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## ORIGINAL RESEARCH

### RELATION OF EFFECTIVENESS IN PICK N' ROLL APPLICATION BETWEEN THE NATIONAL GREEK TEAM OF AND ITS OPPONENTS DURING THE MEN'S WORLD BASKETBALL CHAMPIONSHIP OF 2006

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#### Abstract

The purpose of this study was to register and analyse the alterations of Pick n' Roll effectiveness between the national team of Greece and its opponents during the Mundobasket 2006 in Japan. The sample consisted of the 9 games that took place between them during the Mundobasket 2006. In the 1528 cases which were registered, we analyzed all the Pick n' Rolls according to 26 pre-estimated factors (form, court area, players combination, way of attack, attack player, shot area, way of defending Pick n' Roll), to reveal all the comparing differences in the Pick n' Roll application and the relation of Pick n' Roll effectiveness and productivity. The statistical analysis package SPSS was used for the statistical analysis of the data, correlation analysis, classification (cluster) and Crosstabs command with  $\chi^2$  (Chi-square) test. The results of the Crosstab analysis, revealed that there are statistically significant differences between the Greek and the other National Teams according to the use of Pick n' Roll move in the offensive set plays and also according the offence efficacy and offence productivity. The Correlation analysis revealed extremely high interrelation between offence efficacy and shot area ( $p = -0,209^{**}$ ,  $\alpha = 0,01$ ), and as far as offence productivity is concerned extremely high interrelation revealed first of all with the final shot player and secondly with the shot area ( $p = -0,2877^{**}$ ,  $\alpha = 0,01$ ). According to the Cluster analysis the results revealed that as far as both offence efficacy and offence productivity are concerned the maximum similarity is modulating in relation with the Pick n' Roll form.

**Keywords:** Basketball, Pick n' Roll, video analysis

#### Introduction

Basketball is characterized as one of the richest and most complicated, as far as the area of tactics are concerned, because during the duration of a game many different situations are presented as much for defense as for offense (Anastasiadis, 1995). In 2000 FIBA changed the rules of basketball in Europe, their aim being to spot the offense more quickly so as to increase the spectacularity of the game in order to increase television ratings and attract sponsors. In this way, the time allowed for offense was reduced from 10" to 8" seconds, and the maximum time allowed from the start of the offense until shooting the ball was reduced from 30" to 24" seconds.

These changes in combination with the continuous improvement of defensive tactics significantly differentiated the way the offense was expressed. In this way, a big part of this, independent of the offensive tactics that follow, end in one on one situations and Pick n' Roll, which consists of the most common cooperation between two players with a ball, and this is why the defense in the two above mentioned situations is so important (Ratberger, 2004). The first responsibility of a player is to create a situation where he can make a pass to a team-mate for a shot in the hoop area or the outside. (Krause, 1991; Kunstadr, 1994; Miller, 1994). That's why, the Pick n' Roll is a great offensive weapon, used by all the teams of the NBA, and is one of the hardest offensive actions to face that teams are called on to stop. Pick-and-rolls are run in transition as drags and step-ups. They are run on the half court on the side, in the middle of the floor and off the elbow. The picks can be stationary or off movement, and they can be set plays or random actions. As you can see, Pick n' Roll plays

can cause a strategic nightmare for coaches just in looking at the numerous actions that a team can present. Now, add to the mix the great players involved, and you further complicate matters” (Ociepka, 2004).

Coaches all around the world independently of their offensive or defensive philosophy adopt a common ground in their goal to beat their opponent at any cost. For this purpose, they use tactics applied to the individual characteristics of the players whom they coach. “Many coaches with an aggressive philosophy, based on pick n roll to help their players increase their opportunities to score with an easy basket”. (Filipovski, 2005).

There are no scientific studies regarding the Pick n’ Roll offensive action in the international references, except those which refer to its appearance frequency according to the total number of attacks. On the other hand the references of great coaches from all over the world as pertains the way of application, the players combination, the offensive opportunities created from the Pick n’ Roll action as well as the ways how to defend Pick n’ Roll, are numerous.

Karl (2003) and Kruger (2007) mention the percentage of using Pick n’ Roll as well in the NBA as in Europe determining the importance that many coaches, around the world, pay for this offensive move. Karl (2003), Yannakis (2006) and Filipovski (2005) explain the reasons and the purposes of the application of this offensive move, emphasizing the creation mismatch within the involved players. Katsikaris (2006) and Ociepka (2004) present the most applicable section of the court and the most prevalent ways defending the Pick n’ Roll. Harris (2007) mentioning the ways defending Pick n’ Roll, detects the increase of the defense efficacy, that the switch offers, during the last seconds of the offence. Winter (1997) explains and analyzes the effectiveness of the offensive triangles created during the Pick n’ Roll application within the involving players and those who spot up in the peripheral area.

In conclusion, Torbert (2004) refers that the attack from the low post offers the attacker, not only the high percentage of shot but also the opportunity of free throws plus the damage of the opponent team which results from the personal fouls.

### **Purpose**

The purpose of this research was to record and analyze the different appearances of Pick n’ Roll as well as the relation of its efficacy between the national team of Greece and its opposing teams during the men’s World Basketball Championship which took place in Japan in 2006, in order to determinate which is the factor that makes the difference between them and maximize the effectiveness of Pick n’ Roll of the Greek offense.

### **Method and process**

The study comprised all the games between the national teams of Greece and it’s opponents, not only during the preliminary round but also during the semifinal and final rounds of the championship. Most specifically video analysis was performed in 9 games of the Greek National Team during this Championship (Greece - Qatar, Greece - Lithuania, Greece - Australia, Greece- Brazil, Greece - Turkey, Greece - China, Greece - France, Greece - USA and Greece – Spain) which were recorded from the international broadcasting sports channels.

### **Instruments collecting data**

The instruments used for the completion of the research were the following:

Video JVC HR-D521EM for the recording of the game, DVD Recorder LG HDMI 10801 Up conversion connected with a computer for the input of the samples for counting, Sony television Trinitron KV-2553 MT for the reproduction of the games, computer with 2GB RAM memory which was equipped with the video analyzing program Pinnacle Studio Plus 700 USB (10.5 Titanium Edition) and one external hard drive WD250 GB on which footages of the plays to be analyzed were stored.

The analyzed factors were: a) method of offense[1<sup>st</sup>-2<sup>nd</sup> fast breaks, 2<sup>nd</sup> fast break with Pick n’ Roll, Set Plays that ended with Pick n’ Roll, Set Plays that contained Pick n’ Roll, Set Plays without Pick n’ Roll, transitions] b) the type of Pick n’ Roll [simple, double high, pick n’ pop, Pick and Re-pick] c) the section of the court that the Pick n’ Roll was performed [high, elbow, side] d) the combination of players involved, e) the type of offense displayed, f) the player of attack, g) the section of the court that the shot was performed, h) the effectiveness of the attack [positive-negative] i) the productivity in points, the type of defense and the section of court it was performed in, the way Pick n’ Roll, and j) all the unique cases.

### **Statistical analysis**

For the statistical analysis the statistic package SPSS 13 was used. On the first level, control of homogeneity and independence (t-test  $\chi^2$ ) was performed, where the differences between the two teams were explored according to the parameters examinable. On the second level we transformed the Cluster Hierarchical analysis between the main variables using the Ward method, where the Euclidean area and degree of homogeneity is analyzed. We chose the Ward method because it fashions the process of choosing between two groups (Clusters). For all that statistical analyses that were performed the level of significance was define to  $p < 0,05$ .

## Results

The Crosstab Analysis had the following results: In a total of 1528 detected phases 215 were fast breaks, 1151 set plays and 162 transitions. In more details, were detected 171 1<sup>st</sup> fast breaks (11, 2%), 44 2<sup>nd</sup> fast breaks (2, 9%), 416 set plays that ended with Pick n' Roll (27, 2%), 72 set plays that included Pick n' Roll (4, 7%), 664 set plays without Pick n' Roll (43, 4%) and 164 transitions (10, 7%). These results show that in a total of 1528 detected offenses, 488 included Pick n' Roll (31,93%) while in a total of 1152 set plays, the percentage of using Pick n' Roll was 42,36%.

Chi Square analysis revealed statistically significant differences ( $\chi^2_{(6)}=26,177$ ,  $p<0,05$ ) regarding the type of offensive play between the Greek team and its opponents. The Greek team executed: 92 1<sup>st</sup> fast breaks (12,1%), 19 2<sup>nd</sup> fast breaks (2,5%), 227 set plays that ended with Pick n' Roll (29,9%), 46 set plays that included Pick n' Roll (6,1%), 315 set plays without Pick n' Roll (41,6%) and 59 transitions (7,7%). On the other hand the Greek opponents had: 79 1<sup>st</sup> fast breaks (10,2%), 25 2<sup>nd</sup> fast breaks (3,2%), 189 set plays that ended with Pick n' Roll (24,4%), 26 set plays that included Pick n' Roll (3,4%), 350 set plays without Pick n' Roll (45,2%) and 105 transitions (13,5%).

Statistically significant differences were observed ( $\chi^2_{(4)}=24,040$ ,  $p<0,05$ ) between the Greek team and its opponents according to the section of the court that the Pick n' Roll was performed. (Table 1.) As well, from a total number of 532 Pick n' Rolls the Greek team executed the 295 (55,5%) 5 of which were performed on the Side Right court area (1,7%), 6 on the Side Left court area (2%), 60 on the Elbow Right court area (20,3%), 61 on Elbow Left court area (20,7%) and 163 on the High court area (55,5%).

On the other hand the Greek opponents executed 237 Pick n' Rolls (44,5%) which 9 of them were performed on the Side Right court area (3,8%), 12 on the Side Left court area (5,1%), 61 on the Elbow Right court area (25,7%), 72 on the Elbow Left court area (30,4%) and 83 on the top of the key [ High] (35%). We observe that the Greek team showed a preference for the High court area in higher percentage respectively to its opponents (66,3% against 33,7%, respectively).

**Table 1.** Team of attack \* Court area that the Pick n' Roll was performed

				Court area that the Pick n' Roll was performed					Total
Team of attack	Greece	Opponent	N	Side Right	Side Left	Elbow Right	Elbow Left	High	
				1,7%	2%	20,3%	20,7%	55,5%	
Team of defense	Greece	Opponent	N	3,8%	5,1%	25,7%	30,4%	35%	
				2,6%	3,3%	22,7%	25%	46,2%	
Total			Count						

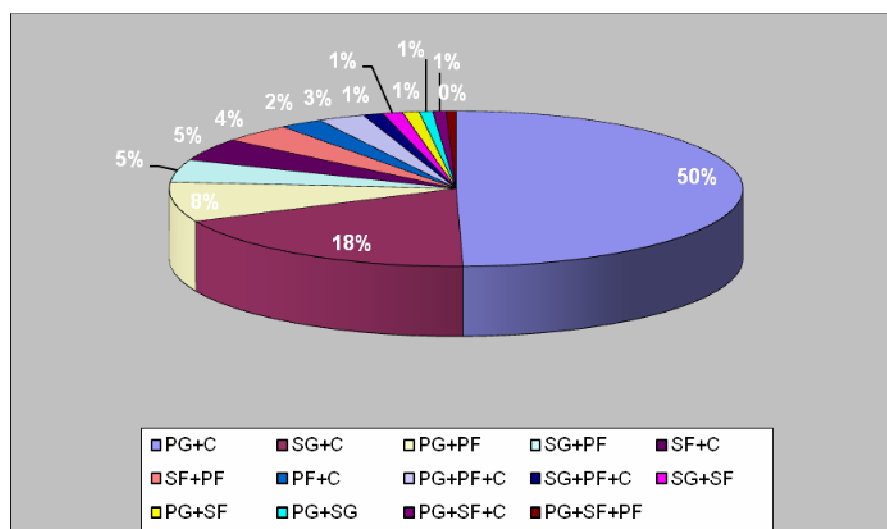
According to the Pick n' Roll form, statistically significant differences between Greece and its opponents were observed ( $\chi^2=0,649$ ,  $df=3$ ,  $p<0,05$ ), showing that the Greek team executed more than the double number of Double High (74,1%, against 25,9%), double number of pop outs (66,7% against 33,3%) and quadruple number of pick and re-picks (81,3% against 18,8%) respectively to its opponents average (Table 2.).

From the total of 295 Pick n' Roll of the Greek national team, 254 pertained to simple Pick n' Roll (86,1%), 20 to Double High (6,8%), 8 to Pop out (2,7%) and 13 to Pick and re-pick (4,4%), while the opposing teams from the total of 237 Pick n' Rolls they execute the 223 were simple (94,1%), 7 Double High (3%), 4 Pop out (1,7%) and 3 Pick and re-pick (1,3%).

**Table 2.** Team of attack \* Type of Pick n' Roll

			Type of Pick n' Roll				Total
			Simple	Double High	Pop out	Pick and re- pick	
Team of attack	Greece	N	86,1%	6,8%	2,7%	4,4%	55,4%
	Opponents	N	94,1%	3,0%	1,7%	1,3%	44,6%
Total		N	89,6%	5,0%	2,2%	3,0%	100,0%

Statistically significant differences were observed ( $\chi^2_{(13)}=88,729$ ,  $p<0,05$ ) as pertains the combination of players in the Pick n' Roll between the Greek team and its opponents.



**Figure 1. : Description of players combination in P/R**

Symbols explanation: PG=Point Guard, SG=Shooting guard, SF=Small Forward, F=Power Forward, C=Center

In a total of 532 Pick n' Rolls that were performed (Figure 1) the 264 pertain cooperation between Point Guard + Center (49,9%), 98 between Shooting Guard + Center (18,4%), 44 between Point Guard + Power Forward (8,3%), 25 between Shooting Guard + Power Forward (4,7%), 25 between Small Forward + Center (4,7%), 21 between Small Forward + Power Forward (3,9%), 13 between Power Forward + Center (2,4%), 14 between Point Guard + Power Forward + Center (2,6%), 6 between Shooting Guard + Small Forward (0,9%), 6 between Shooting Guard + Power Forward + Center (1,1%), 5 between Point Guard + Small Forward (0,9%), 4 between Point Guard + Shooting Guard (0,8%), 4 between Point Guard + Small Forward + Center (0,8%), 3 between Point Guard + Small Forward + Power Forward (0,6%).

In more detail,, the Greek team performed (Table 3.) 0 Pick n' Rolls between Point Guard+ Shooting Guard (0%), 0 between Point Guard + Small forward (,0%), 22 between Point Guard + Power Forward (7,5%), 180 between Point Guard + Center (61 %), 1 between Shooting Guard + Small Forward (0,3%), 10 between Shooting Guard + Power Forward (3,4%), 52 between Shooting Guard + Center (17,6%), 2 between Small Forward + Power Forward (0,7%), 5 between Small Forward + Center (1,7%), 3 between Power Forward + Center (1 %), 0 between Point Guard + Small Forward + Power Forward (,0%), 4 between Point Guard + Small Forward + Center (1,4%), 10 between Point Guard + Power Forward + Center (3,4%) and 6 between Shooting Guard + Power Forward + Center (2%).

Respectively the opposing teams which performed 4 Pick n' Rolls between Point Guard + Shooting Guard ( 1,7%), 5 between Point Guard + Small Forward ( 2,1%), 22 between Point Guard + Power Forward (9,3%), 84 between Point Guard + Center (35,8%), 5 between Shooting Guard + Small Forward ( 2,1%), 15 between Shooting Guard + Power Forward (6,3%), 46 between Shooting Guard + Center ( 19,4%), 19 between Small Forward + Power Forward ( 8 %), 20 between Small Forward + Center ( 8,4%), 10 between Power Forward + Center ( 4,2 %), 3 between Point Guard + Small Forward + Power Forward (1,3%), 0 between Point Guard + Small Forward + Center ( ,0%), 4 between Point Guard + Power Forward + Center ( 1,7%) and 0 between Shooting Guard + Power Forward + Center ( ,0%)

**Table 3. Players combination in P/R.**

Symbols explanation: PG=Point Guard, SG=Shooting guard, SF=Small Forward, PF=Power Forward, C=Center

Players Involved		Team of attack		Total
		Greece	Opponents	
PG+ SG	N	0,0%	1,7%	0,7%
PG+ SF	N	0,0%	2,1%	1,0%
PG+ PF	N	7,5%	9,3%	8,2%
PG+ C	N	61,0%	35,8%	49,6%
SG+ SF	N	0,3%	2,1%	1,1%
SG+ PF	N	3,4%	6,3%	4,6%
SG+ C	N	17,6%	19,4%	18,4%

SF+ PF	N	0,7%	8,0%	3,9%
SF+ C	N	1,7%	8,4%	4,6%
PF+ C	N	1,0%	4,2%	2,4%
PG+ SF+ PF	N	0,0%	1,3%	0,5%
PG+ SF+ C	N	1,4%	0,0%	0,7%
PG+ PF+ C	N	3,4%	1,7%	2,6%
SG + PF+ C	N	2,0%	0,0%	1,1%
Total	N	55,4%	44,6%	100,0%

The Greek team has performed more than double Pick n' Roll attacks with Point Guard + Center than its opponents (68, 2% against 31, 8% respectively), on the other hand the opponent teams have performed ten times more attacks with Small Forward + Power Forward (90, 5% against 9,5% respectively), quadruple number of attacks as well with Small Forward + Center as with Power Forward + Center respectively (80% against 20%).

Statistically significant differences were presented also ( $\chi^2_{(16)}=35,546$ ,  $p<0,05$ ) regarding the way of attack between the Greek team and its opponents as shown in Table 4. Particularly the Greek team after the Pick n' Roll attacked 26 times with ball handler's drive (9,6%), 35 times with split and pass to roller (12,9%), 52 times with split out and extra pass and shot (19,2%), 6 times with split and pass to pop out and 6 times with high low (2,2%), 15 times with Fake the Pick and drive (5,5%), 13 times with Fake the Pick and split out (4,8%) and 6 times with Fake the Pick split out and extra pass and shot (2,2%).

Respectively, the opponent teams after the Pick n' Roll performed their attacks 50 times with ball handler's drive (23,8%), 19 times with split and to roller (9%), 38 times with split out and extra pass and shot (18,1%), 4 times with Fake the Pick and drive (1,9%), 6 times with Fake the Pick and split out (2,9%) and finally only 1 time with Fake the Pick split out and extra pass and shot (0,5%).

As we observe the opponents of the Greek team performed over a double number of attacks with ball handler's drive (65,8% against 34,2% respectively). In contrast, the Greek team performed double number of attacks with split and pass to roller (64,8% against 35,2% respectively), devastating higher percentage of high-Low attacks after the pop out pass (100% against 0% respectively). We also observe, in the Greek team, much higher percentage of attacks with split out-extra pass and shot (57,8% against 42,2%), over than three times more attacks with Fake the pick and drive (78,9% against 21,1%), three times more of attacks with Fake the pick and split out (72,2% against 27,8%) and six times more attacks with Fake the pick and pass-pass-shot (85,7% against 14,3%).

As to the rest way of attack, after the Pick n' Roll move, no statistically significant differences were observed between the Greek and the opponents National teams.

**Table 4.** Way of attack \* team of attack.

Way of attack		Team of Attack		Total
		Greece	Opponent	
ball handler + shot	N	8,8%	8,5%	8,7%
ball handler + drive	N	9,6%	23,8%	15,8%
split and pass to roller	N	12,9%	9,0%	11,2%
split and pass at low post	N	2,9%	3,3%	3,1%
split out	N	15,1%	19%	16,8%
split + pass at weak side	N	8,1%	7,1%	7,7%
split + pass to pop out or flare	N	2,6%	1,4%	2,0%
split +pass to pop out + high-low	N	2,2%	0,0%	1,2%
split+extra pass-shot	N	19,2%	18,1%	18,7%
Fake the Pick +shot	N	1,8%	1,4%	1,6%
Fake the Pick +drive	N	5,5%	1,9%	3,9%
Fake the Pick +split and pass to roller	N	2,5%	2,3%	2,5%
Fake the Pick +split and pass at low post	N	0,7%	0,0%	0,4%
Fake the Pick +split and pass at weak side	N	0,7%	0,0%	0,4%
Fake the Pick +split and pass to pop out	N	0,0%	0,5%	0,2%
Fake the Pick + split out	Nt	4,8%	2,9%	3,7%
Fake the Pick +extra pass- shot	N	2,2%	0,5%	1,4%
Total	N	56,4%	43,6%	100,0%

Statistically significant differences between Greece and its opponents were presented in regards to the player who would perform the shot after the Pick n' Roll ( $\chi^2_{(4)}=31,439$ ,  $p<0,05$ ). As shown in Table 5. From a total of 382 offenses which were executed, 108 ended with Point Guard (28,3%), 75 ended with Shooting Guard

(19,6%), 47 ended with Small Forward (12,3%), 73 ended with Power Forward (19,1%) and 79 ended with Center (20,7%)

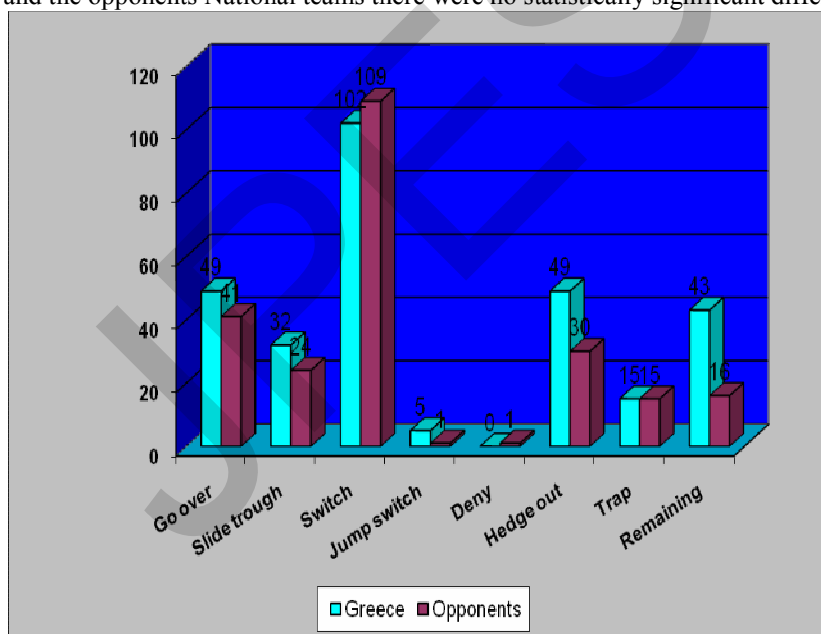
**Table 5.** Player of attack \* Team.

			Player of attack					Total
			Point Guard	Shooting Guard	Small forward	Power forward	Center	
Team in Offense	Greece	N	29,4%	18,2%	4,7%	22,4%	25,2%	56,0%
	Opponents	N	26,8%	21,4%	22,0%	14,9%	14,9%	44,0%
Total		N	28,3%	19,6%	12,3%	19,1%	20,7%	100,0%

Detailed, from the total of 214 offense were performed by the Greek team 63 of them were finished by Point Guards (29,4%), 39 by Shooting Guards (18,2%), 10 by Small Forwards (4,7%), 48 by Power Forwards (22,4%) and 54 by Centers (25,2%).

On the other hand the opponents team performed 168 offenses and the final shot was attempted 45 times by Point Guards (26,8%), 36 times by Shooting Guards (21,4%), 37 times by Small Forwards (22%), 25 times by Power Forwards (14,9%) and 25 times by Centers (14,9%). We observed that when Greek team was attacked with the Point Guard its percentages was much higher than its opponents (58,3% against 41,7%), oppositely the opponents were attacked with Small Forwards three times more respectively to Greek team average (78,7% against 21,3%).

The Greek team showed a preference to attack with the Power Forwards, over a double percentage respectively to opponent teams average (65,8% against 34,2%), as to attack with Center with similar percentage respectively to opponent teams average (68,4% against 31,6%). As regards to the attacks with Shooting Guards between the Greek and the opponents National teams there were no statistically significant differences observed.



**Figure 2. :** Way to defend Pick n' Roll

The Chi Square did not show statistically significant differences regarding the section of the court where the shot was performed ( $\chi^2_{(8)}=8,208$ ,  $p<0,05$ ). Nevertheless the Greek team's percentages from the Low Post area were over a double respectively to opponent teams (64,8% against 35,2%). Specifically the Greek team performed 70 shot from this area in comparison with the only 38 of its opponents. For the rest of the court sections the percentage laid at the same levels. Every team had a preference for 3 G section. In a total of 317 shots 87 of them were made from this section (27,4%) and the Greek team performed the 48 of them (55,2%)

As regards to the defensive confrontation of the Pick n' Roll statistically significant differences were observed between the Greek team and its opponents ( $\chi^2_{(8)}=16,552$ ,  $p<0,05$ ) (Figure 2.). From a total of 532 Pick n' Roll which were performed 90 of them were confronted with Go over the top (16,9%), 56 with Slide Through (10,5%), 211 with Switch (39,7%), 6 with Jump Switch (1,1%), 1 with Deny (0,2%), 79 with Hedge Out

(14,8%), 30 with Trap (percentage 5,6%) and 59 remaining on the own player in case of the fake action (11,1%).

Specifically the Greek team confronted their opponent's Pick n' Roll 49 times with Go Over (16,6%), 32 times with Slide Through (10,8%), 102 times with Switch (34,8%), 5 times with Jump Switch (1,7%), no one time with Deny (,0%), 49 times with Hedge Out (16,6%), 15 times with Trap (5,1%) and 43 times with remaining on the own player 14,6%).

In contrast, the opponents confronted the Greek Pick n' Roll 41 times with Go Over (17,3%), 24 times with Slide Through (10,1%), 109 times with Switch (46%), 1 time with Jump Switch (,4%), 1 time with Deny (,4%), 30 times with Hedge Out (12,7%), 15 times with Trap (6,3%) and with remaining on the own player 16 times (6,8%).

As pertain the way of defending the Pick n' Roll, the Greek team confronted the opposing Pick n' Roll with Hedge Out almost double the times more than its opponents (62% against 38%), with staying at the own player (in case of fake the Pick) three times more than its opponents (72,9% évavti 27,1% respectively), while the most used way was the Switch as well as for the Greek team as for the opponents (211 times in a total of 532).

No statistically significant differences were revealed as regard to all the special cases like "Push" which could increase the Pick n' Roll efficacy ( $\chi^2_{(1)} = 20,712$ ,  $p < 0,05$ ).

In a total of 295 Pick n' Roll which were performed by the Greek team only in 11 were with "Push" while in a total of 237 Pick n' Roll performed by its opponents only 12 were with "Push"

Statistically significant differences were revealed between the Greek team and its opponents as regard to the Group tactical defensive system in which the teams applied the Pick n' Roll move (Table 6) ( $\chi^2_{(4)} = 20,712$ ,  $p < 0,05$ ). In a total of 532 Pick n' Rolls 47 were performed against Zone defense (8,8%) 15 against Zone defense with traps (2,8%), 8 against match up Zone (1,5%), 454 against man to man defense (85,3%) and at last 8 against mixed defensive tactics (1,5%).

**Table 6. Team in attack \* Group defensive tactic.**

			Defensive Tactic					Total
			Zone defense	Zone defense with trap	Match Up Zone	Man-man	Mixed defense	
Team in attack	Greece	N	9,5%	5,1%	2,4%	80,7%	2,4%	55,4%
	Opponent	N	8,0%	0,0%	0,4%	216	0,4%	45,6%
Total		N	8,8%	2,8%	1,5%	85,3%	1,5%	100,0%

Most specifically, the Greek team applied the Pick n' Roll 28 times against Zone defense (9,5%), 15 times against Zone with traps (5,1%), 7 times against Match up Zone (2,4%), 238 times against man to man (80,7%) and 7 times against mixed defensive systems (2,4%).

Respectively the opponents teams applied the Pick n' Roll 19 times against Zone defense (8%), no one time against Zone with traps (0,0%), 1 time against Match up Zone (0,4%), 219 times against man to man (92,4%) and 1 time against mixed defensive systems (0,4%).

The above results confirm our main research suggestion, that there are statistically significant differences regarding the Pick n' Roll application in the teams offense between the Greek National team and its opponents.

These differences were performed according to the way of attack, the section of the court in which the Pick n' Roll was applied, the Pick n' Roll form, the players involved, the player of the final attempt and the defending way of the opponent Pick n' Roll.

In regards to the offense efficacy no statistically significant differences were revealed between the Greek team and its opponents ( $\chi^2_{(14)} = 13,747$ ,  $p = 0,469$ ).

In more detail, the Greek team from the Pick n' Roll gained 47/88 2points shot, 18/68 3points shot, 11 personal fouls, 21 fouls plus option of 2 free throws, 1 foul plus option of 3 free throws and 3 cases of 2points goal foul. On the other hand the following mistakes were made: lost 28 times the ball possession, by opponent stealing or pass cutting, made 7 offensive fouls, 1 time by the violation of 24" regulation, 4 times by violation of dribble regulation and 1 temporary out of lines.

Respectively, the opponents from the Pick n' Roll gained 26/65 2points shot, 27/64 3points shot, 13 personal fouls, 10 fouls plus option of 2 free throws, 4 cases of 2points goal foul, 1 foul plus option of 3 free throws and 2 cases of follow and goal. On the other hand the following mistakes were made: lost 24 times the ball possession, by opponent stealing or pass cutting, made 5 offensive fouls, 2 times by the violation of 24" regulation, 3 times by violation of dribble regulation and 1 temporary out of lines.

## **Discussion**

The purpose of this research was to indicate the different appearances of Pick n' Roll as well as the relation of its efficacy between the national team of Greece and its opponents teams according to all the factors that can involve this action.

The results indicated significant differences as to the style of offense between the Greek National team and its opponents. The percentage of the fast breaks was at the same levels (14,6 % for the Greek team and 13,4% for its opponents respectively). The above agree with the results of the previous research by Fotinakis, Karipidis & Taxildaris (2002), which show that the percentage of the fast breaks in respect to the total number of attacks varying close to 14%. As for the organized offenses displayed, the set plays offenses were the major part for both the Greek team and its opponents (77,6% against 73%). On the other hand the Greek team appeared to have much less percentages of attacks which were stopped at the transition and they didn't end in fast break or set play offense (7,7% against 13,5%). This fact shows the ability of the Greek team to apply an effective foul court press based on its peripheral players (Yannakis, 2006) and to break the opponents pressing.

In the organized Greek offenses, the percentage of set plays which included Pick n' Roll, irrespective of whether the last attack ends in it, was higher than its opponents (36% against 27,8%). The above shows that the Pick n' Roll move was a basic component of the Greek offense (Yannakis, 2006) and verifies G. Karl belief that in NBA as well as in Europe the percentage of pick n' Roll appearance in every offense is about 30-40%. Kruger gives even higher percentage saying that in NBA 75% of the offenses include some kind of Pick n' Roll. So it seems to be clear that the Greek national team tried to take advantage of the 1 to 1 situations which results from the mishmash created by Pick n' Rolls, targeting to the ability for a quick drive of the guards against the slower tall opponents (Karl, 2003), or to the strong and quick cut of the rollers towards the basket (Yannakis, 2006) or even to the increase of the players possibility to score with an open shot (Filipovski, 2005).

The above agree with the results of a previous research which showed that the 1 to 1 situation was the most used offensive act for all the players irrespectively of the offense to be chosen by the coaches (Garefis et al., 2006).

More specifically Remmert (2003) says: "The man-to-man defense is the basic and by far most utilized defensive strategy in elite basketball, and that set offense is more often played than a fast break (70% against 30%)."

In regard to the section of the court in which the Pick n' Roll was applied we notice that the Greek team as its opponents avoided the side area and did the majority of their offenses from the Elbow or High area. The reason for avoiding the specific area is that it offers to the ball handler the only option of attacking toward high post while the defenders deny the penetration from the base line and force the ball along the side line creating the danger of a trap or an undesirable out of bounds (Katsikaris, 2006).

Many coaches, including the famous Pat Riley with N. York Knicks, prefer to react to every Side Pick n' Roll with trap, irrespectively of the players involved in it (Ociepca, 2004).

In the section of the court where the Pick n' Roll is performed, the Greek team showed a preference for the High area, respectively than its opponents (55,5% against 35%). The Greek team with this way took advantage of the fact that when the ball is in the high position, there is no weak side, so it's very hard for the opposite teams help and recovery within the offensive triangle which is performed between the roller-cuter and the peripheral players in spot up position. In result that the drive and the probable split out pass for an open shot becomes most effective.

Tex Winter who was ex assistant coach with the Chicago Bulls, consultant till 2007 with LA. Lakers and introducer of triangle offense refers: "I'm fanatic of spacing. It's extremely difficult for the defense to help and recover, especially in cases of trap, while the offense have a good spacing, because in every way there will be at least one player in spot up position for an open shot, as offensive triangles are created at both sides of the half court" (Winter 2007). According to the form of the Pick n' Roll the Greek team performed over a double times more Double High, double times of pop outs quadruple times of Pick and re-pick.

It's obvious that with this strategy of attacking the Greek team tried to take advantage of the cooperation between its two tall players, (one of whom was excellent in dunking toward the basket, with roll or slip and the other one who was a great shooter after the pop out move) and the great Guards with increased ability to drive or shot Yannakis (2006).

The conclusions above are enforced by the results of the way the players were involved in the Pick n' Roll. The Greek team performed more than twice as many attacks with Point Guards + Centers than its opponents and over ten times fewer attacks with Small Forwards + Power Forwards. The Greek National team having guards who were great shooters with an increased ability in drive as well as big players good enough in screening and dunking towards the basket, showed a preference to pass the ball at the Low Post leaving its Guards in the perimeter for an open shot. It's worth mentioning that the Greek team performed from the Low post 70 shots while its opponents only 38.

As regards to the offense productivity while using Pick n' Roll the Greek team performed 227 set plays, Roll, with which it won 187 points. 207 out of 227 were simple Pick n' Roll and ended in 172 points while 20

were Double High that ended in 15 points. The coefficient of productivity (points/attempts) was 0,83 for the simple Pick n' Roll and 0,75 for the Double High. On the other hand its opponents performed 189 set plays with which it won 161 points. 182 were simple Pick n' Roll and ended in 157 points and 7 were Double High that ended in 4 points. The coefficient of productivity for the opponents was 0,86 for the simple and 0,57 for the Double High.

The results above agree with Remmert's results of a previous research in which he analyzed sixty high level basketball games and examined the Group tactical offensive behavior, says that coefficient productivity of the direct screens to the ball is 0,83 (points/attempts) or 1,08 (points/offenses) and for the multiple it is 1,06 and 1,27 respectively (Remmert, 2003)

Pertaining to the way defending the Pick n' Roll, for both the Greek team and its opponents the most used way was the Switch [102 times for the Greek team (34,8%) and 109 times for its opponents (46%)]

These results are higher but in agreement with Remmert's results, who mentions that the main and the most used confrontation of the direct screens on the ball is the switch with a percentage of 30, 8% .

It's obvious, that any time the Switch is used to confront the opponents Pick n' Roll mismatch is caused something that every team tries to take advantage of in two different ways. Firstly with hard dribble and drive from the ball handler or with an accurate pass to the Center who has locked his smaller defender post up for an easy shot from the paint. Under these circumstances questions arise from this choice.

The answer is that the switch on one hand, is the quickest option, with no uncovered player. On the other hand while the opponents are ready for an act like that, they are prepared to react with one of the following ways: Either by keeping the screener defender into the paint, (transforming the man to man defense to zone denying any drive and risking one long distance open shot) or with hard and strong defense against the Roller denying any direct pass to Low post or with rotation while the weak side player takes the responsibility to defend the roller. Del Harris who was the head coach for the Dallas Mavericks, Houston Rockets, Milwaukee Bucks and Los Angeles Lakers and now assistant coach for eight seasons in a row with Dallas Mavericks refers about the switch: "This method is the easiest and is utilized most often when equal-sized players are involved in the Pick n'Roll. However, late in the game, most NBA teams will use the switch with 4, or even all 5 men in order to prevent a quick easy shot, especially a 3-pointer. It is a good strategy when the possession clock is down to 7 seconds as well, any time in the game. The open shots beat you, especially the threes. Mismatches caused by switching are a far less dangerous situation to be in than giving up an open shot to a good player" (Harris, 2007).

As pertain the offense efficacy in regards with the court section in which the Pick n' Roll was applied we observe, that for the opponent teams the offense efficacy took positive sign only when the Pick n' Roll was performed at the Left Elbow area and oppositely took negative sign from the Right Elbow area. The Greek team offense efficacy was negative for both sections but from the left Elbow side the negative efficacy was reduced.

This happens because the attack was performed towards the High post (avoiding the side line area) thus the ball handler from the Left Elbow made the drive and shot with the same right hand having defender's pressure on his left side protecting the ball with his body. But from the Right Elbow area, as the major part of the players use the right hand for shooting, the ball handler who performed his drive by the left hand was forced to bring the ball on the right hand for a shot where the pressure was maximized. Karl (2003) says that "in NBA we want to put the right-hander Guard to the left side of the court and drive toward the basket with his good right hand. We aim the opposite for the left-hander. Examining the relation between the attack efficacy and the players involved in Pick n' Roll we found that the best balance of efficacy appeared in the cooperation of Shooting Guard + Center or Point Guard + Center for both the Greek team and its opponents. The same results were revealed as regards to the relation between the attack productivity and the players involved in Pick n' Roll. The Greek attack gained 168 points from the cooperation of Guard + Center and its opponents only 129 points.

It's obvious that the Guards, having much better ball handling, more explosive actions and an increased ability in driving towards the basket are able to come out of screens for a shot or drive easier than the Small Forwards can do. On the other hand Centers are more effective in the screen application with a great ability for post up and scoring from a short distance thus they are more effective in the inside game than the Power Forwards. The opponents of the Greek National Team having great Small and Power Forwards preferred to use this combination in Pick n' Roll targeting to maximize the efficacy of their attack. It's worth mentioning that they performed over ten times more attacks with Small Forward + Power Forward, over quadruple times more attacks with Small Forward + Center and over five times more attacks using the combination of Power Forward + Center. As regard to the results in relation between winners and losers on one hand and the players of final attempts after the Pick n' Roll, on the other, they agree with the results of Garefis et al. previous research (2006) in which it showed that in 1 on 1 situations, the winners tended to use point guards, shooting guards and small forwards in their attacks more than the losers who tended to use Power Forwards.

Regarding to the way of attack, the balance of the Greek offense efficacy taking positive sign when the attack was performed after the Pick/Fake the pick, with the ball handler's drive or with the ball handler's split and pass to the roller. On the other hand the balance of the opponents efficacy taking positive sign when the attack was performed with the ball handler's drive or with ball handler's split and pass to low post. On the

contrary, after any split out, either with extra pass or not, the negative efficacy was superior in value to the positive in every way. It's obvious that the offense efficacy was increased after the Pick n' Roll when the ball goes from the peripheral inside to the paint with drive or pass and not with one "in out pass". These results are not in agreement with Mavridis (2003) previous results, who mentions that the effectiveness of the control offense is statistically more important, when it occurs after the return of a pass from the central to the guard and forward positions for both winners and losers.

Remmert (2003) stated that the offensive players should cut and penetrate or use fake actions as often as they can to engage their defenders attention and keep the defending team busy making any offensive action easier. From this analysis has been found out that when the player of the final attempt was the Center the percentage of positive efficacy were higher not only for the Greek team but for its opponents as well. But the percentage of the Greek offense efficacy was higher than its opponents (58,3% against 41,7% respectively). The same results appeared as regard to the offense productivity in which the Greek team gained 49 point by attacking with Center against only 28 of its opponents.

These results agree with Garefis et al. (2006) previous research results in which he concluded that the Power Forwards and Centers in 1 to 1 situation very often tend to play facing the basket. The Centers play in modern basketball is not at all one-dimensional. They not only use the post-up game but they start the 1/3 of the 1to 1 situations facing the basket. Obviously, every coach must pay attention to work with their Centers not only in the short distance shot but in long distance, too. Remmert (2003) mentions the importance of daily practice in long distance shooting capabilities and focus on outside shooting (pop or flare) out of the direct screen.

All the teams pay attention to passing the ball at the low post area increasing their offense efficacy. Torbert (2004) mentions that the attack in the Low post gives the offenders a high percentage of scoring plus the option of free throws plus the foul damage for the defenders. Norm Stewart coach at the Missouri College mentions that "There are three sections of the court. We prefer to play in the low post area close to the basket. The game can be won in this area, the table bounding, the rebounds, scoring from short distance, the free throws that's the game"(Norm, 2002) . Mexas et al. (2005) in their study analyzed 50 games and mentioned that the 3 sec area appears the higher percentage of scoring than any other area of the court.

The results above agree with Tsamourtzis (2006) previous research results in which he analyzed the effectiveness of various types of shot in a sample of 100 games of the Greek Championship, finding that the Low post area in relation to all the other sections of the court is the one from which the winners perform many shots with better percentage than the losers. Ortega et al. (2006) came to the same conclusion when he analyzed a sample which consisted of 184 male players with an average age of  $15.6 \pm 0.2$  years from 16 teams in 24 games from the men's under-16 finals of the Championship of Andalusia (Spain). For this particular area Mikes, (1987); Tavares and Gomes, (2003) mention that the area near the basket is the area with the best percentage of scoring.

The importance of the shot area in relation to its efficacy is showed by the Correlation analysis which performed ( $p = -0,209(**)$ ). It's obvious that the increase of the shot distance and the shot efficacy are inversely proportional amounts. This fact is confirmed by the results of Miller & Barlett's, research (1996) in which they mention that the basic factor that influences the shot is the distance.

### **Conclusion**

To sum it up, we must emphasize the fact that there's no other similar research regarding the "Pick n' Roll" in the international bibliography, so as you can see, our conclusions may be considered arbitrary and must re-examine them again while the sample of this study was limited. On the other hand the quality and the level of the teams which participated were so high that it counterbalanced the sample's limitation.

As regard to our research suggestions we observe a partial or total verification of them. More specifically, we notice that our main suggestion regarding the differences in Pick n' Roll application between the Greek team and its opponents was verified. The percentage of the set play offenses, which contained Pick n' Roll, was higher for the Greek team than its opponents, regardless of the kind of the final attempt. The Greek team showed a preference in the top of the key area and with the combination of Point Guard + Center in contrast to its opponents who preferred the combination of Small Forward + Power Forward

The Greek National team passed the ball inside the paint more successfully than its opponents. They also performed double times more shots from the Low Post using the "split and pass to roller" as their main offensive option than the other teams did in contrast to, its opponents who used the option of "ball handler's drive and shot". As regards to the offense efficacy, statistically significant differences were observed in part indexes, something which partially verifies our second research suggestion. More precisely the balance between the positive and negative efficacy took positive sign any time that the Greek team attacked with simple Pick n' Roll from the Left Elbow Area with "ball handler's drive and pass to roller" for a short distance shot from the Low post, having the Center as a final attempt player. Respectively its opponent teams, presented higher offense efficacy when they performed their attack with "ball handler's drive and pass to the roller" for a shot from 2points Left Forward area. As pertain the way defending the Pick n' Roll, for both the Greek team and its opponent teams, the results revealed that the most unsafe and unsuccessful way was the "Switch" because it

maximized the opponents offense efficacy. Nevertheless, we must admit that there's no ideal defense in Pick n' Roll, because everything depends on the quality of the players involved in it, either the offensive players or the defenders. Every time you have to adjust your attack according to what the defense gives you and your defense according to the quality of the offense you have to confront. There's always a risk that becomes smaller and smaller if you have analyzed how exactly the opponents act and if your players remain focused on what exactly they have to do (Ivanovic, 2007). Statistically significant differences were revealed as regard to the offense productivity proving in this way that our third main research suggestion. More specifically the Greek team gained 187 points from Pick n' Roll while its opponents 161 points only. The offense productivity from the Low post area was much higher for the Greek team while the area of 3G was more productive for the opponent teams.

In this study, we tried to set up and substantiate coaches' choices and offensive or defensive philosophies regarding the Pick n' Roll move, in various cases, which they have not ever been analyzed until now in order to achieve a scientific background. In the future, the researchers must focus on other elements of basketball applied group tactic as well in order to give the possibility to every coach to place his basketball coaching firstly on tangible, measured scientific data and secondly on coaching philosophies and subjective opinions.

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