ANALYSIS OF BALL CONVERSION IN EUROPEAN AND AMERICAN PROFESSIONAL BASKETBALL GAMES

Aleksandar Selmanović, Luka Milanović, Mate Brekalo

1University of Dubrovnik, Croatia
2Faculty of Kinesiology, University of Zagreb, Croatia
3University of Mostar – FPMOZ, Mostar, Bosnia and Herzegovina

Abstract

Start of offense significantly affects the development and execution of the offense. Evaluation of beginnings of offense in professional European and American basketball reveals proportional distribution of 12 applied modalities, however, statistical analysis showed significant differences between the two basketball systems. NBA comparatively demonstrates a higher frequency of offenses that start by winning the ball without time stoppage. In contrast, Euroleague shows significantly greater representation of offensive beginnings by inbounding the ball. The most common forms of offensive openings in basketball are by Inbounding the ball from the baseline on back-court, followed by Opening of offense by a defensive rebound after an unsuccessful field-goal attempt. Both forms are slightly more pronounced in the US professional basketball. A higher degree of offensive efficiency was shown after steals, as it was expected, however, the execution of such modality has also a higher success rate in the NBA. The research results indicate the specific characteristics of observed basketball systems based on correlation of conversion type and situational outcomes. Those explicit features partially affect the principles of appropriate game and training concept.

Key words: European and American basketball, offence start, game structure

Introduction

Examining the dependence of games’ structural elements represents, among others, a valuable analytical approach to broaden the knowledge about basketball norms. By treating the game of basketball as a set of alternating phases of offence and defence it is important to examine the forms of their start, progression and outcome. The moment of change of ball possession from defence into offence and vice versa in basketball terminology is called “conversion”. Due to the coherence of offence and defence, a form of conversion represents an important precondition of the following game phase. Therefore, tactical approach should aim to create a suitable opening of offense that will consequently ensure more successful outcome of offense.

This brings to a conclusion that a high-quality offence is generally a product of high-quality and controlled defence, which is primarily reflected by strict abidance of technical and tactical principles combined with an appropriate aggressiveness. In this context, the beginning of offence is, mainly indirectly, subject of analysis of numerous basketball studies which aim to evaluate the interdependence of its’ structural components or to examine the impact of technical and tactical parameters on success in the game, as well as the ones that aim to analyse the individual and team tasks or to evaluate the standard indicators of situational efficiency.

Javier (1992) describes the importance of spatial and temporal characteristics of the game and motor interaction compliant with technique, tactics and team strategy. Defensive obstructions based on the integration of group tactical manoeuvres such as penetration, cuts, setting picks etc. has a positive effect on offensive efficiency as well as more appropriate prevention of possible fast-breaks by opponents (Remmert, 2003). By examining the effects of different types of defence, Gomez et al. (2007) emphasize the patient ball control on the offense as a prerequisite of controlled defence. Tsamourtzis et al. (2005) and Ortega et al. (2006) emphasize the objective of achieving a high number of offensive transitions which will generally ensure greater success of the offence. The research of individual factors of situational efficiency generally identifies shooting efficiency in the offensive phase and defensive rebounds in the defensive phase as dominant variables affecting victory in basketball (Karipidis et al., 2001.; Milanović et al., 2001.; Csataljay, 2009.; Ibáñez et al., 2008). Thus those modalities of conversion represent a key orientation towards success in the game.

The aim of this study is to determine the characteristics and differences between professional European and American basketball focusing on the analysis of different forms of offensive openings and evaluating their correlation with a successful or unsuccessful offensive execution. Comparison of American and European professional basketball is partially limited due to differences in basketball rules. Regulated specifics, such as primarily limitations in the defence, the dimensions of the court, etc. have a relative impact on the form of conversion which consequently affects the tactical
implementation of the game, i.e. the typical execution of defensive and offensive tasks. Taking into consideration the differences in basketball rules between the two systems, the results of this study contribute to a more precise knowledge regarding the level of connections between observed research subject with game performance.

**Methods**

**Sample of entities:** Entity in this study represent basketball offenses whose limitations are not set according to the principle of change of possession but in accordance with the game rules. Overall sample is consisted of 5718 entities which are collected by notation analysis of 30 randomly selected playoffs matches in 2010 / 2011 season of which 2,604 entities were generated via complete evaluation of 15 Euroleague games and 3,114 from 15 NBA games.

**Sample of variables:** Start of the offense indicates the form in which the team began the offense, and generally the beginnings of offense are divided into two basic types: the start of the offense by capturing the ball without stopping the game time and the start of the offense by inbounding the ball from the side line. Those types generate 12 modalities which cover all forms of offensive openings. Those variables are:
1. Opening of an offense by the jump ball at the beginning of the 1st quarter; (OL-PL)
2. Opening of an offense by defensive rebound after an unsuccessful field goal attempt; (OL-SO-SI)
3. Opening of an offense by offensive rebound after an unsuccessful field goal attempt; (OL-SN-SI)
4. Opening of an offense after: held ball, intercepting the pass; steal, after blocked shot; (OL-UL)
5. Opening of an offense by defensive rebound after an unsuccessful last free throw; (OL-SO-SL)
6. By free-throws; (OL-ISB)
7. Opening of an offense by offensive rebound after an unsuccessful last free throw; (OL-SN-SL)
8. Inbounding the ball from the baseline on the backcourt; (UL-CL-PO)
9. Inbounding the ball from the side-line on the frontcourt; (UL-BL-PN)
10. Inbounding the ball from the side-line on the backcourt; (UL-BL-PO)
11. Inbounding the ball from the baseline on the frontcourt; (UL-CL-PN)
12. Inbounding the ball from the side-line at half-court, (UL-BL-SI)

**Data processing** includes analysis of corresponding modalities in absolute as well as relative values which are especially significant considering the difference in match duration between the two monitored systems. Scoring efficiency is determined by the offense benefit value (KIN) which indicates the relative ratio of their frequency and the number of points. Finally, a non-parametric data analysis method - χ² test is applied to compare European and American basketball in nominal variables at the 0.01 significance level. Data were analysed using Statistica 8.0. statistical package.

**Results and discussion**

The analysis of various beginnings of offensive phase in professional basketball on a comprehensive sample of entities (Tables 1 and 2) shows that majority of offenses begin by inbounding the ball (59.2% in the Euroleague; 55.5% in the NBA), and that is primarily by inbounding the ball from the baseline on the backcourt (38.9% in the Euroleague; 42.1% in the NBA), then from the side-line on the frontcourt (7.6% in the Euroleague, 6.9% in the NBA) and the side line on the backcourt (6.3% in the Euroleague; 5.6% in the NBA). Opening of an offense by capturing the ball without stopping the game time is recorded in 40.7% of cases in the Euroleague as opposed to 44.5% of cases in the NBA. Evaluation of related modalities reveals that those offense openings are predominantly presented by defensive rebound after an unsuccessful field goal attempt (20.4% in the Euroleague; 23.2% in the NBA), followed by steals (8.8% in the Euroleague; 9.7% NBA) and offensive rebound after an unsuccessful field goal attempt (7.3% in the Euroleague, 7.5% in the NBA).

From the results presented it can be generally concluded that offenses in basketball usually start after scored basket (40%). Despite the high frequency of this modality, the most offenses end up unsuccessfully even when combining them with neutral outcomes (OL-SN-SI, OL-SN-SL), in other words, those offense openings in which teams gain an additional opportunity to score. Such a hypothesis is confirmed offense benefit value which is generally less than one point per offensive possession.

Furthermore, from the efficiency viewpoint, it is evident a higher benefit value of offenses that began while ball was on the court (0.89 in the Euroleague; 0.94 in the NBA) than those started by inbounding the ball (0.80 in the Euroleague; 0.83 in the NBA). Such a situation is understandable because almost all transition offenses that hold the greatest efficiency potential are created by steals or defensive rebound (transitions starting by inbounding the ball are quantitatively negligible). From the practical aspect of the game these results emphasize the tactical orientation towards aggressive and mobile defences that present prerequisites for a greater number of primary and secondary transitions. Such tactical orientation is primarily reflected by the high pressure on the player with the ball and the players on the “first pass”, disabling an easy
ball movement and, finally, by ensuring defensive rebound through a strict boxing-out after the shot attempt. Although it would be useful to examine the correlation of conversion modes in a particular type of offense (transitions or set-offenses) and its outcome, these results define the significance level of skilful and effective implementation of offenses that resist defensive pressure.

Table 1: Difference in the type of openings of offences between European and American professional basketball

<table>
<thead>
<tr>
<th>Type of start of offence</th>
<th>Euroleague (freq.)</th>
<th>NBA (freq.)</th>
<th>Euroleague%</th>
<th>NBA%</th>
<th>Euroleague KIN</th>
<th>NBA KIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>OL</td>
<td>1,062</td>
<td>1,387</td>
<td>40.78</td>
<td>44.54</td>
<td>0.89</td>
<td>0.94</td>
</tr>
<tr>
<td>UL</td>
<td>1,542</td>
<td>1,727</td>
<td>59.22</td>
<td>55.46</td>
<td>0.80</td>
<td>0.83</td>
</tr>
</tbody>
</table>

Chi² = 8.177 df = 1, p = 0.0042

Legend: OL – beginning of the offense by obtaining the ball without stopping the game time; UL – beginning of the offense by inbounding the ball from the side lines, KIN – offense benefit value; Chi² – the value of chi-square test; df – degrees of freedom; p – level of significance (<0.05)

Table 2: Difference in the modalities of the beginnings of offense between European and American professional basketball

<table>
<thead>
<tr>
<th>Modality of the beginning of offence</th>
<th>Euroleague (freq.)</th>
<th>NBA (freq.)</th>
<th>Euroleague%</th>
<th>NBA%</th>
</tr>
</thead>
<tbody>
<tr>
<td>OL-SO-SI</td>
<td>532</td>
<td>722</td>
<td>20.43</td>
<td>23.19</td>
</tr>
<tr>
<td>OL-SN-SI</td>
<td>191</td>
<td>232</td>
<td>7.33</td>
<td>7.45</td>
</tr>
<tr>
<td>OL-UL</td>
<td>229</td>
<td>303</td>
<td>8.79</td>
<td>9.73</td>
</tr>
<tr>
<td>OL-SO-SL</td>
<td>67</td>
<td>73</td>
<td>2.57</td>
<td>2.34</td>
</tr>
<tr>
<td>OL-PL</td>
<td>15</td>
<td>16</td>
<td>0.58</td>
<td>0.51</td>
</tr>
<tr>
<td>OL-ISB</td>
<td>13</td>
<td>34</td>
<td>0.5</td>
<td>1.09</td>
</tr>
<tr>
<td>OL-SN-SL</td>
<td>15</td>
<td>7</td>
<td>0.58</td>
<td>0.22</td>
</tr>
<tr>
<td>UL-CL-PO</td>
<td>1,013</td>
<td>1,312</td>
<td>38.9</td>
<td>42.13</td>
</tr>
<tr>
<td>UL-BL-PO</td>
<td>197</td>
<td>215</td>
<td>7.57</td>
<td>6.9</td>
</tr>
<tr>
<td>UL-CL-PN</td>
<td>163</td>
<td>175</td>
<td>6.26</td>
<td>5.62</td>
</tr>
<tr>
<td>UL-BL-SI</td>
<td>120</td>
<td>22</td>
<td>4.61</td>
<td>0.71</td>
</tr>
<tr>
<td>UL-BL-SI</td>
<td>49</td>
<td>3</td>
<td>1.88</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Chi² = 159.407 df = 11, p = 0.0000

Legend: OL-PL – Opening of an offense by the jump ball at the beginning of the 1st quarter; OL-SO-SI – Opening of an offense by defensive rebound after an unsuccessful field goal attempt; OL-SN-SI – Opening of an offense by offensive rebound after an unsuccessful field goal attempt; OL-UL – Opening of an offense after: held ball, intercepting the pass; OL-SO-SL – Opening of an offense by defensive rebound after an unsuccessful last free throw; OL-ISB – By free-throws; OL-SN-SL – Opening of an offense by offensive rebound after an unsuccessful last free throw; UL-CL-PO – Inbounding the ball from the baseline on the backcourt; UL-BL-PO – Inbounding the ball from the side-line on the frontcourt; UL-CL-PN – Inbounding the ball from the baseline on the frontcourt; UL-BL-SI – Inbounding the ball from the side-line at half-court.

Although the values of 12 set modalities of offensive openings in European and American professional basketball are highly correlated, recorded deviations generate statistically significant differences ($\chi^2 = 8.177; p = 0.004$). The difference between Euroleague and NBA in this segment consequently affects the further course of the game flow.

Initiating the offense by rebound or a steal, as well as, inbounding the ball from the baseline show higher frequency in NBA basketball. This thesis is to some extent contradictory, since relatively more steals and greater rebounding efficiency in defense represents defensive success, however inbounding the ball from the back-court baseline is mainly due to opponents’ successful shot, i.e., defensive failure. This arrangement of displayed values of modalities indicates certain specificities within the distribution of offenses between the observed systems of basketball. The results of the study by Cardenas et al. (1995) and Parra (2008) prove that the modality of defensive rebounds, followed by steals modality, is the most common method of initiating the fast-break. Refoyo (2009) also determines the dominance of these modalities, but in the reverse order of frequency. From this we can conclude that the NBA basketball demonstrates the increasing number of transition offenses which is consequently reflected with the highest efficiency (also seen in Table 1). This case is also confirmed in the study by Milanović et al. (2014).

Transition offenses feature random situational obstacles with unpredictable circumstances. The success of transitions is greatly influenced by individual reaction speed, technical skills and motor and cognitive abilities. Such construction makes transition offenses more challenging to improve during training process. Practicing fast-breaks should involve
quick opening of after rebound and progressing according to eventual tactical decisions (movement through proper lanes of attack, dribbling and passing regulation, presence of picks, cuts and various types of offensive execution).

On the other hand, the given structure of offensive beginnings in European basketball indicate the orientation towards ball control in the Euroleague, thus emphasizing greater tendency towards se offense and systematized form of motion offense, which mainly aims at reduction of turnovers and prevention from opponent’ transitions, however, it raises doubts regarding the productivity of the offense. Lower efficiency in European basketball can be, to some extent, justified by specific game rules which allow more freedom of mutual help in defence. Dynamic help side, unlimited double teams and, generally, continuous zone defense significantly affects the neutralization of field goal attempts, penetration and other offensive manoeuvres. The complexity of coordinated defence in the set phase requires diverse and more comprehensive technical and tactical (individual and team) preparation because the level of quality implementation of this type of defence will ultimately have the most significant impact on the final score.

Considering the obtained ratio of offensive beginnings and the fact that the transition offenses mainly start by capturing the “live ball”, logically set offences commonly begin by one form of inbound from the side line which in this case is recorded as a greater incidence, i.e. the distinctive feature, of European basketball. Cruz and Tavares (1998) found that the greatest number of set offences start from the baseline after received basket (36%), followed by inbound behind other lines (24%) and defensive rebounds (11%). The modality Inbounding the ball from the baseline in the defensive zone (UL CL-PO) may serve as a convenient measure of offensive efficiency since it is almost always preceded by opponents scoring. The difference of approximately 3% for UL-CL-PO between two types of basketball implies higher scoring efficiency in the NBA and, at the same time, more successful defence in the Euroleague. It should be pointed out the relative impact of the difference in rules between the two monitored basketball systems. Different measures of restricting defence can certainly result in such a state. From defensive point of view, a greater freedom of collective defence in European basketball, puts comparatively limited zoning on geometrically larger court area of American basketball in disadvantage.

The practical implications of this study relate primarily to game tactics. Defensive rebounds and steals on defence are emphasized. The successful prevention of opponents’ fast-break creation will primarily secure an organized and well-balanced offence, from which derive precise assignments, roles and responsibilities in transition and set defence. This is the only way a team can control game phases and suppress critical intervals during the game.

**Conclusion**

Examining the 12 modalities of starting the offence encountered in basketball, generally can be concluded that Inbounding the ball from the baseline in the defensive zone is the most common form of starting the offense. The frequency of this modality is somewhat more pronounced in professional American basketball. The next significant form of offensive beginning is evident in modality Opening of an offense by defensive rebound after unsuccessful field goal attempt which also demonstrates greater representation in the NBA. The results confirm the findings of previous research that such offenses regularly initiate high frequencies of fast-breaks which contain the greatest efficiency power. From these results it follows that basketball offenses usually start after conceding the basket (40%), followed by defensive rebounds (between 20 and 25%). The rest of modalities are represented by less than 10%. Analysis of differences between European and American professional basketball in variable Beginning of offense indicates specific practical features of the game. The NBA has recorded relatively higher frequency of offenses that started by attaining the “live ball” (without stopping the game time). Those instances of conversion from defence to offense, provide a greater chance for successful offensive outcome. In the Euroleague its shown a greater representation of offensive starts by inbounding the ball.

There is no question that characteristics of each system are, to some extent, a consequence of differences in game rules. Differences in court geometry and provisions restricting defence relatively affect different execution of defensive and offensive tasks which is reflected in a different structure of defence-offense conversion. However, the research proves the logical statement that a team ensures quality offence to a high extent by playing quality defense and vice versa.

**Literature**


