. Alagappan M. From 5 to 13: Redefining the positions in basketball. In: MIT Sloan sports analytics conference; Boston, MA: March 2-3, 2012.

35. Kalman S, Bosch J. NBA lineup analysis on clustered player tendencies: a new approach to the positions of basketball&modeling lineup efficiency of soft lineup aggregates. In: MIT Sloan Sports Analytics Conference; Boston, MA: March 6-7, 2020.