

Performance analysis of switching defense to ball screens in the fourth quarter of close Euroleague matches

PANAGIOTIS FOTEINAKIS¹, STEFANIA PAVLIDOU², NIKOLAOS STAVROPOULOS³

^{1,2}, Department of Physical Education and Sport Science, Democritus University of Thrace

³ School of Physical Education and Sport, Aristotle University of Thessaloniki, Laboratory of Biological Evaluation of Human Performance, GREECE

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Abstract:

Adopting a defensive strategy of switching to ball screens (pick and roll) has become increasingly prevalent in contemporary basketball. This study evaluated the technical and tactical aspects of defensive actions when encountering ball screen offenses, identifying key factors influencing success or failure in defending the pick and roll, particularly in crucial moments during the fourth quarter of close Euroleague matches. A comprehensive analysis of forty-five games from the 2023–2024 Euroleague championship revealed an average end-of-game score difference of 4.42 ± 2.7 points. A total of 452 pick and roll actions were evaluated, where the defense opted for switching, leading to a mismatch scenario. Factors such as the initial defense on the ball-handler before the switch, the technique employed by the screener's defender upon switching onto the ball-handler, defensive strategies for handling outside and inside mismatches, the approach of the ball-handler's defender when switching onto the screener, and the effectiveness of the switch in determining the outcome of the pick and roll action were examined. The findings underscored that switching to counter-pick and roll offenses was the most commonly deployed defensive tactic (52%), showcasing a high success rate, particularly towards the end of the games (56.4%). Notably, the winners performed a switch over the screen by the ball-handler's defender more frequently (55.3%, $\chi^2 = 5.042$, $p < .05$), followed by a defensive strategy to force the ball-handler to use their weaker hand during outside mismatches (37.3%, $\chi^2 = 9.402$, $p < .05$). Additionally, an aggressive defensive approach involving the screener's defender effectively neutralizing the 3-point shot from the ball-handler (67.8% of total mismatches) and employing a defensive stance in front of the post-up players during inside mismatches demonstrated a success rate of 60.8%, thus proving to be effective defensive strategies against the pick and roll. This study found no significant correlation between the effectiveness of defensive switches and the match's outcome.

Key Words: basketball, pick and roll, defensive switch, mismatch

Introduction

In recent years, performance analysis has evolved significantly, enabling the recording, analysis, and assessment of individual and team performance. As elucidated by Drust (2010), performance analysis in team sports encompasses the detailed examination of technical, tactical, and strategic behaviors exhibited during training sessions or competitive matches, aiming to measure and understand performance levels. In basketball, professionals such as performance analysts, scouts, and statistical experts have adopted innovative technologies to comprehensively understand the intricacies of the sport, encompassing its technical, tactical, and various other aspects (Peraica, 2022). This concerted effort provides coaches and players with invaluable feedback regarding their performance, offering guidance on decision-making processes within complex game scenarios (Nunes, Iglesias, Daza, Iruña, Caparrós & Anguera, 2016).

Traditionally, observational video analysis has been instrumental in retrospectively evaluating performance discerning patterns between winners and losers (Csataljay, O'Donoghue, Hughes & Dancs, 2009; Ibanez, Sampaio, Feu, Lorenzo, Gomez & Ortega, 2008; Sampaio & Janeira, 2003; Trninic, Dizdar & Lukšić, 2002; Karipidis, Fotinakis, Taxildaris & Fatouros, 2001; Fotinakis, Karipidis, Papadimitriou & Taxildaris, 2000), home or away advantage (Moreno, Gomez, Lago, & Sampaio, 2013; Gomez, Lorenzo, Ibáñez, Ortega, Leite & Sampaio, 2010; Jones, 2008), and probing into the technical and tactical aspects of team strategies, aiding in both self-preparation and opponent scouting efforts (Sampaio, Drinkwater & Leite, 2010; Tsamourtzis, Karypidis & Athanasiou, 2005; Fotinakis, Karipidis & Taxildaris, 2002). However, in the past decade, video analysis has rapidly evolved owing to advancements in information technology resources available to teams, allowing to refine performance analysis and shed light on factors influencing game outcomes (Vaquera, García-Tormo, Gómez Ruano & Morante, 2016). The rise of the ball screen (pick and roll, PnR) play as a cornerstone of basketball strategy has been a prevailing trend in the EuroLeague since the imposition of the 24-s shot clock limitation in 2000. Teams continually seek ways to create space advantages for their key players, with PnR being

a prominent method for inducing defensive miscommunication or increasing the decision-making load. The PnR is the most frequently employed tactic for leveraging 2-on-2 ball screen actions in basketball (Remmert & Chau, 2019; Marmarinos, Apostolidis, Kostopoulos, & Apostolidis, 2016; Gómez, M. Á., Battaglia, O., Lorenzo, A., Lorenzo, J., Jiménez, S., & Sampaio, J. 2015; Polykratis, Tsamourtzis, Mavridis & Zaggelidis, 2010).

The strategic advantages of employing the ball screen in basketball are indisputable. A well-executed ball screen puts pressure on the defender tasked with containing the ball handler, compelling split-second decisions. Euroleague teams increasingly incorporate ball screen plays into their offensive strategies, exploiting defensive reactions in initial and subsequent rotations. Recent research underscores the challenge posed by ball screen offenses across all levels of basketball, with studies affirming its prevalence and difficulty to defend against (Izzo, Varde'i, Righi, Cejudo & Giovannelli, 2023; Nunes, Iglesias & Anguera, 2021; Stavropoulos & Stavropoulos, 2020; Remmert & Chau, 2019; Štrumbelj, Vračar, Robnik-Šikonja, Dežman & Erčulj, 2013; Vaquera, Cubillo, García-Tormo & Morante, 2013; Lamas, Junior, Santana, Rostaiser, Negretti & Ugrinowitsch, 2011). As ball screen offenses have become the focal points of Euroleague strategies, defensive countermeasures to contain and neutralize these plays have also become focal points. Defending against ball screens is one of the most challenging tasks in half-court defense (Messina, 2005). The complexity arises from the required collective effort of all five defenders, contrasting with the traditional 2-on-2 scenarios, as the offensive team seeks to create space advantage while the defensive team tries to counter such actions (Messina, 2005). A study by Koutsouridis, Karamousalidis, and Galazoulas (2018) evaluated the efficacy of Hi-PnR (PnR executed at the middle of the court) and its impact on defensive strategies and game outcomes during the 2016 Olympic Games, highlighting switching as the most effective defensive response. Additionally, Polykratis et al. (2009) found statistical significance only in the case of switching defenses, attributing success primarily to this tactic. However, Gómez et al. (2015) observed limitations in the effectiveness of switching defenses against PnR.

Cumulatively, research exploring offensive and defensive strategies surrounding PnR actions underscores the growing popularity of switching defenses. Indeed, switching is not merely an isolated strategy but a rising trend within the Euroleague. Calvo, García, and Navandar (2017) studied offensive mismatches resulting from ball screens, while Symeonidou, Karamousalidis, Stavropoulos, Ntikas, Zavaropoulos and Galazoulas (2021), investigated the exploitation speed of PnR mismatches. As the definition implies, a switch occurs between the ball handler and the screener's defender, initiated when the on-ball defender cannot effectively pursue the ball and attain a balanced position. In such instances, the on-ball defender transitions to guarding the roll man while the screener's defender is responsible for containing the ball handler. This scenario, commonly called a mismatch, presents a viable defensive strategy because it compels the offense to adapt, resulting in various possible outcomes (Calvo et al., 2017). The offense may exploit the speed advantage of the ball handler against a typically slower defender (outside mismatch), utilize the size advantage inside with the roll man posting up against a smaller defender (inside mismatch), or exploit defensive adjustments made to counter mismatches by passing to uninvolved players, thereby capitalizing on defensive lapses (help defense). This defensive tactic is used across various coverages and court positions. However, in basketball performance analysis, most studies have predominantly focused on aspects related to offensive play, with comparatively fewer investigations into defensive strategies (Peraica, 2022; Nunes et al., 2021; Battaglia, Sanchez, Borrás & Jiménez, 2009; Álvarez, Ortega, Gómez & Salado, 2009). Nunes et al. (2021) revealed that in 57.1% of instances, defenses in the ACB League failed to counter PnR actions effectively. Franks, Miller, Bornn and Goldsberry, (2015), attribute this lack of research on defending the PnR to the inadequacy of traditional defensive statistics, which offer limited insights into defensive efficacy. This limitation is particularly pronounced when analyzing switching defenses in ball screens, where the determinants of success or failure remain insufficiently explored. According to De Saá, Martín Gonzalez, Sarmiento Montesdeoca, Rodríguez Ruiz, Arjonilla López, and García-Manso (2013), scoring dynamics during the latter stages of basketball games, particularly in the third and fourth quarters, become inherently unpredictable, especially in closely contested matches with fewer than 10-point score differences. It is reasonable to infer that teams competing in such tight contests transition into critical stages at the end of the games (Gomez et al., 2016). Therefore, the objective of this study was to evaluate the technical and tactical defensive variables before, during, and after switches to ball screen offenses, discerning factors indicative of defensive success or failure in defending against the PnR and influencing game outcomes during the fourth quarter of close Euroleague games. We hypothesized that defensive tactical behaviors during ball screens depended on the specific movements of defenders tasked with guarding the ball handler and screener.

Materials and Methods

Participants

The sample comprised 45 closely contested matches from the 2023–2024 EuroLeague regular season. Games were selected based on the criterion of "close games," defined as those with a score difference of fewer than 10 points at the end of both the third quarter and the game, consistent with previous research (De Saá et al., 2013). The average score difference at the end of the game was 4.42 ± 2.7 points (mean $\pm$ SD), while at the end of the third quarter, it was 4.68 ± 2.75 points. A total of 452 ball screens from set offenses employing a man-to-man defense by opponents were identified and analyzed, with the defensive response being a switch. The participating teams in the analyzed games included Baskonia, Barcelona, Real, Valencia, Bayern, Alba,

Olympiakos, Panathinaikos, Maccabi, Milan, Virtus, Zalgiris, Fenerbahce, Crvena Zvezda, Partizan, Monaco, and Villeurbanne.

Observation Instruments/Data Analysis/Statistical Analysis

The analysis of the games was conducted through systematic observation, employing video analysis software (Sport Scout STA Ver. 3.2). Using this software, all games were played on a laptop, allowing for pausing and replaying to identify instances of ball screens. The observations during game monitoring were recorded using a Microsoft Excel spreadsheet (Microsoft Inc., Washington, USA).

The SPSS 29 package software was used for statistical analysis. Crosstabulation analysis was utilized, employing a chi-square (χ^2) distribution, with the significance level set at $p < .05$. To ascertain the relative significance of variables concerning the effectiveness of defensive switches and their impact on game outcomes, chi-square automatic interaction detector (CHAID) decision trees were created.

Procedure and Variables

The game analysis was conducted by a seasoned basketball coach and Sports Sciences graduate with over 20 years of professional experience. To ensure data observation and registration accuracy, each game underwent two thorough assessments. Moreover, four randomly selected games were re-observed by the same observer after one month to evaluate the consistency of observer registration and validate the data. Intra-observer reliability was assessed using weighted Cohen's Kappa correlation coefficients, yielding results ranging from 0.82 to 1.0, signifying high to perfect agreement (Altman, 1991). This study focused solely on ball screen actions occurring in the fourth quarter of games, specifically those instances where the offense gained a clear tactical advantage, decisively influencing the offensive outcome. Only genuine defensive switches (double or triple) were recorded, excluding temporary switches prompted by circumstantial factors unrelated to the team's defensive strategy. Actions such as slip screens, hand-offs, and screen rejections were omitted from the study. Various variables were analyzed during game observations, including the game result (win-loss), the defensive approach towards the ball handler before the switch (pressed or not pressed), the technique employed by the screener's defender (denying the 3-point shot or not), defensive responses to outside mismatches (forcing the ball handler to use their weak or strong hand, or employing a flat-parallel guarding approach), the method of switching by the ball handler's defender (over or under the screen), defensive positioning against inside mismatches (front or behind the inside player), and the efficacy of the switch (positive or negative) concerning the outcome of the ball screen offense (positive or negative). A ball screen offense was deemed successful if the team scored two (2p) or three points (3p), secured a basket and foul for two (2pF) or three points (3pF), or when the offense received a foul resulting in no bonus free throws (FO) or bonus free throws (FT1, FT2, FT3). Conversely, a ball screen action was considered unsuccessful if the team missed a shot (-3p, -2p), committed a turnover (TU, including offensive fouls), or encountered a blocked shot (BL).

Results

The study findings revealed that out of 872 ball screen actions during the fourth quarter of 45 closely contested EuroLeague games, defensive teams opted to switch in 52% ($n = 452$) of the total ball screen actions, resulting in a mismatch scenario. Figure 1 illustrates the comparison of overall data, indicating no discernible difference in the frequency of switching and game outcomes. Both winning and losing teams executed comparable switches, with winning teams employing 224 PnR actions and losing teams utilizing 228 PnR actions.

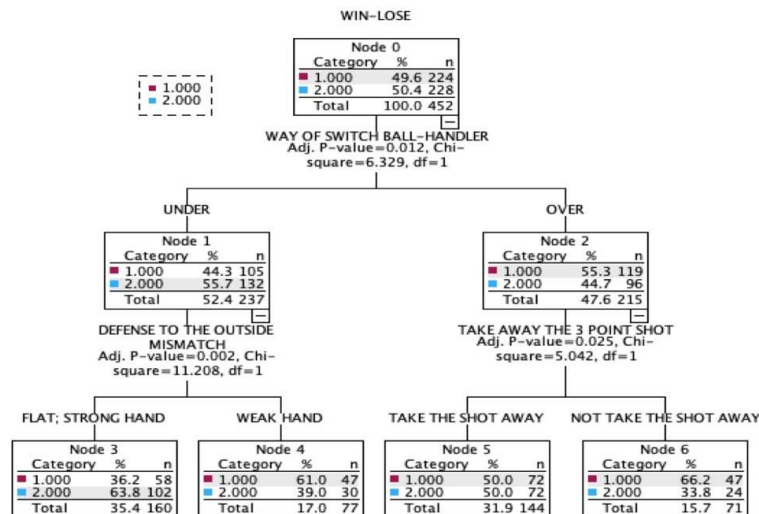


Figure 1. Growing method. CHAID tree describes the frequency of the result of the game according to the way of the switch by the ball-handler and the defense to the inside and outside mismatch.

Regarding efficacy (positive or negative), as outlined in Table 1, the switch to the ball screen was successful in yielding a negative outcome for the offense in 56.4% (n = 255) of total actions while resulting in a positive outcome in 43.6% (n = 197) of total actions (Table 1). No statistically significant difference was observed between the switch's efficacy and game outcomes ($\chi^2 = 1.796$, $p > .05$). Notably, the winning team demonstrated greater efficiency in defending the PnR, with a 59.6% (n = 134) success rate compared to 53.3% (n = 121) for the losing team.

Table 1. Efficacy of the switch in mismatch actions according to the result of the game.

		Efficacy of the Switch					χ^2
		Positive		Negative		Total	
		N	%	N	%	N	
Result of the game	Win	134	59.6%	91	40.4%	225	1.796 p>.05
	Lose	121	53.3%	106	46.7%	227	
	Total	255	56.4%	197	43.6%	452	

Note: N: number of actions, %: percentage of actions, * $p < 0.05$

This study also examined ball-handler pressure before the switch to the ball screen. The crosstabulation analysis results indicated that in 28.1% (n = 127) of ball screens, the ball-handler experienced pressure before the screen. However, no statistically significant differences were observed in the efficacy of the offense concerning the defense applied to the ball-handler ($\chi^2 = 2.134$, $p > .05$) or the game outcome ($\chi^2 = 1.072$, $p > .05$).

Statistically significant differences were found in how the ball-handler's defender switched onto the screener during the ball screen and its correlation with the game outcome ($\chi^2 = 5.042$, $p < .05$). Winners exhibited a higher frequency of switching over the ball screen, accounting for 55.3% (n = 119) of their actions (Figure 1), compared to 44.7% (n = 96) for the losing teams.

However, the game result was unaffected by the method employed by the screener's defender in switching onto the ball-handler ($\chi^2 = 1.699$, $p > .05$). Winners executed an aggressive switch, aiming to nullify the 3-point shot from the ball-handler in 64.9% (n = 146) of instances. In comparison, the losing teams similarly utilized this strategy in 70.6% (n = 161) of total mismatch situations (67.8%, n = 308). As illustrated in Figure 2, the aggressive switch by the screener's defender contributed to a negative outcome for the offense in 56.3% (n = 254) of total situations, with no statistically significant difference ($\chi^2 = .016$, $p > .05$) observed between switch technique and PnR action efficacy.

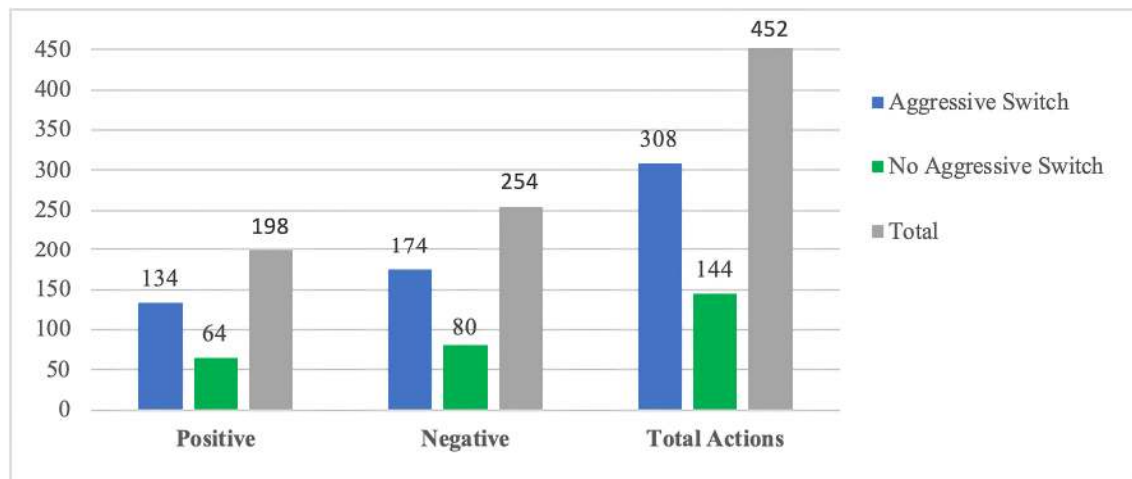


Figure 2. Effectiveness of the switch (positive-negative) regarding the technical approach employed by the screener's defender

Conversely, statistically significant differences were found in the defensive approach to outside mismatches regarding game outcomes ($\chi^2 = 9.402$, $p < .05$), with winning teams exhibiting a more systematic tendency to force the ball handler towards their weaker hand (Table 2).

Table 2. Defense to the outside mismatch actions according to the result of the game.

		Defense to the Outside Mismatch						x ²
		Force to the Strong		Force to the Weak		Flat Def.		
		Hand		Hand				
		N	%	N	%	N	%	
Result of the game	Win	72	32.0%	84	37.3%*	69	30.7%	9.402 p<.05
	Lose	69	30.3%	60	26.3%	99	43.4%*	
	Total	141	31.1%	144	31.8%	165	37.1%	

Note: N: number of actions, %: percentage of actions, * p<0.05

However, the efficacy of the defensive switch regarding the approach to outside mismatches did not yield statistically significant differences ($\chi^2 = 1.298$, $p > .05$). Notably, PnR offenses resulted in adverse outcomes in 60.1% ($n = 86$) of cases where the defense directed the perimeter player towards their weak hand, followed by a 55% success rate ($n = 93$) with flat defense. Conversely, forcing the perimeter player towards their strong hand in outside mismatches was least effective, with a success rate of 54.2% ($n = 87$).

Regarding defensive approaches to inside mismatches (either defending in front or behind the roll player), no statistically significant differences were observed in either game outcomes ($\chi^2 = .000$, $p > .05$) or offensive efficacy ($\chi^2 = 1.625$, $p > .05$). Overall, Euroleague teams opted to defend inside mismatches in front of the roll player in 43.1% ($n = 171$) of total situations, achieving a success rate of 60.8% ($n = 104$). Conversely, defending behind the roll player yielded a success rate of 54.4% ($n = 123$).

Discussion

Most studies investigating defensive strategies typically focus on determining defensive systems' prevalence and impact on game outcomes. Franks et al. (2015) highlight that few studies elucidate the individual player behaviors in dynamic sports like basketball. Nonetheless, it is imperative to analyze the technical and tactical defensive actions employed by EuroLeague teams during the switch to ball screens, aiming to counter one of the most challenging offensive actions in the game.

This study examined the technical and tactical defensive variables occurring before, during, and after the switch to ball screen offenses during the fourth quarter of closely contested EuroLeague games, focusing on discerning success from failure in defending the PnR. The analysis encompassed the defensive approach towards the ball handler before the switch, the screener's defender's switching technique on the ball handler, defense strategies for outside and inside mismatches, the ball handler's defender's switching method on the screener, and the efficacy of the switch regarding the PnR action outcome. Our findings corroborated that opting for the PnR switch is one of the most common defensive actions (Calvo et al., 2017; Koutsouridis et al., 2018), particularly prevalent in the final quarter of closely contested games (Prieto-Lage, Vázquez-Estévez, Paramés-González, Argibay-González, Reguera-López-de-la-Osa, & Gutiérrez-Santiago, 2022).). This period often determines the game's outcome. Our results revealed that when defensive teams employed the switch in PnR actions, the offensive team's success rate notably declined, consistent with a previous study (Prieto-Lage et al., 2022).

This study evaluated the pressure applied to the ball handler before the ball screen. The findings revealed that Euroleague teams employed ball-handler pressure in 28.1% of total PnR actions, with no significant impact on offensive efficacy. This aligns with the study by Christmann, Akamphuber, Müllenbach, and Güllich (2018), which found that in 65.7% of analyzed ball screens, defensive pressure on the ball handler was either moderate or absent.

Despite Euroleague teams in this study predominantly opting to switch under the screen, it was determined that defensive effectiveness increased when the ball handler's defender switched over the screen. This strategic choice aims to prevent quick shots by the ball handler in case of a late or non-aggressive switch by the screener's defender. Additionally, it enables the defenders to position themselves in front of the screener after the switch, delaying direct passes and facilitating help defense. Nunes et al. (2021) also advocated for defending over the top of the screen as the optimal approach, contrary to findings by Battaglia et al. (2009), who found going over the screen to be minimally significant.

Our results showed that offensive efficiency decreased when the defense forced the ball handler to utilize their weak hand during outside mismatches. This defensive tactic aims to neutralize the ball handler's driving advantage and establish a clear understanding of strong and weak defensive sides for the rest of the defensive players.

Furthermore, our study observed that defending behind the post-up player was more prevalent in inside mismatches, yet defending in front yielded higher success rates. Positioning the defense in front of the post-up player allows to prevent direct pass opportunities, particularly effective when ball screens culminate in shots by the screener, as suggested by previous studies (Remmert & Chau, 2019; Zukolo, Dizdar, Selmanovic & Vidranski, 2019; Marmarinos et al., 2016).

Conclusions

When the defense employs switching to defend PnR actions, it introduces the potential for exploiting mismatches between players with varying defensive abilities and skills. One advantage of this approach is that it maintains the PnR as a "2 vs. 2" game, minimizing the need for weak-side help. Additionally, it eliminates the need for extensive scouting efforts to cover all actions in the opponent's playbook. A well-executed switch often disrupts the offensive flow, limiting 3-point opportunities by minimizing defensive rotations and prompting isolation of perimeter or post-up players.

From a defensive standpoint, the study underscores the significance of various technical and tactical parameters in the efficacy of switching in PnR actions. Switching to PnR offenses is the most prevalent defensive strategy, with a notable success rate in late-game scenarios. Switching over the screen by the ball-handler's defender is recommended, alongside a defensive tactic of forcing the ball-handler towards their weak hand in outside mismatches and defending in front of the post-up player in inside mismatches. Employing an aggressive switch from the screener's defender to neutralize 3-point opportunities from ball-handlers is also effective. Thus, by implementing switches, the defense aims to force the ball handler to exploit the perimeter mismatch, with the primary objective being to force contested pull-up shots outside the paint, which carry lesser offensive value than other PnR actions.

The limited statistical significance of the results may stem from the fact that the games analyzed in this study involved teams competing in tightly contested matches, particularly in the final quarter, where performance differences were minimal. Further analysis of defensive parameters in complete games, considering additional defensive variables, home-court advantage, and the roles of other defensive players in managing mismatches arising from PnR switches, would be an interesting direction for future research.

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